



A
DICTIONARY
OF
PRACTICAL MEDICINE:

COMPRISING
GENERAL PATHOLOGY,
THE NATURE AND TREATMENT OF DISEASES, MORBID STRUCTURES,
AND THE DISORDERS ESPECIALLY INCIDENTAL TO CLIMATES, TO THE SEX,
AND TO THE DIFFERENT EPOCHS OF LIFE;

WITH
NUMEROUS PRESCRIPTIONS FOR THE MEDICINES RECOMMENDED,
A CLASSIFICATION OF DISEASES ACCORDING TO PATHOLOGICAL PRIN-
CIPLES, A COPIOUS BIBLIOGRAPHY, WITH REFERENCES;

AND AN
Appendix of Approved Formulæ:

THE WHOLE FORMING A LIBRARY OF PATHOLOGY AND PRACTICAL MEDICINE,
AND A DIGEST OF MEDICAL LITERATURE.

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CONTENTS.

| | |
|--|---|
| <p>EYE—Exanthematous Ophthalmia - 1009</p> <p style="padding-left: 20px;">Inflammation of the Sclerotic Coat, &c. - - - - - 1010</p> <p style="padding-left: 20px;">Rheumatic and Arthritic Ophthalmia - - - - - 1012</p> <p style="padding-left: 20px;">Inflammation of the Cornea - - - - - 1013</p> <p style="padding-left: 40px;">Anterior Chamber and Interior Parts - - - - - 1015</p> <p style="padding-left: 40px;">Iris—Idiopathic</p> <p style="padding-left: 60px;">Iris—Symptoms and Causes - - - - - 1016</p> <p style="padding-left: 60px;">Sympathetic Iritis—Diagnosis - - - - - 1018</p> <p style="padding-left: 20px;">Inflammation of the Internal Tunics - - - - - 1019</p> <p style="padding-left: 20px;">Phlegmonoid Inflammation of the Ball—Treatment, &c. - - - - - 1022</p> <p style="padding-left: 20px;">Bibliography and References - - - - - 1023</p> <p>FAINTING—Pathology, Causes, &c. - - - - - 1024</p> <p style="padding-left: 20px;">Diagnosis—Treatment - - - - - 1027</p> <p>FEIGNING DISEASE - - - - - 1029</p> <p>FEVER—Pathology of - - - - - 1038</p> <p style="padding-left: 20px;">Symptomatic—Diagnosis - - - - - 1044</p> <p style="padding-left: 20px;">Types and Forms—Terminations, &c. - - - - - 1049</p> <p style="padding-left: 20px;">Appearances after Death - - - - - 1050</p> <p style="padding-left: 20px;">Prognosis - - - - - 1052</p> <p style="padding-left: 20px;">View of the Ancients respecting - - - - - 1054</p> <p style="padding-left: 40px;">Moderns - - - - - 1056</p> <p style="padding-left: 20px;">Pathology of - - - - - 1061</p> <p style="padding-left: 20px;">General Treatment - - - - - 1069</p> <p style="padding-left: 20px;">Bibliography and References - - - - - 1084</p> <p>FEVER, INTERMITTENT — Simple</p> <p style="padding-left: 20px;">Ague - - - - - 1085</p> <p style="padding-left: 40px;">Complicated Ague - - - - - 1087</p> <p style="padding-left: 40px;">Masked Ague - - - - - 1088</p> <p style="padding-left: 20px;">Appearances—Prognosis—Causes, &c. - - - - - 1089</p> <p style="padding-left: 20px;">Treatment - - - - - 1093</p> <p style="padding-left: 20px;">Bibliography and References - - - - - 1099</p> <p style="padding-left: 40px;">REMITTENT—Causes—Description - - - - - 1100</p> <p style="padding-left: 60px;">Diagnosis - - - - - 1104</p> <p style="padding-left: 60px;">Treatment - - - - - 1106</p> <p style="padding-left: 60px;">Chronic - - - - - 1113</p> <p style="padding-left: 40px;">REMITTENT, OF CHILDREN—Remote Causes - - - - - 1115</p> <p style="padding-left: 60px;">Description—Termination, &c. - - - - - 1117</p> <p style="padding-left: 60px;">Treatment - - - - - 1118</p> <p style="padding-left: 20px;">Bibliography and References - - - - - 1121</p> <p style="padding-left: 40px;">HECTIC—Description - - - - - 1123</p> <p style="padding-left: 20px;">Causes and Varieties, &c. - - - - - 1124</p> <p style="padding-left: 20px;">Pathology and Treatment - - - - - 1126</p> <p style="padding-left: 40px;">CONTINUED—Pathology - - - - - 1129</p> <p style="padding-left: 20px;">Prognostic Symptoms - - - - - 1132</p> | <p>FEVER, EPHEMERAL - - - - - 1136</p> <p style="padding-left: 20px;">INFLAMMATORY—Forms - - - - - 1137</p> <p style="padding-left: 40px;">Terminations and Prognosis - - - - - 1141</p> <p style="padding-left: 40px;">Treatment - - - - - 1145</p> <p style="padding-left: 20px;">BILIO-GASTRIC — Description, &c. - - - - - 1150</p> <p style="padding-left: 40px;">Causes and Treatment - - - - - 1153</p> <p style="padding-left: 20px;">MUCOUS—Symptoms—Diagnosis - - - - - 1156</p> <p style="padding-left: 20px;">SWEATING—History, &c. - - - - - 1158</p> <p style="padding-left: 20px;">SYNCHOID—Description of - - - - - 1162</p> <p style="padding-left: 20px;">TYPHOID - - - - - 1168</p> <p style="padding-left: 40px;">Complications - - - - - 1170</p> <p style="padding-left: 20px;">Exanthematous Eruptions - - - - - 1172</p> <p style="padding-left: 20px;">WITH PUTRO-ADYNAMIA - - - - - 1173</p> <p style="padding-left: 20px;">SPOTTED, of New England - - - - - 1176</p> <p style="padding-left: 20px;">TYPHUS—Pathology - - - - - 1181</p> <p style="padding-left: 20px;">TYPHOID—Prognosis—Terminations, &c. - - - - - 1185</p> <p style="padding-left: 40px;">TYPHOID and TYPHUS—In the United States - - - - - 1191</p> <p style="padding-left: 60px;">Treatment, &c. - - - - - 1202</p> <p style="padding-left: 60px;">of Putro-Adynamic - - - - - 1211</p> <p style="padding-left: 60px;">Certain Medicines in - - - - - 1215</p> <p style="padding-left: 60px;">Bibliography and References - - - - - 1228</p> <p>FIBROUS TISSUE—Morbid States of - - - - - 1231</p> <p>FLATULENCY—Causes, &c. - - - - - 1235</p> <p>FŒTUS—Diseases of the—Causes, &c. - - - - - 1238</p> <p>FUNGOID DISEASE — Description, &c. - - - - - 1243</p> <p>FURUNCULAR ERUPTIONS — Description, &c. - - - - - 1250</p> <p style="padding-left: 20px;">Causes—Treatment - - - - - 1252</p> <p style="padding-left: 20px;">Bibliography and References - - - - - 1253</p> <p>GALL BLADDER AND DUCTS - - - - - 1</p> <p style="padding-left: 20px;">Inaction of - - - - - 2</p> <p style="padding-left: 20px;">Diagnosis - - - - - 5</p> <p style="padding-left: 20px;">Inflammation of - - - - - 6</p> <p style="padding-left: 20px;">Treatment, &c. - - - - - 8</p> <p>GANGRENE—Pathology of - - - - - 9</p> <p style="padding-left: 20px;">From Inflammation - - - - - 10</p> <p style="padding-left: 20px;">From Debility, &c. - - - - - 12</p> <p style="padding-left: 20px;">From various Physical Agents - - - - - 15</p> <p style="padding-left: 20px;">Constitutional Symptoms - - - - - 19</p> <p style="padding-left: 20px;">Prognosis - - - - - 21</p> <p style="padding-left: 20px;">Treatment - - - - - 22</p> <p style="padding-left: 20px;">Bibliography and References - - - - - 28</p> <p>GASTRO-ENTERIC DISEASE — Pathology - - - - - 29</p> <p>GLANDERS—Description of - - - - - 34</p> <p style="padding-left: 20px;">Treatment - - - - - 36</p> <p>GOUT—Acute—History of - - - - - 37</p> |
|--|---|

CONTENTS.

| | | | | | |
|-----------------------------|-------|-----|------------------------------|-------|-----|
| GOUT—Chronic and Irregular | - - | 40 | HÆMORRHAGE INTO THE BLAD- | | |
| Diagnosis and Prognosis | - - | 44 | DER—Pathology, &c. | - - - | 125 |
| Causes, &c. | - - - | 46 | FROM THE UTE- | | |
| Treatment of Acute | - - - | 52 | RUS—Causes, &c. | - - - | 127 |
| Chronic | - - - | 61 | Puerperal Uterine | - - - | 130 |
| Irregular | - - - | 63 | Treatment | - - - | 133 |
| Bibliography and References | - - | 70 | Bibliography and References | - - | 141 |
| HÆMORRHAGE—Pathology | - - | 72 | INTO SEROUS, OR | | |
| Changes in the Seats of | - - | 74 | SHUT CAVITIES | - - - | 142 |
| Remote Causes | - - - | 77 | INTO THE ARE- | | |
| Prognosis and Division of | - - | 79 | OLAR TISSUE | - - - | 143 |
| Treatment | - - - | 80 | HÆMORRHOIDS—General Descrip- | | |
| Bibliography, &c. | - - - | 86 | tion | - - - | 145 |
| FROM THE SKIN— | | | Consequences, &c. | - - - | 146 |
| Causes | - - - | 87 | Diagnosis and Prognosis | - - - | 150 |
| FROM THE NOSE— | | | Treatment | - - - | 152 |
| Treatment of | - - - | 91 | Bibliography, &c. | - - - | 158 |
| Bibliography, &c. | - - - | 93 | HAIR, ALTERATIONS OF—General | | |
| FROM THE MOUTH | | | Pathology | - - - | 159 |
| AND THROAT | - - - | 94 | LOSS OF—Causes | - - - | 163 |
| FROM THE RES- | | | Trichomatose | - - - | 164 |
| PIRATORY ORGANS—History of, | | | Treatment | - - - | 166 |
| &c. | - - - | 95 | HEADACHE—Pathology | - - - | 167 |
| Bibliography | - - - | 107 | Nervous—Congestive | - - - | 169 |
| FROM THE STOM- | | | Dyspeptic and Bilious | - - - | 171 |
| ACH—Causes, &c. | - - - | 112 | Rheumatic, &c. | - - - | 173 |
| Treatment | - - - | 115 | Treatment | - - - | 175 |
| FROM THE INTES- | | | Remedies recommended | - - - | 178 |
| TINES—Pathology, &c. | - - - | 118 | Bibliography and References | - - | 181 |
| Causes—Treatment, &c. | - - - | 120 | HEARING, IMPAIRED OR LOST— | | |
| FROM THE URI- | | | Pathology of | - - - | 182 |
| NARY ORGANS—Causes | - - - | 122 | Causes of | - - - | 183 |

77. *γ. Local Treatment.*—When the external inflammation is considerable, or approaches the characters of common ophthalmia, and is attended by symptomatic disturbance of the system, *local bleedings*, and the rest of the antiphlogistic regimen, should be prescribed, particularly at an early stage of the complaint. The intolerance of light is no indication of the propriety of local depletion; for it is generally aggravated by the practice, and relieved by tonics and a light and nutritious diet. Mr. MACKENZIE advises, particularly in chronic cases, and in the seat of the vascular fasciculi, *scarifications* of the eyes and lids. *Fomentations* with warm water, or a warm decoction of poppies and chamomile flowers, are of service. Applications as warm as they can be borne are more beneficial than those that are cold, which are not suited to scrofulous persons. The steam of warm water, to which camphor and opium have been added, is also useful; or a few drops of an opiate may be allowed to run between the lids. After the painfully acute symptoms have been removed, and the bowels freely evacuated, a solution of from two to six grains of lunar caustic in an ounce of water, dropped between the lids, is very serviceable in diminishing the irritability of the organ, and in healing slight ulcers. A stronger solution may be applied by a pencil to the ulcerated part, and the red precipitate ointment to the lids at night. In older children, *blisters* behind the ears or on the nucha are serviceable; but they ought to be removed after five or six hours. If thickening and opacity of the cornea be going on, the free administration of calomel or hydrarg. cum creta, either alone or with JAMES'S or DOVER'S powder, is advised by Mr. LAWRENCE, until the mouth is affected. When incrustations form in the vicinity of the organ, tepid abluion, and the mild ointments, at first alone, and afterward with the oxyde of zinc, when the state of the complaint and of the system, or the previous treatment, will admit of drying them up, should be employed. In cases attended by ulceration of the cornea, it will often be necessary to touch the part, every second or third day, with lunar caustic, as directed by SCARPA. The application of *bella-donna* to the eye or its vicinity, to cause dilatation of the pupil, will occasionally be serviceable in preventing either adhesion or prolapse of the iris. *Relapses* should be guarded against by a careful examination of the eye from time to time, by attention to the digestive organs, and by an invigorating regimen.

78. F. EXANTHEMATOUS OPHTHALMIA. SYN.—*Exanthematous Conjunctivitis*—Inflammation of the Conjunctiva occurring during Exanthematous Fevers.—Inflammation of the conjunctiva is frequently observed in the course of, or consequent upon, (a) *Smallpox*; (b) *Measles*; (c) *Scarlatina*; and (d) *Erysipelas*.—As to each of these associations, and the treatment most appropriate to it, I proceed to offer a few observations.

79. a. *Variolous Ophthalmia*—*Conjunctivitis Variolosa*.—a. *Smallpox* causes inflammation of the lids, of the lachrymal sac, and of the eye, during the active stages of the eruption; and it gives rise to inflammation of the eye, and of the conjunctiva of the lids, and of the nasal duct, after the eruption has subsided. When variolous pustules form only on the external

surface of the *eyelids*, or the ciliary margins, the affection is comparatively mild. In confluent or severe cases of smallpox the lids are much swollen and closed, and the oozing of matter usually agglutinates them, and confines the secretions poured out in the conjunctiva. As the disease subsides, the lids are opened, and the eye appears to have been but little affected. They are, however, often somewhat injured. The pustules on the ciliary margins partially destroy the cilia, and render the margins uneven and liable to inflammation from slight causes.

80. β. When the inflammation extends to the globe during the *eruptive stage* of smallpox, constituting true or *primary variolous ophthalmia*, and occasioning pustules on the conjunctiva or cornea, the affection is very severe, and is often rapidly followed by suppuration or sloughing of the latter, and by the more serious consequences of these changes. As the eyes are closed, and cannot easily be examined, it is important to ascertain by symptoms the existence of inflammation of the globe. This is indicated by a sense of dryness, stiffness, or of sand in the eye, with pain in the ball, increased on moving it, aggravated by light, although the lids are closed, and attended by augmented lachrymal discharge as the affection proceeds.

81. γ. A form of the disease may occur two, three, or four weeks after the desiccation of the smallpox pustules (*secondary variolous ophthalmia*). It is generally more mild in this case; but one or more pustular elevations may form on the cornea, with redness of the sclerotic, lachrymation, pain, and intolerance of light. It does not terminate by sloughing, but suppuration and ulceration often supervene, leaving more or less opacity, or a permanent white cicatrix, limited to a small extent, as the surrounding haziness of the cornea is removed, vision being partially or completely restored. In scrofulous constitutions, it assumes the characters described above, and degenerates into the chronic form.

82. δ. *The Treatment of these forms of affection* must be conducted conformably with the principles already explained. When the pustules are confined to the lids, they may be touched, in an early stage, with the lunar caustic, in order to arrest their progress, as advised by M. VELPEAU; or they may be opened, and the matter evacuated, the incrustations afterward formed being removed by emollient applications and frequent tepid abluion. In the two other states, the danger to the organ is much greater, particularly in the form attending the eruption. But, as the affection of the eyes is most common in the confluent and adynamic states of smallpox, it cannot be advantageously combated by such free depletions as some surgical writers have advised. In many cases, local blood-letting and free purging may be of great service; but, when the constitutional powers are much depressed, no plan of ascertaining the state of the globe should be neglected, and a somewhat similar treatment of the pustules to that just advised should be practised as early as possible, to prevent their development, and be followed by such astringent applications, alternated with soothing means, as the circumstances of the case may

suggest. In the *secondary variolous ophthalmia*, *local depletions*, active *purgatives*, or even an *emetic*, resorted to at any early stage, are more appropriate and beneficial. But the subsequent use of *astringents* will generally be required. In all the forms, *tonics* will afterward be necessary; and the patient should be kept in a perfectly dark, but well-aired, apartment during the course of the disease.

83. *b. Morbillous Ophthalmia—Conjunctivitis morbillosa.*—Inflammation of the conjunctiva is a common attendant on *measles*. It is generally of a catarrhal kind, and may be either *primary*—preceding or accompanying the eruption; or *secondary*—remaining after, or following the disease at a short interval. Sometimes pustules form on the cornea, and pass into ulceration. There are generally much pain and intolerance of light in this variety; but it seldom assumes a severe, although often a chronic, character. The *Treatment* consists of *local depletion* in the more acute cases; followed by active *purgatives*, *diaphoretics*, *blisters* behind the ears or on the nucha, *tepid washes*, and the protection of the organ from light.

84. *c. Scarlatinous Ophthalmia—Conjunctivitis Scarlatina.*—Inflammation of the conjunctiva may occur in the course of scarlet fever, in similar modes to those noticed in respect of the other exanthems; and although not so common in scarlet fever as in measles, it is sometimes more severe in the former than in the latter, ulceration occasionally supervening to a greater or less extent. This is, however, often the consequence of neglect. The *Treatment* is, in every respect, the same as that directed for the morbillous form.

85. *d. Erysipelatous Ophthalmia—Conjunctivitis Erysipelatosa.*—The inflammation of the conjunctiva attending erysipelas is preceded by redness and great swelling of the lids. In rarer instances, it follows upon an erysipelatous affection of the throat and posterior nares; and it is, in cases of severe affection of the face or scalp, often attended by much inflammation of, and effusion into, the cellular tissue surrounding the globe. It is most common in persons past middle age, or of a cachectic habit of body. The conjunctiva of the lids and ball is more or less injected; that of the latter often rises in soft yellowish red vesicles around the cornea, and occasionally it is affected in nearly a similar manner to the *pustular variety* already described. In some cases the redness partakes of a yellow tint, and in others of a livid or brownish hue. The eye has a watery appearance, and the cornea is often hazy from the fluid collected on its surface, but it is seldom otherwise affected. As the disease subsides, the copious lachrymation generally present is diminished, but the organ regains its natural state very slowly. The constitutional disturbance is very severe in this variety. (See ERYSIPELAS.) The *Treatment* consists of local depletions, which, however, should be cautiously practised; of emetics, purgatives, blisters, diaphoretics; and of opening the vesicles that form with the point of a lancet. In an advanced stage, tonics, and other remedies suited to particular cases, are requisite.

II. INFLAMMATION OF THE PROPER EXTERNAL TISSUES OF THE EYE.—A. COMMON INFLAMMATION OF THE EXTERNAL TUNICS.—SYN.

Ophthalmitis externa Idiopathica, BEER; *Ophthalmia Sclerotica*, VETCH; *External Inflammation of the Globe*, LAWRENCE; *Catarrho-rheumatic Ophthalmia*, MACKENZIE—*Phlegmonoid Sclerolitis*.—*a. Acute*—*b. Sub-acute*—and *c. Chronic*.

86. *CHARACT.*—*Redness of the external proper coats of the eye, with pain, intolerance of light, increased lachrymal discharge, and febrile disturbance.*

87. *a. Symptoms and Course.*—Simple or common inflammation of the eyes of persons otherwise healthy may originate in the conjunctiva or sclerotica; but, when severe in either, it generally extends to the other, and also to the cornea. It frequently also appears almost coetaneously in both coats; and it presents every grade of severity. The external redness usually begins on the anterior part of the globe, forming a zone around the cornea, and arises from small vessels advancing from the posterior part of the sclerotica to the part adjoining the cornea. As the inflammation proceeds, the redness becomes uniformly diffused in the sclerotica, and is of a pink, rose-red, or almost violet hue. In the more severe cases, the distended vessels are seen under the conjunctiva, occupying the whole surface of the sclerotica, and generally running in nearly straight lines from behind forward. When the inflammation is seated in both this coat and the conjunctiva, the difference as to tint and situation between the vessels of each is very remarkable. The patient complains of stiffness and dryness of the eye, is intolerant of light, and feels a burning or aching pain, with a sense of tension, or pressure, or of dust in the eye (*Xerophthalmia*, or *Oph. Sicca*). The pain usually increases, and extends to the orbit and corresponding side of the head; the intolerance of light becomes greater, and the pupil is contracted. As the disease advances, the conjunctiva participates, its vessels are distended, and the cornea becomes dull, but not, at first, nebulous or opaque. In more violent cases, this membrane acquires a bright red colour, or even passes into a state of chemosis. At the same time, pain and fever increase, the inflammation extends to the lids, and the cornea assumes a grayish hue. The dryness characterizing the commencement of the complaint gives place to lachrymation, which is increased on opening the eye to the light, or moving it.

88. *b. The Effects* that present themselves, as the disease proceeds in an *acute form*, are observed chiefly in the cornea, and occasionally also in the iris. The former becomes either vascular, and red or reddish brown, or grayish, and subsequently white, cloudy, and yellow, as if pus were infiltrated into its substance. It often afterward *ulcerates*, the ulcerations sometimes extending into the anterior chamber, and causing the usual consequences of this change. *Adhesion*, also, of the iris to the cornea may occur either with or without ulceration of the latter, but always with more or less *opacity*. When the cornea presents only the first stage of change, is grayish, cloudy, or white, ulceration may be prevented, or arrested if it have begun, by suitable treatment, and, if it have not occurred, the cornea may regain its natural appearance.

89. *c.* The sub-acute and chronic states of the complaint are characterized by less severity, but longer duration, of the symptoms described above, particularly those depending upon the affection of the sclerotica. They often follow the neglected or inactively treated acute disease. In these cases, the conjunctiva of the eyelids is somewhat irritated or inflamed. The eyes are painful on exertion, or exposure to much light, and the lachrymal discharge is thereby increased. In the more severe and protracted attacks, the transparency of the cornea and vision are more or less impaired. Although the chronic often thus supervenes upon the acute complaint, owing to neglect, to errors in diet, to indulgences in spirituous liquors, or to exertion of the organ when the inflammation has been only partially subdued, yet, in persons of a cachectic habit of body, it may be the primary affection. In delicate or unsound constitutions, also, the complaint very frequently assumes a sub-acute or chronic form from the commencement, and continues long, until an increase of certain of the symptoms alarm the patient.

90. *d. Diagnosis.*—Inflammation of the external proper tunics of the eye is distinguished from that of the conjunctiva by the redness commencing in the sclerotica, in the vicinity of the cornea, and extending backward in the direction of the orbit, and only consecutively to the conjunctiva; inflammation of this membrane usually following an opposite course, and extending to the sclerotica only when it advances to the cornea. The discharge being lachrymal, and not mucous or purulent; the severity of the pain and the intolerance of light; the situation and direction of the injected and enlarged vessels; the peculiar tint presented by the inflamed sclerotica; and the more frequent affection of the cornea, are circumstances sufficiently diagnostic of the complaint. The natural state of the pupil and iris, and the unimpaired vision, distinguish it from internal ophthalmia.

91. *e. The Prognosis* entirely depends upon the degree in which the cornea is affected. As long as this part is unchanged, or if the lesion of it be but slight, a favourable opinion may be given. The case becomes serious when the complaint occasions chemosis, and a grayish or whitish alteration of the cornea; and still more so if matter be formed in it. In this case, ulceration will be inevitable; and the effect of ulceration or opacity upon the sight will depend upon their extent and situation in reference to the pupil.

92. *f. Treatment.*—*a. In the acute form.*—The predisposing and exciting causes (§ 4, 5, 6) to which the complaint may be referred should be completely removed. The organ should next be protected from exertion, and from light and air. If one only be affected, the other should not be used, nor exposed to injurious influences. These measures, in slight cases, may be sufficient to cure the complaint, and have succeeded when farther treatment could not be resorted to. But others should be employed, particularly in severe cases; and still more so in such as are violent, or are attended by affection of the cornea. Even in mild attacks, active treatment should not be withheld, as, even in these, neglect may be followed by se-

rious results as respects the sight. *Blood-letting*, general or local, can rarely be dispensed with. The former ought always to be preferred when the complaint is attended by febrile disturbance, and should be carried sufficiently far to impress the circulation. It will be most advantageous if practised in the manner advised in the article *Blood* (§ 64), and followed by the means there recommended (§ 65). In milder cases, or in more delicate persons, or after venesection, *local bleeding*, either by cupping on the nape of the neck, or behind the ears, or on the temples, may be directed; or leeches applied on the two latter situations. Mr. LAWRENCE advises them to be placed upon the lids, to the number of from twelve to twenty-four in the case of an adult. *Scarification* of the conjunctiva is disapproved by him, although recommended by some writers. WELLESER advises it when chemosis is present. In this form of ophthalmia the modes of depletion now mentioned are the most appropriate. *Cupping* in many cases may supersede venesection; as a sufficient quantity of blood may be taken in this way from either of the situations just named for the exigencies of almost any case.

93. *Purgatives*, low diet, *refrigerants*, when the febrile excitement is considerable, and *diaphoretics* are the next most important measures. *Calomel* and JAMES'S powder, either with or without *opium*, at bedtime; cathartics in the morning, and mild diaphoretics and diluents during the day, are generally appropriate. If vascular excitement continue notwithstanding, an antimonial *emetic* should be prescribed; or it may follow the depletion and precede the exhibition of a full dose of calomel and purgatives. In the more violent or protracted cases, *tartar emetic* may be given, so as to keep up a continued nausea. When costiveness is present, or purgatives act insufficiently, drastic or terebinthinate *enemata* are requisite. If the free use of calomel, after the depletions, affect the mouth, the occurrence should be viewed as favourable; complete recovery being thereby accelerated, and the ill effects of the disease on the cornea prevented. *Colchicum* has been noticed in this complaint by several writers, and is serviceable either in the form of powder with calomel, or in aperient mixtures. It is most efficacious after the bowels have been fully evacuated. When the inflammation has been nearly removed by the preceding remedies, blisters on the nucha or behind the ears, and warm *pediluvia* at bedtime, are useful in preventing a relapse or the passage of the complaint into a chronic state.

94. *The local means*, in addition to bleeding, consist chiefly of *cold*, *warm*, *emollient*, and *astriking* applications. The choice of these is a matter of some difficulty; but when the disease is only commencing, or when the patient complains of great heat or burning in the eye, and experiences relief from *cold epithems*, then any of the various modes of applying cold may be adopted. If, however, the complaint be advanced, or if cold occasions an aching or chilling sensation, warm applications or *fomentations* should be preferred. It has been doubted by Mr. LAWRENCE and some other writers whether such as are *emollient* and *narcotic* be at all superior to those which are more simple.

The former have been recommended principally by Continental, the latter by British, physicians. The doubt has arisen chiefly from a physiological notion long entertained, although the grounds on which it is founded admit of a ready refutation. An intimate observation of phenomena—the only legitimate experience—should alone decide the question. Although my experience in this matter has necessarily been limited of late years, yet have I seen enough even of this complaint to convince me that fomentations with emollient and anodyne substances are superior to those which are simple, which consist only of warmth conjoined with humidity. Therefore, when the pain and intolerance of light are great, the disease somewhat advanced, or even established, warm emollient and anodyne applications ought to be preferred. SCARPA directs mallows boiled in fresh milk as a fomentation; or emollient and anodyne vapours, to be conveyed to the eye through an inverted funnel. Mr. MACKENZIE directs *opiate frictions* of the forehead and temples, and the eye to be kept under the influence of *belladonna*. Fomentations, with a decoction of poppy-heads and chamomile flowers, or marsh-mallows; and the vapour of warm water, to which camphor and the watery extract of opium have been added, are generally beneficial in the circumstances just stated. Dr. SMITH remarks that, when the pain was not alleviated by blood-letting or by fomentations, much and lasting relief was procured by exposing the eye, twice or thrice daily, to the steam arising from the following mixture brought to a boiling heat. It is now eighteen years since a nearly similar combination, but with much more opium and camphor than is here ordered, was prescribed by me with great relief in a case of the disease.

No. 219.—R Mist. Camphoræ ʒij.; Tinct. Opii ʒss.; Liq. Ammon. Acet. ʒij.; Aq. Rosar. ʒiv. M.

95. *β.* The *sub-acute* and *chronic states*, especially the former, sometimes require either *venæsection* or full *cupping*, particularly in young or robust persons. In most instances, *leeches* should be applied to the vicinity of the eye; and sometimes either they or cupping ought to be repeated oftener than once. *Purgatives* should be freely employed; and, if the tongue be loaded, and the evacuations offensive, an *emetic* should precede them. Great attention ought to be paid to the *diet*; and animal food must be taken only in small quantity or nearly relinquished. *Counter-irritation* is generally beneficial; and either open blisters, pustulation by means of tartar emetic, setons, or issues, should be directed to the nape of the neck, behind the ears, or to the temples. During treatment, the bowels should be freely opened by stomachic purgatives, particularly if the tongue be loaded, and the discharges morbid; and the regimen as well as the diet rigorously restricted. If the above treatment have been actively employed, the complaint will be removed without the necessity of resorting to *astringent* or *stimulating applications*. But, in neglected cases, they are sometimes very beneficial, especially if the affection of the conjunctiva be considered, after the above measures have been appropriately prescribed, and when the complaint is far advanced, or in a chronic state. The *vinum opii*, dropped into

the eye, was recommended by Mr. WARE, and is suited chiefly to chronic cases. The liquid laudanum of SYDENHAM (F. 729), or preparations similar to it, may also be applied. The collyrium praised by CONRADI, and which consists of one grain of bichloride of mercury dissolved in six ounces of rose-water, with the addition of a drachm of mucilage of quince-seeds and half a drachm or a drachm of SYDENHAM'S laudanum, is often of service. Several other applications, some of them much more astringent than the above, have been recommended, but they are undeserving of particular notice. The astringent ointments and solutions found so beneficial in the treatment of conjunctivitis (§ 16, 50), may also be employed in the chronic states of this complaint, particularly under the circumstances just specified.

96. *B. RHEUMATIC, CATARRHO-RHEUMATIC, AND ARTHRITIC OPHTHALMIA.*—SYN. *Ophth. Rheumatica et Arthritica.*—*Sclerotitis Rheumatica et Arthritica.*—*Inflammation of the External proper Tunics in Rheumatic and Gouty Constitutions.*

97. *a.* The *Rheumatic* modification of ophthalmia.—*Sclerotitis Rheumatica*, or *Atmosphærica* of MACKENZIE—is seated in the external proper tunics of the eye, as in the common, or phlegmonoid, variety just described. The conjunctiva is only slightly affected; but the inflammation sometimes extends to the *iris*, or *cornea*, or to both, but generally in a slight degree. It is commonly *caused* by cold, or currents of air striking the eyes of persons of a rheumatic diathesis. It is not a common affection, and seldom arises from metastasis.

98. *b. Symptoms and Course.*—A stinging or tearing pain is complained of in the eye, increased by heat and by a warm bed, and extending to the orbit and adjoining parts of the head and face. The sclerotic is of a rose-red, and shines through the conjunctiva, which is more injected than usual. There is an increased flow of tears, aggravated by changes of temperature. The pain subsequently becomes more dull and aching, extends, with greater severity, to the neighbouring parts, and lachrymation is augmented. The intolerance of light, which was only slight, is afterward felt only in a strong light. Dulness or haziness of the cornea is frequently observed, but is seldom followed by any serious change. Sometimes *phlyctenula* appear in the conjunctiva oculi and cornea, but they do not often pass into ulceration. The biliary and intestinal functions are more or less disordered, and febrile disturbance is commonly present. The *severity* and *duration* of an attack vary very much. Slight cases soon subside; but severe attacks may give rise to *iritis*, which is, however, rarely acute, unless the disease be neglected, when it may go on to effusion of coagulable lymph. Rheumatic scleritis is not attended by affection of the lids, nor by chemosis: it does not give rise to suppuration, and rarely to ulceration, the ulcers being small or peculiar, and healing readily; and it sometimes lapses into a very chronic, slight, or recurring form.

99. *c.* The *Catarrho-rheumatic* ophthalmia of some writers does not differ materially from the common or phlegmonoid inflammation of the proper external tunics (§ 86), being seated

in the sclerotica and conjunctiva. It is usually caused by cold and atmospheric changes, and in the rheumatic diathesis very nearly approaches, or merges into, the rheumatic form; the only difference being in the greater affection of the conjunctiva, and in the consequent manifestations of certain catarrhal symptoms.

100. *d. Arthritic Ophthalmia—Scleritis Arthritica.*—*Arthritic external Oph.*—or inflammation of the external proper coats occurring in the gouty habit, is oftener attended by *iritis* than the rheumatic variety; but *iritis* is frequently observed in gouty persons without *scleritis*. Sometimes gouty inflammation of the sclerotica is accompanied with an *erysipelatous form of conjunctivitis*, which BEER has seen to follow the suppression of gout in the feet by cold. The progress of this modification of external ophthalmia, in its early course, is similar to the rheumatic, when it is confined chiefly to the sclerotica; but when the conjunctiva is also affected, it hardly differs from the *erysipelatous variety* already described (§ 85). When the external proper tunics are the parts attacked by the gouty affection, pain of the eyeball is very acute, and darts in the course of the facial nerves, and is usually preceded by a pricking sensation. A flow of acrid tears takes place. The sclerotica around the cornea becomes of a rose-red colour, which is less vivid towards the circumference of the globe; and does not extend to the cornea, but leaves immediately around it, as a pathognomic symptom, a narrow bluish-white ring. The conjunctiva oculi soon partakes in the redness and increased vascularity, and is subsequently congested and varicose, the bright redness being changed to a dirty gray or violet colour. Arthritic ophthalmia runs a shorter or longer course; is milder in dry weather and in summer than in wet weather and in winter; and is aggravated by, or accompanied with, derangements of the digestive organs. It is generally associated with *iritis*, but arthritic *iritis* may exist without the external proper tunics being materially affected. (See *Arthritic Iritis*, § 134.)

101. *e. The prognosis in rheumatic ophthalmia* is favourable, unless phlyctenæ have formed and occasioned small ulcers, or *iritis* have supervened. But in young or healthy persons these ulcers seldom leave permanent specks or cicatrices behind them. *Arthritic ophthalmia* is generally a more serious complaint than the rheumatic; and if it be attended with *iritis*, the association is much more dangerous to vision. It is also frequently accompanied with affection of the internal parts.

102. *f. Treatment.*—*a. In rheumatic ophthalmia*, general blood-letting is rarely necessary, but local bleedings are often serviceable. *Calomel* conjoined with *camphor*, JAMES'S powder, and *opium*, at bedtime, and stomachic purgatives in the morning, assisted by *terebinthinate enemata*, are very beneficial in this variety. *Colchicum* is often of use, in conjunction with aperients and alkaline or magnesian carbonates, but it should not be given in the very large doses mentioned by some surgical writers. Its effects ought always to be carefully watched. After the bowels have been freely evacuated, the *linctura colchici composita*, or a combination of the powder and camphor, should be prefer-

red, particularly in delicate or aged persons. Warm applications and *fomentations* are most appropriate in this variety; and the steam of boiling water, containing camphor and tincture of opium, generally affords relief. *Diaphoretics* and warm *pediluvia* are also useful. If *iritis* has come on, *calomel*, in the combinations just stated, is especially indicated. If the mouth be affected by it, the good effects will be greater and more permanent.

103. Besides the above remedies, others may be employed in *chronic* or obstinate cases, as the compound decoction of guaiacum, or the decoction of bark, with the compound tincture of colchicum; quinine, with or without the powder of colchicum; FOWLER'S arsenical solution; PLUMMER'S pill and aperients; antimony, or ipecacuanha with camphor and opium; vinous or spirituous preparations of opium dropped into the eye; frictions in the vicinity of the eye with opium or belladonna, or with both, to alleviate pain and dilate the pupil; and counter-irritation, by blisters or the tartar emetic ointment, behind the ears or on the temples. If phlyctenulæ form, and run into small ulcers, *astringent and stimulating applications* will be necessary. In cases presenting much biliary or gastric disorder, an *emetic* will be useful; and, under any circumstances, change of air, regulated diet, attention to the biliary and intestinal functions, and the repose or moderate exercise of the organ, will be of essential service.

104. *β. The treatment of arthritic ophthalmia* does not materially differ from that recommended in the rheumatic form. Warm stomachic purgatives, with full doses of the alkaline carbonates, and the compound tincture of colchicum; mustard pediluvia; blisters behind the ears; and dry warmth applied to the eye; and anodynes rubbed upon the temples and eyebrows, are more particularly indicated in this variety. If *iritis* supervene, the means directed hereafter in *Arthritic Iritis* must be resorted to.

[The various preparations of *iodine* will be found particularly efficacious in this form of ophthalmia, especially the iodide of mercury and potass, the latter to be given in doses of five grains, three times daily, in sirup of sarsaparilla, or the decoction of yellow dock, or the bitter-sweet. The corrosive sublimate, in doses of the sixteenth of a grain, three times daily, with the compound decoction of bark, will often be attended with beneficial effects, and even effect a permanent cure.]

105. *C. INFLAMMATION OF THE CORNEA.*—*SYN. Corneitis Ceratitis, JUENGEN; Keratitis, ROSAS.*—*Corneitis* may be either *acute* or *chronic*, *primary* or *consecutive*. Inflammation may commence in the cornea, and be confined to it, or extend to the sclerotica and conjunctiva, and sometimes to the iris, or it may begin in either of these tunics, and advance to the cornea. *Corneitis* often comes on, in this latter form, in most of the varieties of ophthalmia which have been considered; and presents either the *acute*, *sub-acute*, or *chronic* states, especially the latter. The *primary form* of *corneitis*, therefore, remains to be noticed. It is much less common than the *consecutive*, and is most frequently caused, especially its *acute* or *scvere* states, by external injuries, and by foreign bod-

ies, or acrid substance brought in contact with the cornea.

106. *a. Acute Corneitis* may be of various degrees of severity in different persons. In some, there is but little local uneasiness beyond irritation on motion; while in others, of a full habit, or who are laboriously occupied, exposed to heat, or addicted to intoxicating liquors, the inflammation is most intense, and rapidly extends to the sclerotica and whole anterior chamber, with *hypopyon*. The more severe states usually commence with a pink zone in the sclerotica, around the cornea, which loses its transparency, and becomes minutely injected with delicate-coloured vessels, particularly at its circumference, and dull, turbid, or cloudy. If the inflammation be excited by a foreign body, ulceration takes place around it. If the disease be not soon arrested, the pink zone assumes a deeper tint, and extends farther in the sclerotica; the cornea is rendered more opaque, and suppurates; and the chambers of the aqueous humour are involved. When the cornea is penetrated either by ulceration or suppuration, the aqueous humour escapes, the iris and cornea coming in contact. When the wound in the cornea is small, it unites by adhesion, and the aqueous humour is soon reproduced; but when it is large, prolapsus of the iris often results.

107. *b. Sub-acute and chronic Corneitis* are common in young persons of a fair complexion and delicate constitution. The cornea loses its transparency, presents a dull gray colour, or becomes hazy, nebulous, or nearly opaque; the opacity commencing at the circumference, and gradually, but unequally extending. The nebulous and opaque spots are sometimes yellowish, as if matter were formed; and the surface loses its polish, and seems rough. The circumference of the cornea is minutely injected with a multitude of very fine vessels, which impart to it a reddish-brown tint, and occasionally elevate it somewhat. The conjunctiva often retains its natural paleness, but the sclerotica is minutely injected, particularly around the cornea. As the brownish-red tint of the circumference of the part increases, the opacity in its centre becomes greater, and vision more affected. There is generally much intolerance of light, notwithstanding the diminished transparency of the cornea, owing to affection of the sclerotica. A *partial form of corneitis*, which is generally of very long duration, is sometimes met with. Inflammation commences in one or two spots at the circumference of the cornea, with pain of the eye and nebulousity, others being affected in succession. Redness is first observed in the sclerotica, in one or two points; and minute vessels extend from these into the cloudy spots in the cornea, more or less of which may become thus affected, or entirely opaque.

108. Although the severe and *acute* grades of corneitis often run into suppuration or ulceration, the *slighter* or more *chronic* states do not terminate in this manner, excepting in sub-acute cases, where partial or circumscribed points of suppuration may occur. The more severe grades are attended by much pain in the eye, temples, and forehead, with tension of the organ, white tongue, and febrile disturbance, particularly at an early stage; and they often

pass into the *slighter* and *chronic* states; but the latter also occur primarily. Chronic corneitis presents much less febrile disorder than the acute, and often continues for several months, or remits. The inflammation sometimes extends to the iris, occasioning adhesion of its margin to the capsule of the lens.

109. *c. Scrofulous Corneitis—Corneitis scrofulosa.*—Inflammation of the cornea in scrofulous habits has been minutely described by Dr. FROBER and Mr. MACKENZIE; but its local characters do not differ from those of the sub-acute and chronic forms noticed above (§ 107, 108), excepting that it is more obstinate, and more liable to return. It is sometimes unattended by redness of the sclerotica, and the pain is not considerable. It is most common about the period of puberty, and is occasionally connected with amenorrhœ in the female, and with swollen lymphatic glands. In the more obstinate cases, increased secretion of the aqueous humour, and consequent enlargement of the anterior chamber, occasionally supervene.

[*Diagnosis.*—The distinctive characteristic of corneitis is, opacity of the membrane, from enlargement of the vessels, and interstitial deposition. At first there is a hazy appearance of the cornea, causing dulness of vision; then a gradual loss of transparency, and general cloudiness, with increasing imperfection of sight, objects appearing as if seen through a cloud or mist. And this cloudiness may, as stated by COPLAND, be general or partial. The cornea resembles a piece of ground glass, and the opacity may be so great as entirely to conceal the iris and pupil. The other appearances in the external vessels of the eye have been sufficiently pointed out.]

Prognosis.—This affection may be promptly cured by proper treatment; the interstitial deposit becomes absorbed, and the sight, consequently, restored. We sometimes, however, find the iris to assume a darker hue after recovery, giving to the eye a somewhat duller hue than natural. If the treatment is not sufficiently prompt and energetic, the cornea loses its transparency, and becomes changed in various degrees, from leucoma to slight nebula. The iris is dull and dark-coloured, the pupil adherent, and there may be opacity in the opening.]

110. *d. Treatment.*—*a. Acute corneitis* requires active depletory and other antiphlogistic measures. *Cupping* behind the ears or on the temples is always necessary. *Purgatives*, and afterward *calomel* with JAMES'S powder, and occasionally with *opium*, until the mouth is affected, are beneficial, especially if the iris be inflamed. In the more obstinate and *chronic* cases, cupping, or the application of a number of leeches to the vicinity of the eye, should be repeated oftener than once, and be followed by open *blisters*, *setons*, or issues. Mr. LAWRENCE advises issues to be inserted in the temples. *Astringent* and stimulating applications, to remove the opacity, are generally injurious. Warm *fomentations* are more serviceable, particularly with emollient and anodyne substances. *Emetics*, if the digestive organs be loaded; and *diaphoretics*, assisted by warm pediluvia, if the skin be dry and fever present, are also useful. *β.* The *scrofulous variety*, especially its more chronic states, is benefited most by sarsapa-

rilla, sulphate of quinine, decoction of bark with liquor potassæ, the compound myrrh mixture, the iodide of potassium, and by small doses of the bichloride of mercury in tincture of bark. As this variety often continues many months, perseverance in the use of these means, and changes from the one to the other, a dry, warm air, and change of air, with attention to the state of the digestive organs, and a carefully regulated diet, are most requisite.

[The influence of mercury in checking the inflammation and restoring the transparency of the part is often strikingly manifested, and, after suitable depletory measures, should never be neglected; and especially is this article indicated where the iris participates in the affection. In feeble constitutions, even local depletion may not be borne well; here tonics, as iron, quinine, and the different preparations of iodine, as the iodide of iron, are the articles on which most dependance is to be placed. A nutritious diet of animal food will often prove advantageous, especially in the scrofulous variety.]

III. INFLAMMATION OF THE INTERNAL PARTS OF THE EYE. SYN.—*Internal Ophthalmia, Ophthalmitis Interna*, Auct. var.

111. DEFIN.—*Inflammation of one or more of the internal tissues of the eye, occurring either primarily, or consecutively of external disease, and attended by impaired vision, and frequently by constitutional disorder.*

112. In diseases of the internal eye, *artificial dilatation of the pupil* is necessary, both to the investigation of their nature and extent, and to their treatment. Mr. LAWRENCE has given a learned account of the agents by which dilatation may be accomplished. Various narcotic vegetables possess this power, but *belladonna* in the highest degree. The tincture, extract, decoction, infusion, or powder of this plant may be employed for this purpose, either internally, or dropped into the eye, or rubbed on the brow or temple. *Hyoscyamus* is the next powerful substance. An aqueous solution of the extracts of either may be rubbed or placed upon the eyelids, or parts in the vicinity, and washed off after remaining for about an hour; or it may be dropped into the eye, when a speedy and certain effect is desired.

i. INFLAMMATION OF THE ANTERIOR CHAMBER.

SYN.—*Inflammation of the Capsule of the Aqueous Humour, WARDROP; Aquo-Capsulitis, MACKENZIE; Kerato-iritis, ROSAS; Inflammation of the Anterior Chamber, LAWRENCE.*

113. CHARACT.—*Diffused muddiness, or mottled appearance of the cornea, dimness of vision, fulness and tension of the eye, dulness of the iris, slightly contracted pupil, headache, white tongue, and fever.*

114. Inflammation of the membrane of the aqueous humour is often *consequent* upon the varieties of ophthalmia already described; but it is also a *primary* disease, and is most common in this form among children. It cannot be considered, even when primary, to be confined to the anterior chamber, or to this membrane. The posterior chamber, the cornea, and iris evidently are also affected, more or less. External inflammation involving the cornea may extend to the anterior chamber and to the iris; or inflammation may commence in

the latter, and spread over this cavity to the cornea, and either adhesion of the iris to the cornea or hypopyon be produced. Primary inflammation of this membrane presents the usual phenomena of inflamed serous surfaces, viz., effusion of albuminous or coagulating lymph, or of a serous fluid, and very rarely of pus, the first of these sometimes becoming organized into morbid adhesions.

115. *A. Symptoms.*—The anterior chamber is cloudy, the iris becomes dull and dark, its surface assumes a reddish-brown tinge, the reddish tint being most evident in light eyes, and the pupil is somewhat contracted. The cornea loses its transparency, becomes nebulous or mottled, sometimes with an ulcer in its surface. There is but little external redness, excepting a pink zone around the cornea. An effusion of whitish or yellowish matter takes place in the anterior chamber, and the patient complains of pain and aching in the eye and forehead, of fulness or tightness in the organ, and of intolerance of light, especially early in the complaint; these symptoms subsiding at more advanced periods. Its progress in children is not rapid. Mr. WARDROP considers the opacity to be seated in the internal surface of the cornea, and that it arises from a number of round specks, which give a mottled appearance to this part, particularly in adults. He also believes the effusion into the chamber, which has been generally considered pus, to be albuminous, and similar to that which causes adhesions, but not coagulable.*

116. *B. Hypopyon*—or the presence of a yellowish matter in the anterior chamber, resembling, and usually called, *pus*, and attending or consequent upon inflammation—accompanies the affection now under consideration. But it more frequently supervenes, in the advanced course of inflammation of the external coats, from the bursting of an abscess in the cornea. It may also occur from iritis, particularly if an abscess of this part burst into the anterior chamber. Inflammation, however, of the membrane of this chamber is common to all these affections in a consecutive or associated form. When matter is effused behind as well as before the iris, it constitutes *empygesis oculi*, or suppuration of the eye. Various forms and divisions of hypopyon have been devised by BEER, RICHTER, BENEDICT, and JUENGEN, but they do not deserve notice, as they lead not to any practical result, and as this is not a peculiar disease, but the result of inflammatory action consecutively or primarily affecting the mem-

* [Dr. HAYS gives the following case of inflammation of the membrane of the aqueous humour:

"ELIZABETH WILLIAMS, a coloured woman, aged twenty, applied at the Pennsylvania Eye Infirmary, April 6, 1826. Her sight had been growing dim for several days, and she suffered slight pain in her eye. On the most minute examination, no change from a healthy state could be perceived, except, perhaps, an extremely faint dulness, situated at the posterior part of the cornea, the cornea itself being evidently unaffected. After some days a small spot became evident, and was shortly followed by two others, differing, both in situation and appearance, from the opacities produced from inflammation of the cornea. They were deep-seated, and evidently produced by the effusion of lymph on the inner surface of the cornea, giving it the appearance of being mottled with white. The margins of these spots were well defined, and the lamina of lymph so thin as not to produce perfect opacity. These spots remained permanent."—(Notes to Lawrence on the Eye, p. 307, 308.)

† [*Eiter-auge* of the Germans; from *uro*, under, and *ruoy*, pus.]

brane of the chamber and tissues surrounding it. Whether the matter in hypopyon be pus or an albuminous fluid, it seems to sink to the bottom of the aqueous humour; but in some instances it appears as if heaped up or in lumps, and in this case a minute admixture of blood sometimes is seen in it.

117. *C. Treatment.*—*a. Inflammation of the anterior chamber* is readily controlled by local bleedings, purgatives, and calomel, with JAMES'S powder, given twice or thrice a day. Mr. WARDROP has strongly advised puncture of the cornea, to evacuate the aqueous humour, in this and some other affections attended by inflammation of the membrane secreting this humour, after suitable treatment has been employed; and MACGREGOR, MUELLER, LANGENBECK, and BENEDICT speak favourably of it, as a measure calculated to prevent rupture of the cornea in purulent ophthalmia. Mr. LAWRENCE, who takes a candid view of the matter, thus remarks: "I have tried it in some instances, but with so little benefit that I have not been induced to persist in the practice; and I have been the less inclined to do so in severe inflammations, because the ordinary antiphlogistic treatment enables us to control them."

118. *b. Hypopyon*, being an attendant rather than a termination of inflammation beginning in, or extending to, the anterior chamber, requires the antiphlogistic treatment recommended in the acute forms of ophthalmia. The only question is, whether or not the cornea should be punctured to evacuate the matter collected behind it. Puncture or incision has been advised for this purpose by WARE, RICHTER, BENEDICT, LANGENBECK, and WARDROP. BEER at one time directed it, but afterward reprobated it. Dr. MONTEATH and Mr. MACKENZIE recommend its performance in every case in which the chambers are completely filled, as they consider absorption in such not to be depended upon, and dread the bursting and destruction of the eye. SCARPA and LAWRENCE, on the contrary, prefer active antiphlogistic treatment, as they consider that the operation aggravates the inflammation, and that when the inflammation is removed by judicious and energetic means, the effusion will be rapidly absorbed. In this opinion I entirely concur.

ii. INFLAMMATION OF THE IRIS. SYN.—*Iritis*, SCHMIDT.

119. CHARACTER.—*Fine vessels running in radii to the edge of the cornea; dark discoloration of the iris; contraction, irregularity, and immobility of the pupil; effusion of coagulable lymph into the pupil and posterior chamber, occasionally also into the anterior, causing adhesions of the iris to the capsule of the lens, with dimness of sight, sometimes almost amounting to blindness, pain in the eye, and nocturnal pain about the orbit.*

120. This affection was not known until it was ably described by SCHMIDT of Vienna. It may be consecutive of the diseases already noticed; but it often occurs in a primary form, and then generally assumes more or less of the characters of adhesive inflammation, the danger occasioned by it to the organ arising chiefly from this circumstance; for, if neglected or injudiciously treated, the pupil may become completely and irremediably obliterated by effusion of coagulable lymph. Some degree of inflammation of the sclerotica, and of the ante-

rior hemisphere of the crystalline capsule, often extending to the choroid and retina, generally accompanies this disease; but the iris is the focus of morbid action, and the situation of the chief lesions. The primary states of the complaint commence in the pupillary edge of the iris, spread to the rest of the iris, to the capsule of the lens, and, perhaps, to the choroid and retina. The attendant inflammation of the sclerotica may be sympathetic or otherwise related to it. *Iritis* has been divided into the *idiopathic*, or that occurring primarily in persons of a healthy constitution; and the *sympathetic*, or that affecting those of an arthritic diathesis, or supervening in the course of syphilitic cachexia.

121. *Causes.*—*Primary Iritis* occurs most frequently in persons of an unsound constitution—the gouty, rheumatic, and cachectic; and hence it presents certain modifications hereafter to be noticed. It rarely occurs in young and healthy persons, although it may supervene in them, upon the other varieties of ophthalmia. It is excited by the common causes of inflammation of this organ (§ 5), especially by over exertion, and employment of sight on minute or bright objects; by external injuries or operations on the eye; and by exposure to cold, wet, and atmospheric vicissitudes. These last are the common exciting causes in persons imbued with the syphilitic cachexia, and in those of a rheumatic and gouty diathesis. I do not believe that the use of mercury will cause the complaint, if it be given so as to affect the mouth.

122. A. IDIOPATHIC IRITIS.—*a. Symptoms and Course.*—*Iritis* presents various grades of severity and periods of duration. It may hence be mild or severe; acute, sub-acute, or chronic. I shall adopt Mr. MACKENZIE'S division of iritis into three grades.—*a. In the first degree* the vascularity of the sclerotica is barely perceptible, and exists only in one or more points, and chiefly behind the upper lid. The ring of the iris next the pupil is slightly discoloured; the pupil is not materially contracted, but is somewhat irregular, without its usual clean and sharp edge, and is hazy; and the motions of the iris are limited and slow. Vision is confused and slightly obscured. There is little or no pain, or aversion from light. This state of iritis may exist for many weeks, and yet be completely removed by suitable treatment.

123. *β.* The second degree, or that with evident external inflammation of the eye, is much more frequent than the foregoing. A zone of vascularity is observed in the sclerotica around the cornea, the vessels sinking through the sclerotica, and not advancing into the cornea. The iris, particularly its inner or smaller rings, is discoloured, either from injection of its vessels or the effusion of lymph; and its anterior surface, instead of being smooth and shining, appears dull, puckered, and swollen, especially near the pupillary opening, where it is retracted towards the lens. The pupil is contracted, irregular, motionless, and filled with coagulable lymph, which generally appears like half-boiled white of egg. Epiphora and intolerance of light are considerable, and vision becomes greatly impaired. The pain in the eye is constant, and attended by pain in the orbit and forehead, particularly at night, and by the usual symptoms of inflammatory fever.

124. *γ*. The *third degree* of iritis presents the following characters: The eye externally is much more inflamed than in the foregoing grades; the redness of the conjunctiva being sometimes so great as to mask for a time the red zone of the sclerótica. Both the smaller and larger rings of the iris are discoloured; the anterior surface being swollen, puckered, and bolstered forward so as to approach the cornea, excepting its pupillary edge, which is retracted towards the lens. Red vessels and spots of blood are sometimes seen on the iris, but more frequently in the lymph occupying the very contracted pupil. One or more minute elevations, of a yellowish colour, which are in some cases specks of effused lymph, in others small abscesses, appear on the surface of the iris; and pus discharged from these abscesses, with lymph, blood, and serum, sometimes occupy the anterior chamber. The cornea becomes hazy and turbid, and occasionally dotted with minute brownish spots. There are at first great intolerance of light and lachrymation, and subsequently vision is completely, and generally permanently, lost. Flashes of light in the eye are frequently perceived by the patient, indicating the extension of inflammation to the choroid and retina. The pain in the organ is constant, great, and sometimes excruciating, with pain in the orbit and eyebrow, increased at night. When attended with extreme pain, especially in syphilitic cases, very serious changes, even abscess of the anterior chamber, disorganization of the vitreous humour, &c., frequently supervene. In these the inflammation is extended more or less to the internal and external tissues of the eye, and general ophthalmitis (§ 153) is the result.

125. *δ*. The *discoloration of the iris* arises from vascular injection and effusion, and is of a yellowish or greenish tint in light eyes, or of a reddish hue in dark eyes; but it is very frequently dull, muddy, and dark, and the natural brilliancy and fibrous arrangement of this part are lost. The *effused lymph* is seen first at the pupillary edge, and afterward on the lesser circle of the iris, causing a villous, rough, elevated, or irregular surface or outline of the part. The lymph may be in distinct masses of very various sizes on the anterior of the iris, or at its pupillary margin; and, in the most acute cases, it may fill the pupil or anterior chamber, or even the posterior chamber. The *colour* of the effused lymph is sometimes a light yellowish-brown or ochrey, but a rusty hue is most common. It is occasionally of a light dirty yellowish tint, particularly when it is abundant and fills the anterior chamber. In this case, or when a small abscess in the iris is discharged in this situation, a form of hypopyon is the result. The *pupil* is contracted, and becomes more and more so in the progress of the complaint. The effusion of lymph and adhesion render it also angular, irregular, and fixed at one or more points, and free in others. It loses its thin, sharp, and well-defined edge, and becomes dull and cloudy, or otherwise discoloured.

126. *ε*. The *acute states of iritis* are observed in persons of a full habit or robust constitution, after the action of powerful causes, especially if they continue to act, and the case have been neglected at the beginning, and in cachectic

conditions of the frame. They are attended by the usual characters of severe vascular action, especially injection of the vessels, extreme contraction of the pupil, effusion of lymph, dulness of the cornea, external redness, loss of sight, violent pain in the eye, and severe headache, with watchfulness, restlessness, and febrile disturbance, terminating, in a few days, in disorganization of the interior tissues, and in irreparable loss of vision. In *chronic cases* the origin of disease is almost imperceptible, and its progress slow. Little or no pain is felt, and the external redness is very slight or unobserved. At last, lymph is effused, vision is impaired, and the complaint is brought under treatment. The *sub-acute cases* are intermediate between these two extremes. The chronic form may also follow upon an inactive or partially successful treatment of the acute and sub-acute forms, but it usually presents itself in the *first grade*; the acute most commonly assuming the *third*, and the sub-acute the *second grades*.

127. *b. Consequences and Prognosis*—*α*. *Change of texture and colour of the iris* follow inflammation which has been violent or of long duration. General adhesion of the iris to the cornea may occur, and lead to staphyloma; or the iris may become adherent both to the cornea and to the capsule of the lens, occasioning anterior flattening of the eye. This is, however, very rare. Dropsical enlargement of the anterior chamber, with closed pupil and staphyloma scleroticæ, may likewise supervene (LAWRENCE).—*β*. After acute or sub-acute attacks, the *pupillary margin often becomes adherent* to the capsule of the lens, either throughout, or in one or more points. When the inflammation has disappeared, the adhesion still continues, or is reduced to slender threads, admitting of partial motion. In some cases, adhesions of the iris are detached, leaving black marks on the capsule, which are permanent.—*γ*. An *adventitious membrane* may form in the pupil from organization of the lymph effused on the surface of the capsule. Its opacity is greatest in the centre, and it may be connected with partial adhesion of the iris. In rarer instances, the adventitious substance is seen in one side of the pupil, and attached to the edge of the iris (*Atresia Iridis incompleta*).—*δ*. *Closure of the pupil* follows effusion into the posterior chamber, and the formation of an opaque adventitious substance, to which the circumference of the pupil is fixed (*Atresia Iridis perfecta*). This adventitious membrane may extend over the anterior capsule, causing adhesion of the uvea to the lens, and enlargement of the anterior chamber.—*ε*. *Atrophy of the globe* may supervene upon copious effusion into both chambers, and deposition of lymph behind the iris in such quantity as to cause bulging of the sclerótica, or to escape through this membrane, and raise the conjunctiva. In this case the fluid is absorbed after the subsidence of the inflammation; but the internal parts of the ball are so altered that they waste and become flaccid, particularly after complete closure of the pupil. The vitreous humour may also be rendered fluid, and the eye soft, without shrinking in size; but this occurs only after acute syphilitic iritis.—*ζ*. *Impaired vision* may be the result of the extension of inflammation to the

posterior tunics, although the disease has been arrested by appropriate treatment, and may follow the acute, sub-acute, or chronic states of the disease. The impaired vision may be caused solely by the lesions produced in these tunics, or by these and the changes in the pupil conjoined.

128. *c. The Prognosis.*—When the disease is recent, and appropriate treatment is adopted, effusion into the texture or on the surface of the iris will be removed by absorption upon the subsidence of the inflammation. Hence we need not dread the result, if the changes be confined to the iris, although the effusion be copious. But when the complaint has continued some time, and is attended by increasing contraction of the pupil and effusion of lymph, with organization of the latter into adhesions and adventitious membranes; or when the consequences described above (§ 127) are present, or inflammation extends to the posterior parts of the globe and retina, or to the cornea with more or less opacity, the greatest danger to vision is to be apprehended. In most cases, a guarded prognosis should be given, for it is often difficult to determine how far the posterior tunics may be affected. Change of colour in the whole iris, with great contraction of the pupil, and an opaque substance in it; intense external redness, severe and deep-seated pain, extinction of sight, and flashes of light in the eye; large effusion behind the iris, and bulging of the sclerotic, and a protruded state of the iris, and adhesion of the pupil, are all hopeless states of the organ. If unfavourable changes have not appeared, recovery may take place, although the complaint has been of three or four weeks' duration, and sight is much impaired.

129. *d. The Diagnosis of Iritis* cannot be difficult, if the history of the case be considered, and the state of the iris carefully examined. The affection most resembling iritis is inflammation of the capsule of the lens. Nebulous, contracted, and fixed pupil, discoloured iris, adhesions between the iris and capsule, are present in the latter, which, however, often supervenes in the course of iritis, and generally attends its most acute attacks; while, on the other hand, inflammation of the crystalline capsule is attended by some degree of iritis. The one is thus reciprocally consequent upon the other.—*Retinitis* resembles iritis chiefly in the great contraction of the pupil; but the former is more sudden, its progress more rapid, its attendant headache more violent, and vision more rapidly impaired, than in the latter.

130. *c. Treatment.*—The indications of cure are, 1st, to subdue the inflammation; 2d, to prevent or arrest the effusion of lymph; 3d, to promote the absorption of what has been effused; and 4th, to preserve the pupil entire. They are to be accomplished by blood-letting, mercurials, belladonna, &c.—*Blood-letting*, in acute and sub-acute cases; in young, robust, or plethoric persons; when the pain is severe, and febrile disturbance considerable, and the inflammation extending to the internal tunics, must be most promptly and actively practised. It will often be necessary to repeat it, and even to follow it by *cupping* on the nape of the neck, or behind the ears, or on the temples. In the circumstances now stated, local bleeding can-

not be confided in alone; but in chronic, sub-acute, or mild states cupping will be preferable. *Leeches* may be employed; but they are, unless a great number be applied, much less efficient than cupping. Immediately after the first bleeding, a full dose of *calomel* and JAMES'S *powder*, with *opium*, should be given, and repeated at bedtime, and an active cathartic draught (F. 216) in the morning, aided by a terebinthinate enema (F. 150, 151). The specific effects of *mercury*, which are most effectual in fulfilling the second and third indications, will be hastened by its combination with an antimonial; and, if the bowels be acted upon daily by a draught containing equal parts of the spirits of *turpentine* and *castor oil*, or a larger portion of the former, the specific operation of the calomel will not be prevented, or even delayed, but the beneficial effects on the disease will be ensured.

131. *Belladonna* is of great benefit in every stage of the complaint, and should be applied as directed above (§ 112), contemporaneously with the exhibition of mercury. Although the pupil be contracted, and effusion or even adhesion has taken place, the specific operation of the latter, and the effects of the former on the iris, will elongate or even entirely detach the adhesions, if they are soft or unorganized. In addition to these, *diaphoretics*, *diuretics*, and warm pediluvia are beneficial. The bowels ought to be kept freely open by the substances already noticed. *Turpentine* may be used for this purpose, or with the view of aiding the effects of calomel, or even as a substitute for it, as advised by Mr. CARMICHAEL, who prescribes it in drachm doses, three times a day, suspended in almond emulsion. *Blisters* are of doubtful efficacy. Mr. LAWRENCE decides against them.

132. *B. SYMPATHETIC IRITIS.*—*a. Syphilitic Iritis*, or inflammation of the iris occurring in persons tainted by the syphilitic poison, is, perhaps, the most common variety of this disease. It is a symptom of syphilis in its constitutional stage; and, although sometimes appearing alone, it is more frequently one of several secondary symptoms, especially ulcerations of the throat, eruptions, swellings of the periosteum, pains of the limbs, affection of the nose, &c. It occurs most frequently along with the earlier secondary affections, and sometimes appears before the primary disorder is cured. (LAWRENCE). It rarely occurs as a symptom of syphilis in infants, although secondary syphilis is not infrequent in them. It may be either *acute* or *chronic*; it is often associated with inflammation of other internal tissues of the organ, and it is most commonly determined or excited by exposure to cold, exertion of the eye, or external injury.

133. *Diagnosis.*—The characters and progress of syphilitic iritis are nearly the same as those of the idiopathic form; yet there are certain points of difference, which are frequently observed in the local symptoms, deserving of notice. These are the tubercular disposition, and the reddish-brown discoloration of the lymph effused on the iris; the angular form of the pupil, and its displacement towards the root of the nose; and the violent exacerbations of pain felt chiefly in the brow during the night, and in a slighter degree or

not at all in the day. The first and second of these are, however, not constant; the last is always present. But the most certain diagnosis are, the concomitance of other syphilitic affections, and the history of the case. Lymph is effused from the margin of the pupil in *arthritic iritis*, but not deposited in a distinct form, and the adhesions are generally white; and both in it and in the idiopathic variety the pupil commonly retains its circular figure and central position.

134. *b. Arthritic Iritis*.—Inflammation of the iris is frequent in the *gouty diathesis*, but less so in the *rheumatic*, unless as a consequence of rheumatic inflammation of the scleroticæ (§ 97). In the *gouty* it occurs most commonly in the iris from the commencement, although often some other tissues of the organ are affected at the same time; but, in the *rheumatic*, it rarely begins in the iris. The *gouty modification* is generally *acute*, and very severe; the *rheumatic*, *sub-acute*, or *chronic*, and more mild. The *former* generally commences with pain of the eye, intolerance of light, lachrymation, and zonular redness of the scleroticæ. Pains are felt in the orbit, brow, and forehead. The iris soon becomes dull and discoloured; the pupil contracted, and fixed at one or more points to the capsule of the lens. The reddish zone in the scleroticæ is of a dull or nearly livid tint, and does not advance to the edge of the cornea, but leaves a narrow white ring between. After a violent attack, with impaired vision, the symptoms subside, and sight is restored, the iris being attached to the capsule by whitish adhesions. This form of iritis often returns again and again, the eyes recovering almost completely after repeated attacks. Mr. LAWRENCE met with a case in which the disease returned fourteen times, yet vision was not materially impaired, though adhesions in each eye connected the pupillary edge of the iris to the capsule. But frequently a fresh effusion attends on each attack, until the pupil is more and more contracted, and at last filled with opaque adventitious membrane, the texture of the iris, notwithstanding, generally remaining but little altered.

135. *c. Scrofulous Iritis*.—This variety is consecutive of strumous ophthalmia (§ 68), the inflammation extending from the external tunics. It is commonly preceded and accompanied by changes in the cornea, preventing the lesions of the iris from being observed. Hence it often escapes detection until it has completed its course. It very rarely occurs as a primary affection. Mr. MACKENZIE adduces a case in which the attack seemed primary; but its history is not conclusive on this point.

136. *Treatment*.—*a.* The *syphilitic variety* requires *local bleedings* and *mercurials*, as advised for the idiopathic disease, and in similar combinations, until the symptoms and the constitutional malady, on which the local one is ingrafted, are entirely removed. *Turpentine* may also be employed as an auxiliary, and to open the bowels, either as directed by Mr. CARMICHAEL, or as prescribed by myself (§ 130–131). *Opiate frictions* around the eye, and *belladonna*, are also of great service. *General blood-letting* is seldom well borne in this variety, unless in robust or plethoric persons; but full or repeated *cupping* is often necessary.

137. *b. Arthritic Iritis*.—The *rheumatic modification* requires the treatment recommended in rheumatic inflammation of the external tunics, especially *cupping*, *leeching*, *blistering*, *alteratives*, with *colchicum*; and, subsequently, *cinchona* or *quinine*, with full doses of *colchicum*, aided by counter-irritation. *Turpentine* is also beneficial in this variety, but it should be given so as to act moderately on the bowels. Mr. WALLACE advises *bark* to be given from the commencement, when this disease follows low fevers. The *gouty modification* will be removed by a very similar treatment to that now stated. *Mercurials*, given with any other intention than that of removing morbid secretions and excretions, are more injurious than beneficial. *Colchicum*, in full doses, with the alkaline subcarbonates and warm purgatives, is especially indicated. *Blisters* and derivatives to the lower extremities; *tepid fomentations* to the organ; frictions, with opium and belladonna, to the forehead; a free state of the bowels, and attention to diet, are particularly requisite. As the attacks are often repeated, measures of *prevention* should be adopted; the chief of these are, low living, a free state of the bowels and of all the excretions, the removal of plethora, and preserving the organ from cold, or over-exertion. Nothing can be added to what has been stated, both here and in preceding sections (§ 130, 131), as to the treatment of the *scrofulous variety* of iritis.

iii. INFLAMMATION OF THE INTERNAL TUNICS.

SYN.—*Internal Ophthalmia*; *Ophthalmitis interna idiopathica*, BEER; *Ophthalmitis posterior totalis*, ROSAS.

138. DEFIN.—*Severe, deep-seated pain of the eye, with impaired vision, contracted pupil, a sense of aching, tension, and heat, without much external redness, but with symptomatic inflammatory fever.*

139. *A.* Inflammation may commence in the *retina*, or in the *choroid*; but it cannot remain long confined to either. It frequently extends from the *iris* to the latter, and to other internal parts. The disease probably begins most frequently in the *retina*, and may therefore be designated *retinitis* in its early stage. We are necessarily less acquainted with the phenomena attending it than with those accompanying iritis. ROSAS considers that the whole *retina* is not equally affected, but chiefly the vicinity of the yellow spot. The *Causes of retinitis* are, sudden exposure to light; the action of a strong light, as looking at the sun or bright objects; the light and heat of a bright fire; exertion of the eyes, particularly when the rays of light are refracted; and the predisposing and exciting causes described above (§ 4–6).

140. *a. Symptoms and Course of retinitis*.—The patient complains of pain and aching deep in the eye; of a sense of tension or of heat, aggravated by using the organ, by exposure to light, or by whatever determines the circulation to the head. The pain is often pulsating, and usually extends to the brow and head. The pupil is much contracted; vision is impaired, and hourly becomes more so. In severe cases, the pupil is nearly closed, and sight almost or altogether lost; and flashes or sparks of light are perceived in the eye. At this period there is little external redness, excepting in the scleroticæ around the cornea; but there are thirst, white tongue, and fever. With the

continuance of the disease, the sclerotic redness increases, and a bright zone is formed around the cornea; and the inflammation spreads inward to the vitreous humour and to the capsule of the lens, and outward to the choroid and iris. The last now loses its natural colour, becoming greenish and reddish, and it is pushed towards the cornea. Sight is lost, even before total closure of the pupil takes place. The disease now may be designated *Inflammation of the internal tunics generally*, or the *second stage of retinitis*. The redness of the sclerotic extends; the conjunctiva becomes injected; the pupil often obliterated from effusion of lymph; the cornea somewhat dull; and general ophthalmia supervenes. The pain of the eye is unequal or pulsative; is attended by a sense of weight, sometimes of cold; and chills or rigours are felt. Suppuration now occurs, and matter is effused in front of the iris, particularly if the pupil is not entirely closed, constituting hypopyon; and blood is sometimes mixed with it. Such is the course of the most acute and severe cases of internal ophthalmia commencing in the retina, when uncontrolled by treatment; and the results are, 1st. Insensibility of the retina, from change of structure—*Amaurosis*; 2d. Contraction and partial obstruction of the pupil, with impaired function of the retina, and opaque capsule and lens; 3d. Closed pupil, with the formation of an adventitious membrane; 4th. Suppuration making its way externally, and leading to destruction of the eye, and collapse of the coats.

141. *b. Chronic Retinitis*.—A very much milder and more prolonged form of retinitis than the foregoing is often observed in persons who greatly exert their eyes. It is characterized by sensibility to light; more or less weakness or obscurity of vision, especially beyond the distance at which the eye has usually been occupied; with gradual contraction of the pupil, immobility of the iris, and aching in the eyes and forehead. This slight grade of the disease is manifestly confined to the retina. There is but little increase of vascularity externally, excepting, in some cases, a narrow or partial zone in the sclerótica around the cornea. The complaint is aggravated by stimulants and a heating regimen, and benefited by opposite means. It often continues months, or even years, with occasional exacerbations; and either in great measure disappears, or becomes greatly aggravated, or assumes the above severe form.

142. *c. The Prognosis in retinitis* is favourable in the commencement, before the pupil is very much contracted, or vision greatly impaired; but it becomes less and less so in proportion to the duration of the complaint. If misunderstood at the commencement, neglected, or ill-treated, the organ is frequently endangered. If the pupil be much contracted, and sight lost, or if sight be quite gone before the closure of the pupil, blindness will be the result. If the disease have gone on to general ophthalmitis, all that can be hoped is to preserve the form of the eye.

143. *d. Treatment*.—Copious general and local bleeding, the active exhibition of *mercurials* until the mouth is affected, the employment of *belladonna*, *cathartics*, low diet, and the rest of the antiphlogistic regimen, as directed for iritis,

with complete rest of the eyes and of the body, and exclusion of light, are the most efficacious means of cure. Blood-letting, although early practised, will often fail, if *mercury* be not freely administered. *Turpentine* may be also given to aid its operation, and act upon the bowels. These measures will succeed only in the first stage, before the pupil is closed and sight is lost. Yet, if suppuration have not occurred, it is still requisite, in order to preserve the form of the eye. In the *slight and chronic form*, local depletion, active purging, low diet, attention to the digestive functions, and repose of the organ are the chief remedies. Open blisters behind the ears, or the ointment of the *potassio-tartrate of antimony*, are also beneficial.

144. *B. Choroiditis*—*a. Inflammation of the choroid*, of the hyaloid membrane, of the capsule, &c., under the terms *Choroiditis*, *Hyaloiditis*, *Capsulitis*, and *Lentitis*—have been described by JUENGEN, ROSAS, and MACKENZIE. But admitting, from analogy, that inflammation may commence in, and be more or less confined to, either of these tissues, for a longer or shorter time, I question the possibility of their being often distinguished from *retinitis*, with which they must necessarily be in some degree associated. I must refer the reader to the observations of Mr. MACKENZIE on *Choroiditis*. He believes that the choroid, although generally affected consecutively upon iritis, is sometimes *primarily* and separately inflamed. The inference is most probably correct, yet experience shows that such a state of disease can but rarely be recognised. He states that *choroiditis*, in its earliest stages, exists without any signs of disease of the iris, and without any effects upon the sclerótica and retina beyond those which must necessarily arise from the pressure of an inflamed and swollen membrane. The dark colour of the choroid shows through the sclerótica, which thus appears bluish or purplish, and distended. The part most discoloured protrudes generally on one side of the ball, and near the cornea, and is of a deep blue tint, with varicose vessels running over it (*Sclerotic Staphyloma*). Several such tumours may surround the cornea, or may protrude on the posterior hemisphere of the organ. A watery fluid is sometimes effused between the choroid and the retina during its progress, and redness is observed in parts of the sclerótica. Although the iris is not inflamed, it is always narrowed or drawn towards the portion of the choroid chiefly affected, causing displacement of the pupil. There are generally attendant intolerance of light, pain, hemicrania, frequently partial opacity of the cornea, dimness of sight, proceeding to total blindness, and febrile disturbance, disorder of the digestive organs. The disease is most common in the scrofulous diathesis; in those who overuse their eyes, without taking sufficient exercise, and who expose them to too much heat and light.

145. *b. The Treatment* consists of copious blood-letting, active *cathartics*, *mercury* aided by *turpentine*, and counter-irritation in the earlier stages; and, subsequently, the internal use of the preparations of *iodine*, or the precipitated carbonate of *iron*; or the *iodide* of iron, and the sulphate of quinine.

146. *C. Arthritic Inflammation of the Internal*

Tunics—*Ophthalmitis Arthritica*, BENEDICT and ROSAS.—*a.* Arthritic iritis frequently is confined to the iris; but, in gouty persons of very impaired constitution, inflammation is either extended to, or almost simultaneously appears in, the retina, the choroid, the lens and its capsule, and the vitreous humour; the sclerotic and cornea being secondarily affected. It usually attacks elderly persons of a full habit, with bloated, red, purple, and veined faces; and it generally terminates in loss of sight, with dilated pupil and opaque lens or glaucoma. At first the patient complains of increased sensibility to light; of lachrymation; and of a severe burning or tearing pain deep in the globe, with a sensation as if the eye were too large for the orbit. A dull and livid redness is observed in the sclerotic; it increases towards the cornea, but is separated from this part by a narrow white ring. The conjunctiva afterward becomes injected, and the cornea dull. The pain is now distracting, and extends to the orbit, face, and side of the head: the iris is dark, assumes a dirty appearance, is irregularly contracted and fixed, the pupil often having an oblong or oval figure, in the transverse direction. A greenish discoloration is observed deep in the eye, from lost transparency of the vitreous humour. The posterior tissues swell and push the lens forward, wedging it into the dilated pupil, and squeezing it even against the cornea. The lens also turns green, yellowish green (*Glaucomatous Cataract*), or dull white. The congestion and swelling of the internal coats distend the sclerotic, or bulge it out in parts; the cornea becomes hazy; and the changes in the iris, pupil, and external tissues impart to the organ a dead appearance. Luminous flashes are frequently perceived in the eye; but sight is either much impaired or altogether lost—sometimes suddenly—from the commencement. At this stage the symptoms frequently subside, the iris preserving its dull hue, the pupil being fixed and dilated, and sight totally lost. A varicose state of the vessels in the sclerotic sometimes remains; or a dull leaden appearance, with small projections or larger bulgings around the cornea, as in choroiditis (§ 144).

147. This disease generally affects both eyes, either in succession or at once. Its duration is various, as well as its severity, and it often assumes a less violent form than that now described, especially when its early symptoms have been mitigated by treatment. In this case, sight is more gradually and slowly extinguished; the pain is less; and the external changes, particularly the bulgings of the sclerotic, are either less or but slight. It is difficult to determine what tissue is primarily affected, but most probably the choroid, retina, and iris are almost coetaneously attacked. The early loss of sight indicates an early affection of the retina; and the equally early tension and pain show that congestion and swelling of the choroid is present from the first.

148. *b.* *The Prognosis* is extremely unfavourable. If the characteristic symptoms of this affection be present, and more especially if vision be lost, permanent extinction of sight will be the consequence.

149. *c.* *Treatment* has hitherto been found to have little influence on this disease. Never-

theless, blood-letting; warm purgatives, with full doses of colchicum and alkaline carbonates; revulsants to the lower extremities, or behind the ears, or to the nape of the neck; active doses of turpentine, both by the mouth and in enemata, so as to act efficiently upon the bowels and vascular system; subsequently, PLUMMER'S pill, and the decoction of guaiacum, with the compound tincture of colchicum and liquor potassæ; and full doses of sulphate of quinine, or of cinchona with or without colchicum, &c., should be fully tried.

150. *D. Inflammation of the internal tissues after fever* sometimes occurs. It has been described by Dr. WALLACE and Dr. JACOB. Of forty cases which the former observed, there were only four who had the disease in the left eye, and only two who had it in both. It may occur very soon, or not for some months, after fever; and it presents *two stages*, in the *first* of which amaurotic symptoms are alone present; in the *second* those of inflammation are superadded. The period at which the former commences after fever, and its duration before redness comes on, are very uncertain. In some cases, dimness of sight and *musca volitantes* have been present from the earliest period of convalescence, yet the inflammatory stage has not supervened for weeks or months; and in other instances the amaurotic symptoms have not appeared till months after the fever, and have been soon followed by the second stage. The inflammatory changes disappear before the amaurotic symptoms (WALLACE).

151. Dr. JACOB met with seventy or eighty cases of the disease in one year. It is most frequent among the poor, in young persons and in females, and attacks always only one eye. The affection of the retina having been present from a few days to several weeks, the transparent parts of the eye become more or less clouded or opaque, the circumference of the cornea presents an opaque whitish appearance or circle resembling the *areus senilis*. The anterior chamber seems clouded. The iris is always dull, and altered in colour; but tubercles of lymph or abscesses are not seen in it, and it often moves actively. The pupil is slightly irregular, yet it does not contract adhesions, or become closed. Hypopyon sometimes ensues. In the worst cases, the lens becomes partially opaque, and presents an opaline amber colour. When vision is permanently lost, it is generally owing to this change. Impairment or loss of vision is the earliest symptom; and there generally are intolerance of light, lachrymation, and a stinging or darting pain through the eye to the temple or nose. Sometimes the suffering is slight; but it is usually increased on exposure to strong light (JACOB).

152. *The treatment* recommended by these two experienced writers is diametrically opposite. Dr. WALLACE found depletion and mercury insufficient for a cure; he therefore gave half a drachm or a drachm of bark in powder three or four times a day, or the sulphate of quinine in two grain doses. Dr. REID also employed bark with success in this sequela of fever. Dr. JACOB, however, states that bleeding locally or generally, purgatives and antimonials, blisters and opiate stupes, and mercurials with opium and belladonna, are the most efficacious means of cure. He adds that the relief from

mercury is so certain, that he has trusted to it almost exclusively with the assistance of belladonna. He has generally found two grains of calomel, with a quarter of grain of opium, or five grains of blue pill alone, three times a day, answer every purpose; tenderness of the gums coming on in eight or ten days. If the pain be severe, he combines hyoseyamus or belladonna with the dose taken at bedtime. He tried the sulphate of quinine in four cases for eight days, but finding no relief, he gave mercury, which effected a cure. The cases occurring after typhus fever, recorded by Mr. HEWSON, and which were similar to those described by Drs. WALLACE, REID, and JACOB, readily yielded to mercurial treatment.

IV. INFLAMMATION OF THE WHOLE EYE. SYN.—*Ophthalmitis Idiopathica, Beer; Ophthalmitis Unicersalis, WELER; Inflammation of the Globe, LAWRENCE; Phlegmonoid Inflammation of the whole Ball.*

153. CHARACT.—*Severe deep-seated pain; increased internal redness and tumefaction; a sense of tension, and a feeling of the organ being too large for the orbit, and about to burst from it; early loss of sight, with discoloured iris, and contracted, immovable pupil; swelling and immobility of the globe, with partial protrusion of it and the eyelids; and severe inflammatory fever.*

154. A. This severe disease has been well described by Mr. LAWRENCE. It consists of inflammation of the internal and external tissues, and is not of common occurrence. It is met with chiefly in very robust constitutions, and persons of a phlogistic diathesis and full habit of body. It is most frequent in the right eye, as is the case with ophthalmic inflammation generally. Mr. LAWRENCE states that, of 134 cases of ophthalmia commencing in one eye, 95 began in the right. General ophthalmitis is most commonly caused by severe injuries of the organ; by the explosion of gunpowder before the eye; by great heat and light striking upon it; and fragments of stone, iron, &c., propelled against it.

155. a. *Symptoms and Course.*—At the commencement, the characteristic injection of both the sclerotica and conjunctiva is evident; with a severe burning or throbbing pain, and a sense of bursting distention. The surface of the organ is stiff and dry, but copious lachrymation soon comes on, and is increased by exposure to light. The external redness increases, and the conjunctiva swells into a broad, firm ring of chemosis around the cornea, which it partially overlaps. There are intolerance of light, dimness of vision, contracted pupil, impaired brilliancy of the iris, and acute sympathetic fever. This constitutes the *first stage* of the disease. The motions of the globe and lids now become difficult and painful, and the pain more and more violent, extending to the brow, cheek, temple, and head. The previously blue or gray iris assumes a dull greenish hue; and the brown or black, a reddish tint. The eyeball swells and loses its power of motion; the cornea grows muddy, and, by degrees, opaque; but vision is generally lost before these changes supervene. The patient perceives luminous flashes or sparks in his eye, owing to disordered action in the retina; and the vascular distention of the internal tissues generally occasions a sense of bursting. The deep-seated

swelling and external chemosis partially evert the inflamed eyelids, which thus resemble, especially the inferior, a red fleshy mass, and both the ball and lids are protruded and immovable. The *second stage* is now fully developed. Sympathetic inflammatory fever always accompanies this severe disease. The local symptoms are preceded, or attended at their commencement by chills or rigours, followed by headache, white tongue, thirst, hot and dry skin, and accelerated, hard, and full pulse. These are increased at night, and accompanied with watchfulness and throbbing in the temple and eye.

156. b. *The Consequences, or the second stage,* according to WELER, are suppuration and opacity of the cornea, &c. If the disease be not arrested, the pain becomes throbbing, delirium sometimes occurs at night, and chills or rigours are felt, indicating impending suppuration. The cornea is first a dull white, and then yellow, and matter is formed. The throbbing and bursting pain continues, notwithstanding, for some days, until the cornea bursts externally, and gives exit to the matter; the coats of the eye collapsing, and the form of the organ being lost. When the progress of the disease has been checked by treatment, the cornea remains opaque, and the pupil is either closed or very much contracted, and the aperture filled by adventitious membrane, vision being either much impaired or entirely lost. Even when recovery takes place, with an open pupil and clear cornea, the retina has generally suffered so much as to cause some imperfection of vision (LAWRENCE).

157. c. *Diagnosis.*—This complaint is characterized by the simultaneous affection of both the internal and external tunics, and is distinguished from the *sympathetic* or *specific* inflammation above considered, by the following circumstances: (a) Redness, pain, swelling, intolerance of light, lachrymal discharge, and impaired vision are all equally and co-ordinately developed; but in the specific inflammations, one or other of these is always predominant over the rest, and accompanied by some peculiar local and constitutional affection.—(b) These symptoms commence at the same time in an equal degree, and continue very nearly so throughout; but in the other ophthalmia this correspondence is remarked neither at their commencement nor during their progress.—(c) The course of the malady is regular and continued, and it always terminates in suppuration of the globe, if not arrested by treatment, while the others remit more or less, and only occasionally terminate in this manner.—(d) Phlegmonoid ophthalmitis is always attended by severe sympathetic fever; but the specific forms are generally without fever, even when most severe.

158. d. *Treatment.*—It is only in the *first stage* that we can expect to preserve the sight. In the *second stage* this will rarely be accomplished. When vision is altogether lost in this period the preservation of the form of the organ can only be hoped for. If symptoms of suppuration have appeared, the eye will be destroyed. In the first and second stages the most active antiphlogistic measures, as directed in internal ophthalmia (§ 143), must be practised: general blood-letting, cupping, leeches applied around the eye, and scarification of the protruded lids;

with active cathartics; calomel and JAMES'S powder in full and repeated doses; turpentine given by the mouth, and in enemata with castor oil; and belladonna, constitute the chief remedies. If suppuration have occurred, the anterior chamber being full of matter, the evacuation of it by a free opening into the cornea will give relief, and not increase the inevitable mischief.

159. *B. General Ophthalmitis consequent upon the absorption of purulent or morbid matters into the circulation may occur.* It has been noticed chiefly after phlebitis, by MR. ARNOTT and MR. HIGGENBOTTAM, and is most frequent in the puerperal state, as a consequence of uterine phlebitis. The local symptoms in the early stages are the same as in the idiopathic, but less violent, and more insidious and rapid, and always terminating in suppuration and sloughing of the cornea. The constitutional symptoms are very different, and are of a typhoid and adynamic type. All the cases that have hitherto been recorded have terminated fatally.

160. *C. An Intermittent form of Ophthalmia* has been described by some writers, particularly HOFFMANN, CURRY (*Trans. of Med. and Chirurg. Soc.*, vol. iii., p. 348), and HEUTER (*Lancet*, No. 331, p. 473); but I agree with MR. LAWRENCE in considering a truly intermitting form of inflammation of any of the tissues of this organ as not to have been made out. Exacerbations, relapses, or returns of the disease from persistence or recurrence of the causes may have been mistaken for an intermittent form. Frequently recurring attacks of inflammation in some one or more of the tissues of the eye, especially of the conjunctiva, and in slight and chronic forms, are sometimes caused by the sympathetic irritation of inflamed or carious teeth. Of this form of disease, which is not noticed by writers, I have seen two or three instances; the removal of the adjoining irritation curing that depending upon it.

161. I should now have proceeded to consider the consecutive and malignant alterations of the tissues of the eye, but these, in a practical point of view, fall mostly within the province of the surgeon, a strictly medical treatment having but little influence in removing them. The malignant diseases of this organ are the same as those observed in other viscera, and are considered under distinct and appropriate heads. The functional disorders are treated of in the articles AMAUROSIS, Palsy, and SIGHT.

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FAINTING. SYN.—Λιποθυμία, Hippocrates. Αποψιχία, Galen. Syncope (from συγκοπῶ, coincide); *Deliquium Animæ*; *Defectio Animæ*, Celsus. *Defaillance*, Fr. *Die Ohnmacht*, Germ. *Swooning*.

CLASSIF.—2. Class, 2. Order (Cullen). 4. Class, 4. Order (M. Good). I. CLASS, III. ORDER (Author).

1. DEFIN.—Temporary depression of the animal and vital actions, with pallor, cold perspiration, remarkably weak pulse, or absence of pulse at the wrist; respiration and sensation also being nearly abolished for a short time.

2. The terms used by HIPPOCRATES and GALLEN are synonymous with *Syncope*, a word of modern use. *Leipothyμία* has been considered by later writers, particularly MORGAGNI, DR. GOOD, and DR. ASH, either as the same as *syncope*, or as signifying a lesser grade of this affection. The definition which SAUVAGES has given of *leipothyμία* assigns it a specific difference from *syncope*, or the usual form of swooning or fainting. He states it to be, "Subitanea et brevis virium dejectio, superstita pulsus vigore, et cognoscendi facultate." I have had several opportunities of observing attentively the whole progress of this affection; and I admit the accuracy of this definition, with the exception of the continuance of consciousness, which is generally somewhat impaired, although not altogether lost. The pulse is unaltered from the state in which it was before or after the seizure, or not materially influenced; and in some cases I have found it so strong as to prescribe depletion; but the respiratory actions are nearly abolished. *Leipothyμία* is, therefore, an affection of the animal and respiratory functions, that of the heart not being impaired. The slight or imperfect seizures often observed to precede fully developed *epilepsy*, or to occur

between, or usher in, the severe attacks, and described in that article (§ 41, 52), are examples of the leipothymia of SAUVAGES.

3. *Fainting and swooning* are grades of the same affection, the latter being a more complete and prolonged state of the former. *Fainting* may occur after very short or irregular periods—the *Syncope recurrens* of GOON. It is then often followed by palpitations of the heart. *Swooning* is much less prone to recur, but is sometimes followed by severe reaction. SAUVAGES has divided syncope into as many varieties as there are principal causes inducing it. Dr. GOON has adopted a somewhat similar division. As, however, it varies chiefly in degree, from whatever cause it proceeds, no farther distinction than that which I have just made need be assigned to it.

4. I. DESCRIPTION, &c.—Fainting is commonly preceded by languor, a sense of sinking at the epigastrium, anxiety, confusion of intellects, obscuration of vision, cold partial sweats, giddiness and ringing in the ears, pallid countenance and quivering of the lips, and coldness of the extremities. These may continue for some time, constituting what is usually called faintness, and disappear; or they pass into full fainting or swooning more or less rapidly. It is seldom that fainting occurs without these precursors; but when it is fully developed, respiration almost ceases, and consciousness is nearly or altogether lost. The action of the heart, however, still continues, but feebly; and although the pulse disappears from the wrist, as in full swooning, it may still be felt in the carotids; or the heart will be heard to beat on auscultation. In some instances, relaxation of the sphincters and discharge of the excretions are said to have occurred. But this is rare in swooning, although it sometimes supervenes in leipothymia, in which the brain is rather oppressed with blood than deprived of it, and in which the pulse retains its vigour. Sickness, or even vomiting, sometimes follows faintness, or accompanies recovery from fainting.

5. The sensations ushering in syncope are generally more or less distressing to the patient, and are sometimes described as accompanied by a feeling of death. MONTAIGNE (*Essais*, liv. ii., cap. vi.) found them rather pleasurable than otherwise; and therefore infers that those attending upon dissolution must be similar. CHAMBERET experienced the like feelings. The duration of the seizure varies from a few seconds to one or two hours; but commonly from half a minute to ten or fifteen. It has extended in some instances to several hours. Much longer periods have been mentioned by writers; but their actual occurrence is questionable.

6. *The Consequences or Terminations* of syncope are, 1st. A return of the functions, respiration becoming more sensible and often suspirious, and eructations or vomiting occasionally supervening; 2d. Palpitations of the heart, or general vascular reaction; 3d. Hysterical symptoms, or a fully formed hysterical paroxysm; 4th. Convulsions, general or partial, with or without consciousness; but they are much more frequently consequent upon leipothymia than upon true syncope; 5th. Partial or slight paralysis, or prolonged vertigo; 6th. In cases

connected with passive enlargement of the cavities of the heart, and attended by a very slow as well as a very weak pulse, coagulation of the fibrinous portion of the blood has taken place in these cavities, and after some time occasioned death; 7th. Dissolution has occurred in extreme cases, owing either to the complete depression of cerebral and nervous power, and the consequent inaction of the heart; or to the asthenia and wasting of the parietes of this organ, in conjunction with nervous depression. The fifth and sixth of these are rare; instances, however, of the latter are adduced in the article HEART. The termination in dissolution is not so rare; and is chiefly observed in cases of great debility or exhaustion from extreme or protracted pain, or from parturition; and particularly when a sitting or erect posture has been suddenly assumed or too long retained in adynamic fevers, and after exhausting discharges or depletions. Some years since I saw swooning caused by strangulated femoral hernia, that passed into complete tetanus of many hours' duration.

7. II. CAUSES.—The causes of syncope are strictly *occasional*. I shall consider them with reference to their operation.—*a. The causes which act more immediately on the nervous system* are chiefly various impressions made upon the organs of sense, and depressing moral emotions. The odour of various flowers, according to the idiosyncrasy, sometimes occasions it. FABRICIUS HILDANUS has seen it produced by the smell of vinegar; and MARCELLUS DONATUS by soft music. The airs of their native land have induced it in persons subject to nostalgia. Various unpleasant sights, or objects of aversion, have caused it, as the sight of blood, of surgical operations, or of a corpse; also sudden terror, fear, anxiety, disappointment. The impression made by mephitic or infectious emanations upon the nerves of smell frequently induce more or less of faintness. Concussions and injuries of the brain; blows upon the epigastrium; shocks of the whole frame; gyration; rotatory motions, and swinging; excessive or prolonged pain; pleasurable sensations carried to excess, particularly the sexual orgasm; the exhaustion consequent upon inordinate excitement, long fasting, and the abstraction of accustomed stimuli, likewise operate principally in this way.

8. *b. The causes which affect chiefly the vascular system* are the advanced stages of diseases of the heart and pericardium, particularly passive dilatation of the cavities, or softening of their parietes. In cases of this kind, a fatal termination often supervenes in the form of syncope, as remarked by BONET, LANCISI, SENAC, MORGAGNI, MECKEL, and others. The most common of this class of causes is the loss of blood, particularly from arteries while in a standing or sitting posture. HOFFMANN met with an instance of syncope from blood-letting proving fatal, and numerous similar cases are on record. During the period preceding the stage of excitement in fevers, syncope may follow the loss of an ounce or two of blood; and yet the same patient may bear, a few hours afterward, when reaction has become developed, the loss of two or three pounds without this effect being produced. Excessive discharges and evacuations occasion it, by diminishing the

circulating current, by deriving from the brain, and by exhausting nervous and vital power. Various circumstances retarding or preventing the return of blood to the right side of the heart will sometimes cause fainting. The sudden removal of prolonged pressure, as of dropsical effusions and of the contents of the uterus in parturition, often occasions it; but whether the removal of pressure acts in this latter manner or not, or in favouring a sudden and overpowering reflux of blood to the heart, is difficult to determine. Something may also be owing to the consequent diminution of resistance to the heart's action, and change in the accustomed states of several viscera, and to the effects upon the abdominal ganglia. It is very doubtful that the syncope, which sometimes occurs upon the removal of the ligature from the arm after bleeding, and upon stopping the evacuation, arises altogether from the loss of blood, as fainting often takes place in such circumstances, although no indications of its approach existed at the time when the flow was stopped. In this case at least, if not in others where pressure is removed from interaxillary venous trunks, the suddenly-increased return of blood overloads the right side of the heart, and overpowers its action for a time, until the load is removed either slowly or more rapidly by restoring nervous energy. In this manner general or relative plethora may cause syncope, the moving power being insufficient for the body to be moved.

9. *c. There are certain causes of swooning which seem to act both upon the nervous system and upon the heart, or upon the latter through the medium of the organic system of nerves.*—These are, 1st. Agents from without that make their impression on the respiratory passages. Some of the first class of causes act also in this way, especially mephitic or infectious effluvia. Instances have occurred of persons having swooned upon exposure to the effluvia of pestilential diseases, and of death having soon afterward taken place. Such an occurrence could not have arisen from the effect produced upon the brain solely, or even chiefly. Indeed, I believe that all agents which impress nerves of sensation, especially those of smell and taste, act more immediately and energetically upon the heart than is usually admitted. 2d. Sudden and intense changes induced in various parts of the body may be sympathetically propagated to the brain and heart, or may coetaneously affect them; as when syncope follows gangrene, or the passage of noxious matters into the circulation, or the ingestion of sedative or noxious matters, or supervenes upon affections of the stomach, or occurs after the invasion of fever, and before reaction comes on. In these cases, however, congestion of the large vessels and right side of the heart, owing to, and associated with, depressed power of the organic nervous system, is chiefly concerned in overpowering or weakening the heart's action, and lessening the supply of blood to the brain. The increased function of remote organs, and the derivation of vital action from the brain or heart, or from both, as in impregnation and quickening in the female, and in various diseases of the abdominal organs, will sometimes induce fainting. The sudden transition from a recumbent to a sitting or an erect

posture, in delicate or debilitated persons, is often followed by vertigo, quickly passing into swooning; and is obviously caused by the rapid return of blood from the head, and the diminished supply to this part, in conjunction with its sudden and overpowering reflux to the left side of the heart.

10. It is unnecessary to adduce every circumstance that occasionally causes fainting, as they may be referred to the above heads; and as there is scarcely an occurrence or external agent which will not, on some occasion or other, however rare, induce it, when acting energetically on susceptible constitutions. On many, however, of the occasions in which it has been said to occur by writers, leipothymia has been mistaken for, and confounded with, it. Thus HEBERDEN, in stating that epileptics are liable to faint upon waking in the morning, has mistaken this state for leipothymia, which is common in the horizontal posture, sensation and respiration being nearly abolished, but the pulse retaining its fulness and strength; whereas syncope rarely comes on, and generally disappears in this posture. In epileptic patients, leipothymia often occurs both when falling asleep and on waking; but syncope principally on suddenly assuming the erect posture.

11. There are some occasional causes, the operation of which is not easily explained, such as warm baths, heated rooms, and overcrowded assemblies; sitting with the back to the fire, particularly at a meal; and great rarefaction of the atmosphere. These, probably, act chiefly on persons whose circulating fluid is deficient in quantity, by deriving it from the heart and brain. They more frequently, however, occasion leipothymia and apoplexy or convulsions, especially in the plethora.

12. The occasional exciting causes seldom act excepting on *susceptible* or *predisposed constitutions*. These are, the debilitated by scanty nourishment, by acute diseases and profuse discharges; persons whose circulating fluid is deficient in quantity; the delicately constituted, especially females; and peculiar idiosyncrasies. Those who possess much sensibility and little moral courage or force of character—who have been effeminately brought up, indulged in childhood and youth, and unaccustomed to the contrarieties of life—are very subject to syncope. Some females, especially the hysterical, weak, and excessively indulged, are remarkably liable to faint from the slightest mental or corporeal cause; and there is reason to believe that the liability is increased by repetition or the habit of fainting.

13. *Pathological Inferences.*—1. In syncope the heart's action never, perhaps, entirely ceases until it terminates in death. 2. In fainting from hæmorrhage, cerebral influence, especially the voluntary powers and volition, is abolished before the heart's action is reduced to its lowest state; but, unless the swoon be complete, sensibility and consciousness are not entirely suspended. 3. The like obtains in fainting from moral emotions and impressions made upon the senses; cerebral influence is first diminished, and instantly afterward the action of the heart is weakened, the weakened vascular action still farther impairing cerebral power, until fainting is the result. 4. Several causes,

both external and internal, or pathological, particularly those already specified (§ 9), seem to act coetaneously and co-ordinately upon the brain and heart, through the medium of the organic system of nerves; while others of the same class of causes (§ 9) seem to influence more immediately and especially the heart through the same channel. 5. Certain causes may suddenly derive the circulating fluid to the external surface or other parts; and the sudden diminution of the quantity returned to the heart and propelled to the brain may induce faintness or full syncope. 6. The sudden reflux of blood to the right side of the heart, especially when it supervenes rapidly upon the states just specified, may occasion fainting, by overpowering the heart's action, and thereby diminishing the supply of blood to the brain. 7. Fainting may arise from inflammation of the heart, or effusion into the pericardium. 8. It may also occur from the imperfect action of the heart caused by deficient organic nervous power, particularly of the cardiac nerves, with or without dilatation of the cavities, and weakness or softness of the parietes of the organ. 9. It may be occasioned by circumstances preventing the return of blood to the heart. To either of these last two are to be imputed the fatal cases of syncope related by Mr. CHEVALIER and Mr. WORTHINGTON, in which the cavities of the heart were found empty and relaxed, and the large veins adjoining devoid of blood.

14. Indeed, *death* may supervene in any of the modes in which syncope is produced, especially when carried to the extreme. Thus I have seen, in two instances, a moderate dose of the acetate of morphine occasion loss of voluntary motion, and scarcely-perceptible pulse and respiration—the characteristic phenomena of swooning. A larger quantity might have caused death; its operation—extended from the stomach to the heart and brain—being the same, but so great as to put an end to the functions of these parts. Other causes, inducing any one of the pathological states now assigned, may act, in favourable circumstances, and in highly predisposed persons, so energetically as to terminate altogether the vital actions; predisposition or pre-existing states of the frame, such as have been mentioned, being often as influential in producing the result as the more direct cause.

15. III. DIAGNOSIS.—Syncope may be confounded with *apoplexy*, with the seizures to which the term *leipothymia* is strictly applicable, with *asphyxy*, with certain states of *hysteria*, and with *death*.—*a.* The strong, laboured, or stertorous breathing, and the full, strong pulse sufficiently distinguish *apoplexy* (see that article, § 66) from fainting.—*b.* In *leipothymia*, volition and voluntary motion are abolished, and consciousness nearly or altogether; but the pulse either is not affected, or is even fuller than usual; and it is more frequently the first stage of, or followed by, epileptic and apoplectic seizures than true syncope. Frequently, also, *leipothymia* is intimately associated with epilepsy, the former being either the earlier manifestations or the lesser grade of the latter.—*c.* In *asphyxy*, the actions and functions of respiration are the first to cease; the circulation of venous blood continuing for some

time, until, owing to the privation of pure atmospheric air, the passage of blood through the lungs becomes obstructed, as first shown by Dr. WILLIAMS (*Edin. Med. and Surg. Journ.*, Oct., 1823), when total arrest of the pulmonary circulation, abolition of the cerebral and nervous functions, and, lastly, *cessation* of the heart's action (see ASPHYXY, § 14, *et seq.*), are the consequences. Respiration and circulation are here quite at an end; and the countenance and general surface are reddish, livid, tumid, or bloated; whereas, in *syncope* the face and surface are pale and collapsed, and the respiratory functions and circulation still continue, although in a low and occasionally almost imperceptible state. In the former there is remarkable congestion of the lungs and head; in the latter the brain is generally insufficiently supplied with blood; and the circulation of the lungs, although languid, is seldom obstructed, and never altogether arrested, unless a termination in death supervenes.—*d.* Various manifestations of *hysteria* either very closely resemble fainting, or are in some way or other associated with it. The more remarkable phenomena of *hysteria* may follow, or precede, fainting, most frequently the former; but the loss of motion and sensation often partakes more of the characters of *leipothymia* than of swooning, the pulse at the wrist being but little affected. Pain under the left breast, borborygmi, and a sense of suffocation, which commonly precede the hysterical form of syncope, sufficiently mark its nature; and, even when these are not present, other signs soon manifest themselves, especially convulsions, weeping, laughing, &c. (See HYSTERIA).—*e.* Syncope is rarely so profound as to be mistaken for death; but PORTAL and CHAMBERET, with some writers on medical jurisprudence, concur in thinking that it may be both so complete and prolonged as to endanger premature interment in countries where the last rite is early performed. Whether or not the action of the heart, which cannot be altogether abolished even in such cases, may be detected by the stethoscope, I am unable to state; but it surely cannot continue many minutes without detection upon a strict scrutiny, unless death have taken place. The state of the cornea, which is soon covered with a film, or deprived of its delicate transparency, and afterward collapsed; the appearances of the thorax upon examination; the signs yielded by auscultation; the condition of the body in respect of flexibility, &c.; and the temperature under the armpits, &c., will generally decide the question even in the most doubtful cases. Placing a mirror before the face, or down beneath the nostrils, and observing whether the former be moistened, or the latter moved, have been long popular means of ascertaining the certainty of death, as happily shown by SHAKSPEARE (*Lear*, act v., sc. 3, and *Henry the Fourth*, act iv., sc. 3.)

16. IV. TREATMENT.—Syncope is frequently not only its own cure, but often the means of removing the cause which induced it. When occasioned by hæmorrhage, the languid state of the circulation permits the formation of coagula, which plug the vessels, and arrest farther discharge; and the loss of the voluntary powers causes the patient to fall in the very position which, of itself, generally restores the

use of his faculties, by facilitating the transmission of blood to the brain. The *indications* are, *a.* To remove the cause of the affection; and, *b.* To recover the patient in the seizure.

17. *A.* For obvious reasons, the second intention often may be the first required, particularly when called to him in the attack. The patient should be placed in the horizontal position, and removed to an open and moderately cool air; and fragrant and cold water—lavender water, Cologne water, or simple water—may be sprinkled on the face, or rubbed on the palms of the hands, &c. In more profound cases, frictions of the limbs, epigastrium, &c., may be assiduously practised in a well-ventilated chamber; and the usual stimuli—æther, camphor, ammonia, &c.—given internally, in moderate or appropriate quantity, as soon as the patient can swallow. The recumbent posture should always be continued until recovery is complete.

18. When syncope supervenes upon *blood-letting*, the recumbent posture should constitute the whole means of restoration; for, unless the operation has been very injudiciously resorted to, this will be sufficient for recovery. The use of stimuli in this case will only increase the consequent reaction, and often aggravate the disease for which the depletion was employed. For syncope from *diseases of the heart*, a moderate and discriminating use of stimulants is often necessary; but they may be injurious if it arise from inflammation of the heart or pericardium. When it is caused by *hæmorrhage*, stimulants are very frequently hurtful, as they interfere with the consequent changes in the vessels, preventing a return of the hæmorrhage; but extreme cases and circumstances occasionally arise, rendering the use of stimuli indispensable.

19. If syncope occur *after parturition*, either from exhaustion of nervous power, or from hæmorrhage, internal and external stimuli ought not to be delayed. Swooning from hæmorrhage in the puerperal state always demands immediate and appropriate treatment, as it arises not only from the loss of blood, but also from exhaustion and the sudden removal of an accustomed pressure, affecting more or less all the abdominal and thoracic viscera, from the combination of the three most powerful occasional causes of the affection. Besides, syncope supervening after the recumbent posture is assumed is never devoid of danger; and the imperfect contraction of the uterus so generally connected with the production of hæmorrhage will not be remedied by the continuance of this state.

20. *Blood-letting* has been considered by some writers necessary to the cure of certain forms of syncope, especially by those who have confounded leipthymia with it, which is often benefited by depletions. ZACUTUS LUSITANUS relates a case in which he practised it largely; but the fainting was there evidently connected with disease of the heart, blood-letting being often necessary in such circumstances, although requiring much discrimination, both as to its adoption and to the mode and extent of employing it. In the actual state of syncope it can hardly be resorted to without risk. The practice in such cases must depend upon the inferred nature of the heart's disease. I was

some years ago called by a neighbouring practitioner to a patient suffering from recurring syncope, vomiting of all ingesta, and severe pain in the epigastrium, with anxiety, &c. The disease was viewed as acute gastritis, and appropriate treatment adopted; it terminated, nevertheless, fatally in a few hours. On dissection, evidence of intense inflammation of the pericardium, particularly the part reflected over the heart, was found.

21. When *vomiting* supervenes during syncope, a speedy removal of the affection is the consequence, unless the syncope be, as in the preceding case, a sign of a most acute and dangerous disease, wherein blood-letting should be resorted to. When fainting arises from the quantity or quality of the ingesta, the exhibition of an emetic is generally beneficial.

22. The question has been proposed by BRAUSER, whether blood-letting should be persevered in or not, when it almost immediately causes syncope without any evident cause! Such cases are not infrequent in practice, and I have met with the occurrence even where venæsection appeared most requisite, and the patient by no means fearful of its performance. In a case of this kind, which lately occurred to me, copious local depletion was substituted with great benefit; but in a still more recent case the patient recovered by means of internal treatment, without bleeding in any way. The question, therefore, cannot be answered in a positive manner one way or the other; but where syncope takes place, bleeding is not required in the great majority of cases, and it may be injurious. At a time when blood-letting was viewed as the chief remedy in fever, and directed to be performed as early as possible in the disease, I had opportunities of seeing it practised in the cold stage, or previous to the development of reaction, of both the remittent and continued types; but it almost instantly, or before two or three ounces of blood had been withdrawn, produced syncope of a profound and serious kind, and proved manifestly hurtful. The results would have been very different had the operation been deferred to the stage of reaction; and hence, although instant syncope, or even faintness, upon blood-letting, is an indication of its injurious tendency, if persevered in at the time, yet a consequent state of action, general or local, may arise in a very short time, in which it will be borne to a very great extent without this affection resulting, and will prove most beneficial.

23. *B. The removal of the causes of the affection*, when these are of a constitutional or structural kind, must be attempted after recovery from the seizure. If it depend upon DEBILITY, the means advised in that article will be requisite; and in other circumstances, the treatment suitable to inferred pathological conditions should be practised, as pointed out in the places where such conditions are more especially and appropriately considered. The *prevention* of a return of the affection will be most effectually secured by this procedure.

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FAUCES. See THROAT—Diseases of the.

FAVUS AND ACHOR. See PORRIGO AND PUSTULES.

FEIGNING DISEASE.—CLASSIF.—DIAGNOSIS.—SYMPTOMATOLOGY.

1. Disease may be, 1st, *Pretended* or *simulated*, the person being in a state of health; 2dly. *Artificially excited*, disorder being actually produced; 3dly. *Exaggerated* in the description and appearance given of it, the patient being indisposed; and, 4thly. *Artificially and intentionally increased*, or aggravated during its course. In these four modes disease may be said to be *feigned* or *simulated*.

2. The objects desired to be accomplished by those who undergo the inconvenience, suffering, and moral degradation of feigning disease are. *a.* To escape from being levied into the public services; *b.* To procure a discharge from the public service; *c.* To obtain both a pension and a discharge; *d.* To enjoy the ease and comfort bestowed on the sick, and to escape from hard work, or unpleasant employment, mental or corporeal; *e.* To obtain objects of desire, or to procure compliance with wishes or caprices; *f.* To avoid punishment; *g.* To excite compassion or interest; *h.* To deceive.

3. The persons who feign disease with one or more of these intentions are, *a.* Soldiers and sailors; the former being usually called *malingersers*, the latter *skulkers*; *β.* Slaves and serfs; *γ.* The lowest class of labourers and mendicants; *δ.* Members of benefit societies; *e.* Persons who have received accidental or intended injury, and desire to obtain increased compensation for it; *ζ.* Prisoners for debt, or for civil or criminal offences; *η.* Young persons of both sexes wishing to escape from the confinement of school and the labour of study, or longing for a return to their homes; *θ.* The spoiled or indulged, who desire to excite interest, or to obtain a compliance with their desires; *ι.* And, lastly, those who wish to accomplish objects of private or political ambition, or to gain particular ends. Feigning disease has been resorted to with the last-mentioned view, very probably, from the earliest times. AMNON the son of DAVID, ULYSSES, SOLOON, the elder BRUTUS, the Roman CÆLIUS

(“*Desit fingere Cælius podagram.*”—MARTIAL).—HOTSUR's father, old NORTHUMBERLAND, the Constable BOURBON, POPE JULIUS III., the Earl of ESSEX, and RALEIGH grace this class of *malingersers*.

4. Disease may be so artfully feigned in one or other of the modes just stated (§ 1) as to require the utmost discrimination and ingenuity to detect the imposture. It is obvious, as Dr. CHEYNE remarks, that the discovery of it will be most readily made by those who are the best physiologists and pathologists, and most accurately informed respecting the operation of medicinal agents. In doubtful cases the practitioner should take into consideration the constitution, education, information, habits, and probable motives of the person; and examine more especially those symptoms which are counterfeited with the greatest difficulty, in respect not merely of their individual, but of their correlative characters. The frequency and rhythm of the pulse, in connexion with the temperature, colour, and humidity of the skin; the expression of the eye and face; and the fœtor, colour, and consistence of the excretions, should especially arrest attention. A morbid appearance may be communicated to the excretions, and to the tongue and mouth; but a morbid fœtor of the former, and various states of the latter, are counterfeited with great difficulty. The intelligent observer will infer much also from the manner of the simulator; from the consistency of the account given by him, and from the relation one symptom bears to another in its seat, nature, or severity; and will be careful not to lead him to suspect that the reality of his ailments is for a moment doubted, until proofs of detection are complete. The circumstance of impostors always overacting their part, overloading their accounts with unnecessary details, complaining of their sufferings, and readily falling into the snare of enumerating incompatible symptoms, when a leading question respecting them is put, should not be overlooked. They are seldom desirous of obtaining medical aid, or of submitting to the treatment directed; and, in every case, strict attention should be paid to the exhibition of the medicines ordered, which ought never to be left in the possession of a suspected person. In doubtful, and even in real cases of feigning, painful or even severe measures should not be inflicted, as in most instances, and especially in the public services, the mind of the impostor is made up to endure even torture rather than *give in*.

5. The importance of this subject in private practice is greater than is commonly imagined, as one or other mode of feigning is often resorted to in civil life, especially among indulged females, in order to obtain compliance with their wishes, or to excite interest, or for the pleasure of deceiving; and, in such cases, the practitioner may lower himself in the estimation of the person attempting to impose upon him, by not detecting the cheat. At the same time, he should be careful not to treat a person as an impostor unless the evidence is complete, for he will thereby injure himself in practice, and, in the public services, endanger the lives of those whom he wrongfully accuses. During the late war, when many went into the public services but scantily stored

with medical knowledge, instances were not uncommon of persons feigning disease with success, and of others being treated and punished as impostors who were actually suffering the complaints they made. In proportion, however, to the general advancement in medical science, such occurrences will be more and more rare; and, in recent times, numerous aids have been furnished, in very able papers on the subject, to those who may stand in need of them. In the following account of feigning disease, an alphabetical arrangement is adopted; indeed, it is the only one which the subject admits of:

6. **ABDOMINAL TUMOURS** have been feigned by paddings worn in the dress, and by pushing the abdomen upward in bed, or forward when erect. Detection is easy in such cases, on examination of the naked person. When this is resisted, the inference is obvious.

7. **ABORTION** is simulated by staining the linen and body with blood, procured either by puncture of a vein in one of the extremities, or from the lower animals. Detection is difficult. The state of the pulse, the appearance of the mammæ, and of the countenance, and an examination *per vaginam*, may lead to more or less suspicion, but furnish no proofs of its occurrence.

8. **ABSTINENCE**, either total or partial, has been feigned in numerous instances. Many of the persons who have done so have possessed the power of abstaining from food for a very long time; but deceit has been always practised when total abstinence has been said to have been carried beyond a few days. A woman was condemned for the murder of her husband in the 31st of Edward III. (*Med. and Phys. Journ.*, vol xxxi., p. 50). She had the wisdom to fast in prison forty days, and was pardoned on account of her miraculous abstinence. ANN MOORE, who gulled the British public for some years in this way, and who really possessed the power of fasting for an unusually long time—eight or nine days, or nearly the whole period that a person can live without food—is said to have made a fortune by the imposture. Very attentive watching and much trouble are required in the detection of it; and wherefore should they be undertaken?

9. **BLINDNESS**—partial or total—is feigned chiefly by men in the public services, by mendicants, and by persons endeavouring to avoid conscription into the army or navy. *Amaurosis* is the common form assumed, but paralysis of the eyelids is also sometimes alleged. Amaurotic blindness, being characterized by a dilated and fixed pupil, may be detected by the absence of this sign, and by watching the patient without his knowledge. During the last wars, numerous French conscripts were exempted from service by simulating blindness, and using belladonna to dilate the pupil and render the iris inactive. When the simulator has had recourse to this means, even the reflected light of a mirror will not cause the contraction of the pupil.

10. **CACHEXIA AFRICANA** was formerly produced by the West Indian slaves, in numerous instances, by voluntarily adopting a practice usually caused by disease. It is often connected with disorder of the stomach at its commencement, and in this case the practice of

dirt-eating only aggravates the primary affection, or changes it into the true African cachexy. Whether the practice be the result of a morbid appetite, or adopted with the intention of affecting the health, or causing death, it may be detected by the exhibition of emetics, and on the examination of the stools, the *egesta* being washed. The only means which succeeded in preventing it, when resorted to with suicidal intention, was to cause the slaves to believe that decapitation would be performed on them after death, as they imagine that this operation prevents their return to their native country, and their migration to other states of existence.—(WILLIAMSON in the West Indies; and myself in Africa.)

11. **CANCER** is said by MAHON, FODERE, and BECK to have been feigned by mendicants and others. A part of the spleen of an animal is glued on the part, with the smooth side to the skin, leaving on the outside the appearance of an ulcerated or diseased surface. PIERRE PIGRAY adduces an instance in which this mode of deception was attempted. His account leads to the inference that it was formerly practised on some occasions for the purpose of performing miraculous cures. Attentive examination of the part, and observing whether general signs of cachexia be present, are sufficient for detection.

12. **CATALEPSY** is not infrequently simulated by soldiers or sailors, and by hysterical and capricious females. It may generally be detected, partly by considering the circumstances in which it is observed, and the kind of persons who are affected, and partly by artifice. The use of powerful stimulants; letting fall a drop or two of a very hot or very cold fluid on the skin of the patient's neck; proposing the actual cautery while the pulse is being felt, and marking the effect; and suspending to the hand which has been stretched out a small weight attached to a string, which should be imperceptibly snapped, and observing whether or no the arm be suddenly thrown up, are the usual means of detection. The last method was resorted to by JOHN HUNTER in St. George's Hospital.

13. **CONCRETIONS** of various kinds have been pretended to be passed from the bowels, urinary organs, vagina, and stomach, by soldiers and females. Cases of this kind are adduced by Dr. LIVINGSTON (*Edin. Med. Comment.*, vol. iv., p. 452), Dr. THOMSON (*Annals of Philos.*, vol. iv., p. 76), and Mr. DUNLOP (*BECK'S Medical Jurisprudence*, p. 7). The most superficial examination, and the rudest chemical experiments, will show the difference between the substances thus used for deception and the ascertained nature of the morbid concretions occasionally passed from the bowels and urinary organs. One of the writers in the *Cyclopadia of Practical Medicine* mentions a remarkable instance of deception practised by a young woman at Edinburgh, and continued from 1817 to 1830. She feigned during that time, hepatitis, epilepsy, amaurosis, aphonia, deafness, paralysis, gravel, anasarca, hæmatemesis, convulsions, gastralgia, dyspnoea, retention of urine, vomiting of substances resembling liver, bone, &c., and at last concluded by excreting bone from the vagina. Bone was first detected in the vagina in 1824, while introducing the catheter, and large quantities were passed or extracted, some even

from the bladder. She was received into the hospital in 1825, and the bones which she passed were believed, for a time, to be those of an extra-uterine fœtus. She was there detected by cutting off the supply, and discharged. She afterward had recourse to the same practice, but at last varied it, and had an illegitimate child in 1828.

14. DEAFNESS and DEAF DUMBNESS are simulated by those who wish to escape from the army or navy, or from criminal trials, and by mendicants. They generally lose their hearing suddenly, whereas real deafness is gradual, or the consequence of severe illness. The expression of the countenance and a change in the pulse often betray the impostor when something of great importance is said in his hearing. But some are prepared for this, and are even unmoved by very sudden noises. Mr. DUNLOP states that a soldier feigned deafness so well, that firing a pistol at his ear produced no effect; but on the experiment being tried after he had been put to sleep by opium, he started out of bed. Those who feign *dumbness* are generally unaware that if a person has acquired the use of speech, he never can become dumb, however deaf he may be. The really dumb acquire an expression of countenance and gestures which are assumed with great difficulty, and few have sufficient art and perseverance to counterfeit deafness and dumbness so as to avoid detection for any length of time. Some have attempted even to cause deafness by introducing solid bodies into the ear, or by exciting inflammation of it by irritating matters. Honey and various other substances have been employed so as to simulate *otorrhœa*. The organ and the discharge from it should therefore be carefully examined.

15. DELIVERY has been pretended, with an obvious intention, after artificial abdominal enlargement and sudden subsidence of the tumefaction. In this case the external parts of generation are moistened by procured blood, and the child of another substituted as the female's own. This cheat can be detected only by examining *per vaginam*. Soon after real delivery the vagina will be relaxed as well as the os uteri; the latter tumefied and tender, and the lochial discharge flowing. But these signs will become less evident the longer the time that has elapsed, and, after nine or ten days from parturition, they cannot be depended upon; but the well-known state of the integuments of the abdomen, and the appearance of the mammæ, will aid detection.

16. DROPSY has been simulated by French conscripts, who have been said to have actually injected water into the cavity of the peritoneum, and thereby produced factitious ascites. Anasarca of the extremities has been caused by ligatures artfully concealed; but the imposture will be detected upon strict examination of the naked body, and by the absence of a leucophlegmatic or cachectic appearance. Cushions fitted to the abdomen and padded clothes are the modes resorted to by mendicants; but these require no remark. Instances are mentioned by MANGETUS, SAUVAGES, and others of *chronic dropsy of the head* being simulated by mendicants, who have daily blown air under the scalp of children through a small perforation at the vertex, until the scalp became enormously distended.

17. DYSENTERY and CHRONIC DIARRHŒA are often feigned by soldiers and sailors, particularly in warm climates, and are sometimes actually produced by their using irritating substances for the purpose. Mr. COPELAND HUTCHINSON has seen even a fatal result follow such practices. He ascertained that vinegar and burned cork were often used to cause the disease. Suppositories of soap, and irritating substances introduced into the rectum, have also been employed to cause mucous discharges (CHEVNE); but drastic purgatives are more frequently taken in sufficient quantity for this purpose. The dysenteric evacuation is simulated by breaking down the fecal evacuation in the urine, and mixing with it the blood procured by pricking the gums. The imposture is detected by the cleanness of the linen; by obliging the patient to use a night-chair, and by watching his proceedings.

18. EMACIATION, partial or general. *General emaciation and debility* are sometimes occasioned with the view of avoiding some disagreeable service, or to be sent home from foreign service, or to procure change of climate. Abstinence from food and sleep, the frequent use of purgatives or diaphoretics, especially antimony, and excess in spirituous liquors, are the means commonly resorted to. Wasting of a limb is caused chiefly by mendicants, by means of continued compression; and the diagnosis between artificial and real wasting is often very difficult. Detection must depend upon a strict examination, and a variety of considerations thereby furnished to the duly qualified examiner.

19. EPILEPSY is very frequently feigned by mendicants, by sailors and soldiers, and occasionally by females, to serve particular ends. In such cases it is proper to notice whether the person falls to the ground without regard to the situation or place; whether the face be livid, the pupil fixed, the spasm and convulsions general, the pulse altered, the insensibility complete, the mouth distorted and frothy; and whether sopor follow the fit, passing into heaviness, vertigo, and exhaustion, as all or most of these symptoms are absent, or imperfectly evinced in the simulated disease. The opportune appearance of, and selected situation for, the feigned paroxysm, the partial or successive production of the muscular actions, the sensibility of the iris, the abrupt termination of the seizure, and the absence of injury to the tongue, should also be taken into account. Foaming at the mouth is sometimes imitated by means of soap kept in it; but it is generally overdone in this case. The real epileptic is desirous of concealing his infirmity, while the simulator talks of his disease, and never endeavours to avoid publicity. It is chiefly, however, by artifice that feigned epilepsy can be fully detected. DE HAËN, observing the sensibility of the pupil in a girl who feigned epilepsy to avoid work, suspected the imposture, and desired the attendants to place her in an erect posture, and to chastise her severely if she fell. She confessed the cheat. A beggar in Paris, who often fell into fits in the streets, was placed on a truss of straw, ostensibly to prevent him from sustaining injury. When in the midst of the paroxysms, fire was set to each corner of his bed, and he sprang up and fled. SAUVAGES was

called to a female who imitated the fit remarkably. He inquired whether, on the access of the paroxysm, she felt pain extending from her arm to her shoulder, and thence to the opposite thigh. She said that she did, and was detected. MR. COPELAND HUTCHISON introduced some Scotch snuff up the nostrils of a man whom he suspected of feigning a fit. It induced a fit of sneezing, and epilepsy was not afterward heard of. Dropping alcohol into the eye (CHEYNE), the introduction of nauseating substances into the mouth, proposing very painful or dangerous means of restoration in the patient's hearing, the dread of the actual cautery, directing boiling water to be poured over the legs, and actually pouring very cold water, have severally been recommended. Dr. CHEYNE states that, in the case of a soldier, a table was placed upon another, and the simulator laid, in the midst of his fit, on the former. Dread of the fall terminated the convulsions. In doubtful cases, particularly in the public services, the medical man should be cautious in giving an opinion, and should never sanction punishment. Dr. CHEYNE and other experienced writers state that they are "in possession of sufficient evidence to prove that real epilepsy has often been considered feigned;" and they might have added, punished accordingly. But these occurrences, however frequent in past times, are not likely to take place often in future.

20. FÆCES.—Incontinence of fæces is sometimes feigned. It is detected by examining the sphincter ani, according to the recommendation of Dr. CHEYNE, who directs that, if it should contract upon the finger, opium and solid food should be prescribed, and a watch set over the person. If he pass solid fæces in bed, he will be a fit subject for punishment.

21. FAINTING and SWOONING are simulated by medicants, by hysterical or indulged females, and by sailors and soldiers in order to escape punishment; but the nearly or entirely absent pulse, the scarcely perceptible respiration, the collapse, coldness, and paleness of the countenance, and cold sweats, with coldness of the extremities, are not easily produced at will. Ligatures or pressure have been used to suppress the pulse, and washes applied to the face to produce paleness; the means of detection should, therefore, have reference to such artifices.

22. FEVER is more frequently produced artificially than feigned. Ague is the type selected when feigning is attempted. The exertions, however, necessary to simulate the rigours of the cold stage will generally be found to be productive of the sweating stage instead of the former. Cantharides, and various stimulants, are usually taken, to induce febrile symptoms; and a temporary acceleration of pulse is often occasioned, by both sailors and soldiers, just before the physician's visit, by striking the elbow against any hard substance. Some persons acquire a power of accelerating the heart's action at will. Emetics are sometimes also resorted to, to make the deception more complete; and the tongue is artificially coloured by chalk, pipe-clay, brickdust, tobacco, brown soap, &c. When suspicion is excited, the pulse should be examined a second time on leaving the patient, and preferably in the carotids or temples, the state of the excretions be-

ing particularly attended to. Cases of feigned fever are generally ephemeral, and a day or two of close examination generally leads to detection.

23. GASTRIC AFFECTIONS, especially *gastralgia* and attacks of *vomiting*, are sometimes simulated. The former is detected with great difficulty, and chiefly from collateral circumstances. *Vomiting* is generally produced by having recourse to the common emetics, or to tobacco, particularly the latter, on account of its depressing influence on the nervous system and circulation, and by pressure on the stomach (C. HUTCHISON). I met with an instance, some years ago, where it was induced at will, by the action of the abdominal muscles, without even the aid of irritating the fauces. In such cases, the state of the appetite and the appearance of the evacuations should be examined; for, unless where tobacco has been taken to disorder the stomach, the former is but little impaired. In the case of vomiting at will just mentioned, the person had no sooner emptied his stomach than he proceeded to replenish it again with an appetite. Not only is vomiting produced, but farther deception sometimes is attempted by introducing various foreign substances into the matters ejected. A singular case, in which a girl was said to have brought up the larvæ of insects and reptiles from her stomach, is recorded in the *Transactions of the Dublin College of Physicians*. It afterward, however, was ascertained to have been a well-managed deception.

24. HÆMORRHOIDS are sometimes simulated, the appearance of the hæmorrhoidal tumours being imitated by means of small bladders filled or tinged with blood, and partially introduced into the rectum (PERCY and LAURENT). Simple discharge of blood from the anus is more easily feigned, and the deception is detected with greater difficulty.

25. HÆMORRHAGES from the *Stomach*, or from the *Lungs*, are often feigned. In order to imitate *Hæmoptysis*, cough is pretended, and the saliva coloured by pricking, scratching, or sucking the gums, or by holding Armenian bole, brickdust, vermilion, &c., in the mouth. An attentive examination of the sputum, and of the physical and rational symptoms, will generally lead to detection. *Hæmatemesis* is often feigned by swallowing bullock's blood, and soon afterward by inducing vomiting. If the quantity taken be considerable, vomiting will often follow without any aid. Instances of deception practised in this way are mentioned by SAUVAGES, METZGER, and BECK. A close investigation of the symptoms, and, if suspicion be occasioned, a strict surveillance, will generally prevent a continuance of the imposture.

26. HEART AFFECTIONS have been simulated, in order to escape from the public services. MM. PERCY and LAURENT state that a ligature has been found so firmly bound around the neck as to cause a livid and swollen countenance, and disorder of the heart's action. Dr. QUARRIER and Mr. COPLAND HUTCHISON ascertained that white hellebore was often used by sailors to produce this effect, vomiting, purging, syncope, tremours, and nervousness, followed by palpitations, being the usual consequences of a large dose of this substance. Mr. DUNLOP states that death was occasioned in one in-

stance by the use of hellebore with this intention.

27. **HEPATIC DISORDERS** are often feigned by soldiers in warm countries, particularly in India, and by officers and others desirous of returning to Europe. If any doubt of the reality of the complaint exist, the person should be undressed, and carefully examined by percussion and the stethoscope. The absence of enlargement in the region of the liver, the complexion, and appearance of the surface and limbs, and the state of the pulse and respiration, are the circumstances which should chiefly be considered. It ought not, however, to be overlooked that most serious disease of the liver may exist without enlargement; and this viscus may be considerably enlarged, and even rise up into the right thorax, without being felt below the ribs. Hence the propriety of having recourse to percussion and auscultation in the investigation, especially when other proofs of disease are wanting.

28. **HERNIA** and **HYDROCELE** have been simulated by blowing air into the cellular membrane of the scrotum. Mr. C. HUTCHINSON met with an instance of hernia being feigned by elevating the testes to the external abdominal rings. Detection in cases of this kind is quite easy.

29. **HYSTERIA** is not infrequently feigned. Dr. DUNGLISON directs sternutatories to be employed; but the affection may be real, although they produce their usual effect. Detection is by no means easy, especially when an intelligent female simulates this complaint. In a case to which I was lately called, the moral circumstances and the symptoms induced me to infer deception, and I accordingly took my leave by simply stating, in the patient's hearing, that if recovery was not complete in a few minutes, the affusion of cold spring water over the head and neck would certainly have the desired effect. It should, however, be recollected that females who are really hysterical are the most prone to feign disease; this affection and the desire to simulate others frequently arising from the same cause, viz., uterine irritation.

30. **JAUNDICE**, notwithstanding the difficulty of the attempt, has been successfully simulated, particularly in France, during the late war. Conscripts employed an infusion of turmeric to tinge the skin, muriatic acid to give the evacuations a clay colour, and rhubarb to heighten the colour of the urine. But the white of the eye cannot be changed by art, although smoke has been tried for this purpose. Washing the surface, and preventing access to the materials of deception, are the chief means of detection.

31. **INSANITY**, in some one of its various forms—but most frequently mania, melancholy, and idiocy—is frequently feigned, and detection is by no means easy. There can be no doubt that, in the public services, pretenders often gained their ends, and that the really afflicted were sometimes treated as impostors. Nor can this be a matter of surprise, when the great difficulty of discrimination is considered. In the present day, madness is most commonly feigned with the view of escaping from the punishment due to crime, and the responsibility of the medical examiner is consequently

great. He should, therefore, have every facility afforded him, and take sufficient time to the investigation, that he may arrive at a correct conclusion. He should endeavour to obtain from the individual a full account of himself, mark its consistency, and place an intelligent watch over him. The expression of the countenance and of the eye, the gestures and manner, the state of the tongue, the appetite, and the evacuations, and especially the duration, continuance, or frequency of sleep, ought to be carefully observed. Certain expressions of countenance and gestures are so peculiar to the insane, that the experienced observer will infer much from them. Pretenders generally overact their parts, assume the more violent or disgusting forms of mania, do not maintain the deception when they believe themselves unobserved, recommence it in the society of others, and possess not the power of prolonged abstinence from sleep and food so generally observed in the truly insane. Sound sleep soon overpowers the pretender, whereas the insane are remarkably watchful, sleeplessness to a distressing degree often preceding the disease, and always attending it throughout, for much longer periods than can ever be endured by a person in health.

32. The insane, during remissions, are desirous of being considered free from the malady, and often assiduously endeavour to conceal whatever may betray them; but simulators seldom carry their deception thus far. The real malady usually commences with slight disorder of the common modes of thinking and acting, and advances slowly through some hallucinations, until at last it is either fully developed, or is suddenly exasperated. The feigned disease, on the contrary, presents not this course, is not preceded by sleepless or restless nights, and by a continued consideration of one topic, but appears at first in its full violence. The existence or non-existence of the causes of insanity, of previous attacks, of pre-existing eccentricity of manner or thought, of hereditary tendency, of antecedent affections of the brain, of injuries of the head, &c., the character of the individual, and the motives for feigning will also be considered by the physician. Care should be taken not to infer deception because the motives for it are apparently strong; for the circumstances constituting the motives may be the causes of the real malady. The costive state of the bowels, the large doses of medicine necessary to move them, the comparative insensibility of the stomach to tartarized antimony, the generally more frequent pulse, and the sudden and extreme irritation on any contradiction, observable in the maniacally insane, should not be overlooked, as they hardly admit of being feigned. Their disregard of the decencies, comforts, and affections of life ought also to be taken into account; for, although these signs are often also simulated, deception in respect of them is seldom carried so far as in the real malady. A person even of pure character, when truly insane, will often use the grossest language, practise the greatest indecencies and brutalities, and evince the bitterest dislike of, and malice to, his friends; but simulators exhibit those symptoms only when they believe themselves watched, or before others. Dr. HASLAM remarks that the *melancholic states* of

insanity are feigned with greater difficulty than the maniacal; the one presiding principle, the ruling delusion, the unfounded aversions, and causeless attachments, the peculiar look, the solemn dignity, and the associations characteristic of the former can never be simulated so as to deceive the experienced observer. *Idiocy* is most easily feigned, yet there are always a hesitation and reflection observable in the discourse of the pretender, his disordered ideas not succeeding each other with the same rapidity as those of a person whose understanding has been really destroyed. The simulator will also, according to Dr. MARC, repeat the same ideas, and often the same words, in order to prove his madness, that he is requested to repeat; whereas the truly insane will wander incoherently from what he is desired to utter. In this form of insanity, the patient is always pusillanimous and submissive, unless during impetuous excesses, which only sometimes occur, and memory and conception are both defective.

33. It may sometimes be proper, if suspicion exists, to mention some severe remedy, or to threaten punishment. The really insane never heed these; but those who feign will often discover, by the change in the pulse, or by looks or actions, the emotions thereby induced. ZACHARIAS states that a physician ordered, in the hearing of a person whom he suspected of deception, that he should be severely whipped; inferring that the external irritation might be useful if the disease was real, or too severe a test if feigned. The threat was sufficient. FODERE, on leaving a female who had long succeeded in simulating insanity, said to the keeper, within hearing of the patient, "Tomorrow I shall again visit her; but if she continue to howl, if she be not dressed, and her chamber not put in order, you must apply a red hot iron to her neck." This was sufficient. The very treatment most conducive to the recovery of the really insane is the most intolerable, if persisted in, to the simulator; who is often all at once cured upon hearing of his being about to be sent to an asylum, or of a continued and rigorous recourse to solitary confinement, low diet, and repeated counter-irritation.

34. LAMENESS is often feigned by sailors, soldiers, mendicants, and convicts, by pretending contractions of the muscles, deformity, effects of fractures, and by introducing sharp bodies under the skin. For pretended contractions of muscles or joints, a tourniquet may be placed above the joint, and so closely drawn as to render the muscles incapable of acting, when the joint will become moveable. The emaciation of the limb in these cases is no proof of their reality, as it necessarily proceeds from disuse of the limb. Previous fractures of bones is often alleged; but the cheat is readily detected on minute examination. *Malformation*, particularly curvatures of the spine, elevation of one shoulder, inversion of the feet, and shortness or distortion of a limb, are sometimes simulated. There can be little difficulty in detection, on a careful examination of the naked body. Pretended distortion of a limb may be ascertained by the use of the tourniquet, or by straightening it, while the simulator's attention is withdrawn from it, as was done by

Mr. C. HUTCHISON in a case which occurred to him. Instances have been met with of females who caused serious swellings and abscesses by introducing a number of needles into the parts.

35. NEURALGIC, RHEUMATIC, and other PAINS are very frequently simulated; and detection is very difficult, as it is next to impossible to prove the absence of pain. Inconsistencies in the patient's account of his case, and contradictions into which he may be readily led by an artful examination, are the chief means of detection. Pain is seldom very severe or prolonged, without being attended by certain symptoms, according to its situation. If it affect the joints, swelling, redness, stiffness, &c., are usually the result; if it occur in any part of the abdominal cavity, the functions of digestion, assimilation, or excretion will be disordered; if it affect the thoracic organs, circulation or respiration will be deranged; if it occur in the head, loss of sleep will, at least, be the consequence. The inference should depend much upon the kind of pain complained of, upon its continuance or recurrence, and the nature of the phenomena attending it. If violent pain is stated to be present, and the patient, notwithstanding, has a good appetite, sleeps well, and does not lose flesh, we may doubt its reality. The effects of remedies should also be taken into the account, as well as the patient's desire of, or objection to, those which are of a severe kind. But the most severe pains may long exist, even in external parts, without affecting their appearance, and be referred to internal organs, without materially deranging the functions. Several instances of this kind have come within my own observation. These have been usually called neuralgic; and have often disappeared for a time, either during treatment, or without the use of any means. Many of the reputed cures of these would have taken place without any remedy whatever; but, to whatever cause the recovery is attributable, the return of the pain in some form or degree is generally observed, although of this as little as possible is said by narrators of extraordinary cures; and sometimes a return of the complaint is the least unfavourable occurrence, a more dangerous or even fatal malady taking its place, especially in the rheumatic and gouty diathesis.

36. Cases have occurred which have caused suspicions of feigning, and yet the results have shown most serious internal disease. A female, some years since, consulted a number of physicians respecting a most violent pain in the left side and loins, extending upward to the left mamma. One considered it neuralgic, another hysterical, a third uterine irritation; a fourth deception, probably connected with hysteria; and, lastly, it was attributed to spinal irritation. The appetite continued good, the urine appeared healthy, and there was no emaciation. After many years of suffering, the lady died; and there were found (what, indeed, might have been expected) a great number of calculi in the uriniferous ducts and pelvis of the left kidney. A celebrated preacher and theological writer long complained in a similar manner. The urine was abundant, and of a good colour, and hence disease of the kidney was not suspected by the numerous eminent

men whom he consulted; but this organ was, nevertheless, found, after death, filled with calculi. I have met with two or three instances of the most severe pain, recurring at irregular intervals, in a particular joint—in the left shoulder joint in one case, and in the right knee in another, without any apparent local or constitutional disturbance; the tongue being clean, the bowels regular, the appetite good, and the flesh and strength undiminished. An ointment, with a large proportion of veratria, was employed for some time in one of these cases, without benefit. The most successful means in both were such as improved the digestive and excreting functions. These cases, in circumstances admitting of the least suspicion, might have been considered as feigned.

37. I have no doubt that formerly, when the pathology of the spinal chord and its membranes was less attended to than now, many very severe affections, occasioned by changes in this quarter, were viewed as fictitious. I lately attended an intelligent tradesman advanced in life, who long complained of severe pains in the thorax, darting through both sides, and often backward to between the shoulders. They were occasionally most violent, and fixed themselves for a time in one place, and then in another, of this cavity. The functions of circulation and excretion were unaffected, but the respiratory actions were sometimes disturbed. One day he was unable to get out of bed, and another he came down to his parlour. His complaints were considered chronic pleurisy, adhesions of the pleura, rheumatism of the thoracic muscles, &c. When first called to him, I examined the thorax by auscultation and percussion. The sounds furnished by both were perfectly healthy. The liver was thought to rise rather high, and the stools were deficient in bile. Chronic disease of the liver was therefore suspected. Upon extending the examination to the spine, two of the spinous processes of the upper dorsal vertebræ were found very prominent, and pressure in this situation caused great pain. The treatment was directed accordingly, and amendment took place. These cases evince the importance of a very minute and extended examination in ascertaining the cause of pain, and, consequently, of proving its reality. When severe pain is complained of by females in any external or internal part, an opinion as to its reality or nature should not be given until the spine is carefully examined, and the state of the uterine functions inquired into. The existence or non-existence of tenderness, pain, or fulness in the hypogastric, iliac, and sacral regions, indicating disease of the uterus or ovaria, ought also to be ascertained; for if the least sign of disorder in any of these situations be detected, we ought not to infer deception, although it must be admitted that exaggeration, and even deception, may be practised nevertheless.

38. OPTHALMIA was not infrequently produced by soldiers and conscripts during the last war, by means of corrosive sublimate, powdered alum, quicklime, acids, salt, tobacco, and various acrid powders and mechanical irritants. The extreme rapidity of the inflammation, especially as respects its invasion of the conjunctiva oculi and cornea, and the circumstance of the right eye only being affected, should ex-

cite suspicions. The chronic forms of ophthalmia were also excited and kept up by extracting the eyelashes and applying irritants to the edges of the eyelids. When entire scclusion of the suspected patient cannot be obtained, as in the navy, the recommendation of Mr. C. HUTCHINSON to use the strait waistcoat should be adopted.

39. PALSY and SHAKING PALSY are not often feigned. If, with the loss of motion, or the continued agitation of a limb, or one half of the body, the general health appears to be good, and the excretions natural, a watch should be set upon the patient, and his actions observed when he thinks himself unnoticed. The cold affusion, electric shocks, moxas, and the actual cautery, will often have a wonderful effect in suspicious cases. Even the threat of having recourse to these means has been sufficient. In cases of simulated paralysis, detection may be easily accomplished by causing sleep by opium, and then tickling, irritating, or pinching the motionless extremity. If the disease be feigned, the limb will be retracted or withdrawn; and, upon first waking, it will often be used before the patient recollects himself.

40. POLYPUS of the Nose has been often imitated, according to MM. PERCY and LAURENT, by French conscripts, who have succeeded by introducing the testes of cocks, or the kidneys of hares or rabbits, into the nostrils, and retaining them there by means of sponge to which they had been fastened.

41. PREGNANCY is often pretended to gratify the wishes of a husband or relations, to increase interest, to extort money from a paramour, to deprive a legal heir, to delay the execution of punishment, and to avoid labour. A careful examination of the areolæ, of the mamma, of the umbilicus, and of the *os uteri*, will generally lead to detection, at least in the more advanced months. (See PREGNANCY.)

42. PULMONARY DISEASES are not often feigned; but I have met with instances—two in females—in which slight symptoms have been exaggerated into the appearance of dangerous disease, particularly in the description of them, in order to accomplish particular ends. In such cases the patient has a frequent and short respiration, and a hacking cough, with little or no expectoration; complains of the pain on coughing or taking a full inspiration, and of night sweats; evidently desires to be considered very ill, but is averse from medicine, as he considers it of no use, and even resorts to various means to produce emaciation, particularly vinegar, the oxides of copper, cream of tartar, tartaric acid, &c. The state of the pulse, the sounds produced by auscultation and percussion, the apparent despondency, instead of the continued and unwearied hopes of the patient, characterizing the real disease; the marked reluctance to have recourse to issues, setons, or counter-irritants, and an inquiry into the wishes of the patient as to regimen, &c., are the chief means of detection. In private practice the physician should endeavour to ascertain whether or no the treatment directed is strictly followed, particularly the insertion of issues, setons, &c.; for if these be not adopted after a confident recommendation of them, strong suspicions of deception should

be entertained, and he should immediately withdraw.

43. **RECTUM.** — *Prolapsus and Fistula of the Rectum* have both been simulated by conscripts and persons desirous of escaping from the public services. AMBROSE PARE, PERCY, and LAURENT met with instances in which a portion of sheep's gut, or the urinary bladder filled with blood, had been partially introduced up the rectum in order to imitate *prolapsus*. *Fistula* has been actually produced by making an incision near the verge of the anus, and introducing into it an acrid tent, particularly the root of white hellebore (DUNGLISON).

44. **RHEUMATISM and LUMBAGO** are often feigned by soldiers and sailors. Where they are complained of without swelling of joints, or acceleration of pulse in the evening, or increased heat of the affected part, wasting of the limb, disorder of the digestive and biliary organs, or loss of the appetite and looks, suspicion should be excited. Dr. CHEYNE remarks that those who feign this disease "give a glowing account of their sufferings, alleging that they have entirely lost the use of the part affected, which seldom happens in genuine rheumatism. There is, for the most part, no adequate cause assigned for the complaint; no relief from remedial treatment acknowledged; and, while real rheumatic affections are aggravated by damp, the impostor complains equally at all times." (See § 35.)

45. **SIGHT.**—Defects of this sense are frequently feigned. *Short-sight* may not only be pretended, but it may actually be occasioned by the use of concave glasses, in order to avoid military service. Those who are truly near-sighted frown or knit their brows habitually, when looking at objects beyond the range of distinct vision, and the *crow-feet* wrinkles at the outer corners of their eyes become early marked. MM. FODERE, PERCY, and LAURENT advise that persons claiming exemption on this account should be caused to read with concave glasses, the book being held at a proper distance; and without them, the book being put close to the eyes; if they cannot read distinctly in both cases, the imperfection is feigned.—*Night-blindness*, or intermittent blindness (hemeralopia, nyctalopia), is often simulated by sailors and soldiers serving in warm climates, where the affection is common; and it is detected with difficulty. The deception is practised in order to avoid night duty, and has been put a stop to by associating a blind man with one who can see in the various works carried on during the night, and when the sentries are doubled (CHEYNE).

46. **SOMNOLENCY, or SOPOR**, has been feigned with the utmost pertinacity, in order to obtain a discharge from the public services, or to answer purposes of revenge, as in the instances recorded by Dr. HENNEN and Mr. DEASE. As cases of sopor sometimes occur, care should be taken to distinguish between the real and simulated. The former is seldom, or perhaps never unconnected with some cause of exhaustion operating chiefly on the nervous system, or without antecedent signs of mental and physical debility, particularly defect of memory, hesitation of speech, remarkable languor, &c. I lately attended, with Mr. BUSHELL, a gentleman about sixty years of age, who con-

tinued for many weeks in a state of sopor, interrupted only by being talked to loudly, or by taking food. When thus roused, he yawned, answered slowly, and instantly fell into a quiet sleep, unattended by any unnatural respiratory sound. He recovered slowly by the use of tonics and stimulants, and the occasional exhibition of stomachic purgatives. No cause but exhaustion of nervous and cerebral power could be assigned for the disease. Such cases, however, most frequently follow injuries of the head, attended by pressure on the brain, or the slow development of tumours within the cranium. Dr. G. SMITH mentions the case of a soldier who feigned a state of insensibility, and resisted every kind of treatment; but on proposing, in his hearing, to apply red-hot iron, his pulse rose, and amendment rapidly followed. A singular case of feigned sopor is detailed in the *Edinburgh Annual Register* (vol. iv., part ii., p. 159). A soldier, eighteen years of age, confined for desertion, lay, apparently insensible, from the end of April to the 8th of July, 1811. Electric shocks, the application of snuff to the nostrils, pins thrust under his finger-nails, and other stimulants failed to rouse him. The sopor being thought the consequence of injury, the scalp was divided in order to ascertain the existence of depression, and the bone even scraped! yet no complaint was made. The case was viewed as hopeless, and the man dismissed. Two days after his discharge he was seen cutting wood some miles from home. But wherefore should a depression of the cranium be hunted out by dividing and drawing back the scalp and scraping the bone? One would expect that some tolerable signs of its existence should have presented themselves before such serious measures were resorted to. Can we be surprised at detection failing in such hands?

47. **TYPANIC and EMPHYSEMATOUS AFFECTIONS** have been simulated by introducing air into the digestive canal, and by inflating the cellular tissue, in the manner already stated (§ 28). MM. PERCY and LAURENT mention the case of a conscript who simulated an immense tympany by swallowing air; and Dr. CHEYNE states that this affection was apparently caused by a number of men in the 84th regiment. The pulse, tongue, and excretions were natural, but pain in the region of the liver, and over the abdomen, which was distended and tympanic, with insatiable thirst, were complained of. Deception being suspected, they were required to take a cupful of a solution of the sulphate of soda in weak tobacco water every four hours until it operated. Recovery was speedily effected by means of this detestable medicine; but sixteen men had succeeded in procuring their discharge before this treatment was adopted. Dr. G. SMITH states that wonderful cures were often effected in military hospitals by a medicine composed of salts, aloes, and asafetida, given frequently in small quantities, so as to keep the taste in the mouth. The substances used to produce this tympany seem not to have been fully ascertained. It was ascribed to the use of large quantities of chalk and vinegar.

48. **TUMEFIED LEG** is excited by means of an artfully-concealed ligature, and keeping the extremity in a hanging posture. The writers on

this subject in the *Cyclopædia of Practical Medicine* state that a case of enormous enlargement of the thigh and leg, resembling elephantiasis, was sent home from India to be discharged. A ligature was discovered, and, upon its removal, the swelling gradually subsided. The detection and prevention of such cases cannot be difficult.

49. **ULCERS** artificially caused were remarkably frequent in both navy and army during the last war. They were generally produced upon the legs by various caustics or irritants, by friction with sand, by quicklime mixed with soap, by compression with metallic or other bodies, and by mineral acids. Arsenic, corrosive sublimate, tobacco, &c., have also been used for this purpose. Mr. C. HUTCHINSON found a halfpenny between the muscles of a leg which he removed in consequence of extensive caries of the tibia following artificially-formed ulcers. Intentional ulcerations are distinguished from the real by their borders being less callous, their surfaces more superficial and less painful, and their disposition to heal, when secured against tampering, much greater, owing to their not originating in, or accompanying, constitutional disorder, as in the case of real ulcers. In order to prevent this species of deception, Mr. C. HUTCHINSON had recourse to a wooden box, in which he locked up the whole limb; all other means, as marked or sealed bandages, &c., having been found insufficient against the ingenuity of malingerers.

50. The **URINE** presents various disorders in respect of its characters and of its excretion, which have been artificially produced or feigned by persons desirous of escaping from the public services, and by hysterical females. *Incontinence of Urine* was often simulated by sailors and soldiers. The circumstance of this disorder occurring frequently in this class of persons, who are mostly young, or in the vigour of life, should excite suspicions of its reality. The simulator generally chooses the circumstances and place suitable to his purposes in allowing the urine to escape. LAURENT and PERCY state that the *glans penis* is always pale and shrivelled in real incontinence, and that the urine never comes away in a stream. M. FODERE, finding that this complaint was becoming epidemic in a regiment, and that blistering the perinæum and other means did not cure it, directed the penis of every patient to be tied and the knot sealed, none but the person guarding them being allowed to remove the ligature. The penis was observed from time to time, to ascertain whether or no distention above the ligature existed, and whether, when it was removed in order to urinate, the discharge took place *guttatim*, as in real incontinence, or in a stream. The expedient succeeded, and the epidemic vanished (vol. ii., p. 481). PERCY and LAURENT prescribed twenty lashes to the loins, with the avowed object of exciting the weakened organs. It was unnecessary to direct it to a second case. An army-surgeon directed a cold plunge-bath twice a day with equal success; and Mr. HUTCHINSON, Mr. COMYNS, and Dr. HENNEN caused a strong opiate to be given at night, and the length of time the urine was retained during sleep to be watched, for, in real incontinence, the urine passes away after a short time under all cir-

cumstances. The patient may also be caused to undress and stand before the medical man at the time when he states that his urine usually passes off. In cases of feigning, the abdominal muscles will be seen contracting in order to expel it.

51. *Bloody Urine* has been simulated by the ingestion of beet-root, madder, the extract of logwood, the fruit of the prickly pear, the Indian fig, &c. But blood is more frequently mixed with the urine. PERCY and LAURENT state that conscripts have injected blood into the bladder, in order to imitate hæmaturia. This disease has even been occasioned by having recourse to cantharides. A boy in Staffordshire, in 1617, having accused a woman of bewitching him, feigned various maladies, and, among others, the excretion of *black urine*. The wisdom of our ancestors condemned the woman to be burned, as was usual in such cases; but the bishop of the diocese, suspecting imposture, caused the boy to be watched, when he was detected dipping cotton in ink, and afterward introducing it within the prepuce, in order to give the urine, which he publicly voided, its dark colour. (*Mem. of Literature*, vol. iv., p. 357.)

52. The excretion of *Gravel*, and of other substances, has likewise been feigned. In all such cases, as well as the foregoing, the person should be made to urinate in the presence of the physician. The real existence of gravel is ascertained beyond doubt, by close inspection and chemical analysis.* *Strictures* have also been feigned; but the passage of a bougie will always ascertain their reality in the hands of an expert surgeon. *Suppression and Retention of Urine* have been pretended, but most frequently by convicts and hysterical females. The introduction of the catheter, and a strict watch, will generally show the state of the case.

53. **UTERINE DISEASES** have been feigned and exaggerated, and I believe more frequently than is commonly supposed. It was attempted in one case, in which I was, some years ago, consulted; but the object becoming apparent, I withdrew. This kind of simulation is sometimes adopted with an evident motive, as dislike of a husband, &c.; but in other cases the object is not so apparent. Dr. THOMSON, of Edinburgh, mentions an instance of a female in a respectable station who pretended to pass vesicular bodies resembling hydatids from the vagina. They were ascertained to be prepared from the intestines of a pig, and were made to resemble a string of beads.

54. **VARICOSE VEINS** have been caused by ligatures or pressure made in the course of the larger trunks. They may also be aggravated, when already present, in a similar way. Attentive examination, and the means advised for ulcers (§ 49), will generally detect the deception, and prevent it.

55. **WOUNDS** have been both pretended and inflicted intentionally. The feigning of wounds has been sometimes practised to avoid the danger of battle, or to be mentioned in despatches. Means which may occasion the ap-

* [For a remarkable case, in which both *urine* and *gravel* were feigned to be secreted and discharged from the mouth, rectum, urethra, nose, ear, side, and umbilicus, see my edition of GUY'S *Forensic Medicine*, p. 250.]

pearance of a contusion, as abraded or discolouring the surface, are chiefly resorted to. Detection will depend upon attendant circumstances and the acuteness of the surgeon. Mutilations, or intentional wounds, are more commonly resorted to, in order to avoid conscription into the public services, or to obtain pensions or a discharge. They are sometimes, also, practised by slaves, mendicants, and revengeful persons. And wounds and injuries involuntarily received have been aggravated, and their healing interfered with, to answer particular purposes. Detection in many instances is difficult, but it will be necessary to consider the possibility of the patient having inflicted the wound himself, its nature and extent, its relation to the alleged cause, to the probable object desired to be accomplished, and all the circumstances connected with it, before a conclusion should be arrived at. Persons in the public services, it should be remembered, occasionally assist each other in causing mutilations, and in aggravating injuries; so that the moral as well as the physical relations of the subject should be carefully weighed in all cases.

56. I have given the sum of our knowledge as to the means of distinguishing real from feigned disease, and of preventing the consequences of successful deception. I have endeavoured to avoid extraneous matters; and have not introduced amusing instances of simulation, as my limits must be more usefully occupied. The importance of the subject is especially great to the naval and military medical officer; but it is not less so to the civil practitioner; and the success of both in detecting imposture will mainly depend upon their science, practical knowledge, and ingenuity. With a tolerable store of each, they will seldom be placed in great difficulty, or be obliged to resort to more painful means of detection than the disease would warrant, were it real.*

* [The following concise rules for the detection of feigned and fictitious diseases, from GUY'S Forensic Medicine, will prove of essential service to the practitioner (*Am. Ed.*, p. 247):

"1. Inquire, in all cases, into the existence of motives for deception. Will the suspected person, by imposition, gain anything he desires, or escape anything he dreads? Is he in a position to profit in any way by deception? It is necessary, in this place, to caution the medical man against concluding that a malady is real, because there is no obvious advantage in simulating it. Both men and women are in the habit of feigning from other motives than those of gain, such as sympathy; and occasionally there is so complete an absence of reasonable motive, that we are forced to believe in the existence of a moral insanity displaying itself in this way.

"2. Inquire into the previous history of the patient, and the character which he bears among those who know him best, as his comrades or companions. It often happens that the impostor has been previously noted for dishonesty, and for practices similar to those of which he is suspected. But in other instances, men of the best character, and who have for years filled their situations with credit, have been convicted of malingering.

"3. In the case of external diseases palpable to the senses, make a minute and careful inspection of the part itself, and examine it by the eye and by the touch. When there is a suspicion of the use of irritating substances, examine the part with care, and search the pockets, boxes, or bed of the suspected party, and, if necessary, isolate him so as to deprive him of the assistance of others, and of his means of deception. Use equal care in inspecting substances alleged to have been discharged, and examine them, if necessary, by the microscope, or by chemical tests.

"4. When some defect or disability not palpable to the senses, but depending entirely upon the assertion of the person himself, as pain, deafness, &c., is assumed, we must endeavour to take him by surprise. In the case of pretended deafness, for instance, we must try to discover

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FEVER. SYN.—*Ἰσπερος* (from *σῆψ, fire*); *Πυρεξία, Πυρεξίς*. Pyrexia, Pyrexia; Febris (from *ferbo*, or *ferbuo*, I cleanse). *Fievre*, Fr. *Fieber*, Germ. *Febbre*, Ital.

CLASSIF.—I. Class, Febrile Diseases; 1. Order (*Cullen*).—3. Class, Diseases of Sanguineous Function; 1. Order (*Good*). III. CLASS, II. ORDER (*Author*, in *Preface*).

the imposition by sudden and unexpected noises, and by speaking to the party immediately on his being roused from sleep.

"5. In cases of feigned diseases, properly so called, consisting of assemblages of several symptoms, we must examine minutely into the history and alleged causes of the disease; compare the age, temperament, and mode of life of the suspected person with the symptoms present; watch narrowly the course of the symptoms, and contrast it with the known march of the disease itself.

"6. The suspected person should be visited at all hours of the day, and at times at which he does not expect to be seen. He should also be watched by those whom he is not likely to suspect.

"7. No questions should be put of a nature to instruct the patient as to what we wish to know, but our inquiries should be so directed as to lead him into incongruous statements. He should be thrown on his own invention, and be allowed to talk in his own way. The suspicions which we may entertain should be carefully concealed; we must ourselves become dissemblers, and meet the malingering with his own weapons.

"8. Observe whether the suspected person be willing to make use of the medicines and measures prescribed for his relief. The impostor is generally less disposed to resort to the necessary means than he who is really ill.

"9. Great caution is necessary in the treatment of suspicious cases. As a general rule, no measures ought to be employed which would not be justifiable on the supposition of the disease being real. But when the suspicion is very strong, low diet, isolation, and nauseous medicines, may be fairly resorted to."

1. DEFIN.—*Painful lassitude, with debility of the corporeal and mental faculties, alteration of the animal heat and of the secreting functions, accelerated circulation, increased thirst, and abolition of the appetites.*

2. The human frame is liable to sudden and powerful impressions from external causes, to the nature or intensity of which it is unaccustomed, and to changes throughout its functions, proceeding from imperfect or impeded actions of some excreting viscus. The derangements thus occasioned are remarkably varied both in degree and in kind, and they constantly induce farther changes, terminating either in restoration to health or in the destruction of the individual. They have been usually named and classed according to certain distinctions assumed from their chief causes, or from their most prominent features, or from the modes in which their principal characters are grouped. As, however, the various species of change or disorder, thus supervening, insensibly glide into each other; and as some symptoms disappear, and others spring up, from different intensities and combinations of remote causes, from the states of the internal organs at the time when the morbid impression was made, and from the ever-varying influences to which the body is afterward subjected; so it must follow that distinctions which are thus based will become unsafe guides in practice. The manifestations of disease possess no unalterable features, and therefore descriptions of them are to be received with due latitude, and the modes and means of removing them accommodated to individual and ever-varying conditions. From these considerations, it cannot be a matter of surprise that such diverse opinions have existed as to the nature of those derangements which have generally received the name of *fever*, and that so much discussion has taken place respecting the differences which exist between them and other disorders, with which, although arising locally, the whole frame more or less sympathizes. Nor can we wonder that, owing to the frequent difficulty of distinguishing between fevers and the disorders which thus originate, all differences between them have been denied, and that the former have been actually considered as strictly local diseases. I shall have frequent occasion, in the sequel, to notice the grounds on which this opinion is founded.

3. The intimate connexion existing between all diseases which, either at their commencement, or in their course, exhibit febrile symptoms, might have been less a source of error, if the phenomena characterizing them had been traced more accurately to their origin, and with a stricter reference to their causes, than they generally have been; and if succeeding and consecutive alterations had been recognised chiefly as effects of the previous changes. If such a course of investigation had been followed, deranged actions, arising almost simultaneously throughout the system, would not so frequently have been mistaken for those which are referable to a single organ or part; nor would derangements of the former kind have been imputed to such a source. There is no doubt that a certain class of causes will produce both local and general ailment in different individuals, according to circumstances

peculiar to each; or even in the same person, at different periods, owing to his state, or predisposition, at the time of their operation. But still, the more remarkable phenomena of these separate diseases proceed in a very different order, and very generally in so marked a manner as to be easily distinguished by the close observer. The most frequently exciting causes of disorder, viz., mental distress, atmospheric vicissitudes, exposure to cold, moisture, &c., shall, according to the state of the individual at the time, produce an attack of general disease, unaccompanied by predominant affection of any particular organ; and the disorder shall commence and terminate without any complication. In a second individual, a more or less evident determination of the malady, or even inflammation, shall appear in the advanced course of the general disease, or even during convalescence. In a third, the local disorder shall be coetaneous, and more or less co-ordinate with the general affection, or even outstrip it in violence during its course; and in a fourth person local disease alone shall be primarily caused; on which, as it increases, and as inflammation becomes more fully developed, symptomatic fever, or the general derangement, shall supervene. These different states of diseased action follow the same cause, according to the disposition, susceptibility, or states of the system at the time. One person, according to this proposition, may have the constitutional derangement complicated with *rheumatic, catarrhal, bilious, nervous, gastric, or dysenteric* affection; the general disorder being attended from some early stage of its course, or from the commencement, by a heightened disease of a particular organ or structure, and thereby constituting varieties of fever, which have been thus denominated and described by STOLL, DE HAEN, REIL, FRANK, HILDENBRAND, and others, and have occurred in epidemic forms on various occasions. Another person may have the nervous, the gastric, or the dysenteric characters superinduced in the progress of the disease, owing to external causes continuing in, or coming into operation, or to improper treatment; and a third may experience, in consequence of the pre-existing state of a particular organ or texture, an attack of inflammation from a similar set of causes to those which produce idiopathic fever. If, therefore, the species of disease which arise from one class of causes are thus varied, owing to the predisposition of certain organs, or to the susceptibility of the whole system, their number must necessarily be farther increased, and their characters very materially changed, when the additional influences of marshy exhalations, epidemic constitutions, or specific infections and contagions, come into operation. Diseased actions become not only more varied and extended by such additional causes, acting either singly or in conjunction, but also much more complicated and violent.

4. These inferences may be legitimately deduced from an extensive survey of some of the circumstances connected with acute diseases. Their relation with such derangements as have obtained the appellation febrile is still more intimate than with those which, strictly local at their commencement, induce consecutively

general disorder. It is necessary, however, to the proper consideration of the pathology of fever, that due regard be paid to the nature and extent of its causes, and of modifying or determining influences, as far as they can be ascertained; and that a strict reference be had to the effects observed to follow the application of both classes of agents, under opposite or varying circumstances. It will also be requisite, while such an inquiry is being prosecuted, that none of the early and intermediate changes be omitted. Such omissions have but too often vitiated our speculations on the nature of disease, and more especially of fever; for, instead of recognising the early changes and states, particularly those which more directly arise from external agents, consecutive and gross effects only have more generally been seized upon, and assigned as the cause of disease. Let it not be supposed that inquiries, such as have just been recommended, are productive of no advantage in practice. The scientific practitioner will consider the most effectual means of preventing, controlling, or removing disordered actions to be indicated by a most careful scrutiny into their nature and extent, and by a judicious inquiry into early aberrations from the healthy condition. He will view the primary derangements, in the relation they hold with their remote or occasional causes, on the one hand, and with consecutive or ultimate lesions on the other; and will thus trace each individual link of the chain of causation throughout.

5. If it be asked, What has the treatment of fever gained by our speculations as to its nature? I would answer, almost everything. I will show this in a more demonstrative manner in the sequel, by adducing the opinions which have formerly been held upon the subject, with the practice to which they have led. But, independently of the practical results of the inquiry, there are other solid and not less alluring inducements which will operate on the inquisitive and well-tutored mind. An individual possessing a mind so constituted feels a laudable zeal in examining into the nature of a class of disorders which concerns not only the existence of a single individual, but influences also the prosperity of nations; and who, entertaining even a moderate idea of the responsibility which the exercise of his profession involves, can enter upon its practical discharges, in respect of this class of diseases especially, without feeling some desire of extending his knowledge of their nature, in order that the course he pursues may be both rational and successful!

6. 1. GENERAL VIEW OF FEVER.—Fever is the most prevalent of all diseases, especially in some countries and localities; and their causes frequently cannot be avoided nor counteracted by human foresight or science. They are more especially prevalent among, and injurious to, the human species, as the history of epidemic, pestilential, and other fevers fully prove; and as evinced by those infectious fevers which often occur in camps, and follow the rears of armies during warfare, and which are sometimes much more destructive than the most hard-fought battles. Epidemic fevers are not, however, confined to the human species; the causes in which they originate, and

the influence which promotes their extension, frequently affecting also the lower animals, a circumstance of importance in our speculations respecting the origin and nature of this very important class of maladies.

7. 1. CHARACTERS OF FEVER.—It is impossible to give a *definition* of fever altogether applicable to the various forms and states it occasionally exhibits. To convey, therefore, a proper idea of what constitutes *idiopathic fever*, especially, a description instead of a definition of it is necessary; and, for this purpose, those phenomena which are the most constantly present should be selected; their presence individually, although in various degrees, constituting its essential characters, and enabling the physician, from the manner in which each presents itself, and is associated with subordinate or contingent phenomena, not merely to recognise the different varieties and conditions of fever, but also to distinguish it from diseases intimately related to it. If one, and especially if more, of these constant and essential characters be absent, *idiopathic* or *essential* fever is not present. An intimate view of its various phenomena can detect comparatively few which exist always in every form of the disease, and in some part of its course. These are, 1st. Spontaneous and painful lassitude; 2d. Weakness of the corporeal and mental faculties; 3d. Alterations of the secretions; 4th. Altered animal heat; 5th. Quickened circulation; 6th. Increased thirst, and abolition of the appetites.

8. *a. Lassitude*, although obviously the result of a morbid impression made upon the nervous system, is generally viewed as spontaneous, the patient often not being able to refer it to a particular cause; and it is usually attended by a painful or irksome sensation in the back and limbs. It is present in every form, especially in some of the stages of fever, and is always one of the earliest and most constant symptoms. It is wanting in many of the diseases which resemble fever, and is manifestly referrible to the depressed state of nervous energy, more particularly as respects the organic nervous system.

9. *b. Weakness of the corporeal and mental Faculties* is, in many respects, a mode of the foregoing, or, rather, both are associated effects of the more immediate impression made upon the system by the exciting causes of fever. This debility, as well as the lassitude, often precedes the evolutions of the disease, and always attends it, but in various grades throughout. It is especially evinced in the muscular organs, and less so in the mental faculties, particularly at the commencement. But, although these latter are not much affected as respects some manifestations, others are more evidently weakened. The powers of attention, comparison, &c., are most debilitated, and imagination least so. There are commonly a painful or confused feeling referred to the head, and a peculiar sensation with pain in the loins and limbs; these sensations being the more intense, the severer and more dangerous the disease, and sometimes amounting to an almost entire annihilation of the muscular and cerebral manifestations. These changes never reach above a slight degree in symptomatic fever, or in other diseases, unless when the brain is overwhelm-

ed by effusion of fluid, and then the attendant symptoms and procession of morbid phenomena are very different.

10. *c. Lesions of the secreting and exhaling Functions* are among the earliest, the most constant, and most important phenomena of fever. The *exhalations* from the lungs and skin are evidently the earliest and the most affected, although the extent of the lesion cannot be readily ascertained and duly appreciated; and it is not improbable that the more energetic causes of fever make their impression on the frame through the medium of the respiratory functions; terrestrial exhalations and infectious emanations floating in the air, and inspired along with it, affecting the nervous influence of the lungs and associated viscera, and impeding the changes which the blood undergoes during respiration. Besides these, the salivary, the gastric, the hepatic, the intestinal, and the urinary secretions are more or less altered, as respects either quantity or quality, the alterations being somewhat different in different types and states of fever. The early and remarkable lesions of the secreting functions, and the generally imperfect actions of the excreting organs, especially in the early stages, are important, not merely as they form a part of the circle of morbid actions characterizing the disease, but as they especially lead to most of the ulterior changes and complications observed in its advanced course. They evidently depend, at their commencement, upon deficient organic nervous power, occasioning at first imperfect or scanty secretion and excretion, and, at later periods, upon the morbid or vitiated state of the blood, the secretions and excretions then frequently becoming free and copious, but altered from their healthy characters. In symptomatic fevers, the secreting and excreting functions are but slightly disordered, and seldom to the extent of vitiating the circulation.

11. *d. Alterations of Animal Heat.*—The temperature of the body is variously altered in different stages of fever. On the invasion and period of exhaustion, particularly the former, it is often below the natural standard, while it is generally above natural during the period of excitement; this symptom chiefly depending upon the state of vital and nervous energy, upon the changes effected by respiration on the blood, and the resulting condition of vascular action. It is not, however, a mere increase or diminution of heat which is observed, but a peculiar or morbid alteration of it that hardly admits of description. This morbid sensation attending that produced by the change of temperature, and which the physician duly appreciates, varies somewhat in different fevers, is partly also dependant upon suppression of the cutaneous exhalation and the state of the circulating fluids, and is most remarkable in the more dangerous and malignant forms.

12. *e. Quickened Circulation* has been considered by writers as one of the most essential symptoms of fever, and by some as the chief phenomenon; their definition of fever being, increased frequency of the circulation with lesion of the functions. But this definition would embrace equally all the diseases in which quickened circulation occurs. It should be recollected that in some stages, particularly in malignant fevers, acceleration of the circulation is

not constantly present; yet it is seldom altogether absent from the commencement. The rapidity of the circulation is, however, often of less importance than other states of the vascular system, and the condition of the blood itself.

13. *f. Thirst* is seldom wanting in fevers, during all their course, although occasionally absent, particularly in their advanced stages, and in cases attended by congestion of the vessels of the head. It is observed in other diseases, but it most constantly accompanies fever.—*g. The appetites*, also, are more or less affected. The *appetite for food* is diminished, or entirely abolished. In rare cases, a craving for food has been observed in an advanced stage of fever, but not throughout its whole course. The appetite for the sex is also abolished until convalescence has commenced, when it reappears, and is sometimes one of the earliest signs of amendment. These symptoms probably depend upon the same cause, upon depressed organic nervous influence, and consequent deficiency of the secretions.

14. *ii. GENERAL DESCRIPTION.*—The word *Fever* is used in a double sense; it is applied, 1st, to that state of constitutional disturbance in which the above symptoms are primary, essential, or idiopathic; and, 2dly, to the general disorder consequent upon, or symptomatic of, some local disease. In the latter the febrile symptoms consist chiefly of increased heat and accelerated circulation, and without these the patient is said to be without fever. But when fever occurs primarily—is a disease *sui generis*—these two symptoms are seldom the most prominent, and are always associated with others, especially those already noticed, which may be much more manifest than they, and which are either altogether wanting in symptomatic fever, or not similarly associated, or only occasionally present. This distinction is necessary, particularly as respects the treatment, and should never be overlooked. Its importance will be more apparent in the sequel. I shall first describe fever as a disease *sui generis*; and next, as a *symptom* of inflammation, or some other disease of a particular organ or tissue.

15. *IDIOPATHIC FEVER* presents, during its whole progress, characteristic symptoms, not consisting merely of increased frequency of circulation and augmented heat, which are sometimes wanting in certain stages of the disease, but of other morbid phenomena that are equally important, that vary in degree and in modes of association with one another, and that superinduce other phenomena, thereby giving rise to the different forms and states in which the disease occurs; it *commences with debility and lassitude, which are followed by chills or rigours*; it is generally composed of several *invasions or exacerbations*; it *implicates the whole of the vital endowments and faculties, the fluids, and the entire organization*; it is *acute and dangerous in its course, with lesion of the circulation, with alteration of the animal heat and of the secretions, and with diminution of vital power*; and it is *versatile as to its symptoms and type, with efforts at sudden changes or crises*.

16. 1st. *Fever begins with lassitude and debility, generally followed by chills or rigours.* It originates in causes which affect the vital energies of the system, and occasion debility and

lassitude as the earliest and most remarkable changes. These are generally attended by an insuperable feeling of fatigue upon the least corporeal or mental exertion, by stupidity, loss of nervous and mental energy, by irritability, moroseness, or impatience, and by heaviness of the eyes. Upon these supervene various uneasy sensations; as, anxiety at the præcordia, occasioning frequent full or laboured inspirations; a peculiar and general uneasiness and restlessness; a feeling of cold, particularly along the spine, and differing from the real or usual sensation; horripilations, involuntary shudders, and tremours or rigours. The debility giving rise to the unconquerable sense of lassitude and fatigue generally precedes the chills for some indefinite time, and accompanies them, or continues after them. Chills or rigours often return and alternate with flushes, and other incipient disturbances, for a variable period.

17. 2d. *Fever is very frequently composed of several invasions or exacerbations, one paroxysm disposing to others, as in agues and remittents. But even in continued fevers a similar circumstance very often obtains, as evinced by the evening exacerbations, and the aggravation of the symptoms on alternate days. Some writers, and more particularly HILDBRAND, consider that, as in remittents, wherein a new invasion supervenes before the previous paroxysm had subsided, so in continued fevers, one fit runs into another.* "Continuæ ergo febres, si non omnes, saltem pleraque, præsertim criticæ, è plurimis paroxysmis febrilibus, quorum unus alterum subintrat, compositæ sunt."

18. 3d. *Fever is a disease of all the vital endowments, functions, and faculties of the fluids, and of the whole organization.* If we trace the whole progress of fever, from the operation of its causes through successive changes, we shall find that the vital power, which is supreme over the physical properties and functions of our different structures, is deeply affected throughout all its subordinate manifestations; as, the *sensibilities* of the nervous systems, the *irritability* of involuntary and voluntary muscular fibres, the *organic contractility* of membranous parts. Hence proceed lesions: (a) *Of the organic functions*—of the respiratory actions and functions, of circulation, and of the circulating fluids; of secretion and excretion, of digestion, assimilation, sanguification, and nutrition; of the appetites, both natural and acquired, &c.—(b) *Of the cerebro-spinal and animal faculties*—of the functions of sense and voluntary motion, and of the powers of mind; the expression of the countenance and the attitudes are changed; the senses either perform their parts imperfectly, or the mind takes an insufficient cognizance of their reports; the attention is wavering and quickly fatigued; the intellectual powers and states are languid, feeble, or otherwise disturbed; the judgment is perverted by internal and involuntary impressions and conceptions; and ultimately all the mental endowments become exhausted and disordered by prolonged wakefulness, or overwhelmed by a continual sopor.—(c) *Of the fluids and whole organization*: The fluids and soft solids undergo changes in their appearances, form, and properties. The *blood* is evidently altered in various ways at different periods of the disease.

Its serum is often at first in considerable quantity, and its crassamentum loose; but afterward the latter generally becomes more firm or cupped, and ultimately again loose, or imperfectly separated from the serum. In many cases it is still more remarkably altered, as shown in the article *Blood* (§ 78, *et seq.*), both in colour and consistence. The *secretions*, which are at first chiefly diminished in quantity, ultimately are changed in quality. They become more offensive, of a darker colour, and more irritating and septic to the tissues with which they come in contact. The *soft solids* are, to a certain extent, affected, owing to the changes previously induced in the powers of life and in the circulating fluids, as respects the *form, appearance, and properties* of all their parts. The cutaneous surface loses its lively tint, is changed in colour, or assumes a dirty, dusky, or earthy hue. The integuments become loose or turgid, harsh or burning; the muscles and cellular parts suffer a diminution of their consistence, and subsequently of their bulk; and the *physical* as well as the *vital properties* of all the tissues, especially their cohesion and elasticity, are very much impaired. Ultimately, the soft solids present a more flabby, dusky, brownish, or livid hue, and are softer and more lacerable than natural. Thus the eyes, lips, mouth, the countenance and whole physiognomy, the skin, the flesh, the habit of body, and the postures of the patient exhibit the universality of disease. From these facts, *fever may be defined pathologically, or with reference to the vital and organic changes, to be an acute affection of all the functions, and of all the fluids and soft solids of the frame.*

19. 4th. *Fever proceeds with lesions of the circulation, of the secretions, and of the animal temperature, and with depression of vital power.* The *pulse* is generally accelerated in some one stage or other. When it rises not above, or sinks below the natural frequency, the cause may either be congestion of the vessels of the head, or the morbid state of the blood, or the influence of the supine posture on certain constitutions. In these cases the pulse often becomes much more frequent when the trunk of the body is raised to nearly an erect position, or even when the head is elevated (§ 12). The *secretions* I have already stated (§ 18) to be early and remarkably changed. The extent and consequences of the alteration will be especially considered hereafter. The *temperature* is altered, during some period, in all fevers. Instances, however, occur in which increased temperature does not supervene on the cold stage; there are also cases in which coldness soon follows upon more or less of heat; and others in which the alteration either way is very slight. Still, some change may be felt, generally in degree, but also in respect of other sensations connected with it, excited in the patient and in the observer. In some cases, especially early in the disease, the patient's feelings may be those of cold, while the surface is actually warmer than natural. The *depression of vital power* is evinced from the commencement in all the functions, and does not the less exist because vascular excitement or reaction becomes great or excessive during a part of the disease. Although vascular action is increased for a time in most fevers, yet vital

power or resistance is lowered, nevertheless, especially in other systems and organs, and is afterward farther exhausted in proportion as vascular action has run high, and it ultimately becomes remarkably lowered with the contamination of the fluids and of the soft solids, impaired power augmenting the changes of these, which, in their turn, increase the depression, and often even accelerate the extinction of life.

20. 5th. *Fever is acute and dangerous in its course.*—A single attack of fever scarcely ever continues beyond thirty days. When it is observed to remain longer, it may generally be considered symptomatic of superinduced inflammation, or of altered structure, or a relapse. Intermittents, however, are often of much longer duration, but each paroxysm may be considered as a distinct attack. Remittents, also, sometimes continue longer, but seldom or never unless associated with visceral disease, which prolongs the febrile action, or converts it into a symptomatic fever, retaining more or less of the remittent, or passing into the continued type. The *danger* of fever results from its nature, and varies with its type, form, and violence; for it is liable to sudden vicissitudes in its progress, and is prone to produce changes of structure having a fatal tendency. Even the most mild form of fever may suddenly change its character from internal or external causes, or from abortive or irregular efforts at a crisis, or from an injudicious regimen or treatment, and put on a most dangerous form, or, owing to predisposition or pre-existing disease of a part, give rise to fatal disorganization in some important or vital organ.

21. 6th. *Fever is mutable in its characters.*—It is but one disease, or *genus*, comprising several species and subordinate varieties—numerous and ever-varying forms and states resulting from the nature, the combination, and the intensity of the causes, acting upon peculiarities of constitution and predisposition. Hence we cannot be surprised to find *fever mutable* in many of its characteristic phenomena; to observe one species or variety closely approximate others; and even to meet with instances of one type or form suddenly or unexpectedly changing into another in some period of its progress. Thus, it is not unusual to see a simple tertian change to a quotidian or double tertian, or an intermittent pass into a remittent, or this latter into a continued form. Occasionally the disease alters from mild to severe, or from nervous to malignant. It sometimes is simple through a great part of its course, without any one organ suffering a predominating disturbance, and yet it suddenly becomes very dangerously complicated, and thereby assumes very different features.

22. 7th. *Fever crines a tendency to sudden changes or crises*, owing to the conservative influence of vital resistance and reaction. These are generally of a salutary nature, when not rendered abortive by some external or internal cause, by the injudicious interference of art, or by pre-existent lesions of an important viscus. When they are fully evolved under the conservative influence of life, so as to lead to the salutary termination of the disease, they have usually received the name of *CRISES*. They are observed not only in continued fe-

vers, but still more remarkably in the paroxysms of an ague, each of which, when once commenced, will proceed until the powers of life terminate it by a critical change. Idiopathic fevers have frequently been denominated *critical*, as distinguishing them from symptomatic fevers, which less frequently experience this mode of termination, and generally in a less decisive manner. When salutary processes supervene, and are developed so as to terminate the disease, a more rapid and perfect return to health is experienced than under other circumstances. It would seem that the evacuations by which favourable changes are brought about are, in some respects, a depuratory effort of nature, more especially as those evacuations generally occur through the medium of organs which eliminate hurtful materials from the circulating fluid. Hence, one of the safest modes of practice is that which keeps these salutary processes in view, avoiding whatever may prevent them, and promoting their evolution, attending, at the same time, to the preservation of the powers of life, and warding off danger from weakened, over-excited, or oppressed organs.

23. When we take into consideration the conservative influence of the vital energy, the salutary changes brought about by it, and the circumstance that every method of cure, or every agent, cannot act in a similar manner in all cases—and that, even during the most injudicious treatment, certain of the agents are calculated to meet the exigencies of some cases, either in supporting the powers of life, or in favouring or determining some critical evacuation—the reason will readily appear why recovery often takes place in fever from the most opposite means, or when left entirely to nature; and we shall easily understand wherefore all do not die who are improperly treated, and how nature often not only overcomes the disease, but also the effects of injurious agents prescribed for it. Of the means which are employed in the treatment of fevers, there are not any which become more dangerous from inappropriate use than the extreme measures frequently resorted to, namely, large depletions and active stimulants. The former may destroy, in a few hours, cases which nature or opposite measures might have preserved, and the latter may over-excite, and inflame to disorganization, viscera which require to be unloaded, or to have their actions moderated.

24. It not infrequently, however, happens that the critical efforts are imperfect, owing to exhausted vital power, or insufficient from the nature and severity of the disease, or misdirected or irregularly exerted in consequence of some controlling or determining influence; and hence they become sources of increased disorder, or superinduced structural change. Such results are sometimes favoured by over-active, inefficient, or inappropriate means of cure, and very often by organic lesions having taken place in so great a degree, and so early in the disease, that the salutary efforts attempted cannot subdue them, but merely tend, in some instances, to their aggravation and danger.

25. The *event* in fevers is *directly* produced by critical changes, and indirectly by the assistance of art; it is *favourable* if the powers

of life remain unsubdued, and act without obstruction; it is *unfavourable* if they languish, or are overwhelmed. So much are we indebted to the conservative efforts of life exerted throughout the frame in the cure of fevers, that more is often to be ascribed to this source than to the interference of art; and I may add, in the words of Professor HILDENBRAND, "Inde enim pendet, quod miseri ac inepti medici famam, quam buccis inflatis non accipere, sed verecundi naturæ magistræ reddere debent, in febribus sanandis sibi concipiunt. Inde pendet quod omnis sectæ medici, ac oppositarum mendedi rationum adsectæ, de felici eventu in febrium tractatione gloriantur. Inde demum pendet, quod quævis theoriarum ad febres curandas applicata, sanatorum ægrorum practica exempla offerre valeat" (vol. i., p. 53).

26. **SYMPTOMATIC FEVER.**—Fever may be a concomitant or an effect of another disease, which would still remain were it possible to remove the attendant fever, but which, being removed, the concomitant fever would cease. In as far as it consists of accelerated circulation, fever may be associated with the majority of diseases; but it is still merely a single symptom, wherefore other phenomena should be present before even symptomatic fever ought to be said to exist. Whatever irritates or stimulates the circulating system to a stronger or more frequent action, or inflames a particular part, is productive of symptomatic fever. Its cause exists within the frame, and more rarely it acts from without, as irritation or inflammation of particular tissues, the presence of foreign bodies, or of calculi, worms, or hurtful ingesta, the absorption of hurtful or acrid matters, or of contaminating secretions, surgical operations, external injuries, and violent exertion. Fever proceeding from these sources has been termed *inflammatory, irritative, fever from irritation, fever of the vascular system, symptomatic inflammatory fever, symptomatic fever, chronic fever, hectic fever*, according to the peculiar irritation or local disease on which it attends.

27. Fever is associated with other diseases in a twofold manner: 1st. *Essentially*, forming what are called *febrile diseases, or symptomatic fevers*, strictly speaking, as in *tuberculous*, in which it is merely a symptom, but one which is uniformly present. 2d. *Accidentally or contingently*, not naturally and constantly, but merely from the association of some occasional disturbance or complication, as in amenorrhœa, chlorosis, dropsy, rheumatism, &c., or as a consequence of treatment. In symptomatic fevers, the constitutional affection is neither so severe, nor so generally and equally extended to all the functions, nor so entirely implicates the fluids and soft solids, as in idiopathic fever. Hence they are more readily traced to their origin—to the irritation in which they arise. The functions which chiefly manifest disturbance in their progress are those of circulation and secretion, the latter often very slightly. Others are also occasionally disturbed, as those of the skin and of the nervous system, but generally in an indirect and slight manner. Consequently, the chief characters of symptomatic fevers are, quickened pulse, heat of skin, disorder of its transpiration, and thirst. The excretions, muscular power, and the faculties of mind, are but

little altered. The pulse retains greater tone and sharpness, and the general surface more animation, than in idiopathic fever. The external physiognomy, the posture, the extreme prostration of muscular power, the profound alterations of the vital endowments of the fluids and of the organization itself, characterizing the latter, are either altogether absent, or present in a very slight degree merely, unless when morbid matters are conveyed into the circulation during the course of certain symptomatic fevers, and thereby vitiate both it and the soft solids, disordering also the different secretions and excretions. Such occurrences sometimes take place, and have fallen repeatedly under my observation, particularly when inflammation attacks the internal surface of vessels, or when purulent or sanious matters are taken up and conveyed into the blood, as in certain puerperal and other diseases. The vitiation of the circulation thus produced, and the effects upon the nervous system and other structures, are such as to give rise to a state of disease altogether similar to some of the worst forms of idiopathic fever.

28. The *duration* of symptomatic fevers depends entirely upon the nature of their causes, and the permanence of the original affection from which they proceed. Sometimes they are short, or even ephemeral, the irritation which occasioned them being removed by the actions which it induced; in other cases their continuance is often very long. But the character of the phenomena experiences but little alteration, and they seldom undergo much change in their type. They are not, however, devoid of efforts at a critical evacuation; but these are more frequently inefficient and abortive than in idiopathic fevers, owing more to their being insufficient to remove the primary malady than to defective vital energy. They are, however, occasionally relieved, or even removed, by spontaneous hæmorrhages, vomiting, diarrhœa, copious perspirations, and critical secretions of urine. Unfavourable terminations frequently also take place owing to congestions, obstructions, or disorganizations in some vital organ arresting its functions. The *treatment* of symptomatic fevers is necessarily directed less to the particular phenomena they present, and more to their origin, than that of idiopathic fever. It is generally founded upon the intention to remove the cause, and, when this cannot be accomplished, to render it less injurious.

29. II. **THE DIAGNOSIS OF FEVER.**—From the description which has been given of the pathognomonic symptoms of *idiopathic fever*, and of the general characters of *symptomatic fevers*, the differences between both, and between the former and other diseases, will be evident. The distinctions just stated between idiopathic and symptomatic fever equally exist between the former and *inflammation*; this latter being one of the chief causes of symptomatic fever. Inflammation, in its primary and phlegmonoid form, attacks not only a single tissue or part, but also in a manner indicating its locality; the resulting constitutional affection differing in its mode of supervention and in its characters (§ 7, *et seq.*) from fever, as above described. It should, however, be recollected that inflammation frequently supervenes in parts or organs at some period of the course of idiopath-

ic fever, or even at its commencement; and, indeed, the fevers of some seasons, or epidemics, are very generally thus complicated. In these cases, however, the inflammation does not present the characters it assumes in the previously healthy frame, but those it puts on when occurring in a very unhealthy or cachectic habit of body; it being ingrafted, when supervening in the course of idiopathic fever, upon a morbid condition of the constitution as respects the vital endowments, the fluids, and the soft solids. Hence, when once excited, particularly in membranous or cellular parts, inflammation rapidly extends or passes into disorganization, owing to the remaining tone of the vessels, and to the already reduced vital resistance being rapidly exhausted by the generally as well as locally increased vascular action. It presents, in such circumstances, many of the characters possessed by erysipelatous inflammation, and very nearly approximates to it, but is frequently still more dangerous, insidious, and rapid in its progress to fatal disorganization.

30. Fever differs from diseases usually denominated *cachectic*, inasmuch as in them the external habit and appearance of the soft solids are principally affected, and the powers of life much less than in fever. They supervene gradually and imperceptibly, and proceed slowly, without much, or even any, acceleration of pulse, or increase of temperature. They present not the complete prostration of muscular power, the versatility of character, the mutability or disposition to change, and the efforts at vital reaction, which distinguish fever, and nature does little towards removing them, while art effects much.

31. Fever differs from disorders termed *neurosis*, in the latter being altogether referrible to the cerebro-spinal nervous system, or parts intimately connected with it, while other systems and organs are either unaffected or not proportionately affected. They present but little change of the circulation, or of animal heat, or of the secretions, or of the intrinsic condition of muscular power, or of the soft solids in general. They are, moreover, generally chronic; they follow no determinate course, are cured with difficulty, and yet are seldom removed by the unaided efforts of nature. Other diseases, as those which are local or attended with increased discharges, are at once distinguishable from fevers by their essential or pathognomonic symptoms.

32. III. OF THE GENERAL COURSE OF FEVER.—Fever commonly runs a determinate course, unless death occurs so early as to prevent it. In order to give precision to our knowledge of the usual progress of the disease, and to enable us to employ the means of cure with a stricter reference to existing pathological conditions, several stages or periods have usually been pointed out, according to the changes observed in its course. Writers have differed materially as to the number of stages into which fever should be divided, and as to the terms by which they should be designated. As respects eruptive fevers, no difficulty need exist as to either. I shall pursue, therefore, that arrangement which my observation of the progress of fever has convinced me to be correct, and which is applicable to continued and peri-

odic fevers equally with those which are eruptive. Fever consists, 1st. Of the *formative* or precursory stage; 2d. Of the period of *invasion*; 3d. Of *excitement* or *reaction*, comprising (a) *incremental* excitement, and (b) *stationary* excitement; 4th. Of the stage of *crises*; 5th. Of *decrement*, or decline; and, 6th. Of the period of *convalescence*.

33. A. *The Formative or Precursory Stage*; *Stadium Opportunitatis*, HILDENBRAND; *Stadium Prodromorum*, REICHE, HELLINGO, and RICHTER; *The latent Period* of Dr. MARSH; *The Stage of Incubation* of French writers; *The dormant Period* of English authors. Although the precursory symptoms of fever have been fully enumerated by CELSUS (*De Med.*, lib. ii., cap. 2), they were overlooked by writers until the middle of the last century, when TISSOT, REICHE, and HELLINGO directed attention to them. FORDYCE, and other more recent authors on fever in this country, have left them entirely unnoticed. In my papers on fever, published between 1819 and 1828, and in my lectures delivered from 1823 to 1827, particular notice was directed to the subject, and these symptoms were described as constituting a most important stage of the disease, inasmuch as in it the nature of fever would be most advantageously studied, and either its subsequent course remarkably meliorated, or its farther progress prevented, by appropriate and energetic treatment. (*Lond. Med. Repos.*, vol. xxviii., p. 238, and other *Refer. in Bibliog.*)

34. The phenomena described above, as characteristic of idiopathic fever, never proceed immediately from the remote causes. The impression made by them occasions a succession of changes before those which really constitute fever supervene. These early changes, being productive of those which constitute the developed disease, may aptly be called *formative*, and the symptoms by which they are indicated *precursory*. The exciting causes of fever seem to act primarily upon the nervous system of organic life, thereby producing changes in the vital manifestations of the frame, which gradually increase until they arrive at a certain pitch, and terminate in one of the modes hereafter to be noticed. The more intense the exciting causes, the predisposition being equal, the shorter will be the duration of this period, and the sooner will the lesions constituting fever be brought about (§ 15).—(a) The earliest effect which is made manifest after exposure to the more energetic causes of fever, as infectious effluvia or noxious exhalations, is a feeling of constriction or oppression in the chest or at the præcordia, attended by frequent sighing, gaping, forced and lengthened inspirations, and by a sense of uneasy depression, or nausea, evincing the morbid impression made upon the nervous system through the respiratory organs. The pulse is weak, slow, irregular, sometimes remittent or reduplicating, and readily accelerated by slight exertion.—(b) The natural and acquired appetites and desires are diminished; nausea is readily excited by food; and the bowels are either costive or easily acted upon by purgatives; *Venus silet*, and all the *organic functions* are impaired.—(c) The patient feels debilitated and fatigued; complains of headache, vertigo, or confusion of ideas; is morose, low-spirited, sluggish, indolent, or in-

capable of exertion, and of directing his attention long to any object; he readily perspires, and his breathing becomes short and quick on the least exertion; his sleep is unsound and unrefreshing, and he awakens with a sense of lassitude, or with pains in his back and limbs; in short, all the *cerebro-spinal functions* are weakened or disordered.—(d) The external expression and appearance are somewhat altered. The countenance and skin are unusually pale, sallow, or unhealthy; more rarely red. The eyes are languid, and deficient in brilliancy. The breath is fetid or cool, and the tongue often loaded. The urine is sometimes pale and copious, and the cutaneous surface dry, cool, and harsh. These symptoms vary in severity, and often are so slight as to escape particular attention. They frequently are insufficient to induce the patient to confine himself.—(e) The *duration* of this stage is various in different fevers; from twenty-four hours, as in plague and some cases of typhus, to several weeks, as in ague; but it is generally from three to fourteen days. The severer and the shorter this period is, the more acute and the more rapid will be the subsequent progress of the disease, and *vice versa*; there are, however, exceptions to this. Fever may be cut short in this stage by active and judicious means, but not afterward, unless occasionally in slight cases.—(f) The *pathological conditions* characterizing this stage are, depression of vital power throughout the frame, with slight internal congestion, particularly of the lungs, liver, &c., with imperfect change of the blood in the lungs, and with diminished secretion and excretion.

35. *B. Stage of Invasion; Principium vel Initium Febris*, Auct. var.—(a) The cold stage of writers is attended by debility, lassitude, painful uneasiness, or sinking at the epigastrium, a sensation resembling cold running down the back, with formication or chills extending over the limbs and general surface. The pulse is constricted, small, weak, or accelerated; the respiration is slow, irregular, or spirious, and attended by anxiety at the præcordia, and occasionally by a slight dry cough. On these supervene gaping, sighing, pandiculation; a sense of weight, pain, or constriction in the head; giddiness, moroseness, depression of spirits, and disorder of the senses; lividity of the lips and nails; pallor of the skin; the cutis anserina, and shudderings, rigours, or shiverings, followed by, or alternating with, irregular flushes. After the rigours cease, a sense of chilliness often continues for some time, although the skin has become hot. These symptoms present various grades and modifications in the different types of fever; in some the feeling of cold is actually attended by reduction of the temperature, and in others the heat is not materially, if at all, diminished, or it is even increased. The former is most commonly seen in the cold stage of periodic fevers, the latter in the invasion of continued fevers. In all, however, the cutaneous transpiration is altogether arrested, and the skin is harsh and dry. The pulmonary exhalation is also diminished, and the breath is cold. Copious discharges of pale urine often take place, evidently arising out of the arrest of the exhalation from the skin and lungs. Loss of the appetites, costiveness, thirst, and occasionally sickness and vom-

iting, are likewise present.—(b) The *duration* of this period may be very short, or it may be for many hours alternating with slight flushes. The shorter and more intense it is, and the severer the rigours, the shorter and severer will be the consequent vascular reaction, and the more nearly approaching the inflammatory type; and the longer its duration, the more prolonged will be the fever. The imperfect evolution of this stage, or its slight occurrence, particularly when it is not attended by rigours, very generally indicates a severe malignant or typhoid state of disease. In some of the most dangerous cases of fever I have seen this stage so slight as to be confounded with the preceding one. This period having supervened, the disease cannot readily be cut short by blood-letting, emetics, &c.; although in the slighter cases, and more inflammatory type, these means have succeeded in some instances.—(c) The *pathological states* of the first period are increased in this, particularly the general depression of vital endowment; the impeded functions of the lungs, liver, &c.; the interrupted exhalation and secretion, excepting the urinary secretion; and the imperfect depuration and arterIALIZATION of the blood. But the lowered vital powers become more centralized, and the congestion of the large vessels, especially those of the thoracic and abdominal viscera, greater; conditions which terminate themselves by inducing rigours, shivering, vomiting, and reaction of the vascular system, with the subordinate phenomena of the next stage.

36. *C. Period of Excitement.—a. Incremental excitement or reaction—incrementum vel augmentum morbi.*—(a) This stage commences with the disappearance of certain of the foregoing signs, with the increase of those that remain, and with the supervention of others. Fever, in its more literal sense, now begins, and manifests its specific form. The gaping, pandiculation, formication, and rigours disappear, and the stricture and collapse of the countenance and general surface are followed by increased warmth and turgescence. The chilliness, however, continues for a short time. Pulmonary transpiration returns in some degree; respiration becomes full, frequent, and sometimes laboured, and the breath hot. The urine is now diminished, high-coloured, limpid, and clear, and its discharge is often attended by scalding. The muscular debility, feeling of fatigue or lassitude, the pains in the head, loins, and limbs, the thirst, and the anxiety at the præcordia are all increased. The countenance becomes turgid; the eyes shining, but with an expression of languor; the cheeks flushed, and the cutaneous surface hot, burning, and turgescient. The appetites are now entirely abolished; the tongue is loaded or furred, or both; the pulse is free, full, and accelerated; often strong, and vibrating in the neck; but varies remarkably in tone with the particular variety of the disease. There are also a sense of weight, fullness, and aching of the head, with giddiness, confusion of ideas, and sometimes with mental indifference, which short and disturbed slumbers seem to aggravate; a morbid susceptibility or disorder of the senses; and occasionally moroseness, restlessness, or jactitation. These symptoms generally increase, often presenting in the continued type slight remissions in the

morning, with exacerbations in the afternoon and evening, and which are most severe on alternate days; and, during the progress of this stage, delirium often supervenes, especially when it reaches its height.—(b) The duration of incremental reaction or excitement varies with the type and form of the disease, from an hour or two, as in ague, to two or three days, as in continued fevers. It is generally shortest in the most severe and violent attacks; but it never extends beyond seven days.—(c) It consists, *pathologically*, of reaction of the vital powers, expressed chiefly in the vascular system, frequently with a preponderance or determination towards particular organs, of the efforts of life to overcome the more immediate effects of the exciting causes, especially the internal congestions, and the superinduced changes in the blood.

37. During this stage *determination* to particular organs or textures frequently occurs, and thus the fever becomes *complicated*, or resembles idiopathic inflammation the more closely, the less severely the vital power and the circulating fluids are impaired or vitiated. Such determinations or consecutive inflammations are observed principally in the *encephalon*, *spinal chord*, *lungs*, *liver*, *stomach*, and *bowels*; they are caused chiefly by the predisposition, previous diseases, and existing states of these viscera; and by climate, season, habits, and occupations, and the circumstances of the individual; whatever disorders, irritates, weakens, or causes habitual determination, or increased momentum of the circulation to either of these organs, thus complicating the fever. Hence the *cerebral complication* is most common in the studious; the *gastric* and *hepatic*, in those addicted to the pleasures of the table or to intemperance, and in hot climates, or during warm seasons; the *pulmonary*, in cold countries and seasons, and in persons much exposed to the open air; and the *intestinal*, or dysenteric, in the ill-fed, in persons using unwholesome water or living upon innutritious and watery food, and in low and moist situations. The prevailing epidemic constitution has also a most powerful influence; the complications, as well as the particular form and type of fever depending upon it, and the nature of the exciting, concurring, and determining causes.

38. *β. Stationary reaction—stadium coctionis* of the humoralists—consists of the persistence of the above symptoms, with slight modifications, and frequently with increased affection of particular organs. (a) During its progress, restlessness continues, with watchfulness; delirium is often constant, or appears for the first time; nervous power is gradually and almost imperceptibly exhausted; the pulse generally loses tone, and becomes more accelerated; the tongue is deeply furred and loaded, and often, also, parched, and mucous sordes collect about the teeth. Respiration is quick, or moaning, and the breath is foul, heavy, offensive, sickly, and loaded with vapour; the urine is still scanty, high-coloured, and clear; the bowels are either costive or irregular, and the stools morbid and offensive; the countenance becomes pale, heavy, collapsed, and of a sallow or unhealthy hue, sometimes muddy or lurid; the eyes are suffused, watery, heavy, and occasionally injected; the skin continues hot,

pungent, or burning, and it afterward either evinces a disposition to transpiration, or becomes damp and clammy; or it is the seat of ptechie, or of eruptious, which, in the exanthematous fevers, appear at an early part of this stage; the prostration of muscular power is increased, and is often so great that the patient cannot retain his position on one side, but falls into the supine posture; adipose matter is subsequently absorbed, and the body lives upon itself; and, if the patient be not delirious, he complains of severe pains, or of a bruised sensation, or of soreness in his limbs, back, and loins, with confusion, vertigo, or pain in his head.

39. (b) The symptoms vary remarkably in this stage with the type and form the fever assumes; with the complications above alluded to; with those which may supervene during the advanced progress of this period; with the more latent changes in the mucous surfaces, or in parenchymatous structures; and with various influences and circumstances occurring during the disease. In some varieties of the continued type of fever the whole of this period proceeds with little or no evident exacerbation, while, in others, exacerbations are very manifest; but this depends much upon the prevailing epidemic constitution. In general, fever caused by infection, and complicated with serious visceral disease, or characterized by severe affection of the fluids and soft solids, is strictly continued; while that produced by terrestrial emanations assumes somewhat of the remittent form, although presenting much of the continued type.—(c) The duration of this state of vascular reaction is shortest in agues, in which it does not exceed a very few hours; and, in continued fevers, it is brief in proportion to the severity of the disease. It rarely, even in the more protracted cases, exceeds fourteen days.—(d) The *pathological states* of the early part of this stage continue, in great measure, in this part of it; but vascular action exceeds vital power, which is gradually lowered; and the circulating and secreted fluids, and the solids themselves, become vitiated, as already stated, and as will be more particularly shown in the sequel.

40. *D. The period of Crisis—Stadium Crisicos—Judicium Febris.*—Crisis in fevers is a sudden change taking place at a particular period of the disease and terminating it. A crisis is brought about chiefly by the efforts of nature, or, in other words, by the febrile action itself inducing changes in the functions and organs productive of a salutary effect. Although it often takes place by the unaided efforts of life, it is frequently assisted by art, and should not, therefore, be preferred before art judiciously employed. The *critical days* are the 2d, 3d, 4th, and 5th (quotidian period); the 7th, 9th, and 11th (the tertian period); the 14th, 17th, and 20th (the quartan period). After the 20th, crises are obscure, and seldom occur till the 27th or 28th. Salutary changes are observed chiefly on the above, unfavourable changes on the intervening days; but death may happen on any day. A very cold climate or season, or either extreme of temperature, the impure air of a hospital, the continued operation of the causes, the complications, great vitiation of the fluids and solids, an active treatment, interfere with, re-

tard, or prevent crises. If the exacerbations be well marked, and vital energy not very much reduced, a favourable crisis may be more confidently expected. Crises are sometimes *indecisive*, or consist of several abortive attempts before the end is attained, especially when the powers of life are much lowered. When several critical efforts are required, each succeeding one renders the task more easy for the next, until the disease is gradually subdued. (See *CRISIS*, and *Critical Evacuations*.)

41. *E. Period of Decline—Decrementum—Declinatio.*—Sometimes the decline is prompt and rapid, especially after a marked crisis (see art. *CRISIS*); at other times it is gradual and slow, particularly when only slight and imperfect crises have occurred, or when the disease terminates in resolution without any very manifest critical evacuation. In the former case, the decline passes quickly into convalescence; in the latter, this stage is often characterized by slight exacerbations, called by some writers posthumous crises, which are apt to be misunderstood. In the fevers of this country, which frequently decline gradually, or in the second of these modes, the symptoms indicative of vital disturbance generally subside in the order in which they appeared. Organic nervous influence and the dependant functions are the first to be restored; the respiratory, secreting, and excreting actions become natural; the perspiration more general, free, and, if it have previously been offensive, clammy, or partial, more natural and genial; the tongue begins to clean on the sides and point, and is more moistened by the commencing return of the secretions poured into the mouth; coma and delirium subside, and the patient regains his power over the alvine excretions, if it has been lost; the sensorial faculties and sleep reappear, and the latter becomes more refreshing; the locomotive powers are freer and more energetic, the patient being enabled to turn upon his side, the sense of soreness and lassitude being diminished; the appetites and desires return, and the excretions are gradually re-established. The action of the heart is the last to subside to its natural frequency, and generally continues long afterward to be readily excited by slight stimuli. The urine is abundant, and deposits a copious sediment; the bowels become free, the motions consistent and feculent, and the skin gradually assumes a clear and healthy appearance; but emaciation increases rapidly, or now is more apparent; absorption, more especially of the less animalized and less highly organized parts or molecules, proceeding rapidly as soon as vascular reaction subsides.

42. *F. Convalescence—Stadium Refectionis—Convalescentia.*—I agree with RICHTER and HILDENBRAND in considering this as a stage of fever. The propriety of this view is obvious, especially as regards the future health of the patient. It is, however, altogether distinct from the malady, inasmuch as it does not present any of the constituent phenomena, which still continued to exist in the stage of decline, but merely those of debility consequent upon acute disease. During its early progress, the bulk of the body still continues to diminish, or does not increase until it is far advanced; all the symptoms entirely disappear; the appetites, desires, digestive functions, the secretions and excre-

tions are re-established, but are apt to be disordered, and therefore require supervision; the cuticle and sometimes the nails are exfoliated, and the hair falls out. Irritability and sensibility often are increased; and tinnitus aurium is sometimes troublesome; but these subside as health is restored. *Relapses* are apt to occur in this period, especially from premature exposure or indulgences, or from disorder of the digestive organs; but they more rarely follow when fever arises from infection or from a specific contagion, though other diseases may be thereby occasioned.

43. IV. OF THE TYPES AND FORMS OF FEVER.—I. These are determined by the following *circumstances*: *a.* By the *previous health*, the temperament, and habit of body, and vital energy of the patient; *b.* By the state of the vascular system, particularly as to the existence of fullness or deficiency of blood; *c.* By the *specific kind of miasm or cause* exciting fever; *d.* By the prevailing epidemic constitution; *e.* By other causes, predisposing, exciting, concurring, and determining, and by the intensity of their action; *f.* By the *external and internal, the physical and moral influences* to which the patient is subjected, from the period at which the morbid impression was made upon the frame; *g.* By the *internal congestions, determinations, or inflammations* superinduced in its early course; *h.* By the *intensity of the morbid impression* made upon the vital endowments, especially of the organic and cerebro-spinal nervous systems; *i.* By the degree to which vital power is suppressed or lowered throughout the frame; *k.* By *vitiation of the circulating fluids* and soft solids; and, *l.* By the treatment and regimen during the commencement and early progress of the fever. These circumstances both determine the particular type, the form, and the complications of fever, and change one type or form into another.

44. ii. The *Types and Forms* which usually present themselves as the result of the remote and efficient causes, and as influenced by the above circumstances, are,

A. The INTERMITTENT: *a.* of a *quotidian*; *b.* of a *tertian*; *c.* of a *quartan*, type; either of which may be, *f.* a *simple*; *β.* *double or reduplicating*, or *irregular*; and, *γ.* *complicated*, 1st, with abdominal visceral disease; 2dly, with cerebro-spinal affection; 3dly, with alterations of the fluids and soft solids; and, 4thly, with visceral lesion and with change of the fluids and solids, the pernicious or malignant agues of some parts, particularly in warm climates.

B. The REMITTENT: *a.* *Simple*; *b.* *bilious*; *c.* *inflammatory*; *d.* *bilio-inflammatory*; *e.* *adynamic or malignant*; *f.* *gastro-adynamic*; *g.* *typho-adynamic*, or associated with severe cerebral affection; *h.* *complicated*, *a.* with pulmonary disease; *β.* with disease of the spleen; *γ.* with disease of the large bowels; *i.* *slight and chronic*.

C. The CONTINUED: *a.* *Ardent fever*; *a.* *diary fever*; *β.* *bilious, inflammatory fever.*—*b. Synchoïd*; *a.* *simple*; *β.* *complicated*, with predominant affection, 1st, of the stomach and liver, *mild gastric fever* of authors; 2dly, of the intestinal mucous surface, *mucous fever*; 3dly, of the cerebro-spinal system, *nervous fever.*—*c. Typhoid or Adynamic fever*; *a.* *simple*; *β.* *complicated* with predominant affection, 1st, of the gastro-intestinal mucous surface, *adynamic*, of,

French writers; 2dly, of the lungs and bronchi; 3dly, of the cerebro-spinal nervous system, *ataxic* of PINEL; 4thly, of the mucous surfaces and brain, *typhus* of writers; 5thly, of these surfaces, brain and skin, with efflorescence or eruption, *exanthematic typhus* (HILDENBRAND), or with petechiæ, *petechial typhus*; 6thly, of the vascular system and circulating fluids, *malignant* or *putrid fever*.

D. PESTILENTIAL FEVERS: *a.* Evincing predominant affection of the fluids and solids, and of the gastro-intestinal mucous surface, with yellow skin, *epidemic yellow fever*; *b.* of the fluids and solids, and of the lymphatic glands, *plague*; *c.* of the vascular system and blood, and of the lungs and gastro-intestinal mucous surface, with spasms, *pestilential cholera*.

E. EXANTHEMATOUS FEVERS: *a.* *Scarlet fever*; *a.* mild or benign; *β.* synchooid scarlatina; (*a.*) simple; (*b.*) complicated; *γ.* adynamic scarlatina; (*a.*) simple; (*b.*) complicated; the complications in both varieties being with inflammation of the throat, or of the gastro-intestinal mucous surface, or of the membranes of the brain, or of the respiratory surfaces, or with any two or three of them; *b.* *Measles*; *a.* mild; *β.* synchooid measles; (*a.*) simple; (*b.*) complicated; *γ.* adynamic measles; (*a.*) simple; (*b.*) complicated; the complications being nearly as above; *c.* *Smallpox*; *a.* mild; *β.* synchoal; (*a.*) simple; (*b.*) complicated; *β.* adynamic or confluent; (*a.*) simple; (*b.*) complicated; the complications being nearly as above; *d.* *Erysipelas* may be similarly divided.

F. PUERPERAL FEVERS: *a.* *Inflammatory*; *a.* inflammation of the uterus; *β.* of the ovaria and tubes; *γ.* of the peritoneum; *δ.* of any two or all of them; *b.* *Synchooid puerperal fever*; *a.* complicated with inflammation of the peritoneum; *β.* with inflammation of the uterine veins, &c.; *γ.* with inflammation of the uterus and appendages; *c.* *Malignant*, or *adynamic puerperal fever*; *a.* simple; *β.* complicated with predominant affection; (*a.*) of the blood; (*b.*) of the fluids and peritoneum; (*c.*) of the fluids, serous surfaces, and soft solids generally; (*d.*) of the blood, the uterus, or of the uterus and appendages; (*e.*) of the internal surface of the uterine vessels, substance of the uterus, &c.

45. iii. *Of the Conversion of Type, Form, &c.*—The above types, forms, and states, not only may result from some one or more of the above circumstances (§ 43), but they also may be variously changed and modified by them, during the course of the disease, a simple state of fever becoming more intense or complicated, according to determining influences, the intermittent type becoming irregular or complicated, or passing into a simple, severe, or complicated remittent, and this latter into the continued type, frequently with predominant affection, either of the nervous or vascular system, or of some important viscus, or of both. This change of a slighter into a severer disease, and of simpler states into those which are more complicated, commonly arises from the circumstances just stated (§ 43), and more especially from those concurring and determining causes about to be enumerated (§ 64, 65), and is much more frequent than an alteration from a severe to a slighter form of fever, as that of a continued to a remittent, or of the latter to an intermittent type, which, however, sometimes occurs.

46. V. TERMINATIONS.—*Fevers terminate*, 1st, in a return to health; 2dly, in some other disease; and, 3dly, in death. *A. A termination in health* is favoured, *a.* by a previously sound constitution, and a spare habit of body; *b.* by the absence of great intensity of the remote causes, and by their nature; those which are slight, or which proceed from endemic sources, or act singly, being less noxious than those arising from living animal bodies crowded together, or from the sick, or from various associations of animal effluvia, and of other causes; *c.* by the absence of unfavourable influences and accidents, physical or moral, during the progress of the disease; *d.* by a complete removal from the continued operation of the exciting, and even of the predisposing, causes during the treatment, and by the advantages of wholesome air and judicious management; *e.* by the easy circumstances and equable mind of the patient; and, *f.* by the occurrence of a crisis. The *modes* by which fevers terminate in health, are, 1st, by crisis, to the production of which art can only indirectly tend, but still tends very powerfully in some cases; 2dly, by a resolution of the disease, without any critical discharge. This is the most frequent mode observed in the fevers of this climate; and results, in a great measure, from the treatment adopted for them, particularly in their early stages, which generally interferes with, or prevents the occurrence of, the natural evacuations constituting *crisis* (see this article). It is chiefly when artificial evacuations have not been pushed far that crises manifest themselves.

47. *B. Terminations in other diseases* are owing, *a.* to previous disease, or the condition of particular viscera at the time of attack; *b.* to the severity and concurrence of the causes, and the intensity of the disease; *c.* to local determinations supervening during the progress of fever, giving rise to complications; *d.* to improper treatment, as a too heating regimen, the continued use of cathartics, or the adoption of such as are too irritating; *e.* to incomplete or imperfect crises; *f.* to the too early or too liberal use of stimulants or tonics during the disease, or during convalescence; *g.* to the continued operation of the causes during treatment; *h.* to the occurrence of new, determining, or superadded causes, as crowding of the sick, bad ventilation, mental perturbations, in the progress of the malady; and, *i.* to neglect, and to a blind confidence in the efforts of life. The *diseases* which may be thus superinduced are, *a.* inflammations of particular organs; *β.* engorgements, obstructions, and enlargements of glandular viscera, particularly the spleen or liver; *γ.* effusion of serous fluids into shut cavities, as into the peritoneal and pleural sacs; *δ.* partial or general anasarca; *e.* ulceration or abrasion of mucous surfaces, chronic diarrhœa and dysentery; *ζ.* hæmorrhage from mucous membranes; *η.* inflammation of some part of the vascular system; *θ.* apoplectic, paralytic, or epileptic seizures; *ι.* mania and insanity in some one of its forms.

48. *C. A termination in death* is favoured, *a.* by constitutional vice, excessive vascular fulness, and a bad habit of body; *b.* by the intensity of the cause and of the disease; *c.* by the continued operation of the chief causes; *d.* by the nature of the complication; *e.* by neglect or

improper treatment; *f.* by unfavourable crises; and, *h.* by the other circumstances just mentioned (§ 47) as productive of consecutive diseases. This *result* cannot be imputed to any single change. Two, or even more, of the following are evidently concerned in its production: *a.* Extreme suppression of organic, nervous, or vital power; *β.* Lesions of organs arresting their functions, and impeding those actions necessary to continuance of life; *γ.* Vitiating of the fluids, changing the condition of, or destroying, nervous influence and the rest of the vital manifestations; *δ.* Exhaustion of vital power, and alterations of the intimate organization of the viscera, as in malignant fevers; *e.* Organic injury sustained by the nervous system, especially its larger masses; *ζ.* Diminished or exhausted irritability of the heart, the patient expiring as in fatal syncope; *η.* Suffocation from effusion into the bronchi; *θ.* Congestion of the lungs, heart, and large vessels, to an extent beyond the vital power of these parts to overcome; and, *ι.* Deficiency of blood so considerable as to destroy the relative conditions of the contained fluid and containing vessels; for, when the tonicity, the organic contractility, of the latter is much impaired, as in the advanced stages of adynamic fevers, and the amount of circulating fluid is also greatly lessened, the vessels will be unable to accommodate themselves to their contents, and the consequences must necessarily be most dangerous, if not speedily fatal.

49. VI. OF THE APPEARANCES AFTER DEATH.

—*A. a.* Cases have been met with wherein the most careful examination has failed to detect any lesion, or strictly morbid appearance, in any of the general systems, or individual textures, or in the fluids contained in the large vessels. It must be admitted, therefore, that changes may take place in the nervous system, or in the blood, sufficient to cause the most acute disease, or even to subvert life, without being so gross as to be demonstrable to our senses; but allowing this, the fact now stated is important, inasmuch as it most materially affects the question as to the nature of fever. —*b.* Other cases have been observed, and much more frequently than the foregoing, in which the morbid appearances were not commensurate with the intensity of the symptoms referrible to their seats, and were quite insufficient to account for a fatal issue.—*c.* Frequently, also, lesions of parts have been discovered, which were not indicated by symptoms, or by the usual symptoms, or very slightly and imperfectly; those changes having been more or less, or even entirely, latent during life, although their nature evinced their existence and progress during the advanced stages of the disease. This circumstance may have arisen from an oppressed or exhausted state of the brain; or from the changes in the circulating fluid impairing sensibility; or, as Dr. ALISON suggests, in his very able and lucid exposition of the Pathology of Fever, from an enfeebled state of the circulation at the time when these local affections take place.

50. *B. As to the nature of the changes observed,* opinions are somewhat different. Many writers have viewed them as purely inflammatory; others as consequences of irritation, or of inflammatory irritation; this condition being

viewed by them as a lesser grade or modification of inflammation. It is important to entertain precise ideas as to their nature, and to mark the circumstances in which they differ from those changes indisputably resulting from pure inflammation, particularly as occurring in a previously healthy constitution. 1st. The lesions observed in fevers rarely present effusions of lymph or pus, especially in the adynamic and typhoid fevers, consequences commonly following true inflammation; and the cases in which these effusions have been detected have been instances of local inflammation supervening in the course of the more sthenic or inflammatory forms of fever. 2dly. The lesions or inflammatory appearances have been more superficial, diffused, and attended with a darker discoloration, and greater softening of the affected and adjoining parts, than in idiopathic inflammation. 3dly. The appearances thus characterized differ the more from inflammation, the lower the type of fever and the more vitiated the circulating fluids. 4thly. They more nearly resemble erysipelatous inflammation than any other. 5thly. They are met with in certain tissues more frequently than in others; and, excepting deficient cohesion and discoloration, are commonly limited to these tissues.

51. *C. The organs most frequently altered in structure* are, the digestive mucous surface, the liver, the spleen, the bronchial surface, the lungs, and the brain and its membranes. But the frequency of the alterations of each differs widely in different fevers; the first and last of these textures being, upon the whole, most frequently and seriously changed.—*a. The digestive mucous surface* is very generally affected in some fevers, particularly in certain that are endemic, as in the fevers of Paris, and in warm or marshy countries. The alterations of it are often insidious, latent, or much greater than the symptoms indicated; and they differ from the appearances commonly resulting from common inflammation, in the dark discoloration attending them, in their being confined to spots or patches, and in the less frequent effusion of lymph. They consist, 1st, of livid or brownish-red patches, covered by a dark reddish mucus; 2dly, of softening, tumefaction, or thickening of the discoloured spots; 3dly, of infiltration of the sub-mucous tissue, with dark or sanious fluids resembling small ecchymoses or internal petechiæ; 4thly, more rarely of effusions of small portions of lymph in spots scattered over the membrane; 5thly, of abrasions, sloughings, and ulcerations of this tissue, either sparingly scattered or aggregated, the latter most frequently in the lower ilium, or near the termination of the ilium. These changes are most common in the parts of the membrane occupied with PEYER'S and BRUNNER'S glands, but they also occur in the mucous membrane itself. Their frequency in different parts of the canal in fevers is the same as stated in the article DIGESTIVE CANAL (§ 36). These lesions are seldom seen alone. They are most frequently accompanied with changes in the mesenteric glands and in the encephalon, and are obviously advanced consequences of the general disease; as they are observed chiefly in the more protracted cases. They are the common causes of the intestinal hæmorrhages, of

the severe pains, and the sinking sometimes occurring in the latter stages.

[It is well ascertained that ulcers thus formed may cicatrize, vestiges of which are often found after death from other diseases. In many cases ulceration extends to vessels of such size as to give a copious discharge of blood; in other instances ulceration leads to perforation of all the coats of the intestines, escape of their contents, and consequent rapid and fatal inflammation of the peritoneum. These effects of ulceration are almost always made known by the sudden attacks of hæmorrhage, or of violent pain and sinking; and these symptoms sometimes commence at so late a period after the febrile action has subsided as to indicate that the fever is by no means necessarily coexistent with the formation, or even the extension of these ulcers.]

52. *C. Alterations of the liver and spleen* are much less frequent in this country than in warm climates, and the countries of the South of Europe.—*a.* The change in the liver consists chiefly of congestion, injection of its vessels, softening, and enlargement.—*b.* The *bile* seldom presents a healthy appearance, either in the gall-bladder or in the hepatic ducts.—*c.* The affection of the *spleen* is most common after the periodic fevers of miasmatic localities, and consists chiefly of great enlargement, softening, and even gangrene.—*d.* The *pancreas* and *kidneys* are not often altered in structure, and the *peritoneum* still more rarely, excepting in puerperal fevers, and after perforation of the digestive canal.

53. *D. The lesions of the respiratory and circulating organs* are frequently very important.—*a.* The *fauces* and *larynx* sometimes are covered by an aphthous exudation, or are œdematous, infiltrated, tumefied, and softened; but the *larynx* is seldom affected to the extent of impeding respiration, unless in eruptive fevers.—*b.* The *bronchial mucous membrane* is often injected in patches of a dark red or livid hue, somewhat thickened and softened, and covered by a discoloured, viscid, and frothy mucus.—*c.* The *pulmonary parenchyma* is occasionally œdematous, or condensed by infiltration of a dark fluid, and, at the same time, somewhat softened. The changes in the bronchial surface and in the substance of the lungs often coexist, and are also attended by gravitation of the fluids to the more depending parts of these organs, and by exudation of the more serous portions—alterations which are not alone consequent upon death, but which often precede it, and constitute the "*Peripneumonic des Agonisans*" of LAËNNAC. [It is to be noted particularly that, in a great proportion of fatal cases of fever, we shall find, to a greater or less extent, marks of inflammation of the mucous membrane of the bronchiæ, vascularity and thickening, and effusion of viscid or frothy mucus; in short, all the appearances generally met with after death from *bronchitis*. It is not unusual to find a considerable amount of serous effusion in the pulmonary cellular substance, or hepatization of portions of the lungs, of a darker and more uniform colour than what usually occurs in ordinary inflammation of this organ. Where these changes occur in the posterior parts of the lungs, they are, for the most part, to be viewed either in the light

of *post-mortem* changes, or as having taken place within the last few hours of life, when the blood, in consequence of its defective arterialization, and of the enfeebled action of the heart, makes its way through the capillaries of the lungs, and becomes obedient to the laws of gravitation.] The changes, moreover, in the respiratory organs, particularly in the typhoid states of fevers, are often attended with lesions within the cranium and in the digestive mucous surface.—*d.* *Gangrene* of the lungs occurs only when inflammation of them supervenes in the course of fever, and the same remark is applicable to alterations of the *pleura* or *pericardium*. Inflammation of these latter textures sometimes takes place during convalescence, owing to premature exposure, and during the decline of fevers, particularly eruptive fevers.—*e.* The *heart* is sometimes softened, and its substance discoloured, particularly in adynamic or malignant fevers, and occasionally a sanguineous serum is found in the pericardium.—*f.* The blood in the cavities of the heart and large vessels is often, also, more or less changed. (See art. BLOOD, § 128.)

54. *E. The lesions within the head* most frequently consist of a morbid increase of the serous exhalation from the encephalic membranes, especially in the ventricles and beneath the arachnoid; but the amount of the effusion is seldom very considerable. The blood-vessels within the cranium, especially of the *pia mater* and substance of the brain, are frequently turgid, with a dark or fluid blood. Slight extravasations of blood are also rarely observed. These appearances have frequently little or no relation to the coma existing in the latter stages, and the same may be stated, as to the changes in consistence which are sometimes seen in the substance of the brain, these changes, however, being neither uniform nor frequent. The *dura mater* is rarely affected.

55. *F.* Lesions are not so common in the *spinal chord* as within the head, but such as occur there are similar to these just stated. No uniform connexion has been established between the morbid appearances in this situation and the pain in the back and loins, or other affections of the voluntary muscles, although some pathologists believe that these symptoms depend upon congestion or effusion within the spine.

56. Upon the whole, the changes observed in particular parts are chiefly advanced consequences of the disease, the most violent or malignant states of fever often being evinced rather in the altered colour, elasticity, and cohesion of the tissues than in grosser lesions, these latter being most commonly superinduced on the former. It is important, however, to distinguish them from lesions which have existed before the occurrence of fever. The blood and all the secreted fluids are evidently more or less diseased, although it is difficult to show in what the change of these consist. (See BLOOD, § 115 and 128.)

57. VII. THE PROGNOSIS OF *FEVERS* is of the utmost importance as respects a knowledge of the changes taking place in their course, and of the signs and tendency of these changes, as well as the reputation of the physician. It is often difficult, owing to the mutability of the disease, and to the liability to err in apprecia-

ting those signs by which changes of the functions and of the organization are indicated, particularly when the chief manifestations of life, and sensibility and organic contractility, are more or less impaired or perverted during the course of fever. The prognosis depends generally upon the following circumstances: *a.* The nature and intensity of the predisposing, exciting, and concurring causes; *b.* The character of the prevailing epidemic, or epidemic constitution; *c.* The type, form, and state of the disease; *d.* The states of the various functions, and of nervous and vital energy; *e.* The congruity of the symptoms, and various contingent phenomena; *f.* The influences, treatment, and regimen to which the patient is subjected; and, *g.* The *entical* or other changes which may take place.

58. *A.—a.* The *predisposition* caused by debility, acute sensibility, or a plethoric and cachectic habit of body; a previously morbid or congested state of the internal viscera, particularly of the liver, bowels, and spleen; and advanced age, increase the danger from fever. Some *epidemics*, however, most frequently attack the young and robust, and prove even more fatal to them. But, although *sporadic fever* may be also common in this class of patients, it is less dangerous in them than in the foregoing.—*b.* The *exciting agents*, particularly specific animal miasms; their contracted form; the concurrence of several causes, either contemporaneously or in quick succession; their prolonged action, or continuance during the disease; and certain of the circumstances inducing unfavourable terminations (§ 48), render the prognosis much more serious. Some importance should also be attached to the character of the prevailing epidemic, as respects its open or insidious form, and the effects following a treatment appropriate to the usual states of the disease.

59. *B.—a.* The *intermittent type* is less serious than the remittent, and this latter than the continued; but the more the fever is inclined to change, to become irregular, or to pass into one of a graver character, the more serious it is. The more complete the intermission, or the remission, so much less is the danger; and the more disposed continued fevers are to evince a remitting form, the more favourable is the circumstance. The longer fever has continued, the more difficult will be the cure; and relapses are more unfavourable than first attacks.—*b.* The *inflammatory and sthenic species* are much more generally favourable than the *dynamic forms*.—*c.* The *simpler* the fever, the more certainly will recovery take place; and the more *complicated*, the greater is the danger. The *dynamic form*, with *predominant affection*, of an important internal organ, especially the intestinal mucous surface, or the brain, or the lungs, is accordingly among the most dangerous; more especially if the vascular system and circulating fluids, or the soft solids, also become vitiated.

60. *C.* The more that the *organic nervous influence* is suppressed, diminished, or disordered throughout the different viscera, the more unfavourable should be the prognosis; and the functions of the viscera, the state of the fluids and secretions, and the appearance of the soft solids, evincing the extent of the disorder and of

the danger. A weak, small, and quick pulse; a dark, dry, and contracted tongue; profuse, offensive, viscid, and unnatural perspirations; watery, fetid, flaky, membraniform, and unhealthy stools; discoloured, scanty, and brown urine; livid or discoloured nails, fingers, eyelids, lips, and nose, independently of the cold stage; a discoloured, dark, and dry mouth and throat; and an offensive and penetrating odour proceeding from the patient, are dangerous symptoms. A pulse of 120 or upward, unless in the puerperal state, is unfavourable, and so much the more so as it is above this number. A brown or black coating, and deep reddish fissures, or a dark or livid colour of the tongue; stridor of the teeth; a movement of the lips and lower jaw as if eating; firm closure of the jaws and lips; extreme anxiety at the præcordia; tumefaction, tenderness, or pain of the epigastrium, hypochondria, or abdomen generally; tympanitic or flatulent distention of the abdomen; copious or repeated discharges of blood by stool; a sudden irruption of the catamenia, and an equally sudden disappearance of them; a moaning, weak, quick, abdominal, or gasping respiration; coldness or rawness of the expired air; hiccough; excessive increase, or diminution, or irregular distribution, and otherwise morbid state, of the animal heat; sunk features; rapid emaciation; great difficulty or impossibility of acting upon the skin by sinapisms or blisters; an earthy, or deadened, unnatural, lurid appearance of the external surface; yellowishness of, or petechiæ and livid or purple blotches on, the skin; and dark mucous sordes on the lips or gums, or sanious discharges from the latter, or from the nose, are very unfavourable circumstances.

61. *D.* The unfavourable symptoms, more directly depending upon the *cerebro-spinal nervous system*, are, *a.* extreme pain of the head; excessive sensibility or depression of spirits; tumid or red countenance, injected watery eyes, contracted brows, &c., quickly passing into delirium, sopor, or coma; prolonged watchfulness, or early somnolency or torpor; convulsive movements, trismus or spasms of parts, great restlessness, and continued tossings; despair of recovery; and a presentiment or feeling that death will ensue; *b.* And still more unfavourable are, early mental indifference, particularly to the issue of the disease; insensibility or sopor; profound coma, and difficulty of being roused; relaxation of the sphincters, and unconscious evacuations; excessive loss of muscular power; inability to retain any other than the supine posture, especially early in the disease, and in connexion with extreme pain in the back and loins; falling down towards the foot of the bed; a position of the limbs and body, depending upon their gravity, and different from that usually preferred by the patient; inability to assume a posture different from that in which he is placed; picking with the fingers at the bed-clothes; subsultus of the tendons; catching after objects in the air; alternate dilatations and contractions of the nostrils during respiration; loss of voice or speech; trembling of the tongue, or inability to protrude it; an open mouth or relaxation of the lower jaw; difficulty of deglutition; and dilatation and insensibility of the pupil.

62. *E.* *Unusual or incongruous symptoms* also

denote danger, especially if the patient is more depressed by, or sinks faster, under the disease than its apparent severity should warrant. The presence of severe symptoms, of which he makes little or no complaint, is much more dangerous than restlessness and anxiety when the symptoms are not so severe. Unquenchable thirst, the tongue being moist, and febrile heat moderate, the absence of thirst, the tongue and mouth being dry, and the temperature high, and remarkable craving for food before remission of the symptoms, the tongue remaining dry, &c., are unfavourable symptoms; the first indicating dangerous lesions of the stomach and liver, the second, oppression of the brain, and the third, inflammatory action of its substance, with extreme debility. An early collapse of the countenance, or a pale, lurid hue of it, with rapid emaciation, indicates a very dangerous form of fever, with vitiation of the circulating fluids. The more complete the change in the expressions, appearance, and habits of the patient, during the early stages of the disease, the greater the danger. A remarkable acuteness of the senses of hearing and sight is more unfavourable than an opposite condition. Changeableness of the urine, especially if it becomes limpid and scanty, from being copious and turbid, or ceases to deposit a sediment, an unnatural sound on deglutition, a marked or unusual sinking or protrusion of the eye, a diminution or an enlargement of the objects seen, or double vision, openness of the eyes during sleep, or sopor; the patient supposing himself in a different bed or house to his own; and his urging a removal to his friends, or to a church, or to the altar, all denote danger.

63. *F.* The more mild, open, and uncomplicated the disease, or devoid of any of the above unfavourable signs, the more certain will be recovery. The occurrence of crises at due periods, and their spontaneous and full evolution, are also very auspicious. But if the critical evacuations are imperfect, or if the exacerbations, or aggravation of particular symptoms usually preceding them, only are observed—the efforts being thus abortive—or if the disease afterward become more severe, danger should be apprehended, especially if the tongue be drier, the secretions more disordered or suppressed, and organic nervous power farther diminished after such attempts. (See article *CRISIS*.)

64. VIII. CAUSES.—i. REMOTE.—*A.* The predisposing causes are not the same in all fevers, for there is a certain susceptibility of frame which favours the action of the exciting causes of epidemic and of certain specifically infectious fevers, independent of the states that predispose to the sporadic occurrence of fever. There seems, also, to be a certain innate susceptibility to the infection of eruptive and yellow fevers that is destroyed by an attack of the disease, the same infection not producing its specific effects a second time; and this susceptibility, particularly when yellow fever is epidemic, is generally connected with high irritability of the muscular system, vascular plethora, and a robust state of the frame. The most influential of the predisposing causes are, dread of the disease; change from a cold to a warm climate; peculiar idiosyncrasy; acute

sensibility and irritability; the excessive use of food, especially animal food, and of spirits, wines, and malt liquors; moist states of the air and diminished electricity; prevailing winds from the south and east; fatigue and exhaustion of mind or body, from whatever cause; accumulations of bile on the biliary apparatus, and morbid collivies in the prima via; insufficient and unwholesome food; a close and moist atmosphere; whatever lowers the moral and vital energies; and the general predisposing causes adduced in the article *DISEASE* (§ 30–38).

65. *B.* The exciting causes are the preceding, particularly when several act contemporaneously, or with much intensity; as a moist, warm, and stagnant air, rapidly carrying off by induction the positive electricity of the frame; a saburral state of the prima via; accumulations of vitiated bile; and mental or bodily exhaustion; miasmata, terrestrial exhalations, and foreign gases floating in the air; emanations from decaying vegetable matter; the exhalations from crowds of persons or animals in a confined space and stagnant air, as in transports, camps, crowded barracks, prisons, &c.; the effluvia arising from putrid or decaying animal matter, particularly when concentrated, or mixed with the emanations from decomposed vegetable matters; the miasms generated by copious secretions and discharges from the sick, as in crowded wards of hospitals, particularly lying-in hospitals, close, crowded, and low apartments, &c.; effluvia specifically infectious, as those of typhus and scarlatina; the force of imagination, or the impression produced on the mind by the sight of a person in the disease; fear, dread, or terror, and any of the depressing passions acting long and energetically; remarkable exertion of mind and body, and consequent fatigue of either or both; defect of the natural or accustomed stimuli, as of food, drink, tobacco, opium, &c. Certain of the causes, as infectious effluvia, miasms, &c., are especially active, and may, therefore, be said to be the *specific, efficient, or essential agents* of the disease; while others, as fatigue, cold, defect of stimuli, and certain of the predisposing causes, may act merely concurrently or consecutively, as respects the principal exciting agent, or in such a manner as to determine or aid its effects. I would refer the reader to what is advanced respecting the specific and determining agents and influences in the articles on the *Causation of Disease* (§ 55–63), on *ENDEMIC INFLUENCES*, and on *INFECTION*.

66. ii. OF THE PROXIMATE CAUSE, or those Changes more immediately consequent on the exciting or efficient Agents of Fever.—*A.* Opinions of the ancients, and of former writers.—Fever has been considered as essential or distinct diseases from the earliest records of medicine; and the extent of the ravages then produced by them may be inferred from the circumstance of a separate divinity having been assigned to them in the Grecian and Roman mythology. The Greeks invoked their divinity by the appropriate name Πυρετός; the Romans by the appellation *Febbris* (PLINY, l. ii., cap. 7, et ÆLIAN, *Var. Hist.*, l. xii., cap. 11, p. 566). The latter even erected temples for her worship on the Palatine Mount, in the Via Longa (Vico

Longo), and in the place of the Monument of Marius (VALERIUS MAXIMUS, l. ii., cap. 5, p. 55). The popular dread which gave rise to such a medium or mode of deprecation* not only marks the destructive prevalence of fevers in these countries, but also indicates the noxious effects of the Pontine Marshes in the time of the Roman Republic.

67. The earliest opinion of the ancient Greeks respecting the immediate cause of fever appears to have been that of ANAXAGORAS (PLUTARCH, in *Vita Periclis*, p. 155); etiam ARISTOTLE (*De Gener. Anim.*, l. iiii., cap. 6), the contemporary of HIPPOCRATES. He attributed all acute diseases to an abundance of bile. ARISTOTLE (*De Part. Animal.*, l. iv., c. 2) combated this doctrine, but it became prevalent nevertheless. HIPPOCRATES, instead of entering into speculations which the want of data and first principles rendered futile, set a better example by directing attention to the varying phenomena of the disease, and to their relation with the vicissitudes of season, &c. PLATO (TIMÆUS, p. 497; et GALEN, *De Dogmat. Hipp. et Plat.*, l. viii., p. 324) considered that fevers, and, indeed, all diseases, arose from a disproportion of the different physical elements which enter into the composition of the body. Continued fevers he supposed to arise from superfluity of fire; a quotidian from abundance of air; a tertian from predominance of water; and a quartan from that of earth. This is, perhaps, the first attempt at explaining the types of fever. It appears to have had but little influence, notwithstanding its universal adoption, in changing the modes of practice already recommended by HIPPOCRATES.

68. The *dogmatists* (GALEN, *de Nat. Hum.*, p. 279) of the following age, in conformity with their doctrine, conceived fever to proceed from the abundance of bile, its quantity determining the type of the disease. The *maximum*, in their opinion, produced continued fever of an ardent character; a less quantity, quotidian; and the *minimum*, quartans. PRAXAGORAS (RUFFUS, lib. i., chap. 33, p. 109) of COS, one of the most faithful followers of HIPPOCRATES, adopted a similar theory, and endeavoured, also, to account for the cold stage of the disease by supposing its source to exist in the vena cava. This opinion possesses some features of the more modern doctrine of congestion, which no doubt exists, both in the vena cava and other large veins, during the cold stage, as a part of the series constituting the diseased actions which obtain the name of fever. ERASISTRATUS was the first who contended for a connexion between fever and inflammation (GALEN, *Comment. II.*, in *L. de Nat. Human.*, p. 27). He conceived these morbid states to consist in a transfusion of the blood into the arteries, disturbing the spirit they contain, and giving it an irregular direction. The former he believed to arise from the presence of blood in the large arteries; the latter from a congestion (παρέμπυσις) of this fluid in the capillaries (*Ibid.*, *de Venæsect. adv. Erasist.*, p. 2). He

was equally averse from bleeding and purging, which had been long and generally in use in the treatment of these maladies, and, in conformity, as he supposed, with his theory, recommended spare diet, emetics, lavements, warm baths, frictions, &c. (*Ibid.*, p. 15, 16).

69. ASCLEPIADES, the founder of the *Methodic School*, adopted a great part of the doctrine of ERASISTRATUS respecting the fundamental corpuscles, and the *pneuma* or spirit of the dogmatists. He explained the heat which takes place in fever by the motion of these corpuscles, and accounted for sensation, pain, &c., by a similar hypothesis (CÆLIUS AURELIANUS, l. i., c. 15, p. 46, 48, 57). According to him, fever consists in an increase of heat and of the pulse (*Ibid.*, l. ii., c. 33, p. 151). The other phenomena of fever and of inflammation he considered to proceed from a disproportion between the particles and their pores. The elementary corpuscles he supposed to pass from the lungs into the heart and arteries, and to produce occasionally, during their volatilization from the body, an obstruction in the channels through which they circulate; the larger causing the most obstinate obstruction, and, consecutively, the most violent fevers; and the lesser, slighter attacks. The type of the disease was explained after the same manner. The longer the intervals between the febrile accession, the more subtle the atoms were supposed to be which had become impacted in the vascular pores (*Iidem, Acut.*, l. i., c. 13, p. 42). ASCLEPIADES conceived that nature could do nothing, of herself, in removing this state, and that all must be attempted by the physician. CÆLSUS (lib. iii., c. 8, p. 469) informs us that "ASCLEPIADES officium medici esse dicit, ut tuto, ut celeriter, ut jucunde curet." Agreeably to this maxim, he prescribed gentle medicines, and dietetic means, instead of the violent remedies of the empirics (CÆL. AUREL., *Acut.*, l. i., c. 14, p. 44). Enemata, blood-letting, dry cupping, frictions, gestation, exercise, bathing, and, more rarely, emetics, were the agents which he recommended. (PLINY, l. xxvi., c. 3, p. 392; CÆL. AUREL., l. c. et lib. iii., c. 8, p. 215.)

70. SORANUS (CÆL. AUREL., *Acut.*, l. ii., c. 33, p. 153) conceived fevers to consist in an absolute relaxation of the vessels and their pores. CASSIUS the Eclectic (CASSII *Iatrosophista, Naturales et Medicinales Quæstiones*, ed. CONR. GESSNER. TIGUR., 1562) was of opinion, conformably with the chief doctrine of the Methodics, that they arise in consequence of a different arrangement taking place in the primary and invisible corpuscles, while he adopted the hypothesis of the more ancient dogmatist, by considering the increase in the temperature to be the result of friction between these particles disengaging their integral heat. The views of fever adopted by the Eclectics led to few modes of practice which had not been previously employed. HERODOTUS (ORIBASIIUS, *Collect.*, l. vi., cap. 28, p. 228, *et passim*), the disciple of AGATHINUS, who embraced more of the pneumatic system than of any other, placed great confidence in warm bathing and in sudorifics. These he considered to be serviceable, by fortifying the *pneuma* or spirit, and assisting it to expel heterogeneous particles. He attempted, also, to determine, with more precision, the time and circumstances in which bleeding, as rec-

* The following is from a votive tablet to the goddess:
Febri. divæ. Febri.
sancta. Febri. magnæ.
Camilla. Amata. pro.
filio. male. affecto. p.

TOMMASINI, in GRÆVIUS, *Thesaur. Roman. Antiq.*, t. xii., p. 567.

ommended by HIPPOCRATES, ought to be prescribed.

71. GALEN (*De differ. Febr.*, lib. i., *passim*) attributed the varieties of fever to a degeneration of putrefaction of the humours, and to a certain change in the pneuma, developing an unnatural degree of heat. He supposed the heart and arteries to participate consecutively in this derangement, and to produce the subsequent phenomena. Continued fevers, according to him, had their chief source in an alteration of the pneuma and of the humours; quotidian in a degeneration of the mucus; tertians in a similar change of yellow bile; and quartans in a putrefaction of the black bile, which he considered the most slowly moved, and to require the longest period for the production of the paroxysm. The doctrine of GALEN continued to be almost implicitly and universally adopted for many ages; and even down to modern times it has had its partisans. The writers in medicine who flourished during the decay of the Roman empire and the Arabian physicians introduced but few modifications of his theory.

72. AETIUS (*Tetrabibl.* II., serm. ii., cap. 54, *et passim*) and PALLADIUS explained the phenomena of fever in a nearly similar manner to GALEN. The former paid particular attention to the good effects arising from cool apartments and ventilation during treatment, and employed the therapeutical means recommended by HIPPOCRATES and GALEN. While PALLADIUS (*De Febribus*, cap. 9, p. 30) admitted the opinion respecting the degeneration of the humours, he considered the disease to arise, also, from other causes, such as external or internal irritations, engorgement or suppression of the secretions and transpirations, and putrefaction of the blood itself.

73. During the seventh and eighth centuries the Arabians attributed fevers to superabundance of impure or thick blood, which they conceived to be connected with a similar state of the bile and other humours. They pretended, although not very appropriately, to dilute the former by purging, and to evacuate the latter by bleeding. AARON of Alexandria and RHASES (*Contin.*, lib. xvii., cap. 6, sect. 360, *et passim*) introduced no change into the humoral pathology. They, however, determined with more accuracy the types of continued fever, and paid greater attention to their production, especially in an epidemic form, by the influence of seasons and of certain states of the atmosphere than had been bestowed upon the subject since the time of HIPPOCRATES. ALI (*Abulfarg. Hist. Dynast.*, p. 325), surnamed the Wise, a physician of the tenth century, deserves notice, more from his recommendation of emetics as prophylactics against that state of the humours which he supposed to be productive of fever, and on account of his employment of bleeding in intermittents, than from any innovation which he made in the received theory. AVICENNA (SPRENGEL, *Hist. Med.*, vol. ii., p. 358) appears to have introduced the greatest change in the doctrine of GALEN of any of the Arabian writers. He attributed the phenomena of fever and other acute diseases more to a superabundance of the different humours than to a degeneration of their constitution. GILBERT,* an English physician in the middle of

the thirteenth century, entertained the opinion that, as the changes which supervene in the humours are infinite, so the phenomena of fevers may be equally various. He defined fever to be a greater heat than natural developed by the heart, and propagated by means of the arteries throughout the body, which deranges the other functions in its course, and promotes the farther degeneration of the humours which first gave it origin. He admitted that the heat of the body was not materially increased in many cases, and not at all in others, and that his definition was consequently incomplete. He, however, endeavoured to get rid of the difficulty by involving it in a cloud of scholastic subtleties.

74. ARNALD of Villanova (*Breviar.*, lib. i., cap. 26, p. 1121, *et passim*) introduced astrology into the doctrine of fever by attributing derangements of the humours to the influence of the heavenly bodies. MENGHO BIANCHELI (*De Omni Gen. Febr. et Ægritud.* Venet., 1536, fol.—a rare work), an Italian physician of the fifteenth century, gave a similar definition and theory of fevers to that already given by GILBERT. MICHEL SAVONAROLA (*Practica Canonica de Febribus*, cap. ix., f. 36), a professor at Ferrara, about the same period, deserves mention on account of the view which he took of the influence of climate in modifying the pathology and phenomena of fever. There are few other authors who wrote during the middle ages deserving of notice. All of them either more or less implicitly adopted the doctrine of GALEN, or mixed it up with a farrago of scholastic subtleties and astronomical suppositions.

75. The removal of the trammels of the schools, and the revival of medical science in Europe, may be dated from the writings of J. FERNELIUS (*Opera Pathologica*, &c., sec. iv.). This eminent author and H. AUGENIUS (*De Febribus*, sec. ii., c. 4, p. 50) were the first to impute the proximate cause of fever to changes in the living solids. They denied that the fluids constituted any part of the organization, and consequently inferred that their influence in the production of the disease could not be primary. They very justly, however, admitted their consecutive derangement. FELIX PLATER (*Praxis Medica*, vol. ii., c. 2, p. 39), one of the first writers who, since the revival of learning, turned attention to the true source of medical science—accurate and intimate observation—stated that when the sensibility of a part is disordered by an excessive increase of its animal heat, the result is fever, the type of which he conceived to depend upon the particular fluid which is affected. He believed that when the fluids contained in the vessels of the mesenteries are disordered, fever assumes an inter-

borum Universalium. quam Particularium, non solum Medicis, sed et Chyrurgicis utilissimum, edit. MICH. VENET. DE CAPELLA, 1510, 4to. This production of our countryman is curious, on account not only of its medical, but also of its metaphysical and dialectic character. The following proposition, which he states and immediately endeavours to solve, considered in relation to the time at which it was written, deserves transcription, and evinces also the metaphysical partialities of the author. "Wherefore is the vegetating or vital principle destroyed at death, and not the intellectual? Because the vegetating or vital principle is derived from matter, and may be regarded as its simple product. Consequently, it must necessarily cease to exist with the derangement and destruction of the materials which produce it. The intellectual principle, on the contrary, is not a simple form; it possesses different attributes, not derived from the materials of the body, and therefore must endure after death." (Fol. 215, 246.)

* GILBERTI, *Anglici Compendium Medicinae, tam Mor-*

mittent type, and that the farther the part whose sensibility is affected is removed from the heart, the longer is the fever in being produced. Enough, however, has been stated to show that his facts are more valuable than his doctrine.

76. THOMAS CAMPANELLA,* the celebrated Italian metaphysician and pathologist of the sixteenth century, discarding the opinions of ARISTOTLE, conceived that the vital spirit, which is produced from the most subtle of the animal humours, and is nourished by the blood, is concerned in the production of all diseases, although itself undergoes no change, being only irritated or excited by the aeriform matters and flatuosities contained in, or proceeding from, the fluids. He considered that, as respects its nature, fever can scarcely be called a disease, since it results from the reaction or the efforts of the vital spirit to resist vitiation and putrefaction of the fluids, and thus to preserve life. He attributed the crisis and critical days to lunar influence, and explained the action of remedies on the principle of their exciting or reducing the temperature of the body. VAN HELMONT (*De Febribus*, c. 16, p. 783) ascribed fever to the influence of the archeus or vital principle. Although the foundation of the doctrine, which afterward became so generally adopted, owing to the form it assumed in the hands of HOFFMANN, CULLEN, and others, was laid by these writers, another theory was soon afterward promulgated. Owing to the increasing enthusiasm with which chemistry then began to be cultivated, the *chemical pathology*, first proposed by PARACELSUS (*Op. Omnia Med. Chémico-Chirurg.*, 4to. Basil., 1589), and supported by SYLVIVS (*Op. Med.*, 4to. Amst., 1679), WILLIS (*Oper. Omnia*, 4to. Geneva, 1680), KERGER, BORELLI (*De Motu Animal.*, pars i. et ii.), WEDEL (*Physiol. Med. et Pathol.*, 4to. Jenæ, 1679), and others, obtained a very general support; and although all the phenomena of fevers were not explained by some according to the principles of this school, yet its doctrines were conveniently adduced to account for various states of disorder.

77. It is unnecessary to notice the dreamings of FLUDD, DIGBY, MAXWELL, GREATRAKE, and others of the sect of the Rosicrucians, which appeared early in the seventeenth century, as to the nature of fever. It is impossible to cast even a glance at the ravings of this sect without entertaining ideas the most humiliating of human nature and intellect. Yet they found followers in Europe, particularly in Germany, as late as the middle of the eighteenth century; and even now emanations of their doctrine may be traced in some of the reveries which have recently been promulgated in that inquiring country. Leaving opinions calculated only to excite the most humiliating suggestions respecting the extent of human knowledge, and equally abasing reflections on the state of medical science in this country at that epoch, we arrive at a period presenting opinions more in accordance with calm and unbiased reason than those immediately preceding.

* Born in 1568, and imprisoned for his metaphysical opinions from 1599 to 1629, when he was set at liberty by Pope URBAN VII. He afterward went to Paris, where he died in 1639. (TIRABOSCHI, *Storia*, &c., t. vii., p. 140; CAMPANELLA, *Metaphys.*, l. ii., p. 39; et *Medecin.*, l. i., c. i., art. 1-4, 8vo. Leyd., 1635.)

78. The writings of SYDENHAM (*Opera Omnia*, Leyd., 1742, 8vo, *best edition*) tended to dissipate the "thick-coming fancies" of the humoral and chemical pathologists; and, although tinctured by the chemical hypothesis, he nevertheless directed attention to the operations of nature. BAGLIVI (*Op. Omnia*, Ven., 1716, 4to), at a later period, trod nearly in the same path as SYDENHAM; and, like him, attended to the prevailing character of epidemics, and viewed their phenomena in connexion with the seasons and atmospherical vicissitudes. STAHL (*Theoria Med. Vera*, 4to. Matæ, 1737), the disciple of WEDEL, forsaking the doctrines of his master, adopted a theory in many respects similar to that proposed by VAN HELMONT (*Op. Omnia*, Amst., 4to, 1664) and CAMPANELLA. The psychico-chemical, or bio-chemical, hypothesis of STAHL subsequently received the support of SAUVAGES (*Nosol. Method.*, 2 vols., 4to. Amst., 1758), who, in addition to the efforts of the anima, the increased motion of the fluids, and augmented secretion and excretion of the salino-sulphureous particles, added the doctrine of BOERHAAVE, of accelerated circulation to remove a mechanical obstacle.

79. Although recent opinions as to the proximate cause of fever may be traced partly to FERNELIUS and others, yet it is to HOFFMANN (*De Generat. Febr.*, Halæ, 1715), the contemporary of STAHL, that we are indebted for some excellent ideas. He placed the chief source of motion in the nervous system, and considered that certain affections of nervous influence induce a general spasm of the extreme vessels, driving the blood from the capillaries into the large vessels, the heart and large arteries thus becoming irritated. A nearly similar hypothesis was soon afterward framed by BOERHAAVE (*Prælect. Acad.*, 2 vols. Goet., 1744) from opinions entertained at different periods, more particularly from some of those promulgated by HOFFMANN. BOERHAAVE, adopting no single nor general principle, to which alone he referred the different manifestations of fever, kept his attention more especially fixed upon the relation subsisting between the exciting causes, and the actions they induce in the system, explaining at the same time the latter conformably with the pathological doctrines of the time. He considered that a quicker and a stronger action of the heart was induced during fever, by an accession of the influence of the brain and the cerebellum, in order to overcome the resistance offered by the smaller vessels, and that fever was therefore an exertion of life to avert death. CULLEN (*First Lines of Pract. of Phys.*, vol. i., p. 42) illustrated in a much more satisfactory manner the doctrine of the living solid, as first proposed by FERNELIUS, and so ably extended, and, indeed, established, by HOFFMANN. The application of it to the theory of fever, which had been made by these and other writers, was more precisely explained by CULLEN, and more conformably with many of the phenomena. The opinions of this very acute and philosophical physician held a stricter reference to the early changes than had been generally entertained. The causes of fever he supposed to act by debilitating the nervous energy, inducing diminished influence of the brain, and consensive atony of the superficial capillaries, accompanied with spasm; reaction

of the heart and larger arteries supervening in consequence of this state. This doctrine was farther illustrated and modified by CURRIE (*Medical Reports, &c.* Lond., 1805, *passim*), GREGORY (*Lectures, &c.*), and W. PHILIP (*On the Nature of Fever.* Edin., 1807, p. 89), the last of whom ascribed febrile reaction to a contest between the capillary and larger vessels; and it was most conducive to the employment of emetics at the commencement, and of diaphoretics through the course of the disease. Among the other neuro-pathologists, SELLE (*Rud. Pyretologiæ Methodicæ.* Berol., 1768, 8vo) and TODE (*De Febrium Indole.* Hafn., 1769) deserve notice. The former imputed fever to a peculiar condition induced in the nervous system in general; the latter referred it to a certain irritation in the common sensorium. SCHAFER (*Versuche, ii.*, p. 44, *et seq.*) and THORER (*De Actione Systematis Nervosi in Feb.* Gott., 1774, p. 257) ascribed it to a similar state of the nerves.

80. The experiments and arguments of HALLER having tended to establish irritability as a principle inherent in the muscular fibre, and independent of the cerebro-nervous system, furnished materials for doctrines founded upon such views. Several modifications of these successively appeared. STOLL (*Aphor. de Febribus*, p. 208; et *Rat. Med.*, vol. i. et ii. Vindob., 1768, 8vo) considered fever to be morbidly-increased irritability of the heart; J. C. JUNKER (*De Spasmo Febrili Dissert.* Hal., 1769) viewed it as augmented irritability of the heart and arteries, the nervous influence being, at the same time, diminished; ELSNER (*Variis Febris Status.* Regium., 1789, Dering., I., p. 110) imagined it to be an irregular distribution of the irritability in consequence of certain internal stimuli; and DOSER (*De Febre.* Wirceb., 1795, p. 17) ascribed it to a similar condition of this principle, the irritability of involuntary organs being heightened, and that of the voluntary lessened. Other pathologists called in the vital influence in a more particular manner than had heretofore been done, in order to explain the phenomenon under consideration. KRAMP (*Fieberlehre nach Mechanischen Grundsätzen.* Heideib., 1794; et *De Vi vitali Arteriarum Diatribo.* Argent., 1786, p. 411) referred fevers to an increase of the vital force of the vessels beyond that which is requisite to the natural circulation of their fluids. FORDYCE (*Dissert. on Fever, passim*) imputed them to efforts made to overcome obstacles opposing a free and healthy circulation; and REIL (*Memoirab. Clinic., &c.*, fasc. iv., p. 107) conceived them to result from an exalted state of the vital influence affecting chiefly the heart and blood-vessels. Along with this state of the vital energy, he supposed its disposition and qualities to be changed in the different kinds of contagious fevers; and hence the alterations which supervene in the constitution of the secretions, &c. SPRENGEL (GALEN'S *Fieberlehre.* Bresl., 1788, 8vo) and C. F. HUFELAND (*System der Pract. Heilk.* Jen., 1802) acknowledged, as the proximate cause of fever, a morbid reaction of the vital influence, which they imagined to take place throughout the system.

81. The doctrine of BROWN (*Elementa Medicinæ.* Edin., 1780, 8vo) was remarkable chiefly for the manner in which the vital phenomena

were explained by it. In this respect, also, the opinions of his contemporary DARWIN (*Zoonomia*, vol. iv., p. 333) were no less distinguished, although greatly inferior to those of BROWN in point of originality, simplicity, and philosophical sagacity. BROWN considered life to be preserved by the operation of the exciting fluids on the excitable solids, and health to be the result of their equable and reciprocal action. This action he considered to be deranged by the causes productive of disease. Fever he supposed to be an asthenic state of the system, arising either from the abstraction of the natural stimuli, or from the causes of the disease having directly or indirectly exhausted the excitability. The notions of DARWIN were merely more involved modifications and illustrations in different terms of the same theory. From these have arisen the new Italian doctrine, which attributes an opposite state of the system to fever from that imputed to it by BROWN. The opinions concerning the nature of disease, and the action of remedies, introduced by RASORI (*Della Febre Petecchiale di Genova; Del Metodo di Curare, &c.*, del Prof. G. TOMMASINI. Bologna, 1821, &c., &c.), have produced so great a revolution in the principles of his master as to entitle him to the honour of being considered as the founder of a new school.

[In connexion with this subject, the doctrines of our distinguished countryman, BENJAMIN RUSH, are deserving, at least, of a passing notice. As Dr. R. confined the whole catalogue of diseases to a single class, and called the whole assemblage a *unit*, so also he reduced all fevers to one, maintaining that they differed only in *degree*, and that every form or variety of disease consists in *irregular action*, and that this irregular action, in its turn, is the approximate cause of every form or modification of disease. All the varieties of disease, according to his system, are owing to the difference in the state of predisposition, and in the difference in the force of the exciting or acting causes.

Rejecting that part of BROWN'S doctrine which teaches that debility, carried to a certain degree, is disease, whether occasioned by the abstraction of natural and customary stimuli, or by their excessive action, exhausting or expending excitability—which, in the former case, BROWN called direct debility, and in the latter, indirect debility, and which he supposed required the application of stimuli of very different powers to restore the deficient excitement to a healthy grade—Dr. RUSH held that debility, whether induced by the abstraction of stimuli, or by the excess of their action, is the only predisposing cause of disease. In both cases he supposes the debility which gives the predisposition to disease is occasioned either by causes that abstract the stimuli necessary to support the healthy action of the several functions of the body (and the debility from these causes he calls the debility of abstraction), or by such preternatural or unusual stimuli as, after first elevating the excitement of the system above its healthy grade, and thereby wasting part of its strength, afterward reduce it down to that state of debility which he calls the debility of action. And he considers the debility to be the same, whether brought

on by the former or the latter causes; for the effect is an increase and accumulation of excitability, or an increased disposition to motion in both cases, and disease, or irregular action, the necessary consequence of the action of stimuli upon the excitability thus generated and accumulated. To apply these views to the subject of *fever*: as in health there exists a constant and just proportion between the degrees of excitement and excitability, and the force of stimuli, so in a predisposition to fever, as well as all other diseases which consist in debility and undue proportion of excitability, or preternatural disposition to motion, the ratio between the force of stimuli, excitement, and excitability is destroyed; in consequence of which the stimuli act with a force which produces *irregular action*, or, in other words, *fever*; and when the excitability is comparatively more abundant in the blood-vessels than in the other portions of the system, which, from their being distributed in numerous and minute branches to every part of the surface of the body, both internal and external, is frequently the case, morbid, or irregular and convulsive motion is produced in them by the stimulating action of the circulating blood; for the equilibrium of the system being destroyed by the sudden abstraction of excitement, in consequence of the suspension of the natural and customary stimuli, the blood becomes unequally distributed, and, by acting with an increase of quantity and force in parts not accustomed to either, becomes an irritant to the muscular fibres of the blood-vessels, and thus an exciting cause of fever. When the excitability is redundant, and the natural or customary stimuli continue to act, the disease exhibits symptoms which indicate too much strength or activity, but more predominant in that portion of the system in which it has become comparatively more abundant than in the other portions of the same; and when it is deficient the symptoms indicate too little strength and activity in the system, and particularly in that portion of it in which the excitability is comparatively more defective than in the other portions; and when either the quantity of the excitability or the force of the stimuli is in an undue proportion to each other, different degrees of excitement or power of action is the consequence. RUSH maintained, moreover, that all the remote or predisposing causes of fever, and all other diseases, are *debilitating*, and all the occasional or exciting causes *stimulating*. Among the remote or predisposing causes of fever he enumerates cold; the debilitating or depressing passions of fear, grief, &c.; immoderate evacuations; famine, &c.; all of which induce debility, or a diminution of healthful power, by the abstraction of customary and salutary stimuli, in consequence of which the excitability accumulates and becomes redundant.

Among the causes which predispose to fever by the excessive or unusual application of stimuli, he mentions heat; intemperance in eating or drinking; inordinate exercise; violent emotions; marsh and human miasmata; contagions and poisons of all kinds; bruises and burns, &c.: all of these he supposes to act, by their stimulating power only, in the production of fever, although he admits that

fever is frequently the consequence of the debilitating effects of the remote causes, without the application of any apparent stimulus, the circulating blood being sufficient, in such a state of excitability, to stimulate the arteries, and by producing *irregular action*, cause fever. "Reaction," says Dr. RUSH, "is thus induced, and in this reaction, according to its greater or less force and extent, consists the different degrees of fever. It is of an irregular or a *convulsive* nature. In common cases it is seated primarily in the blood-vessels, and particularly in the arteries. These pervade every part of the body. They terminate upon its whole surface, in which I include the lungs and alimentary canal as well as the skin. They are the outposts of the system, in consequence of which they are most exposed to cold, heat, intemperance, and all the other external and internal, remote, and exciting causes of fever, and are first roused into resistance by them." In bringing about reaction of the blood-vessels, in which fever consists, Dr. R. rejected the *vis medicatrix nature* of CULLEN, and attributed it altogether to their elastic and muscular texture, being "as simply mechanical as motion from impressions upon other kinds of matter."* According to RUSH, then, there is but *one fever*, and one exciting cause of fever, namely, *stimulus*. The phenomena of fever resolve themselves into a chain, consisting of the five following links: 1. Debility from action, or the abstraction of stimuli. 2. An increase of their excitability. 3. Stimulating powers applied to them. 4. Depression. 5. Irregular action or convulsion; all the links being only perceptible when the fever comes on in a *gradual* manner.]

82. The ideas of the humoral pathologists have been lately revived in Germany by CH. L. HOFFMANN (HILDENBRAND, *Institutiones Medicæ*, vol. i., p. 93), WEDEKIND (*Nachrichten über das Französische*, &c. Leips., 1797, 8vo), and HERZIG (*De Febribus in Generæ*. Colon., 1790, 8vo). They suppose some change analogous to putrefaction to supervene in the blood, which, irritating the vessels, produces fever. At a still later period, the opinions of the bio-chemists have been attempted to be restored. J. C. STARK and G. F. PARROT (HILDENBRAND, l. c.); and HUFELAND's *Journal*, *passim* attributed the proximate cause of the disease to an excitation and disturbance of the calorific process, and to the abundance of carbon in the blood. G. C. REICH (*Von Fieber und dessen Behandlung*. Berl., 1800, 8vo) assigned a defect of oxygen in the organization as the cause; J. C. BAHRENS (*Über Fieber und Sauerzäure*. Leip., 1802) imputed too great an abundance of this substance to the system during fever; and J. C. HARLES (*Neue Untersuch. über das Fieber*, Leip., 1803) referred the whole phenomena to the agency of electricity.

83. Although fever and local inflammation may arise simultaneously from concurrent predisposing and exciting causes, or from epidemic influence, yet the identity of both diseases did not become an article of pathological belief until towards the close of the last century. RIVERIUS (*Prax. Med.*, sec. xvii., c. 2), indeed, had very justly stated that acute and malignant fevers very rarely run their course with-

* [*Medical Inquiries and Observations*. By BENJ. RUSH, M.D. Phil., 1809, 4 vols.]

out inflammation of some viscus; but he remarks, in a manner worthy his high reputation, that the superinduced inflammation is different from that which is primary or idiopathic. Other writers had conceived, from the predominance and character of certain symptoms occurring in the progress of fever, that inflammatory action is no infrequent attendant upon it. COITER, of Groningen, was surprised when he found no inflammatory appearances within the head, in cases where the cerebral symptoms were very remarkable; and WILLIS, long afterward, supposed fever to be an inflammation of the spirits (*spirituum phlogosis*). Dr. GRANDVILLIERS is, however, the first writer who has distinctly ascribed fever to inflammation of the brain, he having remarked, in 1757, this organ especially affected in an epidemic characterized by malignant symptoms; and Dr. WENDELSTADT, in his description of an epidemic that prevailed in 1794 and 1795 in Wetzlar, attended by delirium in some cases, by catarrh or pneumonia in others, or by both delirium and pneumonia, considered inflammation of the brain to have occurred from the commencement. Still, the existence of essential fever cannot be said to have been called in question, until the appearance of the works of PLOUCQUET (*Exposit. Nosolog. Typhi*. Tubing., 1800) and CLUTTERBUCK (*Inquiry into the Seat and Nature of Fever*. Lond., 1802), in which this disease is ascribed to inflammation of the substance of the brain. This doctrine was soon afterward controverted by Dr. BEDDOES (*Researches concern. Fever as connected with Inflamm.*, &c., 8vo), but MARCUS, of Bohemia, forsaking the pathology of BROWN, became a convert to it, and its most zealous supporter (*Ephemer. der Heilk.*, b. i., st. 2, &c., 1809); and other writers of inferior note espoused the doctrine, both in MARCUS's *Ephemerides* and in HORN's *Archives*.

84. Shortly afterward another theory of fever made its appearance, and in France, at least, attracted considerable attention, owing to the copious writings of BROUSSAIS and of his pupils. This pathologist maintained that the mucous membrane of the digestive canal is the primary seat of fever, and presents the most general and unequivocal lesions after death; affections of other organs being merely consequent upon, or sympathetic of, disease of this part. Although several writers, especially RAIN (*Briefwechsel*, &c., p. 250. Zurich, 1787) and BEDDOES (*Op. cit.*, p. 63), considered the gastric system most frequently affected in fevers, it was reserved for BROUSSAIS to conclude that "all the essential fevers of authors are to be ascribed to gastro-enteritis, simple or complicated." (*Exam. des Doct. Med.*, &c., t. i., p. 34.)

85. These two theories are the most important of those which have had reference to the local origin and seat of fever. They are manifestly founded on narrow views of the deranged actions consequent upon prolonged mental depression and anxiety; upon change of climate, season, and weather; upon the operations of endemic agents and epidemic influences; upon the action of various infectious miasms, according as each or several of them may affect persons differently predisposed, by temperament or diathesis; by habit of body and constitutional energy; by the state of the secreting and excreting viscera, and by the cir-

cumstances in which they are placed. They appear also to be deduced from mistaken conceptions of the actual sequence of the disordered actions characterizing the various species of fever—sporadic, endemic, epidemic, infectious, &c.—however they may be associated or complicated with more or less local disease, either at their commencement or in their progress.

86. The opinions which have recently been most adopted on the Continent, especially in Germany, are those which were taught by J. P. FRANK (*De Curandis Hom. Morbis*, &c., t. i., p. 34) and V. N. ab HILDENBRAND (*Institut. Pract. Med.*, t. i., p. 96). The former of these writers confesses that he despairs of conveying any exact idea, or even of coming to any satisfactory conclusion, respecting the proximate cause of fever. He thinks, however, that fever may be viewed as resulting from irritation induced by an unaccustomed stimulus; the powers of life reacting, or making efforts at reaction, in order to remove it. HILDENBRAND states nearly the same proposition in different words, in concluding that the cause of fever is to be found in a morbidly-increased reaction of the vital forces, owing to the irritation of a morbid stimulus. He farther remarks, 1st. That all fevers are caused by an absolute or relative irritation, and, consequently, that they are all at their commencement irritative; 2dly. That the reaction of fever never follows mere debility, although it is attended by debility; and that the debility of the vital powers is always secondary, and the effect of the morbid irritation, or adventitious, as in the progress of the disease. Admitting that it is difficult to explain—although I think it quite possible—how reaction of the vital forces can take place in the system in consequence of a cause primarily producing debility, more especially in the part where the impression is primarily made; still it is evident that all the causes of fever are not positive stimuli or irritants in their primary action, and, consequently, that their immediate effects on the surface to which they are applied are not exciting. Indeed, we have no evidence that the effects which are proximately consequent upon their application, are similar to those which uniformly result from those stimuli with the action of which we are acquainted. Stimulating effects undoubtedly follow remotely in a majority of instances; but they supervene in consequence of intermediate operations taking place in the system itself.

87. The opinions of Dr. JACKSON are not materially different from those of HILDENBRAND. He considers the material cause of fever to be of an irritative kind; that it enters the body by the absorbents of the first passages, proceeding into the circulation; and that it produces the febrile act by irritating the extreme series of organic capillaries, thereby occasioning subversion of the existing mode of action, and giving rise to changed or unnatural forms of action, through which the different secretions and functions are diminished, increased, or modified, in various ways and degrees.

[An abstract of the views of Dr. STEVENS as to the cause of fever existing in changes in the vital fluid will be found under the article "Blood," p. 241. Dr. S. divides fevers into two great classes, viz., 1st, those which arise from

the introduction of some deleterious poison into the system, and, 2d, those which depend entirely on other causes, as cold, checked perspiration, long-continued and excessive heat, local inflammation, &c. In fevers of the former class, Dr. S. maintains that the blood is invariably diseased previous to the commencement of the cold stage, and that whatever premonitory symptoms are present arise from the diseased state of the vital fluid, independent of inflammation of any of the organs. Excitement in fever Dr. S. regards as always a good symptom, being a sure sign that the blood has not yet undergone any fatal change; but in pestilential diseases the blood has become so much vitiated early in the disease that it has lost the power of stimulating the heart so as to keep up its healthy action; and probably, also, the vascular organs are early affected by the action of the poison, and lose the power of either feeling the stimulus or reacting with force on the impression which is communicated to their internal surface by the vitiated blood. This diseased state of the vital fluid he considers to be the effect of the remote cause acting on the vital current, but particularly by immediately lessening its vitality, and ultimately diminishing the quantity of its saline ingredients. The treatment derived from this pathology consists in simply supplying the saline portions of the blood which have been lost, and bringing the vital fluid to its original state of integrity. (See *Observations on the Healthy and Diseased States of the Blood*, by WM. STEVENS, Lond., 1832.)

Dr. TWEEDIE observes that "Dr. STEVENS has shown that, for days or weeks before the disease breaks out, the blood, in persons who have been exposed to the poisonous effluvia, is usually dark, its serum brownish or yellow, with colouring globules precipitated through it, and its venous tint incapable of being thoroughly turned to arterial red by contact with air or various salts. These morbid characters Dr. S. imputes to a diminution of the saline ingredients of the blood—those ingredients which he was the first to prove, by a set of very interesting experiments, to be essential for a healthy process of arterialization in the lungs. As the disease progresses, this morbid condition of the circulating fluid increases; the salts become less and less abundant, and, in consequence, the blood becomes progressively darker, the serum more coloured, the clot looser and looser, venous blood less and less capable of becoming florid under exposure to air or saline solutions, till, at length, what is found in the dead body undergoes no change with either agent, or even with both together. These progressive changes he maintains to correspond invariably with the progress of malignant symptoms. And, on the contrary, it is alleged that, if the morbid state of the blood is encountered in time by the administration of natural non-laxative salts, allied to those usually found in the blood in its healthy condition, this fluid quickly recovers its healthy character, amendment speedily ensues, and the mortality, from one of the severest scourges of man in hot climates (the yellow fever), is reduced to a mere insignificant fraction. Dr. STEVENS's theory, therefore, is, that the poisonous miasma of marsh remittent, and the infectious effluvia of

yellow fever, alter the condition of the blood, especially by removing its saline ingredients; that this diseased state is the cause of such fevers; and, more particularly, that its gradual increase is the occasion of all the malignant symptoms, and of death. Moreover, he maintains that all essential or idiopathic fevers are primarily produced by a diseased state of the whole circulating current." (TWEEDIE, in *Cyc. Prac. Med.*—STEVENS on the *Blood*.)

Dr. TWEEDIE remarks, also, that "Dr. STEVENS's researches go to prove that the fevers of the West Indies originate in a diseased state of the blood;" and that "the humoral pathology has thus, for the first time, been placed on something like a substantial basis." It does not fall within our province to enter into an examination of the truth of this and other doctrines on the subject of fevers, but merely to present them to the reader, and leave him to draw his own conclusions. It appears to us, however, that the views and facts of Dr. STEVENS are eminently worthy of a candid examination; and if they shall not be found eventually to sustain the inferences which have been deduced, they will at least serve to throw much light on the nature and causes of this important class of diseases.]

88. I am not aware that any opinion has been promulgated different from those now briefly stated, up to the period when my own views as to the pathology of fever were published. Dr. ARMSTRONG was the most copious and recent writer on fever at that period; but, after an attentive perusal of his work on typhus, and of his published lectures, I am unable to ascertain what his views are, or wherein they differ from those generally entertained at the time, especially from those previously published by Dr. JACKSON, excepting that he particularly insists upon congestion as an important pathological state of some forms of the disease; but in this he merely followed STAHL, JUNCKER, R. SPRENGEL, JACKSON, and some other older as well as contemporary Continental writers. Upon the whole, his views, both pathological and practical, are so contradictory and vacillating, that a reference cannot be made to them with any degree of confidence.

89. IX. PATHOLOGICAL STATES—i. The EARLY CHANGES IN FEVER.* In approaching the pathology of fever, there are certain circum-

* The views embodied in this chapter, and indeed throughout the whole of this article, which are not assigned to some other writer, especially those on the *Nature and Complications of Fever*, were promulgated by me on various occasions, and in different works, since 1819. In 1820, 1821, and 1822, they were published in the *Foreign Medical Review*, the *Medical and Physical Journal*, the *London Medical Repository*, and other works (see the *References*). In the winter of 1820 and 1821 they were fully stated, in answer to the views of Dr. CLUTTERBUCK, during a discussion at the London Medical Society, in which that able physician and myself were chiefly engaged for three successive evenings. They were also fully developed in my lectures from 1824 to 1827, and in the *Westminster Medical Society*, as reported in the medical journals of the day. My experience of fever had been considerable, previously even to the earliest of these dates. I had treated the most malignant types and complications of fever in the most pestilential climates within the tropics; I had closely observed the typhoid form of it which prevailed in Germany and France soon after the late war; and had seen and treated it as it presented itself in various parts of Great Britain since the year 1810. I state this, in order to show that whatever opinions are here offered similar to those contained in works which have appeared subsequently to 1821 and 1822 are certainly, at least, not derived from them.

stances to be kept in view: *a.* That the chief causes, particularly malaria and animal effluvia, exert a noxious or poisonous influence upon the economy: *b.* That these agents, usually tainting the surrounding atmosphere, when acting injuriously on the frame, pass along with it into the lungs during respiration—the extensive surface there exposed to the tainted air; the organic properties, relations, and functions of this surface; the constant renewal of the air brought in contact with it, &c., favouring the action of these agents in this quarter in preference to any other with which they can have any communication: *c.* The uncertain period that elapses between the time at which the morbid impression is made and that at which it develops the fully formed malady, this period being usually of several days' duration, often much longer, and occasionally very much shorter, or almost instantaneous, especially when the cause is intense and the predisposition strong: *d.* The general character of symptoms constituting the formative and invading stages (§ 33, 35): *e.* The state of function or vital manifestation throughout the frame, and the evident changes in the fluids and solids in the various periods of the malady: *f.* The complications and local determinations which supervene in the course of fever, and the periods at which they present themselves: *g.* The external appearances and nature of the lesions observed after death, the seat of these lesions, their number and extent, and the relation they bear to the symptoms during life: *h.* The obvious differences between the structural changes and those usually consequent upon common inflammation; and, *i.* The frequent absence of any lesion sufficient to account either for the symptoms or for death.

90. *Existing opinions* as to the nature of fever, particularly as respects the changes immediately following the exciting causes, may be reduced to the following: 1st. That fever arises from inflammation, seated, according to some, in the brain, and, to others, in the digestive mucous surface, but sometimes also reflected upon the brain: 2d. That it depends upon congestion of the large vessels and internal viscera: 3d. That it proceeds from the direct contamination of the circulating fluids by its material cause, the nervous symptoms, local affections, inflammations, &c., appearing in its course, arising from the action of vitiated blood upon the organs: 4th. That the causes first affect the cerebro-spinal nervous system, the phenomena of fever arising from the changes produced by them upon this system: and, 5th. That the morbid impression is first made upon the organic or ganglionic nervous system, and, owing to the circumstance of this system actuating the circulating, secreting, and excreting viscera, is manifested in an especial manner by the changes observed in the state of vascular action, in the animal temperature, in the functions of secretion and excretion, in the circulating fluids, and in the other functions which are more or less intimately dependant upon the ganglionic system. (See my views respecting this system, in the *Appendix* to M. RICHERAND'S *Elements of Physiology*, p. 556; and as to its pathological relations, &c., particularly in connexion with the causation of fever, in the *Lond. Med. Repos.*, vol. xvii., p. 376.)

91. *A.* The doctrines imputing fever to *inflammation of the brain, or of the digestive mucous surface*, are subverted by nearly the same facts and considerations: *a.* Inflammatory appearances are not uniformly observed in fatal cases, and *a fortiori* cannot generally exist in those which recover.—*b.* The lesions which actually exist, although possessing certain of the characters usually ascribed to inflammation, are wanting in others, especially those indicating sthenic or purely inflammatory action; therefore these lesions, as stated above (§ 50), are either not the consequence of inflammation, or the result of an inflammation remarkably modified from the common or idiopathic kind, by some superadded cause, or by pre-existing changes in the state of vital power and of the circulating fluids, as will appear hereafter.—*c.* As the lesions, whatever their nature may be, are often inadequate to account for the symptoms or for death, they are to be looked upon as contingent phenomena, or merely as the grosser portion of those changes supervening throughout the frame; the whole group of symptoms, their succession, and the ultimate issue, depending more upon the functional disorder in the first instance, and the consequent changes in the fluids and general organization, than upon the more palpable lesions of structure, which occur in different parts from various influences determining or exciting a predominant state or grade of the morbid or general action during its course to some particular viscus or structure.—*d.* The inflammatory appearances observed after fevers are not co-ordinate with those produced by inflammation, nor are they identical with, or even similar to, them (§ 50).—*e.* These lesions are not restricted to the same situation or viscus, the inflammatory complications or local determinations whence they proceed being chiefly seated in different organs, in different cases and different epidemics; the stomach and bowels being principally or predominantly affected in one case or in one epidemic; the head in another; the lungs in a third; the liver in a fourth; according to various predisposing, concurrent, and determining influences, as previous disorder, mental distress, the temperature, season, and weather, the state of the air and of the locality, fatigue, exposure to cold, &c.—*f.* The existence of vascular congestion, although more common than the other inflammatory appearances, in no way supports this doctrine of fever, inasmuch as it may be present to the extent observed in most instances of fever without causing much disturbance, or it may supervene shortly before death, or even immediately after dissolution. But readily granting its existence even early in the disease, it is merely one of several changes consequent upon others much more important, as will appear in the sequel (§ 92).—*g.* Those who believe in the inflammatory origin of fever do not agree respecting the particular viscus which is its especial seat, some assigning one organ, others another. The diversified complications, or predominance of morbid action in one viscus, or even in several, over others, in different cases and epidemics (*e*) furnishing them with the only arguments they can assign in favour of their opinions.—*h.* The changes supervening in the blood, in the secretions, and in the general organization during the progress of fever cannot be

explained by, or reconciled with, its origin in local inflammation.—*i*. The appearances considered inflammatory, and to which this class of pathologists refer in support of their doctrine, most frequently take place in the progress of fever, and seldom at its commencement, as shown by a careful observation of the symptoms.—*k*. The tendency to a favourable termination and to natural crises is much more remarkable in fevers than in inflammations.—*l*. The general characters of fevers vary remarkably in different epidemics and epidemic constitutions, a circumstance not remarked in respect of inflammations, or in a much slighter degree; and, lastly, the *juvantia* and *lædèntia*, in both respectively, indicate a great difference between them. The extent to which depletions can be carried in both, and the frequent benefit derived from very opposite measures in the former, and which are injurious in the latter, are also no mean proof, for although vascular depletions are often requisite to control the local determinations or even inflammations which supervene in the course of, or early in, fevers, yet they cannot, owing to the state of vital power, be carried so far as in pure inflammations; and, although evacuations are most necessary in some epidemics, and tonics or stimulants injurious, still the former cannot be practised to the same extent, at least in this climate, as in the phlegmasiæ, while in epidemics of an opposite character bleeding is often injurious and opposite means are required, a circumstance not observed respecting inflammation.

92. *B*. Certain of the arguments now urged are equally applicable to the doctrine of congestion, or irregular distribution of the blood.—*a*. The espousers of this opinion do not agree among themselves as to the chief seat of congestion; but granting that congestion very frequently, or even generally, exists at some period of the disease, especially in the large vessels adjoining the heart, it is only one link of the chain of morbid causation and action, itself being caused and attended by, as well as inducing, other changes equally important. Besides, those instances which occasionally occur of remarkably great congestion of the large vessels of internal viscera, as from asphyxy, &c., are not followed by the phenomena of idiopathic fever; and, although, as I shall have to show hereafter, many of the worst forms of fever are attended by congestion as one only of the various changes that characterize them, yet others of a slight kind, as ague, are accompanied with still more remarkable congestion during the cold stage of each paroxysm, without farther mischief than the subsequent reaction which it aids in developing.—*b*. When congestion becomes considerable, it is referrible to the noxious influence of the exciting causes exerted primarily upon the organic or ganglionic nervous system, and consecutively upon the vascular system; the action of the heart being thereby weakened, and the tone and resiliency of the vessels impaired; and hence, when the morbid impression on the former is very intense, the effects produced upon the latter are also severe, congestion being only one of these effects. When, in consequence of the persistence of the morbid impression, or change primarily produced in the ganglionic nervous system, the effects upon the heart and vessels continue, the resulting con-

gestions, with the other concomitant lesions, either cannot be removed, or are removed with difficulty, the heart being rendered unable to exert a due reaction in order to overcome them; the vessels being incapable of that degree of tonic resistance necessary to a healthy circulation and a regular distribution of blood; and the capillaries being impaired in all their functions, owing to the state of nervous power influencing them, and of the circulation in them. Thus congestion is established as one of the more evident lesions that follow the primary changes in fever, but only as one of subordinate importance.

93. *C*. To the doctrine that imputes fever to the direct contamination of the circulating fluid by the material cause, the following objections may be urged: *a*. The febrile cause, acting as a poison, should instantly affect the appearance of the blood if it made its first and principal attack in this way; but, when the cause is energetic, the effects, instead of progressively and gradually appearing, as they necessarily would do in this case, instantly manifest themselves in the functions of the nervous systems, more especially of the organic nervous system, and in the functions of the organs actuated by it. I shall, however, have hereafter to show that the blood is the next animal constituent that becomes affected, although frequently in no very manifest manner at first, especially when disease slowly develops itself upon the exciting causes. It should not be overlooked, in our researches on this subject, that agents which especially affect or depress the organic nervous influence produce also co-ordinate effects upon the vascular system and on the blood itself, owing to the intimate connexion subsisting between these two systems.—*b*. In cases where the morbid impression has been already made, either by malaria, or by infectious effluvia, the full development of the disease may be prevented during the first or second stage, by substances which produce a powerful restorative or tonic action on the nervous systems, particularly that of organic life, an effect that could not result if the blood were the primary or principal seat of the disease. A powerful stimulant or tonic will instantly cut short an ague, even when given at the commencement of the cold stage, an effect that would vainly be looked for if its chief seat were in the blood.—*c*. The phenomena and progress of those diseases, as scurvy and purpura hæmorrhagica, in which the blood is especially altered, furnish analogous indications that it is not the primary nor sole seat of fever, but that it is merely secondarily affected, to an extent varying remarkably in different fevers and epidemics; and that the change in this constituent is only a part of the general state of disease, is only one of the many lesions forming idiopathic fever.—*d*. The abatement of fever after crises has been considered as evidence of the primary affection of the blood. Granting that morbid matters carried into the circulation, or generated in it from a morbid seminum, are eliminated from it in the form of crises, or by less manifest evacuations, still this is no proof that the blood is primarily or chiefly changed; but merely that it is one of the animal constituents affected, more particularly in certain forms of fever, as the eruptive and infectious; for we often ob-

serve critical discharges occurring without any permanent benefit, as in remittents, and recovery taking place in others without any crises. While, therefore, a numerous class of fevers, especially the periodic and simple continued, present little or no evidence of contamination of the blood in their course, unless they change their characters and become complicated, a different class, as the adynamic and malignant, present as little evidence of this change at their commencement; the vitiation of the circulating current appearing either consecutively upon the morbid impression made upon the nervous system of organic life, or nearly contemporaneously with this impression, and in a less manifest degree, although progressively advancing, owing to the affection of this particular system, and its influence upon the circulation. But the arguments which are about to be offered in support of my views as to the primary lesions in fever, will more clearly show in how far the blood is concerned in causing many of the phenomena of fever in its more severe forms.

[It is, as ALISON has observed, a very difficult problem, indeed, to solve whether the effect on the nervous system, essential to fever, is produced directly by the external cause acting on the nervous system, or whether it first works a change in the blood, and through its intervention affects the brain and nerves.

"It is plain," says Dr. ALISON, "that the blood is changed, at least as to its power of coagulation, in most cases, and probably it may be so in all cases of idiopathic fever. But a similar change as to that property may be produced in it by causes acting in the first instance on the nervous system; and this fact, therefore, does not indicate the part of the system which is primarily affected in fever.

"Reasons which appear, on first consideration of the subject, satisfactory, may be given against the supposition of many of the older pathologists, that fever essentially and exclusively consists in a certain change in the blood (*quæ prasens morbum facit, sublata tollit, mutata mutat*); in particular, two facts already stated, viz., 1. That after the morbid cause has been applied to the blood, it may depend, as we believe, on causes acting on the nervous system only, whether or not it shall produce its specific effect; and, 2. That, even after that specific effect has been produced, and the febrile actions begun, they may, in a few instances, be arrested by means (such as the cold affusion) which neither evacuate any part of the blood, nor alter its composition. But when it is distinctly understood that the change in the blood, believed to be morbidic, is not in its chemical constitution simply, but in the vital qualities by which that constitution is constantly regulated and maintained, these facts have not the weight against the humoral pathology of fever which has been ascribed to them.

"At least it may be thought that the remote cause of fever does not produce its effect by merely once impressing the nervous system, or other living solids; but that it must necessarily affect for a time the fluids of the body, and perhaps multiply itself in them, in order that it may take effect on the solids. And in favour of this form of the humoral pathology of fever the following facts may be attested:

"1. In a great majority of cases in which we see typhoid fever we are sure that some peculiar matter, generally absorbed from without, must be contained in the blood; as in the case of fever from malaria, from contagion (whether of simple fever or the eruptive fevers), from inflamed veins, from animal poisons introduced by wounds, or from suppression of the natural excretion at the kidneys. That this peculiar matter, or the blood altered by it, should act like a ferment, assimilating much of the circulating fluid to itself, in the former case equally as in the latter, is quite in accordance with what has been observed when purulent matter has begun to form in the blood. (See GULLIVER'S *Translation of Gerber*, p. 104.)

"2. In all cases of idiopathic fever, as well as of the eruptive fevers, an interval, which is variable and often long, necessarily elapses between the application of the morbid cause and the development of the fever, which is easily understood on the supposition that a change is gradually wrought on the blood during that interval, but not on the supposition of the poison acting simply on the living solids.

"3. In a great majority of cases of typhoid fever we know that a matter similar in its effects on the human system to that which excited the disease is ultimately evolved in large quantity from the blood, making the disease contagious; i. e., the morbidic poison in one way or another is multiplied in the blood of the living body.

"It has been naturally supposed by pathologists at different times that the frequent and rapid abatement of fevers after critical evacuations is farther proof of the doctrine of their cause residing chiefly in the blood, and that this morbidic cause is really carried off by these evacuations. And, in support of this opinion, it has been stated that when putrid matters, or diseased secretions, have been injected into the veins of animals, and excited febrile symptoms, a peculiarly fetid diarrhœa has preceded the recovery from these.

"But when it is considered, 1. That copious or spontaneous evacuations (*e. g.*, of sweat) at the critical periods of fevers often take place without the least good effect, if unattended by other marks of restoration of the natural condition of the capillaries; 2. That many fevers abate spontaneously and perfectly without crisis; 3. That in all contagious diseases, morbidic effluvia escape for a long time from the body, without any good effect; 4. That there is no evidence of the critical evacuations possessing more contagious property than the effluvia which continually escape without advantage; and, lastly, that in smallpox in particular experience has shown that the morbidic matter in the pustules may be evacuated as quickly as it appears without benefit, and may be reabsorbed into the blood without injury; we must think it doubtful whether the critical evacuations are the cause of the solution of the fever that succeeds them, or whether we ought not rather to regard them as the *sign* of the restoration of the natural state of the vital actions in the capillaries of the body, whereby the excited action of the heart is enabled to throw off an unusual quantity of secretions and excretions, and then subsides; because the cause confining the circulation, and there-

fore stimulating the heart, has ceased to operate.

"The doctrine of the existence of a morbid matter in the blood, therefore, is not established by the facts as to the critical evacuations, but must be rested on the other facts above stated.

"Whether the morbid cause first alter the fluids or not, it is evident that it affects the actions of all the living solids whenever it excites fever; and it may be questioned whether the first effect of the morbid cause is exerted on the living action of nervous or of the vascular system. Besides what was formerly said on this point in treating of symptomatic fever, the following reasons may be given for thinking that the nervous system is much concerned in the changes occurring even from the commencement of fever.

"1. The nervous system is evidently more affected throughout the whole series of morbid actions than in the former case, and the first symptoms by which the idiopathic fever can in general be recognised are strictly affections of the nervous system.

"2. We have seen that when inflammation coexists in the living body, with the effect of a violent concussion of the brain and nerves, the fever that it excites has often quite the typhoid character.

"3. We have good reason to believe that changes taking place unquestionably in the nervous system, viz., those which attend mental emotions of sufficient duration and intensity, if they have not power (as it may reasonably be conjectured that in certain circumstances they have) to generate fever, have, at least, such an influence on its causes as to determine their efficiency or inefficacy in individual cases; which is of itself a strong presumption in favour of the belief that the primary action of these causes is on the nervous system.

"4. Besides these mental emotions, there are various other agents, formerly noticed as concurrent and accessory causes of fever, and by which we have reason to think that the development of fever, after the poison has been imbibed, is often determined; *e. g.*, cold, muscular exertion, and intoxicating liquors, and the chief action of all these causes, also, is on the nervous system.

"There is, at least, one remedy of peculiar efficacy in counteracting the agency of one of the causes of fever, *i. e.*, the cinchona, which produces no visible effect on the vascular system, and the chief action of which, there is reason to believe, from what we see of it in other cases, to be on the nervous system.

"But whatever be the mode in which the morbid cause in idiopathic fever comes to affect the circulation, it is to the direct action of this cause, and not to the influence of any local diseased actions excited in the body, that we must ascribe the enfeebled state of the circulation, the altered state of the blood, the peculiarly vitiated state of the secretions, and, in a great measure, also, the deranged state of the nervous system, which were described as characteristic of idiopathic, and especially of typhoid fever.

"And there is nothing inconsistent with what is known of the action of poisons, or of other agents on the animal economy, in suppo-

sing that the morbid cause, after existing for some time, and perhaps multiplying itself in the fluids, may act *simultaneously* on the constitution of the blood, on the vital affinities in the capillary vessels, on the powers of the heart, and the vital actions of the brain and nerves. Indeed, if its first action be on the vital affinities, as formerly defined, it must necessarily affect nearly simultaneously all these parts.]

94. *D.* The doctrine that the causes of fever first affect the cerebro-spinal nervous system is invalidated by the following considerations: *a.* This system either does not send nerves, or it supplies but few nerves, and those often indirectly, to the organs especially or essentially affected in idiopathic fevers, as the heart, blood-vessels, secreting viscera, lungs, &c.—*b.* That the chief avenues to this system open to the invasion of the exciting causes are, the organs of sense and the cutaneous surface. Of these the sense of smell is the principal. Although this sense is evidently impressed by several of these causes, when acting intensely, and admitting that the brain is somewhat affected in consequence, still the effect produced in this quarter seems inadequate to explain the chief, and far less the whole, of the early phenomena.—*c.* In some instances the intense operation of the effluvia generating fever has produced its effects almost instantly, and even caused death itself with equal rapidity, a result which the total annihilation of the cerebral functions could not produce, but which would necessarily follow the interruption or suppression of the influence transmitted to the heart and lungs by the nervous system of organic life.—*d.* The generation of fever within the body itself cannot be explained upon the supposition that the cerebro-spinal nervous system is primarily and solely, or even chiefly, concerned in the production of the disease; but may be readily solved by means of the nervous system of organic life, if we take into consideration its functions and structural relations, especially with the vascular system, the circulating fluids, and the excreting viscera. (See DISEASE, § 65.)

—*d.* The early lesions, whether of function or of organization, characterizing the first as well as the advanced periods of fever, cannot be accounted for by assigning the cerebro-spinal nervous system as the primary seat of the disease; for, 1st. As this system cannot influence the action of the heart and the state of the vessels, excepting through the medium of the organic nervous system, and this only to a very limited extent, changes in it do not explain the alterations of vascular action, and still less the vitiation of the blood; 2dly. As it does not control animal heat, so it cannot induce those remarkable extremes and morbid states of temperature distinguishing the maldy; 3dly. As it does not supply nor materially influence secreting surfaces and glands, so it cannot give rise to those early changes of function which they present, nor to those lesions of structure which they often subsequently experience; 4thly. As it does not materially affect the actions of assimilation and nutrition, so it cannot occasion the remarkable changes they present in fevers; and, 5thly. As it does not present aberrations of function, in the slighter and simpler states of fever, equal in degree to

those manifested by the viscera chiefly supplied by the nerves of organic life; and as, when such aberrations supervene in a remarkable manner, they are generally consequent upon those of the organic nervous and vascular systems and of the blood itself, so that the primary impression made upon it must be much less energetic than is supposed by those who support the present doctrine; although I may grant that it partakes, in some measure, or in some forms of fever, of the morbid impression especially and principally made upon the nervous system of organic life, and extended to the organs which it actuates.

95. *E. That the efficient agents of fever act primarily and chiefly upon the organic or ganglionic nervous system* is evident from what has been now adduced, and is farther proved by the following facts and inferences: *a.* The intimate connexion of this system with the organs of circulation, respiration, assimilation, and secretion, on the one hand, and with the cerebro-spinal nervous system on the other, and the influence exerted by it over their functions in health, are sufficient to show that morbid impressions made upon it must necessarily affect all the organs and parts with which it is related.—*b.* The functions primarily disordered in fever, and chiefly affected in its course, are precisely those which are especially subjected to the influence of this system. As we cannot, consistently with our knowledge of the animal actions in health and in disease, infer that a grave and permanent disorder of any one function can exist, unless either the influence that actuates it is impaired, excited, or otherwise altered; or the structure of the organ, which is the instrument of the function, is more or less affected; we are necessarily led to inquire as to which of these sources the disorder is to be imputed. Having inferred from the nature and extent of the disorder, from the causes in which it arose, and the suddenness and manner of its occurrence, as well as from various other circumstances, that it does not consist of lesion of structure, we are therefore compelled to adopt the former alternative, and, from the kind of disorder, to infer the manner in which the influence actuating the organ is affected. Thus, observing that respiration, circulation, secretion, and animal heat are primarily and especially disordered at the commencement of fever, and that various other morbid phenomena are consequently produced, and finding no structural or local change to account for the affection, we refer it to the state of the influence which actuates these functions. Anatomical and physiological evidence concur in showing that the nervous system of organic life is chiefly concerned in the production of those functions; and therefore it may be inferred that this system is first impressed by the causes of the disease.

96. But it is not merely requisite to show the particular system first affected, but also to ascertain, as nearly as possible, the *nature* of the affection. This, however, can only be a matter of inference from the kind of disorder manifested in the functions especially subjected to the influence of this system. What, therefore, is the general character of the disorder which these functions first evince? 1st. The respiratory actions are inadequately performed, voli-

tion being often exerted in order fully to dilate the lungs, and the changes in the blood are imperfectly produced; 2dly. The action of the heart is weakened, and the tone of the pulmonary vessels lowered, so that the circulation is languid, irregular, &c., and congestion supervenes; 3dly. Secretion and excretion are impeded or interrupted, animal temperature diminished, and all the functions indicate at first depression or suppression of the organic nervous influence. There is, however, reason to suppose that this influence may not only be *depressed*, but that it may be otherwise *altered*, according to the cause which affects it, particularly by specific infectious miasms. It is chiefly to this circumstance that the opinions of JACKSON, FRANK, HILDENBRAND, and others, respecting the irritation excited by the material cause of fever, is to be imputed. Whether the alteration in question be called an irritation, or anything else, is immaterial, if the term adopted convey an idea of what the change is, in most of the circumstances in which it occurs. But if by this irritation be meant a form of excitement, the term is applicable only to the state of vascular action often consequent upon, and attended by, the alteration of nervous influence, and not to the state of the influence itself. The whole that we know of the matter, from observation of the earliest phenomena, is, that the change evinces diminished power or influence of the system of nerves actuating the organic functions, and very frequently an otherwise altered or morbid state of this influence which cannot well be described, but which is variously modified in different fevers, and is generally attended by depression; these conditions still continuing in diverse grades, although vascular reaction supervenes, which, when it becomes excessive, increases them, and, in consequence, hastens on disorganization. From this it will appear that the exciting causes of fever first depress or otherwise alter, or both depress and alter, the healthy influence exerted by the nervous system of organic life. That they primarily irritate or excite this system, does not appear from the phenomena, unless either of these states associates itself with some other morbid condition which deflects it from its usual forms; but of this we have little proof, unless it be found in the stage of reaction. This much, however, is apparent, that certain causes seem to depress the organic nervous influence more than others; and that some alter it more from the merely dynamic states, and impress it with a specifically morbid character.

97. But, while disorder of this influence is thus considered the chief and primary constituent of the morbid impression made by the causes of fever upon the economy, it may be asked, Is the impression entirely limited to this quarter? or are the cerebro-spinal influence, and the circulating fluid itself, also partially and primarily affected? 1st. As to the former of these, it may be inferred, from a consideration of the circumstance of the nerves of one of our senses being extended over the upper part of the respiratory passage—the entrance to a most important and vital organ—in order to convey, by their reports, intimations of the presence of such gases or vapours as, if received into the lungs, would prove injurious,

that the more intense causes will act in some measure upon the brain, although in a comparatively slight and evanescent manner. The lungs evidently digest the air received into them, as much as the stomach digests the food; and the entrances into both organs are guarded by two sentinels—the senses of smell and taste—taking cognizance of whatever passes into them. But in cases where injurious effects follow the injection of hurtful matters, is it in the stomach or in the nerves of taste that the morbid impression is to be looked for? and if it be in the former, and not in the latter, that they are to be found, no more should we infer, as heretofore, that the morbid change is first produced on the brain, and not on the nerves of the lungs, when noxious effects follow the respiration of a tainted or infectious air—recollecting always that respiration does not mean simply the passage of air into and out of the lungs, but the actual digestion of this air by them, the important changes excited by its constituents upon the blood and upon the organic nervous influence, and those effected by this influence upon the blood, and upon the air received into the organ.

98. From various considerations and researches into the subject in different climates, I infer that, although the more intense causes may affect the brain, and thereby heighten and accelerate the effects upon the heart and stomach arising from the impression made upon the organic nervous system, yet their action in this quarter is evanescent, and, as I have shown (§ 94), insufficient to explain the phenomena. Judging from my own sensations on having inspired an air so loaded with infectious effluvia as to be remarkably offensive to the smell, the morbid impression was first sensibly felt in the lungs themselves; numbness, weight, or oppression in the chest was instantly felt; frequent forcible inspirations were made, and continued for long afterward to be made, in order fully to dilate the lungs, which felt as if they were partially deprived of their resiliency; the pulse became weak, and the animal temperature was lowered; but the functions of the brain were not impaired. In this case the lungs were certainly the first organ affected, and almost instantly afterward the action of the heart and the functions of the stomach. Instances, moreover, are not infrequent in which the febrile cause has made its impression, and the patient has been removed from every chance of having that impression renewed; and it has not, until the end of weeks, and even months, given rise to its specific effects. In this case is the cerebro-spinal system, or the nerves of organic life, or the blood affected, and the seat of the latent or almost latent impression? I have observed the phenomena occurring during this period in cases of rabies, of smallpox, of measles, of scarlatina, of typhus, and of marsh or periodic fevers; and in every instance they have not indicated any affection of the cerebro-spinal system, but disorder more especially of the functions depending upon the nervous system of organic life. This period, moreover, is frequently shortened or prolonged, the symptoms attending it diminished or aggravated, and the impending malady even prevented, by means which act more especially upon the latter system. Hence the importance of this in-

quiry, for, by arriving at just conclusions as to the constituent part of the economy first affected, and the mode in which it is affected, we are the more enabled to guard against fever, or even to remove the morbid impression after it has been made, and before it has developed itself into open disease.

99. The opinion that the morbid causes even partially operate by first inducing changes in the blood cannot be reconciled with the arguments already stated, and with others which may be offered, although there are circumstances which seem to favour it, the most forcible of which is the propagation of certain diseases by means of a virus, and the long period a virus or morbid miasm often takes to incubate or produce its full effects. But if we look closely into these very circumstances, we shall find that they are not so conclusive of the opinion they are adduced to support as is supposed; for in the case of an inoculated virus—the most favourable to the doctrine of primary contamination of the blood—the consequent infection will be hastened by whatever depresses, and retarded by whatever exalts without exhausting, organic nervous power; it will be accelerated by the usual concurring and determining causes, as a close, foul, moist air, by cold, by excesses of any kind, and by despondency; and it will be retarded, or even prevented, by a dry and pure air, by the use of tonics, or what communicates power and increases vital resistance to the invasion of a noxious cause. The phenomena, also, observed between the application of the cause—whether a contagious virus, an infectious miasm, or an emanation from the soil—and the explosion of the malady, however prolonged the intervening period may be, cannot be referred to any alteration of the circulating fluids that may not be shown to be entirely dependant simply upon the existing state of organic nervous or vital power. In rabies, in which the longest formative or incubating stages is observed, symptoms referrible to the organic nervous system are the first to appear, and the functions depending upon this system are those which especially languish during this period. The same is observed in agues, and in the specific infectious maladies. But even granting that a portion of the animal miasms passes into the blood and vitiates it, the morbid impression is not the less made by them on the nerves of the organ, and not the less unproductive of the principal part of the phenomena more immediately supervening. But this topic is more fully illustrated in the article INFECTION.

100. In order to show what appears to be the common procession of phenomena consequent upon the impression of the exciting causes, I shall presume that a person in health, with no particular organ especially predisposed to disease, is exposed either to infection by the effluvia from a patient in typhus, or to the operation of marsh exhalations. In these cases the exciting causes, floating in the air, are received into the lungs, and, if they be concentrated or energetic, they slightly, although they may sensibly, affect the organ of smell in their passage. But their chief action is exerted upon the nerves of the lungs themselves. It may even be admitted that they also partially affect the blood during the digestion of the air which

is their vehicle by the lungs: of this, however, we have no satisfactory proof; and as their direct operation on the nervous influence of this organ is sufficient to produce all the phenomena, it is unnecessary to assign an additional agency to explain them. The morbid impression having been thus principally made in this quarter, it is necessarily extended to those organs which are chiefly supplied with the same system of nerves; and thus the lungs, the heart, and blood-vessels, the digestive organs, and the secreting and assimilating functions, almost immediately experience the effects. As respects the lungs, their vital resiliency is somewhat impaired; hence the frequent and forced inspirations; and the changes effected by the air upon the blood, which, although chemical, are partly also vital or influenced by the organic nervous power of the organ, are more or less impeded. This latter fact I endeavoured to put to the test of experiment. In a paper written at the commencement of 1815, I had endeavoured to prove that many of the phenomena of fever were referrible to diminution of the changes produced in the blood by respiration; and in 1817, when engaged in ascertaining the alterations effected in the respired air, under various circumstances, I found, in two cases of ague and in one case of remittent, just before the cold stage of the former, and near the first accession of the latter, that the changes in the respired air were diminished from one fourth to one third their usual amount. These experiments were too few, and not sufficiently varied, but they serve to illustrate the subject.

101. The effect, then, of the morbid impression on the organic nervous influence of the lungs being to diminish the changes caused by respiration on the blood, and to render the pulmonary circulation more languid, one source of the alterations observed in this fluid in the early stages of fever is made manifest. These alterations, at this period, seldom extend beyond a darker or more venous appearance of the blood than usual, the crassamentum being often soft and imperfectly separated from the serum. Almost contemporaneously with the effect upon the lungs, the action of the heart and the tone of the vascular system generally become diminished. Hence the increasing languor of the circulation, the internal congestions, and the deficient secretion and excretion; these last, however, depending as much upon the state of organic nervous influence as upon the circulation in the secreting organs. The congestions of the large vessels, and the changes in the quantity and quality of the blood, consequent upon deficient secretion and excretion of its watery and noxious constituents, having reached a certain pitch, bring about vascular reaction, if the organic nervous or vital influence be not too far reduced, or otherwise altered, by the exciting causes; but when the morbid impression has been very intense, and the more immediate changes very great, reaction either takes place imperfectly, or does not supervene at all in extreme cases, vital power being insufficient to develop increased vascular action. Such appears to be so far the progress of the phenomena, as respects the organic functions. The cerebro-spinal manifestations are also early affected—in a slight and passing

manner by the impression made by the noxious effluvia on the nerves of smell; but much more seriously by the influence exerted by the organic nervous system upon the brain and spinal cord, or extended from the former to the latter, and consecutively by the changes in the states of vascular action and of the blood.

102. *F. Consecutive Pathological States.*—When reaction thus supervenes upon either of the specific causes mentioned above (§ 100), it may be variously modified according to the association of various grades of increased vascular action and of diminished or otherwise altered nervous or vital power, and to the local determinations or complications attending it. When, in consequence of the nature and intensity of the causes, relatively to organic nervous energy, the former do not depress the latter beyond the power of reaction, whereby the morbid impression is effaced, and the effects upon the different organs and on the blood are removed, the more sthenic forms of fever take place, vascular action is high, and nervous or vital power not greatly impaired. But when the nature and intensity of the causes are such, in relation to vital power, as greatly to depress or otherwise change it, the more adynamic forms are produced, and vascular reaction is much less energetic, the depressed state of vital power being a prominent and increasing feature throughout the disease. In some of the latter forms, vascular action becomes either excessive or tumultuous relatively to the state of nervous or vital power, owing to the effects produced by the secondary changes in the blood, upon the heart and blood-vessels, and on the organic nervous system, and rapidly exhausts itself, or passes into disorganization; and in others reaction does not supervene, the tone of the vessels being progressively diminished, and the blood, with the soft solids, more and more changed. Hence result, in the last stages, discoloration, softness, flaccidity, lessened vital cohesion, and infiltration of membranous and parenchymatous tissues, with effusions of fluids from mucous and serous surfaces.

103. *G. Local determinations and complications* may attend fever from an early period, or appear at any time during its course, or even at its decline, owing to the circumstances influencing its terminations (§ 47), but especially to the following: 1st. To pre-existing functional or structural lesion of an organ or tissue. 2d. To the predisposing and concurring causes. 3d. To the nature and intensity of exciting and specific causes. 4th. To the character of the epidemic. 5th. To various determining or consecutive influences. 6th. To the effects of reaction upon certain viscera. 7th. To interrupted excretion. 8th. To the morbid states of the circulating fluids exciting disease, quickly passing into disorganization; and, 9th. To injudicious treatment.

104. *a. Pre-existing disease of a part*, especially when seated in the alimentary canal, brain, or lungs, aggravates fever, and gives it a modified form. A loaded or congested state of the liver, also, in respect either of its vascular system or of its biliary ducts, often disposes to fevers, and imparts to them a bilious or gastric character. Various lesions observed after fever, and sometimes imputed to it, have

existed previously, or have been merely aggravated by it, particularly those seen in the pleura and in the liver, and some of those found within the cranium.

105. *b.* The *predisposition* arising from the use of unwholesome water and food especially favour the low types of the disease, with lesions of the mucous follicles and membrane, which can hardly be said to be inflammatory, and contamination of the blood; that from excessive mental exertion or anxiety, increased affection of the brain; and that from gross living or intemperance, complications with disease of the liver, stomach, and bowels. The *concurring determining and consecutive agencies* not merely develop the action of specific causes, as shown in the article DISEASE (§ 61), but they also complicate the fever produced. Thus cold both aids the operation of other causes, and occasions increased pulmonary disorder; and the influences of season, weather, climate, confined air, &c., cause aggravated affections of the intestines, or of the liver, of the brain, of the respiratory passages, or of the circulating fluids.

106. *c.* The *nature and intensity of the chief or specific causes* often determine the complication. Malaria most frequently causes congestion of the liver and spleen; the emanations from persons affected by low fevers, aggravated affections of the digestive canal, of the brain, and often also of the lungs; and the exanthematous effluvia, their specific eruptions, and disease of the digestive mucous surface and pulmonary organs; these local aggravations of the malady appearing chiefly where the causes have acted most intensely relatively to the state of vital power and predisposition, or have been aided by concurring influences. The complications in fevers produced by the former of these causes are the least severe, and those arising from infection the most dangerous, owing to the states of vascular action, of vital power, and of the circulating fluids generally accompanying them; the first of these states being often excessive, or of an unfavourable kind; the second depressed or otherwise altered; and the third more or less changed from its natural condition, or even contaminated.

107. *d.* The complications are different in respect of their seat, nature, and severity, and the states of local action, of vital power, and of the circulating and secreted fluids in *different epidemics*, often independently of season, climate, weather, and locality, although these have much influence in many that are limited in their diffusion. Consequently, the complications are much more prone to pass into disorganization in one epidemic than in another; but those occurring in the epidemics of warm countries are more uniform in their character and seat than those observed in the epidemics of temperate countries. It is chiefly upon a close observation of all the circumstances connected with their complications that a successful treatment of epidemic fevers depends.

108. *e.* *Reaction or vascular excitement* occasions local determinations and complications, which generally present more or less of an inflammatory character; the brain, alimentary canal, the liver, or lungs, most frequently being the seat of the predominant affection, and evin-

cing the effects of it after death. If, however, vascular action far exceed vital power, the superinduced local affection seldom presents many of the truly inflammatory characters, as shown above (§ 50), and it often rapidly passes into disorganization, or gives rise to sanguineous, serous or sanious effusions, but very rarely to the effusion of lymph or of albuminous fluids, unless in the most sthenic state of the disease.

109. *f.* *Interrupted secretion* induces complications frequently at far advanced periods of fever, especially implicating the bowels, the liver, and brain. They are generally of a most severe, although often insidious form, owing to their association with depressed or exhausted states of the constitutional powers; these states having been more or less concerned in causing the imperfect excretions, and with alterations in the blood, which the latter has contributed to produce; and they often quickly pass into structural lesions, not so much from the inflammatory or increased vascular action which attends them, as from the septic and contaminating effects of the retained excrementitious matters upon the tissues, and from their depressing influence on the nerves of the part.

110. *g.* *Morbid states of the blood* induce the most dangerous complications, and, like the preceding, most frequently at advanced periods of the disease, the mucous membranes, PEVER'S and BRUNNER'S glands, the brain, and the lungs being the parts chiefly affected. As the changes in the blood are chiefly caused and attended by a depressed or altered state of organic nervous power, the local affections caused by them, whether they be characterized by increased vascular action or by simple congestion, generally pass quickly into structural lesions, especially of the mucous membranes, or give rise to effusions of a sanguineous, foul, dark, or sanious fluid, either from these membranes or from serous surfaces.

111. *h.* *Injudicious regimen and treatment* are much more frequent causes of aggravated local lesions in fever than is supposed. External heat or cold inappropriately employed; the improper use of stimulants and tonics; the neglect of suitable evacuations early in the disease; and the use of acrid or irritating purgatives, frequently occasion or heighten predominant affections of the intestinal mucous surface, of the liver, and of the brain. Excessive doses, or the prolonged and inappropriate exhibition of antimonials, especially tartar emetic, in the manner often resorted to in Italy, have evidently caused serious irritation and ulceration of the mucous membrane of the stomach and bowels, without producing either sickness or vomiting after its first operation in this way. The too early and free use of bark, or of quinine, in periodic fevers, or before morbid secretions have been evacuated, and congestions of the liver removed, has often induced serious inflammation and structural change in the liver.

112. *i.* It must be evident, from the foregoing, that the predominant affections or complications of fever must vary, not merely in their seat, but also in their intimate nature, in its different types and forms; the low and adynamic states being attended by those which are the least inflammatory, the most imperfectly indicated by the symptoms, and the most prone

to pass quickly into disorganization; this event, indeed, often being the first indication of their existence. It requires, therefore, a close scrutiny of the various functions to detect them, especially when they are seated in the *intestinal canal and lungs*. Although the complications in the former of these situations may be indicated by tenderness on deep pressure, by distention or fulness of the abdomen, and by the appearance of the evacuations, yet they may be present, nevertheless, without any such signs, even the stools evincing no very material disorder. When the stools are copious without any amendment, and particularly if they continue so, the pulse being weak, soft, and very frequent, and the skin harsh, lurid, or discoloured, we should dread the presence of disease of the digestive mucous surface and follicular glands; and if these symptoms be attended by flatulent distention of the abdomen, and by blood in the evacuations, this complication most probably exists. The complication with disease of the *substance of the liver* is often equally obscure in the dynamic varieties, more especially when the brain is much affected; for, although fulness and tenderness in the region of the organ, or a rising of this viscus high into the right thorax, as detected upon percussion, may sometimes be present, yet serious lesions may supervene without any of these indications being observed.

113. *k.* Most serious disease, and even disorganization, may affect the lungs, particularly in the low forms of fever, without cough or pain being complained of. This organ, therefore, should receive due attention, and its state be inquired into by percussion and auscultation, which will very often detect bronchial affection, and hepatization or infiltration of it, although these lesions may be either imperfectly or not at all indicated by the usual symptoms. When the pulse is very soft and weak; the lips, tongue, and skin are dark, lurid, or livid; the delirium is low or muttering; and the respiration is hurried and laboured; the changes effected on the blood in the lungs are evidently impeded, and the cause exists either in depressed nervous influence, or in more palpable disease of the respiratory apparatus, or even in both; for the latter is often the indirect consequence of the former. In the low forms of fever, the changes that supervene in the bronchial surface, or in the substance of the lungs, as well as those that take place in the alimentary canal, possess but little of the truly inflammatory character, excepting capillary injection, sometimes with infiltration of a sanguineous serum into the adjoining tissues, or with effusion of a similar fluid from the injected surfaces.

114. *l.* Predominant cerebral affection less frequently amounts to actual disease, or passes into disorganization, in fevers than has been very generally supposed; the disorder most commonly existing in this quarter, in low fevers especially, being more functional than structural—depending more upon the state of organic nervous influence in the organ than upon inflammatory or other lesions. The effusions and congestions observed in fatal cases are probably in great measure *post mortem* changes; and, even granting their existence during life, they are often insufficient to account for the

symptoms referrible to this part.* Whatever the alterations existing within the cranium may be, there can be no doubt that, when the affection of the brain is very predominant, lesions in other situations are very seldom complained of, and with difficulty detected. The above complications, as well as others casually alluded to, will be more fully elucidated when the particular species of fever come under consideration.

115. *m.* It is evident, from what has been stated respecting the pathology of fever, that a most scrupulous and minute inquiry into the states of organic nervous or vital power, evinced in all the functions, and of vascular action and tone—into the evidence of local congestions, or predominant visceral affection—into the existing functions and lesions of individual organs—and into the conditions and appearances of the secreted and excreted fluids, of the blood, and of the solids—should furnish the basis of our curative intentions, and direct the choice of individual means. Nor ought it to be overlooked that the mutability of fever is so remarkable, that the pathological states actually existing at the time of investigation may change their characters, and even their nature, in an hour or two afterward; that each successive stage is very different in the grouping of the phenomena, and in the conditions of vascular action and vital power, from that which preceded it; that serious complications or predominant affections may suddenly arise and become almost irremediable in a very short time; and, consequently, that the treatment devised should be promptly administered, and prescribed either with reference to the usual successions of morbid states, or merely for a period, in which no very important change is likely to take place.

116. X. GENERAL TREATMENT.—The treatment of fevers is *prophylactic and curative*. The former has been little attended to by writers, and but imperfectly understood; and the latter has too frequently been directed without due attention to pathological states, and often with an imperfect knowledge of their seat and nature. Before a general view of the curative treatment of fevers is exhibited, a few remarks on their prevention will be necessary.

117. *i.* PROPHYLACTIC MEANS.—The prevention of fever should have reference, 1st, to the avoidance of its causes, and the seclusion of those suffering infectious forms of it; 2dly, to means which may destroy or dilute its more specific agents, and counteract their operation; 3dly, to measures calculated to fortify the frame against the impression made by them; 4thly, to means which may prevent the development of disease after the impression has been made; and, 5thly, to a treatment calculated to arrest

* [Instead of being chiefly *post-mortem* changes, we believe that the effusion of fluid under the arachnoid, the injected state of the pia mater, the rose colour of the cortical substance of the brain, &c., noticed by LOUIS and other pathologists, after death from fever, are generally the product of the last hours or days of life. It is a remarkable fact that we find the same lesions of the brain and its membranes in about an equal proportion of patients who die of fever and other acute diseases, showing conclusively that the lesions do not hold with the symptoms the relation of cause and effect. Were this the case, we should always find a certain order of symptoms more or less marked, and similar to one another, in individuals in whom the brain or its membranes present the same lesion.]

its farther progress at a period when arrest is still within the reach of art. The *first, second, and third* of these are so fully insisted upon in the articles ENDEMIC INFLUENCE (§ 20) and INFECTION, that little farther need here be advanced respecting them, the remarks offered under these heads having especial reference to *periodic and infectious fevers* respectively.

118. *A. Measures calculated to fortify the frame against the impression of the exciting causes* often succeed in preventing fever, especially when these causes are of casual occurrence and of short continuance, or when their presence is known or suspected, and their nature tolerably understood. But in epidemics, particularly those which are pestilential, where these conditions do not obtain, means of this description generally fail, their causes being more generally diffused, and in almost continual operation. The measures resorted to, in order to resist the causes of fevers, should have reference to the habits and circumstances of the individual, to his constitutional powers, and his habit of body. All the predisposing causes should be carefully avoided. Vascular plethora ought therefore to be reduced, and vital power and resistance promoted where it is lowered. High irritability, vascular fulness, and rigidity of fibre seem to predispose to several pestilential epidemics, especially to yellow fever; and, although these states will often resist for a long time the operation of marsh exhalations, particularly in temperate countries, yet such is not generally the case as respects persons migrating from cold to hot climates; for they commonly experience, in consequence of these states, much more violent attacks of fever than those who have been seasoned to the country; the fever in them often evincing inordinate excitement and re-action, and, consequently, assuming characters which have caused it to be confounded with the true or epidemic yellow fever. The most efficient resistance to the action of the causes of fever is afforded by a due performance of all the organic and mental functions. Hence, whatever over-excites or depresses them will be injurious. Confidence, continued mental occupation, and moderate excitement, are especially efficacious in resisting the causes of most fevers. There is a moral courage sometimes possessed by persons, the weakest perhaps in respect of physical power, that enables them to resist infectious and epidemic influences more successfully than the most robust, who are not thus mentally endowed.

119. The quarter in which the most active causes of fever invade the system should not be overlooked, for the casual or temporary operation of infectious effluvia, when their presence is anticipated, may be easily and certainly guarded against by the use of the aromatic spirit of vinegar, or by keeping a small piece of camphor in the mouth. When terrestrial emanations are present, care should be taken not to be exposed to the morning or night air, especially with an empty stomach, as they are then most concentrated; nor to sleep in apartments upon or near to the ground floor, for the body is most susceptible of their influence on these occasions. When such precautions cannot be used, a cup of coffee should be taken before going abroad, and a pill with two or

three grains of quinine and one or two of camphor at bedtime; but these means are of most benefit in cases of short residence in unhealthy localities, for which occasions I have directed the following pills with success:

No. 220. R Camphoræ rasæ ℥j. ; Quinina Sulphatis ʒss. ; Pilul. Galbani Comp. ʒj. ; Pulv. Capsici gr. xvj. ; Balsami Canadensis, q. s. M. Fiat Pilulæ xxxvi., quarum capit aduas vel tres hora somni.

120. The system should not be stimulated by wines or spirits unless better means are not within reach, and even then these should be used in very moderate quantity, otherwise exhaustion and its attendant predisposition will result from them. The same objection is applicable to cigar smoking; care ought also to be taken not to inhale the breath, or the effluvia proceeding from under the bed-clothes, or from the evacuations of persons in continued fevers, whatever means of resistance may be employed; but more especially with an empty stomach, or in states of debility or exhaustion, should this precaution be observed. During the prevalence of epidemics, of which infection is one of the chief elements or causes of diffusion, strict seclusion can alone be depended upon. Still, other means should not be neglected. It has been supposed that external irritation, or the discharge from an issue or seton, will prevent an attack of epidemic or pestilential fever, and cases have occurred to countenance the opinion, but they are not sufficiently conclusive. Upon the whole, a due regulation of the digestive, the secreting, and the excreting functions; avoidance of all causes of physical and moral depression; and a proper recourse to the additional means recommended to prevent INFECTION in that article, are most to be depended upon.

121. *B. After the morbid impression has been made, the development of fever may often be prevented, if the patient no longer remain subjected to the operation of the exciting causes.* We have seen that disease is frequently many days in forming, the system manifesting slight disorder only during the time (§ 34). The object on such occasions should be to enable the frame to maintain a successful struggle against the impression that has been made, and its more immediate effects. With this view, all the causes enumerated in the article DISEASE, under the name of *determining or consecutive* (§ 61), should be carefully avoided, especially exposure to cold, to wet, and moisture; the use of cold fluids, and of cold, indigestible substances; excess of every kind, and the common causes of physical and mental depression; and the patient ought to remove to a pure, dry, and open air. *Tonics* ought, at the same time, to be employed, especially such as determine the circulation to the external surface, improve the tone of the digestive organs, and promote the secretions and excretions, particularly those of the bowels and liver. When the actions of the bowels require aid, cold and debilitating aperients should not be prescribed. Warm and *stomachic purgatives* or laxatives, or these combined with tonics, are the most appropriate. When the impression has been energetic and made by infectious effluvia, an immediate recourse to *stimuli*, especially *camphor, ammonia, aromatic spirits, spirits of nitric ether* in tea, &c.; or, if these be not at hand, to

warm wine whey, or brandy and water, will generally prevent any ill effects. The *dict* should be regular, moderate, nutritious, and easy of digestion; the stomach having nothing to do that it cannot perfectly accomplish. If these be found insufficient, a *warm bath*, followed by active *friction* of the surface; and if reaction have not supervened, *warm diaphoretics* may be directed. If the patient still continue to complain of the symptoms of the formative stage, an *emetic*, with aromatic adjuncts (see F. 198, 402), should be exhibited, and repeated until it fully operates, after which the diaphoretics may be repeated, or a moderate dose of *calomel*, with five or six grains of *camphor*, and one or two of *opium*, may be given, which should be followed, in a few hours, by an active stomachic cathartic (F. 181, 216, 266). These means have been employed by me in several instances, during the formative stage of fevers, with perfect success. But in cases where we suspect inflammatory irritation to have commenced in the alimentary canal, and during the prevalence of epidemics characterized by this complication, emetics, particularly those containing tartarized antimony and acrid purgatives, should be withheld, and the other means be resorted to, especially the *warm bath*, to which stimulating substances may be added, and frictions of the surface. Internal irritants of the digestive mucous membrane should be also abstained from in the formative stage of the exanthemata, for in them this membrane is generally irritable and injected; and it readily becomes inflamed upon the injection of stimulating and acrid matters, the healthy development of the eruption being thereby prevented. It is chiefly in robust constitutions, and after the operation of other causes than infection, that severe shocks, by active emetics or cathartics, are best borne; while the other remedies, especially camphor, calomel, and opium, warm diaphoretics and diluents, tonics with camphor and ammonia, external derivatives, and warm, mild, but efficacious purgatives, are most suitable when the morbid impression has been made by infectious emanations. This treatment may not succeed in arresting the fever, but it will seldom fail of shortening the premonitory stage, and rendering the subsequent disease more mild or of shorter duration; for it frequently is observed that, when the formative period is allowed to continue, and to develop the series of changes to which it leads when left to itself, the consequent disease assumes a very severe or dangerous form.

122. *C. The arrest of fever may be also successfully attempted during the stage of invasion* (§ 45), or up to the commencement of vascular reaction or excitement; but when once this period has supervened, the fever will run a regular course, although it will often be much shortened by treatment. Fevers, I believe, caused by infection are very rarely arrested after reaction is established. The means just advised for the formative stage may likewise be tried in that of invasion; but much discrimination is requisite in the choice of means. Camphor, ammonia, and warm diaphoretics and diluents, sometimes with opium, when the head is not affected; the warm bath, the vapour or heated air bath, and frictions subsequently, are the most generally appropriate. In robust persons, and where terrestrial emanations have

been the chief cause, a warm emetic (F. 198, 402) and active stomachic purgatives (F. 181, 216, 266) may also be exhibited, but they should more rarely be ventured upon in other circumstances for the reasons just assigned; the recipes now referred to, however, will not be attended with the least risk. When there is tenderness at the epigastrium, with other signs of gastric irritation and depression of nervous power, instead of an emetic or cathartic, a large sinapism or a warm turpentine epithem should be placed upon this region and over a great part of the abdomen; or, in other cases, upon the insides of the thighs; but neither of these ought to be resorted to if reaction have supervened, nor continued after it has come on.

123. ii. CURATIVE TREATMENT.—The indications of cure in fevers are, 1st, to remove the exciting, and all other causes likely to exert an unfavourable influence on the patient, and to place him in a pure, dry, and temperate air; 2dly, to moderate vascular action when it becomes excessive, and to impart tone and energy to the vascular system in states of depression or exhaustion; 3dly, to support vital power, especially when associated with imperfect reaction, or when resulting from depressed or exhausted organic nervous influence and vascular action; and, 4thly, to remove local obstructions, congestions, determinations of blood, or predominant states of action, or other disease, in particular viscera. This last may be termed the *symptomatic treatment* of fever, the others the *vital*, inasmuch as they have especial reference to the states of organic nervous power, and of vascular action.

124. In endeavouring to fulfil these indications, there are various circumstances to be kept in view, viz.: *a.* The previous health, age, and condition of the patient, in relation to the existing states of vascular action and power, and of individual functions.—*b.* The nature, intensity, and combinations of the causes of the disease, and the unfavourable influences which still continue to operate, and cannot be removed.—*c.* The manner in which different pathological states modify the operation of many of the most active medicines.—*d.* As precise a recognition as the symptoms will afford of the ever-changing conditions of vascular action, of nervous power, and of exhalation, secretion, and excretion during the course of the malady; and strict appropriation of the means of cure, not merely as respects their operation in health—their physiological action; but as regards their influence on disease, especially existing states of it—their therapeutical effects. The importance and, indeed, the necessity of attending to these circumstances in the treatment of fevers, is well illustrated by the action of antimonials in their various forms and states. The potassio-tartrate of antimony is one of the medicines most generally employed on the Continent, particularly in Italy, as a *contra-stimulant*, in what is called, by the modern Italian school, the *stimulant diathesis* of fever; and it is an excellent remedy in several forms of the disease, during the stages of excitement, in which it may be given in very large doses. But the tolerance of such doses depends mainly upon the states of vascular excitement and of vital power, and on the repetitions of the medicine, for they may be remarkably injurious in states of

low action, in the very young or in the aged, in persons previously ill fed, in fevers attended with predominant affection of the digestive mucous surface, especially when of a low type and caused by infection; it often occasioning in these, especially when taken in very large quantities, the serious lesion of the mucous membrane of the stomach and bowels. Keeping, therefore, these *indications and circumstances* in view, the treatment of fever must be directed according to its type, its particular form, its varying conditions and complications, and its existing stage or period, and with due reference to the measures which have already been adopted.

125. *A. The patient should be removed from the exciting, concurring, and consecutive causes, and be placed in as pure and dry an atmosphere as possible, in a large, well-ventilated apartment, but out of the way of currents of air, and in an equable and moderate temperature.* When an elevated situation or chamber can be selected, the advantage should not be neglected, particularly in large towns. The earlier in the disease that this intention can be fulfilled the better, as the more completely the functions of respiration are performed, especially as to the changes effected by it on the blood, the less risk there will be of future vital exhaustion and of contamination of the circulating and secreted fluids. Nor should it be overlooked that, although the pulmonary functions are imperfectly performed during the formative and invading stages, they are more or less completely restored as reaction is developed, and they often assume their accustomed activity, unless the bronchial surface or substance of the lungs have been inordinately affected by congestion or determination of blood during the early stages; the subsequent activity of this organ contributing to restore the impaired purity of the circulating fluids, and to prevent or counteract much of the vitiation they afterward would experience from an impeded elimination of hurtful matters, particularly in circumstances unfavourable to the due performance of the several depurating functions, of which the lungs are themselves one of the most important, and a dry, pure, and temperate air one of the most effective agents.

126. *B. The moderation of excessive vascular action* is obviously necessary; but the particular means by which it should be effected, and the grades of action that should be interfered with, are not so evident. These are points which must not be determined by theory, but inferred from extensive experience and observation. If the patient was previously in good health; if the causes were not remarkably intense, or are imperfectly known; if the symptoms do not indicate great excess of action, or serious irritation of any particular system, or determination to any viscus, or congestion, then little need be attempted, and certainly no active means should be resorted to, especially among the poor and persons of a spare habit of body. In the rich and well fed, or those who are more plethoric, simple saline refrigerants and diaphoretics, mild aperients, and cooling diluents and diuretics may be employed, rather with reference to consequent changes than as respects the existing state of disorder—to the prevention of future lesions, the removal of obstructions, and the preparation of the organs

for salutary or critical changes. These means exert a solvent or relaxing operation upon the capillary vessels; they promote secretion, soothe vascular irritation, equalize the circulation, and facilitate the excreting actions.

127. When vascular action rises above the state just mentioned, it should be considered excessive, and more energetic remedies employed. Inordinate action varies remarkably in grade, and somewhat in kind, with the causes which induce it, with the consequent state of organic nervous power, and with the constitution, habit of body, and age of the patient, from that just noticed, to the vehement forms, which are rapidly followed by exhaustion, by a dissolved or otherwise altered condition of the blood, by lesion of capillary action and tone, and by structural change, especially in mucous surfaces and parenchymatous viscera. The most intense forms of reaction, and, consequently, the most rapid in their course, often have nearly passed off before the patient is brought for treatment, the effects of morbid action being then only observed, and the exact nature of the disease frequently mistaken. But in proportion as the action of the heart and the pulse are strong, frequent, full, and hard; the countenance and surface injected, turgid, and animated; the eyes bright and prominent; respiration full, deep, and laboured; animal heat increased, or acrid and burning; the excretions diminished or suppressed; the animal functions unbroken, consistent, and free; the course of the disease, whether epidemic or sporadic, acute and rapid, and the type perfectly continued; so much the more active and immediate should be the means employed to lower the excited action on which these depend, and to prevent its dangerous tendency. These means have been usually named from the morbid states they are employed in removing, as *anti-phlogistic, antispasmodic, contra-stimulant, refrigerant, lowering, evacuant, &c.*, and are very numerous; although the remedies which are appropriate to particular forms of excessive action are much more limited.

128. *a. Vascular depletions* were resorted to by the ancients, generally with the view of diminishing inordinate action, or of diverting an impetuous motion of the fluids from vital organs; and observation taught them that, when pushed far, with an intention of curing or arresting the progress of fever, they were frequently injurious. A nearly similar practice was adopted by the best writers, from HIPPOCRATES to SYDENHAM, who both illustrated it. SYDENHAM explicitly states that bleeding is required to repress the tumultuous or irregular motions of nature, and remove the flux of blood from an important organ or part, to which the febrile impulse has determined it; and the ideas held respecting the practice, among judicious writers of recent times, nearly agree with the above, although they differ as to the employment of it in certain types and forms of fever. When the symptoms just stated (§ 127) are present, blood-letting should be promptly and decidedly employed; and when the patient is removed into a pure air, beyond the influence of the causes, and is robust, plethoric, and young, it may often be carried to a great extent. This appears to have been the case with DOVER'S patients. His account of the treat-

ment of the fever which broke out among his followers to South America was given by Dr. FRANKLIN to Dr. RUSH, and was a principal cause of the change which took place in the practice of the latter during the epidemic fever of North America in 1797. DOVER was a buccaneer leader, and no mean physician, and practised both professions much in the same spirit. He ordered bleeding, to a very great extent, at the commencement of the disease: a treatment successfully adopted in our own times, under similar circumstances, and which I have resorted to in the ardent fever occurring within the tropics. In a case wherein I directed blood-letting before reaction had supervened, the loss of three or four ounces caused profound and prolonged syncope; yet, within four hours, when reaction had come on, fifty ounces were taken before any effect was produced upon the pulse; and before the sun of the same day had gone down, forty more were abstracted at one time—in all, ninety-four ounces within twelve hours. But the patients for whom this practice has been prescribed with success have been young, robust, or plethoric, and removed from the continued influence of the causes which produced the disease.

129. *a.* The extent to which blood-letting should be employed, and the good effects from it, will depend on the particular form and complication the disease assumes, on circumstances peculiar to the patient, on the character of the epidemic, and on the period at which it is resorted to. It may be injurious, from being carried too far, or not far enough; and from being resorted to before reaction has supervened, or when the reaction is about to pass into exhaustion, or in cases in which it is not indicated. Its effects will depend upon the manner in which these and other circumstances are weighed by the practitioner; but it should not be overlooked, that it depresses the vital energies much more remarkably in fever than in idiopathic inflammations; and, when inappropriately or too freely practised, it prevents or retards salutary evacuations and crises, and either disposes to unfavourable changes, or renders convalescence difficult and prolonged. HILDENBRAND very justly remarks that, even in cases where the propriety of the practice is undoubted, a moderate quantity only should be taken away at one time, and the effects upon the disease, as well as the appearance of the blood, should be carefully observed before its repetition be directed. This precaution is especially requisite at the commencement of epidemics, if depletion be employed late in the disease, and if vascular action be tumultuous, or much exceed nervous or vital power.

130. Large blood-lettings have been directed with the view of arresting or shortening the fever; and, when the person has been robust, the constitution sound, the cause not very intense, and its effects not very violent, the practice has occasionally so far succeeded as to subdue the morbid excitement down to that grade which is necessary to the restoration of the secreting and excreting functions, and the production of a salutary crisis. We sometimes observe a large or full depletion in a few hours afterward, followed by a general perspiration, and copious alvine evacuations. But this re-

sult should not be confidently calculated upon, even in the class of patients just mentioned, and least of all in fevers arising from infection and mental anxiety, or during epidemics, however early in the stage of reaction it may be resorted to. Much discrimination is necessary, even in cases where the practice appears to be indicated, not to run a risk of mischief by having recourse to it.

131. When, in the progress of fevers, but more especially at their commencement, signs of local determination or of predominant vascular action appear in the head, lungs, or abdominal viscera, depletions, both local and general, are most requisite. If, however, these affections come on in advanced periods of the fever, although depletion, to some extent, is required, the existing states of vital power and action, and even of the blood itself, often forbid it to be practised nearly to the amount generally required in idiopathic inflammations, unfavourable terminations, or even gangrene, rapidly supervening, owing to these states, upon a too free recourse to it; for it is not so much from excessive action as from diminished power, and alterations of the circulating fluids, that these unfavourable results occur in the progress of fevers. The earlier, however, the predominant local disease or complications appear, the more energetically may blood-letting be employed.

132. *β.* The *circumstances* more especially requiring recourse to vascular depletions may be summed up as follows: (*a.*) Inordinate excitement, or irritation with rigidity of fibre, and general increase of the animal heat; (*b.*) When the patient is robust, plethoric, or young, the sanguiferous system being so surcharged as to prevent the free exercise of the functions; (*c.*) When the general reaction of the vascular system is such as to endanger vital parts, or too strong to allow a salutary or critical change, or so vehement or tumultuous as quickly to exhaust vital power; and, (*d.*) When the blood is determined to, or vascular action is inordinately increased in, an important organ. In these *conditions*, blood-letting is employed with the following *intentions*: *a.* To remove the excitement and irritation, and relax the exhaling and secreting surfaces and organs; *β.* To diminish the load which oppresses the vascular system, congests it, or overpowers the organic nervous influence that actuates it; *γ.* To reduce the excessive reaction, and thereby to guard important viscera, to prevent consequent exhaustion, and to favour the supervention of salutary evacuations; *δ.* To remove or divert the increased impulse or action from important organs.

133. *γ.* There are certain considerations and symptoms *contra-indicating blood-letting*, that should not be overlooked. Some of these I have seen but too often neglected, even by old practitioners; and others are so remarkably misinterpreted by them as to have been their only reasons for having recourse to depletion, although actually the strongest indications against it. A very frequent, soft, and open pulse seldom or never admits of depletion, for in such cases the tone of the vessels is insufficient to accommodate them to a diminution of their contents; consequently, remarkable sinking and depression, with increased rapidity of the circulation, &c., supervene. The pulse

may be also open, soft, expansive, and tumultuous, indicating excessive action beyond vital power, as in certain forms of adynamic and malignant fevers, attended by contamination of the circulating fluid. In this state, the loss of even a very few ounces of blood will produce bad effects. Vascular depletion is seldom well borne in fever when the pulse ranges so high as 110, and still more rarely if it reach 115 or 120 in adults. Irritable females, however, and those in the puerperal state, offer exceptions to this.

134. Great prostration of strength and of vital power; the supine posture; languor of the eyes; paleness or collapse of countenance; a lurid complexion; a dark or flabby state of the tongue, with indentations of the teeth on its edges, or dark mucous sordes on the tongue, gums, and teeth; great sadness and depression of spirits; low delirium; tremblings of the hands, and especially of the lower jaw; a feeble, small, and weak, or an open, compressible, and undulating pulse; a frequent and hurried respiration; incontinence of fæces or urine; coldness of the extremities, or of the ears or nose; coldness or rawness of the expired air; softness and flabbiness of the soft solids; and a dirty, muddy, lurid, or discoloured appearance of the integuments, are the strongest indications against any kind of depletion, and in all circumstances of fever.

135. In addition to these, the noxious nature of the exciting causes, their concentration, and their intense operation, as in the case of infectious effluvia; imperfect ventilation, &c.; the character of certain epidemics; the continued influence of the contaminated air, or of the infectious emanations that caused the fever; previous depression and insufficient nourishment; the presentiment of an unfavourable issue, or mental distress and anxiety; the circumstance of the patient being treated in the midst of the malaria, or marshy exhalations, that caused the disease, or in an hospital, camp, house, or low street, in which infectious fever is prevalent, all militate against blood-letting, or indicate a necessity of caution in respect of it, according to the form which the disease assumes. Vascular depletion, also, is not so well borne by persons living on a poor, watery diet; nor by the studious and exhausted; nor by the fat, bloated, cachectic, and intemperate; nor by residents in low, marshy districts; nor by those confined in close factories, or living in close or low apartments and streets; nor by persons past fifty; as by those differently circumstanced. But the various species of fever furnish peculiar indications in favour of or against blood-letting that will be considered in their proper places.

136. *d. Of the repetition of blood-letting.*—Previously to determining upon a second depletion, the effects both immediately and more remotely consequent upon the first, and the character of the disease, should be most carefully studied. It may happen that the first bleeding, although small, has produced fainting, followed by so strong reaction as to render a second, or even a third, full or moderate bleeding indispensable. This is chiefly observed when the first has been practised too early, or before the stage of reaction has been fully developed. If the fever is complicated, and the

local affection presents much of the inflammatory character; if the patient has been relieved by the former bleeding; if the pulse remains good; if reaction, or determination to an important organ be diminished, the symptoms which indicated the first depletion still persisting to a certain degree, we may proceed to a second, but always with circumspection. If, on the contrary, the pulse becomes weak, and the strength sinks, we never ought to repeat the bleeding. In all cases, the physician should attentively observe the pulse during the flow of blood, in order instantly to assure himself of the propriety of depletion; for if it become feeble and irregular, and the patient at the same time more distressed, the evacuation should be immediately stopped. The blood drawn in the first instance sometimes furnishes indications for or against the repetition of blood-letting; but such indications should seldom be acted upon alone. The inflammatory coat, and cupping of the coagulum, are favoured by cold, dry weather, by the puerperal states, by the rheumatic diathesis, and by the blood being taken in a full stream, and in a deep and narrow vessel. But this condition, as well as a very loose or dissolved coagulum, or imperfect separation of it from the serum, and the other states of the fluid, described in the article BLOOD (§ 78, *et seq.*), should be duly considered, in connexion with the other phenomena, before they can be made the basis of curative indications. VAN ROTTERDAM justly states that, when the crust consists of a delicate bluish membrane, covering a greenish gelatinous matter, the crassamentum being livid, soft, and floating in a thick and greenish serum, a second bleeding will prove most mischievous; and I may add, that least of all should depletion be repeated in any mode, if the colouring matter be precipitated to the bottom of the weak crassamentum, and of a blackish or purplish colour.

137. *e. Local blood-letting* is required chiefly in very young patients, or after general depletion, or in local determinations and complications, or in circumstances that render the propriety of blood-letting doubtful. It is most serviceable when the head is affected, and then either cupping or leeches may be employed, but preferably the former, when a quantity exceeding six ounces is to be taken away; and either mode may also be adopted when the viscera in the large cavities are affected. If leeches be employed late in fever, particularly in its low and complicated forms, care should be paid to the bleeding after their removal, as it is apt to continue, and is arrested with difficulty. *Dry cupping* is sometimes useful in states of internal congestion, when the detraction of blood can hardly be risked.

138. *ζ.* The question has been often agitated, *How late in fever should blood-letting be practised?* but it evidently cannot be answered by any absolute rule, or without reference to the *ensemble* of existing phenomena. In the cerebral and pulmonary complications, as well as in others in some cases, blood-letting, in one mode or other, may be employed until an advanced or critical period. But reaction having come on, and the indications for it being evident, the earlier in the disease it is resorted to the better. In the stage of crises, both vascular depletion and all perturbing means should be avoided.

The indications already noticed respecting this remedy will assist the practitioner as to both the latest time of resorting to it and the repetition of it; but in these matters, as in many besides, he must be guided chiefly by his pathological knowledge, and powers of practical observation and discrimination.

139. *b. Refrigerants*, internal and external, are of great service in moderating vascular excitement; and some of them produce this effect more than others, without lowering vital power.—*a.* The choice of *internal refrigerants* should depend upon the form fever assumes, and upon their especial action. In the early part, and more sthenic forms of excitement, sedative refrigerants should be selected, as the *nitrates of potash or soda*, the various *neutral salts*, the *mineral and vegetable acids*. Several of these may be advantageously conjoined, as a solution of the *sulphate of magnesia* with that of the *acetate of ammonia*; and other substances, also tending to promote the exhalations and secretions, may be added. In the far advanced stage of excitement, and in its more adynamic or low states, refrigerants which are more restorative and antiseptic, as *camphor*, in small doses, the *hydrochlorate* and *acetate of ammonia*, the *spirit of nitric ether*, and the various *etherial preparations*, particularly *chloric ether*, are, upon the whole, to be preferred, and may be conjoined with numerous other substances, according to existing morbid conditions. The refrigerant effect of several of these is only relative to the state of action at the time, but it is not the less beneficial. Thus, in the low excitement characterizing adynamic fevers, or when vascular action exceeds vital power, and the heat of surface is of a morbid kind, both the vascular action and the unnatural heat are best reduced by the more restorative refrigerants, as by *camphor*, the *hydrochlorate of ammonia*, *chloric ether*, &c., all which may be given in conjunction (F. 431). Much benefit will also result from a judicious choice of refrigerant beverages or *drinks* during the stage of excitement. A selection suitable to particular cases may be made from those prescribed in the APPENDIX. (See F. 592, 593, 594, 595, 915, and 916.)

140. *β. External refrigerants* are of great service, but they often require much discrimination. The patient, especially in warm weather, should be laid upon a hair mattress, covered only by a single sheet, and his surface sponged, in the more active states of febrile excitement, with cold spring water. If this be done frequently, as much benefit and much less fatigue will be experienced than from the cold affusion, which, although more rapidly lowering the animal heat than it, hastens the return of the cutaneous reaction. If much determination to the head exist, the hair should be cut off, and *cold*, in various forms, as the *affusion of a stream of cold water*, *evaporating lotions*, &c., should be resorted to, the head being placed on a cool pillow. Formerly, there was much difficulty in regulating the temperature of the head; for, although one half of it was readily cooled by lotions, the other half was kept remarkably hot by the feather pillows in constant use. I frequently, therefore, placed under the pillow-case a folded piece of common floor-cloth, which, by intervening pieces of linen,

might be so managed as to carry off the excessive heat of the head, as rapidly or as slowly as could be desired. Pillows may now be filled with either air or cold water, and their temperature regulated according to circumstances.

141. In cases of determination to internal viscera, excepting to the head, the use of external refrigerants is more or less hazardous; and, if the local complication be serious, and the general excitement of a low or adynamic form, it should be laid aside. But when this form of reaction is general, and not attended by excessive determination to, or congestion in, any of the thoracic or abdominal viscera, *tepid or warm sponging* and *ablution* will prove both useful and grateful. Whether cold, tepid, or warm sponging be adopted, the addition of bicarbonate of soda or of potash, or the bi-borate of soda, to the water thus used, will tend to relax the skin, and will cleanse it from the impurities which impede its functions. In cases accompanied by an acrid heat of surface, tepid sponging, or the tepid bath, medicated as just directed, will be advantageously followed by *frictions with sweet oil*, which, by relaxing the exhalants, will cool the surface.

142. *c. Antimonials* are among the most energetic *contra-stimulants* in fever; but they are not suited to all fevers, nor to all their stages. They are most serviceable in the more sthenic or inflammatory forms, in those arising from other causes than infection, in some epidemics more than others, and in the earlier periods. The best preparations are the true JAMES'S powder, and the *potassio-tartrate*; the former of which may be conjoined with *calomel* and small doses of *camphor*, or with mild aperients; and the latter may be given in various saline solutions, or in the patient's common drink. Tartar emetic has been employed most largely in Italy to lower febrile excitement; but I believe that it will be found equally beneficial and less injurious to the digestive mucous surface when used in moderate doses. I have frequently given as much as three or four grains in the course of the day in solution; but from one to two grains has been equally serviceable. It is especially indicated when pulmonary affections supervene in the course of fever; but it should not be prescribed in low or adynamic fevers, even when thus complicated, unless with great caution, and in combinations hereafter to be noticed. A judicious use of either of these medicines early in the stage of active excitement will often either entirely supersede depletions, or prevent the necessity of having recourse to those which are large.

143. *B. Inordinate depression of vascular action*, during the period of the disease which usually follows that of invasion, is very much less frequent than the states of excitement. It sometimes requires the most active means to remove it, but these means should have reference to the cause, and the various pathological states attending it. This condition generally arises from the intense impression of the exciting cause on the organic nervous influence, preventing thereby the evolution of vascular reaction; the stage of excitement either not following the earlier changes, or appearing in an irregular and imperfect manner. In such cases, which are most common in certain epidemics, and in some localities productive of

the more concentrated states of malaria, there is generally more or less congestion of the large vessels and parenchymatous viscera, and the vascular depression is dependant, 1st, upon lowered nervous influence; 2dly, upon an overloaded or oppressed state of the circulating and vital organs; the state of *congestion* so strongly insisted upon by STAHL and his disciples, but which I have shown (§ 92) not to be a primary change, as believed by more recent writers. In this case, the means advised for the stage of invasion (§ 122) should be resorted to, especially the *heated air* or the *vapour bath*, and *warm baths*, followed by *frictions* of the surface. In some cases, especially when irregular or unavailing efforts at reaction are made, the abstraction of a few ounces of blood from a vein, while the patient is immersed in a warm bath, and frictions of the surface are being employed, will often assist in restoring circulation to the surface and in removing the internal congestion. If the pulse rise during the flow of blood, a larger quantity than otherwise might be safe may be taken, or the operation may be repeated, according to the effects observed after the first evacuation. If a satisfactory result is not soon observed from these, a hot *turpentine epithem* should be placed over the epigastrium and abdomen, and covered over with oiled silk or leather, so as to prevent evaporation, and be either kept there or renewed until erubescence of the surface is produced. In the more dangerous cases, a similar epithem may also be applied to the insides of the thighs. At the same time, moderate doses of *camphor* or *ammonia* may be given internally, in warm diluents, or small quantities of the *chlorate of potash*. Depressed vascular action, whether occurring in the early progress of the disease, or consequent upon some grade or other of excitement, being chiefly an effect of the change in the state of organic nervous power, although often associated with congestion at the commencement, and with vitiation of the circulating and secreted fluids in the latter stages, should be farther combated by the measures which are required for the fulfilment of the next intention; an especial attention to these conditions being paid in the remarks about to be offered.

144. *C. To support organic nervous and vital power*, especially when associated with imperfect vascular reaction, or with a morbid state of the blood, or when proceeding from exhaustion, is of the greatest importance; but the circumstances in which the accomplishment of this intention becomes requisite, and the treatment most appropriate for it, in the various states of fever, are among the most difficult topics of practical medicine. In certain varieties, especially those that commence with low excitement or imperfect reaction, the debility is owing, in great measure, to *suppression* of power; to the overloaded state of the vascular system, consequent upon interrupted exhalation and secretion, preventing its free reaction upon its contents. In such, power is best restored by moderate vascular depletion; the pulse becoming more free and developed as the congestion and load are removed. It is in this class of cases that early evacuations are most requisite, as the best means of preserving vital power, and are the oftenest neglected; while

in others, particularly those which are characterized by excessive action, although attended by loss of vascular tone and nervous power, or by a vitiated state of the blood, or both, depletions are inappropriate, and the most likely to be injuriously resorted to. In certain adynamic fevers, in which reaction assumes this latter form, and apparently indicates blood-letting rather than opposite means, if employed sufficiently early and with much circumspection, some advantage, or little mischief, may result from it, especially if the patient was in health, well fed, or at all plethoric, before the attack. But when the pulse is very quick, broad, or open, the vessel yielding on a gentle pressure of the finger, as well as before the impulse of the heart upon the column of blood in it, depletions should either not be attempted, or be accompanied with remedies which will restore nervous power. In general, however, they are, in any mode, hazardous in such cases; the febrile poison or cause having infected the organic nervous influence and the vascular system, as well as its contents, and prostrated vital power in such a manner as to be roused only by tonics and restoratives. But even in these circumstances, stimulants should at first be cautiously used and judiciously selected; for a too early recourse to them, especially to such as are at all heating, may be very injurious. When this state of the circulation occurs late in the disease, or is consequent upon a more vigorous reaction and an obviously vitiated state of the blood, the most energetic means of restoration are necessary.

145. Debility from *suppressed power* is frequent in the early periods of fever, when the brain and lungs are predominantly affected, and is best relieved by moderate depletions and derivatives. Care should be taken to distinguish this form of debility, as, whether occurring early or late, the use of stimulants would be more injurious than beneficial, unless in peculiar circumstances, and when these medicines are conjoined with other more appropriate means. The association of this state with vascular congestion, in these as well as in other cases, requires rather the treatment directed for depressed vascular action (§ 143) than that for exhaustion.

146. It must be evident from the foregoing, therefore, that numerous circumstances must be duly considered before restoratives—either of a tonic or stimulant kind—should be resorted to in fevers. These circumstances furnish the *true indications* for the employment of them, and are chiefly the following: *a.* The intense operation of the causes of infectious and epidemic fevers, these generally requiring, *ceteris paribus*, an earlier and more liberal use of restoratives than those which are sporadic; *b.* The summer and autumnal seasons; *c.* An age past the meridian; *d.* Imperfect nourishment and clothing; the patient having lived chiefly on vegetables, or on fish, or salt provisions, or having been addicted to ardent spirits, or to sexual indulgences; *e.* An intermittent, remittent, or low *type* of fever, or any of its adynamic forms, especially if uncomplicated with any inflammatory state; *f.* The continued operation of the poisonous effluvia which caused the disease, as in low, marshy situations, the close air of crowded hospitals, &c.; *g.* Signs

of real debility, or of exhaustion, especially when attended by a moist or flabby tongue, by a very soft and quick pulse, the secretions not being suppressed; *h.* An indifferent or apathetic state of mind, despair of recovery, mental depression, &c.; and, *i.* The symptoms enumerated above as contra-indicating blood-letting (§ 133). Besides these, there are numerous others, which appertain more especially to certain species and forms of fever, and which will be noticed hereafter. Various circumstances may, however, arise which will render vascular depletions and a recourse to tonics, and even to stimulants, nearly at the same time, extremely proper. Remittents and intermittents, particularly in warm countries, and several complicated states of continued fever, often exemplify this.

147. *The selection of means* in order to support nervous and vital power must have reference to the cause and form of fever, and to existing pathological states and complications. In endemic fevers the various preparations of *cinchona* and sulphate of *quinine* are, upon the whole, most appropriate. In those caused by *infection*, the same preparations with *camphor*, the chlorates, especially the *chlorates* of potash and soda, *serpentaria*, *arnica*, *camphor* with *opium*, *wine* given in *Seltzer water*, *yeast*, *carbonic acid*, various *tonic infusions* taken with the *citrate of ammonia* in a state of effervescence, *spirits of turpentine*, *pyroligneous acid*, *creasote*, the *mineral acids* and *æthers*, especially the *hydrochloric* or *chloric*, and *chloric æther*; and in the complicated states of fever, especially external *derivatives*, *vesicatories*, *sinapisms*, *epithems* with warm *turpentine*, or *liniments* with this latter, and *camphor*, *capsicum*, &c., are the most efficient remedies. When the blood appears contaminated, or the excretions acrid, offensive, and excoriating, combinations of tonics with antiseptics, as the decoction of *cinchona* with the chlorate of potash—a combination which I have used for many years with much success—or with *chloric acid* and *chloric æther*; the *pyroligneous acid* with *creasote*; *spirits of turpentine*, &c.; and these, or similar substances, administered in *enemata*, are most to be depended upon. But the appropriation of these and of other remedies to the particular forms and states of fever is more fully shown in the sequel.

148. *D. The promotion of the exhalations, secretions, and excretions, by emetics, purgatives, diaphoretics, and diuretics*, is a most requisite intention in the cure of every type and form of fever. By a judicious selection of means belonging to these classes of remedies, adapted to existing pathological conditions, vascular action may be developed when it is low or suppressed, or moderated when it is excessive; nervous power may be relieved when it is oppressed, or supported when it is exhausted; and the circulating fluid may be preserved in a state of comparative purity, or relieved from the contamination it may have experienced in the course of the disease.

149. *a. Emetics* were formerly more employed in fever than at present. SVDENHAM, STOLL, and many others, prescribed them very generally; but the recent views as to the seat of fever in the brain, and digestive mucous surface, have tended to bring them into disuse.

In the early stages of the simple and sporadic forms of fever, they are often of great benefit, especially in arresting them, as advised above (§ 121, 122), or in developing imperfect action. They are seldom productive of much service after the excitement has become fully established or stationary, and should not be employed in the cerebral complication, or when tenderness or pain is felt in the abdomen, especially at the epigastric region. When prescribed thus early, they are calculated to prevent congestions of the lungs and liver, and even to remove them at their commencement. SVDENHAM, from a fear of their effects upon the brain, seldom prescribed them until blood-letting was premised, and thereby lost much of the benefit they are calculated to afford, inasmuch as the period at which blood-letting could be advantageous was more advanced than that in which emetics are most serviceable. Ipecacuanha is, upon the whole, the best substance that can be used. Tartar emetic is not so safe, if there be tendency to the gastric complication, or in low, infectious forms of the disease. Some authors have recommended emetics at a late period, but I have had but little experience of them later in fever than I have advised them. In the early stages, I have both frequently prescribed them and seen them prescribed with benefit. They may, however, prove beneficial in more advanced periods, especially in the bronchial complication, and to answer particular purposes; but they should be conjoined with such other substances as will assist them in answering the especial intention with which they are directed.

150. *b. Purgatives* are the most generally prescribed medicines in fever in this country, and are, at least, among the most useful when judiciously selected. Calomel early in the disease, in conjunction with JAMES'S powder, and in the adynamic states with *camphor*, &c.—*jalap* with *cream of tartar*, in sporadic cases—the *mild neutral salts*, or the more *cathartic salts* in mild doses, in similar circumstances—*rhubarb* in nearly all fevers, variously combined—*spirits of turpentine* with *castor* or *olive oil*, &c., when the head is much affected, and in certain states of the abdominal viscera; and various other mild aperients, as *manno*, *tamarinds*, *prunes*, &c., with the *citrates*, *tartrates*, &c., are the most serviceable. The *phosphate of soda*, or any of the strong *neutral salts*, either alone and in small doses, or with diaphoretics and diuretics, will frequently produce both refrigerant and evacuant effects. They are indicated chiefly during the stages of excitement, more especially in sporadic and endemic fevers.

151. In general, the purgatives used in fevers should be mild, and such as are not calculated to irritate or inflame the digestive mucous surface. They should be employed with the intention, 1st. Of simply removing mucous sordes and accumulations from the prima via; 2dly. Of promoting the secreting and excreting functions of the collatitious viscera, and of the intestinal surface; and, 3dly. Of thereby unloading the vascular system of a part of the effete materials conveyed into it, and liable to accumulate in and contaminate the blood. They should rarely or never be prescribed with a view of deriving the circulation from other parts to the digestive canal; for, in fevers, in-

ritants of any kind, acting upon this part, will often react upon the brain and liver, with the exception of the purgatives just enumerated. If oils be employed, especial care should be taken that they are quite fresh, otherwise they may occasion great danger. In pulmonary complications, the addition of the potassio-tartrate of antimony, in small doses, or of ipecacuanha, to the purgatives, will be useful, and will promote their operation. In advanced stages, the utmost discrimination is necessary in the selection of purgatives, and more especially if we dread the presence of disease of the mucous follicles. In these, doses of rhubarb sufficient to evacuate freely the bowels, with the hydrargyrum cum creta, camphor, and ipecacuanha, are most beneficial. This lesion is commonly connected with, if it be not caused by, the injurious remora of sordes or morbid secretions in the canal, and by a vitiated state of the blood; the aperients or purgatives selected should, therefore, not merely be mild, but possess tonic and antiseptic properties, or be conjoined with such substances, especially camphor, cinchona, sulphate of potash, the chlorates, or creasote.

152. *c. Diaphoretics* should be prescribed with strict reference to the existing degree of excitement; for, if the vascular action mount above a certain pitch, the cutaneous exhalation cannot be procured until it is reduced; and, if it sink too low, the perspiration will either be interrupted, or become partial or clammy. In the stage of excitement, therefore, depletions and refrigerants are the most efficacious diaphoretics; or such substances as relax the skin by acting on the digestive mucous surface, as calomel with antimony, and in some forms of fever especially, with opium; or ipecacuanha with nitre and opium, &c. During this period the more cooling diaphoretics should be selected, especially those mentioned under the head of refrigerants (§ 139), and emollients and relaxants will often very materially aid their operation, especially if gastric and intestinal irritation be present. Whenever vascular action, or vital power, particularly the latter, sinks materially, the warm or stimulating diaphoretics, as camphor, serpentaria, ammonia, arnica, &c., should be preferred, and be combined with tonic infusions, &c., according to the circumstances of particular cases and existing pathological states.

153. *d. Diuretics* are, upon the whole, less requisite in fevers than the preceding; but they are often useful adjuncts to tonics, diaphoretics, or even to the milder purgatives. The aëthereal preparations, especially the spirits of nitric ether, citric acid, and the citrates, the tartrates, and most of the neutral salts, and nearly all the refrigerants (§ 139), may be thus employed. They are indicated more especially in the pulmonary, cerebral, and hepatic complications of fever, those of an antiphlogistic kind being the most appropriate.

154. *e. Mercurials* are often necessary in fevers, especially calomel, blue pill, and the hydrargyrum cum creta. Calomel is of great service as a deobstruent purgative, in fevers arising from endemic causes, especially when the liver becomes obstructed; in conjunction with opium, after bleeding, in the gastric and other complications; and with camphor and

opium, in certain malignant states, which will be particularly noticed. *Hydrargyrum cum creta* is most useful with ipecacuanha and rhubarb, or with camphor and opium, in the intestinal affections occurring in the progress of the disease. Of the use of mercurial frictions in continued fevers I have not had much experience, but in periodic fevers, when the liver has become enlarged, I have directed them with advantage, using either the ointment with camphor, or the mercurial liniment with the compound camphor liniment, or one of those in the Appendix (F. 306, 311). Mercury pushed so far as to affect the mouth, or to produce salivation, has been considered both a prophylactic and a cure for fever. I have tried to affect the system in the most malignant forms of fever in warm climates, without succeeding; and, where I have succeeded, there was every reason to believe that recovery would have taken place nevertheless. In some complicated states of fever in this country I have given very large doses of calomel and camphor with opium every four or six hours, with success; and, although recovery has taken place as frequently without the mouth having been affected as otherwise, I have generally considered the latter a favourable occurrence. This treatment was introduced by me about fifteen years ago, and was then resorted to in many cases in a public institution: it was taught in my lectures, and published in several periodicals ten or twelve years since. The circumstances in which it is calculated to succeed will be pointed out hereafter. That mercury possesses no prophylactic influence against fevers, has been satisfactorily shown by several able writers, and proved by my own experience. A person, whose mouth was affected for the cure of syphilis, was seized with malignant remittent fever, in Africa, in 1817, and came under my care soon after the attack. He died a few days afterward, the most active treatment having failed in developing vascular reaction, and in supporting the vital powers. A nearly similar case is mentioned by Dr. GRAVES in his excellent lectures. I believe, however, that instances in which salivation has followed a mercurial treatment of fever without recovery having taken place are very rare.

155. *E. It is often necessary to remove local congestions, determinations of blood, or predominant states of vascular action, or other disease of particular viscera, during the progress of fever, and thus to protect important viscera from injury during the febrile action.*—*a.* One of the most dangerous and most frequent complications—one which does not limit itself to any particular type or form of fever, although more frequent in some localities than in others, and in some epidemics—is predominant affection of the digestive mucous surface, particularly of the lower part of the ilium and cæcum. This condition is more particularly noticed hereafter, with reference to its early occurrence, when it forms the mucous, gastric, and intestinal fevers of authors. It is chiefly to its occurrence in the advanced stages that I shall here advert. Notwithstanding the erroneous views of BROUSSAIS and his followers as to this point of pathology, we are indebted to them for the great attention which has been paid to it in recent times. Unfortunately, lesions in the small in-

testines may proceed to a fatal issue in fevers, without any evident sign of their existence. Those symptoms, nevertheless, which are most frequently observed, as well as those which are occasionally connected with them, should receive due attention. When, therefore, pain or tenderness is felt in the abdomen or epigastrium on pressure, with tension and burning heat, a loaded tongue with red point and edges, a soft and very quick pulse, from twelve to twenty leeches should be applied; and after the hites have bled sufficiently, a warm turpentine epithem or fomentation in the same situation will prove of great benefit. This epithem has been very frequently employed by me, since 1820, in the complicated states of fever, in both public and private practice, and has been publicly recommended by me for them on several occasions soon after that time.

156. α . If this complication appear early in fever, a repetition of these means will often be necessary; and, if the bowels be not sufficiently free, or if the evacuations be acrid and offensive, laxatives, especially rhubarb with the hydrargyrum cum creta, ipecacuanha, &c., and emollients or demulcents, will be necessary. If it occur very late in fever, and be attended with much depression, or with *diarrhœa*, small but frequent doses of the hydrargyrum cum creta, with camphor, ipecacuanha, and opium, ought to be given, the above epithem being also resorted to; and, if these fail, the chlorates, particularly the chlorates of potash or of lime, should be prescribed, with the preparations of cinchona, or of tormentilla; or the treatment advised for the *Asthenic Forms of Dysentery* (§ 88, *et seq.*) may be employed. In these latter cases, the affection of the mucous follicles is either consequent upon, or coetaneous with, contamination of the circulating and secreted fluids; therefore the chlorates, cinchona with hydrochloric acid, chloric æther and opium, camphor in large doses, creasote, and other tonic and stimulating antiseptics, are especially indicated. If dark, grumous, or bloody stools, and more particularly if large *discharges of blood* take place, turpentine should be administered by the mouth, and in demulcent enemata, it being the most efficacious means we possess in such circumstances, as well as when flatulent distention of the abdomen supervenes. Ulceration of the follicular glands, and softening, and even sloughing of the mucous surface of the bowels, may take place in the latter stages; and, although these lesions are often preceded by the symptoms just noticed (§ 155), and attended by evacuations indicating their occurrence, no very conclusive evidence of their existence may be observed, unless they terminate in perforation and peritonitis. This is more especially the case when the abdominal symptoms are marked by severe cerebral affection. But ulcerations may especially take place in this insidious manner, also, when the sensibilities are not thus obscured, and even during the periods of decline and convalescence. These more extreme changes in the internal surface of the bowels can be met only in the manner just advised, the medicines being exhibited both by the mouth and in enemata; and by the means recommended in similar states occurring during *Dysentery* (§ 89). If *peritonitis*, consequent upon ulceration and perforation,

supervene, terebinthinate epithems, or sinapisms, and large doses of opium, as advised by Dr. GRAVES and Dr. STOKES, or of camphor and opium, are the most rational means. The administration of other medicines by the mouth or by injections, or, indeed, the ingestion of any substance whatever, may increase the mischief by its passing through the perforation, which may possibly be repaired, if the actions of the bowels be restrained by the remedies just advised, the natural processes which sometimes take place in such cases being thereby favoured. The application even of leeches may be injurious, particularly if this occurrence take place late in, or during adynamic states of fever, by depressing the powers of life too low for the exertion of the usual processes of reparation.

157. β . The occurrence of *diarrhœa* of a mild character, the stools being feculent and not remarkably unhealthy, should not be interfered with, more especially at a critical period of the disease. But when the symptoms of inordinate vascular determination are present, the evacuations being watery, offensive, or otherwise morbid, small doses of hydrargyrum cum creta and DOVER'S powder should be given every four or five hours; and if these fail, and more especially if the type of fever be low, the stage far advanced, and vital power depressed by the evacuation, the more active means just mentioned (§ 157) should be administered. This complication is more common, and more apt to assume a dangerous form, in some localities than in others. Thus, it is more frequent and severe in Paris than in London, and in London than in Edinburgh, probably owing to the water in common use in these cities.

158. γ . When *flatulent distention* of the abdomen comes on in any of the forms of fever, but more particularly in adynamic states, PERRY advises that an elastic tube should be introduced into the rectum, in order to carry off the flatus. I am, however, not sure that the discharge of it in this manner is so beneficial as may be supposed; and I am confident that, at the period of the disease when this is a troublesome symptom, the internal surface of the bowel will be readily injured, owing to its tender and almost softened state, even by the incautious introduction of a clyster-pipe. I have, since 1820, recommended and employed the spirits of turpentine in cases of this kind, by the mouth, in several forms (F. 216), in enemata (F. 150, 151), and in warm epithems and fomentations placed upon the abdomen. This substance is especially indicated where, with the abdominal distention and intestinal affection, there is also delirium or coma; and is equally beneficial in a relaxed as in a constipated state of the bowels; for, by modifying the dose and the combination, it will increase or restrain their actions, according as either effect is desired. In a remarkably dangerous, and, indeed, hopeless case of this description, which I attended in 1822, with Mr. BUSHELL of Crawford-street, this medicine was resorted to with instant benefit and ultimate success; and although I have met, both previously and subsequently to this date, with numerous instances, in public and private practice, where it has proved equally beneficial, I refer to this in preference, because it is among the earliest

cases of the kind, of which I can find the notes, where I employed this medicine in consultation with another practitioner—the fact thus not resting merely upon the testimony of an observer, who may be supposed to be over-partial to a medicine which he was the chief means of bringing into general use (see my *Memoirs on the Action and Use of Terebinthinate Remedies in various Diseases, in the Lond. Med. and Phys. Journ.* for July and August, 1821), but also upon that of an equally competent observer. A nearly similar instance to that now referred to is adduced by Dr. GRAVES (*Lond. Med. and Surg. Journ.*, vol. ii., p. 781).

159. The nature and treatment of the complications of fever with intestinal disease have not always been well understood; for, as they have too frequently been considered as merely inflammatory, and not as consequences of the pathological states explained above, so have they been viewed as contra-indicating the exhibition even of mild purgatives. This, however, is not the case, inasmuch as they may not only be occasioned by the insufficient use or neglect of these medicines early in the disease, but also aggravated by the same cause at a later period. The septic and irritating effects of the morbid secretions and excretions poured into the alimentary canal, and even from its own surface, during the course of adynamic fevers, when its mucous membrane possesses its minimum of tone and vital resistance, require both that the intestinal contents should not be allowed to accumulate and remain long in contact with it, and that they should be rendered less injurious by dilution and the exhibition of antiseptic substances—indications of which both reason and experience have shown the propriety and success.

160. *b.* The complications of fever with severe lesions of the respiratory functions and structures are more frequent, and often occur earlier, than is generally supposed. The influence of early impairment of these functions in the production of the consecutive phenomena of fever should of itself attract a particular attention to them during the progress of the disease. We shall generally find that, in proportion as the causes of fever act intensely upon the lungs, and impede the changes of the blood in them, the more severe and complicated will be the form of the disease, and the more disposed will this organ be to experience either manifest or concealed disorder, generally consisting of a peculiar congestive form of bronchitis, or of congestion of the lungs and bronchial lining, or of determination to these parts, or of asthenic or nervous pneumonia, passing into condensation of portions of the organ, in the lower types of fever; or of peripneumony or more purely inflammatory states of both the lungs and pleura, in the more inflammatory varieties. There are also other circumstances which should influence the treatment of these complications, viz.: *a.* Their greater frequency in the low adynamic fevers than in the sthenic; in the continued than in the periodic types; and in some epidemics, seasons, and localities than in others; *b.* The particular stage of the fever in which they appear; *c.* The part they seem to act in superinducing further complications, especially cerebral and hepatic affections; and, *d.* Their particular form and character in relation to

general vascular action and nervous power. It must be evident that, inasmuch as this complication may supervene and proceed to a fatal length without detection, especially when the brain is much affected, an attentive inquiry after it should be made by means of auscultation, through the progress of the disease, and even during convalescence.

161. *a.* In cases where the local affection, as well as the general disease, evince most of the inflammatory characters, *general or local depletions*, according to the circumstances of the case, are especially indicated. Of the latter, *cupping* is the most useful, especially between the shoulders; and, if leeches be applied, the glass may be placed over the bites. In the adynamic states, local depletions only are admissible; and, if leeches be used, attention should be paid to the bleeding afterward. If farther depletion cannot be ventured upon, *dry cupping* on the back or chest will sometimes be serviceable. Great advantage will also accrue from resorting to external derivation or revulsion, after sufficient depletions have been practised. The repeated application of blisters, so as to produce merely a rubefacient effect; or of sinapisms; frictions with irritating liniments (F. 299, 300), especially with capsicum, croton oil, &c.; and stinging with nettles, are frequently beneficial. But I have found, in numerous cases, since 1821, of both common and eruptive fevers, where these means have failed, that warm terebinthinate epithems, placed over the chest or epigastrium, or even upon the insides of the thighs, and retained or repeated until erubescence and burning heat were caused, have produced decided benefit. Such instances have occurred where I have met with other practitioners, among whom I may mention Mr. FAXON, Mr. BARNWELL, Mr. PAINTER, Mr. BRYANT, Mr. BYAM, Dr. T. WILLIAMS, and Mr. LEESE, who have witnessed with myself the efficacy of this application.

162. *β.* *Antimonials*, especially the tartar emetic solution, have been much employed in this complication; but the caution already offered respecting their use (§ 142), particularly in the low forms of fever, should not be overlooked. The doses of the potassio-tartrate of antimony ought not to exceed the quantity advised above. When judiciously employed, and following moderate depletions, it is productive of great benefit, and very frequently prevents the necessity of recurring to blood-letting. In some of the states of predominant pulmonary affection, where, although occurring early in the disease, vascular depletion can hardly be ventured upon, this substance, either alone, or with camphor and small doses of squills and opium, will often prove efficacious. In such low forms of the complication, especially when supervening late in fever, even tartar emetic may not be either beneficial or indicated. In these, the external derivatives just mentioned; ipecacuanha with camphor and opium, or also with squills; the decoction of senega, and other medicines advised in the *Asthenic Form of BRONCHITIS* (79, 84), will prove most serviceable. It will sometimes become a question, whether or not wine and the more active tonics and stimulants, sometimes required at an advanced stage of adynamic fevers, should ever be administered when complicated with nervous or asthenic

bronchitis or pneumonia. To this I would answer that, having resorted to the means already advised, or merely to dry cupping, the external applications and the internal medicines just insisted upon, without benefit, vascular depletion not being farther admissible, the administration of appropriate stimulants and tonics should not be longer delayed, and more especially in an advanced stage of fever, the external means being repeated and assiduously persisted in. Before, however, wine and the more heating stimulants and tonics be resorted to, the effects of camphor in full doses, or of ammonia, with opium, &c., should be fully tried. If the bronchi be loaded with accumulated mucus, and the respiratory functions thereby obviously impaired, the exhibition of an emetic (F. 198, 402), or repetitions of it, will be serviceable, however late in the disease.

163. *y.* The treatment just advised is also applicable to the more rare complication with *pleuritis*. Vascular depletions are more generally required, and may be carried to a somewhat greater extent in it, than in associated bronchial and pneumonic affections. Full doses of calomel, JAMES'S powder, and opium are particularly indicated; and if the mouth become affected, the occurrence may be considered favourable. The external remedies should be strenuously enforced, particularly the turpentine epithem, on the outside of which a piece of soft leather or oiled silk may be laid, in order to prevent evaporation. The tartar emetic solution should also be prescribed; and the more largely, the more manifestly sthenic or inflammatory the fever and local affection, in order to economize the loss of blood.

164. *c.* The *affections of the cerebral functions*, owing to their nature, often present more prominent characters in fevers, and hence attach to themselves greater importance than they are actually entitled to. Even in cases where they have been most remarkable, the *post mortem* examination has not disclosed any lesion sufficient to account for them. The circumstance of their being more frequently caused by the state of organic nervous influence in the encephalon, and by morbid changes in the blood, and of their being often consequent upon affections of the respiratory functions and of the digestive mucous surface, has been too generally overlooked; and a treatment has, consequently, been adopted more calculated to interfere with the salutary efforts of nature than to remove morbid conditions which have actually existed. If we analyze those cases which present, in the common estimation, very prominent lesions of the cerebro-spinal functions, and compare these lesions—whether of mental manifestation or of voluntary power—with those evinced by the other organs or systems, with the functions of digestion, assimilation, circulation (comprising the changes affected by respiration on the blood), secretion, and excretion—in what will the predominance of cerebral disorder be found to consist? and, still more, to what organ or system will the balance of morbid action incline? Keeping, therefore, this inference in view, that prominent symptoms, especially those connected with the sensitive functions, do not always prove, or truly indicate, the amount of lesion, or even its seat in the part disturbed, the cerebral complica-

tions of fever should receive a due but not an exclusive attention, even when most predominant. In proof of this position, I can appeal to no very limited experience, and to those who, like myself, have witnessed the worst forms of typhus fever, as they occurred in various parts of France and Germany soon after the peace, whether or not death was caused more by the cerebral than by the other changes, judging from an intimate analysis of the symptoms in the latter stages, and of the morbid appearances. Indeed, in many instances, the lesions of other organs were individually greater than those found within the cranium.

165. In cases of fever attended by very marked determination of blood to the head, or by vascular action increased to an inflammatory state, or by severe cerebral symptoms at advanced stages of the disease, *vascular depletions*, full doses of calomel, with purgatives, or followed by them, especially by Formula 216, and enemata (F. 140, 150); and cold applied to the head, particularly the cold affusion on it, the rest of the body being kept moderately warm, or revulsants being applied to the lower extremities, should be promptly resorted to. Blood-lettings ought not, however, to be too implicitly confided in, for they will never of themselves remove this complication. No advantage will accrue from opening the temporal artery or jugular vein above that derived from bleeding from the arm; and even this will not be frequently requisite, the more especially as an equal or even greater benefit, at a less waste of blood, will result from cupping largely on the nape or over the mastoid processes, or from leeches in the latter situation and occiput. Both bleeding and the cold affusion on the head may be carried to an injurious length, especially if it be attempted to remove, or materially to benefit, within an inadequately short time, this complication; many of the phenomena of which are dependant upon, and inseparable from, the fever, and to be removed only with it. Let not, therefore, this or any other treatment be mischievously persisted in, with the mistaken view that it can accomplish what the nature of the disease renders impossible; but, at the same time, let it not be insufficiently employed. Purgatives, especially those with calomel, with JAMES'S powder, or other antimonials, should follow early depletions, particularly if this complication occurs early in the fever; and at later periods the calomel may be given with opium, every four or six hours, the bowels freely opened, and derivatives applied to the insides of the thighs or calves of the legs. As to the treatment of COMA and DELIRIUM in fever, it is unnecessary to add anything to what I have advanced in those articles, and at other places in this. It should, however, be recollected that other complications may co-exist with predominant cerebral affection, particularly in adynamic fevers; and if this affection be very severe, or consist of delirium or coma, and more especially if it depend upon a morbid state of the blood, these complications may be thereby masked, and proceed to a fatal height before they are detected. This we have seen to be the case as respects the lungs and intestines, and it is not less so as regards the *liver* and *spleen*. Nor should the readiness with which sphacelation occurs, either from the

pressure of the body, or from excoriating discharges, and inattention to cleanliness, and to the preservation of a dry state of the linen, or from blisters or injuries, be overlooked; for an early inquiry after the first indications of this occurrence will often prevent much trouble, suffering, and danger.

166. *F.* The regimen and management of patients in fever are much more essential to recovery than is sometimes supposed. Not only are the purity, dryness, and rapid renewal of the air deserving of attention, but also its temperature, which ought to be regulated, as well as the quantity of the bed-clothes, according to the state of vascular action and vital power. The patient should be screened from too free a current, particularly of cool air, and especially in fevers of low excitement, as the pulmonary, and, indeed, other complications may be induced by this circumstance. When excitement is fully developed, the air should be cool, and the clothes light; but in other conditions, especially when the temperature of the body does not rise above natural or is depressed below it, proportionately increased warmth is necessary, in respect of both the air and the quantity of bed-clothes. The room, also, should be darkened, all noise excluded, and mental excitement or irritation carefully avoided. The mouth and gums ought to be washed from time to time, and the linen changed very frequently; the surface of the body being sponged with simple or medicated water, of a temperature in relation to the forms of fever, as stated above (§ 140). All the evacuations ought to be passed in the bed-pan, without leaving the supine posture; and if they take place involuntarily or unconsciously, oiled silk should be placed next the bed, and folded sheets underneath the patient. Care must be taken that retention of urine or over-distention of the bladder does not occur, without being detected at once and remedied. The accounts of the nurse must not be trusted to in this, more than in other matters, but the state of the abdomen above the pubes carefully examined. If pressure cause excoriations, or threaten sloughing, measures should be immediately taken to prevent farther mischief. The part may be washed, as Dr. GRAVES advises, with a solution of ten to fifteen grains of nitrate of silver in an ounce of water, or with a weak solution of the super-acetate of lead in spirits of turpentine; or with this latter and dilute pyroligneous acid; or it may be covered by defensive plasters. If sloughing occur, carrot poultices, copiously sprinkled with chlorates, particularly of lime, or with spirits of turpentine, or with creasote, must be employed; or poultices with bark, to which either of these may be added; and pressure removed from the part and its immediate vicinity by air-pillows, or by the use of Dr. ARNOTT'S hydrostatic bed. But these unpleasant occurrences should be prevented, where the appearance of the soft solids and the prostration of the patient indicate a disposition to them, by having early recourse to these latter means, and by supporting vital power by the means appropriate to existing pathological states.

167. *G.* The food and drink in fevers should be varied with the existing states of vascular action and power. In periodic fevers, light

food may be allowed in proportion as the apyrexial period is complete. But in continued fevers, particularly during the early stages, and while excitement continues, no food beyond thin water-gruel, fresh whey, and orangeade or lemonade, should be given. The best drinks during excitement are those prescribed in the APPENDIX (F. 592, *et seq.*), or any of the mineral acids in sugared water, and flavoured by lemon-peel, or weak black tea, according as they may be congruous with the medicines prescribed internally. Thus, care should be taken not to allow the patient any of the mineral acids when calomel, or any of the other preparations of mercury, is being taken. But when vascular reaction is low or imperfect, and vital power considerably depressed, or when the pulse is very rapid, tumultuous, and soft. Seltzer or soda water with old wine, hock, or weak punch, or wine whey, spruce beer, brisk bottled stout, or brisk bottled beer, &c., according to the peculiarities of the case and the previous habits of the patient, may be allowed. If coma be present, *green tea* is one of the best beverages that can be allowed; and if the powers of life be very depressed, it may be made into a weak punch; the patient also being often roused by talking to him on lively, interesting topics. He may be allowed oranges, grapes, or lemons sweetened with sugar, particularly when the mouth is foul and dry; but care should be taken that neither the pulp nor the stones are swallowed. These will often both refresh and feed the patient as much as is necessary until the decline of the disease. If the fever be prolonged, or of a slow, nervous character, very light nourishment may be allowed as the excitement subsides, such as roasted apples, jellies, in some cases asses' milk, sago, arrow-root, tapioca, wine whey, chicken or mutton broth, weak beef tea, &c.

[Dr. GRAVES, of Dublin, has lately called attention to the importance of allowing fever patients a more liberal diet than is usually granted them, and states that many fall victims to prolonged abstinence in fever. To enforce its importance, he refers to the effects produced by prolonged abstinence from food, as a dragging pain at the stomach, burning thirst, and, after some time, epigastric tenderness, fever, and delirium. There is also, as observed in those who have suffered shipwreck, vomiting, determination of blood to the brain, suffusion of the eyes, headache, sleeplessness, and tendency to putrefaction of the animal tissues, as shown by the spontaneous occurrence of gangrene of the lungs. In fever, the natural sensibilities of the patient are blunted and impaired, and it by no means follows that because he does not ask for food, that therefore the system does not require it. Dr. G. therefore attributes much of his success in the management of fevers to the liberal but judicious allowance of food. For the first three or four days, particularly if the patient is young and robust, he allows only water, weak barley-water, and whey; after this he begins to give a little thin, well-boiled gruel made of groats, and flavoured, if there be no tendency to diarrhoea, with sugar and a small quantity of lemon-juice; also a little thin panada, morning and evening, during the latter part of the first and the beginning of the middle stage of

the fever, or after the fourth or fifth day of the disease, according to circumstances. A table-spoonful of these every two or three hours will generally be sufficient, and, after the disease has advanced a little, some mild animal broth or jelly will prove useful; and of these none is better than chicken-tea, which should be given cautiously at first, and gradually increased if it does not bring on heaviness, sickness of stomach, flushing of the face, excitement of pulse, or increased feverishness; in which case it should give way to the gruel and panada. In the middle and latter stages of fever, we have latterly been in the habit of giving it in small quantity, frequently repeated, with the happiest effects. Stewed and roasted apples, grapes, oranges, and, indeed, acid and raw fruits of every kind, are extremely hazardous, and should not be permitted in the treatment of this class of diseases. It is important, as Dr. G. has suggested, that all kinds of food and nutriment should be given by day, and the patient, if possible, restricted to the use of fluids by night.]

168. *H. Convalescence* from fevers requires the utmost discrimination of the physician, and yet both the patient and his friends are but too eager to supersede his functions. The ill consequences of mismanagement in this period are chiefly, 1st, Relapse; 2dly, Inflammatory affections of the lungs, bowels, or brain; 3dly, Dropsical effusions; and, 4thly, Mental alienation. These are usually caused, *a.* by the patient getting up too early from bed; *b.* by errors in diet; *c.* by too early exposure to the weather, to the sun's rays, to cold, malaria, &c.; *d.* by mental excitement or irritation; and, *e.* by premature exertion of the physical powers. Convalescence is prolonged and difficult, and the consequent risk of some one of the ill effects of mismanagement supervening proportionately great, *a.* when the fever has been unusually severe; *β.* when it has been very promptly and actively treated at its commencement, and either quickly subdued, or thereby rendered of short duration; *γ.* when it has slowly subsided without any regular crisis; *δ.* when it has been complicated in the severer form stated above.

169. *I. Relapses*, as well as inflammatory or other affections of the principal viscera, are most frequently caused by getting about too soon, and by indulgence of the appetites, particularly that for food, which very generally requires restraint at this period. When the disease has been shortened by large blood-lettings, these, or other ill effects, as mental alienation in persons predisposed to it, are very apt to occur. The greater is the necessity, therefore, to place the patient upon the strictest diet and regimen during convalescence. At the same time, he should not be kept too low, either in respect of food or medicine; otherwise anæmia, dropsy, mental disorder, chronic debility, and rheumatism, &c., may be thereby produced. Change of air, sea-voyaging, and travelling, with due precaution against cold or wet, will particularly assist recovery. If either of these cannot be adopted, the use of gentle tonics, especially when the situation is not remarkably healthy, and strict attention to the bowels, and, indeed, to all the secretions and excretions, are particularly necessary. The

patient should not be in too great haste to remove the hair after fever, or to have it cut too close; and he should be particularly careful not to expose his head to the sun's rays. The return to his occupations, whether mental or physical, as well as to his usual food, ought to be gradual. As the cuticle and hair generally fall off after severe fevers, warm or tepid baths, when convalescence is far advanced, will promote the patient's comfort.

170. If, notwithstanding these precautions, a relapse takes place, the treatment should proceed according to the principles developed in this article with reference to its cause, the progress it has made, the state of action, and of power, &c. The fact of the greatest proportion of cases of this kind being occasioned by errors in diet should not be overlooked. Hence the great success ascribed by the older writers to an emetic in such circumstances. Therefore, after the action of an emetic, the bowels also ought to be freely opened by a mild purgative, the operation of which may be promoted by enemata; and the treatment, in other respects, should proceed according to the type and form the disease assumes, and the stage at which our assistance is required. If a relapse is merely threatened, or if the symptoms characterizing its invasion be present, the remedies just mentioned are especially indicated, with the other means above advised (§ 121, 122) in this period. (See the art. DEBILITY, § 36, 43, 45, 46, for still more particular directions as to the management of CONVALESCENCE, and as to the measures that ought to be adopted.)

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Those who wish a farther reference to the subject may consult, also, the collections of *BONET*, *MANGET*, and *PLoucquet*, where comparatively few of the above works will be found in this case, as in every other throughout the work.

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XI. INTERMITTENT FEVER. SYN.—*Διαλείποντες πυρετοι*, Hippocrates and Galen; *Aetius*, Young and Good; *Kalte Fieber*, *wechelfieber*, Germ.; *Paludal Fever*, *Periodic Fever*, *Ague*.

171. DEFIN.—The febrile phenomena running their course rapidly, observing a certain succession, usually terminating in crises, and returning after regular approximal intervals.

172. Intermittents have been divided by modern writers into the *quotidian*, *tertian*, *quartan*, &c.; into *vernal* and *autumnal*; into *regular*, *erratic*, and *anomalous*; into *simple*, *complicated*, and *masked* (FOURRIER, VAIDY, &c.). But in addition to these TYPES, which have reference merely to the intervals between the accessions of the paroxysms, agues assume certain FORMS or CHARACTERS, which are still more important than they are, in a practical point of view. These have been variously distinguished by writers. J. P. FRANK has arranged them into the *nervous*, the *gastric*, and *inflammatory*, the second and third of these, in being *complicated*, often assuming a remittent type. J. FRANK has divided them into, 1st, the *evident*, and, 2d, the *masked*; the former being, *a. benign*; *b. malignant*; *c. regular*; and, *d. irregular*. M. PINEL has classed them into *inflammatory*, *gastric*, *mucous*, *adynamic*, and *ataxic*; M. BOISSEAU

into *benign*, *pernicious*, or *complicated*, and *erratic*, *anomalous*, or *masked*; and the author into, *a. the simple*, or *uncomplicated*; *β. the inflammatory*; *γ. the adynamic*; *δ. the complicated*; and, *ε. the anomalous*, or *masked*. I shall follow the same arrangement here.

173. i. *Simple Ague*—*Mild, uncomplicated*, or *benign Intermittent*—appears after a longer or shorter interval from the time when the morbid impression was made by its cause upon the system. During this *formative* or *premonitory* stage, symptoms of disorder may be more or less manifest; but they are often very slight, or hardly discernible, until shortly before the paroxysm, which may occur suddenly or unexpectedly, with the usual *invading* symptoms (§ 35). The *premonitory* phenomena are essentially the same in ague as have been described (§ 33); but frequently, during the few days immediately preceding the full development of the fit, slight fever appears, and returns about midday or a little before; consisting of accelerated pulse, white tongue, thirst, lassitude, and pains in the back and loins, loss of appetite, high-coloured urine, &c.

174. a. The *fully developed paroxysm* commences with a creeping chilliness along the spine, with languor or a sense of fatigue, paleness and slight collapse of countenance, lividity of the nails, and a feeling of universal coldness. The temperature of the surface is reduced; the skin is dry and rough, sometimes with livid patches or spots, especially on the extremities; shiverings, tremblings, or rigours occur; and the teeth chatter. Sighing, oppression, or anxiety at the præcordia, yawning, stretchings, difficult or forced respiration, occasional cough and nausea are also present. The patient complains of a constrictive pain in the head and temples; of aching of the back and loins; and of clamminess and a disagreeable taste in the mouth. The tongue is white or loaded; the appetite lost; the urine limpid, sometimes pale, and voided often; and the bowels are generally constipated. Sickness and bilious vomiting sometimes supervene and hasten the next period; the pulse is constricted, small, weak, and often accelerated; and the mental powers are weakened or overpowered. Such is the *cold stage*, which answers to the period of *invasion* described above (§ 35).

175. b. These symptoms, having continued from half an hour to three, very rarely to four hours, are followed by transient flushes of heat, at first alternating with rigours; by restlessness; great heat of surface; flushings and turgescence of the countenance and skin; rending headache and throbbing of the temples; by a full, strong, and free pulse; high-coloured and scanty urine, intense thirst, and most of the symptoms characterizing the period of *excitement* (§ 36), with the first part of which especially, this, the *hot stage*, corresponds.

176. c. After a time varying from two to eight hours, but most frequently three or four, perspiration breaks out over the forehead and breast, increases rapidly, extends over the whole body, and soon becomes profuse. All the symptoms now subside quickly; the urine being more abundant, and depositing a lateritious sediment: the bowels being more readily acted upon, and the mind more composed. A sense of exhaustion only now remains, and the

patient often falls asleep; and the paroxysm is at an end. This, the *sweating stage*, corresponds with the *periods of crisis and decline* (§ 40, 41). The whole *duration* of the fit varies from four to sixteen hours, the common length of it being about six or seven.

177. A. *The Types and Intermissions.*—The paroxysm, having terminated more or less completely in health, some degree of lassitude and debility usually remaining, is renewed after an interval, the duration of which constitutes the *type of ague*—after twenty-four hours in the *quotidian*; after forty-eight hours in the *tertian*; and after seventy-two hours in the *quartan* types. The most common of these is the *tertian*, which is considered the primary type of fever. These form the primary and *regular* types of intermittents; but there are others which are *irregular*, as the double, triple, and reduplicating *tertian*; the double, the triple, and reduplicating *quartan*, &c. Of these, the *double tertian* is the most common, and differs from the *quotidian* only in having, on alternate days, fits corresponding in severity, character, and duration. The *triple tertian* has two fits on one day, and one the next. A *duplicated tertian* has two paroxysms in alternate days, with one whole day of intermission. A *double quartan* has a fit on one day, a slighter fit the next, and a complete intermission on the third day; the paroxysms returning in a similar manner on the fourth and fifth. A *triple quartan* has a paroxysm on each day—on the two usual days of intermission; but, as in the case of the double *tertian*, the fit of each differs in character and period of accession, so that the one returning every fourth day is alike. The *duplicated quartan* has two paroxysms on one day, with two whole days of intermission. Besides these, intervals of four, five, six, seven, or eight days may occur, or even longer periods, constituting *erratic* or *atypic* forms of ague; and may be caused by treatment, by atmospheric vicissitudes, or states of the digestive organs, but they are comparatively rare.

178. a. The *quotidian* usually begins in the morning, and continues the longest; having the shortest *intermission*, or period between the termination of one fit and the commencement of the next.—b. The *tertian* usually appears about noon; the duration of the fit being about seven or eight hours, but that of its hot stage being often the longest.—c. The *quartan* commences in the afternoon (from two to five), and has the longest cold stage, and the shortest paroxysm.—d. The *tertian* is the most common, the regular *quotidian* the least so.—e. Agues are most prevalent in spring and autumn; *tertians* and *quotidians* in spring, and in adults of a sanguineous or bilious temperament; and *quartans* in autumn, in very young persons, in females, and in the lymphatic temperament. *Tertians* are the mildest and the shortest in duration, and sometimes disappear of themselves. *Quartans* are removed with greatest difficulty, particularly in autumn, and they occasionally continue till the following spring.

179. B. The longer the *apyrexial interval*, the more complete is the restoration to health; but during this period, or *intermission*, the patient often complains of weakness, of heaviness or pain of the head, of a sense of cold, want of

appetite, &c.; many of the symptoms stated above, as indicating the *formative* period of fever (§ 33), being present. Indeed, the interval in every respect corresponds with this period. When the ague continues some time, although it may not change its type or form, as it is then prone to do, especially in warm climates, the patient becomes weaker, loses flesh, has a sallow hue, and experiences obstructions or enlargements of the spleen, liver, mesenteric glands, &c., with a deranged state of the secretions and excretions; the disease passing into the complicated states (§ 183), or terminating as will appear hereafter (§ 189).

180. C. The *conversion* of one type of ague into another often occurs; *tertians* and *quartans* changing to *quotidians*, or to double or triple *tertians* and *quartans*, especially when they become aggravated; and *quotidians* into *tertians* when they are somewhat ameliorated. Agues, particularly *quotidians*, may also be converted into *remittents*, or even into the continued type, by the constant operation of the exciting causes, or by other powerful determining influences; but they often assume a complicated or an irregular form in the course of transition. When the fits of a *quotidian*, or of a double *tertian*, or of a triple *tertian* approach each other so closely that the one is hardly finished before the next commences, the fever has been called *sub-intrans*, or *sub-intrans*, and differs but little from a *remittent* type, excepting that the cold and sweating stages may be somewhat more marked in the former.

181. ii. *Inflammatory Ague.*—Intermittents with more or less of inflammatory excitement have been described by SYDENHAM, PRINGLE, HUXHAM, SELLE, FIZEAU, BOISSEAU, &c. Mr. ANNESLEY and the author have shown their frequency in warm climates, especially during the cold seasons, in elevated situations, and in persons of a previously healthy constitution. They are characterized by very severe rigours in the cold stage, followed by vomitings and intense vascular reaction; unquenchable thirst; by severe and rending headache, sometimes with delirium; by great heat, and by turgescence of the countenance and of the whole surface. The reaction during the hot stage is generally attended, particularly in plethoric persons, by marked determination to, and vascular turgescence of, particular viscera, according to accessory or determining causes. The organs which thus evince a predominance of vascular action are, the encephalon; the liver and stomach, especially in warm climates, and in autumn in cold countries; the lungs and bronchi in some instances; and the uterine organs in rare cases. This form generally assumes a *tertian* or *quotidian* type; is easily removed if actively treated, owing to its common occurrence in sound constitutions; but it rapidly passes into organic change, or into the *remittent* or continued type in hot climates, when neglected or improperly treated.

182. iii. *Ague with oppressed Power*, or partaking more or less of an *adynamic character*, is often met with in Europeans who have resided long in hot miasmatic countries; in debilitated persons living in low, marshy, and moist countries; and in the intemperate; but it rarely occurs in these in an uncomplicated state. While vascular reaction and vital power rise

above the standard presented by *simple ague* in the *inflammatory form*, they sink more or less below it in the *adynamic*. The cold stage is often attended, in this latter, by general tremblings, rather than by strong rigours, and is followed by nausea and vomiting; developing a burning or pungent heat of the skin, which is dry, and occasionally somewhat sallow. The pulse is very quick; the tongue loaded, and red at the edges; and the epigastrium tender and oppressed. This state nearly approaches the *gastric variety* of Continental writers. More frequently, however, this form commences with horripilations, seldom amounting to trembling or rigours; often with nausea and vomiting; fulness at the epigastrium, and headache. To these succeed increased heat, alternating at first with chills; a quick, oppressed, but not hard or full pulse; a somnolency, and imperfectly developed and hot and sweating stages. Thirst is not much increased; the heat is moderate; the skin is sallow, yellowish, or lurid; the urine citron-coloured; and the subsequent perspiration is scanty, or offensive. This form usually assumes a quotidian, double tertian, or triple quartan type; more rarely tertian; and sometimes erratic. It commences also irregularly, either early in the morning, or in the evening, or at night. The *intervals* are attended by more or less disorder; by an unhealthy appearance of the surface, a loaded tongue, and morbid excretions. The lower grades of ague are more frequently complicated (§ 183) than simple, or, if the latter, they soon superinduce congestions, obstructions, and organic lesions of important viscera, most frequently of the stomach and bowels, of the spleen, liver, mesenteric glands, and pancreas.

183. iv. *Complicated Ague*—*Intermittent pernicious* of the French—*Intermittentes comitata* of TORTI—the *Malignant* of some writers—is very frequent in warm climates, and in marshy districts in the south of Europe, and is sometimes met with in parts of this country. It usually presents the preceding form as respects the states of vascular action and power, but it may assume more or less of the inflammatory character, particularly in the early paroxysms. It often has less perfect intermissions than the foregoing forms, especially after two or three paroxysms; is generally quotidian, double tertian, or triple quartan; and frequently passes into a remittent or nearly continued type, especially in Europeans who have resided long in hot countries, and in the intemperate. It appears in two ways; *a.* primarily in a faulty constitution, or in persons with previous disorder of some important viscus; and, *b.* as an advanced grade of either of the preceding forms. The most frequent complications are with diseases of, *a.* the digestive and biliary organs and spleen; *β.* of the thoracic viscera; *γ.* of the cerebro-spinal functions; and, *d.* of other parts.

184. *A.* *With disease of the abdominal organs*, ague presents diversified symptoms, according to the viscus especially affected.—*a.* If the *stomach* be particularly diseased, severe, burning pain at the epigastrium, with tenderness, distention, nausea, and vomitings, which are increased by whatever is taken into the stomach; distressing flatulency; dry or red tongue; high-coloured and scanty urine; sallow or depressed countenance; yellow streaks around

the mouth; imperfectly developed hot stage, with a sharp, quick, and contracted pulse; pungent heat on the trunk, with little alteration or even depression of it in the extremities; intense thirst, hicough, and headache or delirium, are commonly present.—*b.* If the *liver* is principally affected, fulness, pain, oppression, or tension at the epigastrium, right hypochondrium, and right shoulder; oppressed breathing; bilious vomiting; diarrhœa, or a dysenteric and morbid state of the stools, which are sometimes black or bloody; a jaundiced, sallow, lurid, and harsh appearance of the surface, and the other symptoms just enumerated, are complained of.—*c.* If the *bowels* are chiefly disordered, the fever assumes a dysenteric character, the evacuations being very morbid; sickness and vomiting are less urgent, or are altogether absent; and the hot and sweating stages are imperfectly formed.—*d.* If the *spleen* be diseased, more or less enlargement is very evident in the region of it, extending into the epigastrium, and over a great part of the abdomen; most of the other phenomena being also present. These complications may coexist, or one or two of them may predominate; but they seldom continue long without assuming still more dangerous features, and the patient sometimes dies in the cold stage. The heat of surface often passes from an acid or pungent state, to a clammy or raw condition, as the paroxysm subsides, and the coldness or lividity of the extremities frequently continues through its imperfectly developed stages—syncope, great debility, quick, small, and weak pulse; a dry, brown, red, or raw state of the tongue; constant thirst; anxiety and oppression at the præcordia; and, lastly, delirium, coma, or death taking place.

185. *B.* The *pulmonary complication* is much less common than the abdominal; but I believe that congestion of the *bronchi* and *lungs* obtains, to a greater or less extent, in most forms of ague, especially in the cold stage; and that, in the more severe states, a sub-inflammatory condition, or active congestion, often exists, although in a form that can be recognised only by the aid of the stethoscope. Dr. STOKES has adverted to this in his able paper on the treatment of ague. But, in ordinary circumstances, the respiratory organs merely participate with other viscera of the large cavities in the congestion characterizing the cold stage. If, however, symptoms of inflammatory, sub-inflammatory, or congestive disorder of these organs continue throughout the hot stage, the ague may be justly considered as complicated with such disorder. The symptoms, even when the pulmonary affection is most severe, are not always very decided, unless the pleura be implicated, which is seldom the case. Those of catarrh, or of bronchitis, are the most common; but the substance of the lungs may be seriously affected without much cough being present, the respiration being only short, quick, or laboured. [In general, however, during the paroxysm, there is intense pain of the chest, aggravated on inspiration, dyspnœa, cough, thirst, dry tongue, small and quick, afterward hard and frequent pulse, general feebleness, and universal chilliness. Cases of this kind usually set in with a severe rigour. If there be a sharp pain on either side, it may be inferred that the

pleura is affected. This complication is an extremely dangerous one.] Particular attention is therefore necessary when this symptom is complained of. The *paroxysm* of ague in this complication is usually *quotidian*, or double tertian; and, in *character*, it may be more or less inflammatory, and but rarely adynamic, unless it has continued for some time.

186. *C.* The *cerebral complication* is seldom observed in the early course of ague; but it often supervenes on the adynamic and the inflammatory forms, and upon that attended by the complications already noticed, especially the abdominal. According to the particular character which the cerebral complication, during the paroxysm, presents, it has been denominated the *delirious*, *apoplectic*, *lethargic*, *comatose*, *soporose*, *epileptic*, *convulsive*, or *paralytic*, these affections occasionally occurring, the delirious and comatose being the most frequent, the epileptic and paralytic much more rare. TORTI, STARCK, WERLHOF, and BAILLY have adduced cases of the apoplectic complication; but it is rather a termination of the disease, recovery from it being rare. The convulsive state occurs chiefly in children, as observed by STOLL, especially in warm countries. These states seldom occur in this country, unless towards the close of a neglected or improperly treated ague, when the functions and state of the more important excreting organs have been overlooked. They are, however, more common in the south of Europe, as shown by the numerous cases adduced in the works of GROTTANELLI, BAILLY, and others.

[In some instances, intermittents are complicated with disease of the *heart*, when we have palpitation, with pain in the region of this organ, sometimes to that extent as to produce sensations similar to those that precede syncope. The senses, with the exception of hearing, are abolished, and the patient is unable to speak; the heart beats feebly and slow, and the pulse and respiration seem almost suspended. This state may last from a quarter of an hour to two hours.]

187. *D.* Besides the above, several other complications have been noticed by writers. Of these, the most remarkable are, the *rheumatic* and *arthritic*, the *neuralgic*, the *asthmatic*, the *nephritic* [the *syncopæ*], and *uterine*. But, although instances rarely occur in which these affections accompany a fully developed paroxysm of ague, they present themselves rather as masked intermittents, or without a clearly defined fit.

188. *v.* *Masked Ague*—*Simulating Intermittent*—*Febres Intermittentes larvæ* of foreign writers—may assume most diversified forms; or, rather, during seasons in which intermittents are very prevalent or epidemic, numerous affections, especially those of the nervous system, as *neuralgia*, *rheumatism*, *arthritic rheumatism*, and *sciatica*; *gout*; *headache* and *hemispheria*; *amaurosis*; *toothache*; *otalgia*; *catarrh* and *asthma*; *palpitations*; *painful affection of the spleen*, *nephralgia*, *hysteria*; *singultus*; *gastralgia*, or *enteralgia*, or *colic*; *epistaxis*; various disorders of the stomach; and *paralysms*, may put on an intermittent type. Of these, the rheumatic and neuralgic are the most common; and, as they frequently are occasioned by the same causes as produce ague, acting in a less

intense mode, the circumstance of their intermittent form cannot be a matter of surprise. A case of intermittent flatulency lately occurred to me, the quantity of flatus eructated daily, from noon to three or four o'clock, being enormous, the patient continuing to belch without intermission. The *type* of masked ague is generally quotidian, double tertian, or tertian, and sometimes quartan or double quartan. As in other forms, it is most common in spring and autumn, especially the former, and when easterly winds prevail; and is usually attended by more or less disorder of the digestive, biliary, and excreting organs, a successful treatment mainly depending upon attention to this circumstance.*

189. *vi.* CONSEQUENCES AND TERMINATIONS OF AGUES.—*A.* The *Effects* of ague depend upon, *a.* the previous health and strength of the patient; *b.* the intensity of the causes, and the duration of their action; *c.* the continuance of the disease; *d.* the treatment adopted; and, *e.* the other circumstances noticed above (§ 47). Intermittents seldom continue long, even in the simple form, or return frequently, without materially impairing the vital energy and vascular tone of the viscera of the large cavities, especially those of the abdomen. Hence arise, 1st, the complications described above; 2dly, remittent or continued fevers, with more or less affection of particular organs, or of the circulating and secreted fluids; 3dly, inflammations, or structural change of internal viscera, superseding the periodic seizures; 4thly, dropsical effusions; 5thly, chronic dysentery and diarrhœa; and, 6thly, a fatal issue, chiefly in the cold stage, owing to insurmountable congestion of the lungs, heart, liver, and spleen, or to rupture of this latter organ.

190. The congestions of this viscera, in connexion with impaired organic nervous power, more especially of the liver and spleen, give rise, by frequent repetition, to enlargements, to a torpid state of the former, and, consequently, to engorgements of the portal vessels and of the hepatic ducts; to imperfect secretion and assimilation of the chyle absorbed and passed into the mesenteric veins; to obstructions of the mesenteric glands; to obstructed circulation and its consequences, through the veins contributing to form the portal circulation; and, ultimately, to an unnatural state of the blood, and structural lesions of the digestive mucous surface, and of the large secreting and excreting glands. Hence old and complicated agues are accompanied with a *sallow*, *sunk* or *bloated*, and *œdematous* countenance; *pale lips*; *foul*, *loaded tongue*; *yellowish*, *foul*, or *lurid skin*; *fulness*, *distention*, or *tenderness* at the *epigastrium*, both *hypochondria*, and over the *abdomen*; *pain* and *aching* between or un-

* [The intermittents that occur in the United States are chiefly of the simple form, although in some districts they often assume one or more of the complications above pointed out, when they are called *congestive* or *perniciou*s.]

In this form the symptoms take on a higher degree of severity; the cold stage is longer, and this is followed by feebler reaction in the second and serious congestion of one or more important organs. There may be loss of sensation and motion, or involuntary discharges of urine or feces; prostration; a *hippocratic* expression of countenance; and extremely languid circulation. These symptoms augment at each returning paroxysm, and the patient sinks under the attack; or he may linger on for months or years under a chronic affection of the liver, spleen, or other organs, and at length perish from such superinduced disease.]

der the shoulders, and in the loins; clay-coloured, or dark, watery, offensive, and otherwise morbid stools, the bowels being more or less disordered; dark-coloured and scanty urine; great debility and dyspnoea; and a weak, irregular, and frequent pulse. If rupture of the spleen occur, acute pain is suddenly felt in the splenic region; with diffused fulness, pain, and tenderness of the abdomen; small, frequent pulse, cold extremities, syncope, &c.

191. *B. Appearances in Fatal Cases.*—Death may take place either from overpowering congestion in the cold stage, or from rupture of the spleen; but it most frequently results from the superinduced disease of internal viscera, in connexion with exhausted organic nervous power, and sometimes with a morbid state of the circulating fluids, particularly in the adynamic and complicated forms. The chief lesions are seated in the liver, spleen, digestive mucous surface, and lungs.—*a.* The liver is often enlarged; its consistence being either increased or diminished; tubercular or purulent formations being, moreover, dispersed through its substance. Increased consistence or density, softening, purulent or tubercular formations, &c., may also exist separately, or in various combinations. Engorgement of the vessels with dark blood; distention of the hepatic ducts and gall-bladder, with a dark or greenish-black, thick, and viscid bile; thickening and injection of the ducts and gall-bladder, &c., are often observed in connexion with other lesions, but more especially with enlargement and softening of the substance of the viscus.—*b.* The spleen is often remarkably enlarged. MORGAGNI and GROTTANELLI found it to weigh eight pounds. In some localities it occasionally reaches an enormous size. On the Gold Coast of Africa it has been found double this weight in Europeans. I saw a case in which it was nearly eleven pounds. Its envelope sometimes presents appearances of chronic inflammation—is injected, thickened, and almost cartilaginous. Its consistence internally is rarely increased, but is most frequently diminished, its structure being friable, often almost diffuent, or consisting of a grayish-black semifluid substance, traversed by grayish fibrous shreds or fibres, and containing a sanguineous fluid of a purplish hue, or resembling wine lees. Instances have also occurred where adhesions have formed between the spleen and stomach, and between the spleen and colon in others; and the thick black blood of this viscus has been thus discharged into the digestive canal by ulceration, the matters passed from the bowels or thrown off the stomach presenting a blackish appearance (MORELLI, GASTÉ, BAILLY).—*c.* The digestive mucous surface is, in various parts—in the ilium, the cæcum, colon, stomach, duodenum, and œsophagus—more or less altered; often softened; injected with dark blood in patches or spots; and occasionally ecchymosed. The mucous follicles are frequently enlarged or inflamed in various parts. Ulceration is seldom observed, unless the disease has been complicated with diarrhoea or dysentery; and then this lesion, with thickening and softening of the coats of the bowels, especially of the cæcum and large bowels, and peritoneal injection, is generally observed.—*d.* The mesenteric glands are sometimes enlarged, and pre-

sent signs of obstruction or of chronic inflammation; more especially when lesions of the digestive canal are very remarkable.—*e.* The pancreas is occasionally enlarged, in some instances so as to obstruct, by its pressure, the common bile-duct.—*f.* The lungs are sometimes congested; but seldom otherwise changed, unless pulmonary complications have existed, when similar lesions to those described above (§ 53) are observed.—*g.* The brain and its membranes are not often much altered, unless in the comparatively rare cases in which coma has attended the fit; or apoplexy, or convulsions, or paralysis, has occurred in it; when congestion, injection of the pia mater, effusions of serum between the membranes, or in the ventricles, are the usual appearances.—*h.* Dropsical effusions, especially in the peritoneal cavity and cellular tissue; a pale, flaccid, or softened state of the structure of the heart; and more or less discoloration of a yellowish, or lurid, or dirty hue, are sometimes also observed, particularly in the more adynamic or protracted cases.

192. *vii. Prognosis.*—It is evident that an opinion as to the result of ague should depend especially upon the form and pathological condition in which it presents itself. As to these, enough has been advanced to enable the reader to form his own opinion. But, in the adynamic and complicated forms especially, and in protracted cases, the diagnosis should be more or less unfavourable, or at least very guarded. The circumstance, also, that, even in more favourable states of the disease, a very dangerous complication, or structural change, may occur, ought not to be overlooked—apoplexy, coma, paralysis, fatal congestions of abdominal or thoracic viscera, or rupture of the spleen, may supervene. The epidemic prevalence of the disease, and more particularly the influence of the locality, should be taken into consideration. In some situations, as in this country, ague is a comparatively mild disease; while in others, as in some parts of Italy, Austria, Hungary, Holland, low warm countries near the seacoast, &c., they are very serious maladies.

193. *viii. Diagnosis.*—Ague may almost insensibly pass into remittents, especially when it assumes the quotidian, double tertian, or triple quartan types, or the adynamic and complicated forms. But in the latter there is no complete apyrexia, and the cold and sweating stages exist very imperfectly. Hectic fever may be mistaken for either of these types. But in hectic the pulse is always accelerated in the intervals, while in ague it falls to a natural frequency. The febrile paroxysm of hectic commences in the afternoon, and the sweating stage is of long duration; in quotidians it begins earlier, its first stage is more severe, and its last is shorter, than in hectic. In ague the countenance is sallow, and the skin muddy or discoloured; in hectic the former is flushed, and the latter clear.

194. *ix. Causes.*—*A. Remote Causes.*—*a.* The predisposing causes of ague are, whatever depresses the physical and mental powers, more especially the causes fully described in the article on the *Causation of Disease* (§ 23, 27, 30, 33, and 35).—*b.* The exciting causes are chiefly, if not solely, exhalations from stagnant

water, or from marshy or clayey soils—from the various sources pointed out in the article on ENDEMIC INFLUENCES (§ 5, *et seq.*). Some authors, as M. BOISSEAU and Dr. GOOD, state that agues may arise from other causes than from malaria. M. BROUSSAIS believes cold and moisture sufficient to occasion them; and M. VAIDY supposes that they may be produced by the influence of the mind and by irritation. Dr. GOOD and Mr. COOPER refer to the rare occurrence of ague in London from the commencement of the present century to 1822 or 1823, and to the frequency of the disease since this time, as a proof of other causes than malaria being in operation. But as respects London and its vicinity, changes have taken place sufficient to explain the circumstance. The streets have been Macadamized, constantly watered, and covered by a wet, clayey mud; the soil surrounding the metropolis has been turned up for the purposes of building, &c., to a much greater extent since that period than formerly; and the muddy and marshy banks of the river have been unusually disturbed and inundated by the swell from the paddles of numerous steam vessels. It should also be recollected that the morbid impression may have been made upon the system many days or weeks before some determining or accessory cause—as exposure to cold, errors in diet, &c.—has occurred to bring it into action; and that, without such occurrence, no effect might have followed the impression produced by the specific cause of the disease. Besides, after an attack of ague, very slight causes—as cold and moisture, painful injuries, improper diet, indigestions, northeast or easterly winds, &c.—will bring it back after months or even years have elapsed; the fully developed disease leaving the frame remarkably liable to be affected by the diffusion in the air of the smallest proportion of marshy effluvia. That agues may be caused by *infection* has been believed by WERLHOF, CLEGHORN, MARX, FORDYCE, KORTUM, AMELUNG, AUDOUARD, and BAILY; and instances have been adduced by them in support of the opinion. Dr. BROWN states that he has met with cases which have led him to suspect that such was the fact. The *epidemic prevalence* of agues is, however, a better established fact, and has been admitted by most writers, the circumstances concurring to cause it being noticed in the article on EPIDEMICS.

[The late Dr. EDWARD MILLER, of New-York, first pointed out distinctly the existence of two kinds of febrile miasmata, the one consisting of poisonous exhalations from marshes and other soils, and the other of effluvia generated by the decomposition of personal and domestic filth. To the former he gave the name of *koino-miasmata*, usually designated by the term *marsh-miasm*—a principle resulting from the humid decomposition of vegetable and animal substances, contained either in marshes, the public filth of cities, or other soils and situations which furnish the materials. We hold, with Dr. EBERLE, and most other writers, that the only general cause of intermitting fever is *koino-miasmata*; and that intermittents are the simplest and, in general, the least dangerous of all the febrile diseases produced by this variety of miasmata. "In the vicinity of marshes," says EBERLE, "we may often trace

the various grades of miasmatic fevers, from the most violent and fatal to the simplest and mildest varieties, as we progressively remove from the focus of the deleterious exhalations towards the circumference of its influence. On the borders of the soil whence the miasmata emanate, if very copiously engendered, continued and very highly fatal cases of bilious fever will prevail; at a greater or less distance from this point, mild remittents will predominate; and, at a still more remote situation, intermittents will be most common. From the same circumstance, the first diseases which occur in miasmatic districts are generally intermitting fevers; as the season advances, remittents occur, and finally prevail with great violence; as the cold weather approaches, and the extrication of miasmata begins to diminish, intermittents again become more common, and the remitting fevers gradually disappear."

In the instances mentioned by RICHTER, EBERLE, and others, where true intermittents appear to have been caused by worms, suppressed catamenia and hæmorrhoidal discharge, the drying up of old ulcers, irritating food, &c., there can be no doubt that the malarious poison was already lurking in the system, and the presence of some local irritation was only required for the development of the disease.

It is a well-known fact that sudden changes of temperature increase the tendency of *koino-miasmata* to produce intermittents, as we find they are most prevalent when the days are very warm, and the mornings and evenings cool and damp. It is also well established, contrary to the opinion of MACCULLOCH, that many days or weeks may elapse after exposure to the malarial emanation before the disease manifests itself. A gentleman of our acquaintance, of the U. S. navy, was exposed several years since to the highly concentrated *koino-miasmata* which produced the fatal endemic among the residents of Thompson's Island, on the Florida coast, and, although he escaped the bilious remittent, which proved so fatal to many others, he yet had occasional attacks of genuine intermitting, for several years afterward, on exposure to cold, moisture, or great fatigue, although residing in a part of New-England where intermittents were never known to prevail.

If we take an impartial survey of the facts which have been collected on this subject, unbiased by theoretical or hypothetical views, we can scarcely help arriving at the conclusion adopted by the great mass of the profession, that a marshy soil, exposed to the action of solar heat, will develop that mysterious and subtle agent called *malaria*, and that this emanation, which is the result of the decomposition of dead organic substances, producing new compounds by the combination of their elements, gives rise to intermitting and remittent fevers. At the same time, we must admit that either the generation of miasmata, or their power of producing intermitting and remitting fevers, is greatly controlled by certain occult conditions wholly unconnected with any appreciable circumstances, with regard to atmospheric temperature or any other of the known requisites for the production of the poison. It has been observed in different parts of our own country, Italy, and other parts of the globe,

that, in certain localities, malarious fevers will sometimes disappear, or become extremely rare, for a number of successive years, and then gradually become more and more common, until, in the course of a few seasons, they assume the prevalence of an epidemic; and yet no material difference will be obvious between these periods of exemption from, and prevalence of disease, in relation to what are deemed the necessary concomitants for the production of miasmata. It is this fact which seems to have led a few modern writers to deny the influence of marsh-miasm altogether as the efficient agent in the production of febrile diseases. But we might as well deny the existence of the atmosphere, because our senses take no cognizance of its presence. Wherever, in a previously healthy district, a stream is made to overflow its banks, by the construction of a mill-dam, or other causes, there intermittent and remittent fevers are sure to prevail; and we could name numerous instances of this kind that have come under our own observation.

The fact has often been noticed, in different parts of the United States, that cultivation renders a climate more salubrious, although, for several years after the soil is cleared from its more bulky vegetable productions, its endemic diseases often become more severe than previously, and not infrequently assume an epidemic character. The soil, when exposed to the sun's rays, yields a more noxious effluvium than when protected from its action by a dense and exuberant vegetation. Every one is aware that a partially cultivated region is more sickly than a wilderness or country in the highest state of agricultural improvement, and that the soldier, the hunter, and the wild borderer suffer less from disease than the actual settler. But if these febrile diseases in question were owing merely to sensible changes in the atmosphere, as heat, cold, moisture, &c., we see no reason for such a difference in the two cases; but it is easily explained by the hypothesis of organic decomposition, occasioned by turning up to the action of our intense summer heats the marshy ground, containing the accumulated vegetable and animal deposition of years. Thus Dr. RUSH, in speaking of the endemics of Pennsylvania, remarks that from this cause intermittents and mild remittents were converted into bilious and malignant remittents and destructive epidemics, and that it was not until after years of cultivation that general salubrity followed. Dr. HEUSTIS, of Alabama, alludes to this same fact in the following remarks: "For the first three years after my arrival in this state, in 1821, 1822, and 1823, the country was dreadfully sickly, and the mortality great and appalling, more especially near the rivers. The whole country was then new, and the warmth and humidity of the seasons caused a great and rapid decomposition in the recently-exposed and turned-up vegetable matters. Many flourishing towns upon the rivers, which had risen up, as it were, by the hand of enchantment, received a sudden check, and became suddenly almost totally abandoned, from death and desertion. Strangers from every part of the United States, invited by the fertility of the soil, the beauty of the country, and the serenity of the climate, brought together

by fortuitous association, with foreign and unseasoned constitutions, were suddenly swept off by thousands. In many families there were not well persons sufficient to attend upon the sick and dying. Never have I known a time of such general calamity."

Dr. FERRY, in his elaborate work, "*The Climate of the United States, and its Endemic Influences*," has particularly noticed the fact that a region of primary formation, with a sandy soil and an undulating surface, is exempt from intermittents, as *New-England, New-Brunswick, and Nova Scotia*;* as the surface is chiefly composed of the *debris* of sandstone and other primitive rocks, forming a coarse and gravelly substratum, through which the rain percolates and flows off; whereas districts of country where the geological structure consists of tertiary and cretaceous secondary deposits, with a deep, rich, clayey, and absorbent soil, especially if low and flat, with an argillaceous substratum impervious to water, yielding by evaporation nearly all the rain which falls upon it, thus carrying into the atmosphere a portion of decayed animal and vegetable matter, is peculiarly exposed to intermittents, as the Valley of the Mississippi and the tide regions of the Middle and Southern States.]

195. B. *The proximate Cause or Nature of Agues*.—a. WILLIS attributed agues to a periodic fermentation in the blood; F. DELEBOE to the absorption of an acid fluid from the pancreas; and BORRELLI to irritation of the nerves, by an acrimony of their fluids. TORTI had recourse to something out of each of these three doctrines. BOERHAAVE and STOLL came nearer the truth, in viewing them as an affection of the nerves that admitted of no farther explanation. SELLE and J. P. FRANK considered them to result from a peculiar irritation of the nervous system, and more especially of the nerves of the digestive organs. Dr. REIL and M. ROCHE have entered into long and intricate explanations of the periodicity of the morbid action; the former imputing it to the intermittent character of all the organic and nutritive functions; the latter to the periodicity of the exciting cause, and to a disposition of the organization to repeat the phenomena it has several times experienced. M. BROUSSAIS attributed intermittents, as well as other fevers, to inflammatory action in the digestive mucous surface; and modifications of the doctrine have been offered by some who profess to belong to the same school—inflammatory irritation in some

* [Dr. HOLMES, of Boston, in his Prize Dissertation on the Intermittent Fever of New-England, has shown that this disease prevailed at Boston in 1671, and also at New-Haven, on its first planting. In regard to the latter place, the historian remarks, "that upon these southern coasts of New-England it is not unusual, as in Virginia, there being sunny years when there is nothing considerable of it, nor ordinarily so violent and universal." Dr. HOLMES'S Dissertation is accompanied with a map of New-England, showing the localities in which intermittent fever has been at any time indigenous; and we notice but twenty-seven such points, including three on Lake Champlain, over the whole of this extensive territory. One half of these localities are on the Connecticut and Housatonic Rivers, which have rich alluvial tracts; and there is a narrow alluvial tract also along the shore of Long Island Sound, between the mouths of these two rivers, where intermittents formerly prevailed; at present, however, owing to the drying up of marshes, and the more perfect drainage of the soil, this class of diseases has almost entirely disappeared from the region.—(See HOLMES'S Prize Dissertation on the Intermittents of New-England, and FERRY on the Climate of the United States, and its Endemic Influences.)]

part of the digestive, or even of any of the abdominal organs, having been assigned by BOISEAU, MONGELLAZ, &c. M. BAILLY, taking into consideration the circumstance of the localities of agues being those in which epizooties most frequently occur, and observing that, while the latter is always continued, the former is periodic, although the causes are manifestly the same, has come to the conclusion that the inter-mittent action is owing to the periodical change from the vertical to the horizontal position, which man only experiences. All these hypotheses, however, fail of fully explaining, not merely the periodicity of the several states of ague, but also their difference of type. Those who espouse the doctrine as to the origin of intermittents in inflammation of some part of the digestive organs, are met by the fact urged by TOMMASINI and others, that true inflammation is not periodic, but continued. While some endeavour to get rid of the difficulty by giving to the morbid action the name of inflammatory irritation. If by this latter term be meant a lower or slighter grade of increased vascular action of a part causing irritation of its nerves, a sort of amalgamation of the inflammatory and of the nervous doctrines is manifestly attempted, more or less of either being assumed, as the circumstances of particular forms of the disease may seem to require. The facts of M. MONGELLAZ as to the intermittent character of some forms of inflammation, and that recorded by Dr. ELLIOTSON, in which the bites of leeches became irritable and inflamed during a fit of ague, certainly do not prove the cause of ague to be inflammation, but merely what *à priori* reasoning, and a full recognition of the phenomena connected with the disease, might suggest, namely, that either pre-existing or superinduced inflammation, if it be not sufficiently intense to supersede the intermittent type, will be aggravated during the paroxysm, especially the hot stage of it.

196. *b.* From attentive observation of the disease in localities the most fertile in its cause, I conclude, (*a*) That paludal exhalations act in the manner already stated (§ 95), and especially affect the nervous system of organic life; (*b*) That, consequently, the organs, which are especially actuated by this system, experience the chief effects of the morbid action; the functions of circulation, calorification, digestion, secretion, assimilation, and excretion, evincing the principal disorder, and the organs performing these functions the chief lesions in protracted or fatal cases, as shown by the appearances described above (§ 191); (*c*) That where, owing to the speciality of the exciting cause, and the intensity or continuance of its operation, its peculiar impression is fully made upon the organic nervous system, either pre-existing or superinduced disease, inflammatory or even structural, if existing in a slight degree, or in a chronic form, will not supersede the periodic or intermittent type; but if such disease be acute or active, or associated with high irritability of fibre and vascular plethora, the type will be either continued or remittent, or change from the intermittent to either of these types; (*d*) That a similar conversion of type will result from contamination of the circulating and secreted fluids when it reaches a considerable height; (*e*) That in localities product-

ive of malaria, the slighter diseases, especially those consisting chiefly of disordered function, or of altered sensibility, assume more or less of the intermittent type; only the most acute maladies, or those of altered structure, or attended by contamination of the blood, assuming a purely continued course; (*f*) After viewing the effects of malaria arising from the various sources pointed out in the article on ENDEMIC INFLUENCES (§ 5) on the human frame, in the various epochs of existence; after considering the nature of the agents by which such effects may be counteracted or removed; and after the experience of the primary and consecutive action of this particular cause upon my own system, I believe that it has a primary, specific, and uniform tendency to impair the energy of all the vital manifestations; (*g*) That the morbid impression having been made by it, and the formative changes having reached that pitch necessary to the production of the cold stage, the consecutive alterations proceed in the manner stated above (§ 101), but much more rapidly and imperfectly, and in a way insufficient to efface the primary morbid impression made by the cause upon the organic nervous system; consequently, the morbid state of this system is little affected by the successive changes characterizing the paroxysm; and continuing the same after, as it was before the fit, is equally efficient in operating a return, after an interval of varying but of short duration, of the same succession of phenomena.

197. From this last inference, and from previous observations, it will appear that each paroxysm is a complete febrile seizure, the successive and critical changes of which are insufficient in most instances for the restoration of health; that the disorder remaining after the subsidence of the fit is in every respect similar to that characterizing the formative or premonitory stage of fevers generally; and that it is necessary, to the cure of the disease, that it should be treated in a nearly similar manner. This view is supported by the fact of relapses of continued fevers being common, when their duration is shortened by an active or very depletory treatment at their commencement. As to the periodicity of the return, or the relapse, of the febrile paroxysm in ague, it seems to be the consequence of the specific nature of the exciting cause, of the morbid impression made by it upon the organic nervous system; and of the continuance of this impression, or, rather, of the morbid state it occasions; for, as long as the morbid condition of this system is uneffaced by treatment, change of air, or by the full evolution of critical changes, it operates a return of the febrile paroxysm after an interval which may be prolonged or shortened by the state of vital power, and peculiarity of temperament or diathesis. As to any farther explanation of the matter, I can add nothing to what is given in the article DISEASE (§ 155-157).

198. *c.* The consecutive changes, and the low or complicated forms of ague, are manifest consequences of repeated seizures, or returns of the disease, in connexion with predisposition, and with the intensity and continued operation of the cause. Owing to the impaired tonicity of the vessels consequent upon depressed vital power, and to the frequent returns or severity of the cold stage, congestions, and, subsequent-

ly, torpor, obstruction, and organic change of internal viscera, often take place, the large vessels becoming engorged, and the cavities of the heart itself sometimes softened, or distended and enlarged. The changes observed in the digestive mucous surface are chiefly attributable to the same causes, and to the morbid condition of the biliary and pancreatic secretions. The low or adynamic forms are evidently results of the intensity of the cause in relation to predisposition and the state of system—of the continued operation of the cause, as when the patient cannot be removed from the locality productive of the malaria—of complications supervening in the course of the disease, and of changes in the circulating and secreted fluids.

199. *x. TREATMENT.*—Ague is treated with comparative ease and success when the patient is removed into a pure air, and when it is neither complicated nor of a low grade. If removal is impracticable, it is often very difficult to manage, and dangerous as respects its consequences or sequelaë, although an unfavourable result may be long deferred. The treatment, however, in either case naturally divides itself into that applicable, *a.* to the *paroxysm*, *b.* to the *interval*, and, *c.* to the *effects* often consequent upon repeated attacks.

200. *A. During the paroxysm.*—The principal intentions that should be kept in view in the treatment of the fit, are, 1st, to guard important viscera from injurious congestions during the cold stage; 2dly, to protect internal organs from the effects of excessive or inflammatory reaction in the hot stage; and, 3dly, to promote an abundant perspiration in the sweating stage, whereby the vascular system and the internal viscera may be relieved.

201. *a. Treatment of simple ague.*—The means advised by STOLL are here generally sufficient. He employed warm diaphoretics and external warmth in the cold stage; refrigerants during the hot stage, and blood-letting if the patient was plethoric; and diluents and diaphoretics in the sweating stage. In some cases, a warm emetic (F. 198, 402), administered at the commencement of the cold stage, is of essential service, especially when the biliary secretion requires to be promoted. *Emetics* at the beginning of the fit have been strongly recommended by DE BOURGES, CLEGHORN, HUXHAM, MURRAY, CULLEN, TRNKA, OTTO, and THOMSON: but, although they may be serviceable in any of the forms of the disease, it is chiefly in the simple ague that they are unattended by any risk. They are contra-indicated by tenderness in the epigastrium or hypochondria; but in other circumstances they usually shorten the cold stage, and render the paroxysm milder. In slight attacks, when no particular viscus is predominantly affected, and the patient is neither very plethoric nor much debilitated, and the disease has not been of long continuance, little farther than diluents and diaphoretics, to promote the sweating stage, is necessary, until the intermission; when the usual means to arrest the disease are to be employed.

202. *b. In the more inflammatory form*, and in plethoric or athletic persons, especially in spring, *blood-letting*, general or local, or both, is necessary; if determinations to the lungs, head, or liver be remarkable, it should not be dispensed with, and still more especially if the paroxysms

be prolonged and the apyrexia incomplete, as these circumstances indicate the supervention of visceral inflammation. In these cases the depletion may be practised in the hot stage, especially at its commencement, and when important parts are threatened by the severity of reaction, although in some instances it is better deferred until the interval, when the state of disorder and the effects of the evacuation may be more justly estimated than during the tumult of reaction. Dr. MACKINTOSH, however, advises it to be resorted to in the cold stage; and in cases of the kind now being considered, or when congestion is great in plethoric persons, it may be safely and beneficially practised. But in ordinary circumstances, or in the lower forms of the disease, I believe it to be a hazardous remedy in this particular stage.* This opinion is substantially the same as that which Dr. W. STOKES has stated, after the full trial which he and Mr. GILL gave the practice. Cooling diaphoretics and diluents with diuretics, especially the potassio-tartrate of antimony, nitrate of potash, liquor ammoniæ acetatis, &c., are all the additional means usually required.

203. *c. In the low or adynamic form of ague*, a warm emetic (F. 198, 402) should be given only at the commencement of the cold stage, and when indications of inflammatory action in the stomach or liver are absent. *Warm diaphoretics* and antispasmodics in this stage, the *warm bath*, followed by frictions of the surface and of the extremities, and the *vapour bath*, often shorten the hot stage, and give rise to a profuse and salutary perspiration. In several countries, the vapour bath at the beginning of the fit constitutes the chief, and almost the only, remedy against the disease, the copious perspiration following it removing internal congestions and proving a perfect crisis. If the paroxysm be attended by great fulness and tenderness at the epigastrium and hypochondria, *local depletions* should be resorted to in a decided manner, and *hot fomentations* afterward applied. Where this practice has been already employed, or where the states of vascular action and vital power contra-indicate it, which, however, will seldom be the case as long as the disease retains its periodic type; or even immediately after local depletions, a *mustard poultice* or the *warm turpentine epithem*, should be placed over the stomach and abdomen, and retained or renewed until it cannot be longer endured, or until a copious perspiration is thereby produced; the latter application, especially, causing an abundant and salutary sweat. During the course of the paroxysm, *diaphoretics* should be freely administered with small or moderate doses of *opium*; camphor, ammonia, aether, warm wine whey, &c., may be also used with this intention. If great irritability of the stomach be present, the external means just advised will relieve it, or a large dose of *calomel* with *opium*, or with *camphor*, also, will have the effect.

* [We have practised bleeding in the cold stage of intermittents, in former years, to considerable extent; but in the form of the disease as it prevails in this part of the country we have found it unnecessary, and therefore have long since abandoned it. There is no doubt that in the apoplectic or congestive state of vital organs—as is frequently met with in the southern parts of our country—this treatment will be found highly useful and appropriate. For the advantages attending it, as well as the circumstance under which it should be resorted to, see MORTON'S edition of MACKINTOSH'S "Practice of Medicine," Phil., 1844.]

204. *d.* The *paroxysm of complicated ague* is often irregular, the hot and sweating stages imperfect, and the intermissions incomplete, the disease assuming the characters commonly called *sub-intrant* (§ 180). The cold stage is also frequently severe or protracted. In these, particularly at the commencement, the *warm or vapour bath* is a valuable remedy, especially in the lower and more congestive forms. If the complication be of an inflammatory nature, and if the lungs, liver, stomach, or head be predominantly affected, general or local depletions, or both, should not be dispensed with. The circumstance of the hot stage being imperfectly developed is no proof that internal inflammation or structural change may not be present; but is the strongest evidence of the existence either of these or of congestion, and the most conclusive argument for vascular depletions and the external applications mentioned above (§ 203). If inflammatory excitement be developed within the head during the fit; or if delirium, or coma, with increased heat of the scalp, be present, the affusion of cold water on it, or cold applications, should not be neglected. If the disease be not only complicated, but also adynamic, a combination of the means advised in this and the preceding paragraph, according to the predominance of vascular determination and of impaired vital power, will be necessary. If *diarrhœa* or *dysenteric symptoms* exist, the internal and external means already advised (§ 203), especially the vapour bath, the warm epithems, the combination of diaphoretics with opium, &c., will be most appropriate.

205. *B. Treatment in the Intermissions.*—Having, by the above means, prescribed appropriately to the different forms and states of the disease, conducted the paroxysm to a safe conclusion, the next object is to *prevent its return*. Our endeavours to fulfil this intention should be equally strenuous in all the forms of ague, for, although the fit has been slight, a much severer one may follow. Even a comparatively and apparently slight paroxysm may produce almost irremediable mischief in an important viscus; and however mild, its frequent return often occasions serious structural change.

206. *a.* After the paroxysm, and especially if the disease be recent, an *emetic* should be administered, and its operation promoted by diluents. If it have been given at the beginning of the fit and acted freely, it may be dispensed with now. But it should not be administered if symptoms of determination to the brain, or of inflammatory action of the stomach, liver, or spleen, be present. After its full operation, a large dose of *calomel*—from ten to twenty grains—ought to be given, and, about four or five hours afterward, a *purgative* draught. If these act not sufficiently in a few hours, a cathartic enema should be exhibited. Having removed local congestions or general plethora by *depletions*, and evacuated morbid secretions and fecal accumulations, *cinchona* or the *sulphate of quinine* may be exhibited to prevent the return of the fit. These are almost indispensable preliminaries to the quinine or bark, especially in the complicated and congestive forms; for, without them, it will either not be retained on the stomach, or, if retained, will convert congestions, or slight forms of inflammatory irritation, to active inflammation, or to structural change.

207. *b.* If the stomach remain irritable after the fit, or if pain or tenderness at the epigastrium, with other symptoms of inflammatory irritation or congestion be present, the full dose of calomel, either alone or with opium, ought not to be withheld; for, as Mr. ANNESLEY has shown by his instructive experiments (*Sketches of the Diseases of India, &c.*, 2d ed., p. 374), this remedy has the effect, in large doses, of diminishing vascular action in the stomach and in the upper portions of the intestinal canal. When prescribed after depletions, general or local, and the external measures described above (§ 203), the internal disorder will be removed, and the quinine, which is almost indispensable to the arrest of the disease, will be retained without uneasiness. If *quinine*, especially its sulphate, cannot be procured, the *bark* in substance, in large doses, must be substituted, and conjoined with ammonia, or camphor, capsicum, or opium, &c., shortly before the expected accession of the paroxysm. The decoction with serpentaria, the extract or the compound tincture, may likewise be employed, but chiefly as an adjuvant. In every state of the disease, during the exhibition of quinine or bark, the excretions demand attention; a full dose of calomel, especially in warm countries, ought to be given from time to time, and followed by active purgatives and enemata. If the alvine excretions, and the biliary and other secretions, be not freely promoted during the exhibition of bark or quinine, great risk of superinducing inflammation, congestion, obstruction, and enlargement of the abdominal viscera, or violent determination to the head, will be incurred.

208. *c.* If the disease have been of long standing, congestion, obstruction, or enlargement, or chronic inflammatory action in some abdominal organ, has probably taken place. In these, the immediate use of *bark* or of quinine will be of doubtful efficacy. The treatment should, therefore, be commenced with sufficient local depletions, followed by the external means already noticed (§ 203), and by the repeated exhibition of purgatives, a full dose of calomel having been premised and given again at bedtime, as circumstances may require. This treatment is especially indicated in those more severe cases in which the intermissions are imperfect, the tongue much loaded, and fulness, distention, or uneasiness in the upper regions of the abdomen are complained of. Morbid secretions and local disorder being removed by these means, the sulphate of quinine or bark should be prescribed, at first either with purgatives, or alternately with those which will act decidedly. It is chiefly to a neglect of this practice that complications and unfavourable consequences so often follow the use of bark, quinine, or of arsenic, for these often interrupt excretion, and over-excite and inflame loaded, obstructed, or congested organs.

209. *d.* When the patient cannot be removed from the continued influence of malaria during the treatment, we must, nevertheless, trust to the energetic employment of the above means, thereby removing morbid secretions, improving the secreting and excreting functions, subduing local disease, and making a powerful tonic impression upon the organic nervous system and digestive organs. With this last view, the doses of quinine or bark should be as large as the

stomach will bear, and exhibited shortly before the expected return of the paroxysm, or immediately after the sweating stage, when the intermissions are short or incomplete.* Its effects will often be promoted, and it will not so readily offend the stomach, if it be given with camphor, opium, capsicum, pepper, cinnamon, &c., according to the peculiarities of the case. In these circumstances, as well as when the disease presents an adynamic form, or is more or less complicated, especially when the tongue is much loaded, or flabby and pale, the paroxysms prolonged, and the intermissions imperfect, calomel in full doses at bedtime, either alone or with JAMES'S powder or opium, a warm stomachic purgative the following morning (F. 216, 266), thereby procuring three or four evacuations daily, and the quinine alone, or combined in the manner just stated, during the intermissions, or until the accession of the cold stage, are most to be depended upon. If the spleen be much enlarged, and the patient subjected to the enervating influence of malaria, calomel must be given with greater caution, and its effects watched. In such circumstances, the pur-

* [We think it unsafe to administer quinine in the manner above recommended, namely, in doses "as large as the stomach will bear," for we have often seen injurious consequences result from inordinate doses of this article, even in cases where no particular uneasiness was excited in the stomach by its administration. Within a few years, the practice has been introduced of giving much larger doses of this article than practitioners were formerly in the habit of administering; but the advantages resulting from the practice are not so obvious. It is not unusual to hear of tinnitus aurium, cephalalgia, loss of vision, and other affections following its use, when given in very large quantities. TROUSSEAU mentions the case of a man who was rendered insane by having taken 24 grains of quinine in one day ("Treatment on Therapeutics and Mat. Medice," vol. ii., p. 217). In another instance, a man took 48 grs. sul. quinine for the relief of asthma. Four hours after taking the medicine he experienced noise in the ears, dulness of the senses, vertigo, and severe vomiting; and seven hours afterward he was blind and deaf, his mind wandered, and he was unable to walk, the vomiting of bile still continuing. TROUSSEAU mentions that 15, 20, or 25 grains in a day often produce deafness and other unpleasant symptoms. BRETONNEAU calls attention to the danger of giving quinine in large doses, remarking that it causes a distinct febrile movement, preceded by tinnitus aurium, deafness, and a species of intoxication. He also states that it causes diarrhoea, and, when applied externally, it irritates, produces considerable local pain, and unequivocal signs of inflammation. At the Hospital La Charité, of Paris, a patient recently died from swallowing a single dose of 76 grains of quinine, and a smaller quantity produced the same result at Hospital Cochin. The symptoms were, pain in the head, then tinnitus, and general agitation, followed by delirium and coma; amaurosis has also followed from taking it in large doses; and death, following its use in acute rheumatism, became so frequent, some time since, in Paris, as to excite public discussion.—(For a discussion which followed the reading of a paper on Quinine before the French Academy of Medicine, see *London Lancet* for Feb. 25, 1843). After a full discussion of the subject, the French Academy have decided that the same therapeutic effects may be obtained by the ordinary doses of the remedy as by the large doses. For a case of poisoning by two drachms of quinine, see the *Provincial Med. Journal*, Dec. 23d, 1843. In the *Am. Journal of Med. Sciences* for April, 1844, it is stated that "M. RECAMIER ordered for a man, 26 years of age, labouring under acute rheumatism, 48 grains of sulph. quinine, in 12 powders, to be taken every hour. The next day 72 grains were ordered, six to be taken every hour; but after the eighth dose the patient was suddenly seized with a violent agitation, followed by furious delirium, and died in a few hours. On examination, evidences of severe inflammation of the cerebral membrane were discovered." We might cite numerous other cases and authorities to prove the danger of administering this potent drug in large doses; but the above will suffice to caution the physician against adopting a mode of practice fraught with such hazardous consequences to the lives and health of his patients.—(See a paper "On the Use and Abuse of Medicine," in the *Boston Med. and Surg. Journal*, vol. 32, p. 249.)]

gatives selected should be prescribed with a tonic, as the sulphate of quinine with the sulphate of magnesia; the decoction of bark with the sulphate of magnesia and the tincture of senna, or with the compound decoction of aloes; or the compound infusion of gentian, or the infusion or decoction of cinchona with the infusion of senna and warm tinctures.

210. *c.* In cases of protracted, irregular, complicated, and reduplicating ague, as well as in those of a low form, and in those occasionally following remittents or continued fever in warm climates, the *liver*, *spleen*, and *digestive mucous surface* are generally more or less diseased. The intermissions, even when distinct or perfect, are accompanied with great languor, general uneasiness, want of appetite, a foul or loaded tongue, a sense of oppression in the epigastrium and hypochondria, and unhealthy countenance and skin, the upper abdominal regions being often full, tumefied, or tense. Here, local depletions, if they be not contra-indicated, and calomel, followed by purgatives, as already advised, should precede the exhibition of quinine. We must not, however, wait for the removal of these signs of congestion and obstruction before resorting to quinine or the bark; for the patient may sink too low, and vital power become insufficient to resist the progress of disorganization. It should, therefore, be given as soon as free evacuations have been procured, and the tongue begins to clean. As long as the tongue is moist, the circumstance of its being loaded must not prevent the administration of quinine, if it be otherwise indicated; but it should be conjoined with a purgative, or the latter ought to be given in the intervals between its exhibition. In ordinary circumstances, I have prescribed calomel, or blue pill, with or without opium, at bedtime; an active and stomachic cathartic early in the morning, and quinine or the bark in a large dose, with camphor, &c., shortly before the return of the fit, or soon after the subsidence of it, when the intermissions are short.

211. *f.* When the *liver* becomes enlarged, and more especially if it be also tender or painful on examination, *local depletions*, followed by *fomentations* and *poultices*; in some instances by the *turpentine epithem*; in others by *blisters*, and a judicious employment of *purgatives*, and of the *bark* or *quinine*, as circumstances may warrant, are indispensable. In most instances of enlargement of the liver consequent upon ague, purgatives, if appropriately combined, and firmly persisted in, have a most remarkable and beneficial effect. If enlargement be connected with torpid function, or if the latter only be present, the *mercurial ointment with camphor* may be rubbed over the hypochondrium; or a large plaster formed of the *emplastrum ammoniaci cum hydrargyro*, or of it and the *emplastrum picis*, or the warm *nitro-hydrochloric lotion*, may be applied over the hypochondrium and epigastrium. An *issue* or *seton* in the right side may also be resorted to if the above fail. In cases of enlargement of the *spleen*, in addition to the use of tonics and purgatives conjoined, the *turpentine epithem*, or the *plaster*, or the *lotion* just mentioned, may also be tried. In all cases of ague, and especially in the protracted, the adynamic, and the complicated, the excretions, particularly those from

the bowels, should be carefully and daily examined; and from these, from the appearance of the tongue, the hue of the skin and countenance, and from the state of the abdominal regions, should our therapeutical inferences chiefly be drawn. The presence, however, of enlargement of the liver and spleen, especially of the latter, although requiring other and appropriate remedies, must not prevent us from having recourse to quinine; for the ague must be removed as soon as possible, in order that its repeated return may not increase the local affection; and as soon as this object is attained, the local disorder will the more readily yield to proper means.

212. *C. Remedies employed to prevent the return of the fit.*—The most certain of these, quinine and bark, have been already noticed. But numerous other substances have a similar operation, although in a much slighter degree. Indeed, any substance which stimulates, in a more or less permanent manner, the nervous system of organic life, tends to efface or to supersede the morbid state or impression made upon this system by the exciting cause of the disease. Hence stimulants and antispasmodics have a febrifuge action, although in a much less degree than bark; and even affections of the mind of an exciting kind exert a similar influence; while the depressing passions increase the malady, tend to complicate it, and cause an earlier as well as a severe return of the paroxysm.

213. *a. Cinchona, or Peruvian bark,* was brought to Spain in 1632, and came into use in England in or about 1655. It soon afterward fell into discredit, so that CROMWELL died of ague without the exhibition of it. According to SIR G. BAKER, DRs. PREJEAN, BRADY, and WILLIS countenanced its employment; but STURMIUS (*Febrifugi Peruviani Vindicium, Pars prior*. Antw., 1659) first established its reputation. SYDENHAM, MORTON, and LISTER extended it in this country, and ascertained the circumstances in which it was most beneficial. The preparation of *quinine* and *cinchonine* from the bark, and the combination of the former with sulphuric acid—the *sulphate of quinine*—has been one of the greatest triumphs of pharmaceutical chemistry. This latter substance has, since 1820, in most instances of ague, superseded the bark, as the small dose in which it is exhibited—from two to ten grains—renders it less offensive to the palate and stomach. After morbid matters have been evacuated from the bowels, it may be given in a full dose—six or eight grains—immediately after the fit, or shortly before its return; or a large dose followed by smaller doses every three or four hours; or the latter by the former may be exhibited.* Inflammatory or congestive complications do not contra-indicate its use, as shown above, if the requisite evacuations have been practised; for, in ague especially, the almost simultaneous employment of depletions, purgatives, and quinine is often both appropriate and beneficial. The quinine or

bark should be continued, and the digestive functions carefully attended to, for a considerable time after the disappearance of the fits. In cases where even the sulphate of quinine cannot be taken in sufficient quantity without offending the stomach, M. DE MARTIN (*Rév. Médicale*, Sept., 1827) has shown that it may be applied efficaciously to the skin denuded of the cuticle, having reduced it to very fine powder and mixed it in cerate.* It thus is absorbed into the circulation, and acts upon the organic nervous system through the medium of the vascular system, with which the former is so intimately associated.

214. *b. Dr. FOWLER'S solution of arsenic* holds the next place to quinine or bark in the cure of ague. Dr. BROWN advises it in preference to quinine when ague is attended by inflammatory determinations. This may be the case, but I have found quinine, employed as above directed, or given in solution with a neutral sulphate, as that of soda or magnesia, equally beneficial in such cases with the arsenical solution. The dose of this solution should not exceed twelve drops, given every four hours during the intermission, either alone, or with a few drops of laudanum, or with the tincture of hyoscyamus. The *sulphate of zinc*, in doses of two or three grains every four hours, or as much as the stomach will bear, is also efficacious; but chiefly in mild cases, or when inflammatory action is present. It was much praised by SIR G. BLANE, and is the best emetic that can be prescribed in the disease. The *hydrochlorate of ammonia* is also capable of arresting the fits, and is best given in an infusion of cinchona, or of orange peel, or of cloves, in as large doses as the stomach will retain. It was much employed by MUYS, WERLHOF, SENAC, PRINGLE, and BROCKLESBY, and is most appropriate to the inflammatory states of ague. MORTON gave a scruple of *chamomile flowers*, ten grains of salt of wormwood, and as much of the calx of antimony, every sixth hour; Dr. HEBERDEN, *myrrh* in large doses; and Dr. CULLEN, *tormentil* and *gentian with galls*.

215. *c. The preparations of iron* have been employed, especially the *ferris ammonio-chloridum*, by STAHL, TRILLER, HUXHAM, and HARTMANN. The *cyanide of iron* has lately been strongly recommended by ZOLLICKOFFER, who prescribed it in doses of four grains twice or thrice daily. The trisnitrate of *bismuth* has likewise been given by HENKESEN; *phosphorus* with bark, by HUFELAND; the flower of sulphur, in full or large doses, by RIVERIUS and DE HAEN; powdered *carbon*, in doses of two drams, shortly before the fit, by PIERQUIN; *ammoniated copper*, by M'CAUSLAND, BIANCHI, and BRERA; *DIPPEL'S animal oil*, by WERLHOF and HALLER; and *cobweb*, by PAULINI, GRANT, and JACKSON. I have

* [After preparing the system, by blood-letting or emetico-cathartics, for the quinine, we usually prescribe it in doses of two grains every hour, commencing three or four hours preceding the paroxysm; or one grain every half hour, beginning six hours before the paroxysm. These doses will, in ordinary cases, prove amply sufficient, and no injurious consequences follow their administration.]

* [A plaster may be formed of the sulphate of quinine by mixing five drachms with four ounces of simple cerate, and spreading of the thickness of a blistering plaster; or 40 or 50 grains may be mixed with two ounces of lard, and a portion of this rubbed in on the armpits and groins three times a day. The acetate, citrate, ferrocyanate, muriate, nitrate, and the phosphate of quinine have all been used in the treatment of intermittents, but they possess no advantage over the sulphate. The Pharmacopœia of the United States had formerly a *Quinia Sulphas Impurus*, which is made by evaporating the liquor poured off the crystals of sulphate of quinia, to the consistence of a pillular mass, and has been known under the name of *Extract of Quinine*; twenty-four grains of this, given between the paroxysms, has generally arrested an intermittent.]

given the *chlorate* of potash with benefit in the decoction of bark, and in the infusion of valerian, with a little tincture of capsicum. *Charcoal* was employed in ague by JACKSON, CALVERT, and TULLY (*Edin. Med. and Surg. Journ.*, vol. x., p. 15, 403), and was found of service when the gastro-intestinal mucous surface was much affected.

216. *d.* The barks of various astringent, tonic, and aromatic trees and plants have been tried, both before the introduction of the *cinchona* into practice, and subsequently as a substitute for it. The most esteemed of these are the *willow bark*; this substance was prescribed by CLOSIUS, GUNZ, STONE, RESENBLAD, THILENIUS, HILSCHEER, JAMES, STYX, and WHITE; the *angustura bark*, by WILKINSON and BRANDE; the bark of the *Sicotetia febrifuga*, by ROXBURGH; *cascarilla bark*, by HECKER and others; the *pomegranate bark*, by REHMANN; the bark of the *Ilex aquifolium*, by ROUSSEAU; the barks of the *chestnut-tree*, of the *elm*, and of the *oak*, by various writers; and the *carapa* bark of South America, which has been said to have succeeded where *cinchona* had failed. Various other stimulating, aromatic, and tonic vegetables have been employed, and some of them are still in use, either as adjuvants of the bark, or of quinine, or in the form of infusion, as vehicles for other substances. The most useful of these are *quassia*, *serpentaria* (LYSONS, &c.), *Calamus aromaticus* (GULBRAND, MOSELEY, and HORN), *arnica* (AASKOW, &c.), and *Capsicum annuum* (BERGIUS and myself). *Ammonia*, *camphor*, the *athers*, *castor*, *musk*, *myrrh*, *ginger*, *black pepper*, *garlic*, *mustard seed*, &c., have likewise been employed, chiefly as adjuncts to more permanent stimulants and tonics, or in large doses with opium, shortly before the accession of the fit. Of these, the most serviceable are *camphor* and *ammonia*. *Piperin*, the active principle of black pepper, has been lately employed by BERTINI, GORDINI, and others, in doses of one or two grains, to arrest the paroxysms; and *salacina*,* an alkaloid found in willow bark, has been very recently recommended as a substitute for quinine. IGNATIUS's *bean* and the preparations of *nux vomica* were formerly used against ague, by PAULLINI, BOURIEU, AASKOW, CULLEN, HORN, and FOUQUIER; and their active principle, *strychnia*, may also be found useful in the lower grades of the disease, especially when complicated with *diarrhœa*; in which, as well as in the *dysenteric* complication, the tormentil, *ipeacuanha*, DOVER'S powder, the hydrargyrum cum creta, and opium are useful adjuncts to other medicines.

217. *c.* The *mineral acids*, especially the *hydro* and *nitro chloric*, have been given in the decoction of bark, especially when the liver or spleen have been enlarged. I have employed the latter in such cases; and, in a state of very weak solution, as a common beverage for the patient during the intermissions. The *sulphuric acid*, similarly exhibited, has been rec-

ommended by STORCK and JOERDENS. It is a useful adjunct to the sulphate of quinine. The *citric* and *acetic acids* have been directed, but chiefly as an addition to the drink taken in the hot stage, in which, however, acid drinks should not be taken, as they tend to diminish the perspiration, which is more or less salutary. *Ethers*, especially the sulphuric and hydrochloric, have also been prescribed in large doses, either alone, or with camphor and opium, shortly before the paroxysm, with the view of shortening the cold stage (HOFFMANN, CLUTTON, and DAVIDSON). The *volatile alkali* has been likewise employed, similarly combined, and with the same intention; and the various preparations of *antimony* have been given before and during the paroxysm, and throughout the intermissions, in conjunction with bark or other febrifuge tonics. *Alum* was at one time much used in ague, it having been recommended by ETTMULLER, LINDT, MUELLER, and others. LANGE and DE MEZA prescribed it with aromatics and sulphuric acid, or æther; and ADAIR, with cinchona. The *sulphate of iron* has been tried by several writers, but is of inferior efficacy to the sulphate of zinc, or to the *tincture of the sesqui-chloride of iron*. The *Prinos verticillatus*, and the bark of the *Prunus Virginiana*, and *P. silvestris*, have been mentioned in favourable terms by BARTON and other writers; the bark of the *pine*, by BERZELIUS; and *valerian* and *gentian*, by VAIDY and others.

218. *f.* *Anodynes* have been used in conjunction with, and as adjuvants of, antispasmodics, stimulants, and diaphoretics. *Opium* has been exhibited with these, and with antimonials, shortly before the fit, by M'CAUSLAND, BREDA, and THOMANN; with *camphor*, by SENAC and AMELUNG; with *ipeacuanha* and nitre, by DOVER; and with aloe and camphor, by ACDOUARD. The extract of *belladonna* has been prescribed with bark and other tonics, by HUFELAND and ERDMANN; the *Lauro-cerasus*, by BROWN LANGRISH; *bitter almonds*, by BERGIUS; and the powdered leaves of the *Laurus nobilis*, by Sir G. BAKER, given in doses of two scruples, in bitter decoctions, shortly before the paroxysm.

219. *g.* In old and protracted cases, attended by infraction of the abdominal viscera, *mercurials*, especially calomel, have been employed in frequent doses, until slight salivation was produced, by WILLIS, STAHL, BARÈR, and LYSONS; and the propriety of the practice, in some circumstances, is confirmed by more modern experience. In similar cases, repeated *frictions of the surface* have proved serviceable, especially with some one of the liniments prescribed in the APPENDIX (F. 299, 311). Frictions along the spine, with stimulating substances, have been advised by HAUTESIERK, VAN SWIETEN, DE HAEN, TRNKA, and others; *rubefacients* and *blisters* over the epigastrium and upper regions of the abdomen have been directed by KORTUM, SCHLEGEL, and the writers just quoted; and are of essential benefit in congestions, inflammatory irritations, or obstructions of the abdominal viscera, and in the low forms of the disease. Frictions with the *antimonial ointment* have been preferred by M. PEYSSON. Compression of the lower extremities by ligatures, shortly before the paroxysm, has been advised by TROTTER and KELLIE; and the *cold*

* [The *salacine*, or *salicina*, is now employed very extensively in this country as a tonic and anti-periodic, in many cases superseding almost entirely the quinine; it is, however, less efficient, requiring larger doses to produce the same effects, which we have thought to be less permanent than those produced by the latter article. When given for the cure of ague and fever, the quantity should be from 6 to 10 grains, and repeated at such intervals that the patient may take at least 40 grains between the paroxysms.]

bath, during the intermissions, has received, since the appearance of the work of Dr. CURRIE, numerous and often indiscriminating trials. In the simple form of ague, or during convalescence, when the practitioner is convinced, by a careful examination of the patient and the state of the excretions, that no complication exists, either a common plunge bath, particularly in sea-water, or the *shower bath*, will often prove serviceable, especially when it is followed by a genial glow on the surface.

220. *h* *Masked or anomalous ague* requires a nearly similar treatment to that already recommended. The decided and repeated use of cholagogue purgatives, both before, and alternately with, a liberal use of quinine, or other tonics, or of the *sesquioxide of iron*, especially when the complaint assumes a neuralgic character; change of air, and attention to the digestive and excreting functions, are the chief and most successful remedies. In the more painful or spasmodic forms of these affections, much advantage will accrue from conjoining quinine with camphor and colchicum; neither these nor other stimulants or antispasmodics impairing the sedative action of colchicum, in as far as regards pain. In some cases of this kind I have given the chlorate of potash in the decoction of bark, and the infusion of valerian with camphor and the compound tincture of colchicum, with benefit. The *alkaline carbonates* in large doses, with energetic tonics, and the *creasote*, are also sometimes efficacious.

221. *D. Treatment of the Sequelæ.*—The treatment of agues should not terminate with the discontinuance of the paroxysms. The functions of the digestive and excreting organs must be restored, and the more severe consequences of the disease in the abdominal viscera removed, otherwise a return of the fits will follow the slightest causes, or the obstructions in these viscera will induce very serious structural lesions. Certain of the complications are also among the most serious sequelæ of ague, especially diseases of the liver, mesenteric glands, large bowels, &c.; for these may both accompany and remain after the fever, or they may not be very manifest, although doubtless previously existing, until the fever has disappeared. This is not infrequently the case with dysentery and chronic diarrhœa, particularly in warm climates, and with dropsies in this country, which, however, are only contingent consequences of the disease. The treatment must mainly depend upon the nature of the consecutive affection, which, as respects the *liver*, commonly consists of enlargement, chronic inflammation, or both, with or without more or less obstruction of the portal circulation, or of the biliary secretion. In either case, the means which have been recommended by Mr. ANNESLEY and myself, viz., local depletions, followed by repeated blisters or setons; a full dose of calomel, taken occasionally at bedtime; the hydrargyrum cum creta or blue pill the intervening nights, and mild purgatives early in the morning, will be found most beneficial. After these have been persisted in, according to the nature of the case, and the more active symptoms have been entirely removed, this organ continuing torpid, the *nitro-hydrochloric acids*, used both internally and externally, and exercise on horseback, will be of service; but mer-

curials must have been relinquished some time before the use of the acids. Lastly, a course of Cheltenham or Harrogate waters, or judicious substitutes for them, used daily and perseveringly, will confirm the recovery.

222. If the *spleen* or the *mesenteric glands* be enlarged, frictions of the abdomen with warm stimulating liniments (F. 311); stomachic purgatives, as aloes, rhubarb with sulphate of potash, and small doses of the sulphate of iron; the iodide of potassium, in moderate doses, and blisters, setons, moxas, &c., will be found most successful. In neither of these states of disease will depletions be required, unless pain and tenderness on pressure be complained of, when local depletions, followed by blisters or the turpentine epithem, will be sufficient. The most appropriate treatment in cases of consecutive *dysentery* and *dropsy* is fully described in these articles.

[In the treatment of intermittents, there is great uniformity among American physicians, as well as a marked degree of success; so that the disease rarely proves fatal, except in very debilitated constitutions and broken-down habits, or complicated with some serious affection of one or more important organs. Dr. RUSH treated the disease with cathartics and blood-letting, followed by the bark in substance immediately preceding the paroxysm. Dr. EVERLE pursued a similar practice; but where there was a relapse of the agues, after quinine had been administered, Dr. E. allowed them to run on to the fifth or seventh day, when he found a few doses of quinine put a permanent stop to their progress. This plan he states to have invariably proved successful. Where the apyrexia is complete, and there are no feelings of illness during the intermissions, this writer very properly recommends to commence at once with the use of quinine, after the bowels have been evacuated by a cathartic. These remarks apply to the ordinary intermittents of temperate latitudes; in that rapid and fatal variety, termed *malignant*, immediate recourse is to be had to the bark, before the use of any preparatory measures. Dr. E. recommends the quinine in *two grain* doses every hour, commencing about six hours before the beginning of the approaching paroxysm, and states that this will generally prove successful, far more so than a single large dose immediately preceding or during the chill. Where the bark in substance is given, two drachms, taken at intervals of an hour within the last five hours of the intermission, he remarks, will perhaps do all that can be effected by bark in this disease.

Dr. E. remarks, also, that where there are strong marks of an inflammatory condition, unless proper antiphlogistic measures are previously employed, the bark may lay the foundation of visceral indurations, rheumatism, dropsy, or other maladies. The most elegant formula for administering quinine to adults is perhaps the following: R *Sulphatis Quina* gr. xvj.; *Eliz. Vitriol* gtt. xvi.; *Sirup Limonis* ʒj.; a tea-spoonful every hour or two for an adult. Where we wish to cover the bitter taste, as in administering it to children, the following mixture may be prescribed: R *Sulphat. Quina* gr. vj.; *Eliz. Vitriol* gtt. x.; *Extract. Glycyrrh.* ʒiiss.; *Aquæ Fontanæ*, ʒij. M. A tea-spoonful for a child between two and five years of age.

Where ague is attended with visceral indurations or enlargements, the quinine is to be given either in conjunction with blue pill, or after a gentle mercurial course. For this purpose, from three to five grains of blue mass may be given three times daily, till the gums become slightly affected. As substitutes for the bark, American practitioners have employed, with more or less success, the barks of the *dogwood* (Cornus Florida), of the *American tulip poplar* (Liriodendron tulipifera), of the *horsechestnut* (E. hypocastinum); of different oaks; willow; the *Virginia snake-root*, *calumba*, *gentian*, *quassia*, *geranium*, &c. The black, or cellular spider's web, has been highly extolled by Drs. CHAPMAN, EBERLE, and others. The last-named writer states that "it certainly possesses very considerable powers in allaying morbid irritability, and in calming the excitement both of body and mind. In my own person, it produces the most delightful state of mental and corporeal tranquillity, far exceeding that which is caused by opium. It is given in five or six grain doses every three or four hours. We have had no experience with this article in the treatment of intermittents, but we doubt whether it possesses any anti-periodic properties, which make it worthy of reliance in these cases." For resolving indurations, Dr. E. considers the *muriate of ammonia* as probably the most powerful remedy we possess, when given internally to the extent of three drachms daily, either alone, or in connexion with quinine. It is to be continued, however, after the use of the quinine has been suspended. The preparations of *iodine* are now chiefly depended upon for the removal of enlargement and induration of the spleen arising from miasmata or intermitting fever. It may be used in combination with *mercury*, *potash*, *iron*, or *arsenic*; the latter is, perhaps, the most efficient alternative that we possess in these cases. Its use, however, is not unattended with danger. The *iodide of iron* will be found well adapted to most cases of chronic engorgements of internal organs, which are the *sequela* of intermittents; but it is necessary to continue its use for a considerable period of time. (For some very judicious remarks on the treatment of intermittents, see BELL and STOKES's *Lectures on the Theory and Practice of Physic*, vol. ii, p. 586, 605.)

223. *E. The diet* during the intermissions should be light, nourishing, in very moderate quantity, and taken at a time not too close upon the accession of the paroxysm. If the disease be of an inflammatory form, or associated with active determination to an important viscus, *abstinence*, as directed by CELSUS, SENAC, TESSIER, &c., should be observed. While purgatives are being employed, broths and weak soups are most suitable. In the paroxysm, diuretics only are admissible.

224. *F. During convalescence*, strict attention should be paid to the diet and regimen, and to the states of the digestive and excreting organs. The latter should be assisted occasionally, and always when they are sluggish, by the usual means; and quinine, the other preparations of bark, or different tonics, should be continued for some time after the disappearance of the paroxysms. Regular and moderate exercise, especially on horseback, also, will

materially promote recovery. Exposure to cold easterly or northerly winds, or to the night air and moisture, ought to be carefully avoided; and if change of air cannot be enjoyed, or if the patient be still liable to be exposed to malaria, the *Prophylactic Measures* advised in the article ENDEMIC INFLUENCES (§ 20) should be adopted as far as circumstances will permit.

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XII. REMITTENT FEVER. SYN.—*Exacerbating, Paroxysmal, Sub-continual, Endemic, Endemical, and Endemical Fever* of various writers.

225. DEFIN.—*The febrile phenomena evincing striking exacerbations and remissions, one paroxysm occurring in the twenty-four hours.*

226. This fever, although holding a middle rank between agues and continued fevers, approaches the former most nearly in its causes, phenomena, and consequences. It is most common in warm climates, and in the warmer countries without the tropics, in which it is most prevalent in summer and autumn. It is strictly a disease of locality and climate, and hence very generally denominated *endemic*; but as climates and localities vary remarkably, so is it modified in character from the mildest form—in which it is similar to simple ague in every respect but the complete remissions—to the more malignant states, in which it so nearly approaches yellow fever in warm countries and seasons, and continued fever in temperate climates, as to have been frequently confounded with them. To intertropical practitioners, es-

pecially, as well as to those in temperate countries which abound with the endemic causes of disease, this fever presents great interest. It is not infrequent in the vicinity of London, and in marshy localities in the southern counties of England and Ireland, during the summer and autumnal months.

227. i. CAUSES.—The *predisposing and exciting causes* have been noticed above (§ 194), and more especially in the articles DISEASE (§ 31–55) and ENDEMIC INFLUENCES. DR. CHAMBERS has supposed that remittents arise from two principal sources: 1st, from marsh miasmata; 2dly, from sudden vicissitudes of atmospheric temperature precipitating some other deleterious principle evolved from hidden sources. Of this latter, however, we can have little or no knowledge; and, even granting the evolution of such a principle, we have no evidence of any sources from which it can arise different from those pointed out in the articles now referred to. As, therefore, the exciting causes of endemic fevers in *adults* are chiefly emanations from the soil—from decaying organic bodies on its surface, or commingled with it—and from stagnant putrid water; and, as these causes are necessarily varied in concentration, activity, and in their nature, according to the states of the air, and to the varying proportions of vegetable and animal matters undergoing decay, so it must be inferred that the effects produced by them, even when the constitution of the recipients is the same, will be also varied: but when we consider the great variety of habit, organization, temperament, and susceptibility, it must necessarily be concluded that the forms and states of fevers resulting from these causes must be still more remarkably diversified, and will vary, not merely in type, from a simple tertian, through the remittent forms, to a purely continued state, but also as to vascular action, vital manifestation, and visceral complication. Remittents, therefore, and as observation has repeatedly proved, are merely severer grades of the same pathological states as constitute intermittents: a more concentrated form, or intense action of the exciting causes which produce the latter, either absolutely or relatively, to the predisposition or susceptibility of the individual, also occasioning the former. That concentration of the exciting causes, or intensity of action is, in some measure, concerned in creating the difference, is shown in the constant residents of an unhealthy locality having ague at one season, when the exhalations are rationally inferred to be neither abundant nor intense, and remittents at another, when these causes are either the one or the other. That the state of the recipient has a marked influence, is proved by persons recently arrived in districts productive of endemic fevers having some one of the forms of remittent at the same time and place as those who have been long resident have ague. Remittents are most prevalent in autumn, next so in summer, and the least so in spring. They rarely occur in winter, in temperate countries, unless in those which nearly approach the tropics.

228. ii. DESCRIPTION, &c.—From the varying forms remittents assume, owing to the circumstances just mentioned, it is evident that all

divisions of them must be purely conventional, and founded on degrees of severity, and on alterations of their most prominent features. M. BEAUMES has distinguished them into three grades: the *severe*, the *less severe*, and the *benign*; and M. BOISSEAU into the *inflammatory*, the *bilious*, the *mucoous*, the *adynamic*, and the *ataxic*. The last three of these are merely modifications of the *adynamic*, as respects the state of vital power and vascular action. I shall adopt a nearly similar arrangement to that which I have stated above (§ 41).

229. *A. Mild remittent* appears after slight ailments of several days' duration; the precursory symptoms being chiefly uneasiness at the epigastrium, lassitude, and pains in the back, limbs, and head, with restlessness at night. These may continue for some time; the *formative period*, or the time elapsing from the impression of the cause to the *invasion* or development of the febrile phenomena varying from five or six to about thirty days, as determining or accessory circumstances may arise to accelerate or re-enforce the action of the chief cause. The stage of *invasion* is similar to that already described, it being attended by coldness of the surface, and frequently by shivering. The coldness is soon superseded by heat, by febrile flushes, or by alternations of heat and cold, by nausea, and occasionally by vomiting, which soon develop the stage of *excitement*. With it, the pains of the head, back, and limbs become remarkably aggravated; the mouth is clammy and dry; the tongue white or loaded; the surface very hot and parched; the face flushed; the features tumid; and the pain of the head attended by a feeling of distention and throbbing, often passing into delirium. The pulse, which at the invasion was small, irregular, and weak, is now full, large, strong, and frequent; thirst is urgent; the bowels constipated, and the urine scanty and high-coloured. There is always more or less tenderness at the epigastrium, with nausea, and often with vomiting. These symptoms generally continue from about ten or twelve to eighteen hours, when perspiration breaks out; the pulse falls in frequency and strength; the irritability of the stomach subsides; delirium disappears; and the skin becomes cooler: but there is merely a remission or abatement, but no intermission, of the febrile symptoms. The remission usually continues from three to nine or ten hours, when an exacerbation occurs, sometimes preceded by chills or shiverings, at other times not, and the severer symptoms are renewed. Thus the disease proceeds with alternate remissions and exacerbations, the former generally taking place in the morning, until the seventh day, or the ninth, eleventh, or fourteenth day, or much later, in temperate countries, when a copious perspiration generally puts a termination to its progress. This form of fever has a particular disposition, as Dr. JACKSON has remarked, to a favourable critical change on the seventh, fourteenth, twenty-first, and twenty-eighth days; but in warm countries it seldom continues longer than fourteen days.

230. *B. The inflammatory form* frequently attacks sanguine plethoric Europeans residing in warm miasmatic climates. It differs from the foregoing chiefly in grade, and the greater

degree of vascular reaction in the period of excitement, which is sometimes so great as to exhaust the tone of the vessels and the powers of life, and even to change the blood, thereby simulating some forms of epidemic or continued fevers, especially when the remissions become obscure, as is often observed in the worst cases. It commences either as the foregoing, or with rigours, pain, and sickness at stomach, and oppression at the præcordia, followed by vomiting, headache, great dejection of spirits, and mental delusions of a low or gloomy kind, sometimes impelling the patient to suicide, which, in two instances, I have seen attempted even before much complaint had been made. In other cases the patient falls down in a state of syncope, following several days of indisposition, with a cold, pale surface, and dejected countenance. The pain of the stomach and head increase, is attended with vomiting, sometimes of bilious matters, at other times of a whitish fluid, with fulness and tenderness at the epigastrium. The vomiting is generally followed by vascular reaction: the pulse, from being small, weak, irregular, or intermitting, becomes full, strong, and very quick; the face injected and tumid; the eyes prominent, watery, and red; the thirst intense; the throat arid and sore; the tongue furred, its edges red; and the headache and delirium increased. In about twelve or fourteen hours a copious perspiration breaks out, the symptoms subside, and the pulse falls to about ninety. After a short remission, the thirst, pain at the stomach, headache, &c., are aggravated, and the delirium and vomiting return. If the disease be neglected at the beginning, the remissions disappear, the skin becomes dry and caustic, or moist and clammy; the pulse small and irregular; the tongue black and crusted, and the vomiting, pain at the epigastrium, &c., more constant. In the most severe and unfavourable cases, yellowness of the skin, or vomiting of matters like coffee-grounds, or both, occasionally supervene. The bowels, which, before the attack and at its commencement, were torpid, are, at farther advanced stages, irritable; the evacuations being watery, greenish, and, at last, almost black; the urine being very scanty and high coloured. If the disease be not actively treated at the commencement, an unfavourable termination takes place between the third and seventh days; but it is often prolonged beyond this period, and it then generally occasions visceral disease.

231. Such is the inflammatory remittent of warm climates. A nearly similar fever attacks unseasoned Europeans lately arrived in the West Indies and intertropical Africa, and often presents an obscurely remittent or almost continued type. It has been very generally mistaken for true yellow fever, owing to the malignant symptoms it assumes at an advanced period, or state of exhaustion consequent upon the vascular excitement of the early stage. The inflammatory remittent, the bilious inflammatory, the *adynamic* or malignant remittent, and the ardent or seasoning fevers of Europeans lately arrived in warm countries, are merely modifications of each other, and differ essentially from epidemic yellow fever, with which, however, they have been all most singularly confounded.

232. *C. Bilio-inflammatory remittent fever* differs but little from the foregoing in its characters and course. It is most prevalent in Europeans who have not resided long in a warm miasmatic country, and in low marshy localities, or in thickly-wooded districts. In temperate climates, it is observed chiefly in the autumns consequent upon very warm summers; and in the bilious or bilio-sanguineous constitutions. It is often dependant upon the vicissitudes of season, especially wet seasons following great warmth, or a very hot summer consequent upon a wet spring; and it is often very prevalent or almost epidemic during the hot months, after very heavy rains, within the tropics. Violent determination to the brain characterizes the commencement of reaction in this variety, and inordinate affection of the liver and digestive mucous surface the more advanced stages. Pain in the head is most severe, especially in the forehead and sockets of the eyes; the conjunctiva is yellow or suffused; the countenance and skin become dusky or yellow; the tongue is loaded by a bilious coating; and the evacuations are bilious, especially the matters thrown off the stomach. The bowels are at first costive, but they afterward often become irritable or dysenterically affected. After the vomiting has continued some time, the appearance of the matters is changed, and ultimately assumes, in fatal cases, the characters just described (§ 229).

233. *D. The adynamic or malignant remittent* is one of the severest and most fatal of endemic fevers.—*a.* It is observed only in places where the endemic causes are concentrated or intense relatively to the state of predisposition; and is seldom ushered in by shiverings, but generally by a prolonged sense of cold, universal collapse of the vital powers, and of vascular action. Pain in the head of a peculiar constrictive kind; mental depression and insane delusions; imperfect efforts at reaction; remarkable lassitude and pain in the loins and limbs, are present at the commencement, with great anxiety, pain, and oppression of the præcordia, and nausea, sometimes giving rise to vomiting, which assists in developing the stage of excitement, and in partly overcoming the internal congestions. The pulse is small, constricted, or irregular; the skin becomes dry and caustic, or moist and clammy, and impresses the hand of the observer with an acrid or tingling sensation; the eyes are watery and injected; the tongue is clammy, moist, or flabby and coated, and afterward dry, rough, or brown; the face is flushed, but dusky or purplish; the bowels are costive, subsequently relaxed or irritable, and the urine is scanty, high coloured, or suppressed. After twelve or fourteen hours, a slight remission is observed, after which the symptoms are exacerbated; the stomach is remarkably irritable; the epigastrium painful and tumid; the breathing hurried; and the patient restless and distressed. In the more dangerous cases, hiccough, constant vomitings, yellowish discolorations of the skin, exudations of blood from the digestive mucous surfaces, low delirium, and death, supervene between the fourth and seventh days.

234. *b.* This variety is variously modified in different circumstances and persons. It sometimes assumes more of a cerebral or typhoid char-

acter; at others, it is bilious or gastric, according to peculiarity of season or concentration of the cause. In some intertropical countries it becomes epidemic, or, rather, this endemic is more than usually prevalent. Occasionally the remissions are indistinct from the commencement, and they generally become so after three or four days.—*a.* In some cases the vascular excitement is at first more or less intense, with remarkable determination to the head, liver, and stomach, and maniacal delirium, the disease very nearly approaching the inflammatory, or bilio-inflammatory forms.—*β.* In others, vascular reaction is very low and imperfect; the pulse small and quick; the abdomen tumid and hot, while the extremities are cold or clammy; the evacuations foul, morbid, and offensive; the tongue fuliginous; the gums spongy, or oozing a bloody sanies; the vomiting constant, and ultimately grumous and dark; the stools, towards the close, black or pitchy; the urine scanty or nearly suppressed; the solids flaccid; and the skin earthy or discoloured. In both these states, a yellowness of the surface occasionally presents itself about the third or fourth day, beginning in the conjunctiva, neck, and breast. The yellowness often passes to a pale greenish hue, in patches, shortly before death; and the soft solids present a liquescent state, having lost their vital cohesion.

235. *c.* In other cases of this form, the symptoms are at first mild, and the excitement inconsiderable; when, after two, three, or four exacerbations, the powers of life appear suddenly exhausted; the pulse becomes weak and fluttering; the tongue foul, black, and dry; the evacuations offensive; the prostration of strength extreme; and the factor of the perspiration remarkable. At last, great anxiety; tenderness and tension of the epigastrium; fullness of the hypochondria; collapsed features; a squalid or yellowish surface; vomiting of dark or grumous matters, supervene, and indicate the utmost danger. This insidious modification of the adynamic form generally occurs in persons highly predisposed, or who have suffered from bowel complaints, or who are debilitated, and are subjected to the more concentrated effluvia.

236. *d.* In some instances the remittent commences in so mild a form that the patient is even able to walk about his apartment, and, for several days, complains only of irregular exacerbations of fever, when, suddenly, violent and malignant febrile action supervenes, which rapidly exhausts vital power, and either quickly carries off the patient, or induces serious structural change in several of the abdominal organs. In other cases vascular excitement is hardly manifest at any period of the disease; the exacerbations consisting merely of increased anxiety, restlessness, general distress, and mental depression, occasionally with augmented sickness; and pain in the head, epigastrium, and loins; the pulse being but little accelerated until the close, and the temperature, unless at the epigastrium, rather under than above natural. In these, however, the weak, soft, and open or irregular pulse; the dark-coated, or soft, flabby, and lobulated tongue; and the blackish-greenish-brown and morbid excretions, in connexion with the other symptoms, denote extreme danger. It would seem as if

the causes had nearly annihilated the irritability of the moving fibres, and deprived the system of its ability of reacting upon, or superseeding, the morbid condition induced by their first impression.

237. *E. Complicated Remittents.*—Complications are observed in the inflammatory, bilio-inflammatory, and adynamic forms; the alterations that take place in the seats of predominant disease being the chief causes of unfavourable terminations. The importance, therefore, of recognising them at an early period must be evident.—*a.* Among the earliest complications in remittents are *inflammatory states of the mucous surface of the stomach and duodenum.* This condition is indicated by constant irritability of stomach; by fulness, heat, and tenderness of the epigastrium; and by a foul loaded tongue, with red sides and apex. This pathological state often extends to the *small intestines*, and even to the *large bowels*, as indicated by tumefaction and tenderness of the abdomen; by a sense of inward soreness or heat; by irregularity of the bowels, or frequent, scanty, and morbid evacuations; and by diarrhœa or dysenteric symptoms. If the *large bowels* be chiefly affected, the dysenteric symptoms are more urgent; and, on examination, soreness or tenderness will often be complained of in the region of the cæcum and course of the colon. Remittents thus associated, often pass into, or terminate with, dysentery. The *gastric complication* is frequently induced by the irruption of an acrid bile at the commencement of the fever, the morbid state of this secretion irritating and inflaming the parts over which it passes. The *intestinal affection* probably arises from the same cause, or from accumulations of mucous sordes or other morbid matters in the bowels. But collections of acrid and morbid secretions and of fœcal matters most frequently occasion the *dysenteric disorder*, and a morbid state of the bile frequently contributes its aid also in producing this complication.

238. *b. Disease of the liver* is a common complication of remittents, especially in the East Indies and in warm climates, and even in this country. In most cases of this fever the functions of the liver are disordered; but actual structural change is also common, and may appear early in the disease, or at later periods. The biliary secretion is most frequently increased; in a few cases it is diminished; and in some it is accumulated in the ducts and gall-bladder for a time, and is afterward let loose, increasing the disorder of the stomach and bowels. But, whether in excess or diminished, it always is more or less changed in quality. The structural affections of the liver attending remittents are nearly the same that are met with in agues, excepting that inflammatory action, acute congestion, or moderate determination affects its internal structure more frequently in the former than the latter, and the vascular action partakes more of the asthenic character. With congestion and inflammation, more or less enlargement also exists, and occasionally puriform matter is formed; but the latter is seldom evinced by diagnostic symptoms, signs of diseased structure of the viscus being only apparent. Even when horripilations or rigours do occur, they are lia-

ble to be mistaken for the cold stage of the paroxysm. *Softening* of the internal structure of the liver, with or without congestion or enlargement, is a common lesion in the adynamic states of this fever. I have observed it most frequently after fulness, tenderness, a sense of burning, or pain in the right hypochondrium and epigastrium, with great anxiety, intense thirst; dark-coloured and loaded tongue, very quick and weak pulse; offensive evacuations, and dark grumous vomiting. *Disease of the spleen* is a common complication in old European residents in hot climates, and in many localities in the south of Europe. It is similar in kind to that already noticed. In the low forms of remittent complicated with disease of the liver or spleen, the greatest care should be observed to avoid roughness in the examination of the abdomen and hypochondria. Too great or sudden pressure has produced irreparable injury in such cases.

239. *c. Determination to the brain* of an active kind, rather than pure inflammation, often occurs early in the more severe remittents. In the most prominent of this class of cases, the symptoms of cerebral excitement, and increased vascular action in the brain, are superseded by stupor, coma, low delirium, and typhoid or adynamic symptoms. The peculiar delirium, insane delusions, and mental depression or apprehension, which often affects the patient from the commencement, seems to be less the result of inflammatory action in the brain than of impaired nervous and cerebral power. It often passes off, or it changes into a state of apathy or indifference to the result of the disease, and strong disinclination to take the medicines prescribed. This effect upon the spirits and mental powers evidently arises from the peculiar or specific action of marsh poison, which, as I know well from experience, occasions a distressing feeling of depression and despondency, even when it does not induce open disease. Maniacal excitement or delirium often passes into coma or stupor, and the patient expires as if in a quiet sleep.

240. *d. The association of remittents with pulmonary affections* is observed in temperate countries, especially in the spring and summer, and more rarely in warm climates. The pulmonary functions are more or less impaired during the formative and invading periods; but acute disorder is seldom developed until the period of excitement, and consists chiefly of *bronchitis, catarrh, and pneumonia* of a nervous or congestive form. In some cases *congestion* of the lungs, and of the bronchial surface, commences during or shortly before the period of invasion; and either partially continues throughout the disease, or passes into a low form of inflammatory action, and even into hepatization. *Rheumatism* is also occasionally complicated with remittents, and *erysipelas* sometimes supervenes when a part is injured, the cuticle abraded, or the skin divided. *Ulcers and sores* not unfrequently take place on the lower extremities in the course of remittents, as well as of intermittents, particularly in low, wooded, and swampy districts within the tropics.

241. *F. The terminations of remittents* are, 1st. In restoration of the healthy functions; 2d. In a chronic form of remittent; 3d. In organic change of one or several important viscera,

particularly of those which manifest predominant disease during the progress of the fever; 4th. In fever of a different type; 5th. In dysentery; and, 6th. In death. Although any of the *consequences* pointed out above (§ 47, 189) may arise, changes of the viscera of the abdominal cavity are by much the most common, in this class of fevers, as well as in agues. The *Prognosis* is apparent from what has been advanced, and in every respect agrees with what has been stated on the subject above (§ 57, *et seq.*).

242. *G.* The lesions observed after death from remittents, as respects both their seat and nature, differ but little from those already described in connexion with agues. They, however, are of that kind which are generally observed to result from acute action in connexion with deficient power. The *liver* is usually injected, remarkably softened, of a dark colour, friable, and sometimes enlarged. The *spleen* is often so soft as hardly to admit of being handled. The *digestive mucous surface* is softened, injected, ecchymosed, of a dark hue, and sometimes thickened, abraded, or even ulcerated in the lower parts of the canal. The *mesenteric glands* occasionally, and the *pancreas* more rarely, are enlarged or otherwise changed. The *bronchial lining* is generally dark, injected, and soft. The *lungs* are sometimes congested, infiltrated, condensed, or inflamed. The *pleura* and *pericardium* often contain some dark sanguineous serum; and the substance of the *heart* is frequently soft, flaccid, and readily torn, the cavities being occasionally dilated, more especially after the adynamic states of the disease. Adhesions between the pleuræ are rare. The changes within the *cranium* consist chiefly of congestion of the veins of the pia mater and sinuses, with a fluid dark blood, and sometimes of effusion of serum into the ventricles, and between the membranes. But the lesions of the *encephalon* are seldom very great, or in relation to the severity of the cerebral symptoms during life.

243. *iii.* *DIAGNOSIS.*—It might be supposed that the remissions would be a sufficient characteristic of this fever, and they certainly are so as respects the remitting type. But the occasional occurrence of yellowness of the skin, and of black vomit, in the advanced stages of its more intense forms, has been the means of confounding it with two other species of fever, in which, also, yellowness of the skin and black vomitings occur—the *bilio-inflammatory* or *ardent fever*, which attacks only new comers to an intertropical country, especially America and Africa—and the *true infectious yellow fever*, which sometimes spreads in a most pestilential form. The more intense and adynamic forms of remittent, the *bilio-inflammatory* or *ardent seasoning fever* of Europeans recently arrived in a hot climate, and the true yellow fever, arise from different causes, and present different phenomena at their commencement and early course, although the character of the symptoms often approximates in their last stages.

a. 244. As respects the *intense and adynamic states of marsh remittent*, it has been shown above that the exacerbations seldom continue above fourteen or eighteen hours, so that one takes place daily, varying, however, in intensi-

ty, so that they thus usually present a quotidian or double tertian type; but in the *bilio-inflammatory*, or *ardent seasoning fever* of Europeans, the type is continued, or a remission does not occur till after thirty or thirty-six hours, a different train of symptoms then usually appearing. These two fevers arise from different causes: the *remittent* always proceeds from malaria in some form; hence it is common to all warm countries, and to temperate regions in warm seasons, and varies remarkably in severity; the *bilio-inflammatory* or *ardent fever* may probably also arise from the same cause, but it is more especially the effect of temperature upon European constitutions, or of atmospheric vicissitudes and other causes acting concurrently with these; hence the much greater uniformity of its character, in which it nearly approximates to the *bilio-inflammatory* form of the remittent. While remittents can, in every instance, be traced to terrestrial exhalations—to the sources described in the article *ENDEMIC INFLUENCES*, *ardent fever* often appears where the operation of such causes has been impossible, and where I have endeavoured in vain to account for its occurrence, excepting in the way stated hereafter.

245. *b.* These two diseases are the *seasoning fevers of Europeans arrived in a hot climate*, *ardent fever* commonly appearing in robust plethoric persons who have emigrated to the West Indies, intertropical Africa, &c.; the intense forms of remittent, in those less robust, or who have not been attacked by *ardent fever*, and who have been exposed to malaria after their arrival. This statement is illustrated by the following facts, which came under my own observation in 1817 and 1818: Some young men arrived from Europe in a place within the tropics, during the healthy season, and where no sources of malaria then existed. They soon were attacked by the common *ardent fever*, with two or three exceptions, and recovered by means of the treatment advised for this disease; but during the unhealthy season several of them had remittent fever; and those who had not been attacked by the *ardent seasoning* had the more severe forms of remittent, which was their seasoning. In the East Indies, *bilio-gastric fever* and the *inflammatory forms of remittent* are the most frequent fevers in recently arrived Europeans; but in the West Indies, *ardent fever* is the most common, especially in the young, plethoric, or robust—in those much exposed to the sun's rays, who use great exertion, and live freely or intemperately, who neglect their bowels, or check the perspiration. In the latter, the yellow skin and vomitings of dark matters are most frequent, and appear earlier than in the intense forms of remittent, and both diseases, although distinct, have been denominated yellow fever, from the contingent appearance of a single symptom towards their close, and have thereby been confounded not only with each other, but also with another fever distinct from both, and merely because one, or, at most, two symptoms are common to all three, but only in the last stage of the most unfavourable cases.

246. *c.* The *true or pestilential yellow fever* is different from severe remittents and from *ardent fever*, neither of which is *infectious*, while *true yellow fever* is *eminently infectious*.—*a.* *Ar-*

ardent fever occurs only in Europeans recently arrived in hot climates, and never in the acclimated, nor in aboriginal or native inhabitants: it cannot attack the dark-skinned races, and the assimilated European.—β. The severe forms of remittent affect both those who have recently arrived in miasmatic districts, after they have been exposed to endemic causes, and those who have resided longer, and become seasoned or acclimated, especially when the causes have been concentrated or intense. They may also attack individuals from adjoining districts, especially from elevated situations, when they descend to the low grounds, and swamps near the sea, or the embouchures of rivers; but they rarely affect the aboriginal inhabitant, and the negro races.—γ. The true yellow fever, on the other hand, attacks the unseasoned, the seasoned, the constant resident, and the dark-skinned races—the negro as well as the European—all within the sphere of its infection who have not previously had the disease. A former attack protects from true yellow fever; but remittents will occur again and again in the same person; and even ardent fever will occur a second time, if the person who has once been affected by it has returned to Europe, resided long in it, and afterward gone to a warm country; although, on this second visit, the fever will much more probably be an inflammatory remittent than the ardent or bilio-inflammatory disease. The remittent is endemic in warm climates, and in several temperate countries in warm seasons, especially those abounding with the sources of malaria; the ardent fever occurs only among persons who have recently arrived from cold or temperate climates into a very hot country; and true yellow fever appears only occasionally, and then the infection may either extend to a few only, the circumstances favouring its diffusion not existing, or to great numbers, the disease thereby becoming epidemic. Thus, the first and second of these fevers are always occurring, especially the first; the third seldom, or after long intervals.

247. The confusion which has thus arisen from confounding three diseases so essentially distinct has been perpetuated by published works and in official returns. Thus, a practitioner observes fever in the West Indies among sailors or soldiers lately arrived; and has to treat, although the locality is healthy, a number of cases of ardent fever, with high action at the commencement, and, in some of the most unfavourable of these, with yellowness of the skin, black vomit, &c., in the last stage. He finds large depletions cure the disease; and notwithstanding his range of observation is confined, and the symptoms referred to contingent, he publishes, to inform all whom it may concern, that he has had numerous cases of yellow fever to treat, that he cured nearly all of them by large blood-lettings, and that the disease was neither contagious nor infectious; all which was very true, with the single exception of the disease being yellow fever, the ardent or bilio-inflammatory, arising from very different causes, having been mistaken for it; and very probably a case of true yellow fever had never come within the sphere of his observation during his residence in the country; or if it has appeared, it has been mistaken for the

disease now instanced, or for a severe remittent; or, indeed, all three may have been confounded together, as most commonly is the case. A second practitioner arrives in a part of the country where the intense or concentrated states of remittent are endemic, and where it presents the inflammatory, or bilio-inflammatory form, in persons more recently arrived from Europe, and where also yellowness of the skin, &c., occasionally appear in the last stage. He finds that bleeding kills as many as it cures when indiscriminately and incautiously employed, and has therefore recourse to mercurials, especially calomel, observing that, when salivation occurs, the patient is generally safe. He also believes that he has had yellow fever to treat, that it is the endemic of the country, and not infectious, and that mercury given to produce salivation, and not bleeding, is the cure for it. He writes to convert those who entertain different opinions from himself, and thinks that no one else knows anything of the matter. The same errors are committed in this case as in the former, excepting that another disease has been mistaken for yellow fever, although that malady has either never been seen by him or has been confounded with the endemic of the country. A third practitioner has enjoyed a more extensive range of observation: he has observed not only both these diseases, but a third also; he has recognised the origin of the three in very different causes; has noticed marked distinctions between them, in their early stages especially; has ascertained the infectious nature and the only occasional occurrence of one of them, to which the name of yellow fever is most applicable; he has watched the beginning, progress, and devastating spread of this malignant disease; and he has experienced the inefficacy of treatment in its most severe cases. These important facts and many others connected with the subject are placed before the public, but are controverted by the first and second practitioners, and those who, having observed, like them, in one confined circle, and during a period of no great duration, have, notwithstanding, become instructors of others; and who, wanting the experience of those whom they oppose, have not even inspiration to plead either in behalf of their doctrines, or as an apology for their intrusion. Thus the inexperienced are bewildered by contrariety of opinions, or misled by partial views which do not apply to the circumstances and diseases which often will present themselves. It will, therefore, be better for him, who has to treat for the first time the fevers thus generally confounded with each other, to apply himself to the task with a mind well instructed in pathological principles, and with a due knowledge of disease and of therapeutical agents, but perfectly unbiased by doctrine or by the reputed efficacy of certain modes of treatment; otherwise he may find out, after some untoward experience, that neither the doctrine, nor the practice founded on it, applies to the cases which he is called upon to treat. I never shall forget with what bitterness an amiable physician, many years ago, told me, on my meeting him in an unhealthy climate within the tropics, where he had arrived some months before myself, of his want of success in treating the fevers of the country. Being desirous of the guidance of

those who had written on the disease, he had treated it at first conformably with the instructions given in books, and the first nine cases terminated fatally in rapid succession. The practitioner should observe and think for himself; and while his mind is open to the suggestions which works will furnish, he should ascertain the states of vital power, and of local and general morbid action, in each case, and employ medicinal agents appropriately to these, and with promptitude and decision, guided, but not weakened by caution.

248. IV. TREATMENT.—*A. Of the mild remittent.*—The treatment of this form differs not materially from that advised above for agues, especially when the remissions are distinct. At the commencement, before reaction is developed, and when there are no indications to forbid their exhibition, *emetics* are generally of great benefit. After their full operation, a large dose of *calomel*, or of *calomel* and *opium*, may be given, and an action produced on the bowels by *purgatives* and cathartic enemata. These means having been repeated until morbid secretions and faecal accumulations are evacuated, bark or quinine may be prescribed, if the remissions are distinct, and the patient not removed from the unwholesome locality. But in cases where the previous health and long residence of the patient in an unhealthy climate do not forbid it, moderate *bleeding* in the stage of excitement will shorten the disease, and render the remissions more perfect. During reaction in the early exacerbations, repeated doses of JAMES'S powder with *calomel*, or the *potassio-tartrate of antimony* given in solution every hour or two, or every half hour, in full doses, commencing it in the cold stage, so as to produce vomiting, and continuing it in this manner throughout the subsequent reaction, will frequently accelerate a favourable termination, and render large vascular depletion less necessary. In old residents in warm climates, or in those constantly living in an unhealthy situation, this medicine will often supersede blood-letting, if the bowels are early and freely evacuated. In the mild autumnal remittent, also, of this climate, a similar treatment is appropriate; bleeding being required chiefly in the young, robust, and plethoric. Subsequently, refrigerants, cooling diaphoretics, and other appropriate means may be employed.

249. *B. In the inflammatory and bilio-inflammatory forms*, the practice, early in the disease, should be energetic.—*a.* In the cold stage, or that of invasion, and when, although there may be most severe headache, the heat of the scalp and the action of the carotids indicate that it is not inflammatory nor dependant upon fulness of blood; and when excessive vascular action in the stomach and liver has not yet been developed, an active *emetic* is of essential service. As soon as the stage of excitement is developed, and proportionately to its excess, and to the degree in which vascular action becomes predominant in the head, liver, or stomach, should *blood-letting*, generally or locally, or both, be practised; the quantity having relation to the constitution, habit of body, &c., of the patient. In order, however, that depletion may be productive of benefit, it must be practised early in the disease; for, if deferred till the excitement has partly exhausted the powers of

the system, its good effects cannot then be obtained, the nature of the pathological states admitting of *local depletions* only, which, however, should be employed in order to remove such local congestions as may have taken place.

250. *b.* Full doses of *calomel*, followed by *purgatives* (F. 181, 216, 266) and cathartic enemata (F. 140, 141, 150) are also early requisite; the first of these having been given soon after the operation of the emetic, and combined with JAMES'S powder. During the vascular excitement, particularly when the skin is very hot and dry, the cerebral symptoms strongly marked, and the abdominal viscera free from congestions, *cold applications* should be kept to the head, and the *cold affusion* frequently resorted to. When vital power is much impaired by the impression of the exciting causes, or exhausted by the previous excitement, and when the abdominal viscera are congested, as evinced by the fulness and tenderness of the hypochondria and epigastrium, the cold affusion is a hazardous measure, the constitutional powers not being always sufficient to bear the shock, and the overloaded viscera sometimes suffering farther from the external impression. In such circumstances, especially when the pulse is quick and irritable and the skin harsh, the *tepid bath*, and sponging the surface with cold or tepid water, will be preferable. A certain degree of vital power is necessary to a successful application of the cold affusion, the surface being hot and dry, and the internal viscera not seriously congested.

251. *c.* When the *head* is much affected, *leeches* to the temples, behind the ears, and to the occiput, or cupping, will be serviceable; evaporating lotions, or the cold affusion on the scalp being resorted to: but even these may be injurious if employed too late, or in states of exhaustion. The appearance of the face and eyes, the heat of the scalp, the expression of the countenance, and the action of the carotids should guide the practitioner, and not the degree of delirium or of insane delusion; for these may be most remarkable where vascular action in the brain is lowest, as they depend more upon nervous and cerebral power than upon vascular action. When much heat, pain, tenderness, and fulness of the *epigastrium* or *hypochondria*, with nausea and vomiting, are present, the matters thrown up being viscid or ropy and abundant, and yellow, green, or yellowish green, or dark green, or colourless, and mixed with albuminous flakes, energetic vascular depletion should be early resorted to, otherwise the vital tone of the mucous coat and capillaries of the stomach will be soon exhausted, and dark grumous vomiting supervene. In these cases, a large blood-letting from the arm, and twenty grains of *calomel*, with two or three of *opium*, should be promptly prescribed. If these be followed by marked mitigation of the symptoms, and a copious perspiration, this latter should be encouraged by cooling diaphoretics; but if the symptoms continue or return, either a repetition of these remedies, or a large depletion near the seat of the chief disorder, ought to be directed. A large *blister* should be afterward applied, or the warm *turpentine epithem*. The latter is preferable, inasmuch as its effect is almost immediate, as it excites a copious perspiration, and as

it may be renewed from time to time with additional benefit. *Purgatives* may now be given, and they will generally be retained; but those which are least irritating to the stomach should be selected, and their action promoted by cathartic enemata. In the intervals, the liquor ammonia acetatis, with camphor mixture and nitrate of potash, may be prescribed, or other cooling diaphoretics.

252. *d.* If the bile be secreted in great quantity and acrid quality, the consequences of the active determination to the liver occasioning this disorder, and the effects of the morbid secretion upon the digestive mucous surface, ought equally to be guarded against, by local depletions, by external derivatives, cooling diluents and demulcents, and by aperient injections. If symptoms of inflammatory action in the liver are manifest, the same measures should be promptly and energetically employed. If the bowels be inordinately affected, a similar treatment is necessary, the external rubefacients being applied over the abdomen, and a large dose of calomel and opium should immediately follow the depletions. All these ought to be repeated according to circumstances, emollient and laxative medicines being exhibited by the mouth and in enemata, and cooling diaphoretics in the intervals. When soreness, tension, or fulness of the bowels continues notwithstanding, the external applications (§ 251) should be repeated. If with fulness of the abdomen, there is much load on the tongue, and oppression at the epigastrium, purgatives, especially in enemata, should be persisted in.

253. *e.* The exhaustion of the advanced stages, produced by the previous excitement and by the treatment, demands attention. If the above means have removed all local disease along with the morbid excitement, and if the patient is beyond the influence of the causes, little more is necessary, as the system soon rallies. But if he be constantly subjected to them, the consequent exhaustion will be thereby increased, or its character modified, and the adynamic condition superinduced. In such cases, suitable means are devised with great difficulty. If the exhaustion be attended by a distinct remission, the pulse falling in frequency, and the tongue remaining moist, the irritability of the stomach having subsided, the exhibition of bark or quinine should not be delayed; for by it chiefly are we to hope to prevent an accession of the febrile action, and to preserve the powers of life from the noxious influence of the surrounding causes. But the effect of this substance should be carefully watched; as long, however, as the tongue is dry or rough, with the papillæ erect, the pulse hard or irritable, and the skin hot and harsh, the remains or unfavourable consequences of the previous morbid action are still unsubdued; and these the exhibition of bark would increase. In this case, local depletions, tepid or warm bathing, purgatives, diaphoretics, and external rubefacients are still required. If the symptoms and circumstances of the case warrant the use of bark, the decoction with the carbonate of soda and nitrate of potash, or with the liquor ammonia acetatis and hydro-chlorate of ammonia, may be first employed, and subsequently the more active preparations of this substance; but, during its exhibition, the secretions and

excretions must be promoted by purgatives with mercurials, &c. The decoction may be given, for this purpose, with the neutral purgative salts, or quinine with either of the sulphates, so as to keep the bowels freely open. If calomel has been freely given at the beginning, and the bowels well evacuated in the progress of the disease, blue pill, with the aloes and myrrh pill, and ipecacuanha, may be taken at night, and the bark or quinine in the day. It is chiefly in cases where depletions and purgatives have been too long delayed, or insufficiently prescribed, and where the latter have been laid aside too soon, that the bark either fails, or occasions congestion, or obstruction, or consecutive inflammation of any of the abdominal viscera.

254. *C.* The adynamic states of remittent fever, occurring primarily, or supervening secondarily upon either of the other forms, are the scourges of intertropical countries, and present such a variety of characters in both hemispheres—the yellowness of the skin and dark, grumous vomiting predominating in the western hemisphere (the *Yellow Remittent Fever* of Dr. CUNNINGHAM)—that methods of cure which shall be appropriate to their varying forms are often devised with as great difficulty as with want of success. In every condition, however, the removal of morbid secretions and accumulations from the prima via is a necessary preliminary. At the period of invasion, the sense of cold being prolonged, and the nausea not attended by free vomiting, and more especially if the formative stage be characterized by dysenteric symptoms, as sometimes observed in hot climates, the exhibition of an emetic will be useful.—*a.* In the more malignant states of this form, in which the stage of excitement commences with tumultuous vascular reaction concentrated chiefly in the viscera of the large cavities, and principally in those of the abdomen, blood-letting, either general or local, or both, should be practised early in this stage, especially in persons of a robust, plethoric, and sanguine constitution; for, if this state of reaction be not speedily moderated, the vital tone of the viscera which chiefly experience it is soon exhausted, and collapse of the vital powers, with organic change and yellowish discoloration of the skin, supervenes as early as the third, fourth, fifth, or sixth days. In unfavourable cases, and later in those which are less so, followed soon after by dark, grumous vomitings, and all the symptoms to which the term malignant may be appropriately given. Emetics are beneficial only in the formative and invading stages of these cases, and are hurtful if administered in the irritated and inflamed states of the stomach and liver generally attending reaction. After free depletion, from ten to twenty grains of calomel should be exhibited, with one or two of opium, and be repeated according to the effect and the circumstances of the case. If the first bleeding has been insufficient, a second should be directed within twelve or eighteen hours, and followed by the calomel and opium; and the bowels ought to be freely opened. In the worst forms of marsh fever, particularly in hot climates, the secretions of the liver are often interrupted or suppressed, large doses of calomel and active purgatives being especially required in them. If the mouth become affected, the

circumstance is favourable, although we should hardly make this a specific indication unless other intentions be also fulfilled. The warm bath, followed by frictions of the surface, or by the terebinthinated epithem on the abdomen, and by diaphoretics, will also be of great service.

255. *b.* While vascular depletions are thus necessary in the more concentrated and inflammatory states, which rapidly pass into the adynamic or malignant form, they are inapplicable to those in which the powers of the system are insufficient to produce vascular reaction; at least, they should never be employed until efforts at reaction are made, when a small or moderate general or local bleeding may be directed, especially after the warm or *vapour bath* and frictions of the surface, with the view of relieving the overloaded vessels of the large viscera, and of removing congestion of the venous trunks and auricles of the heart. If an adynamic state has continued from the commencement, the skin of the trunk being harsh and dry, the extremities damp, the pulse weak and rapid or irregular, the tongue dark and coated, the bowels disordered or costive, and the evacuations morbid, the vital energies of the frame should be roused by means of the hot or vapour bath; by assiduous frictions with stimulating liniments (F. 299, 300, 311); and internal congestions removed by warm diaphoretics, stimulants, purgatives, and mustard poultices, or the hot turpentine epithem applied over the epigastrium and hypochondria, and, in extreme cases, on the insides of the thighs also. In this latter class of cases, calomel is still indicated, especially if the stomach be irritable; but it should be conjoined with large doses of either camphor, ammonia, or opium, with opium. Subsequently, the bowels having been very freely evacuated, and the states of the tongue, of the pulse, and of the skin not forbidding, bark in decoction, or sulphate of quinine, may be prescribed.

256. *c.* A similar treatment is indicated when an adynamic or malignant state supervenes on that of low excitement, when the skin becomes yellowish or dusky, and the irritability of the stomach urgent, or disposed to pass into the dark grumous vomitings, indicating great danger. This affection of the stomach is much more violent when it is consequent upon excitement than when it occurs in the course of a fever in which excitement has been imperfectly expressed; for, in the former case, the vital power of the organ is exhausted, and the organization affected; in the latter, power is simply diminished or suppressed, restoration being more easy in it than in the former. In both circumstances, the external derivatives just mentioned, and calomel in the combinations specified, are chiefly to be relied upon. When the vomiting consists of a pumping up of the contents of the stomach, rather than of active retchings, cordial stimulants should be employed in addition to these; and aromatic spices, ammonia, æther, camphor, opium, &c., may be variously combined. Fluids evolving carbonic acid, as spruce beer, seltzer-water, soda-water, bottled stout, &c., may also be prescribed. In a few urgent cases, I have found from half an ounce to an ounce of the spirits of turpentine, taken on the surface of milk or any aromatic water, with half a drachm

of magnesia, allay the irritability of the stomach, lower the pulse, and render the tongue moist, after other measures had failed; and I have exhibited this dose, or F. 216, as a purgative, three or four hours after a bolus consisting of ten or fifteen grains of camphor and calomel, with one, two, or three of opium, had been taken; promoting the action of the bowels by warm cathartic enemata, if necessary.

257. *d.* In low, miasmatic districts, bark or quinine, in suitable combinations, is often necessary in an advanced stage of the adynamic states. The former in substance, however, or the latter in large doses, generally irritates the stomach, and it then proves injurious. The infusion of bark, therefore, with the chlorate of potash, or with hydrochloric acid or ether; or the decoction with hydrochlorate of ammonia, or with nitrate of potash, and the solution of the acetate of ammonia, should be first employed; and subsequently the quinine with acids. But while we thus endeavour to support vital power, morbid secretions and faecal collections should be fully evacuated, either by mild purgative draughts—and preferably by those of a stomachic or tonic kind—or by enemata, or by both. If the combination of the mild preparations of bark with the antiseptics and refrigerants just instanced are inefficacious, the more energetic preparations with æther, or the preparation of ammonia, or with aromatics, &c., must be resorted to.

258. *D.* *The complicated states* must be treated with reference chiefly to the condition in which vascular action and vital power are manifested. The treatment of the more inflammatory complications has been already described. The complications of the more adynamic states are so diversified, that the measures already recommended, as well as others about to be noticed, must be adapted to individual circumstances. If an irritable or dysenteric state of the bowels occur, morbid secretions or faecal accumulations have probably caused irritation of the mucous coat. A full dose of calomel should therefore be given, if it have been neglected, and be followed by a common purging draught, by castor oil, or F. 181, 216, 266; and in a few hours, laxative enemata and demulcents should also be administered. After the full operation of these, anodynes, with gentle alteratives and light tonics, or the preparations of bark or quinine in the forms above mentioned, may be exhibited. In the adynamic states this complication is very unfavourable, especially when the stools are very dark, black, or otherwise morbid, and the abdomen swollen and painful. Calomel, with camphor and opium, is necessary in such; and large blisters, or the other external applications previously directed (§ 251), are especially indicated. Tonic purgatives, &c., are also requisite; and bark or quinine in large doses, and in forms of combination most appropriate to this particular class of cases. The other complications either have been already noticed, or demand no material modification of the treatment. Whether seated in the head, thorax, or abdomen, the state of vascular action, in connexion with vital power, requires attention; local depletions, external derivatives and revulsants, active purgatives and diaphoretics, with diuretics, constituting the chief means of cure.

259. *E.* A treatment has been strongly recommended by Dr. STEVENS for the advanced stages, and malignant or adynamic forms, of remittent and other fevers; but I am not aware that it has been satisfactorily or properly employed by other practitioners. One of the substances, at least—the chlorate, or ozymuriate of potash—I have often prescribed as a tonic and stimulant, and for a great many years, both at the infirmary for children, and in private practice; and I am quite convinced, from an extensive experience of its effects in low states of fever, of its very beneficial effects. It has often a remarkable and rapid effect upon the state of the tongue, rendering it more moist and clean. Dr. STEVENS states that, when adynamic symptoms appear after venæsection, mercurials, cold affusion, and purgatives have been prescribed, no time should be lost in exhibiting non-purgative saline medicines, especially the carbonate of soda, the chlorate of potash, and common salt; and that these should be repeated every hour during the disease. These substances he believes to act beneficially upon the constitution of the circulating fluids, and to replace that portion of the saline constituents of the blood which he supposes to be lost or changed in the early course of the disease.

260. *F.* If the remissions become hardly distinguishable, the states of morbid action being in other respects as above treated of, the method of cure must still be the same as recommended for the inflammatory, bilious, concentrated, and adynamic or malignant forms respectively; the nature of the disease being no farther changed by the continued type thus assumed, than that the constitution suffers more decidedly, and the vital powers sink more rapidly under the unremitting state of disease induced. Hence the means of cure should be the same in kind, but administered, in warm climates especially, with greater promptitude and decision.

261. *G.* Where remittents assume the intermittent type, as they occasionally do in unhealthy localities, the liver, spleen, or mesenteric glands, or all of them, are more or less disordered, or actually diseased; and enlargement or obstruction of one or more of them generally soon afterward becomes evident. In cases of this kind, although the active exhibition of bark or quinine is necessary to prevent the return of the paroxysms, which, by their continuance, would increase the mischief, yet the full operation of purgatives and deobstruent laxatives is equally requisite; for, without them, neither will the obstructions already existing be removed, nor the intermittent disease be safely arrested, nor the bark or quinine exhibited with permanent advantage to the patient. In cases of this kind, change of air is next in importance to the employment of suitable medical treatment; and, in all cases, the one should accompany the other. If remittents pass into dysentery, disease of the liver and of the mesenteric glands, with the other changes in the large bowels, fully described in that article, is a common pathological state; and the treatment must be directed accordingly, and as fully detailed under the above head. The regimen and convalescence of the patient, and the means proper for the prevention of relapses, differ in no respect from what has been stated on these topics under the treatment of intermittents (§ 223, 224).

[*Bilious Remittent Fever of the United States.*

—The bilious remittent is the most generally prevalent fever that occurs in our country, especially in the middle and southern sections of the Union. Originating from the same malarious causes as the intermittent fever, like it, also, it possesses certain well-marked and peculiar features, is characterized by similar pathological changes, and requires a modification of the same remedial management. The United States present such a variety of climates, localities, and seasons, that this, like every other disease, assumes a great diversity of aspect, as modified by these different circumstances; so that all the forms of remittent fever above described by Dr. COPLAND are met with in different districts, or even in the same, in different seasons.

Symptoms.—The ordinary simple remittents of our country are ushered in by the same symptoms as attend intermittents, languor, drowsiness, pains in the back, head, and extremities; with a sense of anxiety, or slight chills, alternating with flushes of heat, which gradually increase until febrile reaction is fully developed. The pains in the head, back, &c., become greatly aggravated; the eyes acquire a yellowish tinge; the tongue becomes coated with a brownish fur; nausea and vomiting occur; the respiration becomes oppressed, with a sense of weight and fulness in the epigastric region; the pulse is full and frequent; the skin generally hot and dry; the urine scanty, and deeply tinged with bile. These symptoms continue with more or less violence till the succeeding morning, when a partial or general perspiration takes place, with a corresponding abatement of the febrile excitement, but not a total remission; which continues for the space of an hour or two, or longer, when an exacerbation takes place, and the fever acquires its former violence, or even greater, which again remits after a certain period; thus undergoing regular revolutions of exacerbations and remissions, until it finally terminates in a perfect crisis, and convalescence, or assumes a more uniform or continued course. EBERLE has particularly noticed this last feature in our autumnal fevers, which gives to our remittents the character of our continued, or typhoid fevers, and which often renders it difficult to distinguish between them, especially when the latter assumed a bilious type: our ordinary mild remittents, whose symptoms are here briefly sketched, for the most part take on the double tertian or quotidian type, more frequently the former; for, although the exacerbations occur once every day, yet there is an aggravation of all the symptoms on the odd or alternate days; and the exacerbations of a remittent of the quotidian type generally occur several hours earlier than those of the double tertian type; the former happening usually about nine or ten o'clock, and the latter not till towards noon, or an hour or two later.—(Eberle.) If the disease continues unabated beyond the ninth day or second week, it is apt to assume an aggravated and dangerous character; the fever is constant; the tongue becomes more furred and dry; the delirium more frequent and severe; the skin yellower; in short, the symptoms take on a decidedly typhoid character, with meteorism and tenderness of the abdomen on pres-

sure, diarrhœa, &c. ; which often go on unabated till the disease terminates fatally. Throughout the whole course of the disease there is a constant tendency to local hyperæmia, or inflammation ; and it is this pathological condition which gives such frequent fatality to the malady, as well as the variety of features by which it is so strongly characterized. There can be little doubt that in every instance there is present more or less inflammatory congestion of the gastro-enteric mucous membrane, especially in our more southern latitudes and hot seasons ; and the extension of this hyperæmia along the biliary ducts to the liver, causing a suppression of the biliary flow, and a sense of pain and fulness in the right hypochondrium, and other phenomena denoting hepatic complication, constitute one of the most important features of the disease. The restoration of the hepatic functions, as denoted by the bilious discharges, is one of the earliest symptoms of amendment, and though denominated *critical*, probably denotes nothing more, as Professor DUNGLISON has remarked, than that the pathological cause of the deficient biliary secretion has passed away, and that the engorgement, which was the cause of the detention of the bile in the gall-bladder and ducts, has subsided. "In other cases," says Dr. D., "where the gastro-enteric hyperæmia is not so great, the hepatic symptoms may be less marked, or be indicated for the first few days simply by a yellowish tinge of the conjunctiva, denoting that the secretion is not freely poured into the small intestines. The liver, in this case, instead of having its secretion locked up, as it were, in the gall-bladder and ducts, after the first few days is merely excited to greater secretion ; and, accordingly, the disease is accompanied by a copious flow of bile, which is indicated in the evacuations both by vomiting and stool. According, therefore, to the degree of gastro-enteritis existing in any individual case, we may have signs of absence or of undue quantity of bile in the evacuations ; but in both cases the liver is affected secondarily, a slight irritation in the lining membrane of the duodenum acting in the same manner as one of our cholagogue cathartics ; the irritation produced by it being communicated, in the manner above mentioned, along the ductus communis choledochus and the hepatic duct to the liver, and along the cystic duct to the gall-bladder ; so that the former is excited to greater activity of secretion, and the latter to a more frequent discharge of its contents."—(*Præctice of Medicine*, vol. ii., p. 504.)

Malignant or Congestive Remittent Fever is another distinct form, or, rather, higher grade of the disease, usually described by European writers under the title of *perniciosa*. It often occurs in the paludal districts of some of the southern and western portions of the United States, and during some seasons proves extremely destructive to human life. The phenomena it presents are characterized by marked adynamia ; indeed, with the exception of the malignant cholera, no disease is attended, perhaps, with greater prostration or more dangerous congestion of the important organs. The cold stage is short, and not often very severe ; the patient is drowsy, or even comatose ; the countenance swollen ; the respiration oppress-

ed ; there is nausea, or vomiting, with anxiety, faintness, diarrhœa, &c. The pulse is scarcely to be felt during the chill ; as reaction comes on, it develops itself slowly, being smaller and weaker than in ordinary cases ; and during the remission it is often slower than natural. The anxiety and sense of weight at the præcordia increase ; the surface is covered, perhaps, with a clammy sweat ; the extremities, as well as the face, are cold and livid ; and the disease suddenly proves fatal. It is this form of the disease to which the term *cold plague* has been given in some parts of our southern country. In the more common malignant remittent, the fever succeeding the cold stage is generally very violent, and accompanied with excruciating pain in the head, back, and limbs, with dyspnœa, anxiety, and a distressing feeling of oppression at the epigastrium ; these symptoms usually continuing for twenty-four hours, when a short remission takes place, only to be followed by a still severer paroxysm, which ends in a clammy perspiration. If the disease is not arrested or moderated, it is very apt to terminate fatally during the third or fourth paroxysm.

Post Mortem Appearances.—These are various, and such as have been pointed out by Dr. COPLAND in the preceding article. In addition to these, Dr. STEWARDSON, of Philadelphia, has pointed out a particular condition of the liver, which he considers characteristic of the disease. "The liver," he remarks, "was enlarged, and its consistence generally diminished ; but the most remarkable alteration was one of colour, which was met with in every instance. This colour more or less resembled bronze, or a mixture of bronze and olive, or some shades of lead colour. This alteration existed uniformly, or nearly so, throughout the whole extent of the organ, except in a single instance, where a part of the left lobe was of the natural reddish, brown hue. As the alteration of colour pervaded both substances, the two were frequently blended together, and the aspect of the cut surface remarkably uniform." Dr. S. found the *spleen* enlarged and softened in every instance, the *brain* and *lungs* presenting such alterations only as are common in all acute diseases ; the *heart* flabby, and its lining membrane of a deep red or violet colour ; the *stomach* uniformly presenting marks of inflammation ; the *glands* of BRUNNER preternaturally enlarged ; and the mucous membrane of the large and small intestines not characterized by any uniform appearances, though sometimes inflamed, or ulcerated in patches ; the *glands* of FEYER were healthy in every instance.—(*Am. Jour. Med. Sciences*, Ap., 1841, and Ap., 1842 ; and STEWARDSON'S *edit. of ELLIOTSON'S Principles and Practice of Medicine*, p. 338. Philad., 1844.)

Dr. J. A. SWETT (*Am. Jour. Med. Sci.*, Jan., 1845) has published the results of dissection, in several cases of death from remittent fever, which occurred in the New-York Hospital, and notices the same peculiar condition of the liver, as described by Dr. STEWARDSON. Dr. S. observed no other positive change in the liver but that of colour, except, perhaps, a slight degree of softening. This organ was natural in size ; yielded but a small quantity of blood by pressure, and contained no lymph or pus in its

interstices; these circumstances, together with the fact that there was no pain or tenderness over the liver during life, lead to the inference that the change in question is not the result of inflammation, but is most probably produced by the action of the bile. In the present state of our knowledge, especially in relation to the changes produced in the liver in other fevers, and other diseases, but little importance can be attached to the appearance pointed out by Dr. STEWARDSON. This writer has attached considerable importance to the pathological condition of the stomach and duodenum, and is disposed to believe that inflammation of the mucous membrane of these organs is a frequent feature of the disease; but the observations made in the New-York Hospital, where opportunities of seeing this disease frequently occur, do not confirm this pathology. Dr. SWERT observes (*loc. cit.*) that most of the changes he has observed appeared to be of a chronic nature, and probably were long antecedent to, and entirely independent of, the acute disease; the injection of the mucous membrane, though present in all cases, to a certain extent, not appearing to be more than is commonly noticed in other acute diseases, and might possibly be referred to simple post-mortem venous congestion; so far as local evidences of inflammation are concerned, the lungs were the organ most decidedly affected; in a few amounting to distinct pneumonia. The glands of PEYER were usually of a dead white colour, and presenting no marks of inflammation. That these glands are, however, sometimes inflamed and ulcerated in this disease, would appear from various observations made in our country, as well as in other parts of the world. In the *N. Y. Jour.* for 1841, six cases of remittent fever are reported by Dr. RICHARDSON, resident physician for that year, in all of which the glands of PEYER were more or less affected. Though these glands are more frequently affected in the typhoid,* or ordinary continued fever of our country, than in any other, yet that they undergo changes in all fevers occasionally, especially those cases which become chronic, and are marked by a general hyperæmic condition of the gastro-enteritic mucous membrane, no one can doubt who has been in the habit of making post-mortem examinations. The attempt to establish the pathology of remittent fever upon the few cases hitherto reported must necessarily fail, from the paucity of the observations.

Treatment.—Dr. EBERLE has, with much judgment, pointed out the indications in the treatment of remittent fever to be, 1, to moderate the febrile reaction of the arterial system; 2, to remove out of the alimentary canal the vitiated and irritating secretions which may be lodged in it; and, 3, to obviate gastro-intestinal irritation, and restore the healthy functions of the liver and intestinal tube.

In the ordinary autumnal remittents of our climate, Dr. E. thinks that the first indication may often be met by cathartics, cool drinks, &c., without resorting to the use of the lancet, especially in the absence of symptoms of strong

local congestion or visceral inflammation, but that in particular localities, and under peculiar circumstances of atmospheric constitution and vicissitudes, remittent fevers may sometimes assume a character which demands free sanguineous depletion. If there is no great inflammatory excitement present, it will be generally sufficient to administer a mild cathartic, enjoin rest, low diet, and the usual adjuvants of an antiphlogistic course; but if the excitement be high, then general bleeding is undoubtedly indicated. In the severer forms of the disease, where the gastric complication is strongly marked, emetics and cathartics are contra-indicated; while most writers bear testimony to the good effects of abstracting blood. The irritability of the stomach is more speedily allayed by this remedy than by any other; but to ensure its full effect, it should be resorted to at an early stage of the malady; indeed, in the highly malignant form, it will be scarcely allowable at any other period. In such cases, leeches may be applied to the epigastrium, and the vomiting allayed by ice, or ice-cold soda water, taken in the act of effervescence, or sinapisms may be applied to the epigastrium. Some difference of opinion exists in the profession as to the extent to which bleeding should be carried in the treatment of remittent fever, some going so far as to proscribe its use altogether. Dr. PARRY, of Indianapolis, has published a memoir on this disease, in the *Am. Jour. Med. Sciences* for July, 1843, in which he states that he employed topical depletion to a limited extent, to relieve local congestion, in connexion with stimulants, tonics, and revulsives. Dr. R. G. WHARTON, of Grand Gulf, Mississippi, in the same Journal for April, 1844, has given an account of the same malady as it prevailed in Mississippi and Louisiana, and advocates the stimulant plan of treatment; he considers capsicum in large doses as almost a specific for the intense thirst which prevails, and that the vomiting, dyspnoea, and oppression are best relieved by stimulants, among which brandy is reckoned as the best; which, he states, often relieves the most intense headache and restlessness. Both these practitioners rely solely upon large and repeated doses of quinine, after reaction has taken the place of the cold stage, to prevent the accession of another paroxysm. Dr. WHARTON says of it, "In this town (Grand Gulf, Miss.), quinine was scarcely used till the latter part of the summer of 1837. The great mortality which prevailed then, when contrasted with the present success in this disease, is to us, who have witnessed it, one of the strongest proofs which could be adduced of its inestimable value." And Dr. PARRY says, "Although I like all the collateral assistance I can receive from other articles, yet the sulph. quinine is the remedy. It is the master article of the materia medica; with it, and reaction once established, I believe nearly every case can be cured; and without it, scarcely any recover." Quinine has been recently recommended by some high authorities to be given through all the stages, both in remittent and intermitent fevers, and it is said that the best results have followed the practice. "The testimony in favour of this practice," says Dr. PARRISH, of Philadelphia (*Am Jour. Med. Sciences*, Ap., 1845), "from various quarters of the

* [For a very able and lucid description of the diagnosis of the disease, see "The History, Diagnosis, and Treatment of Typhoid and of Typhus Fever, with an Essay on the Diagnosis of Bilious Remittent and of Yellow Fever." By ELISHA BARTLETT, M.D. Philadelphia, 1842.]

country during the past year, is very strong, and calculated to break in upon the long-established prejudices against the use of bark or quinine in the early stages of remittent fever.*

Allowing, however, that the disease may often be successfully treated by tonics and stimulants, it by no means follows that congestion may not constitute one of its most important features, as we know this may sometimes be relieved by the opposite remedies of stimulation and depletion. A proper combination of both these we hold to be the true secret of treating this disease successfully. The remedy on which chief dependance appears to have been placed in the management of intermittents and remittents in the United States has been *mercury* in some of its forms, especially calomel; and it would perhaps be difficult to decide whether greater evils had flowed from the disease or the mode of its treatment. We are happy to know that the abuses which but recently existed in the use of this drug are rapidly subsiding, and that patients no longer look upon their physicians with greater apprehension than upon their maladies.

The treatment of remittent fever in the New-York Hospital for several years past has been eminently successful. Most of the cases are seamen, or passengers from some of our southern ports, as Wilmington, Georgetown, Norfolk, Charleston, Savannah, &c., and they are received in the middle, or, perhaps, the last stage of the disease. The treatment generally pursued has been of a mild, stimulating, and supporting character. In the summer of 1836, *ninety-four* cases of this fever were treated in the hospital by Dr. F. U. JOHNSTON, of which *four* only proved fatal, one of which was from a complication of the disease with phthisis. This great success is to be attributed, not only to the judicious administration of remedies, but also to the good nursing, and the careful attention paid to the patients; every symptom being observed and noted at the bedside, in the morning, at noon, and in the evening; no patient was left alone at any time; and every one was visited by the house physician every two hours, or oftener. We quote the history of a single case, as given by the resident physician, Dr. N. SHOOK (*New-York Jour. Med.*, vol. i., p. 95).

"ALEXANDER SUTHERLAND, aged 35, seaman, admitted Sept. 30, 1836.

"*Symptoms* at the time of admission. Extreme prostration; almost perfect coma; answers no questions; lies upon his back; pupils contracted; face flushed; sordes about the gums and tongue; desires constantly to pick his lips and tongue; pulls the bed-clothes; high fever; pulse 110, and feeble; skin dry and hot, temperature of the head and abdomen greatest; subsultus tendinum at the wrist; no

petechiæ or sudamina; can get no information as to the condition of his bowels or urine; symptoms altogether very unfavourable.

"*History*.—The only information I could obtain from his shipmates was, that he was seized with the fever twelve days ago, on the passage from Savannah; that he had a chill, followed by great heat and feebleness; pain in the head and back; and that on the third day of the fever he became delirious.

"*Treatment*.—September 30th. The patient was ordered, immediately after admission, wine whey; he could swallow but a few drops at a time; mustard sinapisms to the feet and epigastrium.

"These means succeeded in a few hours in arousing him sufficiently to answer questions, and to swallow quite easily.

"Oct. 1st. Better; slept about an hour; had a free alvine discharge; voids no urine; complains now of aching pains all over the body.

"Direct snakeroot tea; a bottle of porter; the wine whey continued; spirit of Mindererus during the exacerbation of fever.

"P.M.—Fever worse again, though not so much determination to the brain as at the time of admission.

"2d. Patient somewhat better this morning; Dr. JOHNSTON now directed me to give him half a grain of the sulphate of quinine every hour in addition to his other remedies.

"P.M.—Exacerbation this evening less marked.

"3d. Slept well last night; feels better this morning; pulse 98 and stronger. Same treatment.

"4th. Better; sordes about the mouth disappearing.

"5th. Much better. Omit quinine and porter; continued wine whey.

"10th. Convalescing.

"24th. Discharged cured.

"*Remarks*.—This was a case of great severity, with strong determination to the head, and portending a fatal termination. It furnishes a fair example of at least one quarter of the patients that are admitted during the months of September and October into the Seaman's Hospital, of fevers contracted at the South.

"The case illustrates, also, very forcibly, the benefit of the supporting plan of treatment, for here were symptoms that denoted great congestion of the brain, and of the abdominal viscera, and the treatment that naturally suggests itself would be strictly antiphlogistic, if not depletory; but not so to one well acquainted with the character of this disease; his only object is to support the sinking energies of the system by equalizing the circulation and restoring the functions of the more vital organs, and thereby enabling his patient to rally under the disease. This he is aware cannot be done by any means which will destroy or diminish, in the least degree, the nervous energies of the system."

Dr. Shook adds the following remarks to his very instructive and valuable paper:

"It appears, from the treatment of the preceding cases, that *tonics* were the principal remedies employed. I am aware that tonics have been long given in the stage of convalescence from remittent fever; but the administration of wine, quinine, serpentaria, and nour-

* [Dr. PARRISH attempts to prove that the phenomena of congestion do not belong to the remittent fever, but "that they occur under circumstances which forbid the idea of congestion; that the various organs which are disturbed in the progress of this fever are similarly affected by causes of a depressing character acting upon the nervous system; that nervous shocks from accidents, operations, &c., will produce them; that they may even arise from hæmorrhages, when the system is drained of blood; and that the discharges which sometimes mark this disease may be fairly attributed to alterations in the blood itself, combined with laxity of fibre."—(*Loc. cit.*)]

ishing soup, to a patient with a dry, harsh, cracked tongue; dry, hot skin; pulse one hundred and ten; severe aching pains of the limbs, and delirium without any previous depletion, is a practice not so common. It is said that tonics should not be administered when the tongue is dry, and the skin hot and free from moisture, and when there is great pain in the head with a rapid pulse; in just such cases were wine, porter, and quinine given with the most gratifying results. The skin became soft and moist; the pulse more calm; the delirium subsided; the tongue immediately began to show that the mucous membranes were acted on, and that an altered state of the secretions was taking place. Tonics not only produced a gradual and permanent influence on the appetite and strength of the patient, but they produced an immediate impression. The improvement was sometimes so rapid as to be very remarkable from one day to the next.

"A doubt may arise as to the propriety of using tonics in the early stage of the fever; they were used in all the stages, although at times disadvantages followed their employment; occasionally the quinine would irritate the stomach and increase the fever; if so (which was rarely the case), the medicine was discontinued until the severity of the symptoms abated.

"The quinine was always given in solution, and in small doses; if the excitement was great, the use of it was suspended in the evening.

"Immediately after admission into the hospital, the patient's bowels were evacuated by some mild purgative, either rhubarb and magnesia, or castor oil; calomel was seldom employed. The following day, if there was a distinct remission of the fever and no local inflammation to prohibit it, the quinine was given; in most cases, it was not given before the third or fourth day after admission. It was usually continued until the stage of convalescence; together with the quinine was administered an infusion of the roots of the *aristolochia serpentaria*—an ounce to the pint of boiling water. This was given to the patients as a common drink in all stages of the fever. If too bitter and strong, it was diluted with cold water.

"Porter was given in many cases with decided benefit, but if it produced diarrhœa it was at once suspended. Wine whey was given to all the patients that were admitted late in the disease with great prostration and exhaustion, even if the tongue was perfectly dry and the gums covered with sordes; it was surprising to see the rapid improvement in such cases. When given in conjunction with porter, the quantity was about eight ounces daily, but as a temporary prescription to obviate extreme prostration, it was not restricted to this quantity. If care be taken to refrain from wine when there is acute inflammation of some organ, no inconvenience will result from its use.

"The spirit of *Mindererus* was given in every case of fever as a sudorific; how far it had the desired effect, independent of the other remedies, I cannot say, as it was always given in conjunction with them.

"The frequent *ablution of the head* and limbs with cold water was found very agreeable to the patients, and of a good deal of efficacy in

equalizing the capillary circulation. Ice water to the head during the height of the fever was one of the most useful remedies in abating the febrile excitement.

"*Anodynes* were given with the most happy effect; nothing appeared to allay nervous irritability and restlessness so well as an anodyne; either ten grains of DOVER'S powder, or a few drops of the solution of sulphate of morphine. It quieted the patient, abated the delirium, and induced sleep. From the decided benefit that morphine produced in most cases, I should class it among the most useful remedies in remittent fever."

We have already expressed our disapproval of the "mammoth" doses of quinine in intermittents and remittents (see under the Art. "INTERMITTENTS"), believing that smaller doses will prove of equal efficacy, and that large doses are not unattended with danger. Dr. DRAKE, however (*Western Journal of Med. Sciences*), gives his testimony in favour of large doses of the sulphate, and states that he has been in the habit for several years of giving it in doses of ten or fifteen grains, alone, or combined with calomel, and that the late Dr. PERRINE, of Mississippi, administered it in such quantities as to amount to a drachm during a single intermission. Dr. MAY, also, of Alabama (*Transylvania Journal*, vol. x.), recommends the article in large doses, and mentions that he himself took fifteen grs. of it in one dose, with the effect of checking the fever, but that it produced a degree of stupor, ringing in his ears, and deafness. Cases illustrating the beneficial effects of large doses of quinine may be found in BELL and STOKES'S "*Lectures*," vol. ii., p. 640-1-2; also in *Am. Jour. Med. Sci.*, vol. xi., p. 250, &c. The calomel and quinine practice, as it is called, is now very popular in some parts of our country, especially the Southern States, where these articles are alternated every two or three hours during the apyrexia in large doses, with sinapisms to the extremities, and warm stimulating drinks, and, it is stated, with very beneficial results (Dr. HOGG and DRAKE, &c., in *Western Journal*). In the treatment of this disease, we hold with Dr. BELL, that it is important to bear in mind, 1. That the chief seat of the disease is in the nervous system; 2. That the remedies should be administered with reference to a soothing and tonic, rather than irritative action on the system; 3. That the latter indication is best, and, for the purpose of permanent cure, only carried out by the early and free administration of the sulphate of quinine, or some other product or analogous preparation of the bark.]

XIII. CHRONIC OR OBSCURE REMITTENT. SYN.

—*Anomalous or relapsing Remittent; Slight Nervous Fever*, I. MACCULLOCH.

262. CHARACT.—*Slight febrile exacerbations and remissions, with headache, &c.; recurring in daily, occasionally in reduplicating, paroxysms; continuing for an indefinite period, and giving rise to various disorders of the digestive organs and nervous system.*

263. This very slight form of remitting fever often continues a very long time when its nature is mistaken. It is by no means an infrequent disease: three or four instances of it have been treated by me very lately; and before my attention was directed to it by the wri-

tings of Dr. MACCULLOCH, other cases had disappointed my anticipations as to their nature and treatment. It appears in delicate persons, and commonly arises from the less energetic action of the same causes which produce the more decided and acute forms of marsh fever, and generally in a primary mode; but it also may follow the simple remittent described above. It bears the same relation to the definite and severe disease as the slight, anomalous, or masked intermittent does to regular ague. When it is so marked as to be esteemed a fever, it is often mistaken for hectic; and in its slighter modes it is confounded with what is commonly called debility, chronic debility, chronic dyspepsia, delicate health, nervousness, low spirits, hypochondriasis.

264. *A.* In the cases which have occurred to me, exposure to *malaria* was manifest; and to two patients the *cause* was assigned and explained, and a different residence recommended. Whether it may arise from other sources is not determined; but I entirely agree with Dr. MACCULLOCH in believing that malaria is far oftener present than has been imagined, more especially during late years, and around the metropolis. In those cases which have been traced to this source, the whole character of the disorder is that of remittents, as shown by its tendency to critical periods, and its diurnal remission, &c. It often, also, terminates in an intermittent as slight and obscure as the original disease; while it is not infrequently followed by local affection of the nervous system, especially periodical headache, toothache, intermittent rheumatism, and neuralgic pains. Its frequent recurrence or relapses, especially during northeast or easterly winds, and in the outskirts of the metropolis, thereby resembling anomalous or masked ague, is also a circumstance deserving of remark, and an argument for considering it, with Dr. MACCULLOCH, as a modification of remittent, and as the effect of a slighter dose, or different conditions of the marsh poison. By mistaking this fever for other diseases, the sufferings of the patient are often materially aggravated; while, having recognised its nature and cause, not only the means of cure, but also those of prevention become obvious. In many cases, the cure and prevention are accidentally hit upon either by the practitioner or patient; and the state of ill-health complained of removed by change of air, or a visit to a watering-place.

265. *B.* The symptoms consist chiefly of great muscular weakness, which often appears unaccountable, of sinking sensations, and disinclination to exertion. A slight chill is often present in the forenoon, or about midday, or a creeping cold down the spine. During the afternoon, evening, and night a slight degree of febrile excitement is manifest, and the palms of the hands become hot or burning. The tongue is generally white, and the apex and edges are often somewhat red. The urine is often pale and abundant in the morning, and higher coloured, and more frequently voided in the evening and night. The patient is sometimes unable to follow his occupations in the morning; he wakens unrefreshed, either from a feverish, restless, or disturbed sleep, or from a lethargic, dreamy, and prolonged sleep; he is fatigued all morning, without knowing

wherefore; is depressed, anxious, and irritable; or complains of want of mental energy or ability, and of dull headache; and, as the chills and sinkings of this period pass into a gentle febrile excitement, he feels more restored in the afternoon or evening. In the case of a delicate, most talented, and accomplished female subject to this disease, and liable to relapses of it during cold easterly winds, although the most distressing sinking and exhaustion were often felt in the morning, so that she was hardly able to dress herself, or to get up to breakfast, yet she often could, in the evening, exert and enjoy herself. The pulse is occasionally not materially disturbed: it is frequently accelerated and a little hard, in the course of the exacerbations, but is commonly weak and slow in the remissions. The bowels are generally sluggish; the evacuations slightly disordered; and the appetite, when the heat is considerable, and the exacerbations very marked, is much diminished, and generally capricious. The patient loses flesh during the attacks, and various anomalous symptoms referable to the stomach, bowels, and other abdominal viscera often present themselves; and, when they become prominent, are liable to be considered and treated as the original complaint.

266. In many cases, although these ailments are both real and distressing, the patient is considered as either feigning or hypochondriacal. In these more especially, and when the course of the complaint is less regular, the time of the day when the exacerbations and remissions occur varies much. If they are tolerably regular, they often present a quotidian, tertian, or double tertian character, the symptoms being worse on alternate days. In the more chronic cases, the mind becomes irritable or despondent, and in some instances this latter feeling is most distressing. Dr. ELLIOTSON confirms the remark of Dr. MACCULLOCH, that the exacerbations are often unobserved from occurring in the night; increased heat, oppression of the head, and depression of spirits, amounting to hypochondriasis, being the chief symptoms. The nights are frequently the periods of greatest suffering. A gentleman who consulted me in the summer of 1834 described them as being most distressing. In another case, an inability to think, with confusion of ideas, was complained of; an inflammatory dyspepsia, a burning sensation at the stomach, and other symptoms of irritation of the digestive mucous surface; sponginess of the gums, and soreness of the tongue, which often becomes smooth and divested of its papillae, occasionally appear in the advanced course of the disease; and ultimately serious disorder of the abdominal organs, prostration of organic nervous power, and a state of ill health, amounting to general disease, supervene.

267. In some instances, this complaint assumes more of the intermittent character, and at different times it seems to vacillate between the remittent and intermittent types; but there is rarely any distinct cold stage, or a greater feeling of cold than that above mentioned (§ 265), excepting at the commencement of an attack, or of a relapse. Signs of functional disorder of the liver, and of torpid function of the colon, often appear, especially in this class of cases; and the disease is frequently consid-

ered a form of liver complaint; the heavy or dull headache sometimes attending it being imputed either to the same source, or to the accompanying affection of the stomach.

268. In conclusion, Dr. MACCULLOCH describes this form of remittent as modified chiefly in degree and duration, it being often so slight as to require some attention in tracing its form, and even its existence. It is apt to become habitual, or to recur at frequent but variable intervals, during even an indefinite course of many years; varying in such a course its characters and symptoms, and being in some cases a marked chronic intermittent, in others remittent, and in some so brief and imperfect in its remissions as to be almost continued. Its accessions are of the ordinary duration of remittents, and they commonly observe the quotidian or double tertian periods. It is, moreover, often a primary disease: sometimes it is consequent upon ague, or the severe states of remittent, or even upon continued fever; and, while it is especially caused by malaria, in some of the slighter modes of this poison, it may possibly arise from other sources; or, after a first attack, a relapse may be caused by cold, moisture, atmospheric vicissitudes, the use of cold or drastic purgatives, vicissitudes of temperature, intemperance, blood-letting, and excessive evacuations.

269. TREATMENT.—*a.* The slighter, primary, and more recent states of this complaint are removed by the sulphate of quinine, the preparations of bark combined appropriately to particular cases, by FOWLER'S solution of arsenic, and change of air; the bowels being duly regulated by laxatives, or mild purgatives combined with bitter tonics (F. 266, 562, 572). But the more chronic states, especially when the nervous system is much affected and the patient has become desponding and hypochondriacal, are treated with much less success. If it degenerate into confirmed hypochondriasis, the case is one of the most difficult that comes before the practitioner. In some instances an active exhibition of *sulphate of quinine* is of great benefit. Dr. ELLIOTSON alludes to a case in which five grains were given three times a day without benefit; but the dose having been increased to ten grains, relief was procured. When signs of inflammatory irritation of the digestive canal exist, the decoction of bark should be first employed with the nitrate of potash, or with the hydrochlorate of ammonia; and if the tongue be flabby, and the gums spongy, as in the case above alluded to, the decoction may be given with hydrochloric acid, or with the nitro-hydrochloric, or with the *chlorate of potash*. The combination of aloes, or the aloes and myrrh pill, with sulphate of quinine and inspissated ox-gall, will be found the most successful purgative: it proved so in one of the cases I lately treated. The *creasote* was employed by me in another case, in conjunction with quinine, in doses of from one to four drops three times a day. The patient was much benefited, but went on the Continent soon afterward.

269. *b.* *Early change to a dry and wholesome air*, whenever the patient's residence is at all in fault, is the chief part of the treatment. Without this relapses will be frequent. Healthy watering-places, travelling, and the rest of the means directed in *hypochondriasis*, must be re-

sorted to when the disease has proceeded so far as to be attended by despondency. *Seavoyaging*, which generally proves so beneficial to persons recovering from the remittents of warm countries, is also very serviceable in this complaint. It is a much more safe mode of enjoying change of air than that too often adopted by patients of this kind; for many of them, preferring to travel on the Continent, are in numerous places and on many occasions much more exposed to the efficient cause of the disease than if they had remained in England. Indeed, the worst instances which I have seen, or which I have heard, have been those who had experienced attacks of ague or of remittent fever in Italy and in warm countries, and, on their return to this country, had suffered from the slighter causes occurring in it, or from the east winds of spring, and then blamed the climate of England for a disease which, if not contracted, had, at least, its seed sown in the countries which have been objects not only of their preference, but of their eulogies.

XIV. REMITTENT OF CHILDREN. SYN.—*Infantile Remittent Fever*, BUTTER; *Febris verminosa*, of various authors; *Spurious Worm Fever*, MUSGRAVE; *Febris mucosa verminosa*, GOELIS; *Hectica Infantilis*, SAUVAGES; *Febris lenta*, HOFFMANN.

270. CHARACTER.—*Exacerbations and remissions, of fever in children, with loaded tongue, loss of appetite and flesh, unnatural evacuations, pains in the abdomen and head, and much irritability; generally chronic in its duration.*

271. i. REMOTE CAUSES.—This disease usually affects children from nine or ten months to twelve or thirteen years old. It was very generally imputed by writers in the last three centuries to worms, which are rather a complication than a cause of the complaint; but a complication of remarkable frequency on the Continent, particularly in the unhealthy localities where this affection is most common, and often misunderstood, both this complaint and worms in the prima via being occasionally concomitant effects of one and the same cause, which has been very generally overlooked. The remarks of HOFFMANN, BAGLIVI, DE HAEN, BRERA, and GOELIS, as to the influence of the latter disorder in causing the phenomena of infantile remittent should, therefore, be considered merely as proofs of the frequency of this concomitancy, while our experience of the disease, in this country in particular, demonstrates its independent nature. Dr. MUSGRAVE, in his "*Essay on the Worm Fever*," was the first who distinctly stated this; but a nearly similar opinion had been given by Professor SINCLAIR, of Edinburgh, long previously, and had also been entertained by Dr. MUSGRAVE'S contemporary, Dr. WILLIAM HUNTER. Dr. CLARK confirmed the statement of MUSGRAVE, and the subject was soon afterward set at rest by the publication of Dr. BUTTER'S work on the "*Infantile Remittent Fever*."

272. Dr. BUTTER assigned debility of the digestive organs, errors in diet, accumulations of morbid matter on the prima via, and the peculiar irritability of childhood and proneness to fever as the principal causes of the complaint. I believe it to be often caused by improper food, by collections of mucous sordes in the digestive canal, owing to a neglect of the bowels,

and by too cold or thin clothing, in connexion with debility of constitution, and morbid irritability of the frame. But, having observed it most commonly in situations evidently productive of humid exhalations, in low, cold, and moist localities, and after exposure to a cold air after rain, particularly at night or in the morning, or during easterly winds, I am led to infer that it arises most frequently from the same causes as produce other periodic fevers, namely, terrestrial exhalations or miasmata, and that less intense or concentrated states of these exhalations than are required to produce either agues or remittents in adults will often occasion the latter in children.

273. ii. DESCRIPTION.—This complaint usually commences gradually, the bowels being irregular, generally costive, but sometimes relaxed or irritated. Febrile exacerbations, with drowsiness, occur in the course of the day and evening, the child often evincing little disorder during the remission excepting a loaded tongue and peevishness. The pulse varies in frequency with the exacerbations, and ranges from 100 to 140. The appetite is variable. These are often the chief symptoms of several days, when the complaint becomes aggravated, and a distinct chill or rigour is sometimes observed, followed by vomiting and a more violent paroxysm of fever, drowsiness, flushed cheeks, and shooting pains through the abdomen and head. The child constantly picks its lips, nose, and eyes, and even pushes substances up the nostrils; and occasionally stiffness of the neck, great sensibility of the general surface, and tenderness in the course of the spine, are observed. After some time, the functions of the digestive canal are almost entirely destroyed, the ingesta being either thrown off unchanged, or passed undigested from the bowels. In older children, the evening or night exacerbations are often attended by delirium. In some instances, particularly in very young children, convulsions occur, and render the diagnosis a matter of difficulty, unless the patient be carefully observed during the remissions. Such is the most common form this complaint assumes. Dr. BUTLER has, however, distinguished three varieties, which he has denominated the *acute*, the *slow*, and the *low*. There are some grounds for this division; or, rather, the complaint presents numerous modifications, which may be arranged under these or similar heads.

274. A. *The acute variety* is generally preceded by symptoms of indisposition, but it may occur rather suddenly. The bowels are irregular, commonly costive; the evacuations are morbid and offensive; the urine turbid, pale, or milky; and the tongue is loaded, especially at the root. Fever supervenes, and is ushered in by cold, rigours, or chills, the child being hot and restless at night. The febrile exacerbations generally recur in the afternoon, and during the night; but there are often three fits, one also occurring in the forenoon; and, in the most severe cases, the remissions are very indistinct. During the *exacerbations* the child is drowsy, and, if it sleeps, starting, moaning, and even screaming, or incoherence are observed; sometimes with vomiting, flatulent distention of the abdomen, accelerated respiration, and cough. The pulse varies from 120 to 160, according to the age. The cheeks are usually

flushed; the abdomen and palms of the hands being hotter than other parts of the body. Occasionally, the paroxysm terminates in a slight perspiration, which is often partial; the child falls into a quiet sleep, and the pulse sinks in frequency. During the *remissions* he picks his lips or nose; is irritable, and without appetite. The bowels are acted upon with difficulty; the evacuations are generally unnatural, but present no constant character; and worms are occasionally voided. The urine is now transparent, of an orange colour, and its quantity in relation to the fluids taken; and all the other symptoms noticed above are present in an aggravated form. As the disease declines, the exacerbations become mild and short, and often terminate in a gentle perspiration with a sound or refreshing sleep; the urine deposits a sediment, and is pale; the appetite returns; and the stools assume a healthy aspect. But the pulse remains frequent, and the flesh and strength are regained very slowly, unless change to a mild, dry air is adopted. If this form of the disease be either neglected or improperly treated, or if the child remain in a moist or miasmatic situation, organic change in some important organ supervenes; or the complaint passes into the chronic form, hereafter to be described, or degenerates into marasmus from mesenteric disease. It usually terminates in from two to four weeks in the more favourable cases.

275. B. *The more adynamic variety*, or state of the complaint, is the least common, excepting in low, humid, and miasmatic situations. It is sometimes prevalent at the same season with the CHOLERIC FEVER OF INFANTS (see this article), evidently depends upon the same causes as it, and is a very closely allied complaint, differing from it merely in the type of the fever, and the degree in which the digestive canal is affected. This variety commonly begins more suddenly than the others, the earlier exacerbation being attended by the same symptoms as the preceding, but by greater affection of the head, and by delirium in the older children, and quickly passing into more or less exhaustion. When this change takes place, the child becomes quiet or indifferent to external objects, and indisposed to the least exertion. He dozes, and is incoherent in the exacerbations; and, in the remissions, he lies in one position, constantly picking his face, particularly his lips and nose, until they become sore, or keeping his hands in continual motion. He usually, however, takes both food and drink, although sparingly. The countenance is anxious, pale, and unhealthy; the eyes reddish, especially the edges of the eyelids; the lips are covered with dark, ragged crusts, or exfoliations of their epithelium; the tongue and teeth are loaded with dark sordes; the bowels are much disordered, often irritable; and the stools are very offensive, watery, greenish, or otherwise morbid, and preceded by much griping and flatulence; both the stools and the urine are frequently passed involuntarily. When a favourable change takes place, the symptoms gradually subside; the voice, which was nearly lost, is regained or becomes stronger; the eyes are more lively; the tongue is cleaner, and the evacuations improve; the exacerbations being shorter, and the remissions more

perfect and prolonged. This variety is generally more chronic than the preceding, but less so than the next. It usually continues from one to two months.

276. C. *The Chronic form of remittent in children* either makes its approach gradually and insidiously, or follows the acute. The child wastes; the abdomen enlarges; the breath is offensive, and the strength fails. There is commonly only one exacerbation in the twenty-four hours, and it seldom appears before evening, lasting till morning, and terminating in sweats. The pulse is usually about 100 in the day, but rises to 140 in the evening. The tongue is white or loaded, but moist, and has often a strawberry appearance; the bowels are generally costive, and the stools always morbid. The child commonly keeps up, but is disinclined to move, or complains of aching in the limbs on exertion. There is little or no appetite or thirst; and the other phenomena characterizing the complaint in its common form, are present in various grades of severity. If the disease is not removed, tympanitic distention of the abdomen, emaciation, harsh discoloration of the skin, enlarged mesenteric glands, aphthous sores on the lips and tongue, chronic diarrhœa, and lientery supervene. When the disease declines, all the symptoms gradually amend, the nocturnal exacerbations abate, and convalescence is established after a period varying from two to four or five months.

277. This disease is generally sporadic, but is also sometimes epidemic. It is endemic in unhealthy localities, and many of the children born of European parents in hot or unhealthy climates are cut off by it before they reach their sixth or seventh year. When it occurs epidemically, it usually assumes the first or second of the above forms, and proves both more rapid in its course, and more dangerous than in the ordinary states. Dr. SIMS, after describing the fevers prevalent in London in the years 1769 and 1770, which seemed chiefly to result from the endemic sources surrounding the metropolis and the state of the seasons, gives a very graphic account of this complaint as it appeared epidemically during these years, and simultaneously with these fevers. As his description very nearly represents the disease as I have seen it in very low and miasmatic situations, I shall abridge it at this place. He remarks that it was called by some a worm fever, though worms were seldom the cause; but as that apparently lay in the stomach and intestines, the error did not materially affect the practice. It was most common in children of a sallow complexion and thin habit, who had been over-fed with the mistaken view of supporting and nourishing them. The leading symptoms were, heat, thirst, quick, full pulse, vomiting, coma, and sometimes slight convulsions, a universal soreness to the touch, a troublesome phlegmy cough, and great peevishness when not comatose. The fever was constantly of the remittent kind, the checks often appearing highly flushed, at other times pale. It lasted for several days, but seldom beyond a week, nor was the fatality attending it very considerable. Many of those who were seized by it had been subject for some time to symptoms which are thought to point out the existence of worms in the *prima via*, as picking of

the nose, grinding the teeth, starting out of sleep, swelling of the belly, white urine, short, dry cough, &c.; yet worms scarcely ever appeared. These symptoms were evidently, as stated above, the early stage of the complaint; those described by Dr. SIMS its fully developed state.

278. ii. DIAGNOSIS.—This complaint is most liable to be mistaken for *hydrocephalus*, in its acute or sub-acute forms. Dr. PEMBERTON has pointed out the differences between them with tolerable accuracy. In the latter there are occasional screamings in the sleep, tossings of the hands above the head, continual endeavour to thrust the head backward, and an intolerance of light, with more or less strabismus. But in this fever there is seldom screaming or intolerance of light, and never strabismus; the hands being brought to the head merely to pick the lips and nose. In *hydrocephalus* the faculties are totally destroyed, and the patient cannot be roused to an exertion of sense, reason, or even of consciousness. But in the delirium of this fever, he can be at any time recalled to his senses, which he will often retain for a few minutes. In the former, food, or anything given, however nauseous, will be taken; but in the latter, often neither food nor medicine is taken. The stools in this disease are more easily procured, more curdled, and contain more shreds of coagulable lymph than in *hydrocephalus*. Convulsions seldom occur, excepting at the commencement of the disease, or at its invasion, and when they disappear the faculties are perfectly restored.

279. Dr. SIMS considers that there is the utmost difficulty in distinguishing between both these diseases, in children under five or six years of age, until *hydrocephalus* has proceeded to the second stage. There is much truth in this, especially where symptoms of cerebral irritation coexist with those of disease of the digestive mucous surface, in the infantile remittent, as is sometimes the case, and as I have several times observed. Yet, in most instances, this disease may be distinguished from *hydrocephalus* with considerable certainty; more particularly by the remissions; by the absence of distinct stages; by its prolonged course; by its affecting delicate, phlegmatic, and over-fed children; by the pains in the belly and head being indistinct, dull, or but little complained of; by the paleness of countenance and sluggishness of manner; by the heaviness and soundness of the sleep; by the perspirations after the exacerbations, and after eating and drinking; by the free state of the excretions, especially the urinary, and the comparative ease with which stools are procured; by the perfect condition of the senses, and tolerance of light; by the unceasing itching of the nose; by the rare occurrence of vomiting; by the little wasting of the body, and the fulness or flatulent state of the abdomen; by the absence of palsy of any part; by the constant peevishness, and by the absence of any expression of pain or distress of countenance.—(See, also, *Dropsy of the Head*, § 246.)

280. iv. TERMINATIONS AND PROGNOSIS.—The most common *termination* of this complaint is a return of the healthy functions; but, owing to original fault of constitution, to great debility, to the influence of an impure air, to im-

proper diet, to injudicious treatment, and to neglect, obstruction and enlargement of the mesenteric glands, lenteric diarrhoea, chronic hydrocephalus, and tubercular disease of the lungs may supervene. The *prognosis* is, however, favourable when the child comes early under treatment; and more especially if the symptoms subside, and the remissions are prolonged and distinct. An unfavourable prognosis should be formed only when the disease is not benefited by the use of suitable remedies; when the exacerbations become severe, more frequent, or prolonged; when the abdomen is tense and swollen, and when indications of any of the organic diseases just mentioned appear.

281. v. The NATURE of infantile remittent fever may be inferred from the causes producing it, the circumstances in which it appears, and the early or premonitory symptoms. These indicate impaired organic nervous power, and imperfect performance of the functions actuated by the organic nervous system. Most recent writers have imputed this complaint either to derangement of the digestive canal, or to a depraved condition of the secretions of this part—which amounts to the same thing. The French pathologists view it as symptomatic of inflammation of the digestive mucous surface; but of the truth of this doctrine there is no conclusive evidence. *Post-mortem* appearances certainly lend it no support. The few instances in which I have observed them, presented chiefly enlargement of the mesenteric glands and of the spleen, with a few tubercles in the lungs. The digestive organs were not inflamed, but the intestines were distended by flatulency, and their coats attenuated. Similar changes of the bowels and mesenteric glands have been remarked by HOFFMAN and PEMBERTON. From an extensive experience of this disease, I infer, *a.* That it proceeds from causes which impair the energy of the organic nervous system, and of the organs which this system more immediately actuates; *b.* That, in consequence of this morbid condition, whether it arise from impure air, or proceed from unwholesome food, the excreting functions, particularly those of the digestive canal, are imperfectly performed; consequently, mucous sordes, &c., accumulate on its internal surface, and become both a source of irritation and a nidus for the generation of worms; and hence the complication of this complaint with the verminous occasionally takes place; *c.* That the disease is frequently long in forming, preliminary changes being required, as in other fevers, to develop the more acute symptoms; *d.* That it does not consist of inflammation, is shown by the character of its early symptoms; by its course, termination, and consequences, and by the *juvantia and lædèntia*; *e.* That it does not altogether arise from a depraved state of secretions of the digestive organs, nor from irritations of these organs, although these changes are very probably induced in its early course, is proved by the facts that such depravation must itself proceed from anterior disorder, and that a treatment based solely upon the above doctrine is not generally successful; a free and healthy state of the alvine evacuations being often brought about without the complaint being removed; *f.* That, in order to cure the complaint with the least delay

and the greatest certainty, it is necessary to evacuate morbid secretions from the *prima via*, to impart energy to the organic nervous system, and to change the morbid states of the various related or dependant organs.

282. vi. TREATMENT.—*A.* The practice advised by MUSGRAVE, BUTTER, SIMS, PEMBERTON, and others, although furnishing valuable hints, is more or less defective; for whoever trusts to it alone, or those whose resources extend no farther, will find the disease by no means so easily managed as they expected, and will see it prolonged until the treatment is taken out of their hands, and, by the common sense of the parent, limited to change of air and light nourishment; which, although among the most efficient remedies, have been very generally overlooked by writers. In all cases the treatment should be commenced with a moderate dose of *calomel* and JAMES'S powder at night, and a sufficient quantity of the bitter aperient mixture (F. 266), or of *rhubarb* and sulphate of potash, or of *rhubarb* and *magnesia*, to act upon the bowels. If these are inefficient, an enema should be thrown up; and from an experience of many hundred cases, I would recommend for this purpose equal quantities of castor oil and spirits of turpentine in water-gruel. At first, the above powder should be repeated every night, or on alternate nights, and the purgative in the morning, the injection being also employed every third or fourth day. At a more advanced stage of the treatment, and when the evacuations have improved, they may be prescribed less frequently. The choice of other means must depend upon the peculiar features of the case.

283. *B.* If the disease be of the form in which it usually presents itself (§ 273), and the evacuations have been improved by the above means, an *infusion of cinchona*, or of *casearilla*, or of *valerian*, with liquor ammoniæ acetatis, will be found of great service. If the bowels be still disordered and torpid, the *sulphate of quinine* may be given in a solution of any of the neutral sulphates, and the abdomen rubbed assiduously with a warm, *stimulating liniment* (F. 311), light, nourishing diet, or a course of ass's milk, and change of air, being afterward ordered.

284. *C.* If the complaint be of the acute form (§ 274), and the child be plethoric and strong, a few *leeches* may be placed over the epigastrium at the commencement of the treatment, and afterward a mustard poultice, or any *rufescent epithem* may be applied; but the purgatives just mentioned, or similar medicines, should be prescribed; and the solution of acetate of ammonia, with sweet almond emulsion and camphor mixture, should be taken in the course of the day. After the more acute symptoms have abated, the infusion or decoction of *cinchona*, or the infusion of *casearilla*, or of *calumba*, may be given with small doses of liquor potassæ, or of the hydrochlorate of ammonia, or the nitrate of potash, or with liquor ammoniæ acetatis, sweet spirits of nitre, &c.

285. *D.* When the disease assumes the adynamic state above described (§ 275), and when it has been of long standing, or considerable exhaustion has supervened, a farther modification of the treatment is requisite. If the bowels have not been sufficiently evacuated, the

above means should be employed for the purpose; and either the sulphate of quinine, or the preparations of bark, or of other tonics, especially cascarrilla, ought to be taken during the remissions. In all the varieties of the complaint the remissions should be selected for the exhibition of bark, quinine, or other tonics, commencing at the subsidence of the exacerbation. In this state of the complaint, I have prescribed, for many years, the *chlorate of potash* in an infusion of *valerian*, or of *cinchona*, with great benefit, keeping the bowels moderately open, and directing the above liniment (F. 311) to be rubbed along the spine, or over the abdomen.

286. *E.* When much pain is felt, and the belly becomes distended with flatus, the enema advised above should be administered; and either an anodyne fomentation applied to the abdomen, or the liniment rubbed upon it. *MUSGRAVE* recommends poultices, or *fomentations* with the warm decoction of *rue* and *aromatic herbs*. A decoction of chamomile flowers, poppy heads, and rue, in the form of fomentation; and a little spirit or oil of anise-seed added to the medicine, will generally give relief. A warm bath at bedtime, or the *semicupium*, some salt, or mustard flower, or both, having been added to the water, will also be serviceable, especially in the low or advanced states of the complaint.

287. *DR. BUTTER* placed much dependance upon the *extract of conium*, in doses of one grain in the day for every year that the patient was old, in conjunction with saline aperients. It is of little service of itself, but is often a useful adjunct to the medicines already advised, especially if the child be very peevish, the abdomen pained, or the bowels irritable. *DR. CHEYNE* relied most upon calomel with antimony at bedtime, and the common purgatives, giving the former more frequently if the complaint seemed liable to pass into hydrocephalus. *DR. CLARKE* and *DR. PEMBERTON* insisted chiefly on tonic infusions, after the bowels were freely evacuated. These are generally serviceable in the circumstances and combinations pointed out, and the addition to them of the extract of conium is also beneficial. In some old cases, in which there was reason to suppose that, in connexion with debility, there was some degree of obstruction of the mesenteric glands, I have given the *iodide of potassium* internally, in small doses, with great advantage; but care should be taken not to prescribe it in doses large enough to irritate the stomach and bowels, otherwise it will increase the disorder.

288. *F.* The *regimen* and *diet* constitute a principal part of the treatment. Change of air, as early as possible, especially to a mild and dry air, and elevated situation, is always most serviceable. Warm clothing, frictions of the surface after the warm baths, and light but nourishing diet, are also very beneficial, particularly when convalescence has commenced. During the complaint, ass's milk, rusks, and weak broth are suitable food. But in the acute form, or at the commencement of the disease, even these may be too exciting. The effect of whatever is given should be carefully watched, and the articles of diet selected accordingly. When convalescence is establish-

ed, the preparations of *iron*, and due attention to the states of the bowels, are most necessary.

[There is no disease of more frequent occurrence in our country than the remittent fever of children, as, with the exception of *croup*, *pneumonia*, and, in the hot seasons of our large cities, *cholera infantum*, there certainly is none more precarious in its progress, less amenable to treatment, or more fatal in its consequences.

Its *causes* have been pointed out with sufficient distinctness by our author; and the same were recognised here, many years ago, by *RUSH*, *KUNN*, *MILLER*, and *HOSACK*, all of whom have traced it to the digestive organs as its primary seat and source. In evidence of this, they point us to the loss of appetite, the foul tongue, offensive breath, and the confined state of the bowels in the forming stage of the disease, symptoms usually attributed to *worms*; and the treatment recommended by these writers is substantially based on this pathology. *DR. HOSACK* has forcibly alluded (*American edition of Thomas's Practice*) to the tendency of the complaint to produce *pneumonia*, or irritation of the pulmonary organs, as manifested by oppressed respiration and cough, and of *hydrocephalus*, as shown by the frequent occurrence of the symptoms which characterize that affection. It was, indeed, the opinion of this excellent observer, that such is the natural tendency and force of the circulation upon the brain during the early periods of life, that this last termination may very generally be anticipated in all the acute diseases of children, if active measures be not early employed to relieve the digestive organs by mild cathartics, and to relax the capillaries of the surface by warm bathing, the use of antimonials, and other diaphoretics. *DR. HOSACK* also frequently attributed the remittent fever of children to teething, and even to the use of mercury, which he believed, in all cases, increased arterial excitement, and thus laid the foundation for this fatal malady. To the frequent employment of this article in the treatment of other infantile affections, *DR. H.* attributed the more frequent occurrence and greater fatality of cerebral affections in modern times; an opinion which is well worthy of the serious consideration of the profession at the present day.

One great cause of the disease is the neglect or mismanagement of the bowel affections of children generally, especially the abuse of purgatives, on the one hand, and of stimulating remedies and diet on the other. We find it also occurring as a sequel of whooping-cough, measles, scarlet fever, &c.; and in these cases it is sympathetic, depending on an irritated condition of the digestive organs, particularly the stomach and small intestines, the result of the original disease; or the artificial product of irritating medicines prescribed for its relief; or of too nourishing diet, too early allowed. That it is also the product of malarious causes is well known to practitioners who reside in those districts of our country where remittent and intermittent fevers prevail, as it is the most fatal scourge to which children in such localities are exposed; so that the remark of *DR. COPLAND* will hold true, that "it arises most frequently from the same causes as produce other periodic fevers." Every physician must have observed the tendency which febrile symp-

toms in children have to assume the remittent type, or to manifest evening exacerbations, no matter what may be the cause, or the lesion, of which they are symptomatic; and this should be borne in mind when considering the causes which may give rise to the disease. Thus Dr. EVANSON relates an instance where a violent fever of a remittent form, which lasted several days, occurred in a child, from swallowing a marble, the symptoms making their appearance instantly on the occurrence of the accident, and as suddenly disappearing on the removal of the irritating cause. An analogous case recently occurred within our own practice from the formation of a cheesy coagulum in the stomach, in consequence of acidity, after swallowing a large quantity of cow's milk. The symptoms continued with but slight abatement until the solid curd was thrown off by the action of an emetic. A similar case is related by Dr. STEWART, in his work on the Diseases of Children.

The *pathology* of the disease, as given by our author, is perhaps more satisfactory than can be found elsewhere, though it may be questioned whether it be not too exclusive. Dissection has certainly thrown but very little light on the nature of the disease; for, as it generally terminates with cerebral effusion, so, in most instances, we find no morbid changes except an effusion of serum in the ventricles. Occasionally, we meet with inflammatory appearances in the mucous membrane of the stomach and intestinal canal; but it is very probable that this arises, for the most part, during the progress of the disease, and that, at first, it was one of simple irritation only. Dr. CONDIE, however ("Diseases of Children," p. 252), states that it is, "in every instance, either a gastro-enteritis, an ileitis, or an entero-colitis, accompanied with febrile reaction," and remarks that the lesions discovered after death "are chiefly inflammation, more or less extended, of the digestive mucous membrane; in some instances of the stomach and upper portion of the small intestines; in most instances, of the ileum, at its lower part, and, in some cases, of both the ileum and colon. The mucous membrane is reddened either in patches, points, or striæ, and is generally thickened and softened, or ulcerated. The mucous membrane is often covered with a thick layer of tenacious mucus. Dark, livid patches of the lining membrane of the small, but more generally of the large intestines, are frequently met with, and occasionally gelatinous softening, with perforation of all the coats. The mesenteric glands are very generally enlarged, sometimes enormously so; sometimes in a state of suppuration, but more commonly converted into a cheesy matter. Peritoneal inflammation is occasionally observed, and in chronic cases the peritoneum is sometimes thickly studded with tubercles. In some cases peritoneal inflammation seems to have been the immediate cause of death, and to have resulted from perforation of the intestines. The liver is generally enlarged, and in a state of extreme hyperæmia; sometimes changed in texture, and at other times of a lighter colour than natural. In the brain there is often more or less effusion between the membranes, and into the ventricles, with opacity of the arachnoid membrane,

and tubercles of the substance or meninges. In the thorax the most common morbid appearance is increased redness of the bronchial mucous membrane, the bronchial ramifications and air cells being filled with mucus. The lungs occasionally display traces of inflammation; and in protracted cases tubercles in the lungs, and upon the surface of the pleura, are frequently met with."—(*Loc. cit.* Mackintosh, Armstrong.)

Such are the pathological characters of this disease as laid down by CONDIE; many of them can, however, be regarded in no other light than accidental, and none of them, so far as our own observation has extended, are invariably present. In many instances we meet with no marks of inflammation in the gastro-enteric membrane, and where we do meet with unequivocal evidences of "gastro-enteritis," "ileitis," or "colitis," we do not always have displayed during life the phenomena of remittent fever. It is therefore a safer opinion, as it is one best supported by existing facts, that it is, in general, a symptomatic disorder, consequent on derangement of the stomach and intestines, or some of the collatitious viscera; or that it arises from an irritative action, at first excited in the mucous membrane of these parts, which may subsequently run into inflammation. If we choose to go back of this, and assign this derangement and irritation to "impaired energy of the organic nervous system," we adopt, it is true, a hypothesis which will very satisfactorily explain the phenomena, but which, in the very nature of things, is insusceptible of actual demonstration.

Treatment.—The treatment of remittent fever in children, like that of all other diseases, must be *eclectic*—accommodated not only to the symptoms that may be actually present, but also to the cause of the disease, of which they are not always the true index. In many instances, the symptoms may be occasioned by the presence of indigestible food, or other irritating matters, in the stomach, and here an emetic would be the most suitable remedy. It may, in some cases, be difficult, perhaps, to determine whether such irritating cause be present or not, but when the attack is sudden in children who have been previously well, it is safer to act on such presumption. Should there be nothing in the stomach calculated to excite irritative fever, the treatment may very properly commence with a mild emetic of ipecacuanha; full emesis in these cases, indeed, often breaks up the disease. We believe that this affection is oftener brought on by the existence of cheesy matter in the stomach than is generally supposed, for we have frequently seen masses of it ejected by the operation of an emetic administered in such cases. Cathartics of some kind are undoubtedly indicated, and we believe, with COPLAND, that calomel will often prove highly useful, although we would not advise to commence the treatment with it in every instance. Where the foul breath and furred tongue give proof of the congested state of the liver, and general derangement of the secretions, this article will prove more efficacious than any other; but if febrile action runs high, and there is much heat about the head, showing a determination of blood to the brain, we agree with Dr. HOSACK in the opinion that it is entirely inadmissible, as it

tends to augment the excitement, and bring on hydrocephalus. Under such circumstances, Dr. Hosack recommends, in place of calomel, an infusion of senna, combined with super-tartrate of potassa and manna,* especially if symptoms of hydrocephalus are manifested. These, with antimony, to unlock the surface of the body, together with the warm bath, and blisters to create a new and relatively safe seat of irritation, are the remedies which are to be resorted to in such cases.—(*Op. cit.*) Dr. Stewart has truly remarked that, if the abdominal viscera are those most deranged, the use of mercury as a prompt cathartic can scarcely be dispensed with, for there is no article of the materia medica which exerts so general an action on the digestive organs, and which is so often followed by an improvement of their secretory functions. The employment of so active an agent is clearly indicated at the commencement, when the premonitory symptoms, those of irregularity of the bowels, or total failure of the appetite, and a fetid state of the breath, show an altered and morbid state of the secretions. "Experience," says this writer, "abundantly confirms the opinion here advanced, that it is on purgatives that we must rely at first, where this morbid condition of the alvine discharges and urine, and swelling of the abdomen are the most prominent symptoms; for the gradual disappearance of the fever will almost invariably follow the use of mercurial purgatives under these circumstances." Dr. Condre founds his treatment on the pathology already indicated as maintained by him, namely, that there is always present an acute or sub-acute inflammation of the mucous membrane of the alimentary canal, to the removal of which our remedies are mainly to be directed. The application of leeches, and a regulated diet, are, of course, the most important of this class; though Dr. C. also advises to commence the treatment with a full dose of calomel, to be followed by castor oil, or a laxative enema. The tepid or warm bath we have always found one of the most valuable remedies in this disease. In the chronic form of it, we have employed with great success some of the preparations of iron, as the sulphate, the ammoniated tincture, the sesquichloride, the persesquinate, or the iodide; and, where there has been tympanitis, or the discharges were of a mucous character, dark and offensive, we have derived great benefit from the spirits of turpentine, given in doses of ten or fifteen drops, three times a day, rubbed up with sugar and mucilage. There is no agent which produces a more decided improvement in the excretions than this, or which with more certainty allays irritation, relieves the distention, by stimulating the alimentary canal to expel its gaseous contents, or corrects the morbid condition of the intestinal mucous membrane. It is also well to bear in mind that in these chronic cases some animal broth, as beef tea, chicken water, or plain mutton broth, with barley or rice, will often agree better with the stomach, and produce a less amount of irritation than farinaceous preparations. *Rhubarb*, in infusion with *soda* and *gentian* or *calumba*, will often act very beneficially

in the advanced stages of the disease. Great attention must be paid to diet, and guarding the surface from the effects of cold or moisture, and too much importance cannot be attached to change of air and proper ventilation.]

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XV. HECTIC FEVER. SYN.—*Ἐπικτὴ* (from *ἐπικτῆς*, constitutional, and this from *ἔσις*, habit of body); *Febris hectica*, *Febris marasmodes*,

Febris tabida, Febris lenta, Febris amatoria, F. ampheterina Hectica, Atrophia, Tabes, Auct. Var.; Epanetus Hectica, Young and Good; Das schleichendes Fieber, Hektisches Fieber, Germ.; Fièvre Hectique, Fr.; Etica Febbre, Ital.; Hectic Remittent, Decline, &c.

289. DEFIN.—Chronic, remittent, or sub-continued fever, with loss of strength and flesh, generally depending upon organic lesion, or some evident or concealed source of irritation.

290. This disease is characterized by its slow and insidious approach; its prolonged duration; by emaciation and frequency of pulse; by febrile exacerbations at noon and in the evening, or after a meal, with heat in the palms of the hands and soles of the feet; and, lastly, by colliquative sweats and diarrhoea. The question as to whether this fever is ever idiopathic, or always proceeds from some evident or concealed local irritation, has been much discussed. The greater number of systematic writers contend that it is occasionally a primary affection, or independent of local lesion. Among these are SAUVAGES, SAGAR, LINNÆUS, STOLL, PARR, PINEL, WILLAN, GOOD, &c.; while VOGEL, CULLEN, HEBERDEN, and others entertain a different opinion. Believing that it is, in very rare cases, not assignable to any local lesion or irritation, but is owing rather to debility or exhaustion in irritable constitutions—that, although not a primary affection, it cannot always be attributed to any local lesion, the nature and seat of which can be recognised—I have introduced it at this place. But, while I admit this, I must confess that the arguments adduced by those who consider that hectic is sometimes independent of local irritation are by no means conclusive. Dr. PERCIVAL in his remarks, published by Dr. GOOD, states that he has seen idiopathic hectic last three months “without any pulmonary affection, and then to break out in the lungs.” But the lungs may be diseased for a long time without their functions being manifestly disordered otherwise than in causing the hectic fever, which may be thus erroneously considered idiopathic. There cannot be the least doubt that various changes may take place in parts possessed of a very low grade of sensibility and imperfect powers of reparation, as the parenchyma of several viscera, particularly the lungs, liver, kidneys, mesenteric glands, bones, &c., unattended by any phenomenon which will enable us to recognise their precise seat and nature, and yet give rise to hectic fever.

291. Mr. J. HUNTER contended for its idiopathic existence by supposing that the constitution may fall into the same mode of action, without any local cause whatever, as proceeds from such cause. This is, however, no argument. He farther observes that nothing is more common than for hectic to exist in patients in whom no local disease whatever can be traced; and that, in such cases, either random suspicions are to be thrown upon the lungs, liver, kidneys, heart, or mesenteric glands, as casual symptoms may suggest, or its idiopathic nature must be inferred. Admitting that there is some truth in this, it should still be contended that improved means of diagnosis, and a more intimate acquaintance with the origin and relations of morbid actions, have greatly abridged the number of instances in

which no local lesion can be detected; and that, instead of this circumstance being common, it is remarkably rare. It is somewhat singular that the same author, M. BROUSSAIS, who has written so ably against the existence of fever as an essential or idiopathic disease, should have produced, in 1803, a work on hectic fever, in which its idiopathic nature is strenuously contended for, and its various forms very minutely described, the least idiopathic of all fevers having been considered by him chiefly as such; M. BROUSSAIS had, however, not then changed his opinions as to the nature of fever.*

292. i. DESCRIPTION.—The early symptoms of hectic are, emaciation, with a pale, and often fair, skin; increased frequency of pulse, especially at noon and evening, with some degree of hardness or sharpness; rapid or short respiration on any exertion; and increased heat of skin. The exacerbations are at first very slight, but they soon become more evident, particularly in the evening; are preceded by a slight or marked chill; are attended by increased heat, which is most evident in the hands and face, the skin being at first dry; and terminate in a free, profuse perspiration, especially the evening paroxysm, which usually subsides in this manner early in the morning. The bowels are costive, but afterward readily acted upon; ultimately they are relaxed, and colliquative diarrhoea supervenes. The urine is various, but most frequently pale and without deposit; more rarely high-coloured, and with a lateritious sediment. As the disease advances, the delicate circumscribed bloom on the cheek, which was at first only occasional, is more constant and general, especially during the exacerbations; the throat and fauces are red, dry, and irritable; the tongue is often clean, red, smooth, without papillæ, and glazed, and, ultimately, with the lips and fauces, is covered by aphthous exudations; the eyes are sunk in their orbits, from the absorption of adipose matter, but are brilliant and expressive, their whites pearly and clear; the whole frame is emaciated, and the temples excavated; the hair falls out; the ankles and sometimes the legs are œdematous; sleep is unrefreshing, feverish, and disturbed; and debility with a sense of lassitude is constant, but the patient's spirits are unbroken or even sanguine. At last, the diarrhoea and colliquative sweats become daily more abundant; the respiration short and precipitate; and the debility so great that the patient often expires when attempting to speak, or on assuming a sitting posture, &c. During the course of the disease, the sensorial functions preserve their integrity; but sometimes, towards the close, slight delirium occurs. In those cases, especially, which depend upon organic change in the respiratory organs, there are more or less dyspnoea, cough, and expectoration; the nails become incurvated; the last joints with the extremities of the fingers fusiform, and the expectation of recovery gains strength with the progress of disease. (See TUBERCULAR CONSUMPTION.)

* [SAMUEL COOPER remarks (*Surgical Dictionary, Am. edition*) that “the absorption of pus has no share in occasioning hectic fever; it is much more probable that it arises from the effect which the irritation of a vital organ, or other parts, such as joints, has on the constitution, when either incurable in themselves, or are so, for a time, to the constitution.”—Page 370.]

293. MM. BROUSSAIS, FOURNIER, VAIDY, BOISSEAU, COUTANCEAU, and some other writers have divided hectic into *three stages*: the *first* continuing as long as the appetite and strength are not materially impaired, and the remissions are distinct; the *second* consisting of a small, quick, and frequent pulse, accelerated during the exacerbations, with debilitating perspirations, burning heat of the palms of the hands and soles of the feet, and rapid emaciation; the *third* supervening with the colliquative diarrhoea, œdema of the lower extremities, extreme emaciation, and prostration of strength.

294. ii. The CAUSES of hectic fever are remarkably diversified. It most commonly proceeds from suppuration, ulceration, chronic inflammation, excessive action, and irritation of a secreting organ or surface; from caries, necrosis, or structural change of osseous parts; and from slow inflammatory action of any part whatever of the frame. It also attends upon various adventitious and malignant productions. But in all these, it is merely a symptom of the extent to which the constitution is influenced by the local change. M. BROUSSAIS has distinguished several varieties of hectic according to the nature and seat of its principal causes, as the *Gastric*, the *Pectoral*, the *Genital*, *Hæmorrhagic*, *Cutaneous*, *Moral*, &c. HILDENBRAND enumerates the following: the *Inflammatory*, *Putrid*, *Nervous*, *Gastric*, *Atrabiliarious*, *Pituitous*, *Verminous*, *Entero-mesenteric*, and *Suppurative*, to which may be added the *Puerperal*. As each of these varieties attaches to itself more or less importance, and as the division adopted by M. BROUSSAIS has been very closely followed by numerous recent writers, I shall offer a few remarks in illustration.

295. *a. Gastric Hectic* is distinguished by anorexia, thirst, dryness of the mouth, prolonged and difficult digestion, and more or less of the usual concomitants of indigestion, especially eructations, flatulence, acidity, cardialgia, &c. Sometimes the appetite is unimpaired, or is even increased, but digestion is faulty. The tongue is loaded, the mouth clammy, and the taste disordered. There are often uneasiness at the stomach, tenderness of the epigastrium, and frontal or sub-orbital cephalalgia. The complaint is exasperated by heating food and the abuse of stimulants, which occasion a sense of heat in the stomach, or pain and cardialgia, with acid or acrid eructations. Ultimately, the patient becomes pale; the breath fetid; the bowels costive, irregular, or even irritable; and the symptoms of hectic fully developed. In *children*, picking of the nose, mucous diarrhoea, and occasionally the expulsion of worms, are also observed, and the disorder is almost identified with, or is merely a modification of, the remittent of children (§ 270). This form of hectic is very probably connected, as BROUSSAIS, BOISSEAU, and others believe, with chronic irritation of the digestive mucous surface; but debility, more especially of the organic nervous system, is the primary and most important constituent of the disorder. The hectic sometimes observed to follow lactation, particularly when prolonged, is often of this kind. M. BROUSSAIS has distinguished the connexion of hectic with cutaneous eruptions, by the denomination of *Cutaneous Hectic*. But the constitutional disturbance is less the effect of the af-

fection of the skin than of the disorder of the digestive organs, with which the latter is very generally associated as a symptom.

296. *b. Pectoral Hectic* consists of the constitutional disorder consequent, 1st, upon inflammation or ulceration of the larynx, and irritation of the epiglottis; 2dly, upon the various forms of bronchitis; 3dly, on the several lesions of the lungs; and, 4thly, upon chronic alterations of the pleura. It should, however, be recollected that any of the various kinds of pectoral hectic may be associated with gastric disorder; indeed, the advanced stages of the former are always attended by more or less of the latter. Hectic arising from these lesions is fully treated of under the respective heads.

297. *c. Genital Hectic* consists of debility, associated with febrile exacerbations, caused by excessive sexual indulgences, or by masturbation; by irritation of, and mucous discharges from, the sexual passages; and, occasionally, by irritation of the urinary organs. These phenomena not merely occasion, but also accompany and perpetuate, the hectic symptoms, until other viscera are drawn within the vortex of morbid action; the digestive organs, especially the mucous surface, or the lungs, or even both, becoming also diseased, and ultimately evincing the most prominent affection. The ill-regulated or excessive indulgences and dissipations of youth are often productive of irritation of the sexual and urinary organs, attended by more or less discharge; by debility, febrile exacerbations, and indigestion. If the indulgences which induce this disorder are continued, organic nervous power is prostrated farther still; digestion and assimilation are rendered more imperfect; circulation through the lungs more irregular; and ultimately tubercular formations are developed in this organ, especially if the diathesis or other causes conspire with this in forming them. It is an important fact, and one which is too generally overlooked, that hectic fever, induced either by irritation of the sexual organs, or by disease of the lungs, is attended by a remarkable propensity to masturbation, which counteracts but too generally every means of cure.

298. *d. Puerperal Hectic* is that form of slow fever which sometimes affects delicate females during *lactation*, and which, if the cause be continued, may superinduce pulmonary disease. It also sometimes follows protracted or excessive lactation, and passes either into pectoral hectic, or into a chronic state of debility, with especial disorder of some one of the abdominal viscera.

299. *e. Hæmorrhagic Hectic*, or the slow fever consequent upon loss of blood, is to be attributed rather to the pathological state giving rise to the hæmorrhage than to the debility caused by the loss of blood. Hectic, even in its slighter forms, seldom follows large bleedings from wounds; while it is a very common sequence of hæmorrhage from the pulmonary and digestive mucous surfaces; for there is generally antecedent disease, either of the mucous surfaces themselves, or of parts intimately connected with them, that, sooner or later, would very generally be productive of hectic fever, if no hæmorrhage had ever taken place. When hectic follows the suppression or disappearance of hæmorrhages, either occasional, habitual, or

periodic, chronic inflammation or irritation of some important viscus, more especially of the lungs, the liver, the uterus, &c., should be suspected.

300. *f.* Some authors have distinguished a form of hectic from *mental or moral causes*.—There can be no doubt, when the mind becomes possessed by a predominating passion or desire, or constantly ruminates on some depressing sentiment, or continually regrets the loss of endearing objects, that the powers of life will gradually languish, and that, in delicate constitutions especially, many of the symptoms of hectic or slow fever will be produced; and, although the mental affection may not induce more than the earlier stage or slighter grade of the disease in sound constitutions, it will frequently occasion, especially in the weak, and in those endowed with a morbid diathesis, structural change in the lungs and other susceptible organs, owing to the continued depression of organic nervous power which it causes, and to the changes resulting therefrom. Every observer must have remarked the series of changes following the loss of loved objects, disappointed or abused affections, unmerited neglect, &c.; and have recognised the influence of the mental impression upon the functions of digestion, assimilation, circulation, and respiration successively, until a predisposed organ—most frequently the lungs, the heart, or the liver—indicated a predominance of disorder and fatal tendency. In these cases, the slighter forms of hectic, the pallor, emaciation, febrile exacerbations, sleeplessness, and debility advance slowly, and become imperceptibly associated with shortness of breath, dyspnoea, short cough, hectic flushes, and morning perspirations; the lungs very frequently evincing most serious disease. In all instances of this kind, it is important to ascertain the changes more immediately consequent upon the exciting cause. In every case which I have seen sufficiently early, the vegetative or organic functions were in a debilitated or blighted state; the appetite was diminished; digestion impaired; the pulse languid, slow, and weak; the circulation through the lungs imperfect and impeded, as indicated by frequent sighing, and oppression in the thorax; and the impulse of the heart very deficient, or at times either irregular or excessive, as if this organ were labouring to overcome the congestion consequent upon the impeded circulation through the lungs. The tubercles which generally form in the course of these affections cannot be ascribed to inflammatory action, as they originate when the organic nervous power of, and circulation through, the lungs are most impaired; but are rather a result of these latter pathological states.

301. *g.* As to the other varieties mentioned by HILDENBRAND, a few remarks may be necessary.—*α. Inflammatory Hectic* is merely that form of symptomatic fever which usually attends chronic inflammation of an internal viscus, or of a deep-seated part.—*β. Putrid Hectic* is the fever sometimes attending scorbutic affections, or gangrenous and spreading ulceration, &c., or arising from unwholesome and innutritious food.—*γ. Nervous Hectic* is the constitutional disturbance observed in persons labouring under mental afflictions, &c. (§ 300),

or chronic disorder of the nervous system, and in chlorotic and hysterical females.—*δ. Atrabiliary Hectic* presents itself in persons long subject to disorder of the liver and other digestive organs, whose portal circulation has become congested or obstructed, their biliary and intestinal secretions morbid, and their digestive canal torpid or overloaded. Such persons are morally and physically depressed; are melancholic and hypochondriacal, sallow, squalid, and thin; are often affected with shortness of breath, colicky pains, disordered bowels, tenesmus, and hæmorrhoids; the stools are dark, fetid, and scybalous, and the abdomen frequently hard or tense.—*ε. Pituitous Hectic* is merely a modification of the gastric (§ 295), attended by pituitous colluvies in the prima via, owing to imperfect power of the organic nervous system. It is common in children, and is characterized by pallor, leuco-phlegmatic indolence, and torpor; swollen lymphatic glands, increased secretion of mucus; tumid abdomen; fluor albus; the collection of viscid mucus on the tongue and teeth; coryza, mucous diarrhoea, and obscurely remitting and slight fever.—*ζ. Verminous Hectic* is a modification of the foregoing, or the association with it of worms in the intestinal canal. It is occasionally observed in delicate and relaxed, or rickety or scrofulous children; and in those who live in low, damp, close, and unhealthy localities and apartments, and who are subject to chronic bronchitis or winter catarrhs.—*η. The Entero-mesenteric* is a modification of the *pituitous and gastric*, particularly when occurring in children; or is, rather, the association of enlargement of the mesenteric glands with the affection of the digestive mucous surface, chiefly constituting these varieties. It is hence closely allied to the affection already described under the head of *Infantile Remittent* (§ 278). (See, also, art. MESENTERIC DECLINE.)

302. *h.* The varieties of hectic which arise from the formation of matter in internal viscera, from tuberculous ulceration, from carious bones, &c., from the irritation of foreign substances, and from chronic inflammation affecting parts possessing a deficient power of reparation, present general features of resemblance, but vary in the more minute details, and differ not materially from the general description given above (§ 292).

303. *iii. PROGNOSIS.*—The *duration* of hectic varies from a very few weeks to a number of years; but, however long, the tendency of the disease is fatal, unless circumstances occur, or medical means be used to arrest its course—unless the causes on which it depends are removed. The *danger* is owing entirely to these causes, and is great according to their nature. In cases of caries, or of other local diseases which admit of removal, the fever disappears soon after the separation of the morbid from the healthy parts. When the disease depends upon the continued or repeated irritation of a secreting surface or gland, as in its *sexual and puerperal varieties* (297, 298), and in the chronic forms of bronchitis and diarrhoea, it generally disappears with the cause that produced it, unless serious disease of some important viscus, as of the lungs, has been superinduced in its course. But when chronic inflammation continues to destroy, or to alter the structure

of some vital organ or deep-seated tissue, or when the substance of an internal viscus is in a state of suppuration, or when hectic proceeds from tuberculous formations, recovery seldom takes place. Yet, in some of these cases, the powers of life continue long to resist the progress of disorganization; and occasionally, at last, are successful, not only in limiting it, but also in removing the chief of whatever changes had taken place. This is demonstrated in the adhesions of serous surfaces, in the absorption of purulent collections from the substance of internal viscera, or in their discharge, and in the subsequent cicatrization of the parts affected. Both the liver and lungs furnish proofs, although in rare cases, of such occurrences. Even a lobe of one of the lungs may be entirely destroyed by suppuration, and the patient recover. Where the cause is obscure, and we doubt whether the disorder is idiopathic or the consequence of some lesion that eludes detection, the patient being young, and vital power not far reduced, hopes should be entertained. But when strength is far reduced, emaciation extreme, and colliquative diarrhœa or perspiration is present, there is little or no chance of recovery.

304. iv. PATHOLOGY.—A. The *Lesions, post mortem*, consist, 1st, of those which *caused* the fever (§ 294); 2d, of alterations of the mucous surface of the digestive canal, upon which the diarrhœa present in the last stage mainly depended; 3d, of disease of the lymphatic and mesenteric glands; and, 4th, of redness and inflammatory discoloration of the lining membrane of the heart and large vessels. The various lesions from which this fever may proceed require no farther notice than has been taken of them in other articles; but those which are evidently consequent upon its early stages, which aggravate it in its course, causing the more severe symptoms characterizing its latter periods, are deserving of attention. The changes in the digestive mucous surface consist chiefly of tubercular depositions, and of ulceration seated more especially in the lower part of the ileum and in the cæcum, with softening, and frequently with superficial redness of the mucous membrane. The ulcers, however, are often unattended by redness, thickening, or unequivocally inflammatory appearances, and are entirely similar to those described in the article DIGESTIVE CANAL (§ 36, *et seq.*). The changes in the absorbent glands are the same as those described in the article LYMPHATICS.

305. The lesions of the circulating system had been overlooked, until notice was directed to them by BOUILLAUD, who has given the details of a number of cases of hectic, in which the internal membrane of the heart, and large vessels, both arterial and venous, presented more or less of inflammatory redness; the substance of the heart itself being often soft and flaccid, and atheromatous depositions being sometimes found in the internal membrane of the arteries. Several years ago, I observed the internal lining of the pulmonary vein, and of its principal branches, of a dark red and reddish brown colour, in a patient who died with tuberculous excavations in the lungs; and I have seen similar appearances subsequently in two or three cases of this disease.

But whether these appearances are the result of inflammatory irritation induced in the internal surface of the circulating system, or depend upon the action of the blood upon this surface after death, has not been satisfactorily ascertained.

306. B. *Nature, &c., of Hectic.*—Pathologists have supposed that the disease depends upon the gradual absorption of purulent, sanious, or other morbid matters into the circulation; and others have believed that it arises entirely from the local irritation—no such absorption occurring. It is necessary to keep in recollection a few facts which will serve to elucidate the matter.—(a) Large excavations, &c., often take place in the lungs without much cough, and with little or no expectation, but with severe and rapid hectic: absorption, in these at least, must exist to a certain extent.—(b) In such cases, the diarrhœa and night sweats are frequently very great.—(c) In caries, the hectic is also severe in proportion to the evidence of absorption.—(d) The glands in the vicinity of carious, suppurated, ulcerated, or tuberculated parts often become affected.—(e) Irritation, excessive pain, foreign substances, &c., may long exist in deep-seated or internal parts, without inducing hectic, or causing more than the symptoms of its slighter forms or early stages, as long as these causes do not give rise to morbid secretions in the substance of the affected tissue; but, as soon as matter is collected, or a fluid is formed from the destruction of the surrounding organization, the usual signs of confirmed hectic appear.—(f) Purulent matters have evidently formed in the liver, and occasioned hectic: the patient has recovered; and, having afterward died of some other disease, has presented proofs, in the changes observed in this organ, that an abscess had existed in it.—(g) Lesions of the blood-vessels are not infrequent in the advanced stages of the worst forms of hectic, or those caused by tubercles and suppuration. These facts induce me to infer, 1st, that absorption actually takes place; 2d, that it proceeds slowly, the depurating viscera, especially the kidneys, bowels, and skin, generally removing the morbid matters, or preventing their accumulation in the blood to the extent of causing very manifest or rapid changes in it; and, 3d, that the absorbed matters ultimately affect the blood, and not improbably the vessels, also, in which they circulate. I believe that the diarrhœa characterizing the last stage of hectic is caused as much by the disordered state of the blood affecting the mucous follicles and membrane as by inflammatory irritation; and that, when this latter condition exists, it arises chiefly from the blood, and the morbid secretion poured out by these tissues. The alteration in the blood may readily be supposed to discolour, or otherwise affect, the internal surface of the vascular system, or even to inflame or disorganize it, in those vessels which proceed from the part which is the seat of caries, suppuration, or of tubercular ulceration. As to the softening and flaccidity of the heart, upon which M. BOUILLAUD places some stress, I have seen nothing beyond what is presented by other muscular parts in these cases, the heart having participated in the emaciation or deficient nutrition of the rest of the body. From these consider-

ations I therefore conclude that hectic fever is most frequently the result, 1st, of local irritation of a slow inflammatory kind, either latent or manifest, and generally consequent upon, and associated with, debility; and, 2dly, of the passage of morbid matters into the circulation, where they occasion most of the severe phenomena uniformly and contingently present in the last stage.

307. v. TREATMENT.—The means of cure must have immediate reference to the cause or pathological state on which the hectic depends. During the first and second stages, they may be often employed with success. But when the third stage has supervened, we can expect nothing from them beyond alleviating the more distressing symptoms.—*a.* When the disease proceeds from the association of *disease of the digestive mucous surface*, with debility (§ 295), the treatment should consist chiefly of strict attention to diet, the farinaceous and easily digested articles of food being selected; of attention to air, gentle exercise, and to the state of the excretions; of gentle tonics conjoined with small doses of ipecacuanha and anodynes; of the infusion of cinchona with the solution of acetate of ammonia, or with small quantities of the nitrate of potash and sweet spirits of nitre, of bitters associated with laxatives, or of emollients with mild narcotics, according to the circumstances of the case. The bitter infusions may likewise be given with hydrocyanic acid, or with the extract of hop. When we suspect the existence of alterations of structure, they may be conjoined with the liquor potassæ, or with BRANDISH'S alkaline solution and conium. If the preparations of *iodine* be tried, very small doses only should be exhibited. A weak solution of the iodide of potassium, or of the iodide of iron, is most appropriate in such cases, either alone or with a narcotic, as hyoscyamus, conium, or extractum humuli. (See STOMACH, Diseases of.)

308. *b.* The treatment of the *pectoral and laryngeal forms* of hectic is so fully stated in the articles on the individual chronic diseases affecting the respiratory organs and passages, that nothing need be advanced on the subject at this place. It is only in the early stages of these forms of hectic especially, that material advantage can be hoped from medicine. The means just enumerated will often be found of service; but they require to be modified according to the peculiar features of the case. Gentle astringents and tonics, mineral acids, &c., are sometimes also useful. Of these, the infusion of roses with sulphate of zinc, sulphuric acid, and narcotics, is most appropriate.

309. *c.* The *sexual and puerperal forms* of hectic generally soon disappear upon the removal of their respective causes, if serious changes in remote organs have not been superinduced by a continuance of the irritating and exhausting discharges, in which the hectic originates, by the practices inducing and perpetuating the disease. In these forms the recovery depends much upon the patient himself. Early rising; mental and bodily occupations; low regimen; the avoidance of stimulating beverages, heating foods, and of warm condiments; travelling or voyaging; change of air; and a prudent regulation of the imagination, are among the most effectual means of cure. Seltzer water, soda water;

the mineral waters of Pyrmont, Carlsbad, of Giehlenau, of Ems, of Vichy, of Bath, of Tunbridge, &c., are severally useful, if appropriately prescribed. When the disease is occasioned by suckling, the cure is generally speedy, if the cause is relinquished before an important organ becomes affected, and if a restorative regimen, with change of air, be adopted. In such cases, the *mistura ferri composita*, and chalybeate waters, or the mineral waters just mentioned, are very serviceable.

310. *d.* The treatment of the other varieties of hectic is not materially different from that now stated. When the disease follows *hæmorrhages*, the means of cure should be directed especially to the pathological state of which the hæmorrhage is the result. (See that article.) If it be connected with *cutaneous eruptions*, the state of the digestive organs, and of the frame generally, ought to claim an especial notice; and if it originate in *mental emotions*, such measures as are the best calculated to divert the mind from contemplating the sources and relations of its misery should be prescribed. The *atrabilious, pituitous, and terminous* varieties require the combination of tonics with warm purgatives (F. 557–563, 572–576), chalybeate mineral waters, and vegetable and mineral deobstruents.

311. *e.* When the *irritation and absorption of morbid matter* are the causes of hectic, their sources should be removed; especially when they consist of carious bones, diseased joints, puriform collections, &c. But when this indication cannot be accomplished, or when the preservation of a limb requires that every means should be tried, the treatment ought to be directed with the view, 1st, of diminishing irritation; and, 2dly, of counteracting or resisting the contaminating influence of the morbid secretion on the circulation. The *first* of these is to be fulfilled by a judicious use of opium, morphia, hop, henbane, hemlock, &c.; the *second*, by medicines which support vital energy, and thereby resist the extension of disease, or promote the powers of reparation; as digestible nourishment, dry and pure air, gentle tonics, antiseptics, absorbents, and astringents. These may be variously conjoined, according to the peculiarities of the case, anodynes and narcotics with tonics, and tonics with antiseptics and absorbents. Thus, the infusion of cinchona may be prescribed with hydrochloric acid and the hydrochloride of morphia; the infusion of cascarella with the solution of the acetate of ammonia and the acetate of morphia, the tonic infusions or decoctions with the alkaline carbonates, or with the solution of potash, or with the chlorates, and the extract of hop or of hemlock, &c. Camphor may likewise be conjoined with narcotics in cretaceous and absorbent mixtures. When vascular action becomes much excited, the nitrate of potash, or the hydrochlorate of ammonia, may be given with such of the foregoing as are chemically compatible with them; and digitalis, or the potassio-tartrate of antimony, may be prescribed in the more inflammatory cases, and when the bowels are not irritated.

312. *f.* Various *urgent symptoms* require to be palliated during the advanced progress of the disease. Great *heat of skin* will be relieved, and consequent perspiration diminished, by

cold or tepid sponging the surface with equal parts of spirits, of solution of the acetate of ammonia, and of rose water. *Restlessness* may be diminished by the anodynes already enumerated, or by hydrocyanic acid, combined with gentle tonics and refrigerants. Camphor, henbane, and the nitrate of potash, or hydrochlorate of ammonia, are the most generally useful in this state, excepting when the bowels are relaxed, when opium, hop, or the extract of poppy should be substituted. When *diarrhœa* supervenes, the pathological conditions to which I have attributed it (§ 306) should be kept in view, as a treatment founded upon them is the most successful in practice; we should endeavour, in these cases especially, to counteract the contaminating influence of morbid secretions upon the circulation, and to impart tone to the digestive mucous surface. The means that are calculated to fulfil these intentions are also restorative of vital power, enabling it thereby to resist the extension of disease. The tonics and narcotics already mentioned (§ 311) may be employed with these views; or certain of them may be conjoined with the chlorates of lime, potash, or soda; or with creasote; or with cretaceous mixtures; or these latter may be given with the compound tinctures of camphor or of opium; or with tonic and astringent extracts; or the acetate of lead, or the sulphate of copper or of zinc, may be prescribed with opium.

313. *g.* The *Diet* and *Regimen* are most important parts of the treatment of hectic; but they should be varied, or even different in its different states. In most cases the *food* should be digestible and moderately nourishing. The milk of asses, or milk warm from the cow, goat's milk or whey, fresh buttermilk, warm milk with one or two tea-spoonfuls of very old rum in it; shell-fish, especially oysters; farinaceous and mucilaginous articles of diet; jellies, particularly those made with Iceland or Carrageen moss; and grapes in considerable quantity, have severally been recommended, and are more or less beneficial, according as they are appropriately prescribed. In most cases, the patient should take very gentle exercise in the open air, when it is mild, and expose himself to the sun and air as much as possible without the contingent risks. In some instances, especially those caused by debilitating discharges, by caries, &c., old wine, especially sherry, port, hermitage, and Burgundy, may be allowed with much benefit; and either old Madeira or sherry may be taken in Seltzer water. It is in such cases, especially, that the mineral waters recommended above (§ 309) are most serviceable. (See, also, the articles *ABSCSS* (§ 55), *ABSORPTION* (§ 15), *BLOOD* (§ 143, *et seq.*), *MESENTERIC DECLINE*, *TUBERCLES*, *TUBERCULAR CONSUMPTION*, &c.)

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XVI. FEVER, CONTINUED. SYN.—*Πυρετός συνεχής*; *Febris continens*; *F. continua*; *Febris continua continens*, *Burserius*; *Enecia*, *M. Good*; *F. Septenaria*, *Auct. Lat.*; *Anhalten des Fieber*, *Germ.*; *Fièvre continue*, *Fr.*; *Febbre continua*, *Ital.*

314. **DEFIN.**—*The changes constituting fever proceeding in one series, frequently with a tendency to exacerbation and slight remission.*

315. *i.* *Of the Division of continued Fevers.*—Fevers of a continued type are so remarkably modified by the circumstances stated above (§ 43), by varied combinations of causes, states of constitution, predisposition, and by epidemic influence, each form insensibly passing into the one nearest allied to it, that every attempt at arranging them must necessarily be more or less conventional, and depend upon characters which, although the more prominent and universal as respects certain species, yet occasionally disappear, or blend with others distinguishing correlative forms and varieties. Owing to this circumstance, the divisions of continued fevers adopted by writers have been arbitrary and varied. **STOLL** arranged them as *Inflammatory*, *Putrid*, *Bilious*, and *Pituitous*—a division not materially different from that previously made by **SYDENHAM**, **HOFFMANN**, and **BOERHAAVE**. **CULLEN**, **PARR**, and others distinguished three species, namely, *Synocha*, *Synochus*, and *Typhus*; **J. P. FRANK**, also three: the *Inflammatory*, *Gastric*, and *Nervous*. **RICHTER**, four: the *Inflammatory*, *Nervous*, *Putrid*, and *Gastric*. **BORSIERI**, five: the *Ephemera*, *Simple Synochus*, *Putrid Synochus*, *Slow Nervous Fever*, and *Hectic*. **J. FRANK**, four: the *Typhoid*, *Gastric* or *Bilious*, *Rheumatic* or *Catarrhal*, and the *Inflammatory*; and **HILDENBRAND**, five: the *Inflammatory*, the *Septic*, *Nervous*, *Gastric*, and *Hectic*. **DR. FORDYCE**, in his dissertations, attempted no arrangement beyond that into the *regular* and *irregular* forms. **PINEL**, desirous of giving precision to his descriptions, divided fevers of the continued type into *Inflammatory*, *Bilious* or *Gastric*, *Mucous* or *Pituitous*, *Putrid* or *Adynamic*, and *Malignant* or *Ataxic*; and has justly considered the plague and puerperal fever as distinct from the fevers belonging to these orders. A nearly similar arrangement has been followed by **BOISSEAU** and **BOUILLAUD**. **DR. WILSON PHILIP** has described only two spe-

cies: *Synocha* and *Typhus*. Dr. M. GOOD, three: *Inflammatory*, *Typhus*, and *Synochal Fever*. HUFELAND, four: *Inflammatory Fever*, *Nervous Typhus*, *Putrid* or *Infectious Typhus*, and *Gastric Fever*. Dr. TWEEDIE has divided continued fever into *Simple*, *Complicated*, and *Typhus*; Dr. ARMSTRONG, into the *Common Simple*, *Common Congestive*, and *Typhus*; and Dr. BURNE, into the *Inflammatory* and the *Adynamic*, either of which he believes may be simple, or associated with local inflammation. Dr. ARMSTRONG, having recanted his former opinions respecting fever, and discarded the influence of infection in causing it, has denied the existence of a synochal or simple inflammatory fever; has considered congestive fever to pass into simple fever, or inflammation, when excitement supervenes; and has argued that typhus always arises from malaria, is essentially the same disease as intermittents and remittents, and differs from them only in type. The various fallacies into which he has fallen respecting the diseases under consideration will appear more fully hereafter.

316. Dr. SOUTHWOOD SMITH has viewed continued fevers "as one great malady never differing in nature, but in every two cases differing in intensity, and giving rise by these differences to various forms of disease;" that this difference alone is the cause of the different forms it assumes. He accordingly admits only of grades of intensity: the first or lowest grade being *Synochus mitior*; the second, *Syn. gravior*; the third, *Typhus mitior*; the fourth, *Typh. gravior*.

317. This view, as involving fundamental principles of pathology and practice, which, if implicitly followed, would lead to very serious results, requires a few remarks. Dr. SMITH'S position is, that continued fever never differs in nature. Now, by the nature of a disease is understood its seat, the tissues affected by it, or the exact pathological condition, whether of vital function or of structure, constituting the malady. If, therefore, it can be shown that in the continued fevers, even of temperate climates, the state of function and organization are always the same in kind; that the vital manifestations and structures are affected in them all in a similar manner, but in different grades of severity, it will be conceded that fever never varies in its nature. As this position, however, is merely assumed, without any attempt at ascertaining its stability, it must still be doubted, until either it or its opposite be proved. If we closely observe the mode as well as the degree in which the vital manifestations in the nervous system, in the muscular system, in the blood and vascular system, &c., are affected in the various forms of continued fever, and the consequent changes in the various functions and structures, we cannot fail of concluding that, however nearly they may all approximate each other, they differ as essentially in nature as in grade. What is the difference as to intensity between the continued fevers enumerated above (§ 44), or even between the epidemics observed at different epochs and seasons, if intensity be the only source of distinction! In the paragraph just referred to, other essential differences, arising out of the prominent affection of particular functions, tissues, and systems, are stated; and from these, as well as from the very distinct and even oppo-

site manner in which the vital manifestations, more particularly the organic nervous power, are affected, the varieties of continued fevers result. If fevers were modified in severity merely, they would be mutually convertible into each other, and either species indifferently would rise from one and the same cause. But no such occurrences are observed; for the nature, as well as the intensity, of fever varies with the kind and combination of causes producing it. Will infectious typhus communicate simple continued fever, or bilious inflammatory fever, or gastric fever, or climate fever, or epidemic yellow fever; or will these species of continued fever arise from the same cause, and admit of being resolved into grades of intensity merely? No one capable of distinguishing disease ever saw the typhus miasm occasion any of these fevers, nor the causes usually giving rise to either of them produce typhus. Neither of them is convertible into the other; and however closely allied or equally severe certain varieties of each may be, something more than difference in intensity is to be recognised. The causes of each are distinct, the features of each different, the course and duration different, the external appearance and internal lesions different, and yet no difference as to severity or intensity may often be ascertained by the ablest pathologist. Is it to this assumed difference of intensity merely that we are to impute the admitted fact that, in the very same period or stage, the treatment which is beneficial in the one fever is death in the other; that large depletions are required at the commencement of one species, and most injurious at the same period of another? The very varied, and even opposite treatment required in several epidemics, even when the same organs are prominently affected, cannot be referred to grades of severity; for fevers, even of this climate, may be equally violent or severe, and terminate fatally after the same duration, and yet be aggravated or ameliorated by opposite measures. The great pathological truth—which ought never to be overlooked, and without a full recognition of which, in estimating the nature and treatment of fevers, our experience will be worse than useless—will be deceptive, and our knowledge worthless empiricism, namely, that the vital manifestations may, all or severally, be variously affected by the causes productive of fever; may be lowered or heightened, or otherwise changed; and that these changes, whether as to kind or as to degree, should be made the basis of distinction in arranging the varieties and forms of fever, and in devising indications for their cure. In the following inquiry, something more than intensity of action will be recognised and made the grounds of arrangement and treatment, inasmuch as each of the several kinds of fever presents characters having stricter reference to the nature than to the grade of disorder; to the state of vital manifestation in the several systems and structures, and to the seat and grouping of the predominant lesions, much more than to intensity of morbid affection. The arrangement, therefore, about to be followed, will not materially differ from the sketch already given (§ 44). But all the kinds of fever there enumerated cannot be treated of under this head; their importance, and, still more, certain pecu-

liarities of character, as well as of the circumstances in which they occur, requiring, conformably with the form of this work, that they should be discussed in separate articles. In considering, therefore, the various kinds of continued fever, those only which are most intimately related to each other will be comprised under this head; the more simple states being first described, and the more complicated and dangerous forms successively reviewed.

[No better plan of arranging fevers will probably ever be found than that which is derived from certain symptoms or phenomena observed in each. In one case, we find the symptoms continue unabated, or nearly so; in another, they are subject to remission, or complete intermission: this circumstance, then, lays the foundation for the important division into *periodical* and *continued*. The complete suspension of the febrile phenomena in some instances, and their partial subsidence in others, gives rise to another important division of *remittent* and *intermittent*. So far, then, we have no difficulty. But when we undertake to arrange continued fevers, on account of the diversified character of the phenomena—the symptoms in no two cases being precisely similar—we are immediately surrounded with difficulties.

Dr. Russ admitted but *one kind* of fever, and did not allow of its artificial division into genera and species. "A disease," he remarks, "which so frequently changes its form and place, should never have been designated, like plants and animals, by unchangeable characters" (*Med. Inq.*, vol. iii., p. 33). The late Dr. Hosack divided fevers into *intermittents*, *remittents*, and *continued*; and the latter class was made to include *synocha*; *typhus*, vel *synochus*; *dysentery*; *Oriental plague*; *tropical plague*. That he believed that these fevers run into each other, and did not always maintain a distinctive character, will appear from the following quotation from his 24th Lecture: "The *typhus* fever, as it appeared at the Walkill, commenced as an *intermittent*, then became remittent, and at length ended in *typhus*. The same thing has been frequently observed of the lake fevers. They commence, for the most part, in an intermittent form, but by their duration they become remittents, and at length terminate in *typhus*" (*Lect. on the Theory and Prac. of Physic*, Phil., 1838, p. 302). *Synocha*, or inflammatory fever, Dr. H. regarded as a "state of pure, general excitement of the system, without local inflammation, and without vitiation of the fluids." This fever, he states, occurs sometimes in cold climates and in cold seasons of the year, but is then apt to run into the local plelegmasia, thereby losing its general character. He, however, adds that it is most usually met with in hot climates, and may, "under peculiar circumstances, become a contagious disease, and propagate itself by contagion," when it is called *yellow fever*; its contagiousness depending upon the condition of the atmosphere in which it originates, or into which it may be introduced. In the Southern States, this fever, he observes, often goes under the name of *Stranger's Fever*, because strangers to the climate are most frequently subject to it. In temperate climates, Dr. H. believed that *synocha* was often changed into *typhus* or *synochus*.

Typhus, or *synochus*, Dr. H. remarks, "is

very generally more or less inflammatory in its first stage," that is, it is *synocha* in its commencement, though it is *typhus* in its progress and its termination. The causes of this form of fever he makes out to be *marsh effluvia*; *confined human effluvia*; *decomposed animal matter*; *salt provisions*; *want of fresh vegetables*, and *contagion*.

Dr. EDWARD MILLER formed his classification of fevers upon their supposed causes, making of these latter two genera, *koino miasma* and *idio miasma*; the former comprehending the effluvia exhaled from the public filth of cities, the soil of marshes, and the noxious emanations from decaying animal and vegetable matter; and giving rise, according as the effects are modified by certain circumstances, not always appreciable, to *plague*, *yellow fever*, *remittent* and *intermittent* fevers; the latter, *idio miasm*, produced from the matter of perspiration and the other excretions given off from the human body, accumulated in small and unventilated places, and acted on by heat, and often called, in the books, "*vitiated human effluvia*, and *typhus* and *putrid contagion*." From this principle he supposes *typhus*, including *jail*, *hospital*, and *ship fevers*, to originate. These fevers, unlike the former, rarely become epidemic; appear in the middle and higher latitudes, and occur, for the most part, in the colder seasons of the year.

Dr. JOSEPH M. SMITH has suggested, in addition to these, that there are certain *compound fevers*, produced by a combination of these two miasmatal poisons. Dr. MILLER had previously suggested that "it would be a subject of curious and interesting inquiry how far these different febrile poisons are susceptible of being blended, and thereby producing effects of a mixed kind; and likewise how far the *idio miasmatic* atmosphere, by means of high solar heat and other concurring circumstances, is capable of conversion into the *koino miasmatic* atmosphere" (*Medical Works*, p. 196). Dr. S., however, regards such a conversion as impossible, and that no circumstances can enable simple human effluvia to produce any other forms of fever than the species of genuine *typhus*, but that certain compound or mixed fevers may arise from the union of these atmospheres. When, therefore, the miasm of *typhus* or human effluvia becomes mixed with the miasm of marshes or the filth of cities, a fever, to which he assigns the rank of a new *genus*, is produced, and this compound source of it he calls "*idio-koino miasma*." No name is assigned by Dr. S. to these fevers except that of "*idio-koino miasmatal fever*;" but, as examples, he designates a fever which prevailed chiefly among the blacks in Bancker-street, New-York, in the summer and autumn of 1826; the cases of fever that were admitted into the Philadelphia almshouse the same season; a fever which appeared in the same city in 1821, an account of which has been given by Dr. G. EMERSON (*Phil. Jour. of the Med. and Phys. Sciences*, No. vi., p. 193), and a fever that often originates on board of ships, where *koino* and *idio miasm* both abound. The *Morbus Hungaricus* (PRINGLE on "*Diseases of the Army*," p. 310), and plague at Athens, are also supposed to have been produced by this compound miasm. *Dysentery* Dr. S. regards as originating sometimes from

human effluvia, sometimes from marsh miasm, and occasionally, as in camps and military hospitals, from a union of both. These two genera are each divided into two species, according to the grade or intensity of the cause. *Koïno miasma* then includes, I. *Proto-koïno miasma*, giving rise to ordinary *intermittent* and *remittent* fevers; and, II. *Perkoïno miasma*, embracing the poisons of *yellow fever* and *plague*. Dr. S. supposes that this species of poison is sometimes attached to clothes, furniture, and other articles, and thus carried from one country to another, or from the town to the country, and thus communicates *yellow fever*, although the disease itself is not contagious. *Idio miasma* is also made to include two species, I. *Protidio miasma*, the ordinary source of genuine typhus fever;* II. *Peridio miasma*, a higher grade of the same poison. The genus *idio-koïno miasma* also includes two species, I. *Protidio-koïno miasma*, the source of the New-York Bankerstreet and other fevers; II. *Peridio-koïno miasma*, the source of *yellow fever* and the *plague*. Reduced to a tabular form, Dr. SMITH'S classification will stand as follows:

GENUS I. KOÏNO MIASMA: Sp. I. *Proto-koïno miasma*, producing intermittent and remittent fevers; Sp. II. *Perkoïno miasma*, producing yellow fever and plague. GENUS II. IDIO MIASMA: Sp. I. *Protidio miasma*, producing the mild forms of typhus; Sp. II. *Peridio miasma*, producing the malignant forms of typhus. GENUS III. IDIO-KOÏNO MIASMA: Sp. I. *Protidio-koïno miasma*, producing the mild forms of compound fevers; Sp. II. *Peridio-koïno miasma*, producing the malignant forms of compound fevers.

Dr. S. does not claim that each of the above species produces a disease as peculiar in its nature as smallpox or hooping-cough. "The pathological phenomena," says he, "which result from infection afford the strongest evidence that there is an affinity between its diseases; but this affinity has its limits. The dogma of the unity of disease derives no support from the similitude sometimes observed between different infectious fevers. Strictly speaking, a unity of disease can exist only where there is a unity of cause. If the same poison operate on individuals whose susceptibilities are different, grades of one disease will be the consequence. As a general truth, therefore, it may be said that different poisons produce different disorders, each of which has different grades, that, collectively, form a unit. It has long been a question whether yellow fever and plague are essentially different from intermittent and remittent fevers, or grades of the same disease. If our preceding views be correct, the two former must be regarded as specifically distinct from the latter; for yellow fever and plague are produced by the species *perkoïno miasma*, while intermittent and remittent fevers arise from *proto-koïno miasma*. These species and their varieties severally produce distinct fevers of various grades. This view of the subject is applicable to all the species of infection.

* [Dr. S. observes that typhus from this source is a disease of frequent occurrence in the cities of the United States, but rare in the interior of the country, and that remittent and other fevers, originating from *proto-koïno miasma*, in their advanced stages, often resemble genuine typhus, from the morbid excretions of the patient reacting on his system. (*Elements of the Etiology and Philosophy of Epidemics*, p. 93.)]

"The similarity of the different species of infectious fevers depends upon the affinity of their poisons, which are probably composed of the same elementary principles, varied in their proportions. Now, so far as these poisons are allied to each other, so far only are the fevers occasioned by them grades of the same malady. Though there are phenomena which are common to all the miasmatic diseases, yet there are others peculiar to each, which clearly indicate a specific difference in the poisons that produce them. In every febrile complaint there is an assemblage of symptoms which enables the experienced observer to ascertain its nature, and to discern its relations to other disorders"* (*loc. cit.*).

The above will serve as samples of the principal attempts on the part of American physicians to arrange fevers according to the nature of their causes; and they are founded on the assumption that no systematic arrangement of fevers will be altogether satisfactory which is based upon their type, symptomatology, or pathological characters.

Dr. E. BARTLETT, in his late work, "*The History, Diagnosis, and Treatment of Typhoid and of Typhus Fever*," &c. (Phil., 1842), maintains that we have but four distinct fevers in this country, namely, 1. *Typhoid Fever*; 2. *Typhus Fever*; 3. *Periodical Fever*, in its three forms of *Intermittent*, *Bilious Remittent*, and *Congestive*; and, 4. *Yellow Fever*. He admits that there may possibly be such a disease as the "*Simple Fever*" of FORDYCE, or the "*Ephemeræ*" of COPLAND; but he has no knowledge of any such, or of any *inflammatory fever* distinct from *Typhus* or *Typhoid*. The same opinion is held by Dr. GERHARD and many New-England physicians. A majority of the profession, however, recognise, with HOSACK, EBERLE, DEWEES, &c., the prevalence of *synocha*, or the *inflammatory fever* of CULLEN; and we believe that many of the fevers that occur, especially in our large cities, during the cold season, belong properly to this type.

Dr. B., as will appear hereafter, has, with LOUIS, made *pathological anatomy* the basis of his classification; making an anatomical condition (inflammation or ulceration of PEYER'S glands) the characteristic mark of *Typhoid Fever*, though the symptoms correspond with those described as belonging to *Typhus fever*. Dr. B. does not, with some pathologists, consider the affection of these mucous follicles as the cause and precursor of all the other morbid phenomena, but as an invariable concomitant. Such a division, if founded in nature, can scarcely be available for practical purposes, as it is founded on circumstances not to be ascertained till after death. If pathological anatomy be recognised as a proper basis of classification in fevers, it will not be difficult to form innumerable varieties, according to the variations in post-mortem appearances, which in no two cases are precisely similar.

* [It does not fall within the scope of our design to criticise the views or systems of others. We may, however, remark, that the data on which the classification of Dr. S. has been founded appear to have been assumed rather than proved to exist; and that, however ingenious, his views are too hypothetical to be recognised as sufficient for the establishment of a new pyretological arrangement. For this reason, probably, his nomenclature, above given, has never gained currency in the profession.]

Dr. DUNGLISON ("The Practice of Medicine," &c., Phil., 1842) treats, under Continued Fever, of the following varieties: 1. *Simple Continued*; 2. *Typhus*; 3. *Typhoid*; 4. *Plague*.

Dr. WATSON makes but one continued fever, occurring, however, under various forms, as *mucous*, *adynamic*, *inflammatory*, *bilious*, *gastro-enteric*, and says that "there is no line of genuine distinction between continued fevers that can be relied on," and that "they run insensibly into each other, even the most dissimilar of them, and are traceable often to the same contagion" (*Lectures on the Practice of Physic*, Phil. ed., p. 834). Dr. EBERLE remarks that "continued fever occurs under a variety of prominent modifications, and under every grade of febrile excitement, from the feeble and sinking reaction of typhus to the vehement and tumultuous actions of synochal fever." He makes but three principal varieties, according to the grade of febrile excitement: 1. *Synocha*; 2. *Synochus*; 3. *Typhus*; the *synocha* embracing all those fevers which are conspicuously *inflammatory*, whether idiopathic or symptomatic, the *synochus* being intermediate between the purely *synochal* and the *typhus* varieties of fever, "constituting by far the most common modification of febrile reaction." The term *synochus* is, however, employed by Dr. E. to indicate a certain grade of febrile excitement, and not as constituting, in itself, a distinct form of fever. By *typhus* he understands those fevers characterized by "a weak, small, quick, and generally frequent pulse," embracing three varieties, according to the grade of arterial action (*Treatise on the Practice of Med.*, vol. ii., p. 157-9). Dr. TWEEDIE (*Cyc. of Pract. Med.*, Phil., 1845) has made but three varieties: 1. *Simple*; 2. *Complicated*; 3. *Typhus*. Dr. CORLAND makes several, as, 1. *Ardent* (embracing, 1. *Ephemeral*; 2. *Inflammatory*; 3. *Bilio-gastric*); 2. *Mucous* or *Pituitous*; 3. *Sweating*; 4. *Synochoid*; 5. *Typhoid* (embracing, 1. *Mild Typhoid*; 2. *Complicated*, or *Low Nervous* (under which are several sub-varieties, according as different organs are complicated); 3. *Typhoid*, with *Putro-dynamic characters*; 4. *Typhus*). These divisions are all founded on a preponderance of certain symptoms, and it would not be difficult to carry division still farther, and make as many varieties of fever as there are of symptoms in different cases. Dr. BELL mentions only, 1. *Simple Continued*; 2. *Typhus*; 3. *Typhoid*.

Such are some of the views entertained by systematic writers with respect to the classification of continued fevers. For purposes of description, such divisions answer a very good purpose, and are perhaps necessary; but we shall err egregiously if we suppose that such varieties are easily recognised at the bedside, or are always so distinctly marked as to enable us to confer on each its appropriate name. There is much reason to believe, as Dr. WATSON has remarked, that all the forms of continued fever may run insensibly into each other, even the most dissimilar of them, and may often be traced to the same contagion. We see, for example, in the same region of country, as New-England, where malarious causes do not prevail, that in one season, or perhaps for a series of years, the inflammatory type prevails, marked by excitement of the sanguiferous system,

and requiring depletion; and in the next season, or for a cycle of years, from some unknown atmospheric change or meteoration, febrile diseases will be marked by depression of the nervous system characteristic of the typhoid type. Again, nothing is more common than for a fever to commence with high *inflammatory*, and end with *typhoid* symptoms. These facts are to be borne in mind, and also, that we are not to prescribe for the name of a disease, but for the actual condition of the system. No remarks are needed in addition to those offered by our author in relation to the ordinary inflammatory form of continued fever which is met with in our country. Under *Typhoid*, *Typhus*, and *Yellow Fevers* we shall append some observations on the phenomena of these diseases as observed in the United States.]

318. ii. *Of the Prognostic Symptoms in Continued Fevers.*—a. *The countenance.*—When the expression is serene, confident, clear, and animated, the disease is of a mild and uncomplicated kind; in the advanced stages this state indicates a favourable crisis. If the face is large, injected, of a crimson or dark colour, with prominence of the eyes, or is agitated and anxious in the early stages of fever, the morbid excitement and determination to the head occasioning this appearance will speedily exhaust the powers of life, and, in a later period, will soon be followed by malignant symptoms or fatal collapse. When the countenance is tinged of a yellowish or earthy hue, or is withered-like or sunk, or constricted, and especially if it exhibit distress, or want of serenity and confidence, extreme danger may be apprehended. A full, bloated, waxy, or livid countenance, particularly if it assume a tawny or mahogany tinge, indicates very dangerous congestion and approaching death.

319. b. *External Surface.*—If the skin be soft and perfect in its sensibility, its heat not excessive, although augmented, but without a feeling of pungency or burning; and if its temperature be equally diffused, a mild attack may be expected. But when the skin is dry and harsh, as if thickened, and the heat is ardent, caustic, or unnatural; if the surface be little sensible, not readily acted upon by rubefacients or blisters; or if vesicated parts assume a dark or black hue; if the heat be ardent in the head or trunk, particularly at the epigastrium, and lowered in the extremities; if the skin be thickened, apparently withered, dusky, dark, or livid in parts, or yellowish, flaccid, tawny, streaked of different shades, lurid, or otherwise changed from its natural hue; if it be damp, greasy, puffy, or bloated, or studded with very dark petechiæ, vibices, or blotches, or unusual eruptions, or if parts pressed upon show any tendency to gangrene, great depression of the vital powers, with contamination of the circulating fluids, should be inferred, and the danger considered great. The more florid, however, the spots are, the less is to be feared; and when the black or violet petechiæ assume a brighter tint, a more favourable opinion may be formed. Large black or livid spots are often attended by dangerous hæmorrhage from the bowels. Small dusky brown spots, like freckles, are very unfavourable signs. Large livid or dark greenish marks seldom appear till very near the fatal period.—(НУХНАМ). If the skin

be covered by warm, general, fluid, and copious perspiration, attended by an open or free pulse, a favourable issue may be expected. But if the perspiration be cold, clammy, scanty, or partial, with a nauseous or disagreeable odour, especially if the pulse be weak, small, very frequent, oppressed, or irregular, there is much danger. The occurrence of erysipelas or erythematic inflammation in the seat of sores or of abrasions; the breaking out of old ulcers, or the opening of cicatrices; or a foul, gangrenous state of old sores, denote sinking of the powers of life, and a tendency to a dissolution of the textures. *Emaciation*, when moderate, and in due relation to the duration of the disease, is rather favourable; but when it is excessive or rapid, it indicates ulceration in the bowels. Little or no wasting, or a bloated and a soft or tumid state of the surface, is very unfavourable, and, with discoloration, indicates a malignant malady. The supine position; inability to turn or remain upon the side; falling down in the bed; or the head being buried deep in the pillow, from frequently throwing it back, or rolling it about, are indications of great danger.

320. *c.* The *abdomen* should be carefully examined, in order to form an idea of the probable state of the stomach, liver, spleen, and bowels. Tension, oppression, and pain in the hypochondria and epigastrium indicate predominant affection of the liver, stomach, or spleen; and if to these be superadded sickness and vomiting, or a sense of internal heat or burning, tumefaction or tenderness, a harsh or caustic heat of the surface of these regions, with a parched skin, great thirst, dark-coated tongue, or great anxiety at the *præcordia*, a very severe form of fever, which will probably pass rapidly into exhaustion, with various malignant symptoms, should be anticipated. A tympanic or distended abdomen; soreness, tension, intolerance of pressure; or a sense of heat or burning; with a hot, dry, harsh, and dusky skin; or with watery, foul, and morbid alvine discharges; or with a dark-coloured tongue, are most unfavourable signs. If any of these be accompanied with irregular or irritable bowels, and the state of the discharges just mentioned, or with mucous or bloody stools, asthenic inflammation, frequently with ulceration, or some equally dangerous lesion of the intestines, is present. If, at an advanced period, or after any of these symptoms particularly indicating disorder of the bowels, very acute pain suddenly occurs in the abdomen, extending from a circumscribed spot, with vomiting, collapse of the features, increased frequency and smallness of the pulse, abdominal distention, tenderness, &c., perforation of the intestines, and its consequences, have taken place.

321. *d.* *Anxiety* at the epigastrium and *præcordia*, with intolerance of pressure, depends upon the affection of the nerves of organic life, and serious lesion of the stomach and heart, and accompanies the worst forms of fever. When attended by great restlessness, it is a most unfavourable sign. It often ushers in, and accompanies, dark, grumous vomiting in malignant and disorganizing fevers. *Singultus* is also often consequent upon this sensation, especially when the stomach, or superior and

posterior parts of the liver, or both organs, are much affected. When it appears late in the disease, and has been preceded by pain, or by a sensation of heat or burning at the epigastrium, or by distention, oppression, and tumefaction in the hypochondria, dissolution is generally impending, particularly if the *singultus* be obscure or suppressed, and attended by anxiety or tension at the *præcordia*.

322. *e.* *Sensibility and excitability* vary much in different forms and stages of fever. During moderate excitement or reaction, when there is no disorganizing tendency in any viscus, these manifestations of life are increased and equally diffused. But when the disease evinces at its commencement, or at an advanced stage, depression of the vital powers, with signs of contamination of the fluids, and tendency to a solution of the vital tone or cohesion of the tissues, the excitability or irritability is evidently diminished, either by the exciting causes, or by previously increased action, or by both; and in such cases it is often unequally manifested, or concentrated in those viscera which are most severely affected. Morbidly increased sensibility and excitability, especially when so great as to give rise to spasms or convulsions, or augmented activity of all the senses, and of cutaneous sensation, are indications of affection of the membranes and surface of the brain and spinal chord, with a tendency to exhaustion, great in proportion to the degree of sensibility displayed. In many of the forms of fever characterized by severe cerebral affection, followed by stupor, black tongue, low delirium, or coma, the vital manifestations under consideration are suppressed by the cerebral congestion, as well as unequally diffused or manifested. In all such instances the prognosis should be very unfavourable. But when these vital states seem neither suppressed nor much lowered, nor very inordinately excited, nor unequally manifested, the surface of the body, the senses and nervous system generally, still retaining their susceptibility of external and internal impressions, a favourable issue may be expected. When the extremities are cold or clammy; the skin thick, dry, loose, or hide-like; the countenance sallow or collapsed, with increased or caustic heat at the epigastrium, we may infer the excitability to be unequally manifested; to be diminished in the periphery of the body and augmented in the more central parts, particularly if irritability of the stomach and bowels, with morbid discharges, be also present.

323. *f.* The *cerebral functions* are more or less disturbed in most continued fevers, and require, as well as the state of the *senses*, the close observation of the physician. If the *sleep* be sound, undisturbed by frightful dreams or sudden startings, unattended by stertor or moaning, and especially if the patient awakens in a more rational or refreshed state, a favourable issue is indicated. But in proportion as the sleep deviates from this are severity of disease and danger to be apprehended. An agitated, unrefreshing sleep indicates increased vascular action in the brain, and this is still more to be dreaded if there be continued watching. Want of sleep often precedes delirium in its worst forms. Stupor, or a desire to sleep, without obtaining it, indicates great danger. Violent

and furious *delirium*, or early delirium, with great excitement of the circulation, irritable or rapid pulse, crimson-coloured and injected countenance, prominent eyes, and rending headache, indicate a state of vascular excitement, which will soon be productive of dangerous exhaustion, even if the brain escape immediate or irremediable mischief. If delirium be attended by convulsions, startings of the tendons, or tremours, the danger is great, and often near. It is not less certain, although somewhat delayed, if followed by profound coma, relaxation of the sphincters, unconscious or involuntary discharges, &c. A mild delirium is not unfavourable when unattended by signs of malignancy, or extreme exhaustion of the powers of life; and if it appear in the advanced course of the disease, and chiefly in the evening. When it follows a state of stupor, it is often indicative of recovery. Very lively or very low delirium, the latter especially, is unfavourable. If the delirious patient states himself to be dying, he is generally right, although there may not be many signs of danger present. Indifference to death, with an apparent desire of it, and a firm persuasion of being perfectly well, are also unfavourable.

324. *g.* If the *eyes* be calm, or slightly animated, in the early stages, a mild form of fever may be expected; at advanced periods, a favourable change has commenced. Agitated, wild, terrified, confused, muddy, painful, prominent, turgid, or suffused eyes indicate a most severe disease at an early stage, and great danger in advanced periods, especially if the whites of the eyes become of a dusky or dirty yellow. Intolerance of light attends cerebral excitement; and rolling of the eyes, with a wild, unfixed stare, often precedes severe delirium or convulsions. A dull, sluggish state of the eyes, want of animation, sinking in their sockets, a dark hue of the conjunctiva, with a sad expression, are unfavourable. A pearly whiteness, with agitation and prominency, is a symptom of dangerous congestion of the lungs and liver; and, if succeeded by a dirty yellow hue, or dulness of the cornea, indicates approaching dissolution. Partial paralysis of the retina, indicated by black spots, or other dark objects floating before the eyes; closure or falling of the upper eyelid, or dosing with the eyelids half closed, are dangerous symptoms. Slight *deafness* without pain in the ears is not an unfavourable sign.

325. *h.* The *tongue and mouth* furnish important indications in fevers. In the course of the milder forms the tongue is foul, coated with a yellowish or cream-coloured mucus, and generally furred; it is sometimes a little red at the sides and apex, and rather dry, or moderately moist, in the centre. In proportion as it departs from these states, the danger is increased. If it be covered by a milky, whitish, or mealy coating, and if it be also large, flabby, or swollen, early in fever, an adynamic or malignant state of disease may be expected. If it become rough, dark-coloured, with prominent papillæ, and not particularly coated, but dark red, especially towards the sides, serious affection of the alimentary canal, or of the liver, should be feared, more especially if the symptoms referrible to the abdomen and these viscera be also urgent. If to these appearances

be superadded dryness, and contraction of its breadth, serious or fatal changes within the head or large cavities have supervened. When the tongue is white or coated, with the papillæ erect or excited, and the edges red and fiery, vascular action is then inordinate in some internal organ, although no other symptom may indicate this state, and vascular depletions are required. If it be covered by a deep yellow coating, congestions of bile in the biliary ducts and gall-bladder are evinced; and if this pass quickly into an excited, dry, and brownish state, the supervention of congestion, or inflammatory action in the substance of the liver, or the digestive mucous surface, or in both, with diminished vital power, may be inferred. A dark or brick-coloured, or livid redness of the tongue, with a glossy surface, or a surface partially covered by a partly detached coating, or black crust, or with a dark, scanty, tenacious mucus in the mouth, or on the teeth or lips, show extreme prostration of vital power, with contamination of the circulating and secreted fluids. A leaden-coloured, sodden, or parboiled-like, flaccid, smooth, enlarged, tremulous, or diminished or shrunk tongue, are all unfavourable signs. If this organ become, in the progress of fever, thickly covered by a dark or fuliginous coating, or exhibit, in addition, deep fissures, the apex and sides being of a brownish or dark hue, the adynamic state is extreme, and the digestive mucous surface will readily pass into ulceration or sphacelation, if, indeed, the former lesion have not already commenced. Vital exhaustion, contamination of the fluids, and solution of the soft solids—the constituents of marked malignancy—are evidently present, if the gums readily bleed when touched, if they and the teeth are covered with a black viscid mucus; if the former discharge a dark dissolved blood, or ichorous bloody sanies; or if a similar fluid escape from the nostrils or posterior fauces. An inky state of the surface of the tongue sometimes ushers in these symptoms, and also evinces the malignant condition. On the other hand, if the tongue becomes cleaner at its edges or apex, or moister round the margin, particularly if other favourable signs appear, a salutary change has commenced.

326. *i.* *Thirst* is often very urgent, or even insatiable; but, although indicating the intensity of disease, it is not of itself a dangerous symptom. The absence of thirst, especially when the tongue and fauces are dry, rough, and parched, is always an unfavourable sign. A constant desire of drink, yet the patient drinking little when it is given him, and a difficulty of deglutition, are very dangerous symptoms.

327. *k.* The *evacuations from the bowels* furnish important signs to guide the practitioner in the treatment and prognosis. In the milder forms of fever the bowels are readily acted upon, and the evacuations are generally feculent, but varying in colour and consistence according to the state of the biliary and other secretions, and the purgatives employed. When the stools give relief from uneasiness in the abdomen, or reduce fulness of it, a mild disease may be expected. If the most active cathartics are required to produce evacuation, the stools being watery, scanty, or otherwise morbid, and voided with a sense of confinement or difficulty, the

abdomen being full or tense, or hot and uneasy, a severe fever may be anticipated, and general or local depletions, or both, are indicated. If copious feculent stools follow this state, a favourable crisis may be looked for. Frequent, scanty, bilious evacuations, presenting every variety of colour, from a light green, or greenish yellow, to a greenish black, sometimes watery, at other times mucous and streaked with blood, occasionally feculent and extremely offensive, often accompany the worse forms of bilious or autumnal fevers, and indicate danger, particularly if they assume a pitchy appearance. When the stools are smooth, dark brown, or blackish, like treacle, the danger is great. When they are intimately mixed with blood, or bloody sanies, or purulent mucus, or are ochrey, very frequent and exhausting, organic changes in the mucous surface of the intestines, or in the liver, are evinced. If discharges of blood are found in the stools, especially if unmixed with other matters, ulceration in the large bowels may be inferred. If the blood be grumous, black, and mixed with the fecal matters, it has generally proceeded from the small intestines. If the stools consist chiefly of a light yellow or serous fluid, or are passed involuntarily or unconsciously, great danger may be apprehended.

328. *l.* The *urine* is always more scanty in fevers than in health, excepting during the premonitory and invading periods, when it is often pale and copious. As reaction is developed, it is diminished, and higher coloured than natural. In proportion to the extent of these latter changes may the disease be considered as severe. In the most dangerous forms of fever, particularly those characterized by morbidly increased action, rapidly passing into the malignant or adynamic states, the urine is extremely scanty, and its secretion nearly suspended. If it also present a muddy, or greenish brown or greenish black hue, great danger exists. A greenish or dark urine is often observed in severe inflammatory, bilious, and gastric fevers, sometimes with a muddy appearance, or with darker clouds in it. When this kind of urine becomes paler, deposits a sediment, especially if it assume a brick colour, and is abundant, a favourable change is taking place. If this secretion become more copious and more natural, with a due deposit, the fever is declining. But if it be more scanty, or suppressed, or passed involuntarily, or if retention occur, extreme danger exists.

329. *m.* The *respiration* is generally frequent or irregular in all severe forms of fever. When it is also attended by a sense of constriction or oppression, or when it becomes short, hurried, difficult, and laborious, or suspirious, great danger is evinced. A still, quiet respiration, the motions of the thorax being scarcely perceptible, is also unfavourable, especially when stupor or torpor is present. A slower state of respiration than natural, occasionally interrupted by deep sighs, or by convulsive heavings of the chest, is a sign of danger. A very hot state of the expired air early in the attack indicates an inflammatory or malignant fever. A coldness or rawness of the expired air, particularly if it have a fishy or otherwise offensive odour, indicates either a malignant disease or approaching dissolution. In all cases of dis-

ordered respiration, especially if cough be present, the stethoscope should be used, unless there be any dread of infection.

330. *n.* The *pulse*, to the experienced and observing physician, furnishes the chief indications of danger, as well as of treatment. If it be under 100 or 110, at the same time free, energetic, and regular, the disease will be mild and tractable. But if it rise above the latter number, if it become also irregular, tumultuous, or oppressed, then danger is to be dreaded. If it reach 120, and especially if it rise above this number, the danger is very great. If it mount to 130, recovery seldom or never occurs, unless in cases of hysterical and irritable females, or those in the puerperal state. Smallness, weakness, irregularity, intermissions, or startings of the pulse; or a too open, broad, and very soft pulse, the pulsation ceasing upon slight pressure of the finger, are all indications of great danger. If it become less frequent, more free and expanded, a favourable change may be hoped for. An intermission every fifth or sixth beat, at the acme of the disease, is sometimes an indication of crisis.

331. *o.* The *blood* taken from a vein furnishes very important indications, both as to the means of cure and as to the result. If it be not materially different from natural, or if the crassamentum be merely slightly cupped, a favourable opinion may be formed. But if the clot be loose, gelatinous, or imperfectly separated from the serum; or if it be dissolved or broken, and tinge the serum; or if the serum be of a brownish or greenish hue; or if the more remarkable changes mentioned in the article BLOOD (§ 129, *et seq.*) be present, most dangerous disease obviously exists, depending no less upon the alteration of this fluid than upon depression of the vital manifestations with which this alteration is associated, and of which it is usually the consequence.

332. *p.* The prognosis, moreover, depends very much upon the *form of the fever*: at least one third of the more malignant kinds of fever terminating fatally, according to the usual modes of treating them, and not more than one case in fifteen or twenty of the milder forms. The *nature of the prevailing epidemic* must be taken into account, in connexion with the *circumstances* that seem to favour or extend it. Of these the most remarkable are full living, and a plethoric state of system. Although the epidemic fevers lately prevalent in Ireland have been produced by the wretched circumstances of most of the lower classes, and have readily spread, owing to these and other allied causes, the mortality has not been generally great in these classes, in proportion to the number affected; whereas, among the higher orders, the extension of fever has been relatively less, but the proportion of deaths to the affected much greater than in the lower. Persons who live chiefly on animal food, or who partake of it very largely, are in greater danger from continued fever than those who live abstemiously, or chiefly on vegetable diet.

333. *q.* The *age* and *strength* of the patient should also be taken into the calculation. Early age and strength do not furnish the protection from fever, nor yet from an unfavourable termination, that is very generally supposed. Indeed, in some malignant fevers, the

young and strong are placed in the greatest jeopardy; as in epidemic yellow fever and plague. The continued fevers of this climate are most prevalent from the fifteenth to the thirtieth years. The proportion attacked during this period may be reckoned, as to all the other periods of life, as three are to two; while the number of deaths in the former, compared with the latter, may be considered as ten to nine; showing that, although the predisposition to fever is greatest at this particular period, the danger is less. After forty years, the risk rapidly increases with the progress of age.

334. *r. Sex* has some influence as to the prognosis of fevers even in this country. But, in warmer and more unwholesome climates, and in certain epidemics, it should have considerable weight. In fevers proceeding from infection, marsh exhalations, and suppressed perspiration, and in various epidemics, a larger proportion of males is generally attacked, owing chiefly to the circumstance of their being exposed more than females to those causes. The latter are also, upon the whole, less severely affected, owing, 1st. To their much less exposure, and the consequently less intense action of the causes; 2dly. To the less rigidity of their fibres; and, 3dly. To the periodic discharges to which they are subject: hence deaths among females attacked are less frequent.

XVII. FEVER, ARDENT; *Febris Ardens*.—CHARACT.—*The stages or crises of febrile phenomena proceeding with rapidity and regularity; the period of excitement being very acute, and attended by greatly increased vascular action; no morbid seminum or infectious miasm being generated in their course, as observed in modern times.*

336. Under the generic denomination of *Ardent Fever* may be comprised those more acute forms of fever which are attended by great vascular excitement, and which, owing to their nature and severity, generally run their course in from one to fourteen days, and are but seldom prolonged beyond nine or eleven days. They may be divided into the more ephemeral and the inflammatory.

i. EPHEMERAL FEVER. SYN.—*Diary Fever, Febricula, Ephemera, Febris diaria*, Auc. Var.; *Simple Fever*, FORDYCE; *Das eintägige Fieber*, Germ.; *Fièvre éphémère*, Fr.; *Esfimero*, Ital.; *Efemera*, Span.

337. CHAR.—*Increased frequency and strength of pulse; with heat of skin, headache, thirst, and highly excited tongue; terminating in perspiration generally within twenty-four hours.*

338. *Simple Ephemeral Fever* may occur in a very mild and slight form—the *Ephemera mitis* of Dr. GOOD; or in a much more acute stage, the *E. acuta* of this writer. But intermediate grades between these may also present themselves.

339. *A. Causes*.—The mildest variety is usually caused by excessive or prolonged muscular exertions; by the more violent passions and emotions of the mind; by protracted study and mental occupations or excitements; by vicissitudes of temperature, and exposure to a warm sun; and by disorder of the digestive organs, proceeding generally from the quantity and nature of the ingesta. The more acute states usually arise from the above causes, from a sur-

feit, from temporary obstruction or congestion of the biliary organs, from the presence of fecal collections and morbid excretions in the prima via, and from violent exercise under a hot sun.*

340. *B. Symptoms*.—*a.* The milder form of ephemeral fever is rarely preceded by chilliness or rigours, but it generally commences with lassitude, yawning, stretchings, and a sense of irritation, or of undue excitement. The pulse becomes frequent, the skin hot, and the head pained. The patient tosses in bed, is restless, cannot sleep, or sleeps in a very disturbed and interrupted manner, and his tongue and mouth are dry. These symptoms frequently commence in the afternoon or evening, and subside in the course of the succeeding morning in a gentle perspiration; thus terminating in from eight to fourteen hours. But often, also, when the cause has been more severe, and the disorder has come on at a later hour, the patient continues feverish in the morning, after a restless night; is indisposed to leave his bed; feels unrefreshed, and unable to make any exertion; and passes the day in disquiet. Towards evening the restlessness and other febrile symptoms increase; but in the night, or at an early hour in the morning, he falls into a quiet sleep; a perspiration breaks out; and he awakens refreshed and restored.

341. *b.* The more acute form often begins—especially when it is caused by disorder of the digestive organs or by cold—with chilliness or rigours, succeeded by great heat of skin and throbbing pain of the head. The pulse is frequent, strong, and full; the face is flushed; the urine high coloured; the tongue is white, the papillæ erect; and the secretions and excretions are diminished. These, and the usually attendant symptoms—as restlessness, languor, want of sleep, and general uneasiness—having continued from twelve to twenty-four hours, a free perspiration supervenes, generally towards morning; the urine deposits a sediment, and the disorder disappears. When this form of fever proceeds from mental emotions or excitement, and from exposure to a hot sun, or from muscular exertions in warm weather, or from a rapid transition to a hot climate, it is seldom or never preceded by chills or rigours, and, if not actively treated by antiphlogistic remedies, is often prolonged beyond the period just mentioned, and assumes all the characters of the next species—*Inflammatory Fever*.

342. *C. Diagnosis*.—These states of disorder may be mistaken for the commencement of some one of the more serious forms of fever. But they may readily be distinguished by ascertaining their causes; by the absence of the usual premonitory signs of fever; by the sthenic and acute vascular excitement, nervous energy being very little impaired; by the rapid increase of the heart's action, by the slight depression of the muscular powers; and by the circumstance of pain being either hardly complained of in the loins and limbs, or altogether absent.

* [This is a very frequent disease in this country, arising, perhaps, more frequently from vicissitudes of temperature and the intertemperate use of alcoholic liquors than from any other causes. If properly treated, it is speedily broken up, rarely lasting longer than two or three days. If neglected, however, in the commencement, it may run a considerable length of time. It is rarely attended with danger, unless some important organ becomes involved.]

343. *D. Treatment.*—The febrile symptoms soon subside after the digestive canal is freely evacuated, especially when they have arisen from the irritation produced by retained excretions. When they are caused by the ingesta, an *emetic* should be given immediately, and its operation promoted by the usual means; but it is contra-indicated in all other cases. Afterward a dose of calomel ought to be administered, and allowed to act upon the secretions for five or six hours. Cooling *saline purgatives*, conjoined with small doses of antimony, or of ipecacuanha, as advised by VATER and GIANELLA, or of the spirits of MINDERERUS, repeated at short intervals, will then hasten recovery, and remove the morbid secretions which have disposed the frame to these febrile attacks. When the disorder has been occasioned chiefly by atmospheric vicissitudes, *diaphoretics*, especially after the bowels have been freely evacuated, and a tepid or warm bath, are more particularly indicated.

344. If the febrile attack have been caused by inordinate mental excitement and exertion, or by fits of passion, by anxiety or other affections of mind, *cold* should be applied to the head in the form either of affusion of cold water, cold sponging, evaporating lotions, &c.; the bowels freely evacuated, and diaphoretics prescribed. If it be produced by exposure to, or by muscular exertions under a hot sun, and whenever vascular action is excessive, or the patient plethoric, full *blood-letting* ought to be practised previously to the last specified means, which should be assiduously employed, and accompanied by cold sponging of the surface, and the internal use of refrigerants and saline medicines. The febrile attacks which follow exposure to the sun in warm climates, or even the quick transition from a cold or temperate to a hot country, when treated thus actively at their commencement, generally subside within twenty-four hours. But it is comparatively rare that a seasoning or climate fever runs its course in so short a time, unless in delicate or thin persons, and when the attack is very slight. In these cases, particularly when the stomach is irritable, much benefit will accrue from the frequent exhibition of small doses of the nitrate of potash, or of it and the muriate of ammonia, in solution, as prescribed by HILLARY, nearly as follows:

No. 221. Potassæ Nitratis, gr. xx.; Ammonię Hydrochloratis, gr. xij.; Mist. Camphorę, ʒvj.; Aque, ʒx. M. fiat haustus, quartis vel sextis horis sumendus.

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ii. INFLAMMATORY FEVER. SYN.—Καύσος, Hippocrates; Σύνοχος, Σνεχηγής φλεγματώδης, Gręc.; Synocha Imputris, Galen; Febris

Sanguinea, Avicenna; Synocha Biliosa, Sennert.; Febris septenaria, Plater.; Synocha simplex, F. acuta Sanguinea, Hoffmann; Febris continens vel Synocha, Stahl; F. continua non Putrida, Boerhaave; Synocha simplex, Juncker; Febris Inflammatoria, Stoll; F. Inflammatoria simplex, Huxham and Hildenbrand; Synocha, Sauvages, Cullen, &c.; Febris continua Inflammatoria, J. P. Frank; F. continens Inflammatoria simplex, Selle; Febris Sthenica, Brown; Encia Cauma, M. Good; Dynamic Fever, Stoker; Calentura continua, Span.; Fièvre Angioténique, Pinel; Fièvre Inflammatoire continue, Fr.; Synoshische, Entzündliche Fieber, Entzündungsfeber, Germ.; Febbre Inflammatoria, Ital.

345. DEFIN.—Pain in the head, back, and limbs; heat generally and greatly increased; pulse full, hard, and accelerated; thirst urgent; urine in small quantity and high coloured; the bowels constipated, with restlessness and anxiety.

346. A. FORMS.—a. MILD INFLAMMATORY FEVER.—a. The fever which usually arises from cold and dry states of the air, in cold climates, in elevated situations, or in temperate countries, from atmospheric vicissitudes or other causes, assumes either *simple* or *complicated* forms, and is generally sporadic. Its epidemic occurrence is comparatively rare, especially in its simple state. It appears chiefly during winter and spring, or during north and north-east winds. In its complicated states, which are most frequent, it forms a connecting link between idiopathic fever and visceral inflammation; the local affection appearing in the early or advanced course of the former, the general disorder, or symptomatic fever, being consequent upon the latter. Thus, inflammatory fever and local inflammation arise most frequently from the same causes acting upon different constitutions, habits of body, and states of local or general predisposition; the simple form of inflammatory fever appearing in the young, plethoric, and robust, and in those possessed of no local predisposition; the complicated form taking place in persons whose previous ailments, habits of life, or avocations have induced a disposition to predominant action in some important viscus, or from a concurrence or succession of external causes tending to the more especial disorder of one or more organs; and the primary local inflammation occurring from a predisposition of some part so great as to experience the onus of morbid action from the commencement, or soon after the impression of the exciting causes, or from the kind and concurrence of these causes. In the *first* case, the whole frame seems to participate equally in the disordered action from the beginning; in the *second*, the disorder is also general from the first, with predominance of it evinced in some organ, either at a very early period, or in some advanced stage; in the *third*, the earliest symptoms of disease are referred to a particular viscus, and with the increase of such disease the whole system sympathizes.

347. β. The symptoms of this variety are uniform in kind, but vary in severity. The premonitory signs are usually slight, or of brief duration. Hence the attack seems sudden, and is commonly ushered in with rigours or chills which are of short continuance, and, although often well marked, are occasionally so slight as

to escape observation or recollection. The rigours or chills seldom recur, and are rapidly followed by general vascular reaction; the skin and integuments become full, injected, dry, hot, and burning; the countenance full, glowing or red, and animated; the eyes injected, intolerant of light, but lively; the pulse frequent, strong, bounding, and full, sometimes hard or oppressed; respiration is frequent, and the expired air hot; the nostrils and mouth are dry; the tongue white, its papillæ excited or erect; and the lips full and red. The external appearance of the body evinces increased vital action; the whole surface appears glowing and animated; the internal sensations indicate generally increased vascular activity; and all the secretions and excretions are diminished or obstructed. The patient complains of great thirst and heat; of a severe or throbbing headache and vertigo; of anxiety at the præcordia; of increased sensibility, especially in respect of light and noise; of restlessness, watchfulness, and of frightful dreams; and of nausea or sickness. Taste and smell, owing to imperfect secretion on the surface of the organs, are impaired or abolished. The pulse seldom reaches 110 beats in a minute; and the heat of skin, although greatly increased, is in due relation with the activity of the circulation, and does not impart the harsh and unpleasant sensation to the hand of the observer that characterizes the more unfavourable kinds of fever. Upon issuing from the vessel, the blood is usually red or florid, viscid, and thick, and separates perfectly into serum and coagulum: the former of which is limpid, watery, and in small quantity; the latter firm and sometimes cupped, but it seldom exhibits the buffy coat unless local inflammation have supervened.

348. The symptoms commonly increase in severity; the tongue becomes red and dry; the urine more scanty, and of a higher colour; the bowels more constipated, and the watchfulness more prolonged. In children, heaviness, drowsiness, or sopor is frequently observed; and in adults, delirium or reverie sometimes occurs. All the phenomena usually are exasperated in the evening; their mitigation in the morning being attended by partial perspiration, or a relaxed, moist, and warm state of the surface. On the third or fifth day they reach their acme. At this period they often appear somewhat mitigated; but generally continue from two to four days longer, with manifest efforts at a critical change, which usually takes place about the seventh or ninth day, and rarely later than the fourteenth. The crises commonly observed are, hæmorrhages from the nostrils or from the hæmorrhoidal vessels, more rarely from the uterus; a copious and general perspiration; and a free secretion of urine, depositing a sediment. After the natural evolution of one or more of these evacuations, the symptoms rapidly subside, and convalescence speedily advances.

349. Although the epidemic occurrence of this form of fever is rare, instances have been recorded by INGRASSIAS, HOVER, HEISTER, VAN SWIETEN, and NAVIERES. In these, the symptoms and progress of disease coincided entirely with the description just given. Blood-letting, and the rest of the antiphlogistic regimen, were adopted in these epidemics, and recovery took place in nearly all the cases.

350. *γ.* This fever may be said to be endemic in warm countries, during dry seasons, especially among Europeans who have recently removed to, or who reside in these countries. But in them it frequently either assumes a severer form than that now described, or, after an imperfect effort at crisis, subsides into a state of dangerous collapse. *Relapses*, also, from errors in diet, or from intemperance and premature exposure, are much more common in them than in persons residing in northern and temperate climates, generally owing to the concurrence of malaria in producing the fever, which, however, more usually assumes the form noticed hereafter (§ 354, *et seq.*). Mild inflammatory fever is seldom protracted beyond seven days, unless it assume an unfavourable and complicated form. The continued fever, which occurs during the hot and dry season, in the more southern parts of Europe, in the East and West Indies, and in other places within or near the tropics, particularly among the natives of cold and temperate countries who have recently removed thither, is generally either of this kind, or of the complicated or severer forms about to be described. The modifications it presents in different climates result chiefly from the difference in the constitution and habit of the affected, from the intensity and concurrence of the causes, and from the association of malaria with high grades of temperature, and the other circumstances already insisted on.

351. *δ.* *The complicated states of inflammatory fever* are more common than the more simple form, whether observed in warm, or in temperate and cold regions. They depend chiefly (*a*) on the season and climate; (*b*) on the habits and occupation of those affected; (*c*) on the concurrence and succession of the remote causes; and, (*d*) on the previous state of particular organs. They generally appear sporadically; occasionally they may be said to be epidemic; and in some places they are endemic. Their epidemic appearance is chiefly in temperate countries during dry and hot seasons, and to a limited extent. Their endemic prevalence is observed under the circumstances assigned above (§ 350). The complications may be either almost coetaneous with the development of the fever, or consequent upon it at any period of its course. They may be either so slight as to constitute merely an exalted affection of a certain organ, or a determination to particular parts; or so severe as to amount to a state of sthenic inflammation, rapidly passing into disorganization.

352. (*a*) *The complication with predominant action or inflammation in the brain or its membranes*, occurs principally in very hot climates, in soldiers and sailors who have been exposed to a powerful sun, and been required to make considerable bodily exertion when thus exposed; in persons who have been intemperate, or have felt the exciting passions of the mind; and in those who have over-exerted their intellectual powers. In these, the fever is often very sudden in its attack; and the symptoms referrible to the head indicate every grade of affection, from active determination of the circulation to this part to fully-developed inflammation. In many of such cases it is difficult to determine whether the local or the general affection is the primary one, so early has been

their coexistence. In these, the patient sometimes falls down from the suddenness and severity of the affection, with a red or tumid countenance, injected or suffused eyes, and hot scalp, but without loss of consciousness. In others, predominant disorder in the head appears only in the advanced progress of the fever; the patient complaining of severe throbbing and distracting headache, and of a feeling as if the cranium would burst from internal distention. In either case, violent delirium or maniacal excitement often supervenes, and rapidly passes into coma or stupor, or is removed by treatment. In all, the secretions and excretions are impaired, and the bowels constipated.

353. (b) *Predominant affection of the lungs or pleura*, forming the pulmonic complication, is observed chiefly in cold or temperate climates during dry and cold seasons, and high winds, and in elevated situations. In intertropical countries it occurs only in the cooler seasons, and in elevated localities. Sudden vicissitudes of temperature, damp clothes, and exposure to the night air after experiencing heat and fatigue, are the most common exciting causes. The affection of the lungs is frequently either not fully developed, or is latent at the commencement of the fever, and is, consequently, often overlooked after it is established, unless it extend to the bronchi on the one hand, or to the pleura on the other; and then the symptoms characteristic of either will direct attention to the complication. The stethoscope should therefore be employed whenever the breathing is laboured or oppressed in the inflammatory states of fever observed in the circumstances just stated. This fever may present also *prominent Hepatic, Gastric, and Enteric disease*; but, in such cases, it will very nearly resemble the forms of fever described under the names *gastro-bilious and mucous*.

354. b. SEVERE INFLAMMATORY FEVER.—The disease described by the names of *Synochus Causonides*, by GILBERT; of *Synocha Causodes*, by MANGET; of *Synocha Ardens*, by SAUVAGES; of *Endemial Causus*, by MOSELEY; of *Inflammatory Endemic*, by DICKENSON; of *Climate or Seasoning Fever*, by several writers; and of *Endemic Yellow Fever*, by others, differs from the foregoing or mild form of inflammatory fever (§ 346) only in grade, as insisted on by JACKSON, and proved by my own observation. This is the disease which most frequently attacks new comers into the West Indies, more especially sailors and soldiers; and which has, as already stated (§ 244-247), been confounded by recent writers with the aggravated forms of bilious fever on the one hand, and with epidemic or pestilential yellow fever on the other. It was also prevalent during the last war among the British troops and sailors in the Mediterranean, and was described by BURNETT, IRVINE, BOYLE, BRUNTON, DOWN, and others; but it generally assumed a milder form than in the West Indies.

[Dr. STEVENS, of St. Croix, maintains that there are three essential or idiopathic fevers met with in the West Indies: I. The *Climate or Seasoning Fever*, which is not produced by marsh poison or contagion, but by long-continued, excessive heat, acting, under peculiar circumstances, on the bodies of unseasoned strangers lately arrived from Northern countries;

II. The *Marsh or Swamp (Remittent) Fever*, caused by malaria from animal and vegetable decomposition; III. The *African Typhus*, or *Yellow Fever* (the *Pestilential Fever* of ЧИСТИЛОМ; the *Bulam Fever* of РУМ, &c.). The two first Dr. S. regards as indigenous to the West Indies, and never communicable from one person to another; while the last "is, in every instance, a contagious disease." "At one period," says Dr. S., "there was an interval of thirty years during which there was not even one case of this fever in the Western world; and in almost every instance where it first commences, when proper inquiry is made to ascertain its cause, its origin can be traced to the traffic with certain countries on the western coast of Africa."—(*Observations on the Healthy and Diseased Properties of the Blood*. Lond., 1832, 8vo.) According to Dr. S., the climate (or stranger's) fever is only met with as an epidemic during the hot months, when the thermometer is upward of 83° during the day, and at least 80° during the night. It is confined to the whites, and almost entirely to those who have lately arrived from Northern countries; is rarely met with in swampy districts, but generally appears in dry situations, and in those localities where there is an accumulation of unseasoned strangers exposed to the action of a burning sun. The *African Typhus*, or *Yellow Fever*, according to Dr. S., prevails in every locality and in every season of the year, in the West Indies; not confined to the whites or those newly-arrived; is as fatal in the coldest weather as in the hottest months; is not produced by any local endemic cause; and is always communicated by contagion. Moreover, while the marsh fever is seldom met with in the centre or near the wharves of large cities, the yellow fever generally occurs in such places where strangers first come in contact with the natives; the marsh (remittent) fever attacks many individuals about the same period, but the yellow fever always begins with solitary cases, and often there is a considerable interval between the primary cases and those that occur afterward. Those who have had the climate fever are not susceptible of it a second time, unless they leave the West Indies and return again after a considerable residence in some Northern country: those who have had yellow fever are completely exempt from any future attacks of the disease; but neither the marsh fever nor the climate fever gives an exemption from the yellow fever, and there is such a resemblance between the two latter, that many suppose they have had two or more attacks of yellow fever. "That the climate fever," says Dr. S., "is not produced by the marsh poison is evident, not merely from the symptoms, but also from the fact that it is generally met with in hot and dry situations, such as the central part of the town of St. Thomas, where the marsh fever is not known as an endemic."—*Loc. cit.*]

355. While the milder form of inflammatory fever is common among the white and assimilated European population of warm climates, the *severe or aggravated form* occurs among those who have more recently arrived in them, and more especially among the young, the intemperate, the robust, and plethoric, and those who are exposed to the sun, to very

high temperature, and to the night air. In most warm climates, terrestrial exhalations are also frequently more or less concerned in the causation of the continued as well as of the remittent types of fever: the type being determined, as shown above (§ 43), by the nature, intensity, and combination of the causes; and by circumstances peculiar to the patient, particularly the novel, or the habitual operation of the endemic influences to which he is exposed. But, although malaria may be a concurrent cause of this fever, especially in respect of persons who have recently arrived in the West Indies, yet I believe that, where its operation is most unequivocal, the kind of fever produced by it is different from this—premonitory and cold stages preceding reaction, which is much less violent than in this, the resulting fever being of the bilious continued form about to be noticed. My experience fully accords with the observation of Dr. STEVENS, that when a young Northern stranger is subjected soon after his arrival in the West Indies to the higher ranges of temperature, his clothes are soon drenched; and that, if he be exposed to a current of air in this state, the cold produced will constrict the vessels of the skin, and prove the exciting cause of fever, which, in favourable circumstances, will often be the mild form of inflammatory fever, such as has been described above, and as is often observed in temperate climates. The causes which produce a severe affection in young and plethoric strangers seldom affect the older residents, and never the natives of the country or the dark races. Women and children, the aged and the weakly, are much less liable to it than the robust and plethoric.

356. *a.* The history of this form of fever has not been given with the requisite precision by the various writers on it, most of them having mixed it up in their descriptions with the inflammatory varieties of remittent, and with the more continued states of fever produced by terrestrial or vegeto-animal exhalations, concomitantly with the other causes of intertropical fevers. The aggravated form of inflammatory fever is seldom preceded by very marked premonitory symptoms. The attack is usually sudden. Giddiness, faintness, and general uneasiness, sometimes, however, precede it for ten or twelve hours.* There is occasionally a

slight and brief chilliness at the commencement, especially in the less violent cases, rapidly followed by a sense of universal heat; by flushed face, frontal headache, and vertigo; by inflamed, heavy eyes, and great sensibility to light and sound; by pain in the occiput, neck, back, and limbs; and by a strong, full, hard, and accelerated pulse. A sense of heat, oppression, pain, or anxiety is felt at the præcordia, sometimes with a dry cough, and pain in the side; respiration is quick, laborious, suspirious, or anxious; the tongue is white, excited, and its edges red; the fauces are arid, thirst urgent, and skin hot and dry; the urine is scanty, the bowels costive; and there is generally nausea, but seldom vomiting until some time after the attack. If the disease be not mitigated by treatment, the patient becomes extremely restless, the headache is rending and intense, vascular action is excessive, and the heat very great. Vomiting now supervenes, and follows the ingestion of whatever is taken to allay the urgency of thirst. The matters thrown off are generally tinged with bile, and a bilious yellow suffusion of the skin is frequently observed. Bilious vomiting and purging occasionally occur with the yellowness of the surface, and, in the slighter cases, become a favourable crisis. There is often great drowsiness, but no refreshing sleep. These symptoms of excessive excitement proceed with various degrees of violence, and occupy a period of from twenty-four to sixty hours, but most commonly from twenty-four to forty-eight hours. During this period blood taken from a vein is remarkably florid, warm, and fluid. The fibrin coagulates firmly, but the crasamentum is without crust, and is rarely cupped.

357. *β.* The excitement, having reached its acme, is quickly followed by exhaustion. This is indicated by a subsidence of the most urgent symptoms: the pain and heat are lessened; the skin becomes damp or clammy; and the patient has a sense of cold or slight chilliness. This delusive remission is a state of great danger: in some cases, it passes into rapid sinking—into a speedily fatal collapse; but, more generally, irregular determinations of blood, or indications of especial lesion of particular parts, are evinced before death ensues. With the diminution of heat and pain, the pulse falls; the countenance becomes anxious and distressed; the eyes sunk, the pupil dilated; vomiting continues without intermission, especially if the cerebral affection has abated; sometimes delirium is present, at others there is great insensibility or tendency to coma, and in these cases the stomach is more tranquil.

358. *γ.* *Discoloration of the skin* generally takes place in this stage, appearing in yellow, yellowish brown, and livid patches. It never occurs in the period of excitement, for it is

* Dr. MOSELEY states that there is a small degree of chilliness and horror, but never a rigour. Dr. JACKSON remarks that there is more or less of horror and shivering, but the cold is rarely great; Mr. DICKENSON, that there is increased excitement from the commencement, and that a slight chilliness at the onset is observed only in the slighter cases (§ 346). Dr. STEVENS observes, in several places, that there is no cold stage at the beginning; and Dr. BRUNTON, that languor, debility, and oppression are complained of, with chilliness. This discrepancy in the account of the commencement of a most dangerous disease, and on a point so necessary to a knowledge of its pathology, may be in some measure explained. Dr. JACKSON has described this form of fever in connexion with the more inflammatory states of remittent, from which it is perfectly distinct. The description of the other writers is more correct; for in several cases, in which I had an opportunity of observing the commencement of the disorder, no rigours, and hardly any chills, were remarked. Even some of those who complained of chills presented a warmer state of skin than natural. The pure climate fever I therefore infer does not commence with shivering or rigours; and seldom with chilliness, unless currents of air, cold, &c., have been concerned in causing it, by suddenly checking the perspiration. But the continued fever attended with high vascular action, arising from malaria and atmospherical heat and vicissitudes,

that is frequently met with in warm climates and in hot seasons, is commonly preceded by manifest premonitory symptoms, and by a cold stage. These two diseases, which frequently resemble each other very closely, have been generally confounded with one another, more especially as they are observed in the West Indies. Nor should this be a matter of surprise, inasmuch as that very many of the instances of fever which present themselves in men in the public services, as well as in civil life, arise from a combination of malaria with climatal influences, and that the cases which are produced by a concurrence of such causes are perhaps more numerous than those which spring from either alone—from marsh exhalations on the one hand, or from high temperature and its vicissitudes on the other.

quite dissimilar from the bilious yellowness occasionally observed in that period. It is commonly attended by passive hæmorrhage from the nose, gums, eyes, ears, &c., and by black and grumous vomiting. The change of colour and hæmorrhage proceed from exhaustion of the vital influence in the extreme vessels, and from the changes induced in the mass of blood. The matters thrown off the stomach consist at first of ingesta and serous fluid, often coloured by bile. In a more advanced stage they are ropy, mixed with numerous small shreds, flocculi, or films, which soon acquire a dark brown, purple, or black colour; but do not, at first, communicate much of the same tint to the fluid containing them. Afterward, the matters vomited are more intimately mixed; and, from dark-coloured blood which has been effused into the stomach, vitiated bile, and other morbid secretions, assume a dark or coffee-ground appearance. At the same time, dark-coloured matter, resembling tar mixed with black blood, is freely discharged from the bowels.

359. The other symptoms characterizing this stage, and preceding dissolution, are, soft, quick, intermitting, or irregular pulse; clammy, cold, or partial sweats; deep and heavy respiration; coldness of the extremities; black urine, or suppression of urine; singultus, convulsive sighs; tremours and subsultus tendinum; faltering speech; low muttering or raving delirium; strugglings to get up in bed; dark or raw appearance of the tongue; livid blotches over the body, particularly the præcordia; faintings or coma, and glazed eyes. The blood at this period is black, thin, and dissolved, its fibrin seems diminished, and it does not separate into crassamentum or serum; or if it does, the former consists of a thin, dark jelly, with the black colouring matter precipitated towards the bottom of the vessel.

360. Such is the usual progress of severe inflammatory fever, as it fell under the author's observations, and as observed by the most eminent writers, under circumstances which seemed to preclude the influence of marsh exhalations. It has been a most prevalent and destructive disease in the West Indies and Mediterranean, during hot seasons, among sailors and soldiers unseasoned to these climates. It is not liable to recur; and, unlike the continued form of fever caused chiefly by malaria or marsh exhalations, it is neither preceded by, nor passes into disease of a periodic type, nor is followed by enlargements of any of the abdominal viscera, unless the patient has been exposed to such exhalations during convalescence. A first attack prevents a second, if the individual continue in the climate which caused it; but if he return to a cold country, and reside there until the energy of his system is restored, he becomes liable, upon his return to the hot climate, to a second attack, although less so than before, and in a milder form. Numerous proofs of this position have come under my observation. This fever will not prevent those diseases which proceed from marsh exhalations; but if the person who has been seasoned by it be seized by fever from this cause, the periodic type will be assumed, and visceral disease will frequently supervene.

361. Of a number of persons whom I treated

in this fever in 1817, and who soon afterward were exposed to marsh exhalations in their concentrated form, not one escaped agues, remittents, or dysentery. I do not believe that this—the climate or seasoning fever—will exempt from pestilential yellow fever, although it may lessen the susceptibility to it when the individual has not intermediately changed the climate. Instances are numerous of seasoned persons—of those who have suffered this, the climate or severe inflammatory fever—afterward being seized with endemic or remittent fever, or with the pestilential disease.

362. *δ.* The complications of the grade of ardent fever are not so distinct as those presented by the milder form. Some cases occur in which the cerebral symptoms are of greater intensity than usual, and closely resemble those of the most severe phrenitis. Such are most common in persons who have undergone much exertion while exposed to a very hot sun shortly before the attack. But these symptoms, even when most violent, subside upon the super-vention of exhaustion, and of the constant vomitings attending that stage. In almost all instances, the gastric affection is excessive, particularly at an advanced period; but this is so characteristic of the malady that it can hardly be called a complication. Often, however, when the cerebral affection is very great, the gastric irritability is not remarkable; and when the latter is excessive, the former is but slight. Biliary disorder is sometimes very prominent, especially during the period of excitement; but it seldom amounts to more than functional disturbance—than an evacuation of bile, often in great quantity, and of morbid quality. There is evidently excited vascular action in the liver, as well as in other important viscera, but it is not actual inflammation; at least, supuration is never observed in dissection of fatal cases. (For *Diagnosis*, see § 243-247; and YELLOW FEVER.)

363. *B. TERMINATIONS AND PROGNOSIS.—a.* Ardent or severe inflammatory fever, if not arrested by an early and energetic antiphlogistic treatment, rapidly terminates in exhaustion of vital power, with alteration of the blood, and organic change of the internal viscera, manifested especially in certain tissues. 1st. A resolution or subsidence of the excited action, without the super-vention of the stage of collapse or exhaustion, seldom occurs, unless an appropriate treatment has been adopted. When the period of excitement is early and duly moderated, the severe symptoms of exhaustion either do not appear, or are very slight, debility of short duration being only present; and the patient rapidly recovers without any visceral disease. The stage of exhaustion is great in proportion to the violence of excitement, and in it the more unfavourable terminations occur. 2d. Organic change of some important organ may supervene during excitement, but rarely to an extent sufficient to produce death: it consists chiefly of vascular injection; discoloration and softening of parts; effusion of serum, lymph, or blood; and takes place most frequently within the head and in the digestive organs. Purulent matter is never formed in this period, nor subsequently.

364. *b.* In the stage of collapse, several changes occur but death is owing rather to

their conjoint influence than to either singly. 1st. Exhaustion of vital power is always present, but not to an extent sufficient of itself to arrest the organic functions. 2d. Deterioration or change of the blood obviously takes place, and is shown by the state of this fluid both during life and after death, but the nature of this change is not fully ascertained; whatever may be its nature, it is merely consequent upon the altered state of organic nervous influence. 3d. It is very probable that exhaustion of this influence, and the resulting changes in the blood, so affect the irritability and tonicity of fibrous and contractile structures as to impair these vital manifestations, and thereby to favour or even to induce the alterations observed towards a fatal close, particularly those affecting the capillary system and mucous tissues; for the vital tone of the extreme vessels and of the digestive mucous surface being thus impaired, and the blood being more fluid and dissolved, as well as otherwise altered, hæmorrhage readily occurs, with discoloration of the skin and of membranous parts; the blotches, &c., observed during the latter stages proceeding from these pathological states. That the head should appear to suffer, especially during the period of excitement, is a necessary consequence of the physical relations of this part, in connexion with general vascular excitement; and that the stomach and digestive mucous surface should evince predominant disorder at an advanced stage, may be ascribed to the irruption of acrid or vitiated secretions, particularly the biliary, to the state of organic nervous power, and to the changes induced in the blood.

365. *c.* The *Prognosis* entirely depends upon the period at which the disease is subjected to appropriate treatment, and upon the violence of the seizure. When the stage of excitement has but recently commenced, the treatment about to be recommended will generally arrest the disease; but the nearer this stage approaches its acme, or that of exhaustion, the greater is the danger, as those changes in the organic nervous influence, in the blood, and in the vital tonicity of contractile parts, may be considered as having begun; and active depletions are then not so well endured, nor productive of the same effects as at an earlier period. When symptoms of collapse appear, the danger is very great; and in proportion to the progress of this stage, and the urgency of its characteristic phenomena, particularly discoloration of the skin, black vomit, and passive hæmorrhages, it becomes extreme, recovery seldom taking place when these symptoms are fully developed. When the cerebral affection is very remarkable at an early stage, the danger is even then great, as the effects of the treatment imperatively required, conjointly with the exhaustion consequent upon excessive action, will induce a state which, although much less dangerous than that which would indubitably follow unrestrained action, is still attended by much risk, and often requires the prudent exhibition of restoratives, &c.

366. *d.* The *Duration* of this fever varies from two to six or seven days. A fatal termination commonly takes place on the fourth or fifth day. On examination, *post-mortem*, more or less evidence of increased vascular action,

often amounting to inflammation, or its consequences, is observed in the membranes of the brain, in the internal surface of the stomach and bowels, and more rarely in the pleura and serous membranes of the abdomen. The digestive mucous surface is studded with numerous dark or ecchymosed spots, from which a fluid black blood seems to ooze. The liver is frequently congested, sometimes larger and softer than natural, and of a dark colour, owing to the quantity of black blood in its vessels. The spleen is somewhat enlarged, soft, and friable, and the omentum injected. The serous as well as the mucous surfaces, especially in the abdominal cavity, often present livid or dark patches. The *blood* is everywhere fluid, black, and dissolved. The internal surface of the heart and large vessels, both arteries and veins, was of a dark red or livid tint in a few cases which I examined; but this point requires farther investigation, as my opportunities were not sufficient for the satisfactory examination of it in respect to the universality of its occurrence, and the exact changes on which its appearance depends.*

367. *C. CAUSES.*—*a. Disposition to, and predisposing causes of, inflammatory fevers.*—If we view these fevers as affections of the vascular system chiefly, we may impute the disposition to become affected by them to the high irritability of the heart and arteries. As respects symptomatic fevers, this explanation may be conceded, inasmuch as the irritability of the different parts of the vascular system is derived from the same source, namely, the ganglionic nervous system; and as all causes of irritation, which act with sufficient energy, relatively to the state of irritability, upon a single part of the system, affect the whole. I here refer the operation of the irritating causes to the state of the irritability, because their action is merely relative: therefore, where the susceptibility to irritation passes beyond the usual standard, slighter causes will induce inflammatory and symptomatic fevers, than when it is either below or at the natural state. The condition of the irritability may vary not only in different individuals, but also in the same person at different epochs of life, and in the different organs of the body; the irritating causes thus exciting a relative action on different individuals, on the same person at different periods, and on the different viscera. But, although the disposition to be attacked by inflammatory and symptomatic fevers depends greatly upon the state of irrita-

* [W. W. GERHARD, in *Am. Journ. Med. Science*, thus describes the appearances after death from the ordinary bilious remittent fever: "In all these cases, the glands of PEYER, as well as the other intestinal follicles, were found perfectly healthy. The large intestine was occasionally, but not constantly diseased, while the stomach, and, to a still greater degree, the liver and spleen, were invariably found in a morbid condition. If the fever proved fatal in the course of the first fortnight, the liver and spleen were softened as well as enlarged; but if the disease assumed a more chronic form, the viscera were hardened as well as hypertrophied. I made numerous examinations of the bodies of patients who died of the same variety of malignant remittent and intermittent during the summer of 1835, and still more frequently in the summer of 1836, a year in which these diseases have been unusually fatal throughout the Southern States. The results of these late examinations have confirmed those already obtained, and showed that the follicles of the small intestines are free from lesions, and that the anatomical character of the disease is to be looked for in the spleen, liver, and stomach."—(*Am. Journ. Med. Sci.*)]

bility, yet the disposition to be seized by other continued fevers does not appear to arise from the same circumstance. Indeed, we perceive that increased irritability of the vascular system has little or no influence in favouring the operation of the exciting causes of several continued fevers; and that other manifestations of the living organization, besides this, dispose more remarkably to them.

368. The predisposing causes of inflammatory fevers consist, *first*, of high irritability and tonicity of fibre, more especially when conjoined with vascular fulness and imperfect performance of any of the secreting or excreting functions—of an inflammatory diathesis, or of rude health, or of a gross habit of body; *second*, of those states of season, climate, or atmosphere which tend to produce this diathesis. Hence these diseases occur chiefly in young adult men; in the plethoric, florid, and robust; in persons of a sanguine and irritable temperament; in those who have experienced the suppression of an accustomed evacuation, or who live fully and richly, or intemperately, or who pursue healthy occupations in the open air, or who habitually take invigorating exercise; and they are most prevalent in cold and dry, or very warm and dry, seasons and climates, in highly-elevated localities, and among mountaineers, sailors; soldiers, and persons living in the country.

369. *b.* The exciting causes are, (*a*) Whatever directly stimulates, in an inordinate manner, the nervous and vascular systems, as change of climate, especially migration from cold or temperate to very warm or dry countries; exposure to the rays of a warmer sun than has usually been experienced; exercise in the sun's rays; the influence of dry winds, and very dry and cold states of the air; sudden vicissitudes of weather or of season; the accumulation of electricity in the frame; a heating or very full diet, warm condiments or sauces, and stimulating liquors; change from a low to a rich or full diet; the intemperate use of wines or spirits, especially in connexion with atmospheric heat or vicissitudes; great bodily exertion; violent mental excitation and emotion.—(*b*) Whatever indirectly induces great excitement or vascular reaction, as the impression of cold when the body is overheated and perspiring; sleeping on the ground or in the open air, especially when exposed to the night dews, or to the moon's rays, particularly in warm and intertropical countries; the operation of marsh effluvia or malaria, especially under similar circumstances, or after intemperate indulgences; an overloaded state of the digestive organs, and obstruction of the excretions.

370. *c.* The chief causes of the varieties of this fever, which attack Europeans after their migration to warm climates, are their early age, plethoric habits, and phlogistic diathesis; inattention to their bowels during their passage, and their use of salt provisions and spirituous or vinous liquors; increased intemperance, and incautious exposure to the sun and to the night air; excessive fatigue, or alternations of indolence and great exertion; and suppressed perspiration. Dr. JACKSON remarks that persons thus circumstanced rarely escape an attack of fever during the first year of their residence in a tropical country; and that the fevers that

occur from these causes are often of the most aggravated kind, and rapid in their course, more especially among troops crowded in barracks or transport ships, where the heat of the climate is augmented artificially; the excess of heat influencing the febrile form, increasing the violence of the symptoms, and retarding the progress of recovery.

371. A question has arisen as to whether or not the inflammatory states of fever in warm countries are caused by malaria, or by the other causes now instanced. There can be no doubt that malaria very frequently produces in the plethoric, young, and robust, who have recently arrived in a hot climate, fever of an inflammatory and continued kind. But it must also be conceded that this fever chiefly occurs, even in persons thus constituted, during the dry season, and at times and in places where the existence of malaria is doubtful, or, at least, by no means proved. It is notoriously admitted that the inflammatory states of continued fever, in both the East and West Indies, appear among those soldiers, sailors, and civilians who have not been long in a warm country, and who have not suffered from disease since their arrival; and that they take place chiefly during the dry and warm seasons, and in situations where the usual effects of malaria are never observed. This is the result of the experience of JACKSON, ANNESLEY, BOYLE, TWINNING, CONWELL, and of other experienced practitioners in warm countries. It agrees with my own observations, and is even admitted by Dr. FERGUSON, who has gone much farther than any one else in assigning malaria as the cause of intertropical fevers. I believe that the other causes assigned above (§ 367–370) will, in these countries especially, produce fever of an inflammatory or bilio-inflammatory kind, in unacclimated Europeans; but that, when those causes are not associated with malaria, the fever resulting from them will generally subside, under judicious treatment, without evincing those dangerous symptoms which characterize fevers proceeding chiefly from terrestrial exhalations. Although some of the causes, especially those which relate to atmospheric temperature and climate, are very different as to their nature and action, yet they are mainly instrumental in producing fevers having many common features, but differing in severity and duration.

372. *D. NATURE OF THE DISEASE.*—Fever produced by paludal miasms, or by infectious emanations from living or dead animal matter, are universally preceded by well-marked symptoms, characteristic of the stages of *premonition* (§ 33) and of *invasion* (§ 35). But inflammatory fever, especially in its more severe form, is seldom preceded by more than chills, unless cold, or other causes which suddenly arrest the cutaneous excretions, have been concerned in producing it. In these fevers, a poisonous agent has infected the frame and more or less depressed its vital energies, particularly as they are manifested in the organic nervous system, vascular reaction being consequent upon such depression, as shown above (§ 95, 96). But in this fever, the injurious agent, or primary pathological change, is generated within the system from the action of new and unwonted influences, generally climatorial or atmo-

spheric. That this agent is not of a depressing kind, as respects its primary operation, is manifest, from the general absence, at the commencement of the disease, of those phenomena which indicate this kind of action. That it is of an irritating or exciting kind, may be inferred, not merely from the character of the invading symptoms, but also from the changes primarily induced by the remote causes. If we inquire into the nature of these changes, we shall find them, 1st. As respects the *mild inflammatory fevers* of cold or temperate climates, to consist, (a) of the organic and nervous excitement consequent upon the rapid and increased oxygenation of the blood during cold and dry states of the air, probably aided by the accumulations of the electro-motive agencies in the system which these states manifestly favour; (b) of the superabundance of irritating matters in the circulating fluids resulting from casual interruptions to one or more of the eliminating or depurating processes constantly going on in the animal economy; (c) of the combination of these circumstances or primary pathological conditions. If we grant that the former of these obtains, it is very obvious that the occurrence of the latter will farther excite and increase it; even a susceptibility to the former, as marked by high irritability of fibre, may be readily kindled into morbidly increased action by causes of irritation which may have accumulated either within the vessels—in the blood itself; or external to them—in excreting organs and surfaces. These pathological states are the obvious results of concurrent causes, which primarily excite the sensible and susceptible parts of the frame, and which retard or prevent the discharge of irritating materials from the vital currents which supply and sustain these parts, the accumulation of these materials either increasing the excitement or giving rise to it. It must necessarily follow that the excitation thus induced will exhaust itself to a degree, and with a rapidity co-ordinate with its intensity, and thereby induce the phenomena characterizing the advanced periods of the disease, which are especially remarkable in the severe or climate fever of warm countries.

373. 2d. As respects the *severe inflammatory or climate fever*, the procession of phenomena must necessarily be different, as it generally arises from causes different, or even opposite to those just instanced, from a very high temperature, often conjoined with rich, nutritious, and heating food, stimulating drinks, and suppressed perspiration. Either of these is alone sufficient to induce the disease; but, when they co-operate, the effect is more certain and severe. They all act in a similar manner; they excite the organic nervous system inordinately; increase the actions of the liver, and irritate its vessels; alter the constitution of the blood, causing it to abound with stimulating and injurious materials; and render the secretions and excretions acid or morbidly exciting. Thus the most violent states of this fever often proceed directly from these causes without any evidence of primary subaction or a cold stage, unless depressing agents, such as cold, human effluvia, or malaria, concur with them in producing disease, in which case the consequent fever will present features modified according-

ly. If cold act upon persons who are under the influence of these exciting causes, a slightly cold stage will often be directly induced thereby. If animal or vegetable miasms concur with them, the fever will present adynamic or malignant characters in proportion to the activity of either of these agents. But when the above direct causes of excitement act solely or principally, their influence upon the organic nervous system is very energetically expressed, and manifested throughout the vascular system, especially that of the brain, liver, and digestive mucous surface. Thus, inflammatory fever differs from the other varieties of idiopathic fever, 1st, in its proceeding from causes, the primary action of which is exciting or irritating; 2d, in excitement or irritation being more or less evinced by it from the commencement.

374. Of the changes that take place in the advanced period of the disease, the most remarkable are those affecting the blood and the digestive organs. As the stage of excitement merges into that of exhaustion, the *blood* changes from a florid to a dark colour; loses its property of separating into crassamentum and serum, and of firmly coagulating; becomes more fluid; and seems deprived of much of its fibrinous and albuminous constituents. (See art. BLOOD, § 128). According to Dr. STEVENS, its saline ingredients are also greatly diminished. The chief cause of these alterations is evidently exhausted organic, nervous, or vital power; and this is farther evinced by a loss of the tone of the extreme vessels, and of the irritability of the moving fibre, always co-ordinately observed in cases presenting this change in the blood. Among the most striking consequences of exhaustion of vital power, as thus manifested in the extreme vessels and blood, are discoloration of the skin, and passive hæmorrhages from mucous surfaces, phenomena characterizing the last stage of the most unfavourable cases of the intense disease. The gastric disturbance in the early stages generally proceeds from excited vascular action, and from the passage of irritating secretions into the stomach, in connexion with an increased susceptibility and irritability of the organ. In the latter stages, it more especially results from the morbid secretions poured into the stomach, and the irritated or inflamed state of its villous surface.

375. The source of the black matter passed from the stomach and bowels in the last stage of this and of other severe fevers of warm countries has been variously stated. Some consider the black colour to proceed from the exudation of dark blood, which, in mixing with the secretions of the stomach, liver, and bowels, imparts to them a still darker tint. Some ascribe it chiefly to the bile and secretions from the digestive mucous follicles, which are often both very dark and thick in the last stage of the more malignant kinds of intertropical fevers; and others believe it to arise both ways. There is no doubt that all the secretions poured into the digestive canal are more or less diseased, particularly in the latter stages; but it is as clear that the black colour mainly depends upon the state of the blood, and that all the matter ejected upward and downward, presenting this appearance, does not consist of altered secretions merely, a great part of it probably be-

ing an exudation of blood from the mucous surface. I believe, also, that these matters vary very remarkably in the ardent climate fever, in the more malignant forms of marsh or endemic fevers, and in the pestilential yellow fever, the diseases thus characterized. Dr. JACKSON remarks that the secretions from the digestive mucous surface are ropy and clear during the early periods, and are brown or black in the latter, sometimes black as soot, and that the sooty or ink-like colour is chiefly observed where the head and stomach are simultaneously attacked. When we consider that the blood becomes darker than natural, as well as otherwise changed, early in the period of exhaustion, and that the liver and mucous follicles of the digestive canal, with the kidneys, are the principal organs of depuration, or channels by which the elements producing these changes are eliminated from the circulation, we need not be surprised at the secretions which these elements go to form, and which these organs excrete, presenting somewhat similar characters. It must, however, be admitted that the share which the secretions perform in producing this phenomena, or that which the exudation of blood has in giving rise to it, will vary much in different varieties or cases of intertropical fevers. The rapidity with which a dissolution of the tissues takes place after death, in the severe forms of climate fever, deserves notice, as marking the rapidity of vital exhaustion, and as resulting from the changes of the blood, these changes commencing with the stage of exhaustion, and advancing until this fluid is no longer capable of influencing the nervous system, and of preserving the irritability of contractile parts, or until it poisons, instead of exciting the sensitive and moving tissues.

[Dr. T. Y. SIMONS, of Charleston, S. C., in a "Report on the History and Causes of the Stranger's, or Yellow Fever," in that city in 1839 (p. 23, 8vo), has described a disease corresponding in all its essential features to the above form of *inflammatory fever* of COPLAND; and Dr. S. H. DICKSON, of Charleston, has also given an account of the same malady (*The Eclectic Journal of Medicine*, February, 1840) and remarks that MOSELEY has well denoted this tropical plague by the appellation of "*causis febris ardens*." The burning heat of skin, he adds, was one of the most important features during its prevalence in former years, but that, in 1838, the surface "was apt to be moist, and by no means especially hot." The disease was marked by a suffused dark flush upon the visage; a red and watery eye; great gastric distress and oppression; full, hard pulse, and pains in the head, back, and limbs; there being but a single paroxysm of long duration without subsidence, and, when subsiding, returning no more. There was occasionally a total suppression of the urinary secretion, and in the latter stages a frequent discharge of blood from the bowels. There was also *black vomit* in many cases. "In different years," says Dr. D., "this terrible symptom shows itself with various degrees of promptness and certainty, and connects itself, more or less generally, with hæmorrhages from the nose, mouth, and other orifices of the body." As to its cause, this writer observes that "the abundant experience of a century and a half has

proved it to be an epidemic, appertaining to our situation as indissolubly as the nature of our soil, our climate, and our geographical position. It is modified by the varying relations of the several contingencies that surround us, but is no less ineradicable than our native forest growth, and can no more be counteracted than the malaria of our immense low country. I need not tell those who hear me that no palpable cause of yellow fever has yet been detected; nor need I remind you that even when we enter with the most metaphysical nicety into the discussion of its probable origin under varying contingencies, we find ourselves still in the dark. If we assign it to the combined operation of heat, malaria, animal and vegetable effluvia, and the effect of personal habits, we are totally unable to explain why these causes, acting together, do not produce it as well in Calcutta as in Vera Cruz, in Milo as in Havana, in Jerusalem as in Seville. If we attribute its spread to contagion, why, at some times, is it transported across the Atlantic; and yet in this, the very land of its nativity, shall refuse to emigrate to our sister Augusta, or our terrified neighbours of Wilmington?"

Accordingly, Dr. D. maintains that, though the cause of the fever may be a unit, it consists of many combined influences, and is in perpetual existence during the summer season; that the various contingencies which have been regarded as the efficient sources are operative merely in relation to the subjects of the attack, by their influence in increasing the predisposition of such subjects. "I do not," says he, "believe that any single summer passes over us without offering cases of yellow fever of greater or less intensity. In a period of twenty-four years, but three have passed in which I have not seen or known of the occurrence of a case or cases of yellow fever."—(*Loc. cit.*) Dr. D. speaks favourably of the *calomel* and *opium* treatment, and of *mild purgatives*, but condemns *blood-letting*, remarking that he has not seen it produce a decidedly favourable impression in more than one or two cases, and that there are but two survivors among all those whom he has bled in a practice of twenty-four years. For farther remarks on the *yellow fever* in the United States, see art. "PESTILENCE.]"

376. E. TREATMENT.—The means that should be employed in the *mild* and *severe* forms of inflammatory fever are the same, the only difference being in the promptitude and energy with which they ought to be administered. In the mild disease, particularly in cold or temperate climates, the febrile excitement is much more prolonged than in the severe, which rapidly exhausts itself by its violence. The necessity, therefore, of restraining it at its commencement is great in proportion to its activity. In the milder forms, vascular excitement may continue several days, and depletions may be practised with advantage as long as this state persists; but in the severe, the period in which they can be employed with benefit passes away sometimes in a few hours; and continues seldom beyond the third, and rarely beyond the fourth day. As in the state of excitement, so in that of exhaustion, the treatment is the same in all the varieties of this fever, the only difference being in the choice of means, in the activity with which they should

be employed, and in the appropriation of them to the varying circumstances of the case.

377. *a.—a.* During excitement, and especially at its commencement, vascular depletions should be practised, and carried as far as the state of the pulse and other circumstances will permit, and in the manner described in the article BLOOD (§ 64). The observations already made on this subject (§ 128–138) will guide the inexperienced practitioner; but it should not be overlooked that, in the intense climate fever, vascular depletion should be prompt, from a large orifice, large, and repeated, to be successful; and that the quantity of blood abstracted should depend chiefly upon the effect produced. Dr. JACKSON justly remarks that it should be taken in quantity sufficient—whatever may be the amount—to relax the surface and set free the secretions. Less than three pounds is rarely sufficient to produce this effect; and six have not been more than sufficient on some occasions; but whatever the amount may be, it will do comparatively little good if we stop short of the quantity which is requisite to effect a decided change. If delayed until the excitement is about to terminate in exhaustion, no benefit—or even mischief—may result from it; for the tonicity of the vascular system will have then become too far weakened to admit of the vessels accommodating themselves to a considerable loss of blood. When, therefore, the symptoms indicating the passage of excitement into collapse, or the deceptive abatement of the febrile action indicating this state is observed—and particularly if yellowish blotches appear about the mouth, face, or breast—the time for bleeding with advantage has passed. If, however, headache is still urgent, the pulse still strong, and the features have not collapsed, blood may yet be abstracted cautiously and in moderation. When the cerebral affection is considerable or persistent, and is unattended by marked symptoms of exhaustion, depletion, general or local, may be repeated. Where the headache is particularly intense—rending, throbbing, &c.—with hot inflamed eyes, one blood-letting, however large or early, will seldom be sufficient. In such cases, the body should be immersed in a tepid, or slightly warm bath, and well scrubbed with brushes, &c., until the cutaneous circulation is rendered free. Cold should also be applied to the head, both during the bath and subsequently, the hair having been cut off. After the patient is removed to bed, the vascular action and headache will often become again excessive; and, although a very few hours only may have elapsed, will require the repetition of very large depletions. Spontaneous hæmorrhage during excitement should not be arrested. In the most severe cases, especially when determination to the brain is great, epistaxis often occurs, but is generally slight, or almost instantly disappears. In these, vascular depletions, aided by the other means appropriate to this state, ought to be most energetically practised; for nothing else will save from fatal changes taking place within the brain, or from as fatal exhaustion and its effects.

378. *b.* *Purgatives*, in one form or other, are a material part of the subsequent means. *Calomel*, with *jalap* and JAMES'S powder, may be given, in the form of pill, from time to time; and,

after a few doses have been taken, a cathartic enema should be administered, and repeated. As to the choice of the enema, the practitioner should be guided by the progress the disease has made. At an early period, *sea-water*, with or without the addition of castor oil, or of extract of colocynth, is appropriate; subsequently, olive oil and oil of turpentine may be substituted for the latter. *Emetics* are not suited to any state of this fever, although they are often serviceable in fevers which have been confounded with it, more especially at the commencement of the various forms of marsh fever.

379. *γ.* *Refrigerants*, when judiciously exhibited, are valuable adjuncts in the period of excitement. Those already enumerated, both *internal* and *external* (§ 139–141), should be perseveringly employed. Of these, the *nitrate of potash*, the *nitrate of soda*, and *hydrochlorate of ammonia*, and injections of *cold sea-water*, as recommended by Mr. DICKENSON, are most deserving of notice. HULLARY prescribed a scruple of nitre and twelve grains of hydrochlorate of ammonia, three or four times a day, in water; and Dr. CONWELL has recently shown the propriety of this practice, and its applicability to other states of febrile action. In the more ardent climate fever, this medicine should be very frequently exhibited during excitement; cold applications to the head, and the cold affusion, being also assiduously employed. The refrigerants just mentioned may likewise be taken frequently in conjunction with the *liquor ammonia acetatis* and *spiritus ætheris nitrici*. After depletions, they will often prevent the distressing irritability of the stomach, which increases with the unfavourable progress of the disease, and allay it when present. Although this is the most violent form of fever which comes before the physician, yet it may be arrested at an early period with greater certainty than any other by the decided employment of the foregoing measures.

380. *δ.* *External derivatives*, and more particularly *blisters*, have been very much employed against the inflammatory forms of fever, with the view of allaying the irritability of the stomach, and protecting it and other viscera from impending injury. But I believe that they have been as often injurious as beneficial; and that, owing to a too early use of them, they have increased the general excitement, and not derived from internal parts. It is only after vascular action is subdued as low as may safely be attempted by the foregoing treatment that *blisters** should be employed in this disease;

* The following case will show the progress of the disease, as well as its cerebral complication, in its most severe form; and the little effect which a depletory practice, short of what it requires, produces upon it.

A soldier, of a full and gross habit of body, aged 28, just arrived in the West Indies, during the hot and dry season, was attacked, at six o'clock in the morning, with giddiness, severe headache, and pain in the back and limbs. He came under treatment at six in the evening (twelve hours after the attack), and then these symptoms were violent; the face was flushed, the eyes heavy and injected; the breathing was laboured; the pulse frequent, sharp, and contracted; the heat great, and skin dry; thirst vehement; tongue white and foul. He was anxious, restless, and complained of oppression at the præcordia. He was bled to thirty-two ounces; a purging bolus was given immediately, repeated in four hours, and accelerated by an enema. He seemed a little faint from the bleeding, and expressed ease, but no decided relief. He passed the following night in much distress.

but they ought never to be applied on the head unless in the stage of exhaustion, when coma or lethargy is present, and the pulse becomes weak and intermittent. The exhibition of *mer-*

Second day of disesse, in the morning, he complained of anxiety and uneasiness at the *præcordia*; sighed frequently, and breathed with catching and difficulty at times. Pulse quick, hard, and strong; the skin very hot and dry; intense pain in the head and loins; bowels not freely opened by the purgatives. Was bled to fourteen ounces; the skin became moist; the pains remitted, but did not cease. Blisters to the head and epigastrium; calomel and JAMES'S powder every third hour; inunction with mercurial ointment; saline diaphoretics. He sweated copiously in the afternoon, had some evacuations by stool, and seemed relieved.

Third day.—Anxiety and sense of burning at the *præcordia*; nausea and vomiting; ineffective motions downward; skin dry; pulse strong, not frequent; thirst urgent; eye and countenance lurid; temper irritable and impatient; alarmed at his situation; complains of the blisters on his head, which give sensations of burning. The skin is dry, and the heat rather above natural. The tongue is somewhat rough and foul.

Fourth day.—Symptoms more unfavourable. He vomits occasionally, and his nose bled in the act of vomiting; anxious, restless, and very uneasy. Pulse regular, full, and strong; ideas confused; countenance irregularly tinged yellow.

Fifth day.—Somewhat delirious; extremely restless and anxious; eyes red and muddy; gums red and hot; no salivation; pulse regular, full, but not weak; skin dry, and of a deep yellowish shade; the blistered surfaces dry, and of a dark red, approaching to a livid hue. He was washed with salt and water. Frequent small, dark viscous evacuations.

Sixth day.—Delirious, with extreme restlessness; pulse soft, full, and slow; skin damp and clammy; heat moderate; vomits glutinous matter of a black colour; dark blotches in the skin; and a black sanies exudes from the nose and mouth. He died in the afternoon, five days and twelve hours from the attack.

Dissection.—The vessels on the surface of the brain were remarkably turgid, giving a livid appearance to several places. Considerable effusion of lymph, and adhesions between the membranes had taken place, particularly near the falx. The stomach and intestines contained a large quantity of black matter. In the latter it was thick as tar, and viscous as bird-lime. The gall-bladder was half full of black bile.

Remarks.—The above case was not treated by the author. Twelve hours were lost before the patient received assistance. On the second day the bleeding was insufficient, and should have been carried farther and repeated: the pulse evinced the necessity of it. In this disease, as in many others, the pulse may be safely followed. If the pulse became an unsafe guide, the fault is most generally that of the observer, who cannot interpret it aright. The application of two blisters at this time, before vascular action was sufficiently reduced, and more especially the application of one of them to the head, during predominant action in this quarter, was sealing the fate of the patient, the bleeding in the first instance being just sufficient to give freedom to the circulation, but not adequate to reduce it; the blister adding fuel to the fire when it was about reaching its height. The inunction of mercurial ointment, with the view of affecting the system, was as fruitless, and just as rational, as respects this fever, as to attempt to extinguish a conflagration by a surgeon's syringe. On the *third day*, the great strength of pulse, and burning sensations in the head and *præcordia*, clearly indicated that large blood-lettings could alone have saved the patient, although late in the disease. The local complication having prevented the sudden accession of this stage, and prolonged vascular excitement, admitted of a later recourse to depletions than in other circumstances. Even on the *fourth day*, owing to the cerebral complication, the pulse retained its strength, and, with all the other symptoms, evinced that bleeding should even then have been practised. After the first day nothing appropriate was done, but much to aggravate the disease. As to the *dissection*, the usual routine only was gone through, and which, if pursued in a million of cases, would not advance our knowledge of the disease one step. The symptoms on the second and third days ought to have suggested a minute examination of the vascular system and blood; but these, as well as the digestive mucous surface, were unexplored. In this case, as in many others, the name of the disease, contradictory opinions as to its nature and origin, and empirical reports of successful methods of cure, mystified the practitioner, and paralyzed the treatment when he ought to have been guided by a knowledge of morbid actions, and of rational means of removing them.

curials with the view of inducing salivation should not be attempted in this fever; for this effect has never been produced unless in the milder cases, which would have recovered nevertheless.

381. *b.* The *period of exhaustion* presents comparatively few chances of recovery, especially when far advanced, and in severe cases; but these few should not be thrown away, either by a temporizing or a trifling practice, or by the use of means already known to be unavailing. There can be no doubt that the change commencing in the blood with the accession of this stage is one of the chief pathological states which should attract the attention of the practitioner; but the exact nature of that change has not been satisfactorily demonstrated. That it partly consists of diminished crasis, or a weakened vital attraction between the globules of the blood, and, consequently, of a defective power of coagulating and of altered colour, has been shown by TOWNE, and by every writer since his time, and is generally admitted; but the observations of Dr. STEVENS, as to the progressive loss of saline ingredients which the blood undergoes with the process of exhaustion, although now published several years, have not received that confirmation for which there have been sufficient time and opportunity. They are not, however, therefore altogether to be thrown aside, more especially as my experience has furnished me with facts calculated to support them in some measure. The exhaustion in this disease arises, 1st, from the previous excitement; and, 2dly, from the changes induced in the blood in the course of this stage, especially at its acme, manifestly depressing the organic nervous influence, the tonicity of the vascular system, and the action of the heart itself, to an extent often incompatible with the continuance of life. It is in this manner that death generally takes place in the intense climate fever; for, however considerable the lesions are which the early excitement had occasioned in the brain or digestive organs, death is seldom the result of them alone in either of those parts. It should, moreover, be recollected that the disease cannot be cured by blood-letting merely, however necessary it may be to the subduing of excitement in the early stage; for, although this state may be lowered by it, still, dangerous exhaustion may nevertheless supervene with the characteristic changes of the blood, and all the consequent phenomena described by the earlier writers on this fever, particularly by TOWNE, WARREN, HUME, LING, HILLARY, &c.

382. *a.* From these considerations, it is manifest that the *intentions of cure*, in this stage of the disease, should be, 1st, to support or rally the manifestations of life in the different organs—to oppose the progressive vital exhaustion; 2dly, to counteract those changes which take place in the blood and vascular system. These indications should be simultaneously carried into effect; for the alterations in the state of vascular action and tone, as well as in the constitution of the blood, are more or less dependant upon the change in the organic nervous influence. At the commencement of this period, and when vascular action still continues high in the encephalon or digestive mucous surface, a moderate local depletion may pre-

cede measures calculated to fulfil these intentions; but even this form of depletion can seldom be carried far; for the tonicity of the vascular system generally, and especially of the capillaries supplying the mucous surfaces, is too far exhausted to admit of that accommodation of the vessels to a considerable diminution of their contents, which is so requisite to the restoration of a healthy state of circulation. The characteristic phenomena of the last stage—the hæmorrhages and discoloured blotches—are manifestly owing as much to the exhaustion of organic nervous influence and of irritability as to the attendant changes in the blood. It is to these latter changes almost solely that Dr. STEVENS directs his means of cure in this stage; but it is evident that the vital conditions on which they depend should receive equal attention. He states that the quantity of the chloride of sodium is greatly diminished in the last stage of this and other malignant diseases; and that, in order to supply the deficiency, he at first gave a strong solution of this salt with nitrate of potash. He subsequently found that the chlorate of potash and other active saline agents answer the purpose equally well, especially those which do not irritate the stomach; and he now seems to prefer a combination of the chloride of sodium, carbonate of soda, and chlorate of potash. The basis of this pathology and treatment is the relation subsisting between the colour of the blood and the saline matters contained in it. The power of certain salts, particularly the chloride of sodium, the nitrate of potash, the tartrate of potash, &c., as well as of the alkaline carbonates, to render the venous blood florid, and to affect its fluidity and coagulating powers, was long since fully demonstrated by VERHEYEN (vol. ii., p. 29), SCHWENKE (*Hæmatologia*, p. 190, *et passim*), HALES (*Hæmastat.*, p. 154), ELLER (*Mém. de l'Acad. des Sc. de Berlin*, t. vii., p. 13), BOERHAAVE (*Elementa Chymie*, t. ii., p. 378), PETIT (*Lettre Seconde*, p. 34), HALLER (*Elementa Physiol.*, t. ii., p. 74), SAUVAGES (*Sur l'Effet des Médicaments*, p. 37), and others. A combination of the nitrate of potash and of the hydrochlorate of ammonia was always employed by HILLARY in this disease, and is applicable to every period of it. *Sea-water* has long been a popular remedy for it and other West Indian fevers, and is very strongly recommended by AREJULA and Mr. N. DICKENSON as an enema. Dr. CHISHOLM employed, in 1798, the chlorate of potash, and remarked its effects upon the blood; but, as Dr. STEVENS justly states, he exhibited other substances calculated to counteract its influence on the disease. But granting that the colour of the blood is changed to its healthy state by these salts, it does not follow either that they shall be absorbed into the circulation during the advanced stage of this fever, or that they shall have the effect of rallying the exhausted powers of life. As to both these circumstances, the sanguine expectations of Dr. STEVENS require confirmation. There can be no doubt that, to be serviceable, these medicines should be given sufficiently early in the exhaustion to allow time for their absorption; and that substances which irritate the digestive mucous surface, and prevent or delay absorption, should not also be exhibited. In the present state of our knowledge, and judging from

some experience of the effects of these salts in the advanced stages of other severe fevers, I infer that they ought not to be confided in alone, but should be conjoined with such other means as are calculated to rally or support the vital manifestations and promote the excreting functions; always recollecting that, in order to preserve the blood in a state suitable to the continuance of life, the depurative actions of the various emunctories require to be promoted.

383. β . In the early stage of exhaustion, HILLARY'S saline mixture may be prescribed, or the same salts—the nitrate of potash and hydrochlorate of ammonia—may be given in camphor julap; the quantity of camphor being regulated according to the grade of depression. The chlorate of potash may likewise be given in the same vehicle; or the citrate or tartrate of potash or soda, with an excess of the alkali. It is very important to avoid such means as will increase the irritability of stomach characterizing this stage of the disease; and I believe that these medicines are much less likely to have this effect than almost any other. A full dose of calomel will often have the effect of allaying for a while the irritable state of this viscus; but, when exhaustion is very considerable, its sedative influence on the organic nervous energy will be injurious, if it be not combined with camphor or ammonia. During the course of this stage little benefit will accrue from such purgatives as irritate the stomach. An occasional Seidlitz powder, or the saline medicines just mentioned, assisted by frequent injections of sea or salt water, with the addition of an ounce or two of sweet oil, will prove much more serviceable than more active means, which will only increase the inflammatory irritation of the digestive mucous surface, and exhaust its vitality. Dr. JACKSON most frequently prescribed a combination of calomel, JAMES'S powder, nitre, sulphur, and soda, in the form of bolus, which was given every fourth hour; and afterward the infusion of senna, with liquor ammoniæ acetatis, so as sufficiently to promote the action of the bowels.

384. γ . In a farther advanced state, and more especially if the pulse become irregular or intermittent, the more energetic restorative and nerve medicines should be prescribed, variously combined with one another, or with the saline substances just mentioned. Warm or rubefacient epithems, or sinapisms, should be also applied over the epigastrium, or to the lower extremities; and hot wine with spices; or champagne; or large doses of camphor with nitrate or chlorate of potash; or brandy and water, as the vehicle of effervescing salts; or half drachm doses of turpentine, every two hours, in milk, or in spruce or ginger beer, may be resorted to, according to circumstances. But, before the exhaustion has proceeded thus far, these remedies, in more moderate doses; the preparations of ammonia, conjoined with saline or other medicines, the warm bath, &c., may be employed, with a cautious observation of their effects. Upon the whole, the principles developed above, in respect of the treatment of exhaustion of vital power in fever (§143-148), should be adhered to.

385. δ . During the progress of the stage of exhaustion, much attention ought to be directed to the beverage of the patient. Spruce beer,

soda water, Seltzer water, bottled porter, and bottled small beer may be allowed, but only in small quantity at a time, as a considerable draught is generally followed by vomiting. These beverages may, moreover, be made the vehicle for the exhibition of refrigerant, antacid, or saline medicines, as the nitrate of potash, the alkaline carbonates, &c. During *convalescence*, the diet should be carefully regulated, and confined, at first, to farinaceous articles in moderate quantity.

336. *c.* The modified form of *inflammatory continued fever*, arising from the concurrence of terrestrial exhalations, with climatic influence, must be treated, in the periods of excitement and of exhaustion, conformably with the views explained above. This form of fever, after the inflammatory excitement is subdued by copious depletions, sometimes assumes a remittent character. In this case, the exhibition of bark or the sulphate of quinine during the remissions will be necessary. Whatever *complication*, also, which may either characterize this fever from its commencement, or appear in its course, must be treated by depletions, local especially, and derivatives, according to the principles already advocated.—(See BILIO-GASTRIC FEVER.)

[In the treatment of "*inflammatory*" remittents, too much importance can scarcely be attached to the use of internal refrigerants, and by these we mean *ice* and *ice-cold water*. The *nitrate of potassa*, the *borate of soda*, &c., which PARIS and other writers suppose produce a diminution of temperature by undergoing a rapid solution in the stomach, appear to us, after long trial, to be absolutely inert for any such purpose. So far as we have observed, and the experiments of JORG confirm the opinion, the nitrate of potassa possesses decidedly excitant properties, and, for this reason, it rarely proves beneficial in this form of fever. The *carbonic acid* proves grateful to the stomach, when developed by the union of the vegetable acid and the carbonated alkali, and is a very valuable article in many cases, especially if nausea be present. But cold air and cold water are the most valuable febrifuges within our reach, and deserve far more extensive trials. By the general adoption of the cooling regimen, in febrile and inflammatory diseases, their mortality has been materially reduced in modern times, and there can be no doubt that the practice might be profitably carried to a still greater extent. Many physicians are deterred from the use of cold fluids in fevers for the fear of salivation or other untoward accidents, where mercurials have been given, but we think without sufficient cause. "All experience," says a late writer, "shows that the two agents are by no means incompatible; and did any doubt exist on the subject, and should a question arise as to whether the mercury or the ice-water should be dispensed with, we should not hesitate, in the large majority of cases, to adhere to the latter." The ordinary diaphoretics, excepting, perhaps, the DOVER'S powder, and, in cases of high arterial action, antimony, are but of little use in fevers.

In the treatment of these, as well as all other affections, we are to bear in mind that the only true and successful mode of inducing perspiration is to relieve that pathological condition on

which its suppression depends. If it be inflammation, or congestion, or high arterial action, as it is in many cases of fever, then the removal of these pathological states is the proper method of bringing on diaphoresis, and, if induced in any other manner, no relief will follow it as a necessary consequence. *Nauseants*, whether of ipecacuanha or antimony, act favourably, from their sedative effect; and in cases of inflammatory action, attended with much heat of skin, and a hard pulse, next to blood-letting and ice-cold drinks, they are the most important remedies.

A variety of opinion exists among the practitioners of our country in relation to the necessity or the advantages of the mercurial treatment in remittent as well as other fevers. A large proportion of them, it is believed, employ mercury to a greater or less extent; some with a view to its constitutional effects, others as a chologogue, or a cathartic, best calculated to promote the hepatic secretions, to allay the morbid irritability of the intestinal canal, while, at the same time, it promotes the evacuation of its contents.

No one can doubt the great value of this article in many cases, especially when given as a cathartic; but we are not satisfied that it is ever necessary, as an anti-febrile agent, to give it to that extent as to show its specific influence upon the system. The writings of Dr. EBERLE have done much to extend its use as an *alterative* in fevers; but, as Dr. DUNGLISON remarks, "his testimony does not do much more than establish the fact that the ordinary remittents of this country will terminate favourably when mercury is administered; and he might have added that they terminate equally favourably in the hands of those who pursue the general principles of treatment, and yet who never employ mercury" (*Pract. of Med.*, vol. ii., p. 511). Many employ mercurials, but rarely in the early stages of fever, believing that the morbid condition of the liver is dependant on a phlogosed state of the mucous membrane of the stomach and duodenum, as laid down by BROUSSAIS, and therefore avoid everything calculated to increase the erethism already existing. Practice based on this pathology has, within our own observation, proved eminently successful. It is not to be denied, however, that after fever has progressed for some time, as beyond the second week, attended with adynamia and a morbid condition of the secretions generally, mercury, given as an alterative, will often be attended with the very best effects, by inducing new actions in the system incompatible with that of the disease. But even here it is entirely unnecessary to push it to that extent as to cause actual salivation; a condition causing great discomfort and apprehension to the patient without any corresponding advantages, and therefore to be avoided.

Dr. GRAVES recommends a combination of opium and antimony in typhus fevers attended with encephalic hyperæmia and other cerebral symptoms; and we have found the same combination highly useful in the latter stages of remittent fever under similar circumstances. There can be no doubt that this combination may often be substituted with advantage for general or topical blood-letting, as it powerfully tends to allay febrile excitement and watchful-

ness, and produce quiet sleep. (*Antim. et Pottass. Tart.*, gr. iv.; *Tinct. Opii*, f. ʒj.; *Aq. Camphor.*, f. ʒviij. M. Dose, f. ʒij. to f. ʒss. every two hours.)

The mortality from the "inflammatory" and other forms of remittent fever in some parts of our country has been very great, and will doubtless continue to be so until, from better cultivation, more extensive draining, &c., the sources of malaria, hitherto so rife, shall have been in a measure removed. Among the British troops in the *West India Islands*, during a period of nineteen years, the deaths from remittent fever were 1966, the aggregate force during that period being 86,661. The cases of admission into the hospitals from this disease were 17,799, or more than one out of every five men; the deaths were about one in nine. In *British Guiana*, the deaths from remittent fever were 762, in an aggregate strength of 17,689, during a period of nineteen years (*Report of the Sick-ness, Mortality, and Invaliding among the troops in the West Indies*). It appears from the British army statistics, that the greatest amount of sickness and death from remittent fever has taken place in those months when the greatest degree of heat was combined with the greatest degree of moisture. The same holds true in relation to the disease as it prevails in the United States. To show the influence of locality in the production of the disease, we have only to contrast the mortality from it in different countries. Thus, in *Jamaica*, W. I., during a period of nineteen years, in an aggregate strength of 44,611, the deaths from remittent fever were 1727; while in *Great Britain and Ireland*, for a period of seven years, the cases of remittent fever were eleven, and the deaths but one, in an aggregate force of 44,611. In *Sierra Leone* (Africa), in an aggregate command of 1843, the admissions of cases of remittent fever were 1601, and the deaths 739, or nearly one death for every two cases of fever, or one death for every 2.4 men of the whole strength. The proportion of cases of remittent fever in the United States Army is one in nine. —FERRY, "*The Climate of the United States*," &c.]

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[AM. BIBLIOG. AND REFER.—See BIBLIOG. of "Fever," "Remittent Fever," and "Yellow Fever."]

XVIII. BILIO-GASTRIC FEVER.—*SYN. Febris Biliosa*, *Hippocrates*, *Stahl*, *Selle*, *Finke*, *Tissot*, and *Stoll*; *Synochus Biliosa*, *Galen*; *Febris Gastrica*, *Baillon*, *Lentin*; *F. Gastrico-Hepatica*, *Hildenbrand*; *Febris Cholericæ*, *Auct. var.*; *Fièvre Meningo-Gastrique*, *Pinel*; *Gastrische Fieber*, *Richter*; *Gastric Fever*, *Gastro-bilious Fever*, *Bilious Fever*, *Bilious Continued Fever*, *Endemic Fever*, *Gastric Inflammatory* or *Bilio-Inflammatory Fever*.

387. DEFIN.—*Vascular reaction following chills or rigours and other symptoms of premonition and invasion, with predominant affection of the biliary functions, and of the digestive mucous surface, frequently with yellowness of the skin, in the severer cases.*

388. This fever is either sporadic, endemic, or epidemic. It is endemic in warm countries and marshy situations among Europeans, particularly those who have not been long resident in these parts; and in marshy localities in the summer and autumn, in temperate climates. It is epidemic in some seasons, particularly in autumn when the summer has been hot, after a wet spring, or after great falls of rain, or after inundations, and when great numbers of predisposed persons, especially from high latitudes, visit such localities. In these circumstances and persons it proves the seasoning fever. It is observed chiefly in adults of the bilious, or bilio-sanguine temperaments, and in persons addicted to spirituous liquors. It is a very prevalent fever in the countries bordering on the Mediterranean, in the East Indies, and in America, and consequently in fleets and armies in these parts.

389. i. DESCRIPTION.—This fever, in robust and plethoric persons, approaches severe inflammatory fever on the one hand, and the more inflammatory forms of remittent on the other; or it presents a predominance of the characters of either, according to the intensity of the causes and the peculiar circumstances of the affected. The chief difference between inflammatory fever and it depends upon the causes whence they respectively proceed; the former arising principally from atmospheric vicissitudes and climatorial influence, in connexion with suppressed perspiration; the latter chiefly from marsh and vegeto-animal miasms (see *Diagnosis*). Its similarity to, and connexion with remittents, are referrible to the origin of both in the same causes; the only differences between them resulting from the intensity and concurrence of the causes, and from individual predisposition, being differences chiefly of grade

and of type, as shown by Dr. BOYD, and confirmed by my own observation. That it should therefore be confounded with these fevers cannot be a matter of surprise, and is of little importance as respects the treatment. But when it is mistaken for the synchoïd and adynamic species, with predominant affection of the digestive mucous surface, then the results may be serious.

390. *A. Gastro-bilious fever* is generally preceded by lassitude, nausea, or want of appetite, by dull pains in the back and limbs, and by flatulence and indigestion. The breath is fetid; the tongue is covered by a yellowish mucous coating; the mouth is clammy, and the taste perverted; the bowels are costive, or relaxed, or irregular; and the countenance is pale or somewhat sunk. This state—the *premonitory stage*—may continue several days, the patient not being confined to bed; but generally in the morning he is seized with chills or rigours, preceded by a sensation of cold creeping along the spine. To these soon succeed severe frontal headache, vertigo, nausea, vomiting, burning heat of skin, restlessness, watchfulness, slight anxiety at the præcordia, pain and oppression in the epigastrium, and in one or both hypochondria, with more or less soreness, fulness, and tenderness. The eyes are moist and injected, the conjunctiva often yellowish; the face is flushed; the breathing oppressed and accelerated; the pulse full, large, quick, and strong, rarely hard; the tongue is clammy, moist, furred, and yellowish, with a bitter taste in the mouth; the thirst is urgent, the breath fetid; the bowels are obstinately costive or loose; the stools bilious, and the urine scanty and dark. When the stomach and bowels are inordinately affected, cerebral congestion very frequently supervenes at a later period. As the disease advances, the pulse feels less full, and is weaker than in health. The thirst and anxiety are increased, and the upper parts of the body are sometimes covered by a profuse sweat, while the skin still continues hot.

391. If the attack be very severe, or neglected at the commencement of reaction, the pain of the head is aggravated; and a disinclination to answer questions, stupor, and insensibility appear about the second or third day. The eyes are turbid or inflamed; a bilious, yellow tinge spreads from the face downward over the body; the tongue is covered by a thick, yellow crust, is red at its sides, and dry and brown in the centre; the strength is diminished; nausea, with bilious vomiting, is often distressing; the pulse becomes weaker and quicker; and the patient has an insatiable thirst, and desire of cold acidulated fluids. The urine is very high-coloured, voided often, and produces scalding in passing it. The bowels are either costive or loose.

392. If the disease has not been mitigated, a slight remission occurs on the third, fourth, or fifth day, generally in the morning, the face and chest being covered by perspiration, and the temperature of the surface reduced. But the symptoms are exasperated towards evening, the tongue becoming drier and darker; the epigastrium and hypochondria more painful, tender, and often also tumid and tense; the pulse more rapid, constricted, or weak. The

anxiety of the præcordia is now changed into severe pain, aggravated on pressure, with oppression and frequent sighing; the countenance is sunk; there is vomiting of putrid or offensive bile; the stools are liquid, greenish brown, fetid, slimy, and occasionally bloody or dysenteric; the skin is often deeply jaundiced, and emits a putrid bilious odour. The patient is now collected, but various adynamic and malignant symptoms appear from the fifth to the seventh or eighth day. These are tremours of the extremities, and of the tongue when held out; startings of the tendons; pain about the pubes, with inability to pass the urine; vomiting of a dark, glairy matter; difficulty of swallowing; sometimes swelling and suppuration of the parotid glands; tympanitic distention of the abdomen; inexpressive, glassy eyes; dilated pupils; clammy sweats, difficult and anxious breathing, and black tongue. To these succeed delirium, coma, intermitting pulse, cold extremities, and death, sometimes with convulsions. Petechiæ, blotches, and passive discharges of blood from the nostrils, gums, fauces, &c., are but rarely observed.

393. *B. Modifications.*—All the above symptoms are not present in the same case, nor always run the same course. In the young, strong, plethoric, and unseasoned, in the sanguine and intemperate, and in very hot and dry seasons, this disease approaches very closely to severe inflammatory fever (§ 354), with predominant affection of the stomach and membranes of the brain, or of the digestive mucous surface generally. But in weak or elderly persons, and in colder climates and seasons, it is more mild, and approaches, or even runs into, some one of the varieties of remittent. Indeed, it may assume either *inflammatory* or *adynamic* characters, or present *complications* similar to those observed in that fever, from which it differs merely in type. When animal miasms and infection are associated with the other causes, as in crowded transports, ships of war, prisons, camps, &c., in warm climates, or in hot seasons, more or less adynamia or depression of vital power, with contamination of the circulating fluids, is evinced early in the disease, *malignant* and nervous symptoms predominating towards the close. In such cases, the premonitory and invading stages are very manifest; reaction is often low or imperfect, as in the more adynamic states of remittent, or, rather, in the malignant forms of fever about to be noticed, and the type is perfectly continued. But when it arises chiefly from terrestrial exhalations, the circulating and secreted fluids are less vitiated, and it presents more of the remitting character. When these causes are very intense, and the predisposition great, the disease often assumes a very *concentrated* and *acute* form, runs its course rapidly, and often passes into the remitting type, or induces visceral disease. These violent states of bilio-gastric fever have been often met by Mr. BOYLE and myself in Africa, and by Dr. J. JOHNSON, ANNESLY, and others in the East Indies. This fever thus may resemble, according to the nature of the causes—predisposing and exciting—of the seasons, of the locality and climate, and of the epidemic constitution, either *inflammatory* or *remittent* fever, or even *malignant* fever; may possess more or less of a

gastric character in one case, of a bilious state in another, of an inflammatory condition in a third, of cerebral affection in a fourth, of an adynamic or malignant form in a fifth, or a predominance of any two or more of them. These modifications give rise to the appellations gastric, bilious, yellow, gastro-bilious, gastro-inflammatory, bilious inflammatory, bilious continued, gastro-meningitic, &c., applied to it by modern writers, and cause it frequently to be confounded with the severe inflammatory fever on the one hand, and with pestilential yellow fever on the other.

394. ii. DURATION AND TERMINATION.—These depend upon various circumstances, chiefly upon the exciting causes and circumstances proper to the patient.—*a.* When judiciously treated at an early stage, a favourable change generally appears from the third to the seventh day, or even earlier.—*b.* But when the disease has been neglected, or aggravated by improper means, *death* may take place from the fifth to the eighth day, preceded by the unfavourable signs just enumerated (§ 393). In these, the brain or its membranes, or the digestive mucous surface, or all of them, have suffered very considerably, and are more or less changed.—*c.* In some cases, and when it is occasioned by the concurrence of marsh exhalations with the other causes enumerated above, more particularly in hot climates, or in temperate countries during warm summers and autumns, the inflammatory action extends to the mucous surface of the small intestines and large bowels, the disease terminating either in enteritis or acute dysentery. As in the remittent type, so in this, the state of the secretions, particularly the biliary, and the nature of the ingesta, concur with the exciting causes in developing these complications (§ 237).—*d.* The fever may also pass into *inflammation* or abscess of the liver. This is a frequent complication and termination of the bilio-gastric fever of the East Indies, and of some other intertropical countries. When abscess forms in the liver in these cases, dysenteric symptoms are often superadded.—*e.* When the disease has not been entirely arrested, but only mitigated by treatment, or when it has been mild at the commencement, and caused chiefly by terrestrial exhalations, the patient continuing subjected to their influence, it may pass into a *remittent*, or even an *intermittent* type. In such cases, enlargements of the spleen, of the liver, of the pancreas, and even of the mesenteric glands, may ultimately supervene.—*f.* *Relapses* are more frequent in this than in almost any other fever, and are caused chiefly by a too early recourse to a full or stimulating diet, by irregularities in food or drink, by incautious exposure to the night air or to cold, by vicissitudes of temperature or of season, and by terrestrial or vegeto-animal miasms. The *lesions observed in fatal cases* are altogether similar to those found in the more inflammatory and severe forms of remittent.

395. iii. DIAGNOSIS.—*Bilio-gastric fever* nearly resembles, 1st. *Inflammatory fever*, in its milder states; 2d. *Remittent fever*, in its severe forms; and, 3d. *Epidemic or pestilential yellow fever*.—*a.* From the *first* it is distinguished by premonitory symptoms of considerable severity and continuance; by the marked chills and

rigours characterizing its invasion; by the early occurrence of nausea and bilious vomiting; by the less continued and violent state of vascular reaction; by the copious and early bilious evacuations, and the bilious suffusion of the skin; and by the usually longer duration of the disease. In severe climate or inflammatory fever, on the other hand, the invasion is sudden, and vascular action more or less excited from the commencement, premonitory symptoms being hardly observed. Subsequently, the blood undergoes a much more remarkable change than in gastric fever, the yellow and livid blotches appearing in the last stage being very different from the bilious suffusion of the disease; and the hæmorrhage from the mucous surface, the black vomit, and dissolution of the fluids, &c., so frequent in the former, being neither so common nor so great in the latter. The pain in, and determination to, the head is more severe in the first stage of inflammatory fever, and the disorder of the stomach much less than in gastro-bilious fever; but the affection of the stomach becomes more violent and unremitting at an advanced stage of the former than of the latter.

396. *b.* Gastro-bilious fever is distinguished from *remittent fever* chiefly by its continued or imperfectly remitting course. In other respects there is little difference between it and the severer forms (§ 230, 232) of that disease, excepting that its severity is often greater and its duration shorter. Indeed, this is but a variety of marsh fever, owing its continued and otherwise modified characters to high temperature and other concurrent circumstances.*

397. As this fever varies from the ardent

* [From the description of this form of fever, as given by Dr. COPLAND, no one can doubt the truth of the above remark, viz. that "it is but a variety of marsh fever" modified by atmospheric conditions, and other circumstances not always easy to be ascertained. The *inflammatory, remittent, bilious, bilio-gastric*, and other fevers described by our author, appear to be modifications of each other—different grades only of the same disease; hence it may be doubted whether they should be raised to the rank of distinct fevers. Most of the remittent fevers of our country—especially of our Southern and Western States—are marked by much gastric and hepatic derangement, or by "bilio-gastric" symptoms, and hence would properly fall under this division of febrile diseases. EBERLE has very properly described all these varieties under the general term, "Remittent or Bilious Fever," characterized by yellowness of the eyes and skin, vomiting of bile, oppression at the epigastrium, &c. The epidemic fever which prevailed in Mississippi in the autumn of 1822, according to Dr. CARTWRIGHT (*Med. Recorder*, vol. vi.), was also attended by similar phenomena, only of a much intenser grade, the skin beginning to acquire a yellow colour during the third paroxysm, with constant vomiting, the "paroxysms continuing to recur until the fifth, seventh, or ninth day, when either death took place, or enormous dark-coloured evacuations from the bowels occurred, and the patient commenced to convalesce."

So, also, in the "*Epidemic Bilious Fever*" that prevailed at Harrisburgh, Pa., in 1819, Dr. AGNEW has described the *stomach and liver* as the seat of the greatest derangement, the stomach being excessively irritable, and the "patients surcharged with bile." Fevers, commencing as *intermittent*, assumed, after a time, a highly bilious type and a remittent form; and those commencing as bilious remittents gradually lapsed either into intermittents, showing the same identity of cause, or took on a distinct *typhus* state, as has been also noticed by many other observers. Dr. AGNEW very justly remarks that we should "treat as kindred all febrile diseases bearing the general outline of the offspring of miasmatic origin, whether called intermittent, remittent, continued typhus, yellow fever, or plague, accommodating our prescriptions to the several deviations from the common character occasioned by localities, exciting causes, and individual idiosyncrasies, and watching the progressive changes occasioned by their separate or combined influence in the different stages of the disease."—(*Loc. cit.*)

seasoning to the distinctly remittent type, with the intensity and concurrence of the causes producing it; and as it may occur contemporaneously with the pure climate fever, and with the more inflammatory forms of remittent fever, as frequently observed in the West Indies and Mediterranean during the hot months, particularly among soldiers and sailors; so it is often difficult to distinguish between them. The chief circumstances, however, which will fix the attention of the practitioner, are, the manner of invasion; the distinctness, obscurity, or absence of remissions; the degree of excitement characterizing the early period, especially as expressed upon the vascular system; the kind of excitement, particularly in respect of sthenic or asthenic action; and the state of the circulating fluid, and of the secretions and excretions.

398. *c.* From *epidemic or pestilential yellow fever*, this disease is distinguished, by passing into the periodic type in many instances, and by frequently leaving visceral disease behind it; by its attacking the same individual oftener than once, if he have intermediately undergone a change of locality or climate; by the more inflammatory or sthenic character of the period of excitement, and the much less remarkable change in the blood and soft solids from the commencement; by the headache being confined chiefly to the temples; by the yellowness appearing early, and first in the eyes, and being of bilious origin; by much less irritability of the stomach in the advanced stages; and by its longer duration—generally from five to fourteen days. In pestilential yellow fever, the yellowness of the skin is not frequent, and is of a pale lemon colour; the face has a putrid, bloated, or livid hue; its duration is from one to five days; it never passes into the periodic type, nor leaves visceral disease behind it, fatal cases always being attended by the black vomit at their close. Moreover, remittent, inflammatory, and bilious fevers are never infectious, unless under peculiarly favourable circumstances, when the latter may assume this character; but epidemic yellow fever is remarkably infectious; and while these are generally benefited by vascular depletions during the period of excitement, the epidemic malady requires a different method of cure.

399. *iv.* The *PROGNOSIS* depends upon the intensity and concurrence of the exciting causes; upon the severity of the attack; upon the treatment adopted at the commencement; upon the state of vascular reaction; and upon the complications that may arise.—*a.* It may be favourable, if the attack be mild or simple, the skin moist, the vomiting moderate, and the matters ejected consist chiefly of mucous or ingesta; if the tongue become moist, the bowels loose, and the stools bilious; if the nervous and vital powers be not much reduced; and if the yellow suffusion be slight or slow in its progress.—*b.* An *unfavourable* opinion should be formed, if any of the more dangerous symptoms enumerated above supervene (§ 392); especially if the skin be either early or deeply yellow, or the sensorial functions early disturbed; if the period of exhaustion be attended by deep redness of the face, dulness of the eyes, much anxiety, or laborious respiration; by a feeble, creeping, or intermitting pulse; by very

scanty and dark urine; great pain, tension, or fulness in the epigastrium and hypochondria; difficulty of swallowing; tremours of the tongue or of the extremities; by startings of the tendons; involuntary discharges of fæces, particularly if they be of a black colour; incessant vomiting, especially if the egesta be dark, or great in proportion to the ingesta; by petechiæ, enlargements of the parotids, and coldness of the extremities.

400. *v.* *CAUSES.*—Gastro-bilious fever is caused chiefly by exhalations from the soil, or from vegetable and animal matter undergoing decomposition, in connexion with atmospheric heat; by exposure to the sun; by the night airs or dews, and the influence of cold following such exposures or excessive exertion or high ranges of temperature; by intemperance and errors of diet or of regimen; by excesses in vinous or spirituous liquors; by great exertions following inactivity; by over-eating, or by a sudden transition from a very poor to a very full or rich diet, as in the case of soldiers and recruits; by anger and other mental emotions; and by the causes already enumerated (§ *b*). It most frequently, however, arises from the concurrence of two or more of these causes. The influence of infection in producing it has been doubted; but the experience of Drs. DENMARK and BOYD, in ships and hospitals in the Mediterranean, has demonstrated its occasional origin in the cause, or, at least, the power infection evinces in producing a severe modification of it.

401. *vi.* *TREATMENT.*—The *indications* are, 1st. To evacuate morbid secretions in the prima via, and restore the suppressed perspiration in the stages of premonition and invasion; 2d. To moderate the vascular reaction attendant upon the period of excitement; 3d. To obviate determination to a vital organ, and mitigate urgent symptoms; and, 4th. To support the vital powers in the consequent exhaustion. The *first* indication is best fulfilled before reaction is developed. At this time an *emetic*, followed by diluents, by the *vapour bath*, or by warm fomentations, *sudorific drinks*, and by warm emollient enemata, will generally restore the suppressed perspiration, and moderate the consequent reaction. *Blood-letting* is the next important means; but the utmost care should be taken not to resort to it before reaction has commenced, or when exhaustion is about to supervene. Dr. DENMARK has insisted upon this, and my experience fully confirms the propriety of the advice. I have seen this fever most remarkably exasperated, and almost fatal syncope occasioned, by the abstraction of even two or three ounces of blood during the stage of invasion, before vascular excitement was developed. When this pathological state has supervened, depletions should be energetically and early practised, but with due regard to the state of the pulse, and to the complications and other circumstances of the case; and they ought to be aided by cold applications to the head, and purgatives. A full dose (from 10 to 20 grains) of calomel may be given immediately upon the first blood-letting, and afterward the tartrate or citrate of soda, or of potash, may be taken at short intervals, in the state of effervescence, with an excess of the alkali. As long as vascular excitement is energetic, anti-

phlogistic remedies should be employed, as recommended above; and, in addition to these now mentioned, there are none more deserving of adoption than small and frequent doses of the nitrate of potash and hydrochlorate of ammonia. Cold affusions, and cold sponging of the surface, are also useful auxiliaries. When internal viscera are oppressed, and reaction is not free and open, the tepid bath, or tepid effusions, will be serviceable.

[When called sufficiently early, the first indication should be, to put a stop to the cold stage, or stage of torpor; and when the disease is of a remittent character, to prolong the remission, and either prevent a recurrence of the excitement, or render it less violent and of shorter duration. When there is a tendency to a favourable termination, convalescence is to be promoted by such supporting measures as experience has proved to be best adapted to the object in view. It is but seldom, however, that the patient is seen by the physician until the cold stage is past. Dr. B. TICKNOR, U. S. N., in his account of the "*Epidemic of Thompson's Island*," in 1824 (a most malignant bilious remittent fever), thus speaks of the use of blood-letting in this disease:

"Reaction having taken place either spontaneously, or in consequence of the means which have been mentioned, it generally ran so high as to require depleting measures. Of these, venæsection was the first and most effectual, and few cases occurred in which it was not required. Wherever I found a tense, wiry pulse, however small it might be, accompanied with burning tenderness and oppression in the epigastric region; violent headache, with red, protuberant eyes, and a tumid, flushed countenance; a hot, florid, and dry skin, I had immediate recourse to the lancet, and used it freely. My rule was, to allow the blood to flow till manifest relief was experienced from all the urgent symptoms above mentioned. But the quantity which it was necessary to take to accomplish this, varied according to the circumstances attending the operation. When drawn in a full stream, from a large, tense vein, and while the patient was in a standing or sitting posture, the loss of from sixteen to twenty-four ounces generally afforded the desired relief. It was only at that period of the disease, however, when reaction had just reached its height, that venæsection was productive of this decided benefit. Indeed, it was only at this time that it could be employed with safety; for if the disease continued its course, the powers of the system were very soon exhausted to such a degree that a loss of blood, instead of retarding or averting, accelerated the patient's doom. A large bleeding, at the moment when the ardour of the febrile conflict had reached its height, seldom failed to calm the commotion of the system, and to prevent an unnecessary waste of the vital energy, by moderating the violence of reaction. To obtain the greatest degree of benefit from venæsection, it was indispensably necessary to carry it so far at first as to make a sensible impression upon the disease; that is, till all the urgent symptoms proceeding from the excess of reaction disappeared; for if these salutary effects were not produced by the first, they never could be by any subsequent bleeding, the system becoming in a short time

too much prostrated to admit of a farther abstraction of blood. When I had an opportunity of seeing the patient sufficiently early in the disease, I rarely had occasion to bleed more than once; and by this one bleeding I was so fortunate, in a few instances, as completely to arrest its progress. But in almost every case the symptoms of reaction returned after a longer or shorter interval of remission, and sometimes they became so violent as to require a repetition of the bleeding. In these instances, it was necessary to be more cautious in the use of the lancet, and the benefit resulting from it was comparatively small. Bleeding could not be safely employed later than the third day of the disease, and its good effects were seldom very apparent after the second. Although the efficacy of this remedy consisted principally in its moderating the violence of reaction, yet it extended beyond this, and was manifested in the greater susceptibility of the system to the action of other remedies. The operation of cathartics, in particular, was facilitated and rendered more effectual by an early and free use of the lancet.*]

402. The *second indication* is to be fulfilled by local depletions in the first instance, followed by rubefacients, blisters, and the other means detailed when treating of the remittent form of bilious fevers (see § 251, 252-258). The *exhaustion* in the latter period requires the same treatment as already advised for this state in the severer forms of remittent and inflammatory fevers (see § 253, 256, 257).

403. The *mercurial plan* of cure in this fever has been very strenuously insisted upon by CHISHOLM, DENMARK, J. JOHNSON, BOYLE, BOYD, and various other recent writers. They advise *calomel* to be given after copious vascular depletions, with the intention of affecting the system, and in various forms of combination—with JAMES'S powder or other antimonial preparations, in frequent doses, or in larger quantities with opium. And they direct the mercurial unguents to be used externally at the same time. I have prescribed mercurials with the same intention, to the utmost extent, and in all these forms in the more concentrated varieties of this fever in hot climates; but I have not satisfied myself that they have been actually beneficial to the extent supposed, even in the cases which have recovered during or after their exhibition. I would, therefore, prefer to use it in the manner I have advised in the severer forms of remittent (§ 250, *et seq.*).

404. The propriety of having recourse to *emetics* in this fever has been much questioned by writers, and especially by those of the school of M. BROUSSAIS. They are, in my opinion, quite inadmissible after excitement has commenced. They should be given only in the premonitory and invading stages, as above stated (§ 401), but, unfortunately, the disease seldom comes under treatment until these have been superseded by reaction; and they ought to be aided, in these periods, by the means mentioned (§ 401) in connexion with them. They are contra-indicated even thus early, if great pain be felt at the epigastrium, with distention and tenderness; and if full and free vomiting have already taken place.*

* [Dr. TICKNOR, U. S. N., who has had great experience in the treatment of this form of remittent fever, thus speaks

405. The *saline treatment*, so remarkably extolled by Dr. STEVENS, in the latter stages of this and other severe fevers, does not appear to have been employed to an extent which will warrant an opinion as to its effects. And, although several years have elapsed since it was so strongly recommended by this writer for these diseases, I cannot find that any additional evidence of its efficacy has been adduced. It surely becomes this physician to furnish farther proofs of its success, and it is morally imperative upon practitioners in warm climates to give it a proper trial. [From late conversations with Dr. STEVENS, we learn that he has continued to pursue the saline treatment in the fevers of the West Indies with great success up to the present time, and that many other practitioners have adopted the treatment with similar results.] It is unnecessary to offer farther remarks on the treatment of this species of fever, as the observations already made in respect of the management of remittent and inflammatory fever will, in a great measure, apply to it; and the more so, as the severe states of these diseases, as well as of this, although commencing differently, and evincing certain modifications in their early course, generally present very similar features in their advanced stages, or when they assume dangerous complications, and pass into exhaustion of vital power.

[In relation to the treatment of this form of fever, few additional remarks are needed. *Gastric irritability* will be best relieved by swallowing frequently small bits of ice, with the application of a blister or sinapism over the epigastrium, or by injections of limewater, balsam

of emetics, in his "Account of the Endemic of Thompson's Island," 1824. "It rarely happened that I saw the patient soon enough after the attack to make use of any means for arresting the cold stage, or stage of torpor; and when I had an opportunity, I was restricted to very few remedial agents by the great irritability of the stomach. The most effectual were a mercurial cathartic, and blisters or sinapisms. The cathartic consisted commonly of a scruple of calomel, which was found to be easy for the stomach, and effectual in its operation. When given sufficiently early, and aided by a large epispastic, or sinapism, immediately applied over the epigastrium, it seldom failed to rouse the torpid powers of the system, and bring on the stage of reaction. In all cases where the gastric irritability was considerable, these were the only means which possessed any degree of efficacy in cutting short the cold stage; but where there was an absence of all the symptoms which indicate the actual presence or near approach of inflammation of the stomach, and where there was an incessant vomiting of bilious matter accompanied with a sense of oppression in the epigastrium, I had recourse to emetics, and derived essential benefit from their operation. To those who have proscribed the use of emetics indiscriminately in yellow fever this practice may appear highly reprehensible; but as I determined, when circumstances should require me to undertake the management of this formidable disease, to be governed by the symptoms as they might present themselves, rather than by any preconceived opinions, drawn from the speculations or experience of others; so, whenever I found emetics to be clearly indicated, I prescribed them without the least hesitation, and never had occasion to regret that I had done so. I need hardly observe that a good deal of caution was necessary in prescribing them; for it was only in those cases where there was reason to expect that the benefit resulting from unloading the stomach of its irritating contents would counterbalance the irritation likely to be produced by the remedy that emetics were admissible. Their good effects, in these cases, consisted, not in wholly arresting the progress of the disease, as they sometimes do in other febrile complaints; but in checking the vomiting, relieving the oppression at the stomach, and in causing a determination to the surface; thus, not only abridging the stage of torpor by inducing re-action, but also preparing the way for the more expeditious and effectual operation of the means for fulfilling the other indications."—(North Am. Med. and Surg. Jour., July, 1827.)]

of copaiba, and mucilage; vomiting will often be allayed successfully by the administration of two drachms of a mixture of equal parts of charcoal and spirits of turpentine. When *hæmorrhage* occurs, cold water, with the acetate of lead in two or three grain doses, often repeated, with *opium*, according to circumstances, will do all that can be done in such cases. *Hiccough* has often been allayed by the bicarbonate of soda and opium internally, while, at the same time, a plaster is applied between the shoulders, composed of pitch, opium, and camphor. Convalescence from this form of fever is generally extremely slow, and requires more than ordinary caution as to regimen, in consequence of the diseased condition of the digestive organs. Porter, and the light bitter infusions, may, at first, be cautiously entered upon; but quinine, especially in large doses, is not unattended with danger. The food should be of a mild, farinaceous kind, as arrow-root, rice gruel, and tapioca, to be replaced by animal broths as soon as the stomach has regained some of its former tone and energy. There is no disease, perhaps, in which relapses of a fatal kind are more common than in this gastric form of remittent fever, and these generally happen in consequence of imprudence in relation to the quantity or quality of the food. The drinks should be toast or barley water, rice water, balm or mint tea; lemonade and other acid drinks do not often agree as well with the stomach.

The *sequela* of this disease are, *dysentery*, *intermittent fever*, or *jaundice*. These are to be treated according to the rules laid down under these different diseases. We may, however, remark that mercury, as an alterative, and quinine in small doses, will be the remedies on which chief reliance must be placed. Complete restoration to health, however, can rarely be expected, unless by a residence of considerable duration in a healthy climate.]

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Svo.—*Fournier et Vaidy*, in *Dict. des Sciences Médicales*, t. xv., p. 274.—*Alibert*, *Nosologie Naturelle*, t. ii., gen. v.—*Raimann*, *Handbuch der Speciellen Therapie*, b. i., § 139.—*W. Boyd*, *De Febre Minorce*, Svo. Ed., 1817.—*Hildenbrand*, *Institut. Medicæ Practicæ*, vol. iv., p. 680.—*Meli*, *Su le Febbri Biliose*, Milano, 1822; et *Su la Condizione Patol. delle Febbri Biliose*, Mil., 1824.—*J. Johnson*, *The Influence of Tropical Climates on European Constitutions*, 4to edit., *passim*.—*F. G. Boissieu*, *Pyretologie Physiologique*, &c., 3d edit., p. 130.—*Schmidtman*, *Observat. Med.*, t. iii., p. 356.—*J. Annesley and Author*, *Researches into the Pathology and Treatment of the Dis. of India and of Warm Climates*, &c., imp. 4to, vol. ii., *passim*.—*W. Stevens*, *Observ. on the Healthy and Diseased Properties of the Blood*, Svo. Lond., 1832.—*W. Twining*, *Clinical Illustrations of the Diseases of Bengal*, &c. Calcutta, 1832, Svo, *passim*.—*W. E. E. Connell*, *On the Funct. and Struct. Changes of the Liver, and on Hepatic Disease in India*, &c., Svo. Lond., 1835, *passim*.—See, also, the REFERENCES to REMITTENT and INFLAMMATORY FEVERS, and likewise to PESTILENTIAL YELLOW FEVER, as this disease has been very frequently confounded with them, owing chiefly to the circumstance of *yellowness* of the skin being one of its chief characteristics; indeed, this symptom is more generally observed in it than in the other fevers just mentioned. The term *yellow fever* ought to be entirely discarded; as *yellowness* being improperly viewed as a pathognomonic symptom of one kind of fever, all others, in which it is a contingent phenomenon, although not more frequently met with in one than in another, have been confounded with that fever. As respects *intermittents*, their periodicity and exacerbations sufficiently distinguish them, even although *yellowness* or signs of malignancy should arise in their advanced course. Besides, *yellowness* is a very indefinite symptom; it not only is of various shades, but also arises from very different causes; it is lurid or tawny in one case, brownish or mahogany-like in another, greenish in a third, orange-colour in a fourth, of a lemon tint in a fifth; and it is, moreover, either partially or generally diffused, or even mixed with different colours, as with greenish, livid, purplish, violet, or reddish blotches. And it may proceed either from the passage of the colouring parts of the bile into the circulation, or from incipient dissolution of the blood, with loss of the vital tone of the capillaries. When it arises from the former source especially, disorder of the biliary secretion is presupposed; in the latter, predominant affection of the circulating fluids and of the vascular system. It would be preferable, therefore, to adhere to the denominations *inflammatory, bilio-gastric, and pestilential*, as respects those species of fever which most frequently present the symptom in question as the result of these causes.

Those who have not seen the fevers incidental to intertropical countries, more especially to the West Indies, Africa, the Mediterranean, and the East, may consider the distinctions made above not to exist in nature, and that remittent, bilious, continued, inflammatory, and pestilential fevers are merely modifications and grades of each other. They may even doubt the utility of the details into which I have entered, particularly as regards inflammatory and bilio-gastric fevers; for they will scarcely observe a case of either in temperate countries, particularly in the severe forms met with in warm climates, unless in very hot seasons, and in peculiar circumstances. But in those parts of the world to which I have just referred, and in others adjoining them, to which medical men may proceed to serve, it will be found that the unacclimated, according to their constitutions, will be affected by inflammatory fevers of various grades or severity in healthy localities, and in hot and dry seasons—with bilio-gastric and remittent fevers, of various forms, in miasmatic situations and sickly seasons; while the acclimated shall escape the first of these maladies in the former of these circumstances, and the second in the latter, or, if attacked, they shall experience only remittents or intermittents. The pestilential yellow fever makes no such distinctions. As already stated, and as will be hereafter shown, its spread is limited only by a low range of temperature, by a previous attack, and by circumstances that circumscribe its infection. While the former fevers are met with in all warm climates, and occur either sporadically or endemically in them, and are not infectious, this last appears only on the intertropical shores of the Atlantic, or parts adjacent, during hot seasons, rages for a time, and then disappears. Thus, it occurs after long intervals, prevails sometimes for years, and then takes its departure, as will be shown in another place. When we consider the very different constitutions—original and acquired—of those who inhabit European colonies within the tropics; when we review the appearance of the new comer, of the old resident, of the creole, of the mulatto of various grades, and of the negro; and take into account the modes of living, the exposures, and the various other circumstances connected with each class, and farther connect all these with variety of situation, season, and temperature, we cannot be surprised at the very different forms which fever assumes among them.

[See Bib. of "FEVER," "REMITTENT," and "YELLOW FEVER" (the latter under "PESTILENCE.")]

XIX. MUCOUS OR PITUITOUS FEVER.—SYN. *Febris Mucosa, F. Mesenterica*, Baglivi; *Morbus Mucosus*, Roederer and Wagler; *Febris Pituitosa*, Stoll; *Febbre glutinosa gastrica*, Sarcone; *Fièvre Adéno-méningée*, Pinel; *Fièvre Muqueuse*, Fr.; *Schleimfieber*, Germ.

406. CHARACT.—*Slight febrile reaction following chills, with mucous evacuations, and pains in the back and limbs, and often with slight remissions.*

407. i. SYMPTOMS.—Some of the older writers confounded mucous fever with *influenza*, with *catarrhal fevers*, and even with *bronchitis*. But more recent observers have, with greater propriety, confined their description of it to that form of general affection, which is characterized by slight febrile excitement and nervous depression, with predominant disorder of the digestive mucous surface, of a sub-acute form, accompanied with mucous or slimy evacuations—admitting, however, the occasional complication of bronchial irritation with it.

408. This fever is preceded by general uneasiness, by a sense of heaviness, or pains in the limbs, loss of appetite, disturbed sleep, acid or acrid eructations, and cold or chilliness, which is first felt in the lower extremities. To these succeed marked dislike of food, slight thirst, nausea, sometimes with vomiting of a whitish, transparent, and viscid fluid of a nidorous or acid taste; a sense of weight at the epigastrium, with fulness; flatulent and colicky pains, with slight tenderness in the abdomen, and relaxed bowels. The tongue is usually moist, white, and covered by a mucous coating, with a sickly or unpleasant taste of the mouth; aphthous exudations are occasionally observed on the fauces and lips; the saliva is sometimes abundant, and the breath is fetid and heavy. The evacuations are mucous, more frequent than natural, sometimes tinged with blood, voided with slight tenesmus, and, in children, often with *prolapsus ani*. In rarer instances, costiveness, or an irregular state of bowels is observed; mucous diarrhœa and costiveness alternating; and, occasionally, worms are voided. The urine is either scanty or natural at first, of a citrine tint, and sometimes passed with pain; it deposits a mucous sediment of a grayish or brick colour at an advanced stage. The temperature of the surface is not much increased, unless during the evening exacerbations; and, towards the acme and decline, a gentle perspiration breaks out, especially in the morning and during sleep. A slight eruption often occurs during the night, but generally disappears in the morning. The pulse is feeble and small, but seldom much accelerated, unless in the evening and night. The patient complains of a sense of weight or of pain in the sinuiput and occiput; with vertigo upon sitting up; of confusion of ideas, and somnolency, without the ability to sleep; of depression, sadness, and restlessness; of pains and soreness in the hypochondria, in all the limbs, and in the joints; and occasionally of cough, noise in the ears, and deafness.

409. ii. The DIAGNOSIS rests upon the circumstances connected with the origin of the disease; on the appearance of the evacuations; on the colicky pains in the bowels; on the

softness, the very slight acceleration or slowness of the pulse : on the little increase of the temperature, and the humidity of the skin ; on the slight degree of thirst ; and on the very moderate or sub-acute character of all the febrile phenomena. In its slighter forms, the complaint is commonly described as fever from cold, or as a cold in the bowels and limbs. In some cases, it presents either a dysenteric or a rheumatic character ; and is with difficulty distinguished from dysentery, or from rheumatism in other instances, unless the history of the disease, and the state of the bowels and of the evacuations, be closely observed. It may even pass into either of these affections, or into others about to be noticed.

410. iii. DURATION, TERMINATION, AND PROGNOSIS. *A.*—The *Duration* of this fever varies from two to five or six weeks. It often presents slight remissions, indicated chiefly by the pulse and skin. The more manifest the remissions, the longer is its duration, which may be extended even beyond the latter period. *Relapses* are very common during convalescence, and are caused chiefly by errors of diet or of regimen, by premature exposure to atmospheric vicissitudes, or to cold and moisture, or to paludal exhalations. The relapse may assume either the same or aggravated features, or a purely remittent or intermittent type.

411. *B.* Mucous fever *terminates*, 1st. In a return to health, which most commonly takes place ; and is frequently preceded either by vomiting, or by a moderate diarrhœa, or by an aphthous eruption on the lips, or by a miliary eruption on the skin, by a general sweat, by the urine becoming copious and depositing a sediment, or by a spontaneous salivation ; 2d. In the adynamic state of fever, with predominant affection of the intestines and of the brain, or of its membranes ; 3d. In a purely remittent or intermittent type, or in dysentery, particularly in marshy localities ; and, in such cases, sub-acute or chronic disease of one or more of the viscera in the abdomen, with or without dropsy, may supervene ; 4th. In unequivocal symptoms of rheumatism, or of peripneumonia ; 5th. In death, after severe inflammatory affection of the intestinal mucous surface, attended by obstinate diarrhœa ; or after excessive nervous exhaustion, or after obscure affection of the brain, or of its meninges, or of the respiratory organs. The *prognosis* is generally favourable, unless any of the more severe changes just mentioned present themselves. This fever seldom terminates fatally when early and judiciously treated.

412. *C.* On *dissection*, the principal lesions are found, 1st. In the *intestinal canal*, which is usually greatly distended by a fetid gas, its mucous surface presenting inflammatory appearances, consisting of vascular injection, thickening, softening, various alterations of colour, ulcerations, and even gangrene ; 2dly. In the *peritoneal covering* of the intestines, which is either partially inflamed or altered in colour, the abdominal cavity sometimes containing serum ; 3dly. In the *mesentery*, which often presents lesions similar to those of the peritoneum, the mesenteric glands being enlarged, inflamed, or changed in colour ; 4thly. In the *liver and spleen*, which are variously altered in different cases, but most frequently congested, enlarged, or

granulated, the spleen being generally softened, friable, enlarged, more rarely small and hard ; 5thly. In the *lungs*, which are congested or injected, hepatized, tuberculated, the bronchi being loaded with mucus and the bronchial glands enlarged ; 6thly. In the *pericardium*, which sometimes contains a turbid or sanguinolent serum, the substance of the heart being flabby or soft. Morbid appearances, consisting chiefly of congestion and effusion of serum between the membranes or in the ventricles, are occasionally observed in the brain. In every instance, the *digestive mucous follicles* have been found enlarged, inflamed in various degrees, and ulcerated, presenting the various lesions affecting these follicles, described in the article DIGESTIVE CANAL (§ 36), the cœcum, large bowels, and small intestines being the parts chiefly diseased.

413. iv. CAUSES.—This variety approaches bilio-gastric fever on the one hand, and the enteric form of synochoid on the other. It may occur either sporadically, endemically, or epidemically, and, in either case, it may arise from, or pass into fever of a periodic type. It may even run into dysentery, and, from the severity of the pains in the limbs attending it, may closely resemble an attack of rheumatism. Its characters, both constant and contingent, result from the various circumstances, both intrinsic and extrinsic to the patient, concurring to *cause* it. These are chiefly, *a.* The epochs of childhood and old age ; the female sex ; the lymphatic, leucophlegmatic, and nervous temperaments ; prolonged watchings ; excessive fatigue or indolence ; languid, weak, delicate, and pale states of frame ; chlorosis, intestinal worms, or a cachectic habit of body ; the debility caused by previous disease, as by agues, mesenteric obstructions, or by excessive venereal indulgences.—*b.* Living in low, humid, cold, and marshy places ; privation of light and of the sun's rays ; the autumnal season, or prolonged wet and cold weather ; want of cleanliness ; the use of indigestible vegetables, of unripe fruit, of tainted animal food, or of unwholesome fish, particularly shell-fish ; of stagnant, marshy, or impure water ; the privation of accustomed stimuli ; the abuse of emetics or of purgatives ; insufficient nourishment, &c. The most common of these are cold and humidity, unhealthy localities, and unwholesome ingesta. This fever is *endemic* in the situations just specified, and it has occasionally appeared epidemically during autumn and winter, particularly after much wet.

414. v. TREATMENT.—SELLE, STOLL, and J. P. FRANK looked upon the character of the stools as the consequence of accumulations of mucus in the digestive canal, and have prescribed emetics and purgatives in order to evacuate them. BAGLIVI more judiciously directed vascular depletions, emollients, and mild purgatives. PINEL first evacuated the stomach by means of ipecacuanha, and either continued this substance afterward, in weak aromatic infusions, or gave rhubarb with the tartrate of potash, or with the hydrochlorate of ammonia. He occasionally directed three or four grains of the extract of jalap in an emulsion, as recommended by ROEDERER and WAGLER. BROUSSAIS and his disciples, viewing this fever as a form of primary *gastro-enteritis* developed under the

influence of cold, humidity, and bad diet, in persons whose mucous surfaces are predisposed to inordinate secretion, and who are liable to sympathetic affections of the limbs, head, &c., advise a treatment founded on these views. They believe that collections of mucus in the *prima via* are not the cause of the constitutional disturbance, but are, equally with such disturbance, produced by the inflammatory irritation of the mucous surface. There can be no doubt of the frequent origin of the morbid secretion in this state, but that it always, or solely, originates in it is questionable. Although inflammation, or, rather, vascular injection, of the mucous membranes is one of the constituents of the morbid condition, there are obviously others which modify it, or give it a more or less specific character. Besides, the follicles are more affected than the mucous membranes themselves, and however prominent the affection of these parts may be, the organic nervous system is manifestly that which is primarily impressed by the causes, and which continues longest and most universally to evince disorder.

415. *a.* The first intention is to remove the exciting causes, and, if the disease comes under treatment sufficiently early, to endeavour to arrest its progress, or to shorten its duration by the exhibition of an emetic of ipecacuanha, by the vapour bath, by hot fomentations, and by warm emollient injections.—*b.* The second indication is to reduce vascular action, if the disease be fully developed, or the patient plethoric or robust, and if febrile excitement be considerable, by general or local blood-letting in moderate quantity, by refrigerants, by the tepid bath, and by low regimen.—*c.* The third intention is to determine the circulation to the surface, and derive from the mucous surfaces by means of DOVER'S powder, or by ipecacuanha, nitrate, and opium, or other diaphoretics, by the warm bath, and by blisters, sinapisms, or warm terebinthinate epithems applied over the abdomen.—*d.* The fourth object is to soothe intestinal irritation and to correct the secretions by emollients and demulcents given by the mouth or by injection, and by small doses of blue pill or hydragrym cum creta and camphor, with DOVER'S powder.—*e.* The fifth is to evacuate morbid matters from the intestines, and to prevent their collection by the occasional exhibition of mild purgatives and laxative enemata.—*f.* Sixthly, to alleviate urgent symptoms or determinations to particular organs—as to the head, the lungs, or liver—by local depletions, external derivatives, rubefacients, &c.—*g.* And, seventhly, to support the powers of life in the latter period by gentle tonics, light nourishment, and by cinchona or the sulphate of quinine, especially when the disease presents remissions, or is disposed to pass into the periodic type, or into rheumatism, and particularly in humid, marshy, and unwholesome situations. I have found the following aperient very serviceable in this form of fever, when the bowels required to be gently but freely evacuated. Others, however, in the APPENDIX (F. 266, 430, 827), will be equally useful.

No. 222. R Potasse Bitart. in pulv. ℥j. Potasse Nitratæ ℥ij.; Confect. Semmæ, ℥ij.; Sircipi Aurantii ℥j. M. Fiat Electuarium, cuius capiat Coch. i., vel iij., minima.

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tarrhalibus. 4to. Jen., 1676.—*C. Piso*, De Morbis ex Serosâ Colluvie ortis, 4to. Lugd. Bat., 1714.—*Bagliivi*, Prax Medica, l. i., cap. 5.—*I. G. De Hahn*, Febr. Contin. quæ Ann., 1729; Uratislaviæ grassatæ sunt, 4to. Urat., 1731.—*Roderer* et *Wagler*, Tractat. de Morbo Mucos., &c. Goet., 1762, 1783.—*Strack*, De Febre Pituitosâ Mug., 1781.—*Knaus*, Annot. quedam circa Morb. Bil. Mucosum Ann. 1783-4, Stuttg. grassat., &c. Stuttg., 1786.—*Wicbers*, Discrim. inter Febr. Bil. et Pituitosam, *Doering*, Tr., vol. i.—*Elser*, Animadvers. in Febr. Pituitosas. Regiom., 1789.—*M. Stoll*, Ratio Med., vol. iii., p. 141; et Aphor. de Cognoscend. et Curand. Febr., &c., edit. 2d, p. 137.—*Consburch*, History Febris Mucosæ Ann. 1783-4, Stuttgardiæ grassatæ. Stuttg., 1790.—*Jacobi*, De Febre Pituitosâ-nervosâ, Stuttg., 1782, grass., 8vo. Stuttg., 1793.—*Stroem*, in Acta Reg. Soc. Med. Havn., vol. iv., p. 321.—*Selle*, Rudimenta Pyretologie, 3d ed., p. 262.—*Canz*, Beschreib. einer Schleimfieber epidemie. Tüb., 1795.—*Reil*, Memoch. Clinic., fasc. i., p. 6.—*Py*, De la Fièvre Muqueuse, Journ. Gén. de Méd., t. xix., p. 229. 1805.—*Sarcone*, Hist. Raisonnée des Mal. Observ. à Naples, par *Ballay*. Lyon, 8vo, 1804.—*Pinel*, Nosog. Philosoph., t. i., p. 132.—*Hildenbrand*, Institut. Med. Pract., vol. iv., p. 741.—*Boisseau*, Traité des Fièvres, &c., p. 174.

XX. FEVER, SWEATING.—*SYN.* *Miliaris Sudatoria*, *Sudor Miliaris*, *Miliaria* (from *mitium*, a millet seed), *Sudor*, *Sudor Anglicus*, *Sudor Picardus*, *Febris Sudatoria*, *F. Helodes Sudatoria*, *Sudatio Febris Helodes*, *F. Miliaris*, *F. Vesicularis*, *Purpura alba*, Auct. var.; *Miliaris*, *Sauvages* and *Sagar*; *Febris Purpurata*, *F. Hoffmann*; *La Suetie*, *La Suetie Miliàire*, *La Suetie Epidémique*, *Fièvre Miliàire*, *Pujol*, *Gastellier*, *Menière*, &c.; *Der Friesel*, *Germ.*; *Miliary Fever*, *Sweating Miliaria*, *Sweating Sickness*.

416. *DEFIN.*—*After lassitude and general uneasiness, a sudden attack of febrile disorder, with most profuse and continued sweat, frequently followed by an eruption of miliary vesicles, the disease occurring epidemically and being infectious.*

417. I have preferred the name *sweating fever* to that of miliary fever, as sweating is the constant and characteristic phenomenon of the disease, and is present in the mild as well as in the most malignant cases; whereas the miliary eruption is sometimes wanting in both. This malady should not be confounded with the febrile affections of lying-in women, attended by sudamina, that have improperly been denominated miliary fever, from the character of the eruptions sometimes occurring as a symptom of them, during hot seasons and a too heated regimen. This is a specific fever seldom observed in modern times in this country, although frequently prevailing epidemically in many parts of Continental Europe.

418. *i. HISTORY.*—The epidemics which have been variously denominated, as stated in the *Synonymes*, have manifestly been modifications of the same disease, caused by the varying circumstances connected with its appearance. The epidemic sweating sickness, which appeared between 1485 and 1528, and which ravaged England in these and several intermediate years, was evidently, as supposed by *MM. Ozanam* and *Rayer*, a most violent form of this malady, in which the sweat was the most prominent symptom, and the progress most rapid and acute. But many cases noticed by *Boyer* and others, in recent epidemics, were similarly characterized.—(*a.*) The epidemics observed in France by *Riverius* during 1618; in Germany by *Welsch* and *Langius* in 1652; in Francfort in 1653; in Augsburg in 1660; in Bavaria in 1666; in Holland by *Grunwal* in 1666; in Hamburg in 1675; in London and in Edinburgh, towards the end of the seven-

teenth century, by HAMILTON and SIBBALD; in Saxony in 1694; in Hungary in 1697; in Plymouth by HUXHAM in 1738; in Normandy by LE PECQ-DE-LA-CLOTURE in 1740; near Mantua by QUESNEY in 1750; in Navarre by AUGUSTINIS in 1755; in Bayeux from 1769 to 1776; in Piedmont by ALLIONI in 1758, and by DAMOLONIO in 1782; and in Toulouse and the vicinity by GALLET DU PLESSIS in 1781, were essentially the same disease. In all these, the fever was ushered in by chills, horripilations, and other premonitory and invading symptoms, which were soon followed by pains in the head, loins, and limbs; by nausea, flushing, profuse sweat, dyspnoea, and, about the third day, by a miliary eruption. Numerous other epidemics that have presented this form of eruption as a prominent symptom have been described by writers who observed them during the last two centuries. But in these, it was apparently caused either by a too heating treatment and regimen, or by the neglect of evacuations during the early stage of the disease; and it was not always connected with excessive sweat. It was, indeed, in most cases, merely a symptomatic eruption appearing at an advanced period, in a similar manner to petechiæ, &c., with which it was even sometimes associated. In the epidemics, however, which I have above enumerated, the eruption was not a consequence of neglected evacuations, nor of a heating regimen, for the treatment was generally depletory and cooling, and it occurred earlier in the disease, although always preceded by profuse sweat, which was coætantaneous with the vascular excitement, and always peculiar and offensive. So thick a vapour generally surrounded the sick, arising from the excessive perspiration, that the flame of a candle was obscured by it.

419. (b) The epidemic occurrence of sweating fever in various parts of Picardy was first noticed in 1718. Since that time it has frequently appeared in that province, and in other parts of France; and has more nearly approached than the epidemics noticed above the characters of the sweating sickness of the 15th and 16th centuries, in respect of the rapidity of its course, the profuse sweat, and the frequent absence of the miliary eruption. The sweating fever of Picardy appears to have prevailed more or less in various parts of this province and of Flanders, from 1718 till 1747. In this year it appeared in Paris, and was described by BELLOT, MALOUIN, and BOYER. In various seasons, cases equal in severity to those of the terrible sweating sickness of the 15th century occasionally occurred. These writers observed some that ran their fatal course in fifteen hours, although more generally death did not take place until the third, fourth, fifth, or sixth day, or even later. When patients passed the seventh day they generally recovered. The most robust were the most violently attacked; children and the aged generally escaped. Irruptions of this form of the disease occurred in various parts of the Oise in 1747; at Beauvais in 1750; in several parts of the north of France in 1753; and in the environs of Amiens in 1758. (MEYZEREI, VANDERMONDE, &c.) The chief peculiarities of these epidemics were, a frequent occurrence of hæmorrhages, and of severe and complicated cases, often terminating fatally at

the end of one or two days. Robust persons were the most severely attacked in these, as in other epidemics. Females often experienced menorrhagia in the course of the disease; and hæmorrhages occurring on the third or fourth day were generally fatal. The sweat was fetid or putrid, as likewise was the air expired by the patient. Blood-letting was employed at the commencement in the more robust and plethoric; and at an advanced stage it was most injurious. Emetics, cooling aperients, acidulated drinks, refrigerants, &c., were also prescribed; and at a later period the preparations of cinchona, the decoction of contrayerva, camphor, &c. These were found the most successful remedies. The epidemic of Saint Quentin, in 1768 and 1769, was generally ushered in by slight chills, rapidly followed by great heat, thirst, pains, and other symptoms. The treatment just described was most commonly employed. Since then, several other irruptions of this fever have occurred, presenting the phenomena about to be enumerated. That which took place in 1821, and was ably described by M. RAYER, was evidently more asthenic than those above referred to.

420. ii. SYMPTOMS.—Individual cases of this fever are very much modified, even during the same epidemic, by the prominent affection of different organs in different persons. To this circumstance is to be imputed its great diversity, as to severity and character, even in the same family and in similar circumstances. M. RAYER, however, divides it into two forms, the *mild* and the *malignant*; but it is obvious that intermediate grades are equally common, and that most of the malignant or severe cases are rendered such by local complications.—(a) In the *milder* form patients frequently complain of lassitude, loss of appetite, and pains over the eyes. Sometimes they feel the gradual accession of fever, and as if a vapour were extending over their limbs, until it amounts to burning heat, and more generally constriction about the epigastrium, for a very short time before the *hot vapour* is exhaled in the form of sweat from the surface. Occasionally, persons have gone to bed apparently well, and have awakened bathed in sweat, which continued till their recovery or death (RAYER). The tongue is covered with a white, foul, or, more rarely, a yellow fur, and the mouth is clammy. There is more or less thirst, no appetite, and the bowels are costive throughout the disease. The urine is scanty. Respiration is oppressed, and the head aches. The pulse is slightly accelerated, but becomes more frequent at the period of the eruption, and is commonly full and soft. This state continues through the second, third, and fourth days; on which, but commonly on the third, a slight sensation of tingling is felt, followed by a miliary eruption on the skin. The eruption appears first on the neck, and spreads, either rapidly and generally, or slowly and partially, to the breast, sides, trunk, and insides of the thighs, legs, and arms. It may, however, come out suddenly as well as in succession, and be distinct or confluent. The vesicles which constitute it are the size of millet seeds, diaphanous or pearly, and are easily felt by the fingers. They are often intermixed with red papulæ, and, more rarely, bullæ appear on some parts of the body. In about two or

three days they dry up, and are followed by a desquamation of the cuticle. The *sweating* is much more constant in its occurrence than the eruption; is always present, is remarkably profuse throughout the disease, especially before the eruption has become general, as it afterward is somewhat diminished, and is attended by a peculiar odour, which RAYER, SCHÄHL, and HESSERT compare to that of rotten straw, and M. MENIERE to that of water impregnated with chlorine, or to that of the stools of patients in cholera. LE PECQ-DE-LA-CLOTURE says that it has a rotten-sour smell. The surface is hot, and more or less red. The sweat, rarefied by the heat, forms a cloud around the patient that is condensed, and falls like fine rain or dew upon the bed-clothes. The dyspnoea seems to depend upon congestion of the lungs and large vessels, and is referred chiefly to the præcordia or to the epigastrium. The headache may be suborbital or general: it is dull, heavy, and depressing, and seems not to be altogether the result of vascular determination to, or congestion of the brain. In this form the abdominal regions present nothing particular. The symptoms decline by degrees, and rarely continue longer than fourteen days; they commonly disappear about the eighth or tenth day.

421. (b) *The severe, complicated, or malignant form* is generally sudden in its attack as well as the mild; but lassitude and want of appetite usually precede it for some days. The principal symptoms of invasion are sometimes chills or horripilations, and commonly vertigo, violent headache, nausea, efforts to vomit, flushed countenance, urgent dyspnoea; pain in the epigastrium, loins, and limbs; anxiety; throbbings of the arteries, and most profuse sweat. Either the cerebral, or the thoracic, or the abdominal symptoms predominate in different cases, and give rise to distinct complications. Where the *head* is more especially implicated, delirium, coma, and convulsions are often present, and soon terminate life. In these, the patient first complains of vertigo, severe headache, nausea or vomiting, flushed face, injected and starting eyes, epistaxis, throbbing of the carotids and temporal arteries, &c., and soon becomes delirious and comatose. In rarer instances, the *spinal chord* and its membranes are particularly affected, the patient complaining of painful tension in the course of the spine, with tetanic rigidity or spasms of the voluntary muscles. When the *lungs* are chiefly affected, there is often deep-seated pain in the chest, great dyspnoea, a short and quick respiration, the crepitating rattle, or a blowing noise in some of the lobes of the lungs, diminished sonorosity of the chest, a full and frequent pulse, and bloody expectoration or hæmoptysis, indicating inflammation or inflammatory congestion of the respiratory organs. When the *digestive organs* are predominantly diseased, the patient complains of an acute constrictive pain in the epigastrium, with urgent anxiety, frequent sighing, a sense of suffocation, or of weight in the chest, and an unusual pulsation in the region of the stomach. These appear from the commencement, are exacerbated at intervals, and are most severe just before the eruption. In others, the symptoms indicate affection of the bowels, with constipation; and in some, severe pains are felt in the hypogas-

trium, with scanty, high-coloured urine, and difficulty in voiding it. This violent form of the disease may prove fatal in twenty-four or forty-eight hours, or in three or four days; but it commonly runs its course in from one to two weeks in favourable cases; sometimes, however, extending beyond three weeks. During convalescence, debility is its chief consequence, secondary affections being rare. Those that do occur are gastro-intestinal disorders, and the eruption of boils.

422. c. *The alterations of structure* have been imperfectly observed. When a fatal result has been preceded by anxiety, pain, or burning in the epigastrium, the mucous coat of the stomach and duodenum has been found much injected. In the cerebral complication, the brain has been found congested, the membranes injected, and the ventricles filled with serum. In the pulmonary complication, congestion of the lungs, and hepatization of portions of it, have been remarked. Although epidemic visitations of this disease in France have been frequent in modern times, and fatal cases very numerous, yet its pathological anatomy has been very imperfectly investigated. It is evident that death is caused chiefly by the severity of the complications accompanying it.

423. iii. *DIAGNOSIS.*—The constant, the profuse, and the peculiar sweat attending the disease from the time of its development not only characterizes it, but distinguishes it from all other fevers. The severity of the complications in the intense form, especially at the time of attack and upon the appearance of the eruption, the character of the eruption, the epidemic prevalence of the malady, and its infectious nature, farther serve to distinguish it. The descriptions of the *sweating sickness* by CALUS, WILLIS, and others, prove that it was a more intense form of this disease than has been lately observed. The characteristic symptoms of the former all exist in the latter; and, although the eruption is not mentioned in the sweating sickness, this appears not to have been a general symptom in recent epidemics. M. RAYER states it to have been wanting in a great number of cases in the epidemic of 1821; and M. MENIERE makes a similar remark as to that of 1832.

424. iv. *PROGNOSIS.*—Sweating fever, as observed in modern times, is a mild disease in its simple form. Predominant affection of any internal organ will render the prognosis unfavourable, according to the severity of such affection. However alarming the symptoms, if they decline upon the appearance of the eruption, a favourable issue may be anticipated. M. RAYER states that, in 1821, the eruption was independent of irritation of the stomach; that it was confluent without violent previous pain in the epigastrium, or nausea; that it did not always succeed the most profuse and incessant sweat; and that it did not invariably appear in cases where the gastro-intestinal disorder was the most remarkable. Death was often sudden—more unexpected than in the common eruptive fevers—and often followed upon shrivelling of the vesicles. The greatest number of deaths occurred in 1821, between the ages of twenty-three and thirty-three. The mortality in males was one in thirteen; and among females, one in twenty-eight. In the earlier epidemics observ-

ed in Picardy, the mortality was very much greater than this. It was greatest at the beginning and decline of the epidemic, and among bakers, smiths, and farriers; but was variable in different townships. The epidemic of 1832 was, in many instances, followed by pestilential cholera. The latter malady often followed the decline of, or convalescence from the former, and even occasionally appeared in its course; the mortality being thereby much increased.

425. v. CAUSES.—The theatre of the epidemic of 1821 was bounded by extensive forests. M. RAYER states that the disease is endemic in some situations, and that it may occur sporadically where it has prevailed epidemically. It has been observed only between 43° and 60° north latitude. Moist and shady places, excessive heat, and an atmosphere surcharged with electricity, seem to favour its irruption. No age gives immunity from an attack, but adults and females are most obnoxious to it. M. MENIERE states that many of those who had the disease in 1821 were again attacked, and died of it in the epidemic of 1832. When once engendered, it spreads by infection, in the same manner as typhus, scarlatina, and measles. Unhealthy situations, and the poor in the vicinity of the place where it first appeared, suffered in proportion to their proximity during these two epidemics. M. MENIERE remarks that, of the numerous epidemics which have occurred in France and in other countries, since 1718, to the present time, there is none which shows its origin, either in marsh exhalations or in unwholesome food.

426. vi. TREATMENT.—Isolation, temporary migration, and avoidance of the affected, are the only preservative means that can be depended upon in this malady. The *mild states* require but little aid; and it is doubtful if medical treatment will either shorten or alleviate the attack. In the *severer forms*, and where some internal organ is especially affected, appropriate remedies ought to be employed to guard it from danger. If the affection of the head, or of the chest, or of the digestive organs be slight, *local depletions* will give relief. If the local complication be severe, general *blood-lettings*, with powerful external and internal derivatives, as blisters, sinapisms, purgatives, &c., will be occasionally used with success. But M. RAYER remarks that the cerebral affection, when severe, is often rapidly fatal, notwithstanding the repeated abstraction of blood; and that the nervous phenomena are occasionally independent of actual inflammation. After the eruption, blood-letting is always injurious, and if it be resorted to at an earlier stage, and in large quantity, with the view of cutting short the disease, it may have a fatal effect, but it never will produce the desired result. When the eruption disappears suddenly, dry frictions, *urtication*, *sinapisms*, *blisters*, and rubefacient liniments ought to be employed to solicit its return. *Sudorifics* may also be employed in this case, but they are seldom useful in other circumstances, as it does not seem advisable to use means to increase the sweat. SCAHL and HESSERT found *cold bathing* and *aspersion* of cold water beneficial at an early stage, and M. RAYER observed the pain at the epigastrium, and spasm of adjoining parts, preceding the eruption, to cease after the application of *cold epithems* to this region. Emol-

lient cataplasms, *fomentations*, and *clysters*, will alleviate abdominal pain and dysuria, and the general *warm bath*, the *hip bath*, and frictions of the surface will have a similar effect, and promote convalescence, particularly if the intestinal or the urinary canal be disordered. In the more recent epidemics, *ipccacuanha* and the preparations of *antimony* were given in the first stage, with the view of rendering the subsequent course of the disease more mild; but this practice was found more injurious than beneficial.

427. The above comprises more than all that M. RAYER, the historian of the epidemic of 1821, has advanced respecting the treatment. TESSIER, BOYER, and MENIERE, however, state that full *blood-letting* at the commencement is generally beneficial, and evidently relieves all the urgent symptoms. Indeed, the epistaxis often attending the cerebral affection, the hæmoptysis accompanying the pulmonary congestion, and the character of the gastro-intestinal symptoms most obviously demand it. They farther advise tepid diluents in moderate quantities, gentle anodynes to relieve the insomnia generally complained of, and mild derivatives to favour the eruption, which, when copious, often alleviates the internal affections. M. RAYER says no more of the use of *purgatives* in this disease than if such means were entirely unknown. The writers who treated the epidemics in the seventeenth and earlier part of the last century employed them freely, and were certainly not less successful in their treatment than he. M. MENIERE advises the milder kinds to be exhibited in most cases, and especially when the tongue is loaded. When the pulmonary congestion is urgent, he directs full blood-lettings and external revulsants; but he judiciously advises the effect of the former to be sedulously watched during the operation, as a too careless mode of abstracting blood, or a too large quantity, may produce instant and fatal collapse. There is evidently more of congestion than of inflammation in all the internal complications of this disease; and vital or nervous power is more or less depressed; therefore, although free depletions are often necessary, they should not be confided in alone; but *camphor*, *anmonia*, *serpentaria*, &c., ought to be exhibited according to the peculiarities of the case, and conformably with the principles explained in various sections of this article. When the eruption appears, means calculated to suppress it, or even to delay or diminish it, should be avoided. Vascular depletions have been then found injurious, and even speedily fatal; and cold applied to the surface is equally dangerous; errors of diet and regimen are likewise injurious.

428. *Regimen*.—Patients ought to be deprived of nourishment of every kind the first four or five days of the disease, or even longer. Diluents of a mild kind, and tepid, should be given in moderate quantity. A little veal or chicken broth may be allowed about the sixth, seventh, or eighth day, and the quantity and consistency of the food gradually increased. Relapses may follow errors in diet, or consecutive gastro-intestinal disorder may be induced by this cause. The regimen and other means usually required in epidemical maladies are necessary in this.

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XXI. FEVER, SYNOCHOID.—*Syn. Synochus, Auct. var.; Encia Synochus, Good; Synochus Mitior, S. Smith; Common Continued Fever.*

429. DEFIN.—*Languor, Lassitude, and chills, followed by vertigo, moderate vascular reaction, and other febrile symptoms, of a continued type, and regular course.*

430. This is the most common form of continued fever in this country. It appears either sporadically or epidemically. In the latter case, it is frequently complicated, or characterized by predominant affection of some particular viscus or part, and thence generally assumes a severer character than in its sporadic form. It often appears in this latter manner from other causes than infection; but, in circumstances favourable to the generation of an infectious effluvia, this may become a superadded or a chief cause, or, indeed, the only cause; but, in this case, the disease which results is some one of the more common forms enumerated under the typhoid species of continued fever. As, therefore, the causes of synochoid, and of these forms of typhoid fever are often the same—their intensity and concurrence producing the more severe states of disease, as well as giving rise to an infectious miasm—the view which is about to be taken of them with reference to the former species will very nearly serve also for the latter.

431. i. DESCRIPTION.—*Common Continued Fever* occurs in a simple and complicated form, presenting various grades of severity; the severe and complicated states passing into, or becoming identified with varieties of the adynamic species. The severe states of common

fever have been very generally imputed to its complications with inflammation of internal parts; but, although its complications are necessarily severe, yet it may be equally so without any evidence of local or predominant affection. This, however, is seldom the case. I shall, therefore, first describe the simple form, and afterward the more usual complications and states of severity.*

432. *A Simple Continued Fever—Simple Fever; Mild Synochus; Synochus mitior*—is usually preceded by the symptoms described above, as constituting, *a. The precursory stage* (§ 34), especially by *lassitude*, and a general feeling of uneasy debility and mental languor. The countenance is pale; the features sharpened, dejected, or anxious; and the pulse weak and small.—*b.* After an indefinite period, varying from two or three to several days, irregular chills, rigours, or shivering, commonly alternating with transient flushings or feelings of heat, are experienced, with the symptoms characteristic of the *period of invasion* (§ 35). This stage is seldom attended by any actual coldness of the surface, particularly after it has continued a short time; the chilliness being accompanied by increased heat, constriction, and dryness of the skin.—*c.* With the disappearance of the chills, the period of *reaction* or of *excitement* (§ 36), and all the phenomena associated with it, supervene. The vertigo, pains of the head, back, and limbs, and restlessness, usually present in the preceding stage, are increased in this. The patient complains of mental confusion and inability; of general uneasiness and restlessness; the countenance becomes full and flushed; the tongue white, foul, loaded, or furred; the heat of surface generally rises above 100°, and the pulse and respiration are fuller, stronger, and more frequent than natural; the pulse being commonly from 90 to 100 or 105 beats in a minute. The fever is now developed, and proceeds, as described above (§ 36), usually for several days—its duration varying from two, three, or four days to as many weeks, until it either subsides in consequence of the treatment adopted, or passes off by means of some critical evacuation (*the period of crisis*), which most frequently occurs on one of the critical days from the third to the twenty-first day from the time of invasion, or that in which chills or rigours were first felt. The stages of *decline* and *convalescence* commonly advance in the manner stated above (§ 41, 42).

433. This mild form of fever generally terminates favourably, even when left to nature; but it may become complicated in its course, or pass into a state of dangerous, or even fatal exhaustion towards the end of the second week, particularly in weak, aged, and exhausted persons. The return of the healthy functions is indicated, *a.* by the subsidence of the

* ["In this country" (Great Britain), says the *British and Foreign Medical Review*, July, 1836, "the general custom is to apply the name *typhus* to fever attended with great prostration of strength; when the symptoms are milder, it is called simply *continued fever*, or subdivided into *synochus* and *synocha*, if the practitioner adheres to the nosological system of CULLEN. The division so long adopted by CULLEN cannot be applied at the bedside, for the same case may, at different periods, put on the three different forms, and oblige the systematic adherent to this classification to change repeatedly the name of one disease."—Page 34.]

prominent morbid actions; *b.* by the appearance of critical evacuations; *c.* by a quiet and prolonged sleep, out of which the patient awakens refreshed, and partially restored; and, *d.* by the other phenomena already enumerated (§ 41), as indicative of a gradual decline of the disease. The transition to a severer form of fever is commonly owing to the occurrence of a predominant affection of the respiratory surfaces, or to the change induced in the circulating and secreted fluids, or to the affection of the digestive mucous surface, or to the circulation within the head.

434. *B. Severe or Complicated Synochoid Fever*—*Synochus gravior*; *Severe Synochus*—occurs from the same causes that produce the milder disease, either acting with greater intensity, or aided by additional circumstances. The several stages may present a more severe affection of all the functions than has been now described, without any very predominant lesion of a particular organ; but much more frequently some important viscus betrays increased disorder, generally of an inflammatory or disorganizing kind. Yet this predominant lesion is not altogether identical with inflammation—certainly not with the inflammation primarily affecting healthy persons. It is less acute or intense as respects the symptoms attending it, more asthenic as regards the state of constitutional power, and more diffusive and sub-acute in its character than common phlegmasia. It partakes of more of the features of the erysipelatous than of those of common or pure inflammation. Even when the local affection is more than usually phlogistic in appearance, still it is most important to recollect, especially as respects the treatment, that it is preceded and attended by a more or less severe constitutional disturbance, by lesion of the various manifestations of life, and by a change of the circulating and secreted fluids—circumstances arising out of the poisonous influence of the febrile cause, and imparting the peculiar characters to this affection—changing it from the true phlogistic or sthenic inflammatory condition, and determining, accordingly, the consequent lesions (§ 50). Instead, therefore, of viewing the complication as the cause of the severity of the fever, we should rather consider the intensity of the morbid impression made by the febrile poison, and the resulting consequences, as the principal source of severity and of local affection, aided by the predisposed state of constitution, and of the viscus especially affected. I shall describe the predominant lesions or complications of synochoid fever in the order of their usual succession and of their frequency.

435. *a. Synochoid fever with predominant affection of the bronchi and lungs.*—This is the most common, and generally the earliest complication, although it frequently exists only in a slight degree. The bronchial surface is often more or less congested and irritated, and the structure of the lungs sometimes implicated. This complication is not necessarily severe in proportion to the severity of the fever; but when it is early present, and its symptoms prominent, it necessarily aggravates the fever, and superinduces farther complications, by impeding the changes produced in the blood by respiration. That the respiratory organs, particularly the bronchial lining, should be very

frequently affected in fever, may be expected from the nature of the exciting causes and the channels through which they invade the system, as already explained (§ 100, *et seq.*), the respiratory surfaces being the parts on which the morbid impression is generally first made on the frame. In most instances, the predominant disorder of these organs is limited to the bronchial surface; but, in others, the substance of the lungs is also congested; and, in rarer cases, the pleura is at the same time implicated. During particular seasons and epidemics, and in some climates more frequently than in others, this complication is very generally observed. When the bronchial membrane is especially affected, and the symptoms are very obvious early in the disease, it has usually received the name of *Catarrhal Fever*. But the affection of the bronchi, especially when the mucous secretion is not abundant, and still more frequently that of the parenchyma of the lungs, is often nearly concealed by the severity of the cerebral symptoms superinduced by it, or is latent, owing to the altered state of the circulating fluids, or masked by some other predominant lesion. This fact, first clearly established by LAENNEC, points out the necessity of having recourse to mediate auscultation, not only in cases presenting the open symptoms of the pulmonary complication, but also in those of considerable severity, and where the sensorium is much disturbed.

436. *The bronchial affection* is generally not very remarkable during the first two or three days; the patient complaining only of a slight oppression or constriction in the chest, with accelerated respiration and occasional sighing. To these succeed fits of dry cough, wheezing, and, subsequently, the expectoration of a dark, viscid mucus. There is often no cough; and the bronchial affection is evinced chiefly by the mucous rhonchus heard more or less extensively upon auscultation, by the disordered breathing, and by the matter expectorated. When the mucous rattle is heard extensively, and particularly if it extend to both lungs, great danger should be apprehended; for the changes induced by respiration on the blood being impeded, this fluid becomes vitiated, and induces serious disturbance of the brain, and of the excreting organs and surfaces, ultimately passing into structural lesion. If the affection implicate much of the substance and vesicular structure of the lungs, the breathing becomes hurried, oppressed, or laborious, especially after coughing; and the expectoration rounded and streaked with blood. In such cases, the fever is always severe, and attended with much danger, generally in proportion to the extent to which the respiratory surface and lungs are affected. But the danger is not dependant solely upon the pulmonary affection, but also upon the consequences which have been just shown to arise out of it. When, therefore, with the symptoms now mentioned, the edges of the tongue and lips are dark or purplish, and the countenance of a dusky hue, or flushed or suffused with a dark red; when the patient becomes delirious or comatose; the pulse very frequent, soft, and feeble; the abdomen tympanitic, or inordinately relaxed; the temperature of the extremities low, or their motions tremulous; and the tongue loaded with a brown or

black coating; consecutive pathological states of great danger, owing to depressed vital power, and to contamination of the fluids, then exist.

437. It not infrequently happens that a severe bronchial complication attends the early stage of this fever; and that, as soon as the blood is so contaminated, and the cerebral functions are so disturbed as to obscure sensibility and lower irritability, the bronchial affection becomes latent, and its more obvious symptoms disappear; the pathological conditions which it induced being now most prominent, and proving the immediate cause of an unfavourable result. If, in such cases, we succeed in removing the morbid condition of the blood by exciting the nervous energy and the functions of excreting organs, the bronchial affection often returns, with the improvement in the circulating fluids and in the nervous functions; but it also often disappears entirely with the other affection of important organs, particularly when critical evacuations terminate the disease. This return of the bronchial affection with the decline of the other dangerous symptoms, I have remarked in several cases; but it may generally be permanently removed by appropriate means (§ 530). In the progress of this complication, the expectoration, which was at first scanty and frothy, or viscid, or altogether wanting, is more copious, of a pale yellow, or yellowish-green hue, and gradually diminishes with the decline of the fever. In some instances it becomes so abundant, as the disease passes its acme, as to favour the resolution of the inflammatory congestion of the bronchi or lungs, and thus to prove a salutary crisis, as remarked by some of the older writers. When, with dyspnoea and oppression, there are much uneasiness and inability to expand the chest, with a short and quick respiration, active congestion of the parenchyma of the lungs should be suspected; and if, in addition to these, pain be occasioned on coughing, and on full respiration, an inflammatory state, probably extending to the pleura, may be dreaded. In the last stage, the skin is dusky and cool; the pulse is feeble and hurried, more rarely slow and intermittent; the headache passes into incoherent wandering, or low, muttering delirium, or coma, but never into violent delirium. When sensibility is early impaired, this complication may proceed to extensive organic change, without having been suspected during life, owing to the imperfect evolution of the usual signs, and to the circumstances already stated (§ 435). But if the breathing be attentively observed, it will be always found more or less disordered in these cases; and if auscultation be also resorted to, the local affection will not pass undetected.

438. *b. Synochoid fever with predominant cerebral affection.*—This complication may appear early in fever, or at any period of its course. It may be the only prominent lesion, or it may supervene on either of the other predominant affections. It may be only occasionally observed, or it may characterize particular epidemics; and it may, moreover, be slight or subacute, or remarkably intense, and in all the intermediate degrees. In the more *slight* or *subacute* forms, it constitutes the *Nervous Fever* of some writers; and, in the more *acute* and *intense* grades, the *Phrenetic* or *Brain Fever* of

others. The former of these very nearly approach, in their pathological states, the nervous variety of adynamic fever denominated *Ataxic* by PINEL, *Neuro-sthenic* by HILDENBRAND, and *Typhus mitior* by CULLEN.

439. *a.* Common continued fever, with predominant cerebral affection—the *Neuro-sthenic* of HILDENBRAND—commences, and proceeds for two or three days, as the simple or mild form of the disease. Either then, or at an earlier period, the patient usually complains of pain in some part of the head, most frequently in the temples and forehead, or in the occiput, extending down the neck. The pain is often constant and severe, but it is sometimes slight, or entirely wanting; and it is commonly attended by throbbing of the carotids and temporal arteries, and the flushings of the countenance. In those cases where no pain is felt, even upon shaking the head, the cerebral affection may not be less urgent and dangerous; but there is always in those a very early and remarkable giddiness, either with or without flushing of the face. Occasionally the pain and giddiness alternate, and the latter is always distressing when the former is absent. The expression of the eyes is either heavy and dull, or morbidly brilliant and animated. The conjunctiva is generally loaded, injected, and suffused in the former case; and brighter and more glistening in the latter. But the eyes are always more or less sensible to light, the eyebrows contracted, and lids half closed upon exposure to it. Hearing and the general sensibility are also more acute. Noises and light invariably increase all the symptoms. The heat of surface is generally above the natural standard, especially over the head; but it is often not augmented on the lower parts of the body. The patient is watchful and restless, and the expression of his countenance indicative of suffering. In the less acute cases, the pulse, the thirst, the appearances of the tongue and of the evacuations are nearly as in the simple form; and the symptoms generally continue, without alteration, for several days. An important change then occurs. In favourable cases the slumbers, which were short and disturbed, or attended by a slight dreary delirium, become quiet, profound, and refreshing. In unfavourable cases, the pain in the head changes to a dull, lethargic state, with a great diminution of the sensibility, and with increased injection and suffusion of the eyes. Delirium, if it have not already appeared, now comes on, attended by moaning or by incoherent muttering, during short and interrupted slumbers; the tongue is loaded, dark, and dry; and the thirst is diminished. In from one to three days the insensibility passes into coma, unless a favourable alteration takes place; the pulse becomes very quick, and often rises to 120 or upward; the strength sinks; and the tongue is more dry. To these succeed tremours, rolling of the head on the pillow, tossing of the hands, picking at the bed-clothes, and the other dangerous symptoms consequent upon the more acute states of this complication. Even when this unfavourable change has occurred, a stop may be occasionally put to its progress, although it generally pursues its onward course. A more tranquil and protracted sleep; subsidence of the delirium, or of the tremours, or

of the frequency of the pulse; and a cleaner or more moist tongue commencing at its edges, with an improvement in the appearance of the countenance, and in the state of the skin and of the excretions, are the usual indications of an arrest of the dangerous progress of the disease.

440. β . In the more acute states the cerebral symptoms are severe, and their progress rapid, in proportion to the intensity of the local complication; the headache or giddiness, the intolerance of light and noise, and the general sensibility, being co-ordinately excessive. The pain in the back, loins, and limbs is very great; the skin is often intensely hot and pungent, particularly over the scalp, and is occasionally covered by perspiration, which is rarely copious or general; the eyes are injected and suffused; the breathing is frequent and suspirious; the patient is anxious, uneasy, and remarkably restless; he rolls the head, and is wholly without sleep. The pulse is at first strong, full, or bounding; but generally devoid of the hardness characteristic of primary or pure phrenitis. Sometimes it is oppressed; and, in the most intense states of complication, it is often intermittent, slow, or not much above the natural frequency. Within four or five days the pain passes into delirium and insensibility. The delirium is sometimes violent, and is then soon followed by tremours and insensibility: and these by subsultus tendinum. The insensibility increases, and passes into a drowsy lethargy; the delirium continuing, but becoming low and muttering. The patient may still become observant, and answer when roused; but coma supervenes occasionally, with rolling of the eyeballs or squinting, dilatation of the pupils, and falling of the eyelids. The tongue is now parched and brown; the gums and teeth are covered by a dark mucous sordes; the evacuations take place unconsciously and involuntarily; the respiration becomes irregular; the pulse either slow or remarkably rapid and feeble, or intermittent; and life soon terminates.

441. Between these extreme states there is every grade of intensity, the above symptoms being variously modified. In some cases the cerebral affection is very insidious, and more or less slow; in others, open, manifest, and rapid. In the former it may be indicated only by giddiness and sickness or vomiting, the pulse in the carotids and temperature of the head not being affected. In a case of this description which lately occurred in my practice (Mr. H. of Fitzroy Market), all the symptoms subsided instantly upon blood-letting. It may thus exist, nevertheless, although in a more protracted form, and present but few of the above symptoms, which, however, are more frequently observed, but not all of them in the same case. The various grades of this complication may be farther associated with considerable bronchial affection, or with the disorder of the digestive canal about to be noticed. In such cases the predominant lesion, either in the head, the thorax, or abdomen, frequently obscures the others, until the treatment, by subduing it, renders them more evident, or until some one of them requires additional activity.

442. *c. Synochoid fever with predominant affection of the digestive mucous surface.*—The mu-

cus surface of the stomach and intestines is affected more or less in all fevers, in common with the rest of the organization. In the simple or mild continued fever, it is generally less disordered than in any other. But in the more severe form it is often prominently deranged, either at the commencement or at a later period.—*a.* The affection of the *mucous surface of the stomach* is sometimes remarkable from the invasion of the disease. In this case, *retchings* and *vomiting*—symptoms seldom observed in the thoracic and cerebral complications, particularly the former—are always present; and the fever has hence been denominated by many writers *Mild Gastric Fever*, from its very close resemblance to the species described above (§ 392). There are also pain and soreness felt in the epigastrium, or in the left hypochondrium, and sometimes also in the right, with tenderness on pressure. The bowels are generally costive; the tongue is red at its sides and point, and loaded with a dirty yellowish fur; the pulse is soft, regular, full, sometimes strong, seldom much above 100; and the skin is hot. This state of disease is often followed by cerebral affection, and all the characteristics of that complication; or it passes into the intestinal or enteric form.

443. β . The *enteric affection* is sometimes present almost at the commencement of the disease; more frequently it does not appear until a later period; and occasionally it supervenes upon either the cerebral or the gastric complications—aggravating the former, and allaying the latter of these affections. In most cases, it indicates a severe form of fever, which, at an advanced stage, is farther associated with very marked cerebral disturbance. It commonly commences with *looseness*, and with *pain* and *soreness* in the abdomen, especially on pressure. Pain and tenderness are much less complained of when this complication occurs late in the disease, or when the cerebral symptoms are also very prominent. In cases of the early appearance of the enteric disorder, abdominal pain commonly ceases as the fever advances, particularly if the head becomes also very much affected, even when the purging and other symptoms are increased. The tenderness, however, generally continues much longer. The tongue is at first unusually red at the sides and point, loaded with a dirty white or grayish fur, and moist. As the fever advances, the redness becomes darker and duller, the surface dryer, and the fur browner; and at last dark mucous sordes collect on the teeth and lips. The abdomen is commonly soft and natural, but is sometimes hard or doughy. The pulse is at first full and soft, ranging from 80 to 100; but usually becoming more frequent at an advanced period. Thirst is also present, unless when the head is much affected, and at the last stage of unfavourable cases. When this complication does not evince any improvement in the course of two or three days, it assumes nearly the same features as characterize the worst cases attended by cephalic affection (§ 437).

444. When the enteric affection comes on in the course of the cerebral complication, it may pass unheeded, unless the physician is particularly watchful and expert in detecting it. In these cases sensibility is so obscured that pain

is seldom felt, even upon firm pressure; and the bowels are occasionally but little disturbed. The tongue, however, is red at its point and edges, is covered by a dirty fur, and is dry; the pulse is generally about 110, soft, and small. In both these states of enteric disorder the looseness or diarrhœa is the most frequent symptom. The stools are from three or four to eight or ten in the twenty-four hours; and are at first feculent, fetid, dark, and thin. They subsequently become, in unfavourable cases, watery and of an ochrey hue—an appearance imputed by Dr. BRIGHT to ulceration in the intestines. But this result is more common in the enteric complication of adynamic than of synochoid fever.

445. *γ.* The complications of the common continued fever of this and other temperate climates are more frequently associated or mixed, as Dr. SOUTHWOOD SMITH has very judiciously insisted upon, than met with singly. In these mixed affections, however, one or other usually predominates more or less; although cases sometimes occur in which it is difficult to say which is most prominent; or the predominating disorder of an early stage subsides, and is succeeded or obscured by another. Occasionally, also, other complications besides those above specified appear, even in the same epidemic. *Sore throat, or inflammations of the fauces, pharynx, or œsophagus, or severe affection of the liver, with more or less disorder of the biliary secretion, sometimes accompanies one or other of the prominent affections above described.*

[In fever attended with these inflammatory complications, it is often difficult to ascertain whether the fever or the local affection be the primary disease. Where inflammations are produced by cold, fatigue, and other causes which first induce congestion, we shall generally find that the fever often precedes the distinct development of the local inflammation; being the phenomena of reaction after the disturbing influence of the exciting cause. These causes first tend to depress the powers of life, and this is the cold stage of fever, marked by weakness of the pulse, coldness of the extremities and surface, general pallor, various uneasy feelings, depression of strength, &c. Afterward reaction ensues, beginning with rigours, accelerated pulse and breathing, and other functional disturbances; then follow heat of skin, pains in the head, back, and limbs, and other symptoms of reaction; with thirst, loss of appetite, restlessness, etc.; and it is during or after the establishment of this reaction that the symptoms of local inflammation become developed. So in eruptive fevers, the general disturbance and functional disorder are greatest before the appearance of the eruption or local inflammation. Dr. WILLIAMS has remarked that, in inflammations from cold or fatigue, the first disorder sometimes resembles that of continued fever, which is changed for simple inflammatory fever as soon as the inflammation is pronounced; and that in other cases, chiefly those which originate from local irritation, the inflammation is developed, and its symptoms are prominent before the symptomatic fever is excited.—(*Prin. of Med.*, p. 247.)]

446. *ii.* CAUSES.—A. Of the remote causes of the varieties of continued fevers most fre-

quently observed in this and other temperate climates, those which precede the operation of the more effective causes, which are usually internal as respects the economy, and which, from the circumstance of their disposing the system to the operation of these latter causes, have been usually called the *predisposing*, require first to be noticed. It is often difficult to determine in what the disposition to be affected by these forms of fever consists, and in what manner it is caused. To say, with many, that it arises from an increased susceptibility, does not advance our information one step, and is merely the substitution of one term for another. Close observation of the circumstances connected with the origin of these diseases will show us that the disposition to become affected with them is not the result of exactly the same circumstances as favour the appearance of ardent fever. A depressed or weak state of vital power, especially as manifested in the nervous systems, but particularly in that of organic life, seems to be one of the most common causes of predisposition. This is proved by the fact that perfect health, mental activity and energy, confidence in various means of prevention, the moderate use of tonics, &c., enable the body to resist the impression of the exciting causes, particularly infectious and mephitic effluvia; and that fear of the disease, despondency, the depressing feelings and emotions, fatigue, increased sensibility, disorder of the digestive and assimilating functions, &c., are among the most common occasions of these causes taking effect. But, although diminished energy of the powers of life has a marked influence in favouring the operation of the exciting causes, yet something more is required; and this must be referred to a certain constitution of frame which is influenced sometimes in a relative manner only by relative causes, and at other times only by positive causes, and which often either resists the operation of the usual causes altogether, or yields merely to the combined action of a greater or less number.

447. A much greater predisposition to be affected by continued fevers exists between the ages of fifteen and thirty-five than at any other period, the forms of fever being generally of a more inflammatory and acute kind between these ages, and in the sanguine, irritable, and plethoric constitutions; while persons past the latter of these ages, and those of a lymphatic, leucophlegmatic, or melancholic temperament are more liable to experience the lower grades of action. Scarcity, famine, and, consequently, insufficient and unwholesome nourishment, among the lower classes of the community, are the chief causes of the generation and spread of fevers, especially those of a simple, low, and infectious character. Whatever depresses or exhausts the vital and moral energies exposes the body to the impression of the exciting causes. The circumstances which produce this effect are fully explained in the article DISEASE (§ 21, 23, 27–36), and in a previous section (§ 64).

448. The disposition, also, which is generated by certain epidemic constitutions of the atmosphere and season, should not be left out of consideration. A peculiar diathesis seems to be gradually and generally induced by the epidemic influence, whatever that influence

may be in respect of its nature; and this diathesis, or change of the vital manifestations of the organization, rapidly passes into febrile commotion upon the action of one or more of the exciting causes. The change thus effected in the diathesis, and increased by the impression of the exciting causes, may hence be viewed as the proximate cause, or earliest pathological state, of the disease; and to its continuance or non-continuance, after the febrile action is fully developed, is often to be imputed the disposition or indisposition to relapse. This is more particularly the case in respect of the fevers caused by exhalations from the soil and from decayed vegetable matters. Infectious miasms, or the effluvia from the bodies of those in fever, suddenly and remarkably increase the morbid diathesis; but when the resulting disease has been undergone, the morbid diathesis is terminated, and a disposition to a return or relapse is altogether or nearly lost. Although epidemic states of the air thus do not favour relapses of infectious fevers, yet they greatly dispose the system to a first attack upon exposure to the exciting causes, when the diathesis has not been changed by a previous attack.

449. *B.* The *exciting causes* of continued fever are, upon the whole, much better known than the states of the system which dispose to their operation. They are extremely numerous; for whatever interests the vital energy so as to disturb generally its manifestations, and to occasion a morbid reaction, may be an exciting cause of fever. It is unnecessary to enumerate even the most influential of them, as they are adduced with sufficient details in the articles DISEASE (§ 55-63), ENDEMIC INFLUENCES, INFECTION, and in an early section of this article (§ 65). The chief causes of this class of fevers are, 1st. Those which proceed (*a*) from the soil; (*b*) from its productions in a state of decay; and (*c*) from animal matter undergoing decomposition; either of these acting separately, or all of them conjointly; 2d. Animal miasms, (*a*) from healthy persons or animals crowded together, or confined in imperfectly ventilated situations, and without due regard to cleanliness; (*b*) from persons labouring under diseases of various kinds in confined apartments; and (*c*) from one or more persons affected by the disease which the effluvia propagates; and, 3d. Changes taking place in one or more of the various functions, and which, having reached a certain pitch, break out in open fever. Each of these requires a few remarks.

450. *a.* Emanations from the soil or its productions in a state of decay are most frequently productive of periodic fevers; but they occasionally also give rise to continued fever, especially during certain states of season and temperature, and in plethoric and robust constitutions. What the conditions are that occasion the continued, in preference to the periodic type, cannot be precisely stated. Extreme ranges of temperature, particularly high grades of it, and humid states of the air, may have considerable influence, as is, indeed, often observed in warm climates, among Europeans who have recently removed thither; but, in this and other temperate countries, the continued forms of fever much less frequently proceed

from this source alone than is supposed by some writers. In many places exhalations from dead animal matter concur with those proper to the soil and its productions in causing fever; and, in this case, the disease assumes a more continued type and a lower grade of action, the circulating and secreted fluids being more remarkably vitiated. There can be no doubt, also, that the particular form and complication of the fever often depend much upon the water in common use, upon the nature of the soil, and upon the exuberance of its products. Water loaded with decaying animal or vegetable matter; rich, clay, deep, low, and absorbent soils, &c.; and the effluvia from putrefying animal matter, are frequently productive, particularly when conjoined, of continued fever, which often assumes a gastric or enteric character.

451. *b.* *Animal miasms* from a number of persons shut up in small space, in ill-ventilated and crowded apartments, and in low and humid localities, as in ships of war, transports, jails, camps, besieged towns, workhouses, &c., will, in favourable circumstances, so contaminate the air with animal effluvia as to give rise to fever, presenting characters of severity in proportion to the extent to which the air is vitiated. Instances of this kind are referred to in the articles EPIDEMICS (§ 12, 17, &c.) and INFECTION, and are adduced by PRINGLE, LIND, BLANE, and by most recent writers on Fever. It is unnecessary to offer any remarks upon this and the other sources of animal miasms, which act as a poison on sound persons, and occasion fevers, or upon *infection* as a principal cause of the specific forms of the disease, as they are fully illustrated in that article.*

* [In the "Fifth Report of the Register General of Births, Deaths, and Marriages in England" (London, 1843), all fevers are ranked under "Typhus," "Ague," and "Remittent;" and the number of deaths from Typhus, comprising cases returned as fever, for the four years, 1838-41, was 18,111 in the town, and 13,159 in the country districts, the mortality to a million living was 1254 and 998. We have no means of determining the comparative mortality of fevers in the city and country in the United States; in those paludal districts where malarious causes abound, fevers are often found more prevalent and fatal than in our large cities. But this remark will not apply to those parts of our country, as the Northern States, where malaria does not abound.

"Every population," says Mr. CHADWICK, "throws off insensibly an atmosphere of organic matter, excessively rare in country and town, but less rare in dense than in open districts; and this atmosphere hangs over cities like a light cloud, slowly spreading, driven about, falling, dispersed by the winds, washed down by showers. It is not *vitalis habitus*, except by origin, but matter which *has lived*, is dead, has left the body, and is undergoing, by oxydation, decomposition into simpler than organic elements. The exhalations from sewers, churchyards, vaults, slaughter-houses, cess-pools, congregate in this atmosphere, as polluted waters enter the Thames; and, notwithstanding the wonderful provisions of nature for the speedy oxydation of organic matter in water and air, accumulate, and the density of the poison (for in the transition of decay it is a poison) is sufficient to impress its destructive action on the living; to receive and impart the processes of zymotic principles, to convert by a subtle, sickly, deadly medium, the people agglomerated in narrow streets and courts, down which no wind blows, and upon which the sun seldom shines.

"A small quantity of organic matter can only escape with the carbon and aqueous vapour (37 $\frac{1}{2}$ daily, according to DALTON) from the skin and lungs. The presence of a putrid atmosphere is perceived by the senses in parts of all towns; and LIEBIG, by operating on large masses of the atmosphere, has obtained ammonia, which is a product of the putrefaction of animal matter. The existence in the atmosphere of organic matter is therefore incontestable; and as it must be most dense in the densest districts, where it is produced in greatest quantities, and the facilities for decomposing it in the sunshine, and sweeping it away by

452. *c.* That changes may take place spontaneously in one or more of the functions, and proceed to the extent of giving rise to the worst forms of fever, appears to be fully proved. The chief causes of these changes seem to be protracted or excessive mental anxiety and depression, loss of property, disappointment, wounded pride, humiliating occurrences, &c. These causes, however, often concur with the predisposition arising out of disorder of the digestive and assimilating functions, especially when such disorder is connected with colicuvies on the *prima via*, and a torpid or loaded state of the biliary organs; and are re-enforced by exposure to cold, insufficient nourishment, changes in the usual modes or habits of life, want of sleep, and exhalations from the soil, &c.

453. *C. Determining influences, &c.*—There are numerous causes which, although often insufficient of themselves to produce continued fever, are remarkably influential in giving rise to predominant affection of particular organs, in modifying its form, or increasing its severity. Several of the exciting causes, moreover, have the power not only of occasioning the disease, but also of determining its type, form, and character. This is the case more especially with the effluvium proceeding from an infected person. It is important to attend to these circumstances, more especially such as determine the nature of the complications, &c., of fever, as a due reference to them guides the practitioner to an appropriate plan of cure.—*Epidemic constitutions* are most influential in thus forming the kind and state of fever (see EPIDEMICS). Next to these are season and temperature; climate and situation; famine; the contingencies of war; employments and avocations; habits and modes of living; mental exertions and moral emotions; and previous disorder of some one or more of the internal viscera.

454. *a.* During cold and dry seasons the more inflammatory or sthenic forms of fever and pulmonary complications are observed. In high ranges of temperature, and in those conjoined with humidity, the digestive mucous surface and liver are inordinately affected, and the period of increased excitement soon passes into exhaustion, with marked change in the circulating and excreted fluids, and often in the soft solids.—*β.* Climate, according to its temperature and humidity, exerts similar effects. The situation, when elevated very far from the level of the sea, has a similar influence to cold and dry seasons; but when it is low, confined, or near the sea, rivers, or lakes, the disadvantage of humidity, and the contingent evils of marsh exhalations, tend to aggravate the type, or to

complicate the disease. The quality of the water has a remarkable influence, both in generating continued fever and in determining its form; putrid water, or water containing decayed vegetable or animal matter, generally causing fever of an adynamic, gastric, enteric, or mucous character.—*γ.* *Employments and avocations* may either prevent or favour attacks of fever. Tanners and workmen exposed to the fumes of pitch, tar, chlorine, &c., are rarely affected, even when fever is epidemic. Persons much exposed to the open air and vicissitudes of weather, are most liable to fever of a sthenic or phlogistic kind, and to the pulmonary and pleuritic complications.—*δ.* *Habits and modes of living* are very influential and powerful determining causes of fever, even in this climate. The influence which full and rich living, and its opposite, poor and unwholesome living, exert upon the state of the disease, has been sufficiently manifested by the epidemics which have prevailed at various times in Ireland since the commencement of the present century, according as they appeared in the poor and ill-fed, and as they extended to those in easy circumstances. In the former, fever usually assumes the common continued, or the milder adynamic and typhoid forms, often attended by the pulmonary complication, or with petechiæ, &c., and frequently passing into dysentery, &c.; in the latter class it is either accompanied, at an early stage, with high action, or with congestion, and predominant affection of the head, liver, or stomach. In persons living chiefly upon fish it generally assumes a low and putrid character. Those who are intemperate, or who have resorted to spirituous liquors on the invasion of the disease, present especial disorder of the brain and digestive mucous surface.—*ε.* *Intellectual exertion, mental anxiety, and other inordinate emotions* may both occasion a severe fever and aggravate its intensity, even when arising from infection; and, in both cases, a cerebral or typhoid complication of a dangerous kind is produced.—*ζ.* *Previous disorder* heightens the severity of the disease, and necessarily determines its predominant features or complications, although sometimes in an indirect manner. Thus, it is common to observe bronchitis previous to, or attending the invasion of fever, followed by a remarkable affection of the brain and of the mucous membrane of the intestines. In this case, the changes effected by respiration on the blood are imperfect; and, consequently, this fluid becomes morbid, disordering first the functions, and ultimately the structure of the digestive mucous surface and brain.

XXII. FEVER, TYPHOID.*—*SYN.* *Adynamic Fever, Astenic Fever, Febris Astenica; Febris Contagiosa; Febris Typhoides; Typhus* (from τυφος, stupor, or τυφω, to smoulder); *Fièvre Typhoïde, CHOMEL; Fièvre adynamique, F. nerveux, F. ataxique, Fr.; Tifo, Ital.; Der Typhus, Nervenfeiber, Germ.; Low Fever, Contagious Fever, Infectious Fever.*

455. *DEFIN.*—*After lassitude and general malaise, imperfect or suppressed vascular reaction, with depressed vital power, manifested especially in*

currents of wind are the least, its effects—disease and death—will be most evident in towns, and in the most crowded districts of towns.

* It is to this cause that the high mortality of towns is to be ascribed: the people live in an atmosphere charged with decomposing matter of vegetable and animal origin; in the open country it is diluted, scattered by the winds, oxydized in the sun; vegetation incorporates its elements, so that, though it were formed, proportionally to the population, in greater quantities than in towns, it would have comparatively less effect. The means of removing impurities in towns exist partially, and have produced admirable effects; but the most casual observation must convince any one that our streets were built by persons ignorant as well of the nature of the atmosphere as of the mortality, which has been proved to exist, and is referrible to causes which, though invisible, are sufficiently evident."—P. 419.]

* I use the term *Typhoid* in the same sense as CULLEN and the majority of writers on fever in this country since his time. It is, in this sense, nearly synonymous with most of the names adduced under it.

the nervous, vascular, and muscular systems, and giving rise to changes more or less evident in the circulating fluids and soft solids.

456. This fever cannot be said to differ specifically from that last described, although certain varieties of it present very marked distinctions. Indeed, the severer forms or complications of synochoid fever very closely approach, or run into certain states of typhoid fever, the chief differences consisting in the more sthenic vascular reaction in the early part of the period of excitement in the former. Even the milder cases of simple continued fever may gradually assume a perfectly typhoid state in the advanced stage. The distinctions which characterize the following varieties are results of the circumstances already shown (§ 43) to determine the forms and complications of fevers generally, especially of the constitution and habit of body; of the previous health and condition of vital organs; of the nature, intensity, and concurrence of the causes of the prevailing epidemic; of the influences operating after infection or during the early stages, and of the treatment and regimen then adopted.

i. MILD TYPHOID FEVER.—SYN. *Simple Typhoid Fever*; *Nervous Fever*; *Simple Adynamic Fever*; *Regular Typhus*; *Slow Nervous Fever*, Huxham; *Typhus mitior*, Cullen; *Febris nervosa*, Auct.; *Languor Panonicus*.

457. A. This form of fever is characterized chiefly by great languor and debility; by giddiness, dulness, and confusion of intellect; by a soft, feeble, and quick pulse; and by loss of muscular power, sleeplessness, and low delirium. It usually commences with similar premonitory symptoms (period of infection, HARTMANN) to those above described. The patient complains of giddiness, lassitude, uneasiness at the epigastrium, of nausea and loss of appetite, of alternate chills and flushes, and of pain in the back and limbs, the period of invasion. The chills are often prolonged, or recur for two or three days, but seldom amount to rigour; the skin afterward becomes warm, but seldom very hot: the period of excitement, of irritation (NAUMANN), of reaction (HARTMANN), of inflammatory irritation (GORDEN); the pulse frequent, full, soft, or weak; the countenance dull, pallid, and shrunk, or, occasionally, transiently flushed; the head heavy, confused, and giddy; the eye heavy, and devoid of lustre; and the tongue loaded or covered with a dirty mucus. There are more or less thirst; a desire of cold, acid drink; sometimes pain at the epigastrium, nausea, and vomiting; or an irregular and relaxed state of the bowels, and offensive evacuations. Pain of the head is but little, or not at all complained of, but that of the back and limbs is felt severely; *tinnitus aurium* is generally present; febrile uneasiness is great, the restlessness constant, and the want of sleep continued. About the third, fourth, or fifth day the head is more affected, and the mind more confused; the respiration is short and quick, and torpor, or *coma vigil*, is often observed; occasional flushes occur in some cases, while the extremities are cool; the urine is pale, of a whey colour, or like small beer; occasionally scanty; the bowels are either torpid, or relaxed, or irregular; and deliquium, or faintness, partial sweats, tremours, &c., are complained of on attempt to sit up. Delirium

of a low kind, or consisting of a muttering incoherence, occurs about this time; generally, at first, during the night, but subsequently recurring during the day; the eyes become muddy, afterward suffused or injected; and the tongue of a darker hue, dry or incrustated.

458. From the 7th to the 9th, 10th, or 11th day, or even later, the delirium degenerates into stupor—the period of predominant narcotism of NAUMANN, the nervous stage of HILDENBRAND, the collapse of CULLEN and HARTMANN; the pulse becomes small, weak, and very quick, or unequal; the heat of the skin natural, or diminished, or irregularly distributed; the hearing dull, and tremour, the supine posture, coma, and unconscious evacuations are soon afterward observed. Petechiæ sometimes appear on the trunk, thighs, &c.; the tongue becomes brown or black, incrustated and fissured, is protruded with difficulty, and the gums and lips are covered by a dark sordes. From about the fourteenth day to a much later period, according to the character of the epidemic, the peculiarities of the patient, the severity of the early stages, and the state of internal organs, a favourable change very often occurs in all the symptoms—the stages of crisis and decline, or of recovery (HARTMANN)—and is announced by a refreshing sleep, or by a warm and general sweat, or by a gentle diarrhœa, followed by subsidence of delirium, tremour, &c.; by the tongue being moist and clean at its edges, the skin more natural, and the pulse slower; by returning consciousness, and by the improved appearance of the countenance. If these changes do not take place, or if the sweats are cold and clammy on the extremities; or if they, or the diarrhœa, be unattended by amelioration of the symptoms, a fatal change should be dreaded, particularly if profound coma and great deafness, subsultus tendinum, or convulsive or spasmodic movements, difficulty or inability to swallow or to articulate, hiccough, involuntary evacuations, retention of urine, tympanitic abdomen, sliding down in bed; very rapid, fluttering, or intermittent pulse; very black tongue, and a quick, jerking, laboured respiration, or other unfavourable symptoms, appear.

459. B. The symptoms which distinguish this form of fever from the synochoid are, the greater prostration of strength from the commencement; the mental torpor and confusion of ideas; the long-continued chilliness, generally without rigour or shivering, at its invasion; the moderate increase of temperature afterward, or its natural grade; the pallid and shrunk countenance, expressive of suffering and debility; the muddy, lack-lustre eye; the torpor, giddiness, and absence of pain in the head, passing into stupor with delirium at an early stage; the quick and small, or the full, open, and soft pulse, even during the period of excitement; the early dryness and dark appearance of the tongue; the remarkable factor of the breath, and of the discharges; the supine posture; the dull, dusky, lurid, or dirty hue of the surface; the frequent occurrence of sloughs in the parts pressed upon, or of erysipelas, and occasionally of enlargement and inflammation of glands; and the early appearance of delirium, with tremour, and other symptoms, indicating extreme depression of vital power. When any of these phenomena occur

in synochoid fevers, it is always at a far advanced stage, the synochoid thus merely lapsing into the typhoid form, owing to various contingent influences, or to predominant affections of particular organs.

460. *C.* Such are the usual progress and characteristic phenomena of simple typhus; but it presents slight modifications, with the activity of reaction in the early stage, with the affection of particular organs or of the skin, and with the character of the prevailing epidemic. When the predominant affection is either so evident or so influential as to modify materially the state of disease, certain varieties result, which have been described by authors as specific or distinct forms of fever, and have been often connected, in too absolute a manner, with the peculiar circumstances in which they were observed, or in which they originated. I shall here notice these varieties, with reference to the circumstances whence their peculiarities seem to proceed, and to the various names imposed upon them, from a desire of appearing original, but with the effect of proving inaccurate, or of causing misapprehension and confusion.

461. ii. **COMPLICATED TYPHOID OR LOW NERVOUS FEVER.**—*A. With predominant Affection of the respiratory Organs.*—The bronchial surface is the part chiefly affected, and is rather congested than inflamed. The pleura is rarely attacked, but the substance of the lungs is sometimes implicated; and it then commonly becomes rapidly infiltrated or condensed, a fatal result quickly supervening. This complication is often obscure, or even latent; but it generally admits of detection by auscultation, or by attentive observation alone. The patient sometimes complains of stricture, oppression, or dyspnoea, but very seldom of pain in the chest. The respiration is short and hurried, is attended by the mucous rattle, and with more or less cough. The skin is seldom hot; at a later period it is cool, or even cold in the extremities, and dusky or lurid; the cheek is tinged with a dark red, and often assumes a livid or purplish hue. The pulse is rapid and weak. The confusion or stupor of an early stage passes quickly into low, incoherent muttering and coma. The tongue becomes very dry, black, crusted, and fissured; it cannot be protruded, and articulation is lost. This state may continue for several days, with unconscious evacuations, and all the nervous symptoms prominently marked; at last the patient sinks asphyxied, the changes necessary to life ceasing to take place in the blood sent to the lungs.*

462. *B. Nervous or Typhoid Fever, with prominent Affection of the digestive mucous Surface—the Ataxic Fever of several French writers; the Dothinentérie of M. BRETONNEAU.* Many of the observations made respecting this local affection in synochoid fever (§ 442) apply to its occurrence in typhoid fevers. It is very commonly observed in large cities, and in circumstances that occasion the use of water containing animal matter in a state of decay; and it

commences in a similar manner to the other varieties of typhoid fever. The symptoms that usually attend its progress are, a tumid, tense, hard, or tympanitic state of the abdomen at an early stage of the fever, frequently without pain or even tenderness on pressure; but with involuntary stools, and unconsciousness of their passage at a later period. The tongue is dry, black, incrustated, and the crust sometimes fissured; but it occasionally is dark red, dry, and devoid of papillæ or fur. The stools are often ochrey, and more frequent than natural. Discharges of blood, in greater or less quantity, sometimes accompany them; but the hæmorrhage, and the changes in the mucous surface occasioning it, may occur without much, or even any relaxation of the bowels.

463. *C. Typhoid Fever, with prominent Affection of the cerebro-spinal nervous System—the Ataxic of PINEL.*—is seldom attended by acute pain in the head. But heaviness, stupor, confusion, and giddiness are felt severely, and very early in the attack. The eyes are injected, suffused, and devoid of lustre. Delirium appears early, and frequently becomes more violent than in mild typhus, the patient attempting to get up, or out of bed. The scalp is warm or hot, and the extremities are often cool. Insensibility and coma quickly supervene, and are sometimes attended by spasmodic contractions of the muscles of a limb, or by partial convulsions. Inability to swallow, retention of urine, and loss of speech, are occasionally observed. Startings of the tendons, relaxation of the sphincters, and failure of the circulation, occur in the last stage, and usher in a fatal termination. This complication is especially characterized by the early appearance and the severe form of the symptoms depending directly upon the state of the cerebro-spinal nervous system.

464. *D. Typhoid or Nervous Fever with severe Affection of several vital Organs—Typhus gravior of CULLEN and others*—is generally characterized by intense disorder of the brain and digestive canal, with more or less evident affection of the bronchial surface; delirium being early, and at first somewhat violent, and soon followed by insensibility, &c. The pulse is quick and weak; the skin is hot, dry, pungent, or harsh, in an early part of the stage of reaction, but it generally becomes cool, particularly in the extremities, and often discoloured; respiration is panting or quick; the tongue dry and black; the abdomen tumid, tender, or tympanitic; and the stools are dark, offensive, and passed involuntarily and without consciousness. In this form there is some degree of reaction, expressed most severely in the digestive canal and cerebro-spinal nervous system; but it is characterized by depression of vital power, that is soon increased by the exhaustion consequent upon the reaction induced in this state.

465. The vital organs may, however, be severely affected, although excitement be very slightly, or even not at all manifested. Such cases constitute the *Congestive Typhus* of some modern writers, a form of comparatively rare occurrence, unless accompanied with petechiæ, and other symptoms indicating serious changes, not merely of vital action, but also of the fluids and soft solids. In this variety the depression of vital power is extreme from the commence-

* [This complication is extremely common in many parts of the United States, especially during the winter months, and often goes under the name of *Pneumonia Typhodes*. (See Remarks on "*Spotted Fever*," under "*Typhoid Fever*," with *Putro-dynamic Characters*," sec. 464.)]

ment, and such as prevents the development, and, in some cases, even the least manifestation of excitement. The causes of the disease have given vitality a shock beyond its powers of resistance or of recovery. Muscular power is almost entirely annihilated, and the anxiety at the epigastrium and præcordia is extreme. Respiration is oppressed, and the pulse is quick, sometimes irregular, intermittent, or even slow, and always small, weak, and thready. The countenance and eyes at first have an intoxicated appearance; the former being pallid, occasionally slightly bloated, or livid and dingy; the latter being vacant or suffused, and, afterward, injected, ecchymosed, half shut, or open. The skin, at an early stage, is warm or harsh; subsequently it is cool, withered, lurid, and sometimes studded with petechiæ or vibices; the extremities being cool, or even cold, and dingy, or of a leaden hue. The mind is very much confused at the commencement, and soon passes into a state of incoherence, delirious muttering, and coma. The patient is unable to protrude the tongue, owing to deficient power of the muscles of the organ, and seldom complains of thirst. The abdomen is tumid or inflated; the bowels being relaxed, the stools black and offensive, and, with the urine, passed unconsciously. The progress of the disease is usually rapid, and generally to a fatal termination; but the *premonitory stage* may be protracted, although severe, the *invasion* being sometimes sudden, and resembling an apoplectic seizure. If the powers of life rally, recovery may take place; but it is tedious, and often attended by various consecutive disorders.

466. *E. Of other Modifications or peculiar States of Typhoid or Low Nervous Fever.*—Various phenomena besides those already described may accompany this fever, according to the combination and intensity of the causes, the previous health of the patient, and the circumstances affecting him subsequently to the operation of the exciting agent.—*a.* When caused by *mental distress, despondency, &c.*, this fever presents certain peculiarities deserving notice. The patient is dejected, indolent, and incapable of exertion. He loses his appetite and strength; he cannot rest at night, or his sleep is disturbed and unrefreshing; and he complains of headache, and of many of the symptoms of a common cold. He is absent, his mind being constantly occupied with the subject of his misery. His countenance assumes an anxious appearance, his healthy looks vanish, and his absence of mind often passes into a state of reverie. After several days, manifest affection of the brain is observed, with characters varying with the age, strength, condition, and habits of the patient. In the robust, plethoric, and in persons addicted to intoxicating liquors, it is sudden and violent in its accession; the headache and despondency quickly passing into delirium of an active and constant kind, the patient calling out, or starting up, and attempting to get out of bed. The pulse is quick, firm, and oppressed or small; sometimes soft or irregular. Muscular power is not so much nor so early reduced as in the other states of the disease, but there is continual jactitation. In the debilitated, the aged, or the ill-fed, the cerebral affection is less violent in its attack, and commences more gradually, often attended by

red or suffused eyes, or by catarrhal symptoms, or by diarrhœa; by delirium, tremour, great prostration of strength, hurried breathing, weak, quick pulse, subsultus tendinum, and, sometimes, with a mottled appearance of the surface. In other respects the progress of the disease is nearly the same as the more severe cerebral complications already noticed (§ 463), but it much more frequently terminates unfavourably.

467. *b.* In some cases the fever is complicated with *sore throat*; and this symptom is occasionally so severe and early as to resemble an attack of *cyanche maligna*. Indeed, cases not infrequently occur, which fully indicate that the one disease may pass into the other, under favourable circumstances in respect of predisposition and concurrence of the exciting causes; or, in other words, that in young persons, in those predisposed to sore throat, and in cold and humid states of the air, certain of the exciting causes of typhoid fever will sometimes occasion a malignant or putrid inflammation of the throat, ushered in and attended by this form of fever; or they will, in such or similar circumstances, produce a low fever, in which inflammation of the throat is a contingent complication, and assumes an asthenic or unfavourable character, owing to the depressed state of vital power, and morbid condition of the circulation, in which it occurs. This complication is observed either as the most prominent local affection, or in conjunction with some other remarkable disorder, especially with the gastric complication. In some instances it is very severe; and the pharynx and upper part of the œsophagus being also more or less affected, and deglutition altogether prevented.

468. *c. Paralysis* may occur, especially in the cerebral state of this fever; and, in this case, the use of one side of the body is generally lost. If the patient recover from the fever, the functions of the paralyzed side are often gradually restored. This complication may take place in those cases which commence with protracted or severe premonitory symptoms, against which the patient struggles until he falls down from exhaustion, or is *suddenly* seized, as in a case of apoplexy; the fever running its course, as after the usual invasion, with chills, rigours, vomitings, &c. When the disease is developed in this sudden manner, it commonly presents the cerebral character throughout, with delirium, passing into coma, &c. In a case, however, of this kind, the cerebral symptoms were subsequently slight, and the disease mild.* In some of the cerebral cases of this fever, the affection of the mind continues for some days, or even weeks, after the bodily functions are restored. Instances may even occur of permanent insanity being the consequence. But, in

* A young lady went some distance to visit an intimate friend, delirious in fever; and having gone into the chamber, she was sensible of a disagreeable odour upon the curtains of the bed being drawn. She soon afterward complained of slight nausea, of headache, loss of appetite, and general lassitude. These symptoms continued gradually to increase for six days, during which time she kept about. On the morning of the seventh day she suddenly fell down without sense or motion. I saw her in this state soon afterward, and, viewing the attack as the result of sudden congestion of the brain, and before I had learned the above particulars, I prescribed a moderate blood-letting and purgatives. The functions of the brain soon returned, and the fever ran its course in a mild form, and without delirium or prominent affection of any organ.

all such cases, hopes of recovery should be entertained until some weeks, or even months, have elapsed from the disappearance of the fever.

469. *F. Relapses and Sequela*.—*a. Relapses* are not infrequent after the mild forms of typhoid fever, especially when the duration of the disease has been shortened by the treatment, or its course materially altered. They are also much more common in one epidemic than in another. In many instances, particularly when the procession of the morbid phenomena has been interrupted by large depletions or drastic purgatives, the symptoms become ameliorated for a time, but recur with their previous severity, the recurrence being different from a relapse; *b. This fever*, especially its gastric and enteric states, may pass, or be converted into a low or typhoid form of *dysentery* (see that article, § 26, 27), owing to the influence of the same circumstances that usually cause relapses; especially premature exposure in early convalescence; the use of too much or of improper food; the continued operation of the exciting causes; a close, impure, and infectious air, and suppression of the excretions.—*Local affections*, particularly *inflammations*, may also appear during convalescence, arising either from the above causes, or from atmospheric vicissitudes; or from whatever may inordinately affect the nervous and vascular systems. In these cases the inflammation is apt to pursue a severe and rapid course, owing to the unfavourable or debilitated state of constitution in which it occurs. Bronchitis, often associated with affection of the substance of the lungs, and inflammation of the mucous surface of the bowels, sometimes with softening and enlargement or ulceration of the mucous follicles, are the most common diseases thus contingent on convalescence. Inflammatory affections of the stomach or liver may also take place. When the mucous surface of the intestines is the seat of consecutive disorder, the bowels generally are more or less relaxed, and the stools are of an ochrey hue, and offensive. In such cases the follicles are especially affected; are often ulcerated; and although they will generally heal under judicious treatment, perforation of the intestines and fatal peritonitis may be the result at a period more or less remote from the disappearance of the fever.

470. *G. OF PETECHIÆ AND EXANTHEMATOUS ERUPTIONS IN TYPHOID FEVERS*.—Nervous or typhoid fevers may occur sporadically or epidemically, without any *petechial* or other eruption; or may be attended by *petechiæ* or *vibices* in their progress, and particularly at an advanced period, or by an *exanthematous eruption* at an earlier stage; or even by both kinds of cutaneous affection, either successively or almost coætaneously. For many years, or in successive epidemics, or even in a single epidemic, typhoid fever may appear in any one or more of the states just described; or it may assume either of these forms, associated with one or other, or with both of the affections of the skin just mentioned in a portion of the cases only; or the affection of the skin may be one of the most unvarying and chief characteristics of an epidemic; and, of the cases composing such an epidemic, some may be of the

mild, others of the complicated or severe form; some may evince more or less reaction or excitement, others may present depression of the powers of life and congestion as prominent phenomena throughout. The above description, although applicable more especially to the occurrence of typhoid fever, independently of any marked affection of the skin, yet does not the less apply to the occasional association of the disease with this affection. Those epidemics in which the changes in the skin are very constant phenomena sometimes possess other characters, both in the early and in the advanced stages, that require an especial notice. While these changes—both *petechial* and *exanthematous*—have been considered by HILDEBRAND, NAUMANN, FODERE, PEBBLES, and other experienced writers as indications of specific kinds of fever, which, in the early stages, may present more or less either of inflammatory excitement or of depression of vital power, they have been viewed by many authors merely as occasional occurrences, or as modifications met with only in certain epidemics, and not as characteristics of distinct varieties.

471. In trying to solve this question, the same difficulties present themselves that arise in all attempts to arrange the different varieties and states of fever in such an order as the more constant phenomena may warrant, and as may conduce to appropriate and successful methods of treatment. If I refer to my own observations in different parts of the Continent, some time after the late war, and in various parts of this country, both before and subsequently, I shall find, 1st. That *petechiæ* and *vibices* were either seldom or rarely seen for several years in some epidemics, excepting in the most severe or malignant cases, or when favoured by a too stimulant treatment and a too heating regimen during the early stages; and that, at other times, they appeared more frequently in the advanced periods of the lowest forms of fever, and even, although much more rarely, towards the termination of synchoid fever, when antiphlogistic remedies had been neglected in the stage of excitement. 2d. That this change in some epidemics was a very common or even general symptom, occurring in mild as well as in severe cases, although presenting very different appearances in each; and that they were sometimes observed early in the low states of fever, particularly when caused by unwholesome and deficient food, by a foul atmosphere, or by infectious miasms. 3d. That they were very frequently connected, especially in the plethoric, in the previously unhealthy, and in persons using much animal food, with evident change of the circulating fluids, with predominant disorder of the digestive organs, with a soft, broad, and open pulse, and with hæmorrhages from the intestines, and a tendency to disorganization of the mucous surface of the bowels. 4th. That an *exanthematous rash* or eruption was observed in some epidemics, from the third to the eighth day of the fever, was quite distinct from *petechiæ*, generally appeared earlier, and was, in some cases, either associated with, or succeeded by, *petechiæ* or *vibices*, or even both. 5th. That this exanthema was of a reddish colour, varying in deepness, and rarely passing to a dark hue; that it occurred in cases charac-

terized by vascular reaction in the early stage, as well as in those of a very low grade: in the mild, in the complicated, and in the severe; that this eruption was most probably overlooked in many cases where it existed; and that it was very generally confounded with petechiæ, owing to its late appearance, or to its colour changing, in a somewhat similar manner to petechiæ, with the states of vital power and of the circulating fluids. 6th. That, although the difference between these affections of the skin has been insisted on by HILDENBRAND and NAUMANN, it has been too widely drawn by them, and without due reference to the occasional association of both affections. From these facts, therefore, I am induced to come to the conclusions above stated (§ 470), and, conformably with the views of the experienced writers just mentioned, to notice more particularly the states of fever in which these changes in the skin are observed, without considering these states as always constituting distinct species.

iii. TYPHOID FEVER, WITH PUTRO-ADYNAMIC CHARACTERS.—SYN. *Putro-Adynamic Fever*; *Σύννοχος μετὰ σπυεδόσος*, Galen; *Synochus Putris*, S. cum *Putredine*, *Febris continua Putrida*, Rivière; *F. continens Putrida*, Selle; *F. Putrida sanguinea*, Vogel; *F. colliquativa putrefaciens*, Quesnoi; *F. Hungarica*, *F. nervosa-putrida*, *F. asthenica*, *F. contagiosa*; *F. colliquativa essentialis*, Borsieri; *F. Putrida simplex*, Richter; *F. character putrido aut septico*, Hildenbrand; *F. Petechialis*, *F. Nosocomialis*, *F. Castrensis*, *F. Purpurata maligna*, *F. Maligna*, *F. Carceraria*, *Pestis Bellica*; Auct. var.; *F. Continens maligna*, Huxham; *Das Faulfieber*, *Faulige Fieber*, Germ.; *Fièvre grave*, *F. Maligne*, *F. Putride*, Fr.; *F. Adynamique*, Pinel; *Febbre Putrida*, Ital.; *Morbo Petechiale*, Cerri; *Febbre Petechiale*, Rossi; *Febbre epidemica Petechiale*, Buffa; *Petechial Typhus*, *Camp Fever*, *Jail Fever*, *Putrid Fever*, *Putrid Malignant Fever*, *Spotted Fever*.

472. Conformably with what I have stated above, I consider this as a variety merely of typhoid fever, its especial characteristic—the appearance of petechiæ and vibices—being contingent upon certain circumstances and causes tending to contaminate the circulating fluids, and to destroy the tonicity and irritability of contractile tissues, and appearing only as the effect of a series of anterior changes. Although petechiæ may occasionally appear in the advanced stages of other fevers, particularly those of the typhoid form, yet in those epidemics which result from famine, war, unwholesome food, and from air loaded with putrid animal and vegetable matter, or with the emanations proceeding from a number of persons shut up in a close atmosphere—causes which are often conjoined—this symptom is very generally, if not constantly observed, and is only one of the indications of the very serious changes which have taken place, not only in the blood, but also in the soft and irritable structures of the frame. Infection, either directly or by fomites, is, however, the chief cause, although cold, humidity, fear of the disease, and the other agents just noticed, may either generate the fever *de novo*, or predispose the system to infection, or aid its operation

after exposure to it. Although certain epidemics evince a putrid or septic character at an early period, and thereby justify the appellation generally given to them, yet this character is seldom primary, or otherwise than the consequence of suppression or exhaustion of vital power, the fever commencing in some one of the forms already described. Indeed, there is no variety of fever that may not evince a septic or putrid state, 1st, from the vital depression produced by the exciting cause; 2dly, from exhaustion consequent upon vascular reaction; 3dly, from the passage of contaminating matters into the blood; and 4thly, from these states conjoined. Hence, when the causes are of a contaminating kind, and the influences continuing to operate after infection have a similar tendency, putrid or malignant symptoms will arise, whether the fever be synochoid, nervous, typhoid, or gastric in its early periods. These fevers are the most prone to the septic character; but others, as remittent, inflammatory, and bilious fevers, may also assume it. This particular character may or may not be developed, or may appear at a later or earlier period, owing to the nature and diversity of the causes; to the condition of the internal functions and of the circulating fluids at the time of attack; to the rigidity or tone, or to the laxity of the softer solids; to the violence or absence of vascular reaction, and to the early treatment and regimen.

473. A. Petechial, or putro-Adynamic fever generally commences with the premonitory and invading symptoms usually observed in other fevers of a low grade. When an epidemic presents changes of a septic or putrid nature, as predominant features, the early stages of the fever vary most remarkably according to the intensity of the causes, and the state of the patient. The period which elapses from infection till the manifestation of the disease ranges from a few hours to five or six weeks. It is commonly some days, but sufficient evidence has been furnished, in the Irish and other epidemics, that the longest of these periods may occur. During the time the disease thus takes to form, the usual premonitory symptoms are observed, and increase until chills, horripilations, or rigours are felt. In some instances the disease commences insidiously, with or without catarrhal symptoms, becoming gradually severe and dangerous. In these it is often difficult to assign the exact period of attack. Fatal cases most frequently begin in this manner, especially in the plethoric, cachectic, and persons accustomed to full living. In others, after a protracted and severe premonitory stage, and indistinct symptoms of invasion, the fever proceeds with indications of imperfectly developed reaction, and soon assumes a putrid or malignant form. In some cases, rigours and shiverings sufficiently evince the period of attack, and quickly give rise to inordinate reaction, followed by exhaustion and evidence of change in the fluids and soft structures. Among the most constant of the early symptoms are, dull pains in the head, occiput, back, and limbs; universal weariness, soreness, and loss of muscular power; confusion of mind; pains in the joints and limbs resembling rheumatism; frequent sighing; nausea or vomiting; and noises in the ears.

474. The pulse, when *reaction* is developed, is full, open, quick, sharp, but soft and easily compressed. Respiration is laborious, suspirious, with oppression or anxiety at the præcordia and epigastrium. Burning heat is often felt internally, and on the surface of the trunk. When reaction is either imperfect, or does not take place, the pulse is slow, or not more frequent than usual; is weak and compressible, sometimes unequal or intermittent; and the temperature is little or not at all increased, or it is unnatural. The tongue is either loaded and furred, or flabby and covered with a dirty mucus. Thirst is generally urgent. The vascular excitement usually continues, in various grades, from six to eight days; and as it passes its acme, or about this period, purplish spots of the size of flea-bites, and of various shades of deepness, appear upon the neck, breast, and insides of the arms and thighs. The pulse becomes more soft and weak; sometimes unequal and small. The tongue is more loaded, and of a darker colour. Thirst is diminished, or is not complained of; and the excretions present a very morbid appearance, and an offensive odour. To these are added dullness of all the senses, or delirium, alternating with stupor, difficulty of articulation, and often also of deglutition, leipthymia, faintness, and tremours. From the eleventh to the seventeenth day, but frequently earlier, the abdomen becomes tympanic, if the disease proceeds *unfavourably*; the petechiæ are of a darker colour; vibices or blotches appear on the extremities; profuse fetid perspirations break out without relief; the posture is constantly supine; parts pressed upon quickly sphacelate; the temperature sinks often below the natural standard; and the tongue is now black, fissured, or flabby, clean, dark red, or livid. Coma; subsultus tendinum; convulsions; hæmorrhage from the bowels; or exudations of a sanious fluid in the evacuations, or from the gums, lips, and nostrils, also take place towards the close.

475. A *favourable* change most frequently occurs from the ninth to the seventeenth day, and is indicated by profound sleep; by a warm, soft, and moderate perspiration; by turbid urine; by natural stools; and by a brighter colour, or disappearance of the petechiæ. The *duration* of this fever is seldom longer than twenty-one days, but it may terminate on any intermediate day between the sixth and twenty-fourth. A fatal issue occurs most frequently from the eighth to the fourteenth. Towards the close of an epidemic, the usual course is often departed from; mild cases of short duration, and *relapses*, among these especially, being very common. When mercury has been given so as to affect the mouth, a crisis is prevented, and convalescence is protracted.

476. *B. Modifications.*—*a.* Such is the more usual course of the disease, particularly as observed in modern times. But it presents various grades of severity, and several modifications and complications. It is in some cases, even in the same epidemic, comparatively mild, yet presenting manifest signs of colliquation, or of a septic tendency, particularly as respects the state of vital power, the circulating fluids, and the appearance of the petechiæ. In others, the attack is violent from the commencement, and the symptoms intense, diminution of the vital

cohesion of the tissues, and dissolution of the fluids, appearing early and proceeding rapidly. In many, the invasion is gradual, or much less tumultuous, than in these; the progress is more insidious, and the results are not less dangerous. In both, the body undergoes decomposition soon after death, and the rigidity usually observed *post-mortem* does not take place.

477. *b.* When this fever is epidemic, petechiæ may appear as early as the third, fourth, or fifth day from the attack, in mild as well as in severe cases; and a white miliary eruption may break out at a late stage, particularly when the perspirations are copious. Yellowness of the skin, or purplish colour of the extremities, or enlargement and inflammation of the glands in the neck or groins, may occur in an advanced period. Pimples may also appear on the surface, and may be considered a favourable indication. Although delirium and insensibility generally follow the headache of the early stages, yet the mind may be serene and unaffected throughout, even to the moment of dissolution. In cases which present no distinct sign of invasion, nor of reaction, but proceed insensibly to a general colliquation of the fluids and solids, the excretions, both cutaneous and intestinal, are generally abundant and very offensive: the flow even of urine being sometimes excessive. The tongue is occasionally natural, or it is clean and raw-like, or as if streaked with blood or with a bloody sanies. An aphthous state of it, and of the lips, is also sometimes remarked.

478. *c.* In persons who live fully and luxuriously, particularly if they have passed their thirtieth year, this fever often proceeds in an insidious but fatal manner. Such patients do not complain of pain, or of much uneasiness, although they are remarkably debilitated and depressed. Their manner is somewhat hurried, but their intellect is clear. The skin is greasy, and covered with dun petechiæ, sometimes intermingled with white miliary vesicles; its temperature is low; the countenance slightly suffused; the eyes glassy; the tongue sometimes loaded or crusted, or clean and moist; thirst is often absent, and the pulse but little accelerated. Convulsions are frequent; and a fatal termination often ensues, mostly before the fourteenth day.

479. *C. Complications*, similar to those already described, may take place in the early stages of this disease.—*a.* The *catarrhal, bronchial, and pulmonary complications* are most common in winter. When the bronchi and lungs are seriously implicated, the respiration is short, hurried, or laboured; cough is frequent; and the sputum is bloody, rusty, or consists of a dark, sanious matter, particularly in the latter stages.—*b.* The association with *cerebral affection* is very frequent, particularly in the strong and plethoric, and in persons whose minds have been much harassed previously to the attack. These latter seldom recover from it. In this state the headache is severe from the commencement; the eyes are injected or suffused; reaction is more or less energetic, and is often attended by epistaxis, which, however, is never critical. Delirium, insensibility, subsultus tendinum, &c., are common phenomena in the latter stages of unfavourable cases.

—c. The *digestive canal* and *liver* are chiefly affected in summer and autumn, the fever assuming gastric and bilious characters at its commencement, with bilious vomitings, &c., but soon passing into the putrid state. The enteric and dysenteric states are also frequent, especially at later periods of the disease. The *enteric* is the most dangerous of the abdominal complications, particularly when the *petechiæ*, or *vibices*, are of a dark or deep purple colour; the abdomen tympanitic; and the stools are green, livid, or black, mixed with dark fluid or grumous blood. In these, fatal hæmorrhages sometimes occur. The dysenteric state may take place in mild as well as in severe cases at an advanced age, with severe gripings, and dark, sanious, bloody, and mucous stools, which are very fetid and infectious. The disease may thus pass into the adynamic form of dysentery. This change was common in the epidemics lately prevalent in Ireland.—d. The complication with inflammation of the *fauces* and *pharynx*, or with putrid sore throat, is sometimes observed, and is to be distinguished from primary *cynanche maligna* by its occurrence in the course of the fever, or as a contingent affection (§ 479).

480. *D.* The *sequelæ* of this fever are sometimes serious. They consist chiefly of dysentery, chronic diarrhoea, dropsies and œdematous swellings of one or more of the extremities, pulmonary consumption, hepatic obstructions, mania, and other forms of insanity, abscesses in various parts of the body, sloughing sores, inflammation of veins, particularly of those of the extremities, gangrene of the feet, rheumatic affections, &c. Most of these result, in great measure, from the changes that have taken place in the blood during the fever; these changes affecting the blood-vessels, and organs most susceptible of congestion. *Relapses* are frequent in cases of short duration, and in those which have been apparently cut short by active treatment, and are generally more dangerous than the first attack. They are more common in males than in females, and towards the close of an epidemic than at its commencement.

481. *E. Diagnosis, or the Changes which more especially constitute Malignancy or Putro-Adynamia in Fever.*—a. The *secretions*, next after the state of vital power, indicate incipient dissolution of the vital cohesion of the blood and soft tissues. The *urine* has, first, a more viscid and albuminous appearance than usual. It is frothy, browner, and less transparent. If this pathological condition increases, the urine becomes brown, or dark brown, clouded, turbid, muddy, and often deposits a brown sediment. It quickly becomes putrid or offensive. The *feces* are fetid, or have a putrid smell; are dark, fluid, ochrey, or contain blood. The *sweat* is thick, clammy, sometimes cold, copious, and always offensive; and occasionally it imparts an ichorous stain to the linen. The secretion poured into the mouth is a thick, viscid, slimy, dirty mucus, of a dark brown colour, that collects over the teeth, edges of the tongue, and lips.

482. *b.* The changes observed in the *vascular system* are, an open, broad, soft, compressible, undulating, or unequal, or a very quick, small, thready, and irregular pulse; a more than usually dark appearance of the superficial veins, or dark streaks in their course; and, at

an advanced stage, exudations of dark, dissolved, or thin blood, or of a bloody sanies, from the outlets of canals, as the mouth, nostrils, anus, vagina, &c. Blood taken from a vein, even previously to the occurrence of these signs, is very dark, thin, sometimes of a black, purple hue; and either does not separate into coagulum and serum, or coagulates into a soft, pulraceous, or gelatinous mass, with imperfect separation of the serum. The fibrinous and albuminous constituents are deficient; and, owing to this circumstance, together with the want of vital power in the vascular system, the coagulum wants cohesion, the least agitation causing a partial admixture of red particles in the surrounding serum. As the dissolution of the vital cohesion of the circulating fluids and softer solids proceeds, the colouring particles of the blood often fall to the bottom of the vessel, or of the gelatinous coagulum, leaving the upper stratum, and the surrounding serum, of various shades: sometimes of a greenish, purplish, or reddish hue. LANGRISH, HUXHAM, FORDYCE, HILDENBRAND, and others have noticed a peculiar putrid odour of the blood when taken from a vein. (See BLOOD, § 110, *et seq.*) This fluid soon undergoes putrefaction after its removal from the body. It presents, however, various anomalies, in particular cases, or in some epidemics; but it seldom evinces very remarkable alterations, excepting as the grosser and more palpable results of anterior changes, which, although evidently of a most important kind, admit not of precise recognition; nor do those alterations occur until the symptoms indicate depression of constitutional power, imperfect assimilation of absorbed fluids, and lesion of the depurating functions. In connexion with these changes, particularly those of the blood, the tonicity, or vital cohesion, of the extreme capillaries and softer solids are very much impaired, occasioning thereby farther alterations. The functions of the cerebro-spinal nervous system are often more or less disordered, as in low nervous fevers; and the states of the mucous and cellular tissues, and of the skin, are remarkably altered. The cellular tissue becomes flaccid, softened, or less coherent, and consequently slightly tumid; and hence the bloated appearance in extreme cases, or cachectic fulness of the surface in the most fatal states of the disease. The mucous tissue is discoloured; it exhibits a dirty brown, or gray, or livid hue, with black, ecchymosed spots.

483. *c.* The *cutaneous surface* is at first merely dusky or lurid; but, as vital power is farther depressed, a bluish, marbled discoloration is sometimes observed in the shape of veins. *Petechiæ* of various depths of shade, from a lively or dark red to a purplish or brown colour, appear principally upon parts usually covered by the clothes. They are either alone, or attended by the exanthematous eruption characterizing the variety next to be noticed (§ 485), or by dark or purplish spots of various sizes. In some cases, the skin, especially that of the extremities, becomes of a dark purple colour. When there is much heat of surface in the early stage of excitement, a caustic or morbid sensation is imparted, which increases while the hand remains in contact with it. When copious sweats follow, a white miliary erup-

tion, intermingled with petechiæ, or vibices also, sometimes is observed. As the temperature is reduced, an unpleasant, raw, cadaverous, or cold feeling is imparted to the hand of the examiner; and the petechiæ often become much darker, or more numerous, or aggregated, or almost confluent in some parts. In such cases, *passive hæmorrhages*, particularly from the bowels, are not uncommon; but they may also occur without much change in the skin. The integuments readily sphacelate from slight injury, irritation, or pressure; and may even be the seat of sphacelating sores or carbuncles in extreme cases. Enlargement or obstruction of the lymphatic glands, with a tendency to asthenic inflammation and disorganization of the surrounding cellular tissue, is sometimes seen in the most malignant cases; but these changes take place most remarkably in *plague*, which has been considered by many able writers as a modification merely of this fever, the one disease running into the other. (See the article on that disease.)

484. *d.* As to the *immediate causes* of, or pathological states giving rise to the septic or putrid changes in the fluids and solids, observed more remarkably in some fevers than in others, even the most experienced writers are not agreed. There can be no doubt that these changes should be referred chiefly to the depressed state of organic nervous or vital power, and to the consequently imperfect functions of assimilation, excretion, and depuration, as insisted upon above (§ 102), and in the article *Blood*. But the direct introduction of putrid animal or vegetable matter into the circulation, in considerable quantity, so as to depress the vital influence below the power either of salutary reaction or of excreting it through the emunctories, will so contaminate the whole mass of fluids as to give rise to alterations and appearances very similar to those just described, and to many of the more intense symptoms previously noticed as depending chiefly upon the state of the cerebro-spinal system (§ 479). The experiments made by GASPARD, MAGENDIE, and others (see *Lond. Med. Repository*, vol. xvii.) have proved this fact; but changes quite as malignant as in the fever now being considered, and in plague and yellow fever, take place without any very manifest or demonstrable source whence they could have proceeded. In such cases, numerous facts and circumstances concur in showing that a morbid seminum—an infectious miasm—proceeds from the bodies of those already affected, and, through the medium of the inspired air, contaminates the blood as it circulates in the lungs, and affects the organic nervous influence. It may also be admitted that miasms proceeding from animal and vegetable matter in a state of decay; from a number of persons breathing the same atmosphere; from those shut up in close, warm, and ill-ventilated places, will produce a similar effect, and generate a malignant fever *de novo*, which will be capable of propagating itself by means of the emanations evolved in its course.

[As Mr. COPLAND has ranked "*Spotted Fever*" under this form of "*Typhoid Fever*" (with "*putro-adydynamic characters*"), it will not be inappropriate to give some account of the disease as it prevailed epidemically in the United

States within the present century. That it is, however, the same disease, will hardly be admitted, when we consider the absence of premonitory symptoms, the suddenness of attack, and the peculiar phenomena which characterize its progress. That it differs from camp or jail fever (typhus gravior), in many important features, no one who is acquainted with, or who reads a description of the two diseases, can reasonably doubt. These differences may be owing to modifications, produced by unknown meteorations causes, occurring at wide intervals of time, and altogether beyond the reach of human scrutiny.

The spotted fever* is believed to have first made its appearance in the town of Medway, Mass., in March, 1806. In the succeeding spring (1807) it appeared at Hartford, and shortly after at Windsor, Conn. From that period to the year 1815, it was met with, at different times and in various places, in the states of Connecticut and Massachusetts; cases occurring in almost every month of the year, but prevailing most extensively in the winter and spring months. It does not appear that any circumstances relative to variation of season or local situation had any particular influence upon the origin or progress of this fever, the inhabitants of valleys and high hills being equally subject to its attacks. In 1812-13, cases of the disease occurred in the states of New-York, Pennsylvania, and New-Jersey, although it was chiefly confined to New-England. The committee of the *Massachusetts Medical Society*† describe the invasion of the disease as generally sudden and violent: "In its course, all the functions of the body are more or less interrupted, and often some of them are entirely suspended. The subject of it is seized in the midst of his usual labour or occupation, and oftentimes is struck down suddenly, almost as by a stroke of lightning. The first symptoms are various, such as local pain or paralysis, delirium or coma, and, rarely, spasms or convulsions. The

* [The "*Spotted Fever*" is stated by historians to have prevailed over the greater part of Europe in 1505; also in 1528, followed by the plague. Again, in 1556, it appeared in England and France; and in Spain, in 1557, it was as mortal as the plague. We read of it, also, in many parts of Europe in 1564, and from this period to 1574, when it was again followed by the plague. It is recorded to have prevailed at Trent in 1591, and in 1592 at Florence; in Europe in 1624; in Italy in 1691 and 1693; in England in 1698; in Prussia in 1704; in England again in 1710 and 1741; in Piémont in 1720; in Egypt in 1760; and in Geneva, Switzerland, in 1805. We can trace it under the name of "*Hospital*," "*Jail*," "*Putrid*," or "*Spotted Fever*," in almost all parts of the world during the last century, following in the train of the great European armies, among which it made the most destructive ravages, and by which it was spread through Germany, France, Switzerland, Italy, and, indeed, every European country. This is the disease to which the Germans have applied the name of *war-fever* or *war-plague* (*Kriegspest, Pestis Bellica*).

† [In the year 1810 a circular was issued by a committee of the Massachusetts Medical Society, consisting of Drs. WALSH, JACKSON, and J. C. WARREN, embracing a series of questions relative to the causes, history, and modes of treatment of spotted fever, copies of which were widely distributed throughout New-England; in reply to which, communications were received, among others, from Drs. PAYNE, FISKE, RABBIT, RICE, CUTLER, WHITSON, FLINT, and HASKELL, of the county of Worcester, and Drs. BARTLETT, HURD, and CHAPLIN, in the county of Middlesex, fellows of the society; also from several practitioners in the State of Connecticut. From these communications, one of the most valuable medical documents was drawn up that has ever been published in this country, "and which," Dr. HOSACK declared, "greatly excels all that has been offered on the subject of spotted fever" (*Med. and Phil. Register*, vol. i., p. 225).]

disease often commences with shifting pains; the patients suddenly feel a pain in one joint or one limb, in a finger or toe, in the side, stomach, back, neck, or head; sometimes the sensation is like the stinging of a bee; frequently it is most excruciating pain, which at once arrests and commands the whole attention. This pain moves from place to place without losing its violence, generally approaching the head, and is often confined to one side of the body; it is said that the left side is more frequently affected than the right; the head is more frequently first affected with pain than any other part; and when not affected at the first moment, it almost invariably becomes so in a short time. The pain in the head is oftentimes intolerably severe, and the patient expresses a fear of losing his senses." "Partial loss of sensibility and paralysis are, in other cases, the first symptoms, and often occur in the course of the disease when they do not in the beginning. The powers of sight are affected in various degrees, from a slight dimness to absolute blindness. In like manner, the sensibility of the skin and parts adjacent is diminished, so that a limb becomes numb, or feels as if it had been asleep. The other organs of sense have not been noticed to undergo similar affections.

"In whatever form the disease commences, there suddenly ensues great prostration of strength. In some instances the patient is described as almost immediately falling down under the weight of disease. This prostration is accompanied or followed by universal or partial chills; the skin becomes dry and pale, or mottled like one who has been long in the cold; eyes glassy; nose contracted; the face sub-livid, with paleness round the mouth, and the countenance expressive of the utmost anxiety and distress, or its features dissolved, with a loss of all character and expression; the whole body becomes cold; respiration very laborious, especially in children; pulses very small and feeble, slow at the commencement, but shortly very frequent. If there be neither coma nor delirium, the spirits are very much dejected; the patient suffers extreme solicitude and anxiety, with apprehensions of death, frequent sighs, restlessness, and agitation. He complains of oppression and faintness, with indescribable distress about the præcordia, and a sensation of fullness at the stomach. Frequently eructation, nausea, and vomiting ensue; and also fainting, in the early stages of the disease; and the vomiting occasionally becomes incessant, embarrassing, and defeating every effort to give relief by internal medicines, while it exhausts the patient" (p. 123, *loc. cit.*).

According to Drs. NORRIS and STRONG, the disease came on generally with a chill of a violent character and considerable duration, in which the skin was cool to the hand of a person in health, but which was early succeeded by preternatural heat in every part of the system. The temperature of the body, as indicated by the thermometer, was always, during the chill, below the healthy standard. If the chill was not accompanied with, it was soon succeeded by severe and excruciating pain in some part of the body, as head, back, stomach, or one of the extremities. And in many instances, a sharp pain attacking one of these parts

was the first warning of the attack. The pain, sharp and lancinating, was usually confined at first to a very small spot; but wherever it commenced, it soon extended till it reached the head. There was a peculiar feeling of sickness and oppression at the epigastrium, varying in duration in different cases, and often recurring in paroxysms. Nausea and vomiting were very constant symptoms, but bile and mucus were never observed in the matters ejected. The respiration was short and laborious during the chill, or when the pain was very severe; sometimes stertorous; but in other circumstances it was quiet and placid.

The tongue varied much in appearance, both on the attack and during the progress of the disease. In some violent cases, it was smooth, dry, pallid, shrivelled, and almost of a livid hue; hence, from its anæmic state, it was often called the *bloodless* tongue. In other cases, it hardly varied from the healthy state, except in being dry; in some it was moist, but soon became dry. It was generally free from any fur or mucus, as in ordinary typhus fever; but during the progress of the disease was covered with a dark-coloured, slimy matter, in some dry, in others moist, resembling molasses. In some a black stripe ran longitudinally through the centre of the tongue, but never entirely covered it. Frequently it became dry and shrivelled, denoting a change for the worse. The bloodless tongue was generally a fatal symptom. In some cases, patients lost the power of moving the tongue a few hours after the attack, its muscles apparently becoming paralytic.

The pulse was always extremely weak, feeble, and depressed; in most cases, more frequent than in health; in others, it was imperceptible on the attack, and for one or two hours, till it was restored by stimulants, external and internal. There was but little increase in the force of the arterial action after the chill, but it remained feeble throughout; in some instances it differed little, in frequency and fullness, from the healthy state; but in all these it yielded to the slightest pressure.

The blood presented differences, according to the stage of the disease. It was generally darker than natural, contained less clot and more serum than in the healthy state; in some cases presenting a broken-down and dissolved appearance; and in a few instances only was any inflammatory buff perceived on standing. Hæmorrhage sometimes occurred from the bowels, nose, or fauces, or from the stomach or the uterus. It also escaped beneath the cuticle, forming petechial spots, varying in colour from a common to a very dark purple or black; and the darker the shade the more fatal the prognosis. From this phenomenon the disease took the name of *petechial*, or *spotted fever*. Besides petechiæ, efflorescences of a scarlet hue, resembling erysipelas, and receding on pressure, were not uncommon; and carbuncles were frequent during convalescence. When the disease first appeared in Hartford, in 1807, petechiæ were present in almost every case; the next year they were less frequent, and in subsequent years they were not met with at all before death. The petechiæ appeared sometimes on the neck and breast, varying in size from a dime to a small pea; sometimes they

were confined to the extremities, or spread over the whole body.

Muscular debility was a very striking symptom of the disease, the strength being completely prostrated from the time of attack. In some, a sudden faintness and prostration were the first symptoms that excited the attention of the patient, who found himself almost unable to raise his hand; in others, a lassitude, or unwillingness to motion, preceded the chill. In a few cases, where it commenced with a furious delirium, there was an apparent increase of strength in the muscles of voluntary motion; but this morbid excitement, in an hour or two, gave place to extreme weakness. In either case the pulse was weak and feeble, and occasionally irregular and fluttering.

The eyes generally had a wild and vacant stare; very brilliant and glassy, pupils dilated, with frequent contractions to the size of a pin head. This alternate contraction and dilatation would sometimes continue for an hour or two, and then disappear, being succeeded by a more natural state of the eye, or permanent dilatation with coma. The eyes were sometimes bloodshot, or suffused with blood, and watery; but in no case yellow. A redness of the eye generally indicated much danger. The sight was often much impaired, frequently destroyed in the first attack, though in some cases loss of vision was of short continuance. In no instance was it permanent. In some cases, the appearance of the eye was natural. Generally speaking, there was no morbid affection of the hearing, but the taste as well as smell was frequently much impaired. The sense of feeling was greatly blunted, if not wholly lost. A general numbness in the extremities was often the first symptom complained of, amounting in some instances to complete paralysis. Sometimes this numbness attacked the face, producing a feeling as if an iron mask was tightly drawn over the countenance. The skin was often so insensible, that the most irritating applications produced no effect; cantharides, nitrate of silver, and even the actual cautery, were in many instances applied without exciting inflammation or causing pain. Delirium was one of the first symptoms of the disease, and was generally present in some form in every case, varying in the time of its accession from the first to the fourth day, or later. Not unfrequently a wild and raving delirium, with excruciating pain in the head, often shooting through the temples, ushered in the attack. In general, and where it began at a later period, as it usually did, it was more mild; sometimes of a hysterical or even playful kind, the patient being sociable and humorous. There was great variation in the feelings; sometimes the spirits being elated, but more generally depressed.

Dr. HENRY FISH* remarks that, "in females above seventeen years of age, the spotted fever often disguised itself under the form of hysteria, attacking with such symptoms as globus hystericus, crying or laughing, sighing or wringing the hands. Generally these symptoms were accompanied by others, from which a diagnosis was not difficult; but when this variety first appeared, there were cases in which the pa-

tients were supposed to have nothing but hysteria, until they had sunk beyond the reach of medicine. These patients, when delirious, were talkative and jocose; from their actions and expressions they appeared to be completely happy; and though convinced that their cases were hopeless, showed no fear of death, nor any desire to recover. Some seemed resolved on dying from the first, and became impatient when attempts were made to encourage them with hopes of recovery. There was much variation in the continuance and degree of these symptoms; generally, when they were present, they began with the disease and continued through its progress. The state of the pulse did not vary from that in other cases" (p. 26).

Coma was a very frequent symptom, occurring in some instances at the very onset of the attack, and in all fatal cases coming on before death. It was, however, not necessarily a fatal symptom, as many recovered from the most profound sopor by the free use of stimulants. It was common for patients to be lethargic, and often difficult to rouse; but when roused, consciousness was in a measure restored. When this could not be effected, an apoplectic stupor was likely to supervene, which frequently continued for some hours, and the approach of death was announced by the breathing becoming easier and shorter, until it entirely ceased; and when coma did not occur, syncope became frequent.* Dr. FISH (*loc. cit.*) states that the appearance of coma varied according to the violence of the attack and the remedies that had been employed; that, before it appeared, the vomiting was incessant, whatever drinks were taken being soon rejected; and that the stronger stimulants remained longer on the stomach than the weaker. "To this succeeded a strong disposition to sleep, with a slight rattling in the breathing; the difficulty of rousing the patient now increased rapidly, and he soon became insensible to the loudest noises, and all efforts to awaken him. At this period the eyes were closed, and of a glassy, shining appearance; the pupil was often dilated, and insensible to the strongest light. If there had been any suffusion of blood in the eyes on the attack, it had now disappeared. Sometimes the skin was of a natural temperature, but more generally it was below it, and not more moist than in health; in some places, as on the forehead or breast, it was œdematous. The mouth was always open, and the gums and fauces loaded with dark-coloured aphthæ, except in one case, and in that the tongue was moist, but pale and shrivelled. The respiration was generally short and laborious, with a rattling noise, or an apoplectic stupor; just before death, in a few cases, it did not vary materially from health" (*loc. cit.*). The lymphatic and glandular systems suffered no great derangement. In many cases, a torpid state of the neck of the bladder rendered the voiding of urine difficult, and it was sometimes necessary to have recourse to the catheter; though, in most cases, half a gill of brandy injected into the rectum would remove the difficulty,

* ["An Inaugural Dissertation on the Disease termed Pettechial, or Spotted Fever, submitted to the Examining Committee of the Medical Society of Connecticut, for the County of Hartford," by NATHAN STRONG, Jun., 8vo, p. 52, Hartford, 1810.]

* "Remarks on the Spotted Fever, as it prevailed at Hartford, Connecticut, in the Year 1809," in *Physico-Medical Trans. of New-York*, vol. i., p. 20.]

and produce the desired discharge. The progress of the disease was very rapid, sometimes arriving at its height in one or two days; and instances have occurred where it proved fatal in three hours. Many sunk under the attack in the course of the second day, while others survived ten or twelve days. Death generally took place between eighteen hours and seven days, though death rarely occurred after the third day. Many physicians considered the patient safe if he survived the first twenty-four hours.* There were no particular symptoms which showed that a crisis was about to take place, or which marked the period when convalescence began. Some were evidently better in a few hours, and recovered very rapidly, while in other cases there was no perceptible amendment for several days, and convalescence progressed slowly.

Besides the symptoms above mentioned, ulcerations in the fauces or throat sometimes accompanied the first symptoms of the disease, and this generally indicated a fatal result. The fauces were often covered with aphthae, which frequently extended through the whole alimentary canal. In violent cases, swallowing was often very difficult; and in a number of cases complete paralysis of the organs of deglutition took place in two or three hours after the commencement of the attack. Deglutition was sometimes impeded by spasmodic affections, which in some cases appeared similar to those of hydrophobia. A strongly-marked feature of the disease was the "deadly feeling," or a "death-like coldness or faintness," as the patients described it, about the upper orifice of the stomach; a sensation which was not constant, but would go and come several times in the course of twenty-four hours. Flatulence and tympanitis were frequent symptoms. "Except the stomach, and some solitary cases of attack of the bowels, the abdominal viscera are but little affected. The intestines are as little affected in this disease as the head is in dysentery."† According to Dr. GALLUP, the *urine* is but little changed, unless the disease is considerably protracted, though strangury is a common symptom. There is generally, also, an extreme soreness and tenderness of all the muscles, and the joints are sometimes affected with swelling and tenderness, resembling rheumatism. Sweating could generally be brought on by external applications and very simple means internally, and the sweats were attended with a peculiar smell, rather sickening, emitting a mawkish-sweet halitus, somewhat cadaverous, but not particularly offensive. Occasionally, the disease was ushered in by spasms or convulsions, and in some instances towards the close, distinct opisthotonos took place. The countenance was generally placid, except when distorted by severe pain, with often a flush upon the cheeks. As the disease progressed, if severe or about to terminate fatally, the features became changed and sunken, or bloated, of a dark, sub-livid hue, with deep brown patches, and reddened eyes. The most constant symptom, according to Dr. GALLUP

(*loc. cit.*), was a pain in the forehead, between the eyes, similar to the pain that accompanies epidemic angina. The disease attacked all ages, and both sexes. According to GALLUP, the aged were most exempt, the middle-aged more liable to it, but children most of all. Dr. FISKE states that children from two to ten years, the young, under and about the age of puberty, women, and persons of feeble constitutions, were more frequently attacked than strong, robust adults, and those in full health. Among the predisposing causes, are fatigue, watching, anxiety, intemperance, and the depressing passions. Sometimes an attack seemed to be brought on by fear and profuse evacuations; though there was satisfactory evidence to show that it was, in some instances at least, infectious. Relapses were frequent; and many experienced a second, and some a third attack. Negroes were not exempt from the disease.

The disease assumed a variety of forms, one of which is described as follows: "Universal deadly coldness; skin white as polished marble, and smooth; countenance perfectly placid; not one distorted muscle; pulse in the wrist imperceptible; motion of the heart scarcely to be felt; respiration visible only by gasping, and that not frequent; and, as it were, only a step between this imperfect state of life and death. Even from this state patients were, by the use of powerful stimulants, sometimes restored to life and health."—(*Mass. Med. Papers*, p. 126, vol. ii.) According to the same authority, the spots on the skin occurred in all stages of the disease, though less frequently on the first than on the subsequent days. In some cases, the cutaneous affection was in the form of a rash, like measles, or military eruption; or of florid red blotches; or vesicles and pustules, like those of kine and small pox, attended with much itching. In some instances, vesicles containing a bloody fluid occurred, similar to blood-blisters, of the size of a pea, and scattered over the whole body. In one instance, blisters like those produced by cantharides appeared on the breast, followed by sphacelation of the skin. Some estimated the cases in which some of these cutaneous affections, or petechiæ and vibices, appeared, to have been two thirds of the whole number, while one physician attended eighty cases of the disease, and observed but four instances in which spots or eruptions of any kind took place (*loc. cit.*). The above description applies to the more severe and malignant forms of the disease; in a large proportion of cases it was comparatively mild, and unattended with danger. For example, one physician reported but two deaths in 130 patients, and another one death in 50 patients; but in general the mortality was much greater. It was regarded very generally as not contagious. After it had prevailed for some time, derangement of the digestive organs became more common, as well as hardness of pulse, heat of skin, and biliary discharges. In some cases, black vomit was present. During the prevalence of spotted fever in New-England, the *typhus* fever was also more frequently met with than usual, appearing in many instances with its ordinary symptoms; in others the symptoms resembled those of the former disease.

Appearances on Dissection.—Soon after the

* [*Massachusetts Med. Papers*, vol. ii., p. 126.]

† J. A. GALLUP on "Spotted Fever," in "Sketches of Epidemic Diseases in the State of Vermont from its first Settlement to the Year 1815, with a Consideration of their Causes, Phenomena, and Treatment," 6vo, p. 419. Boston, 1815.]

patient expired, the skin assumed a deep livid colour, either generally diffused, or in spots of an irregular or rounded form. Wherever the cuticle was removed by vesication, the skin was almost black, and often covered by fluid blood. *Head.*—When the cranium was separated from the dura mater, there was often much adhesion, and a discharge of considerable quantity of blood. The whole surface between the dura mater and tunica arachnoides was quite moist with serum, sometimes transparent, at other times tinged with blood. The longitudinal sinus was filled with blood, and a general turgid condition of all the veins and sinuses. In some cases, the two hemispheres of the brain were adherent to the dura mater, near the longitudinal sinus, and to each other, with so much strength as often to require a laceration or incision through the substance of the brain, to arrive at the corpus collosum. The medullary substance exhibited a great number of bloody points at the sections of the vessels, while the cortical part seemed paler than usual. The lateral ventricles always contained a considerable quantity of water. The membrane at the base of the brain presented the same appearance as at the vertex. *Thorax.*—In every instance the small vessels on the surface of the heart were beautifully injected. The right and left cavities usually contained a small quantity of black blood, and frequently also the aorta. No particular marks of disease appeared about the lungs. Their substance contained a very variable portion of blood, of a black or purple colour, and the pleura seemed to be shrivelled, and adherent to the diaphragm. *Abdomen.*—The contents of this cavity scarcely showed any marks of disease. The coats of the stomach were generally free from the slightest morbid appearance; its contents had sometimes a resemblance to coffee grounds, or more nearly to brown soap, while in other cases they consisted of greenish mucus, each without any offensive odour. The whole tract of the intestinal canal was in a healthy state. The liver and spleen were deeply livid, and generally more or less congested, but free from any other morbid change. The gall-bladder was generally full of bile, which was of a dark colour and rosy consistence. The pancreas and kidneys presented nothing extraordinary. The bladder was commonly full of urine. The muscles, as well as all other parts which were filled and exhibited the colour of blood, were of a livid appearance, such as is not witnessed in other diseases.—(*Mass. Med. Papers*, vol. ii., part ii., 8vo, p. 178.)

In general, no particular marks of disease appeared in the thoracic and abdominal viscera, except those usually found in congestive diseases of a malignant character. Dr. GALLUP, however, speaks of discovering *petechia* on the external and internal coats of the stomach of the size of a pin's head; also throughout the whole *intestinal tract*; in the *diaphragm*, the *pleura*, and the serous membranes generally (*loc. cit.*). Dr. BOWEN has reported a case where a considerable quantity of pus was discovered between the dura mater and the brain, near the base, and unequivocal marks of inflammation appeared through the cranial contents. He also mentions the existence of spots in the membranes of the important viscera (GALLUP

On Epidemics," p. 243). It is to be regretted that no examinations of FEYER's glands appear to have been made in this disease, and we are therefore unable to institute a comparison between its anatomical characters and those of the ordinary *typhoid fever* of New-England, as described by HALE, JACKSON, and BARTLETT. Dr. FISH tells us that "there is little or no resemblance between *spotted* and *typhus* fevers, except in mild cases of the former; and in these the character of the disease may easily be discovered by the pulse, the temperature, the appearance of the tongue, the impaired external senses, the excretions, the delirium, and the state of the skin. In *typhus*, we have an increase of arterial action, a foul tongue, bitter taste in the mouth, and loss of appetite, clearly indicating a disordered stomach. The intestines also are deranged; the excretions are altered in quality or quantity; the temperature is increased, and the skin hot and dry; in short, between almost every symptom of the two diseases, when they are carefully compared, there will be found a material difference. In *spotted fever*, we have a severe chill, which is never succeeded by any permanent increase of heat; pungent and excruciating pain; entire prostration of strength, without previous excitement or debilitating evacuations; clean, or dry, pallid, and shrivelled tongue; weak, feeble, and, in some cases, imperceptible pulse; raving, or mild and playful delirium; hysteria, independent of any usual cause; impairment of the external senses; exemption of the alimentary canal from disease; profound coma and apoplectic stupor," &c. "All these," says Dr. F., "serve to distinguish this from other diseases, and mark it as hitherto unknown."—(*Loc. cit.*)

Such were the features of this disease as it prevailed in Connecticut, Massachusetts, and Vermont; but it was variously modified in different localities, sometimes running into ordinary typhus, at others complicated with a bronchial affection, attended with cough and the expectoration of a yellow mucus tinged with blood, and symptoms of severe pulmonary engorgement.

In some parts of the country, when complicated with bronchial affection, it went under the name of *typhoid pneumonia*, and Dr. J. STEARNS, in a paper read before the New-York Med. Soc., Feb., 1813 (*Med. and Phil. Register*, vol. iii., p. 504), descriptive of the "Epidemic," as it prevailed in Albany, calls it the same disease as prevailed in the Eastern States under the name of spotted fever, and says that "it appears to partake of two distinct and opposite natures, *pneumonia* and *typhus*." The *pneumonia typhodes* of 1812-13 was, however, generally regarded as a distinct disease.*—(See MANN'S "Medical Sketches.")

* ["The winter epidemic of 1812-13 was a form of disease distinct from that which, in the northern districts of the Eastern States the preceding winters, had been known by the name of *spotted fever*, although the exciting causes may have been similar. In the *spotted fever*, mental derangement was an almost general concomitant of the disease. In many instances, this operation of the brain was the first symptom of morbid action. Whereas *pneumonia*, especially among the troops, was never accompanied with mental derangement at its first attack, and but seldom in its more advanced stages, nor until the laborious respiration, which was a most prominent symptom at the first attack, had somewhat subsided, or the patient at the point of death."—MANN'S "Medical Sketches," p. 20. (For treatment, see under future section.)]

[AMER. BIBLIOG. AND REFER.—“A Treatise on a Malignant Epidemic, commonly called Spotted Fever, &c., by *Elisha North*, New-York, 12mo, p. 249, 1811.—Medical Papers communicated to the Massachusetts Medical Society, vol. ii., part ii., 8vo, p. 178.—An Inaugural Dissertation on the Disease termed Peticular, or Spotted Fever, submitted to the Examining Committee of the Medical Society of Connecticut, for the County of Hartford, by *Nathan Strong*, Jun., 8vo, p. 52. Hartford, 1810.—Observations on the Spotted Fever as it appeared in Orange County, N. Y., in 1808 and 1809, communicated in a Letter from *Dr. D. R. Arnell*, of Goshen, to *Dr. D. Hosack*, in *Am. Med. and Phil. Register*, vol. i., p. 12.—*Ibid.*, p. 176.—Remarks on the Prevailing Epidemic of New-York, by *John Stearns*, M.D., of Albany, read before the State Medical Society in Feb., 1813, in *Am. Med. and Phil. Register*, vol. iii., p. 504.—Remarks on the Spotted Fever as it prevailed at Hartford, Conn., in the Year 1807, in *Physico-Med. Trans. of N. Y.*, vol. i., p. 20, by *Henry Fish*, M.D.—Sketches of Epidemic Diseases in the State of Vermont, from its first Settlement to the Year 1815, with a Consideration of their Causes, Phenomena, and Treatment, by *J. A. Gallup*, 8vo, p. 419. Boston, 1815.—Medical Sketches of the Campaigns of 1812, 13, 14, to which are added Surgical Cases, Observations on Military Hospitals, &c., by *James Mann*, M.D., Hospital Surgeon of the Army. Dedham, 8vo, p. 317; 1816.—*E. Hale*, on Spotted Fever.]

iv. TYPHUS.—SYN. *True Typhus*, *Exanthematic Typhus*; *Nervous Fever with exanthematous Eruption*; *Contagious Typhus*; *Febris nervosa epidemica*; *F. nervosa exanthematica*; *F. maligna cum sopore*, Rivière; *F. contagiosa*; *F. nervosa petechialis*; *F. pestilentialis Europæ*; *Typhus Contagiosus exanthematicus*, Hildenbrand; *T. Castrensis*, Boerhaave; *T. Gravior*, Cullen; *T. nostras*, *T. Europæus*; *T. Communis*, *T. Bellicus*; *T. Contagiosus*, Naumann; *T. Exanthematicus*; *Pestis Bellica*; *Der Ansteckende Typhus*, *Das Ansteckendefieber*, *Das Exanthematische Nervenfieber*, Germ.; *Die Kriegsppest*, Hufeland; *Das Fleckfieber*, Reuss; *Typhus Contagieux*, *Fièvre d'Hôpital*, Fr.; *Fièvre adynamique ataxique*, Pinel; *Tifo Contagioso*, Ital.

485. This fever is characterized by phenomena which distinguish it from the foregoing varieties, by *catarrhal and gastric symptoms early in the disease*; by *stupor, delirium, or typhomania*; by *a peculiar cutaneous eruption*; by *more or less evident affection of the liver*, and by *the determinate course and regular succession of all the febrile changes*.

486. *True or contagious typhus* has been confounded with *synchoïd and nervous fevers*, on the one hand, and with *putrid or malignant fever* on the other. It has been already stated that putridity or malignancy not only may characterize a particular form of fever or certain epidemics, even at an early period of their course; but also, owing to various contingencies, may take place in advanced stages of any other fever. As the circumstances favouring the generation and spread of typhus are often such as also tend to develop those changes which have been usually named putrid or malignant, and as these changes are frequently observed in the latter stages of typhus—the symptoms distinguishing this fever becoming associated with, or followed by those indicating the putro-adynamic state—so has it been often confounded with other fevers, in which this state has predominated more or less. If we refer to the numerous histories of epidemic typhus recorded by writers from the close of the fifteenth century up to the present time, or even to the brief abstracts furnished by *M. Ozanam* (*Hist. Méd. des Maladies Epidémiques*, &c., t. iv., p. 155, *et seq.*), we shall find, that although many of these, owing to the concurrence of circum-

stances developing a putrid or malignant disease, were instances of fever, either identical with, or very closely resembling that which I have described as such in the preceding section; yet many others—or even the majority—were true typhus in which the putro-adynamic state was either early or prominently developed; the exanthematous eruption characteristic of typhus being succeeded or accompanied by the petechiæ indicating the approach of the septic condition, and being either mistaken for them, or for an eruption of miliaria. Owing to this circumstance especially, typhus, low nervous, and putrid fevers have been very generally confounded together. The essential characters of typhus were first distinctly traced by SAUVAGES; but CULLEN mixed them up with the symptoms of those forms of low nervous or typhoid fever which occur sporadically. Even among modern writers, comparatively few have made the distinction, excepting HILDENBRAND, FODÉRÉ, NAUMANN, PEEBLES, and some others. True or contagious typhus has not been epidemic in England for many years; or, if it have appeared in a few places, it has not extended beyond them. In Ireland, however, it was extensively prevalent, particularly in the years 1817, 1818, and 1819; and in some parts of Scotland since that time. The fevers most commonly observed in England, and particularly in London, have been either synchoïd, simple, or complicated; or low nervous fever variously associated, and but rarely displaying a predominance of putrid or septic characters. During 1836, 7, 8, and 9, this fever was very prevalent in London, and in several other places.

487. True typhus, although prone to assume a septic condition, especially when epidemic, and appearing under the unfavourable circumstances about to be noticed, yet may run its whole course without petechiæ or any marked putrid symptom. It may, as shown by HILDENBRAND, be simple, or variously complicated; and, as remarked by Dr. PEEBLES, it may be benign throughout, or assume a malignant character, according to individual diathesis, the nature of the prevailing epidemic, or the mode of treatment. It generally presents itself as an epidemic, is contagious, and runs a uniform course, unless predominant affection of some internal organ modifies its course or prolongs its duration.

488. It has been shown above that the *petechial affection* consists of minute stains or ecchymoses, caused by the transudation of blood from the minute capillaries of the vascular *rete* of the skin, owing to the atony of these vessels and the alteration of the blood; that it may occur in the advanced stage of any fever, even of the more inflammatory or purely eruptive, when converted into an adynamic or typhoid state, by improper treatment or the peculiar condition of the patient; and that it is not, in any sense of the word, an *eruption*, as it has been very improperly denominated by some writers. This change in the skin, which has been viewed as one of the chief indications of incipient putridity, or of a septic tendency, is very different from the eruption characterizing typhus. The *petechiæ*, or cutaneous ecchymoses, vary in dimensions from minute *stigmata* to large patches or *vibices*, and in the deepness or shade of colour. They very rarely appear at the com-

mencement, even of the more putrid or malignant fevers, unless from peculiar depravity of constitution, or from causes affecting more especially the circulating fluids—as impure air, imperfect nourishment, unwholesome food, or other injurious ingesta.

489. But the *exanthematous eruption* attending true typhus is as characteristic of it as the eruptions of measles or of scarlatina; and, although observed by numerous writers, it has been confounded with petechiæ, with which it is often associated in the advanced stages of the fever, or with miliary eruptions. HILDENBRAND gave a description of it, as it appeared in the contagious fevers prevalent in Germany during the commencement of the present century; and Dr. PEBBLES has recently described it accurately and minutely, and as he saw it in Italy soon after the war. His description agrees with my own observations about the same period. This eruption appears in the early progress of a fever produced by human effluvia, when circumstances occur to promote them, or to prevent their dissipation. The animal miasm, whether generated by numbers crowded in a small space and confined air, or proceeding from a person affected by the disease, should be viewed as a poison affecting the human body in a specific manner, and causing fever with an eruption of a certain form, which propagates itself by the diffusion of a morbid effluvia in the surrounding air, or by its retention in various animal productions or porous substances when shut up from the air.

490. This eruption usually appears from the third to the seventh day of the fever; but it may be delayed till the twelfth or fourteenth day. It is of a florid, reddish, or reddish pink colour; disappearing on pressure, but soon returning when pressure is removed. This circumstance is sufficient to distinguish it from petechiæ. The more exuberant resembles the measles, and has been mistaken for them; but it is more papillar, and rougher to the touch, being sensibly elevated to the eye; and, although sometimes grouped or crowded, it does not coalesce so much as measles, but each papilla is more or less separate. It is sometimes vesicular, and followed by desquamation of the cuticle. It is occasionally indistinct, and may be then overlooked, and it sometimes approaches more nearly the miliary eruption. Hence it has been mistaken for this eruption in such cases. It is generally confined to the trunk of the body, the arms, and thighs, but it may cover nearly all the body. It rarely extends over the face or hands. In children it appears only upon the trunk, or parts of it, and often scantily. It is sometimes evanescent, disappearing in one part of the body and returning in another (PEBBLES). It may be copious in some cases, and scanty in others, even in the same family. Owing to these circumstances, it may escape observation. It is not liable to recede early in its course; but if it disappear from injudicious treatment, or a faulty state of the system, malignant symptoms are apt to supervene.

491. In some cases, the interstices of the skin between the papillæ are red or erythematous. In these, there are also increased suffusion of the eyes, redness of the tongue at the point and edges, redness of the fauces, as in mild scarlatina, and subsequent desquamation of the cuti-

cle. The *duration* of this eruption is from three to five days. When the exantheme is slight, it disappears without leaving discernible marks; but when it is exuberant, stains are left in the situation of the papillæ. If petechiæ occur in this fever, they seldom are observed before the eighth or tenth day, and then this eruption has usually disappeared. When the petechiæ are earlier, or the eruption continues longer, so that both exist together, they are quite distinct and different in their appearances; for the latter is never so dark or livid as the former generally is, and the petechiæ are not attended by the elevation of the cuticle and roughness characterizing the eruption. The stains left by an exuberant eruption generally become livid when petechiæ are present; but the eruption itself does not assume a dark tint as long as it retains its papillar form. In the more malignant cases, and when petechiæ appear early in the disease, the colour of the eruption may, however, become deeper, or may change with the alteration in the fluids and softer solids.

492. *A. DESCRIPTION.*—True typhus proceeds in a more regular and determinate manner than synochoid or nervous fevers, and presents the several stages into which I divided fever when treating of it generally. *a.* The *premonitory stage* exhibits the same symptoms as are observed to announce other fevers, and varies much in duration. HILDENBRAND states from three to seven days; but a much longer time may elapse from the time of infection to the occurrence of the *stage of invasion*. This period is the commencement of the febrile paroxysms. It begins with a creeping sensation over the head and back, followed by shiverings, paleness of the surface, the cutis asnerina, intervening flushes of heat, heaviness or giddiness of the head, and the usual symptoms of this stage. *b.* After a few hours—seldom more than twelve—the *stage of reaction*—the *inflammatory* of HILDENBRAND, the *irritative inflammatory* of GOEDEN—appears. The pulse becomes full, strong, or oppressed; the countenance flushed; the skin hot and turgid; the head confused, heavy, or giddy, and the urine scanty and high-coloured. With these are associated catarrhal or gastric symptoms. On the second day of this stage, after a sleepless and restless night, the heat increases, while the vomiting and sometimes the nausea disappear. The weight in the head changes to stupor, often with *tinnitus aurium*; giddiness is augmented, and the upright posture cannot be borne. The catarrhal affection is more developed: the eyes are red; the mucous membrane of the nose and fauces is tumid and red: deglutition is painful; tightness is felt in the chest, often with cough; and both hypochondria are tense and painful. The patient is averse from exertion, tardy in his answers, silent as to his complaint, and slow in protruding his tongue. These symptoms continue during the third and fourth days. On the latter of these, an exacerbation takes place, usually followed by a moderate epistaxis, excepting in the milder cases, and generally with relief of the affection of the head. From the third to the sixth day, but sometimes later, the surface of the body becomes turgid and the eruption appears. During the fifth, sixth, and seventh days the symptoms are unchanged, excepting that the ca-

tarrhal affection commonly ceases with the appearance of the eruption. On the seventh day an evident exacerbation takes place, followed by a slight remission of a few hours, and introduces a new stage.

493. *c. The nervous stage—the status nervosus* of HILDENBRAND—begins with the eighth day from the occurrence of rigours. The heat of the surface is now considerably increased, but the turgidity disappears. The epidermis is dry, shrivelled, and brittle, but petechiæ or miliaria are frequently present, and either appear in the latter part of the preceding stage or early in this. The tongue, which was at first clean, and subsequently white, rather than loaded or furred, now becomes parched and shrunk. Thirst is increased, but the torpor is often so great that the patient does not ask for drink. The tightness of the chest goes off, and the breathing is freer, but more frequent. The cough ceases, and is often replaced by singultus. Swallowing is impeded, chiefly owing to the dryness of the fauces and pharynx. The bowels now assume activity, predominant action being determined to them in place of the skin. Repeated, loose, fetid stools occur, attended by slight pains in the bowels, and by flatulent distention of the abdomen, evidently owing to increased vascular action. The pulse is variable; it generally continues full, free, not very frequent, nor small or soft; and it often indicates imperfect reaction or contraction after the heart's impulse, or seems to be in a state of constant expansion. The most prominent, however, of the symptoms in this stage are those referable to the sensorium. In the preceding stage the external senses are impaired, and the ideas confused. There are sleeplessness, restlessness, and some involuntary motions. These are all aggravated or modified in this period. Muscular power is suppressed by the general torpor of the nervous system, rather than by debility, as in a state of intoxication; but the involuntary motions, such as tremours, subsultus tendinum, slight convulsions, or spasmodic affections, are increased. Difficulty of deglutition, and of evacuating the urine, is more common; deafness is increased; vision is impaired, and smell and taste are lost. The patient dreams without being asleep (*typhomania*), talks deliriously, is occupied with his internal impressions, and disregards or is unimpressed by external objects, or confounds internal and external perceptions. A single idea or impression usually torments the patient during the fever, and on recovery there is seldom any recollection of it. This state closely resembles somnambulism. With insensibility to external objects, there is complete loss of the appetites and desires; the patient wishes and feels nothing, and replies, when roused, that he is very well. This stupor, in various degrees, with the supine posture, at once announces the form of the disease. The foregoing symptoms continue during the ninth and tenth days. On the evening of the latter day a stronger evening exacerbation than usual occurs, and lasts for a few hours; and a gentle perspiration, or some evacuation by stool or urine, takes place. A slight remission follows on the eleventh day; but on the twelfth and thirteenth febrile heat, and the affection of the nervous system, are again increased.

494. *d. The period of crisis* now generally succeeds, and without any assistance from art. At the end of the thirteenth day, a more severe exacerbation than any former one takes place; the heat is more glowing; the arteries pulsate more strongly; the brain is more affected, and the stupor passes into sopor. In twelve hours afterward, and on the fourteenth day, the parched skin shows a tendency to perspiration. In some a slight epistaxis occurs, with relief to the head; the nostrils become moist; the tongue, at the point and edges, moist, clean, and red; and perspiration more copious and general. A free expectoration often takes place, especially if the chest has been affected. When the perspiration is salutary, it is uniform, not clammy, has a peculiar smell, and occurs during sleep. The stools are now copious, loose, and offensive; and the urine plentiful, muddy, high-coloured, and deposits a copious sediment. With these changes, or in a few hours afterward, the patient seems as if he had awakened from a dream, or from a state of intoxication; and, with the return of complete consciousness, all the severe symptoms abate. A sense of fatigue and weakness, soreness of the whole body, pale, hollow countenance, giddiness, deafness, and *tinnitus aurium*, drowsiness, or frequent inclination to sleep, tendency to perspire, quick pulse, and acceleration of it upon slight irritation or exertion, unnatural taste in the mouth, whitish tongue, &c., remain for six or seven days after the crisis, these symptoms gradually disappearing, the *tinnitus aurium* last of all.

495. *B. Modifications and complications.*—As in exanthematous fevers, so in this, variations from the regular type, both in the symptoms and in their course, are apt to occur, owing, 1st, to the age, habit of body, previous health, and temperament of the patient; 2dly, to the prevailing epidemic constitution, whether inflammatory, bilious, or tending to the periodic type; and, 3dly, to the living, diet, and treatment, and to the unfavourable circumstances to which the patient is exposed.—*a. The anomalous phenomena* observed in the *stage of invasion* are few. The shivering may be so slight as hardly to be observed; the fever seeming to begin at once with increased heat; or the rigours may last or return at intervals, during some days. In the *period of reaction* the modifications are often more numerous and striking. The inflammatory character of this stage is often greatly increased; sometimes as respects the violence of the general symptoms, but at others with severe local affection. When the *head* is the seat of prominent action, the delirium may be phrenitic, maniacal, or the stupor may amount to apoplectic sopor. Inflammation may take place, either in the *lungs*, or in the *liver*, or in the *digestive mucous surface*, and be so fully developed as to resemble idiopathic disease of the viscera, if the previous fever, stupor, *tinnitus aurium*, and peculiar eruption, did not establish the difference between them. *Bilio-gastric* affection, also, may be so prominent as to simulate that form of fever. But the stupor and typhomania will assist the diagnosis, should the eruption be so slight as to escape observation. The *nervous* character may show itself prematurely, especially when the vital powers are weak, depressed, or speedily exhausted. In

these, *septic* or *malignant* symptoms may occur. In some cases, the inflammatory stage may continue to the ninth, or even to the eleventh day.

496. *b.* In the *nervous stage* various modifications are also observed. Local affections may continue through the greater part of this stage, or may even first appear in it; particularly those seated in the intestines, and implicating especially the mucous follicles. Diarrhœa, or typhoid dysentery, may thus supervene, and be either slight, severe, or fatal. The former of these affections is caused by vascular determination to the intestinal mucous surface, consequent upon the subsidence of the eruption, and by the unhealthy bile secreted by the irritated liver from the impure blood circulating in it. The dysenteric symptoms are owing to the morbid action going on in the lower part of the ileum, cæcum, and large bowels. Lumbrici are sometimes passed. But the principal and most frequent variations consist in the appearance of numerous *petechia* and vibices, or in their increase or deeper hue, if they had previously been observed, with several other putro-adyamic changes. In these, the nervous symptoms may not be more remarkable than in milder cases; or these symptoms may be very prominent, either with or without the occurrence or aggravation of the malignant or septic state. Military eruptions may also appear in this stage. In the more unfavourable cases the tongue may be shrunk like a piece of burned leather, the heat of surface excessive, the diarrhœa exhausting, the distention of the abdomen great, and pains in the bowels severe. *Musca volitantes*, picking of the bed-clothes, constant muttering, spasmodic affections, stiffness or cramps of the extremities, paralysis of the eyelids or tongue, horror at liquids may also occur. A black coating of the tongue and teeth; fetor of the breath, stools, and of the body; dark *petechiæ* or vibices; ecchymoses or bluish patches; passive hæmorrhages, and even carbuncles, may appear during this stage, particularly when circumstances concur to produce putrid or septic changes in the course of the fever. These severe cases, if they are not fatal before the fourteenth day, often run on to the seventeenth, twenty-first, or twenty-eighth day, and generally end in death.

497. *c.* Sometimes the *præcrisis* on the seventh day either does not take place, or is not followed by any alleviation, or is attended by aggravation of the symptoms. If a decisive *crisis* take not place on the fourteenth day, it rarely happens till the twenty-first, a crisis between these days being seldom effective. When death occurs, the fatal change is either premature or procrastinated. The symptoms accompanying a crisis are often variable. Changes in the urine cannot be depended upon. Discharges from the bowels are often copious, without benefit; and if they continue so without alleviation of the symptoms, or are unnatural, ulceration of the intestinal mucous surface may be dreaded. A critical sweat is sometimes wanting, the patient recovering nevertheless.

498. *d.* The *decline* of the disease may be protracted, but never shortened; and attended by various symptoms, as a continuation of the stupor, nightly recurrence of delirium, or lingering affections of some one of the thoracic or abdominal viscera. A new disease, of an in-

flammatory kind may occur during the stages of decline and convalescence, or tubercular consumption may supervene; and *relapses* are not infrequent in the latter period, owing to a fresh infection. *Recovery* may be *retarded* by the severity of the complications, by want of sleep, by errors in regimen, and by the depressing passions.

499. *e.* The foregoing modifications refer entirely to aggravating circumstances, but some cases are so slight that the patient scarcely keeps his bed, a trifling degree of stupor, with scanty eruption, and occasional pains in the bowels, constituting the chief complaint. In the more benign cases, a decisive crisis occasionally takes place as early as the eleventh, or even the ninth day; but *relapses* are liable to follow if the patient be exposed to a re-infection.

500. *v. CAUSES.*—*A.* The causes of typhoid fevers differ but little from those of the synchoid forms.—*a.* The *predisposing causes* (§ 446) of both are the same. Although typhoid fevers most frequently occur in persons from fifteen to forty years of age, yet the mortality, in proportion to the number affected, is much less in this than in more advanced periods of life. The predisposition to be attacked diminishes remarkably with advancing age, especially after fifty; but the proportion of those who die increases in a still greater ratio. The predisposition also diminishes as we descend from puberty to infancy, and the mortality diminishes in a still greater ratio. Thus children and aged persons are least obnoxious to typhoid and infectious fevers; a somewhat different law here obtaining from that which characterizes the operation of exhalations from the soil upon the human constitution; these latter affecting the young and old as well as the middle-aged, and renewing their attacks in various forms, while typhus fever seldom occurs oftener than once in the same person.

501. *b.* The *exciting causes* of typhoid and synchoid (§ 449, *et seq.*) fevers are often the same, excepting that infectious miasms, want, and famine, the various contingencies connected with the operations of war, and epidemic influences are most concerned in producing the *severer varieties* about to be described. The *sporadic cases* of this fever, and which generally present either the milder form, or most of the nervous character, often originate in the depressing passions, in changes from the usual habits and modes of life, or in exposure to novel influences, physical and moral; in weak, delicate persons, of a lax habit of body; in persons imperfectly fed, or reduced by previous disease, or by exhausting discharges, &c. From these causes, especially, proceed the adynamic, slow nervous, or mild typhoid fevers often observed in persons who have recently removed into large cities, or who live in crowded, low, and ill-ventilated apartments. The *epidemic visitations* of typhoid fever are usually of the more low or severe forms described hereafter.

502. Although nervous and typhoid fevers arise from animal or infectious miasms, yet they proceed also from other causes, as shown above (§ 452, 501), especially mental emotions and impure air. The more complicated and putro-adyamic states of those fevers may be consequent upon other forms of fever, or upon

fevers differently characterized at the commencement; but they may also arise from infectious exhalations, or more immediately and sporadically from terrestrial emanations, or from the effluvia produced by animal and vegetable matters during decomposition, particularly in a close, warm, and humid air; or from a combination of causes both internal or intrinsic and external, as respects the patient; and they may subsequently extend themselves by the infectious miasms generated in their course.*

503. B.—The chief cause of true typhus has been already stated to be an animal miasm, generated either by a number of persons confined in a close air, or by the disease itself. This miasm contaminates the air, and infects the healthy frame through the respiratory organs, either directly as it proceeds from the morbid source, or indirectly by means of substances capable of retaining it for a time, and of giving it out upon exposure to the air. The causes predisposing to, or counteracting infection, are deserving of a brief notice. Infants and old persons are the least susceptible. Adults, of delicate habits and melancholy disposition, and those who dread infection, are most liable to be attacked. Insufficient or unwholesome nourishment, personal or domestic filth, and bodily fatigue or mental distress, are very influential concurring causes. Persons of a lively disposition, those who use tobacco, and who have no fear of the disease, most frequently escape. Chronic diseases, particularly those of the lungs, ulcers, and external sores or eruptions, are very often preventives. HILDBRAND states that, in his very extensive expe-

rience, he never saw a consumptive patient contract the disease. A regular and fully developed attack seems to prevent a second, for many years afterward, if not forever.

504. C.—The Causes of both Synochoid and Typhoid Fevers are most active, or abound most—are longer retained and more rapidly spread—in large cities, or in manufacturing towns, especially in low, crowded, foul, close, and ill-ventilated parts of these towns. This fact, already well known, has been ably illustrated by Dr. COWAN. In the large manufacturing city of Glasgow, these fevers have been lately more prevalent than in any other part of Great Britain. This has been the case since 1815, and more particularly since 1824. A nearly equal prevalence of these fevers in Edinburgh since 1831 has been shown by Drs. ALISON and CHRISTISON. Dr. COWAN estimates the numbers of cases of fever in Glasgow in 1835, 1836, and 1837, at 6180, 10,092, and 21,800 respectively, one third of which cases was treated in hospitals. The epidemic prevalence of fevers in Glasgow and Edinburgh is favoured beyond what is observed in the large manufacturing towns in England, by the much lower living of the poor, and by the want of due provision for the necessitous in the former places. The diminished prevalence of fever with advanced age, remarked upon above (§ 500), has been well illustrated by Dr. COWAN in his researches into the statistics of the epidemic of Glasgow in 1836. He adduces the following table of the relative population and relative numbers of cases of fevers at different ages admitted into hospitals:

| Age. | 5 to 10. | 10 to 15. | 15 to 20. | 20 to 30. | 30 to 40. | 40 to 50. | 50 to 60. | above 60. |
|--------------------|----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Population - - - - | 25,707 | 21,211 | 20,745 | 38,185 | 26,419 | 18,014 | 11,648 | 10,220 |
| Fevers - - - - | 191 | 318 | 501 | 715 | 309 | 128 | 43 | 11 |

According to the observations lately made both in Edinburgh and Glasgow, the prevalence of synochoid and typhoid fevers in both sexes appears to have been nearly equal.

505. XXIII. PROGNOSIS, TERMINATIONS, MORTALITY, AND ORGANIC CHANGES IN SYNOCHOID AND TYPHOID FEVERS.—I. PROGNOSIS.—The prognosis will be influenced by the appearance of any of those phenomena to which attention has been directed above (§ 418, *et seq.*). But in addi-

tion to these, the practitioner will take into the account the previous condition, the age, and the sex of the patient, the nature of the prevailing epidemic, and the influences continuing to operate during treatment. As to the manner in which age should affect the prognosis from the beginning, some very interesting facts have been adduced by Dr. ALISON, who has given the following table in illustration of the comparative prevalence and mortality of typhoid fever at different ages, as observed in his practice:

| | Cases. | Deaths. | Proportions. |
|----------------------|--------|---------|--------------|
| Under 15 years - - - | 83 | 2 | 1 in 41½ |
| 15 to 30 - - - - | 149 | 11 | 1 in 13½ |
| 30 to 50 - - - - | 93 | 17 | 1 in 5½ |
| Above 50 - - - - | 17 | 7 | 1 in 2½ |
| Total | 342 | 37 | 1 in 9½ |

Of these 342, there were 170 cases of simple or mild typhus, in which only three deaths occurred; 79 cases presenting prominent affection of the head, and in these 21 were fatal; 58 cases with affection of the pulmonary organs, in which 13 were fatal; and 35 with abdominal affection, in which only one death occurred. From these, as well as from other data and facts which have come before every experienced physician, it may be inferred that the mortality from this fever increases in an accelerating ratio with advance in age and predominant affection of vital organs. It is very probable that the great increase in deaths at an advanced age proceeds from the circumstance of the powers of life being then less able

* A gentleman far advanced in age, on ascending the steps leading to the entrance of a chapel in this city, underneath which the bodies of the deceased members are buried, was suddenly struck by a gush of foul air which issued from the grated openings, leading from the place of burial, on each side of the steps. He instantly felt sick and faint, and after a short time was obliged to leave the chapel. The following day (Monday) he was confined to his house, and complained of aching pain of the back, limbs, and joints; of sinking and anxiety at the epigastrium and præcordia; of giddiness, confusion of intellect, and of chilliness, and great depression. I saw him on Tuesday. In addition to these symptoms, there was great prostration of muscular power; his pulse was quick, weak, and unequal, but not above 100; his tongue was loaded with a brownish fur, and dry; his bowels constipated; his skin dry, harsh, and unhealthy in its aspect; his countenance anxious and sallow. The disease proceeded very nearly as described above (see 473, *et seq.*), and he died on the eighth day of my attendance, and about the eleventh from exposure to its cause. His wife, also far advanced in age, and who had continued to sleep with her husband during the first three days of the disease, was similarly attacked two days afterward, and three days before his death. Her symptoms throughout were entirely similar to those of her husband. She also died on the eighth day of the disease. The bodies of both rapidly went on to decomposition, although the weather was very cold. Disinfecting means were employed as soon as the nature of the fever was manifested, and no other person was infected.

to resist the changes and tendency to death that takes place in the course of the disease, and the contamination of the fluids and soft solids; and from certain internal organs having then become highly predisposed to serious functional and organic lesions.

506. Typhoid fevers are seldom dangerous to children in any class of society, although they are often attacked when the disease is epidemic. In the upper ranks, and in those accustomed to live fully and luxuriously, they are very fatal, and generally assume highly inflammatory states in the early stages, or septic changes at a later period. In the epidemic in Ireland, during 1817, 1818, and 1819, from one fourth to one half of those in good circumstances who were infected died. Of twelve physicians who were actively engaged in the treatment of the fever in Cork, eleven were seized with it, and four died. They are much less fatal to females than to males; but pregnant women often miscarry when they are attacked. In an equal number of males and of females affected, the deaths may be stated to be in the relative proportion of eleven of the former to seven of the latter. Persons whose minds have been very much harassed or exerted previously to infection are in the greatest danger. The putrodynamic form, and next to it the low or complicated nervous, are the most dangerous of typhoid fevers. These fevers, particularly when epidemic and under circumstances favouring infection, are extremely fatal to the dark races, and especially to negroes. The circumstances more particularly indicative of the prognosis has been fully discussed above.

507. ii. THE TERMINATIONS OF SYNOCHOID AND TYPHOID FEVERS vary remarkably, according to the peculiar features of the epidemic, the locality in which it prevails, the classes of society which it especially attacks, to the age, sex, previous health, and circumstances of the infected, to the numerous extrinsic and intrinsic circumstances of the attacked, and to the contingent occurrences and concurrent causes connected with the appearance of any form of those fevers.—A. Recovery, however, takes place in the great majority of cases of these fevers, even when left to nature. Treatment influences chiefly the amount of that majority, and, unless when very injudicious, not in so remarkable a degree as usually supposed. The causes which prevent this issue are those which, singly or conjointly, favour a fatal termination; and are chiefly, 1st, treatment of the patient in unfavourable circumstances, as in a foul, close, or infectious air; 2d, exhaustion of vital power and of irritability; 3d, local complications proceeding to organic lesion; 4th, contamination of the circulating and secreted fluid; and, 5th, officious interference on the part of the medical attendant.

508. B. Although death is most commonly the result of these changes, yet visceral disease, remaining after recovery from the fever, and either gradually disappearing, or becoming more and more fully developed until life can no longer be sustained, is sometimes consequent upon one or other of them. This is, however, a much less frequent termination of the fevers proceeding from animal infection than of those arising from terrestrial emanations.

509. C. Death is generally caused by two or

more of the above circumstances, seldom of one of them only, although either may be mainly concerned in causing it. When death is produced by inflammation of the brain or of its membranes, during the stage of reaction, or by simple or inflammatory congestion, in this or the subsequent stage, symptoms of an irritated or inflammatory state of the brain, passing more or less rapidly into apoplectic sopor, precede the fatal issue. In these, the blood-vessels of the brain and membranes are engorged, sometimes with extravasation of serum, or of sanguineous serum, or more rarely of blood. The patient sometimes dies soon after a critical exacerbation from the sudden occurrence of the apoplectic state. In this case the brain is only slightly congested, with little or no effusion of fluid. In those who die with cerebral affection in an advanced period of the disease, collections of serous fluid in the ventricles and between the membranes of the brain are frequently found. Abscesses in the substance of the brain are met with in rare instances. HILDENBRAND considers nervous apoplexy to be the most frequent cause of death in exanthematic typhus. This only occurs in the latter days of the disease, preceded by the symptoms of the nervous stage, a fatal result taking place suddenly. As it usually happens on critical days, it may arise from the exacerbation which then occurs wholly exhausting the nervous powers, particularly as no morbid appearances, at all adequate to account for death, are observed on dissection. It differs but little from death by debility, excepting that the latter mode takes place gradually and slowly. When debility or exhausted irritability, the state of the blood, or lesions of the intestines, cause this termination, the stupor and delirium generally cease, and the patient recovers his consciousness just before death. Upon dissection, in these cases, no morbid appearances, beyond slight congestion, or a somewhat increased quantity of fluid in the ventricles or at the base of the brain, are observed within the cranium, the digestive mucous surface, and the blood in the large vessels and cavities of the heart being most altered. Medical treatment, if not very judiciously directed, may be as injurious as beneficial, by interrupting the regular succession of morbid phenomena, and preventing those changes from taking place that are conducive to recovery. An officious interference may thus be mischievous, particularly when the disease is regular or moderate, and no vital organ is very severely affected. Medical treatment will not shorten the disease; we can only expect to conduct it to a successful issue by protecting internal organs from injury when they experience the onus of morbid action, and by resisting the tendency to death in the last stages.

510. A fatal issue is evidently caused or accelerated, in some cases, by the severity of the associated disease of the respiratory organs preventing the necessary changes from being effected in the blood circulating in the lungs. It proceeds in others chiefly from the influence of the morbid blood upon the weakened irritability of contractile tissues, and particularly of the heart, and, in rare instances, from perforation of the intestines inducing general peritonitis, which soon exhausts the remaining powers of life. The lesions of the digestive

mucous surface evidently assist in producing this effect, but in a much less degree than the depression of organic nervous power and of irritability, and the deteriorated state of the blood, with which they are intimately connected, and of which they are important effects. All these internal lesions evidently commence in the course, or even not until the advanced stages of the disease, and, when developed, are analogous to the sphacelated sores and other alterations which take place in external parts in the more malignant cases. These internal as well as external lesions depend upon the anterior changes in the organic nervous power and irritability, and in the blood; they present similar characters, and, where even the slighter external lesions are observed, the existence or occurrence of those that are internal is to be feared. The most constant of these latter are discoloration and diminished cohesion of the intestinal tunics, distention of the intestinal tube by flatus, and enlargement and ulceration of the follicles, with inflammation or engorgement of the mesenteric glands. There are various other lesions associated with those, but they are different in different cases.

511. iii. THE RATE OF MORTALITY in these fevers necessarily differs with the circumstances just alluded to. It is obvious that the rate will be high in hospitals which receive cases at an advanced stage of the malady, and to which the worst cases are sent. Not only does the mortality vary with the form of fever and its complications, with the prevailing epidemic, with the season, and with the numerous circumstances predisposing to and aiding the exciting causes, but also with the influences which come into operation during the progress of the malady. Hence the great differences in mortality observed by writers in different fevers and epidemics. Dr. ALISON found the mortality at all ages, 1 in $9\frac{1}{3}$; Dr. CHRISTISON 1 in 10 in 1837, and 1 in $6\frac{27}{100}$ in 1838. Dr. COWAN states the deaths to have been 1 in 15 in Glasgow during 1835, 1 in 12 during 1836, and 1 in 10 during 1837; the rate of mortality in Glasgow and Edinburgh during this last year being the same. HILDENBRAND estimated the deaths in exanthematic typhus at one in 10. Dr. BARDSLEY observed the mortality in typhoid fevers, in the Manchester Hospital, to vary from 1 in 12 to 1 in $6\frac{1}{3}$, the average being 1 in $8\frac{1}{4}$. It has been supposed that a great increase of deaths from fevers diminishes the number of deaths from other diseases; but Dr. COWAN has proved, by documents of what has been observed in Glasgow since 1813, that during the prevalence of epidemic fevers in that city the mortality from other diseases may be greatly increased. In 1835-6-7, the deaths from fever were 412, 841, and 2180 respectively, and from other maladies, 7198, 8441, and 10,270 respectively, constituting, in relation to the mortality caused by other diseases, 1 in 15.6, 1 in 10, and 1 in 4.7 annually; and to the population, 1 in 570, 290, and 116.

[From the "Fifth Annual Report of the Registrar General of Births, Deaths, and Marriages in England" (Lond., 1843), it appears that out of 100,000 MALES dying under 5 years, 61 die of ague (intermittent fever), 61 of remittent fever, and 1086 of typhus. Out of 100,000 dying at 5 and under 10, 107 die of remit-

tent, and 7166 of typhus; at 10 and under 15, 10,405 die of typhus; at 15 and under 20 (of males), 216 die of ague, and 10,173 of typhus; at 20 and under 25, 6568 die of typhus; at 30 and under 40, 3853 die of typhus; at 40 and under 50, 3591 die of typhus; at 50 and under 60, 56 of ague; 56 of remittent, and 2083 of typhus; at 60 and under 70, 1722 die of typhus; at 70 and under 80, 1440 die of typhus; at 80 and under 90, 186 die of remittent, and 186 of typhus. Out of 100,000 FEMALES under 5, 34 die of ague, 45 die of remittent fever, and 1144 of typhus; at 5 and under 10, 218 die of ague, 327 of remittent fever, and 8052 of typhus; at 10 and under 15, 274 die of ague, 274 of remittent fever, and 8493 of typhus; at 15 and under 20, 9534 die of typhus; at 20 and under 25, 5006 die of typhus; at 25 and under 30, 4333 die of typhus; at 30 and under 35, 60 die of ague, and 2776 of typhus; at 35 and under 40, 2615 die of typhus; at 40 and under 45, 2376 die of typhus; at 45 and under 50, 1544 die of typhus; at 50 and 55, 214 of typhus.—(*Loc. cit.*)

From statistics collected and published by Dr. A. S. THOMSON (*Ed. Med. and Surg. Journ.*, July, 1828), in relation to the prevalence, susceptibility, intensity, and prognosis of fever in Great Britain, we learn, 1. That the annual ratio of deaths from fever in London has decreased since the commencement of the 18th century. 2. That the susceptibility to be attacked by fever is greatest among individuals under 10 years of age, and from 20 to 30. 3. That the period of life during which the highest ratio of mortality occurs from fever is from 40 to 50. 4. That there is no very apparent difference in regard to one sex being more susceptible to fever than another. 5. That there is about 1 death for every 15 persons attacked by fever. 6. That the intensity of fever increases with the age of the patient about 34 per cent. every decennial advance in life. 7. That attacks of fever are one third more intense among males than females. 8. That fever is most prevalent from July to December inclusive. 9. That the intensity of fever is much greater during January, February, March, April, and May than at any other part of the year. 10. That during those months fever is most prevalent, the temperature and quantity of rain are considerably greater than during those months fever is not so prevalent. 11. That during those months fever is most intense, the temperature and quantity of rain are comparatively low. 12. That medical treatment has a powerful effect in lessening the danger or number of deaths from fever. 13. That early medical treatment shortens the duration of fever. 14. That the mean duration of fever among individuals under 40 is shorter than among those above that period of life. 15. That the general prognosis of fever is favourable, there being fourteen chances to one that the patient will recover. 16. That the prognosis of fever becomes less favourable as the patient is advanced in life, the intensity of the disease being nearly twice as great at 41 years of age as at 21. 17. That the prognosis of fever is more favourable from June to December than from January to June. 19. That the prognosis of fever is one half more favourable among patients who come under medical treatment before the seventh day of the disease than those

who are admitted at a later period. 20. That the prognosis of fever is unfavourable when there are cerebral or thoracic complications. 21. That the second week of fever is most dangerous; out of 1000 cases passing through this week, 82 died.—(*Loc. cit.*)

512. iv. THE ORGANIC LESIONS are not confined to any single viscus in any one form of synochoid or typhoid fever.—a. M. CHOMEL gives the following as the results of a very careful inspection of the *encephalon* in 38 cases of typhoid fevers: Injection of the membranes in 4; œdema of the membranes in 7; very slight general softening of the brain in 6; effusion of serum in the ventricles, varying from a drachm to half an ounce, in 12; numerous red points upon dividing the cerebral substance in 5; increased density of this substance in 2; and the normal condition in 15.

513. b. The *mouth*, *tongue*, and *pharynx* are frequently covered with a thick mucus, underneath which the mucous coat is often not manifestly altered. But in some cases this coat is softened, discoloured, and studded with a few small, round, or oval ulcers, most of them not referable to the follicles. The *œsophagus* occasionally is excoriated or slightly ulcerated; the *stomach* is variously coloured in its internal surface; it is sometimes pale, most frequently red in various grades, or purplish or brownish red, occasionally yellowish; and often the parts of the organ in contact with the liver and spleen have imbibed the colour of these viscera.—*Softening*, or diminished cohesion of the mucous and submucous tissues, throughout the greater part of the large curvature, or even the whole of the stomach, is observed in a large proportion of cases. The softening seldom extends to all the coats. Sometimes the mucous tunic is not only softened, but entirely destroyed, the cellular tissue or the muscular coat being denuded. It is generally easily detached from the subjacent parts. M. CHOMEL found, of forty-two cases, more or less extensive softening in fourteen. He remarks, that he observed softening of the internal coats of the stomach in the same proportion of fatal cases from smallpox.—*Thickening* and great *tenuity* of the mucous coat have also been seen, but not so frequently as softening. Although M. LOUIS met with ulceration of the mucous membrane of the stomach in four cases, and M. ANDRAL in ten, yet M. CHOMEL did not find one instance in the forty-two inspections of which he has given the details.

514. c. The *duodenum* and *jejunum* have occasionally imbibed the colour of the bile or of adjoining viscera; they are generally of a deeper red than the rest of the intestines. The *ileum* is usually more or less red, with numerous arborizations on the external surface; but more frequently the redness is seated chiefly in the mucous coat, and particularly in the margins of the valvulæ conniventes. In many cases the redness is disposed in zones, between which the three coats of the intestine present a remarkable pallor. The redness and injection are not greater around the ulcerations and tumid patches of agminated follicles than in other parts. Alterations of colour are not so common in the large as in the small intestines, the former presenting chiefly reddish-brown patches or ecchymoid spots, or dirty purplish or

brown-coloured tints. *Dark discoloration* of the small intestines, as already noticed (§ 510), is very general. *Softening* of the mucous surface of the bowels, in the situation of the agminated follicles, or in the intervals between them, is seldom very great; the subjacent cellular tissue more frequently and decidedly presents this change. *Induration* is never observed in the digestive canal after typhoid fevers. In several cases the mucous coat is remarkably *tumid* or thickened, presenting a gelatinous aspect, and various shades of colour, from a bright red to a reddish-black. This change varies in extent from two or three inches to as many feet, but is quite continuous, extending around the intestine. It is most frequently found in the ileum, but it may occur in any part of the small or large bowels. It arises from the infiltration of fluid blood into the mucous and submucous tissues; for, upon pressing the part, the blood exudes through the pores, leaving the mucous coat almost in its natural state. M. CHOMEL observed this lesion in seven out of forty-two cases, and in all these there was hæmorrhage, either from the bowels or into them; he also remarked it in other diseases wherein intestinal hæmorrhage had occurred before death.

515. d. Since PETIT and BRETONNEAU directed attention to the almost constant change in the *intestinal mucous follicles* in typhoid fever, the subject has been farther illustrated by the researches of LOUIS, ANDRAL, BRIGHT, CHOMEL, and others. But, although this lesion is so constant in the low fevers occurring in Paris and some other parts of France, it is certainly not so frequent in the same states of fever in this country; and, instead of viewing it as intimately connected with the nature of these fevers, I consider it as only one of several changes superinduced in the progress of the disease, but one of the most frequent and important. The first alteration which these follicles present is enlargement or engorgement, owing to the formation, under the mucous coat, of a yellowish-white matter, slightly friable, which imparts to the agminated follicles the appearance of a thickened patch, and to the isolated follicles that of a pustule. To this state, which is generally preserved till the twelfth or fifteenth day, succeeds, in most cases, ulceration, beginning either in the mucous surface, and extending to the whitish matter, or in this latter, which becomes softened, and detaches the mucous coat from the parts underneath. These grades of lesion in the follicles almost constantly commence in those nearest the ileo-cæcal valve. From the eighth to the fifteenth or twentieth day the agminated patches which have not experienced the above changes present a reticulated appearance, their mucous covering being of a deeper colour than natural, softened, partially detached, and perforated by numerous orifices of enlarged follicles. In proportion as these patches disappear by ulceration or by sphacelation, the margins of the ulcers become either more level, evincing a disposition to cicatrization, or more elevated, owing to thickening of the submucous and muscular tunics. The ulceration generally extends in width and depth, and successively invades the submucous, muscular, and serous coats, ending at last in perforation; but

death most frequently takes place before this last change occurs. Evidence of cicatrization is, in rare instances, observed when the disease has been of long duration. Ulceration does not attack all the patches containing the enlarged glands; for resolution sometimes takes place, or absorption of the matter they contained.

516. *e.* The *mesenteric glands* are very generally more or less changed, especially in connexion with intestinal ulcerations. They are frequently only enlarged, sometimes softened, and occasionally both enlarged and indurated. In some instances, puriform matter may be traced in the sanious blood which they contain. They are usually only enlarged or indurated, or sometimes injected in fatal cases which have not been of long duration. M. CHOMEL gives the following as the results in the 42 cases examined by him: Enlargement, with commencing softening and suppuration in 14 cases, dead from the seventh to the twenty-fifth day of the disease; marked softening in 12, dead from the tenth to the thirty-sixth day; redness, enlargement, and induration in 10, who died after the nineteenth day; slight enlargement, with a bluish, purplish, and blackish discoloration, in 3 cases, dead after the seventeenth day.

517. It would seem that the mesenteric glands experience an analogous change to that of the follicles; that they become enlarged and softened about the same period as the follicles; and that, if the disease takes a favourable turn, they are gradually diminished, and assume their natural state. Suppuration is seldom observed in them, and ulceration never. The glands nearest the cæcum are those chiefly affected; and this is the part in which the follicles are most frequently and early diseased. M. CHOMEL does not think that ulceration of the follicles is the cause of the suppuration of the glands, as the latter may exist without the former. I believe that softening of the mesenteric glands, with traces of puriform matter in them, may take place without any necessary dependance upon ulceration of the follicles.

518. *f.* The lesions observed in the other abdominal viscera are seldom such as materially to influence the termination of typhoid fevers. The *liver* is frequently more or less softened. M. LOUIS found this alteration in nearly one half of the fatal cases he examined. It is generally associated with softening of other organs, especially of the *spleen*. This viscus is enlarged in most of the fatal cases; in one half it is increased to about double its usual volume, or upward. It is always, also, softened—sometimes very remarkably so. The alterations of these organs seem to have little or no influence upon the symptoms during life; the same may be said of the lesions of the mesenteric glands. Even the ulcerations found in the intestines have no determinate relation to the phenomena referrible to the digestive canal. Diarrhœa is not a uniform result of this lesion, and pain is seldom complained of, unless at an early stage, or when the peritoneal tunic is perforated. The ochrey appearance of the stools, noticed by Dr. VIGNIÉ, cannot be depended upon as an indication of this alteration; and meteorismus, or a tympanic state of the abdomen, although often attending it, indicates chiefly ex-

treme depression of vital power, evinced especially in the weakened irritability or tonicity of the intestinal tunics throughout the whole tube, rendering them incapable of resisting the accumulation of flatus. Many of the symptoms referred by Continental writers to organic lesions of the bowels, originating either in inflammation or irritation, are inseparable from the typhoid states of fever, and are the expression of the disease on the whole economy rather than on this part of it in particular. That the affection of the digestive mucous surface and follicles is greater in some epidemics and countries than in others, and in large cities than in towns or country places, I am convinced from observation and the researches of modern pathologists. That it is more common in France, especially in Paris, than in England, is evident from the results of recent inquiries. Actual ulceration was found in *La Charité* by M. ANDRAL, in 92 cases out of 229 examinations, and only in 16 out of 54, by Dr. TWEEDE in the fever hospital. The proportions, although different, show the frequency and importance of the lesion, and the necessity of guarding against its occurrence in the course of the disease. But the above changes of the intestines and mesenteric glands are not confined to typhoid fevers; they often take place in other fevers, whether bilious or gastric, mucous, synochoid, &c., particularly in localities where the water is impure, and when these fevers lapse into a putrid or typhoid state in their advanced stages, or when the fluids become deteriorated. Their frequent occurrence also in hectic is well known; and I believe that they would have been found still more frequently in all fevers, both continued and remittent, if the intestinal canal had been more generally inspected in that way in which only it can be said to be inspected, namely, by laying it open throughout its whole extent. That it has been very imperfectly examined in most epidemics, is evident, from the descriptions furnished of the morbid appearances, and from the circumstance of it having been very generally overlooked as late as the epidemics described by HILDENBRAND and others early in this century; and, although occasionally inspected by some of the writers upon the epidemic of Ireland, in 1817, 1818, and 1819, it was not until after the researches of BROUSSAIS, PETIT, BRETONNEAU, ANDRAL, and LOUIS, that attention has been generally directed to it. Making every allowance for the undue importance assigned to the lesions observed in this situation, the propriety of estimating them correctly, as to their origin and consequences, must be conceded.

519. *g.* The importance of the lesions observed in the *respiratory organs* has been alluded to. The *epiglottis* has been sometimes seen œdematous. M. CHOMEL found it ulcerated, with denudation of the cartilages, in three cases out of twenty which were carefully inspected. The *larynx*, especially its superior aperture, is occasionally also the seat of ulceration. When ulceration is observed in either of these situations, it often also exists in the *pharynx*, in which it seems often to have begun; and it is generally found to consist of several small but deep ulcers, commencing in the form of pustules filled with whitish purulent matter, but without any surrounding injection or inflam-

matory circle. The *lungs* are often much diseased, but the alterations of them most frequently seen occur only during the last days of life, and are referrible to the predominance of physical over the vital forces, as the disease approaches a fatal issue. But as congestion of the circulating fluids occurs in the more depending parts, the vital cohesion, particularly of the parenchymatous parts of the lungs, becomes diminished, giving rise to more or less marked *softening* of the engorged part. In less frequent instances it is not only a simple congestion from stasis of the fluids that is found, but also indications of pneumonia in the first or second degree. The pneumonia is sometimes confined to two or three lobules; in which case it may have passed into a suppurative state before death: in other instances it occupies a whole lobe, but without any signs of suppuration. Œdema, or even emphysema, of parts of the lungs is also occasionally remarked. The *bronchi* are generally red, or of a livid red, or violet colour. The tint generally deepens in the small bronchi, and in the direction of the air-cells. They also contain some mucus. M. CHOMEL gives the following as the state of the lungs in 42 cases: Congestion, with or without softening, in 18; hepatization in the first degree in 3; hepatization in the second degree on one side in 2; lobular pneumonia in 3; emphysema in 2; œdema in 2; effusion into the pleura in 2; and the normal state in 10.

520. *h.* The state of the *blood* varies much in fatal cases of nervous, putrid, or typhus fever. Where the putrid, malignant, or septic characters have been most remarkable before death, the changes of the blood have been usually the greatest. This fluid is commonly dark, black, diffuent, and but rarely in the state of fibrinous clots. In a few cases the blood in the heart and large vessels assumes the form of black coagula, which are different from those observed in other acute diseases. This state is evidently owing to the absence, or great diminution of fibrin. The presence of a gaseous fluid in the blood, especially in that of the veins, is also evident in some cases. I have observed this circumstance in death from other diseases, particularly if asphyxy was the mode in which the fatal event took place. (See art. *Blood*, § 110, *et seq.*)

521. *i.* The *heart* is often softened and somewhat discoloured. The *softening* of this organ varies from an almost unappreciable to a most marked degree. In some cases it is so great that the fingers may be pushed through the parietes of the ventricles with ease. This diminution of cohesion is generally observed in cases where the changes in the blood, and softening of the liver and spleen, have been the most remarkable. *Flaccidity*, or a state of softness different from that just mentioned, is still more frequent. The flaccidity may exist without very manifest loss of the cohesion of the structure; but it is generally attended by some degree of the latter, and the softening may be great and yet the flaccidity not very apparent, although this is rare. The *colour* of the internal membrane varies in different cases, and even in the opposite sides of the heart in the same case. In some the membrane is red; in others dark, brown, or livid: it is often colour-

less, particularly when the heart is softened. It never presents inflammatory appearances, nor the changes immediately proceeding from the inflammatory state. The researches of MM. TROUSSEAU, RIGOT (*Archives Génér. de Méd.*, t. xii.—xiv.), and CHOMEL (*Clinique Méd.*, p. 279) show that the redness often found in the aorta, cavities of the heart, and large veins, in this class of fevers, is entirely owing to the tinging by, or to imbibition of the colouring particles of the blood. Inflammation of the heart, or of its membranes, has not been observed in any case of these fevers.

522. *k.* The *external changes* observed after death most frequently commence a considerable time before this event. These consist chiefly of petechiæ, vibices, and blotches, varying as to size, situation, and depth of colour; and are to be ascribed to the extravasation of serum, coloured with red particles, or of blood itself, into the vascular layer of the skin. Gangrenous eschars and sphacelus are met with chiefly in parts pressed upon by the weight of the body, as the sacrum, shoulder blades, heels, and scalp of the occiput, or in those to which blisters, sinapisms, or other acrid substances have been applied. But these changes may occur in other situations, although rarely, and without these causes, as in the insides of the thighs; unusual pressure, or any other cause either dissipating or exhausting the remaining vitality of the part, producing these effects. Phagedenic sores or ulcers, and enlargements of the absorbent glands, are also observed in rare instances. These sphacelating or spreading ulcers often commence in the form of pustules or vesicles, which break, leaving a foul sore which rapidly spreads. Besides these, the usual consequences of erysipelas are sometimes observed, or the remains of exanthematous and miliary eruptions. Even emphysema has appeared shortly before, and has remained after death.

523. *v.* PATHOLOGICAL CONCLUSIONS.—The above *exposition* of the organic lesions more especially proceeding from typhoid fevers, suggests some important considerations relative, not only to the nature, but also to the treatment of these diseases. Few of these changes become apparent before the seventh day from the invasion, when vascular action has passed into exhaustion, when organic nervous power and irritability are remarkably lowered, the circulating and secreted fluids are become morbid, and the powers of vital resistance in great measure overthrown. If inflammatory action should attack any part, either in this state, or even at an earlier stage, it will be very different as to its phenomena, its progress, and its results, from inflammation occurring primarily or in a system whose vital and physical constituents are not materially deranged. It is the remarkable affection of these constituents by the causes of fever, and by the changes following more directly upon these causes, that imparts a similar character and termination to all the lesions now described. The depressed vital power of the extreme vessels, the lessened irritability of contractile parts, and the diminished vital cohesion of parenchymatous and other structures, heightened by the morbid state of the blood, are very frequently followed by gradual softening, infiltration, congestion, or

effusion; and these often pass into disorganization amounting even to sphacelation, or to sphacelating ulceration, even without the intervention of inflammatory action, or of any of its consequences. Owing to the intimate dependence of the states of the digestive canal, more especially of its internal surface, upon organic nervous influence, the former is involved, in a correlative manner, whenever the latter suffers. The tonic contractility of the muscular and serous coats of this canal is much diminished, the vital cohesion of its mucous membrane is weakened, the tonicity of the extreme vessels of this coat is lessened, and its functions of secretion impaired or otherwise changed. In this state it is unable to resist the impressions made by morbid secretions passing over it. The alterations which had previously taken place in the organic nervous influence, in the functions of respiration, and in the blood have conjointly given rise to diseased—usually acrid, or irritating, or septic—secretions from the liver, pancreas, and even also from the intestinal surface. When we find these secretions produce spreading or sphacelating sores, as they often do, in the protected cutaneous surface, we cannot be surprised at their occasioning analogous lesions in the more delicate mucous surface of the intestines, rendered still more delicate and susceptible of lesion by the previous changes just described. During the several days of the patient's life, from the commencement of these changes, or from the presence of morbid secretions in the intestinal canal, absorption will proceed on the digestive mucous surface; and, notwithstanding the amount of absorption may be very small, yet we cannot conceive it possible that morbid secretions, either floating through the intestines or collected in the follicles, will pass through absorbent glands, or even into the vessels which run to them, without producing a material change in them. If these views be just, the inference that depressed organic nervous influence and irritability, a morbid state of the blood, and disorder of the secretions are concerned especially in causing the changes of structure observed in the digestive canal, will be admitted; and, if admitted, it becomes the basis of a rational method of treatment. But these early pathological states induce also those organic lesions in typhoid fevers affecting other internal organs, and even other external parts, and stamp them all with the same important characters—characters indicating both a common origin and a similar tendency, and pointing to the same principles of cure.

[Of the Typhoid and Typhus Fevers in the United States.—The remarks of Dr. Copland on synchooid, typhoid, and typhus fevers are applicable, to a greater or less extent, to the continued fevers that prevail in the United States. It is, however, believed that a more definite and particular account of them will not be unacceptable to the medical reader.

Having already spoken of that peculiar form of typhus, if so it may be called, designated by the name of *spotted fever*, we shall now offer a few remarks on that form of fever to which has latterly been assigned the name of *typhoid fever*, after the fever described by Louis under that appellation. The inhabitants of this country, like those of every other of which we have

any knowledge, have, from its earliest settlement, been more or less exposed to febrile diseases. In New-England these diseases have been chiefly of a typhoid type, though intermittents have occasionally prevailed in some places, from local malarious causes; while, in the Middle, Southern, and Western States, remittents and intermittents, with occasionally yellow fever, have been the principal diseases of this class. From the want of authentic historical records, and the paucity of accurate observations by medical men, we are not able, at this period, to form a very satisfactory judgment as to the precise character of febrile disorders that formerly prevailed, although we can gather from various sources that the inhabitants were liable to a disease resembling our present typhoid fever, and which was variously designated as *long fever*, *slow fever*, *nervous fever*, *putrid fever*, &c. It is stated by Dr. NATHAN SMITH* that there is no instance on record, and that he has never heard of an instance where an aboriginal inhabitant of this country has ever experienced an attack of typhus fever. Whether this exemption really exists, remains for future observations to determine. Dr. SMITH informs us that, previous to the year 1767, a fever called *nervous* had prevailed to a considerable extent in a part of New-Hampshire, on the Connecticut River, where he was then residing; but that for 28 years afterward it had entirely disappeared, when it again began to be met with; and from that period to the time at which he wrote, 25 years thereafter, he had constantly met with the disease, and could follow its changes from one place to another, and tell where it was prevailing. During this period it spread all over the New-England and some of the other states, staying from one to two; or three, or more years in a place, and then ceasing and appearing in another, being apparently uninfluenced by locality, rank, or occupation; affecting equally those living on lofty mountains or the lowest valleys, on the banks of rivers or the borders of lakes and stagnant ponds; attacking alike the poor and the wealthy, the filthy and those more cleanly in their habits. Dr. MINER remarks (*“Essay on Fevers”*) that “the exemption from wide-spreading and mortal epidemics (including typhus fever), during the period from the Revolutionary war to about 1805, was so great that many physicians passed the whole term of their practice, and scarcely met with a single well-marked, original *typhoid* disease.” Since the disappearance of the *spotted fever* in 1812, typhus has prevailed sporadically, to a greater or less extent, over the whole of New-England; assuming, however, a variety of grades and forms, but answering to a common type. It is generally conceded that the synchoa of CULLEN, the inflammatory continued fever of COPLAND, is nearly, if not altogether unknown.

It was remarked by NATHAN SMITH, one of the ablest physicians whom our country has produced, and who practised physic and surgery for 35 years in various parts of New-England, that he had never met with a case of simple inflammatory fever, nor any continued fever but *typhus*, unless the simple, unmix'd catarrhal fever be of such a character. The

* [Essay on Typhus Fever, Svo. New-York, 1824.]

great mass of practitioners in New-England still continue to designate the prevailing fever of the country by the name of *typhus*; and a majority of them hold with Dr. N. SMITH that the disease is a specific one, and propagated by a specific contagion.

The attempt has recently been made to identify the typhus or common fever of New-England with a fever described by LOUIS, under the name of typhoid fever, in consequence of discovering similar lesions in the follicles of PEYER, as well as from a similarity of symptoms. These anatomical characters appear to have been first distinctly noticed in this country by Dr. E. HALE, who published in the "*Medical Magazine*" (Boston) for December, 1833, an account of three dissections of persons who died of typhus fever. Dr. GERHARD, of Philadelphia, however, called the attention of the profession more particularly to the subject in 1835,* by publishing some cases of fever attended with alteration of these glands. Dr. E. BARTLETT gave an account, in the "*Medical Magazine*" for June, 1835, of the entero-mesenteric alterations in five cases of what he denominates "unequivocal typhoid fever," which alterations correspond exactly with those described by LOUIS.

The next formal communication on the subject was from Dr. JAMES JACKSON, of Boston, who presented to the Massachusetts Medical Society, in June, 1838, an elaborate report on "typhoid fever," in which he remarks that, since he became acquainted with the work of M. LOUIS, in 1833, he had found that the continued fever of Boston was the same as that which M. L. has described. "The symptoms are essentially the same, and the appearances discovered in the body after death are precisely the same. These appearances had been noticed here before, when the examination was so made as to disclose them. From 1833 our fever has been the same it formerly was, and, in every case where an examination has been made, the morbid changes have been found to be the same as described by M. LOUIS. In neighbouring places a similar confirmation of the identity of the disease has been furnished from different quarters."—(*Loc. cit.*) Since the above period, observations have been published by Drs. HALE,† BIGELOW, BOWDITCH, J. B. S. JACKSON, HOLMES, and SHATTUCK, of Boston, and by Drs. GERHARD, JACKSON, and STEWARDSON, of Philadelphia, all going to sustain the doctrine of the entire identity of the typhoid fever of Paris and the ordinary continued fever of the United States. An able work also has been published by Dr. E. BARTLETT, entitled "*The History, Diagnosis, and Treatment of Typhoid and of Typhus Fever, with an Essay on the Diagnosis of Bilious Remittent and of Yellow Fever*" (8vo, p. 393, 1842), in which the same doctrine is supported with much zeal and ability.

Typhoid Fever.—By this term, then, as now employed by most medical writers, is to be understood that form of febrile affection which is attended with lesion of the glands of the ileum

(PEYER's glands), and characterized by *metcrosis, enlargement of the spleen, rose-coloured spots on the abdomen, and sudamina*. It is the disease first described by PETIT and LEVRES, in 1812, under the name of *entero-mesenteric fever*; by BRETONNEAU under that of *dothineritic*; and by CRUVEILHIER under that of *follicular enteritis*; by the Germans it is called *abdominal typhus*; in New-England it goes under the name of *typhus fever*. Since the disease was first described in 1812, it has been shown by the researches of MM. BROUSSAIS, BRETONNEAU, LOUIS, BOULLAUD, CHOMEL, ANDRAL, and others, that the disease has anatomical characters which are nearly constant, and functional lesions which are almost always identical. It is to be regretted that the term *typhoid* has been assigned to this disease, as it is wanted to designate phenomena characterized by prostration and debility attended with more or less stupor, and probably always will be employed for this purpose in time to come. We consider, therefore, the term *abdominal typhus* as much preferable, as its symptoms and general pathological characters so closely resemble the disease described by British and German authors under the name of typhus, that it may be considered as a modified form of the same malady. That it, however, differs in some important features is generally conceded by those who have made themselves accurately acquainted with the minute characters of both. Thus, Dr. E. HALE, of Boston, in 1833,* published a paper on the typhus fever of New-England, in which he maintained that the disease presented phenomena widely different from those laid down by ARMSTRONG and SOUTHWOOD SMITH, as characterizing the typhus fever of Great Britain, and "which," he remarks, "can only be reconciled to them by remote deductions or theoretical speculations. The first deviation of our typhus," he continues, "from that of England consists in the absence of most of the prominent marks of the disease. There is no cold stage followed by heat and excitement, no marked depression of the sensorial functions, and no local affection of any prominence or importance. The symptoms are all, or nearly all, negative. The patient feels that he is sick, but is at a loss to know what ails him. He has no headache nor dizziness, and sometimes no consciousness of any loss of mental vigour; no pain in any part; no considerable thirst; the appetite may be lost; at other times it is said to be good, although it appears that little food is taken; but this little is taken with tolerable relish, and there is no loathing of food, and no suffering from indigestion; the bowels are either regular or a little costive; the skin is dry, but not remarkably hot; the pulse is, at first, moderately quickened, and becomes quicker from day to day; the countenance exhibits more unequivocal marks of disease, being heavy, and expressing anxiety and depression; the sleep is generally, but not always disturbed, and the disturbance commonly increases as the disease advances. The patient, if a labouring man, keeps at work for several days, and only perceives that he is more fatigued than usual; if a gentleman, he meets his physician at the door, apologizes for troubling him with so small

* [American Journal of Medical Sciences for February, 1835.]

† [Observations on the Typhoid Fever of New-England, read at the Annual Meeting of the Massachusetts Med. Society, May 29th, 1839, by ENOCH HALE, Attending Physician to the Massachusetts General Hospital, 8vo, p. 77. Boston, 1839.]

* [Remarks on the Typhus Fever of this Climate (Boston Med. Magazine, vol. ii., p. 301, 1833).]

a matter, and, from day to day, converses pleasantly and cheerfully with him. At length, when he finds that he is truly sick, he wonders that he recovers so slowly; and unless he has previously known his physician well, so as to have the fullest confidence in him, it is a chance if he do not suspect him of unfaithfulness or incompetence for not curing him more rapidly." "This is the slow fever," says Dr. H., "of which we often hear, and which we occasionally see. It continues for a considerable length of time, three or four weeks, acknowledging little respect to remedies of any kind, and in most cases spontaneously but slowly disappears. In some instances, after continuing in this manner for some time, it suddenly assumes more positive symptoms, and hastens to a termination, sometimes favourable, more often fatal. In some rare cases it proceeds slowly to a fatal termination without any great change of character. Such a result is so infrequent, that we have not often opportunity to ascertain the morbid appearances by dissection. The case of the celebrated Dr. SPURZHEIM appears to have been of this sort; and in that no morbid change of structure was discovered on examination after death."* Before proceeding to a more particular description of the continued fever of New-England, we shall give a synopsis of the symptoms, pathology, and diagnosis of the typhoid fever of Paris, as laid down by Louis, in order that the reader may be able to institute for himself a comparison between them.

The mean age of patients attacked by the typhoid affection of Paris was twenty-three years; they were generally persons in good health, and who had resided but a short time in Paris. The predisposing causes were the same as those of other febrile and inflammatory affections. The disease came on generally with a chill of considerable violence, accompanied with trembling, headache, universal feeling of lassitude, anorexy, thirst, some pains in the abdomen, and, in a large majority of cases, liquid dejections supervened upon these symptoms during the first twenty-four hours. To the chills succeeded heat; although they recurred several days in succession in nearly all the subjects, and generally in the evening; afterward the skin was constantly more or less hot, and nearly always dry.

To these other symptoms succeeded, relating to the cerebral functions, the organs of sense, and the abdominal viscera. The patients complained of a peculiar weakness, dizziness, or a dazzling sensation, when rising up and attempting to walk; an inclination to somnolency, so that they readily fell asleep on ceasing conversation; a weakness of memory, and disinclination to intellectual exertion, and an indifference to danger and to what was passing around them. Sleep was imperfect, unrefreshing, and

disturbed with dreams. Delirium frequently accompanied the somnolency, but rarely preceded it; sometimes it commenced from two to six days after it; was slight, and only during the night; or more marked and constantly present; occasionally it was so violent as to make it necessary to use corporeal restraint, and, like somnolency, it generally continued until death, except where the disease ran a long time before proving fatal. *Tinnitus aurium* was a frequent symptom, and sometimes connected with deafness, which began later than the other symptoms, and often became total. The eyes were injected, and somewhat smarting; sometimes of a uniform rose tint, though rarely so at the commencement; and one patient had strabismus; many suffered from epistaxis, from which they experienced no relief. The greater number had an eruption of rose-coloured lenticular spots on the surface of the body, more or less thickly clustered together; and these eruptions generally made their appearance about the tenth day of the disease, never before the seventh day, and they varied no less in duration than abundance. *Sudamina* were frequently connected with them.

The abdomen was meteorized (tympantic), and rarely preserved its natural size and form to the end of the disease; in some this meteorism was slight, in others more marked, so that the abdomen projected beyond the line of the chest. As these characteristic symptoms became developed, diarrhœa increased; if much delirium was present, the dejections were involuntary, and often tinged with blood. The tongue, in a large number of cases, presented no unusual appearance, but in general it was gluey or dry, sometimes ruddy or red, at times coated, at others not so, crusted or otherwise, in certain patients blackish, in others more or less thick. It was protruded with difficulty, and with a tremulous motion; deglutition difficult; the back part of the mouth more or less inflamed. Nausea and pain at the epigastrium were not infrequent symptoms, and vomiting also, in the latter stages of the disease. The debility daily increased, the patients stood erect with difficulty, and trembling; walked as if intoxicated; at length took to the bed, in which they lay in the same position, ordinarily upon the back, and were moved about like inanimate substances. Soon the skin over the sacrum became red, excoriated, and gangrenous; blistered surfaces were covered with pus of an offensive odour and had a livid colour, and ulcerations of the skin, to a greater or less extent, took place. The skin was generally very hot and dry; chills were occasionally felt; the pulse was much accelerated, usually above 100 per minute, and small, feeble, contracted, and irregular. In a few it preserved a certain degree of fulness till death. In a majority of cases there was more or less cough present, together with a sonorous râle throughout the chest. Towards the close of the disease, the crepitous murmur was often heard over a circumscribed portion of the thoracic surface.

Remarkable changes took place in the countenance in the course of the disease. At first, in a large number, the face was purplish and bloated, which gradually subsided, till there was a total want of expression; at length it became sunken, or there was stupor, or abso-

* [Dr. SPURZHEIM went on with his lectures for nearly a week after the disease, which proved fatal to him, began; and it was nearly another week before either he himself or his physicians and friends thought it seriously alarming. It went on, however, constantly increasing in severity, but at no time exhibiting any very marked symptoms, except the delirium which came on a few days before his death, or presenting any prominent object for the application of remedies, and he died at the end of about four weeks. On dissection no morbid appearances were discovered which would serve to explain the pathological characters of the disease.]

lute indifference, or the patient appeared absorbed in a profound reverie, in violent excitement, or had simply a wildness of look, according to the kind of delirium present. The lips and eyelids were sometimes spasmodically contracted, or the muscles of the jaws, giving an expression of suffering and pain; these spasms were sometimes of long continuance, so that there was subsultus tendinum, or spasmodic motions of the upper extremities, or permanent contraction of the same parts. Death often occurred from perforation of the small intestine; sometimes it took place while the patient was in delirium, or in a kind of calm, the patients having lost their consciousness but a few hours only, and occasionally it took place suddenly.

Such were the phenomena in most cases of the severe typhoid fever, of which M. LOUIS has given a history. In many patients there was merely present febrile excitement, with heat of skin, thirst, slight somnolency, and giddiness, with loss of appetite, and moderate depression of strength; diarrhœa and pains in the abdomen were absent, so that the seat of the disease could not easily be indicated. These were what LOUIS calls latent cases of the disease, which, however, often terminated fatally from perforation of the intestine. The symptoms were extremely varied in different cases, the diarrhœa and meteorism being in some cases the most prominent symptoms; in others, the prostration, delirium, and spasmodic motions giving the disease the characters, either of putrid ataxic fever, or an inflammatory one, in which the pulse was full, and the surface florid and hot. The duration of the disease varied from eight to forty days.

On dissection, more or less serious lesions of the elliptical patches (PEYER'S glands) of the small intestine were always found; and these were more serious, according to the proximity of the patches to the ilco-cœcal valve, presenting remarkable differences according to the duration of the disease, and accompanied by analogous changes of the corresponding mesenteric glands. The others were frequently diseased, but their lesions were not constant, and differed in some respects only from those which are observed in those who die of other acute diseases.*

Whatever opinion may exist in the profession as to the practical benefits that are to result from attempts to identify forms of fever existing here with those prevailing in other countries, no one can deny the importance of becoming accurately acquainted with their phenomena, their nature, seat, and anatomical characters.

DIAGNOSIS.—The diagnostic symptoms of the affection, according to M. LOUIS, are epistaxis, rose-coloured lenticular spots on the skin, sudamina (when large and numerous), meteorism, a blackish and thickly-coated tongue, drowsiness, stupor, extreme debility, when not proportionate to the other symptoms, eschars upon the sacrum, ulceration of the surface where blisters have been applied, spasmodic move-

ments or permanent contractions of the muscles of the different parts of the body; "phenomena," says M. L., "which are very rarely observed, or which do not occur in other acute affections, or which exist in a moderate degree when observed at all. When more or less of these symptoms exist in the same subject, we cannot doubt that he is attacked with the typhoid affection; that the elliptical patches of the ileum are the seat of the lesion which has been described; for if each one of these symptoms is observed occasionally during the course of other acute affections, such is not the fact with a combination of them. There is no difficulty in the diagnosis when all these symptoms coexist, but the most important of them sometimes fail to appear, and a majority exist at a certain period only of the affection" (*loc. cit.*). Dr. E. BARTLETT* remarks that "it is hardly possible to confound typhoid fever with any other affection. There is no other, in any considerable degree, resembling it. Chills, more or less severe, repeated or not, accompanied with, or immediately followed by headache, and pains in the back and limbs; these pains subsiding and disappearing in the course of a few days; thirst; heat of skin; acceleration of the pulse, with an evening exacerbation; entire loss of appetite; great muscular debility; dulness and confusion of the intellect, passing gradually into delirium; restlessness; vigilance or somnolence; twitching of the tendons, or picking at imaginary objects; occasional epistaxis; ringing or buzzing in the ears; the appearance of a scattered, rose-coloured eruption, principally upon the skin of the chest or abdomen, during the second week; a dry, glutinous, cracked, red, brown, or blackish tongue, protruded with difficulty, and trembling; dark, thick sordes upon the teeth; diarrhœa, the stools thin, watery, and dark, or yellowish, sometimes consisting of blood; tympanitic distention of the abdomen; dulness on percussion over the spleen, and gurgling upon pressure upon the right iliac region; with a dry, sibilant, or sonorous rhonchus over the chest: these symptoms, coming on without any obvious cause, occurring in a person under forty years of age, and referable to no local disease; more or less regularly and successively developed; increasing in severity, and terminating in death at an indefinite period after the eighth day, or gradually subsiding and disappearing, one after another, and giving way to convalescence at an indefinite period after the fifteenth or twentieth day, mark, most clearly and unequivocally, a disease wholly unlike any other. These symptoms are sometimes, during the progress of the disease, and in various degrees of relative severity, all of them present; and in these cases, at any rate, there is no possibility of mistaking typhoid fever for any other disease. The diagnosis, independent of the evidence to be derived from the lesions found after death in the fatal cases, is easily and certainly made."—(*Loc. cit.*)

SYMPTOMS.—Typhoid fever generally makes its attack in a very insidious manner, more so, perhaps, than any other acute disease whatever. The patient complains of mental and

* [*Anatomical, Pathological, and Therapeutic Researches upon the Disease known under the name of Gastro-Enterite, Putrid, Adynamic, Ataxic, or Typhoid Fever, compared with the most common acute Diseases.*] by P. CH. A. LOUIS, Translated from the original French by HENRY J. BOWDITCH, M.D., 2 vols. 8vo. Boston, 1836.]

* [*The History, Diagnosis, and Treatment of Typhoid and of Typhus Fever,* &c., by ELISHA BARTLETT, M.D. 5vo. Phil., 1842.]

bodily languor, of more or less debility, disinclination to motion, pain in the head, back, or limbs, and a sense of general soreness and fatigue. Its progress has been well described in the above extracts by Drs. HALE and BARTLETT. Dr. NATHAN SMITH, also, says that "the disease attacks in such a gradual manner that we hardly know on what day to fix its commencement;"* and Dr. JAMES JACKSON remarks that "there is more difficulty, perhaps, in ascertaining the commencement in cases of typhoid fever than in any other acute diseases."† CUOMEL, however, states that the access was sudden in seventy-three cases out of one hundred and twelve cases, and in the others there were obscure premonitory symptoms. The first symptom may be a chill, attended by debility and headache, and followed by heat and thirst; or it may be a severe griping pain in the bowels, with tenderness on pressure. A severe and fatal case, which we lately saw in consultation, came on with a severe chill after riding a considerable distance in a snow-storm, the patient having suffered much from the cold. Diarrhœa was, in this case, a very early symptom. Of thirty-three fatal cases cited by LOUIS, thirty-one had chill; and of forty-five grave cases that recovered, all had chills but three; and of thirty-one mild cases, there were chills in twenty-four; and generally they occurred in the commencement of the disease. The chill, or rigour, is followed by increased heat of skin, varying much in degree; sometimes moderate, and diffused pretty equally over the whole body; at others intense, and unequally distributed. "Sometimes," says Dr. N. SMITH, "the head and trunk will be excessively hot, while the extremities are cooler than natural; at others, the extremities will be preternaturally hot, when the body is but moderately so. One cheek will often appear of a deep red colour, and be very hot, while the other remains pale and cool: as its colour and heat subside, they seem to cross over and affect the opposite cheek in the same manner. This colour and heat usually extend so far as to include the ear of the affected side."—(*Loc. cit.*)

The skin is also variously affected in regard to heat and moisture; being sometimes dry through the whole course of the disease, at others covered with profuse sweats, which may be partial or general, and often of an acrid smell. The body, also, emits a peculiar odour, which is of a musty, cadaverous kind, and characteristic of this affection. The pulse ranges from 70 to 140 in a minute; its frequency being proportioned to the severity of the disease. Of cases reported by Dr. JACKSON that recovered, the average least frequent pulse was 74, and the average most frequent pulse 102; while, in fatal cases, the average least frequent pulse was 91, and the average most frequent pulse was 129. Among the fatal cases in the males, the average least frequent pulse was 85, the average most frequent pulse was 124; while among the fatal cases in the females, the average least frequent pulse was 106, and the average most frequent pulse was 138: showing that the pulse is considerably more fre-

quent in female than in male patients. The respiration is modified as in other grave diseases, where there is a morbid condition of the brain; and NATHAN SMITH alludes thus to a peculiarity in the breathing: "After the patient has been some time sick, if the disease proves severe, there is a peculiar whistling sound produced when he breathes through the nose; and when asleep, or lying in a state of coma, the mouth is generally kept open, and the breathing has somewhat of a stertorous sound." Dyspnœa is not unfrequent, where there is much abdominal tympanitis. There is always more or less cough present after the fifth day, and the sputa are small in quantity, sometimes tenacious and colourless, sometimes bloody, and indicating pneumonitis. There is also generally present a dry, sonorous, or sibilant rhonchus, which is very characteristic of the disease; and this, in many cases, is loud, and heard over the whole chest. Occasionally, there is a humid or moist rhonchus. Pain in the head is a very constant symptom; so that out of 87 cases in which the patients recovered, LOUIS mentions that there was headache in all but three. It generally is one of the first symptoms, and is of a dull, heavy, or throbbing character, first felt in the morning; sometimes intense and acute, occasioning great suffering. Most frequently it occupies the forehead and temples, but often the whole head, and in severe cases its duration is from eight to ten days. The headache is often attended with severe pains in the back and limbs. The state of the mind has already been alluded to. Mental languor, indifference, irritability, forgetfulness, listlessness, or impatience, merging gradually into delirium or stupor, are all met with, and the delirium is severe in proportion to the danger. Statistics prove that this symptom is present in at least 38 cases out of 46 (LOUIS). Dr. BARTLETT states that he has seen the disease prove fatal in the second week without any delirium; we have never met, however, with such a case, although we have seen much of the disease in New-England, as well as in this state. In many instances it is mild and temporary; but if the patient be carefully watched, especially during the night, or during the febrile paroxysm, it will be found to exist more or less strongly marked. In fatal cases, it generally continues till the patient sinks into coma, or perishes. It is generally low and muttering; the patient appears confused or intoxicated, picks at his bed-clothes, is restless, and in constant motion; or the delirium may be playful and childish, or distinctly monomaniacal. In most cases, by exciting the attention, the patient may be roused from his state of incoherency, and even from that of coma; although he relapses into it immediately when the attention is withdrawn. Dr. N. SMITH alludes to this circumstance, and also states that the patient, on recovery, forgets everything that occurred during his sickness. Dr. S. also relates instances where the moral principle seemed to have been affected after recovery; so that persons acquired a propensity to steal, or commit other offences. LOUIS states that, of 300 cases of typhoid fever, there was but a single one where there remained any morbid condition of the mind after convalescence. The countenance is heavy and stupid, dull, listless,

* ["A Practical Essay on Typhus Fever," by NATHAN SMITH, M.D.]

† [Report on the Typhoid Fever, by JAMES JACKSON, M.D.]

and vacant, expressive of languor, and total indifference and apathy of mind. Where the pain is severe, the expression of features is one of anxiety and distress; in mild cases there is no particular change, but a want of animation and cheerfulness. Somnolence, or drowsiness and stupor, is a symptom rarely absent in the typhoid affection; preceding, or alternating with delirium; persisting, in fatal cases, till it is lost in coma, and appearing early in proportion to the intensity of the disease. Of cases treated in the Massachusetts General Hospital, it occurred in one case in 3·81 of those that died, and one in 7·25 of those that recovered (JACKSON). Louis found it present in nine tenths of his fatal cases, and in one half of those that recovered. Vigilance, or prolonged and obstinate watchfulness, interrupted occasionally by a transient slumber, and often associated with delirium, is also a frequent symptom in typhoid fever. The hearing we have generally found impaired from an early period of the disease; and the patient often imagines that he hears sounds and voices that do not exist. *Tinnitus aurium*, or ringing in the ears, is a frequent symptom, especially in the early and middle periods of the disease. The vision is seldom much affected till near the close of life, although it sometimes is false, double, or distorted; and the eyes present a peculiarly heavy, languid appearance, watery, or red from an injection of the conjunctival vessels. The secretions of the eye are generally viscid (causing the eyelids to adhere), accumulate in the angles, dry, and often put on the appearance of scabs. The sensibility to light is sometimes much increased. The sense of taste is dull and perverted, so that nauseous medicines are swallowed without repugnance.

The voluntary motions are unsteady; the tongue is tremulous when protruded, and there is often more or less *subsultus tendinum*. Dr. JACKSON found this symptom present in 1 of 3·36 fatal cases and in 1 of 10·03 of those that recovered. The muscles of the face are sometimes spasmodically affected, producing contraction; or the diaphragm is affected in a similar manner, causing *hiccup*. Prostration of the muscular strength is an early and strongly-marked symptom of typhoid fever. The voice is altered from the beginning; early in the disease it is usually rather plaintive and small, but as it advances, and more particularly in bad cases, it becomes guttural, and at last truly sepulchral. The patient lies on the back, and is constantly inclined to slide down towards the foot of the bed (SMITH). An increase of muscular strength, shown by turning upon the side, is a highly favourable symptom, and often indicates the commencement of convalescence. The abdominal symptoms, or those indicative of an affection of the digestive organs, are perhaps more characteristic of typhoid fever than those already mentioned, and they especially serve to distinguish this form of disease from typhus fever.

As we observed the disease in Connecticut, the tongue was generally covered with a whitish fur in the commencement, which became yellowish as the disease progressed, and gradually changed to a brown, or even black colour in some instances, when it would crack and peel off, leaving the tongue smooth, dry,

and very red. The same process would be repeated the second, and even the third time, in the course of the disease; a circumstance also mentioned by NATHAN SMITH (*loc. cit.*). In some cases, as Dr. BARTLETT has observed, the tongue was but slightly altered in appearance, covered perhaps with a light fur, somewhat inclined to dryness, or to a yellowish cast; or it may be smooth, moderately red, and moist with a tenacious, adhesive matter. Sometimes a brown stripe runs through the middle of the tongue; or it becomes red at its tip and edges; or it is coated with a whitish, aphthous exudation or ulceration, which involves the fauces and the mucous membrane of the mouth generally; or the whole tongue becomes swollen, painful, and tender. The dryness of the mouth and tongue, owing to the deficiency of salivary secretion, occasions a difficulty of protruding the tongue, of swallowing, and other disagreeable sensations; and the lips and teeth are covered with a dark, tenacious sordes, very adhesive. A thick, tough mucus is secreted in the fauces, which is often thrown off in large quantities. The appetite is wholly gone, as well as the power of digesting food; and in their place succeed nausea and vomiting, the matters thrown up consisting of vitiated mucus, or mucus mixed with bile of an unhealthy colour and consistence. Diarrhœa is a frequent symptom in typhoid fever. In all Louis's fatal cases it was present, with the exception of 3; and in 40 fatal cases, it was present on the first day of the disease in 22. Dr. JACKSON states that it occurred in more than half his cases, or 1 in 1·77; and of these cases, a much larger proportion died than of those in which this symptom was not present. In mild cases, it is often absent, and makes its appearance at a later period in the disease. Dr. SMITH observes that "the latter stage of all severe cases is attended with diarrhœa."

According to Dr. HALE, diarrhœa is a more frequent symptom in the typhoid fever of Paris than in that of New-England; and this opinion is confirmed by the Report of Dr. JACKSON. The stools are liquid, turbid, or of a yellowish or dark-brown colour, like new cider; of a fetid, offensive smell; and sometimes contain blood, rarely any mucus. Dr. SMITH has truly remarked that the danger of the disease is in proportion to the violence of the diarrhœa; that when the patient has not more than four or five liquid stools in twenty-four hours it is not alarming, as it does not weaken him much; but that if they exceed that number, serious consequences may be apprehended. He adds that he never lost a patient whose bowels continued constipated through the whole course of the disease, nor ever knew a fatal case of it unattended by diarrhœa.

Abdominal pains, generally proportioned in severity and frequency to the diarrhœa, are characteristic symptoms; and with them, *meteorism*, or a tympanitic condition, is a common phenomenon. According to our observation, this is a later symptom in the disease than the others above mentioned; although Dr. HALE remarks that he met with it most frequently in the beginning of the attack. The peristaltic action, as Dr. SMITH observes, is sometimes entirely suspended, and flatus rarely passes *per anum*. Emaciation generally goes on gradually, and often becomes extreme where the dis-

ease is protracted; but it is not generally very obvious before the end of the second week. The *urine*, at the commencement, is not high-coloured, nor does it deposit a sediment; the quantity is somewhat greater than natural, and it often foams, on being voided into a vessel, like new beer. As the disease advances, it becomes more highly coloured, and lets fall an abundant sediment towards the close. Epistaxis is a common symptom; and lenticular, rose-coloured spots are so frequently observed on the skin as to have received the name of *typhoid eruption*. Dr. BARTLETT describes it as a small spot, not a pimple, slightly elevated above the surrounding skin, not always sensible to the touch; about as large in circumference, on an average, as the head of a pin, and of a bright red or rose colour; disappearing on pressure, and as suddenly returning when the pressure is removed. This eruption is believed by some to be almost an invariable accompaniment of typhoid fever; and yet LOUIS found it in 26 out of 36 fatal cases only; Dr. JACKSON observed it in but two thirds of his patients in the Massachusetts General Hospital; and Dr. HALE states that he met with it in 177 out of 197 cases; and he believes the rose-coloured spots to be a constant attendant upon the disease. *Sudamina*, or transparent vesicles, were noticed by Dr. H. in 75 cases; and they were present in two thirds of LOUIS's cases. They generally occur late in the disease, being seldom seen before the twelfth day, and disappearing after a few days.*

Anatomical Lesions.—These have been detailed at great length by LOUIS, CHOMEL, HALE, and BARTLETT. The most striking are those connected with PEYER's glands. There is a diminution in the natural proportion of the fibrin of the blood, and the cavities of the heart often contain whitish fibrinous coagula (ANDRAL and GAVARET). Blood drawn from the veins during life rarely exhibits the buffy coat; and when present, it is generally soft, gelatinous, or infiltrated, and of a grayish or greenish colour. Dr. HALE has recorded the results of 33 dissections after death from typhoid fever,* a synopsis of which we present (from the *Am. Journ. Med. Sciences*, vol. XXV., p. 397), as the fullest history of the pathological changes in this disease hitherto given in our country:

"The head was examined in fourteen. There was some effusion of serum in the arachnoid, or pia mater, in ten cases; an increase of bloody points in the cerebrum, with other marks of fulness of the blood-vessels, in four; glands of ПАСЧЮНИ enlarged in two; and three were healthy. These appearances are not peculiar to this disease, but are found quite as often in many others.

"The passages in the neck were examined only in seven cases. Ulceration of the epiglottis was observed in one case, and ulceration of the tongue in two. In the remaining four all the passages were healthy.

"The state of the lungs was noticed in thirty-one cases. In eighteen they, as well as the

pleura, were healthy; in three there was effusion into the cavity of the pleura: in eight, hepaticization, more or less, of the lungs, sometimes in one or two small masses; at others extensive; and, in one or two cases, in both lungs; in two the lungs were engorged with blood; in one infiltrated with serum; and in two there was more or less emphysema. The heart was examined in twenty-eight cases. In three there was somewhat more than the usual quantity of serum in the pericardium. The structure of the heart was healthy in all, except rather flaccid in two or three. In about the same number there was a little thickening of the mitral and semilunar valves.

"In the abdomen the morbid changes were more important. The peritoneum was sometimes found extensively and highly inflamed. In the greater number it was not particularly affected. The condition of the stomach is noted in thirty-two cases. In seventeen it was nearly or quite healthy; in six there were ulcerations in the mucous membrane, in one case perforating it, in the remaining five small and superficial; in five the mucous membrane was softened more or less extensively, but in no case thickened; and in five it was somewhat mameelonated.

"In the small intestines, the mucous membrane generally was healthy, except that it was often of a deep-red colour in the lower part of the ileum, and sometimes a little softened.

"Dr. HALE next speaks of the appearance of PEYER's glands in their natural state, and describes the changes produced by disease. He notices four classes of appearances, according to the stage of disease in which the patient has died. When this occurs early, there is a well-defined, uniform thickening of the altered patch, commonly of a light-red colour, over the whole surface, sometimes surrounded by a deeper-red line, the intervening surface being softened, and studded with numerous minute, white, opaque points. Twenty or more of these patches are often discovered. They are most numerous at the lower extremity of the small intestines, and the disease is always more advanced in those near the cæcum than at a greater distance.

"In a somewhat later stage, ulcerations are observed in some of the diseased patches. They are of different sizes, sometimes quite small, at others occupying nearly the whole patch. They are situated in the submucous cellular coat of the intestine, laying bare, and sometimes destroying the muscular coat; in some instances they penetrate the peritoneal coat. In these there is the same evidence of greater progress in the patches near the cæcum. Not unfrequently there is a particularly large and deep ulcer almost or quite in the cæcal valve, while some elevated patches higher up are free from ulceration.

"In cases where the patient has relapsed after a temporary convalescence, when he dies of pneumonia, or other cause, after a long struggle, the ulcerations of PEYER's glands are found cicatrized. The margin is of a bluish or grayish colour, and sometimes the colour is diffused over the whole patch, and a delicate mucous membrane is found extended over the cicatrized surface. The cicatrization is found farther advanced near the termination of the

* [Remarks on the Pathology of the Typhoid Fever of New-England, as exhibited in its Physical Signs and Anatomical Appearances, by ENOCH HALE, M.D., Attending Physician to the Massachusetts General Hospital. Boston, 1839, 8vo, p. 77.]

ileum than above, showing, as in the other cases, that the affection of the glands began in this part.

"The fourth class of appearances are formed by perforation of the intestine. This is of various depths; sometimes it takes place in the peritoneal coat, and the contents of the intestine are poured into the peritoneal cavity, producing violent inflammation and speedy death. This termination is not confined to cases that have been previously remarkably severe. It often occurs in those, at first, of a mild character. The patient has been walking about the room, with a confidence of a speedy recovery, when he has been suddenly seized with excruciating pain in the abdomen, and died in a few hours. There are no intimations by which the danger of this occurrence can be foreseen.

"In one or more of these modifications, an affection of PEYER'S glands is found in every case of typhoid fever. Out of the thirty-three cases, nine presented only the first stage of this affection; thickening, softening, and a red surface. In eighteen, while some of the diseased patches were in this stage, others, near the lower extremity of the intestine, had passed into ulceration, the ulcers varying in number from two or three to twenty or more. In three, some of the ulcers near the cæcum had been cicatrized; and in three the intestine was perforated. The perforation was, in no instance, in the ulcer nearest the cœcal valve, and in one case it was at a distance of four inches. The periods when these changes occur are various. In two, ulcerations were found before the twentieth day; while in one the disease had continued for months, and there were but three ulcers, and no cicatrization.

"The solitary glands in the small intestines were enlarged in fifteen cases. In eleven they were not visible, and in seventeen they are not mentioned in the record; probably they were not enlarged. The affection of these glands was chiefly found in the lower portion of the intestine. In the large intestines the solitary glands were found enlarged in five cases, healthy in seven; and in six they are not mentioned. In two the mucous membrane was softened. In seventeen, ulcers, quite numerous, were found in the cæcum, or first part of the colon. These ulcerations were not large, like many of those in PEYER'S glands, but small and distinct. In one case, in which the immediate cause of death was hæmorrhage from the bowels, a firm coagulum of blood was found hanging from an ulcer in the cæcum, showing the source of the hæmorrhage. In this, and many other cases of hæmorrhage, both the large and small intestines contained a considerable quantity of blood.

"The condition of the mesenteric glands corresponded to the state of disease of the intestinal canal. Those glands which belonged to the healthy portion of the intestine were healthy, while those of the diseased part were enlarged, red, and infiltrated. At later stages they were found softened, and sometimes suppurated.

"The liver was examined in twenty-seven cases. Its structure was healthy in fourteen; more or less soft and friable in ten; hard in one; congested in one; and in one the serous

coat of the left lobe was highly inflamed, and covered with a coating of lymph.

"The spleen was large in twenty-one cases. In some it was enlarged to twice or thrice the natural size, and then commonly soft in its internal texture, breaking down by pressure into a sort of thick, dark-red fluid. In seven cases it was of its natural size; in two small; in two its condition was not noted.

"Dr. HALE gives an abridged history of four cases, one in illustration of each of the forms in which he has described PEYER'S glands as affected.

"He next proceeds to inquire as to what extent the same morbid appearances are to be found in other acute diseases. For this purpose he examined the records of 159 cases of acute diseases at the hospital. Of these, eighteen were fatal, and fifteen were examined after death. Sufficient data were not found for a comparison of the state of the head, lungs, and heart. The stomach was noted as healthy, or nearly so, in seven cases; the mucous membrane was mamelonated in three; and in five its condition was not particularly described.

"The state of PEYER'S glands is referred to in eleven cases, in all of which they were healthy. In two the organs of the abdomen are declared healthy; in two no reference is made to them. Dr. HALE mentions six other cases of similar diseases, in all of which they were healthy. He states that there is no other disease except typhoid fever in which these glands have been found diseased in the adult. In phthisis they are the seat of ulceration and of tubercular deposits, but the appearances do not resemble the thickening and ulceration of typhoid fever.

"In teething children the glands are affected in precisely the same manner as in typhoid fever. Dr. HALE has seen six cases in his practice of children who have died during teething, in which the glands were thus affected.

"In four of the fifteen cases of acute disease before referred to the solitary glands of the small intestines are noticed as enlarged; and in one they were ulcerated in the cæcum. In the remaining eleven they are not mentioned; probably because no disease was observed in them. The spleen was mentioned in three cases; in four it was small, and in three of natural size, or healthy. In one case where it was large, and in two where it was small, its texture was soft. The liver was examined in all the fifteen cases. It was healthy in seven, and somewhat soft or friable in eight. In three it was large, in three small, and in nine its size was not noticed as unnatural. The other organs furnished no points of comparison to demand attention.

"From this statement, it appears that the spleen, stomach, and liver were affected in a less proportion of cases than occurred in the observations of LOUIS. Dr. HALE, however, considers the only essential difference between the fever of Paris and New-England to be in the greater frequency of diarrhœa in the latter. This difference is, however, the same in other acute diseases."

The appearances, on dissection, as given by Dr. HALE, correspond very closely with those recorded by LOUIS and CHOMEL, as witnessed in the typhoid fever of Paris. The anatomical characters are various and complex, corre-

sponding in this respect to its symptomatology; most of them are doubtless accidental, and it is difficult to determine, with any degree of certainty, what relation the most constant and essential of them bear to the disease itself.

The affection of PEYER'S glands is undoubtedly the most important characteristic of the disease; but we cannot regard this as primary, and the cause of the other morbid phenomena. It may be one of the earliest pathological changes that takes place in the solids; but it remains to be proved that it is invariably present, or that, when present, it gives rise to the existing symptoms. On this point some of our writers have drawn hasty conclusions from a too limited array of facts. That typhoid fever is not a gastro-enterite, is very certain; neither is it a dothinerite; for its severity bears no constant relation to the intensity of the local disease. The phenomena of the disease cannot be satisfactorily explained from the local lesions of the intestinal canal. In short, we hold, with BARTLETT, that "it is much more philosophical and satisfactory, much more in accordance with what is seen in many other diseases, to regard the lesion of the elliptical plates, not as the local cause of all the other appreciable phenomena of typhoid fever, but as constituting one of the pathological elements in a very obscure and complex disease; all which elements—and this quite as much as the others—are themselves the result of some morbid agent, or influence, or process, the nature, sources, and operation of which are wholly unknown to us."* Dr. B. supposes that the lesion of the elliptical plates bears the same relation to typhoid fever as that which their several characteristic eruptions bear to measles, scarlatina, and smallpox; in none of which can we regard the cutaneous eruptions as the causes of the symptoms and of the other various phenomena which go to make up the several diseases themselves. The causes of typhoid fever are as yet but imperfectly understood; age has a powerful influence in its production, as, in 291 cases occurring in the Massachusetts General Hospital, and analyzed by Dr. JACKSON, the average age was about 22 years and a third; of 138 cases reported by LOUIS, 59 were between the ages of 18 and 30; and of 117 cases mentioned by CHOMEL, 91 were between the ages of 18 and 30 years. LOUIS and CHOMEL, also, have shown that *recency of residence* in a place, especially in cities, has an important influence in predisposing to the disease. Typhoid fever is regarded by some, and perhaps a majority of our practising physicians, as decidedly *contagious*. Dr. NATHAN SMITH, a capital observer, considered the disease to be as contagious as smallpox or measles, and gives instances where it was apparently propagated from one individual to another. LOUIS has also lately expressed his belief in the same doctrine.

We have observed that typhoid fever (the *typhus* of NATHAN SMITH, GALLUP, and others) is the prevailing fever of the Eastern States; and some believe that no other fever is met with in that region of country; it prevails in a sporadic form, however, in nearly every sec-

tion of the Union, especially in the winter months. Dr. BARTLETT states that he has seen it in Kentucky, where it is sometimes called the *red tongue fever*.—(*Loc. cit.*). Dr. J. P. METTAUER has given an account of the prevalence of the disease in Middle Southern Virginia during the 13 years from 1816 to 1829, during which time he states that he treated more than 400 cases of it. Dr. M. regards synocha, typhoid, and typhus as varieties of the same fever; and states that they all prevailed at different times in the same region of country. The synocha, "which was only the more open and well-developed form of the disease," prevailed during dry and warm, and warm and damp seasons, and always as an endemic-epidemic of considerable extent. The typhus and typhoid fevers were generally confined to malarious districts; and typhus did not often make its appearance until many cases of the typhoid affection had previously occurred in a family.* The typhoid fever has been very rife in the interior of the State of New-York for several years past, and has gradually spread over the whole of the Western States,† where, at times, it has caused considerable mortality. The migratory character of this disease is one of its most singular features. It is also extensively prevalent in the large manufacturing villages of New-England, occurring far more frequently in some years and seasons than in others.

Like other fevers, the typhoid assumes many forms and varieties; LOUIS makes three, one of which depends on the severity of the disease; CHOMEL describes several, as the *inflammatory*, the *bilious*, the *mucous*, the *ataxic*, and the *adynamic*, depending on the predominance of certain symptoms. One form is called by LOUIS *latent*, where the usual morbid phenomena are not manifested. In some seasons the disease will be mild, and the mortality small; while in others it will be severe and very fatal, the treatment being the same. Thus in the Massachusetts General Hospital, from 1822 to 1835, there were 303 cases of typhoid fever and 42 deaths, or about 1 in 7; in 1830, the deaths were 1 in 3½; in 1831, 1 in 14½; in 1829, 1 in 25. From 1832 to 1835, the number of cases was 129, and the number of deaths 22, being a mortality of 1 in a little less than 6; while from 1836 to 1838, the number of cases was 108, and the number of deaths 7, or 1 in 15. From November, 1836, to November, 1838, there were 55 successive cases without a single death; and the treatment was essentially the same during the whole of these periods. The *duration* of the disease in this country varies in different years from 18 to 26 days. In 255 cases treated in the Massachusetts General Hospital, between the years 1824 and 1838, the average duration, reckoning to the beginning of convalescence, was 22 days; and of 186 cases at the same hospital, between Oct. 1st, 1833, and Oct. 1st, 1839, the average duration was 39 days.‡

According to NATHAN SMITH, the disease

* ["Practical Observations on Continued Fever, as it prevailed in Middle Southern Virginia during the 13 years from 1816 to 1829 inclusive," by JOHN P. METTAUER, M.D., of Virginia. *Am. Jour. Med. Sciences*, July, 1819.]

† "Causes of Death in Typhoid Fever," by B. RUSH MITCHELL, of Ohio. *Western Lancet*, Oct., 1844, p. 268.]
‡ [JACKSON'S Report on Typhoid Fever, p. 108, 109, 110, 111. HALE on the Typhoid Fever of New-England, p. 241.]

* ("The History, Diagnosis, and Treatment of Typhoid and Typhus Fever," &c., by ELISHA BARTLETT, M.D. Phil., 1842, 8vo.)

rarely terminates under the 14th day from the commencement, and rarely extends beyond the 60th.* Relapses are not unfrequent in this disease, and it is not often complicated with other affections. Peritonitis, from perforation of the intestine, is not an uncommon accident. Of the diagnosis and prognosis we have already incidentally spoken. We may add that an extremely frequent pulse is a very dangerous symptom; so, also, are the noisy, irregular respiration, violent delirium, deep somnolence and coma, epileptic convulsions, or sub-sultus tendinum, great restlessness and agitation, the Hippocratic face, severe diarrhœa, involuntary discharges, hæmorrhage from the bowels, retention of urine, erysipelas, &c. The prognosis can rarely be positive, as patients often recover from the most desperate condition.

In the present stage of our knowledge, then, it is impossible, perhaps, to determine whether the disease, of which we have now given an account, be a specific one; or whether it be but a variety of our continued fever, of which we have, according to some writers, an *inflammatory*, and, as recognised by our best observers, a true *typhus*; and occasionally that form called *spotted fever*. We are inclined to take the latter view of the subject, and think it desirable, as already remarked (considering the necessity of retaining the term *typhoid* to express a state of the system met with in other diseases), to designate the phenomena of this fever by the name *abdominal typhus*, the name assigned to it by German writers. The fact of its general prevalence over our country, and that its ravages are gradually extending every year, must be our apology for the space allotted to it on these pages.

The treatment of typhoid fever will hereafter be considered.

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TYPHUS FEVER.—That a form of fever cor-

responding to the typhus of Great Britain, in which there are no anatomical lesions corresponding to those described as characterizing the typhoid fever of *LOUIS*, is now generally admitted as prevailing at times in our country. It is the fever that attacks the inmates of our almshouses and passengers on board of emigrant vessels, and many such cases are annually received into the hospitals of this city. In March, 1842, the ship *Eutaw* arrived at New-York, after a passage of forty-two days, from Liverpool, with two hundred Irish passengers, of whom seventy were sick with typhus on her arrival. Among these there were eight deaths. In May, 1842, the bark *Barlow* arrived at this port from Greenock, after a passage of forty days, with fifty typhus patients, there having been three deaths before her arrival. And in August, 1840, twenty-one cases of typhus fever were admitted from a single vessel into the Boston Almshouse, of which four proved fatal. The prominent symptoms in these cases were, dulness of mind, deafness, stupor, suffusion of the eyes, and dinginess of the skin. The bowels were torpid, and there was rarely any meteorism or pain in the bowels, as in the typhoid variety. *Dr. A. S. Doane*, late quarantine physician of the port of New-York, and who treated much of the disease, states that the most striking and constant phenomena attending it were, injection of the eyes, fuliginous aspect of skin, and deafness. Diarrhœa was rarely observed, and the alvine discharges, when procured by medicine, were dark and offensive. The disease was evidently contagious, and *Dr. D.* remarks that during his connexion with the institution, a period of about three years, there were no less than sixteen individuals connected with the hospital who died of typhus fever contracted from the emigrant patients.* True typhus has at different times prevailed epidemically in the almshouse of this city, attacking nurses and physicians, and often proving very fatal. We have treated many cases of the disease in this city, in individuals from on board passenger vessels, and in the narrow lanes, and crowded, filthy apartments of that class who apply to dispensaries for medical aid, and we have had abundant evidence of its contagiousness, as well as opportunities for observing its characteristic phenomena. In 1843, some forty cases of genuine typhus occurred in the immediate neighbourhood of an establishment in this city for the manufacture of lard oil from putrid pork, five of which came under our treatment in a single family; all were marked by delirium and coma, dusky hue of skin, sub-sultus tendinum, constipated bowels, a thick, yellowish, pasty fur upon

* [According to *Dr. GERHARD*, the spotted fever was similar in its nature to the British typhus. *Dr. J. JACKSON* thinks it was a different disease. *Dr. BARTLETT* remarks that, in many important particulars, it bore a very striking resemblance to true typhus. *Dr. E. NORTH* called it a *new petechial malignant typhus*, which seems a very appropriate name. *Dr. HALE* speaks of many points of resemblance between it and *Dr. ARMSTRONG's* typhus, and also notices many strong points of difference. *Dr. BARTLETT* has remarked that it seems to belong to that class of new and more or less temporary epidemics, each having its peculiar character, marked by its peculiar phenomena, and depending upon new and peculiar combinations of unknown morbid influences, which have always, from time to time, made their appearance. Rather than to the class of established and permanent maladies.]

† [*BARTLETT* on Typhoid and Typhus Fever. *Phil.*, 1842.]

* [SMITH'S *Med. and Surg. Memoirs*, p. 56.]

the tongue, hot skin, and full pulse, &c., and their average duration was about thirty-five days. In these cases, there was no doubt whatever that the exciting cause of the disease was the emanations from the putrid meat. We have alluded to a typhus fever described by Dr. METTAUER as having prevailed for a period of thirteen years in Middle Southern Virginia (*Am. Jour. Med. Sci.*, July, 1843), and which was attributed by him to malarious causes, and propagated, especially in the cold season, by personal contagion, or *idio-malaria*. The blacks were most subject to this form of fever. According to Dr. GERHARD, the epidemics which overran the Middle States between the years 1812 and 1820, were of typhus fever; and of this disease Drs. RUSH, WISTAR, and DORSEY died. As a very perfect analysis of the symptoms of this disease, we quote the following from the work of Dr. BARTLETT (*loc. cit.*):

"This disease, in the present state of our knowledge respecting it, may be defined in the following terms: Typhus fever is an acute affection; occurring at all ages of life; attacking, at least in cities, somewhat more frequently persons who are recent than those who are old or permanent residents; often transmitted directly from one individual to another; very much more common in the British Islands than anywhere else, although prevailing at times in other countries, generally in the form of circumscribed epidemics; often connected with the crowding of many persons into small, dark, and poorly ventilated apartments, amid filth and destitution; sometimes sudden and sometimes gradual in its access; attended at its commencement with chills, usually slight, and in many instances repeated; then with morbid heat of the skin, in many cases very intense and pungent; with increased quickness, with softness and feebleness of the pulse; with accelerated respiration; in many cases with the physical signs of bronchitis and pulmonary congestion; with pain in the head, back, and limbs; dullness or perversion of the powers of the mind; drowsiness or stupor; dizziness, deafness, and ringing or buzzing in the ears; morbid sensibility of the skin and muscles on pressure; extreme prostration of muscular strength; spasmodic twitchings of certain muscles; dull and stupid expression of the countenance; fuliginous flush of the face; suffusion of the eyes; with loss of appetite and with thirst; sometimes with a slightly altered tongue, but in grave cases with a dry, red, brown, or black and fissured state of this organ; sordes upon the teeth and gums; occasional nausea and vomiting; frequently with a constipated or sluggish state of the bowels; epigastric and abdominal pain and tenderness; the skin of the body and extremities being generally the seat of an abundant eruption, coming out, in most cases, between the fourth and seventh day of the disease, and declining at uncertain periods during the second and third week, consisting of small spots, generally somewhat obscurely defined and irregularly shaped, not infrequently grouped and confluent, of a dusky, dingy red colour, not elevated above the surrounding surface, and disappearing only imperfectly, or not at all, on pressure; the body of the patient, in grave cases, giving out a pungent, offensive, and ammoniacal odour; which

symptoms differ very widely in their duration, in their march, in their severity, and in their combinations in different cases, several of them being frequently wanting; but enough of them being generally present to characterize the disease; the most constant of which are the loss of strength, the stupor, the suffusion of the eyes, the fuliginous skin, and the dusky cutaneous eruption; which symptoms may either gradually diminish in severity, and finally disappear between the seventh and thirtieth day of the disease; or may increase in severity and terminate in death between the third and twentieth day from their access; the liability to a fatal termination being much less early than late in life; the bodies of patients exhibiting, on examination after death, no constant pathological changes of any of the organs; but in a considerable, though varying proportion of cases, engorgement of the vessels of the brain, with moderate sub-arachnoid serous effusion; engorgement of the posterior portion of the lungs; redness of the mucous membrane of the bronchia; softening, or mamelation of the mucous membrane of the stomach; the blood being generally of a dark colour, often fluid, or grumous; the coagula, when formed, soft and non-fibrinous; and the body, in many cases, running rapidly into decomposition; which disease, thus characterized and defined, constitutes a peculiar, individual affection, differing essentially from all others, although related by many analogies to typhoid fever."

It is still in dispute whether there exists any essential diagnostic character between the typhus fever above described, and the typhoid fever of Paris and America. On this subject the following remarks of Dr. GERHARD are in point:

"On considering the symptoms of typhus and typhoid fevers, we observe that the latter disease is not confined to any particular season. It commonly attacks individuals of a particular age, and exposed to some unaccustomed mode of life. It sometimes occurs at the same time that an epidemic of autumnal remittent or of typhus exists. I have seen it under both these circumstances, but I have always observed symptoms which distinguished it from either. There could be no doubt of the correctness of the diagnosis, for it was not made in private practice, but in hospitals, where there were always a number of physicians and pupils present to correct and verify the facts.

"These remarks are designed to show that the distinctive characters of these fevers are not such as in practice to allow them to be confounded together. Nor was it very difficult to acquire this facility of diagnosis, as all the better-instructed students easily attained it. That the very early stages of typhus and typhoid fevers resemble each other is true; but in no greater degree than in the early stages of typhoid fever and smallpox, which I have known to be mistaken for each other by the most experienced observers. When the initial period of the fever is passed, the disease may be readily distinguished. Even very early, before the fever assumes its characteristic appearance, there is usually some fact which may throw light upon its nature.

"1. *Thoinentritis* is usually a sporadic disease, although it sometimes appears as a wide-

spread epidemic. In the latter case the symptoms are so well marked, that these are never doubtful, except in a few of the earliest examples. Now typhus is very rarely sporadic; and if scattering cases do occur, they are generally connected with an epidemic and follow it, as scattering cases of cholera were observed for a long time after the great epidemic of 1832.

"2. Typhus is evidently very contagious; in the epidemic of 1836 it was quite as contagious as smallpox. I am fully convinced of its contagious nature from extensive observation as a physician to the hospital, and from the official visits and inquiries which I made as a member of the Board of Health. Dothinenteritis is certainly not contagious under ordinary circumstances, although in some epidemics we have strong reason to believe that it becomes so. It bears in this respect the same relation to typhus fever that measles do to smallpox.

"3. The initial symptoms of the two affections chiefly differ in the greater stupor, dullness, and prostration of typhus, which are in strong contrast to the moderate cephalalgia and disturbance of the senses in dothinenteritis.

Still, there are now and then, perhaps once in twenty or thirty cases, some symptoms which are apparently common to the two forms of fever. Just as in the diagnosis of measles and scarlatina there is usually no difficulty; but we sometimes see cases of a hybrid character in which the most experienced physicians may be doubtful. In two or three cases out of three hundred the symptoms of typhus and typhoid fever seemed blended together; but these were slight forms of disease, which are necessarily less distinct than those of a more severe type. In practice, such cases are too rare to give rise to any difficulty.

"The more severe cases of dothinenteritis sometimes resemble typhus fever very closely, but the resemblance is confined to the symptoms offered by the patient in the most aggravated period of the disease, and does not extend to the succession of symptoms. Indeed, if these cases of typhoid fever are examined at the early stages of the disease, they are certainly more characteristic than the slighter varieties; and although the symptoms occurring during a single day would lead us into error, the comparison of the successive changes will always guide us.

"When the disease is completely formed, the characters on which the distinction between the two forms of fevers rest are, 1. The suffusion of the eyes, which occurs in every case, or nearly every case, of typhus fever, with the dusky-red aspect of the countenance; 2. The extreme stupor and inactivity of the mind, even when positive delirium does not exist; 3. We also observe in typhus no constant abdominal symptom, and at first merely dullness on percussion and feebleness of respiration at the posterior surface of the lungs; 4. If to these symptoms be added the peculiar eruption of petechiæ, which is scarcely ever absent in whites, there remains hardly a possibility of error. In the typhoid fever, we consider as distinctive characters the prostration, the somnolence, the slow development of nervous symptoms, which are not so strongly marked as in typhus. The abdominal symptoms are

tyimpanitis, pains in the abdomen, and diarrhœa. The sibilant rhonchus is heard in the chest; and, lastly, there is an eruption of rose-coloured papulæ and sudamina upon the skin.

"It is not necessary to insist upon the diagnosis between typhus and the ordinary autumnal remittents. The peculiar season at which these latter diseases originate, their progress and termination, all differ too widely from the symptoms of typhus to allow of error, without extreme inaccuracy of observation.

"Some rare cases of pneumonia, especially when they occur in drunkards or patients whose constitutions are enfeebled from other causes, resemble typhus in many particulars. Indeed, the diagnosis is vastly difficult, were it not for the petechial eruption, as the stupor is sometimes considerable, and the suffusion of the face and eyes nearly as great as in typhus. If in these cases we are totally without knowledge of the early circumstances, we may occasionally mistake a case of pneumonia for typhus fever. But we could scarcely confound the pneumonia, which appears as a mere complication in typhus, with the original inflammation of the lungs. In some of these cases we derive less benefit than we could anticipate from the physical signs, because pneumonia may be present and be readily distinguished by auscultation, but, at the same time, be strictly secondary. Neither bronchitis nor angina resemble typhus, unless they occur as an epidemic."—(*Am. Jour. Med. Sciences*, vol. xx., p. 307.)

It remains for future observations to determine the precise relations which these diseases hold towards each other.]

524. XXIV. TREATMENT OF SYNOCHOID AND TYPHOID FEVERS.—i. TREATMENT OF SYNOCHOID FEVER.—In this fever, as well as in all others in temperate climates, the *indications and circumstances* stated above (§ 123, 124) as deserving of especial attention should be strictly observed. The prevailing epidemic, and the changes that take place in its nature, or characteristic states of vital action, with its progress and with the season, should be carefully studied and made the basis of treatment. Some difficulty may occur, at first, in coming to just conclusions; but it will vanish with the extent of observation, especially when diligence has been used. The chief points to which the attention of the practitioner will be directed are, the nature and concurrence of the causes, the extent to which they may have affected vital manifestations, the degree of excitement or vascular reaction in connexion with nervous power, the state of the circulating and secreted fluids, and the nature and amount of local complications or determinations. The physician who has studied, in an intimate manner, the various phases of disordered vital manifestation, will have little difficulty in recognising the chief characteristics of fever under the ever-shifting circumstances in which they present themselves, and in appropriating accordingly his method of cure.

525. A. The ancients observed carefully the spontaneous changes which take place in fever, and conduce to recovery (see art. CRISIS); and they were guided, in forming their indications of cure, by these changes, which they merely attempted to promote or to imitate. This

mode of practice may be followed in synchoid fever more successfully, perhaps, than in any other. Yet it will be better to combine with it the more modern indication of resorting to such means as may subdue the more urgent symptoms, and avert contingent danger.—*a.* If the patient be seen as early as the *premonitory* and *invading* stages, the impending disease may be averted by the means advised above (§ 121, 122), more especially by *emetics*, warm *diaphoretics*, and the *vapour bath*. But when *excitement* has commenced, the treatment should be antiphlogistic. In this stage we should endeavour, by a careful examination of the symptoms, to ascertain the existence of local complications; and, having determined their absence, the question will then be as to having recourse to *blood-letting*. I have already considered this topic so fully (§ 128–139), that nothing farther need be here advanced. If the nature of the prevailing epidemic, or the degree of reaction, require depletions, the earlier in this stage they are resorted to the better. But even then they require caution and discrimination. If the excitement be slight, and the patient neither robust nor plethoric, and more especially if the causes and circumstances connected with the origin of the disease be of a depressing nature, they will be better withheld.

526. *b.* The exhibition of *emetics* in the stage of excitement was advised by many of the ancients, and practised by some of the most recent writers, although objected to by others. The reason of this difference of opinion is very obvious. There are states, even of this stage, in which they will be of service, and others in which they will be injurious. When reaction is slight—when the patient is not plethoric, has not experienced full vomiting, and does not complain of pain or of tenderness in the epigastrium or hypochondria, then emetics may be exhibited. But if the excitement be great, with determination to the head, and if the patient have already vomited freely, and more especially if the symptoms just mentioned be present, they should not be prescribed. (See § 149.)

527. *c.* *Purgatives*, so much decried by BROUSSAIS, and with some justice as respects several states of fever prevalent in France, are certainly of very great service in the common continued fever of this climate, when employed with a cautious discrimination. Early in this disease, calomel, either with or without JAMES'S powder, may be given at night, and a purgative draught in the morning. At a more advanced stage, calomel, or hydrargyrum cum creta, may be conjoined with rhubarb. If the stomach be too irritable to retain the more common purgatives, a full dose of calomel will generally be retained; but its action should be promoted by enemata (see F. 140, 144). During the febrile excitement, and when the bowels are sluggish, the stronger saline purgatives may be given in solution, in small doses and at short intervals, with refrigerants (F. 440, 441). The remarks already offered upon this subject (§ 150, 151) will guide the practitioner as to the choice of purgatives, and the extent to which they should be prescribed. In this fever especially, it can never be injurious to give them to the extent of freely evacuating morbid accumulations in the bowels, and of promoting the alvine secretions and excretions. When the fæces are

very offensive, greater mischief will accrue from allowing them to remain, even for a short time, in the bowels, than from too active measures in evacuating them.

528. *d.* The remarks that have been offered above respecting *refrigerants* (§ 139, 140), *diaphoretics* (§ 152), and *diuretics* (§ 153), are entirely applicable to this form of fever. The *cold affusion*, which formerly attracted so much more, and now so much less attention than it deserves, is more appropriate in this than in any other disease. This practice, although resorted to by the ancients and in Eastern countries, was but little known in this until it was employed by WRIGHT and JACKSON. The work of Dr. CURRIE on the subject first brought it into fashion, but now it certainly has not fashion in its favour. When the excitement is fully developed, and the heat of skin above the natural standard, when there is no sense of chilliness, and when the surface is hot and unperspirable, the cold affusion may be employed. Dr. CURRIE directed water of the temperature of from 40° to 60° or 70°, and preferred the hours from six to nine in the evening for its use. In cases of debility, the *cool* or *tepid* affusion is more appropriate. I have resorted to cold affusion over the whole body in several cases of fever in a warm climate, but I was not induced, by its effects, to entertain a high opinion of it. The affusion of cold, cool, or tepid water on the head, when this part is prominently affected, and cold-sponging the surface, are more beneficial, and admit of more general application. Dr. CURRIE believed that the general affusion had the effect of lowering the pulse and the morbid heat, of inducing perspiration and sleep, and of cutting short the fever. I have never seen it succeed unequivocally in producing the latter effects, but have remarked that the excitement returned shortly after its use. In the complication with disease of any of the thoracic or abdominal viscera, it should not be used (§ 141).

529. *B. Of the Complications.*—*a.* Predominant *affection of the head* has received attention above (§ 165). What I have there stated is applicable to this complication of common continued fever. *Blood-letting* is especially requisite, but its amount, and the mode of performing it, should entirely depend upon the symptoms and the stage of the disease. The *cold affusion* on the head, and *purgatives*, are the next in importance. When the cerebral affection has been preceded or attended by diarrhœa, purgatives should be prescribed with caution. Rhubarb, with hydrargyrum cum creta, given so as to evacuate morbid matters, and promoted by suitable enemata (F. 140), will be then sufficient. When *delirium* is the principal symptom, care should be taken to discriminate accurately the states of vascular action and of vital power. If it be unattended by increased heat of scalp, the pulse being very quick and soft, and the countenance sunk or pale, and especially if it have followed intestinal disorder, all lowering agents should be laid aside, and restoratives with opiates, and mild nourishment in small quantities, prescribed. When fever occurs in persons addicted to spirituous or other intoxicating liquors, the cerebral affection is apt to become very severe, and to be attended with delirium, and often with tremour.

In such cases, depletions should be used with caution. If tremour, irritability, &c., appear, opium, with or without camphor, should be exhibited. In other respects, the means advised in the article DELIRIUM, according to the pathological states upon which it depends, will be here appropriate. I have repeatedly seen the cerebral symptoms greatly aggravated by the application of a *blistre* to the scalp at a too early stage of the disease. Blisters should be applied preferably on the nape, but never on the head, unless there be profound coma, or low delirium with great exhaustion of vital power, as more fully shown in the articles КОМА (§ 16) and DELIRIUM (§ 19).

530. *b.* The observations already made respecting the *pulmonary complications* (§ 160–163) are mostly applicable to those occurring in this form of fever. *Bronchitis* is the most common affection, and requires the treatment above advised (§ 161, 162). When the substance of the lungs, or the pleura, is implicated, vascular depletions ought to be early practised. But even in these cases, we should recollect that blood-letting must be employed with greater caution than in inflammations occurring primarily and in healthy constitutions. It is in this fever, and in its pulmonary complications especially, that antimonials may be given with greatest freedom. After depletions and antimonials have been carried as far as seems prudent, blisters, or other external derivatives, should be used. If the air-passages become loaded with mucus, antimony, or ipecacuanha, or sulphate of zinc may be given so as to excite full vomiting.

531. *c.* *Predominant affections of the digestive mucous surface* have already received attention, and the treatment there recommended (§ 155–159) is quite appropriate in these complications of this form of fever. In the *gastric state* of disorder, particularly when much pain and tenderness, with irritability, exist, local depletions should be early employed; and a full dose of calomel, given shortly afterward, will generally allay what may remain of these symptoms. Enemata, also, will assist materially in producing this effect, and evacuate morbid matters from the bowels. Small, but often-repeated doses of hydrochlorate of ammonia, or of the nitrate of potash with the carbonate of soda; or camphor julep, with the solution of acetate of ammonia, and nitre, or spirit of nitric aether, will afterward be extremely beneficial. Even in this form of fever, but still more in the adynamic, we should be cautious not to be misled by the persistence of pain and tenderness at the epigastrium; or induced to prescribe too frequent or too large depletions with the view of overcoming these symptoms. They may never be removed by these means, however freely employed; for, notwithstanding the arguments of BROUSSAIS for their origin in inflammatory action, I believe that they depend more upon the altered state of the organic nervous sensibility than upon increased vascular action in the stomach.

532. In the *enteric complication* the treatment will depend upon the stage of fever at which it appears, and the progress it may have itself made. Local depletions, external derivatives, and the other means enumerated above (§ 156–159), are generally necessary. If bloody or

ochrey discharges are observed, especially late in the disease, the terebinthinate medicines, or the acetate of lead with opium, as advised by Dr. BARDSLEY, will be found the most efficient remedies. If the powers of the system become much reduced, gentle tonics, with the chlorates, as the infusion of valerian with the chlorate of potash, and paregoric elixir, will be of essential service. The following medicines will prove of great use in earlier stages of this complication, after local depletions, especially when aided by external rubefacients and derivatives. In slight cases, either of them may be given, according to circumstances; in the more urgent, both may be taken alternately, at intervals of three hours.

No. 223. R Sodæ Carbon. gr. x.; Potassæ Nitratis gr viij.; Tinct. Camphoræ Comp. ʒj.; Mist. Camphoræ (vel Infusi Valerianæ) ʒx.; Sirupi Aurantii ʒss. M. Fiat Haustus, sextis horis sumendus.

No. 224. R Camphoræ rasæ et subactæ gr. ss.—j.; Pulv. Ipecacuanhæ Comp. gr. iv.—vj.; Hydrarg. cum Cretâ gr. iij.—v.; Sirupi Simp. q. s. ut fiant Pilulæ ij. vel iij. sextâ quâque horâ sumendæ.

533. *ii.* TREATMENT OF TYPHOID FEVERS.—The treatment of this class of fevers is the most difficult in practical medicine. If the physician possess not just views as to the different and varying states of vital action, and as to their influence in producing organic lesion; if he be not enlightened as to physiological pathology, as well as to pathological anatomy; if his knowledge of the instruments of his art be not adequately varied and comprehensive; if his resources be not great, and based on science, he administers to a patient in any of the forms of typhoid fever with an equal chance of doing mischief, or of affording benefit; and he may as well adopt his plan of treatment from the “hazard of the die,” as to attempt to reason on the matter. It is better that the patient were left to the spontaneous efforts of nature than that he should fall into the hands of such a practitioner. If we look back to the influence of theory and system in the treatment of these diseases, to the importance bestowed on names, and to the manner in which names have been confounded with, or substituted for indefinite and varying entities, we shall not be at a loss to explain wherefore it has often been a matter of difficulty to decide whether or not medical interference has proved beneficial or injurious. This is, however, not an opprobrium to our science, but a proof of its difficulties, and of the ill-founded pretensions of many of its professors and teachers. In our own days we have seen pretensions to which ignorance gave confidence, and for which professional cant procured currency, obtain a credence which now seems surprising, and produce results which the adequately informed always anticipated. We have witnessed the promulgation of doctrines, and of modes of practice, warranted neither by an acquaintance with vital actions, nor by a knowledge of, nor regard to facts, lead to the most serious consequences; and have remarked, moreover, the power they obtained over those who were either unwilling or unable to inquire into their truth. But we have also seen, in the brief space of two or three years, the illusion vanish before the increasing and spreading lights of pathological and practical knowledge.

534. The difficulties attendant upon the treat-

ment of this class of fevers depend chiefly upon the varying states of vital action in their course ; the modifications and complications they present in different circumstances and epidemics, and the inadequate means of discrimination in our power between the changes induced by treatment and those taking place spontaneously. It is not also from the effects produced upon a few detached cases that we can judge sufficiently of the efficacy of certain remedies, but from the results in a number, from the rate of mortality in various circumstances, and in different epidemics. Whatever may have been the method advised by writers—too many of whom have written from motives wide from those by which alone they ought to have been actuated—we shall find, upon close inquiry, that the general mortality has been such as to demonstrate its little efficacy, or to show the small superiority possessed by it over others.

535. The ancients observed the changes which take place in the course of fevers with great attention, attributed recovery to the critical evacuations which frequently occurred in their advanced stages, and did not attempt to interfere with the efforts of nature as long as the disease pursued a simple and mild course, but interposed in order to accelerate and replace evacuations when they did not occur after a certain period, or were interrupted by any circumstance. The chief fallacy in this doctrine is, that the evacuation, when it occurred, was mistaken for the cause of the amendment, instead of being viewed as the effect, and as one of the signs by which this change is often indicated.

536. The physicians who, in modern times, attributed an important part to putridity of the humours, recognised merely a portion of the mischief, and that often the most remote and contingent, and mistook, in great measure, both its origin and nature. They had recourse to camphor, bark, musk, and various preparations, both vegetable and mineral, possessing antiseptic properties ; and, if they had employed them in appropriate periods and states of the disease, the benefit derived from them would have been much less equivocal. But, mistaking the origin of the phenomena usually called putrid, they frequently prescribed these medicines improperly ; and while endeavouring, by an early exhibition of them, to prevent putridity, they actually often accelerated or favoured its occurrence.

537. A nearly similar mode of treatment was advised by BROWN, and his once numerous followers on the Continent ; but it was based upon a different doctrine—upon the predominance of the asthenic diathesis and its consequences. Although wine, opium, tonics, and stimulants were recommended by them, in various forms and combinations, with advantage, in certain states of typhoid fevers, particularly in the latter stages, yet the evils resulting from an early recourse to them were also sufficiently evident, and at last became manifest even to the disciples of this school. That this practice, and the modifications introduced by its partisans, did not prove so injurious in the treatment of fever, especially on the Continent, as may be supposed, is accounted for by the circumstance that depressed vital power, with septic changes in the fluids in the last stages, character-

ized the much larger proportion of fevers prevalent for several years after its promulgation. But the appearance of exanthematic typhus in the north of Italy, at the close of the last century, opened the eyes of RASORI to the impropriety of having recourse to stimulants in its treatment, and laid the foundation for the doctrine and practice of *contra-stimulus*. The general character of the petechial fevers prevalent about the commencement of the present century in Italy and Germany was such as I have delineated in the section on typhus (§ 435), with more or less inflammatory or irritative action in the stage of excitement, the exanthematic eruption in this stage being frequently mistaken for petechiæ, and the appearance of these, and of other adynamic symptoms, being favoured by the vascular reaction which preceded them.

538. The administration of the *potassis tartarate* of antimony in large doses was the principal treatment employed by RASORI. When the patient was young and robust, and the disease had not reached the acme of excitement, he directed a moderate blood-letting at the outset, and immediately afterward four, six, eight, ten, or twelve grains of tartar emetic, or even more, in solution. He prescribed this medicine in smaller doses subsequently, or substituted for it the *kermes mineral*, conjoined with nitre, and in doses of one grain, or of a grain and a half, every half hour or hour, or every two hours, according to the degree of vascular excitement. He often gave the tartar emetic and kermes alternately. RASORI also employed purgatives, particularly when the antimony did not act sufficiently upon the bowels ; preferring neutral salts, manna, and tamarinds in large doses, and administering them, in other cases, in enemata. He enforced a cooling regimen and severe diet, and allowed only refrigerant beverages. The success of this treatment is stated to have been great ; and its propriety, as well as success, may be admitted, when employed in an epidemic characterized by high vascular excitement at its commencement, and when adopted sufficiently early after reaction has taken place, and in previously healthy persons. But in other states of typhoid fever, and in the latter stages especially, the large doses of antimony here advised appear not, *a priori*, to be suitable means. It should, however, be admitted that the exhibition of the potassio tartarate of antimony, in the advanced stages of this fever, has never been satisfactorily tried, either in this country or in France and Germany. That it may be found not so inappropriate as generally considered, is an inference which the trials made of it, very recently, by Dr. GRAVES, of Dublin, fully warrant.

539. The pathological tenets lately prevalent in France have, as M. CHOMEL states, prevented the treatment of RASORI from being adopted, or even tried in that country. The doctrine of BROUSSAIS was opposed to this, and every other means that seemed to its supporters likely to aggravate the inflammatory action of the digestive mucous surface, which they supposed to be the cause of all fevers. If we examine the practical tenets of this school, we shall find more than one postulatium assumed as fully established, although admitting not only of doubt, but even of disapproval. That fever does

not depend upon this lesion, although predominant morbid action in the digestive canal may appear in many cases, and in some fevers more frequently than in others, has been already shown. And, granting that this morbid action is attended by vascular injection of the mucous membrane, it still remains to be proved that it is the same kind of affection as inflammation. That it is not the same as primary and sthenic inflammation, its phenomena and results, as well as the *juvantia* and *ledentia*, sufficiently prove. Even granting the doctrine of BROUSSAIS in its fullest range, it still remains to be demonstrated that the treatment advised is that which is the most beneficial or the most appropriate in the numerous and varying morbid conditions which fevers assume; and it, moreover, should be shown that the means which the espousers of this doctrine reprobate are one whit more prejudicial than those which they laud. In a class of diseases so varying, and even opposite, as to their pathological states, as fevers are, not only in their different forms, but also in the same case at different stages, the success of various remedies cannot be predicated from doctrinal tenets. However ingenious the theory and close the reasoning by which we are led to practical inferences, careful experiment and repeated observation are necessary to test the character of any method of cure; and even were we to adopt the views of BROUSSAIS, to these tests we ought to resort before we should decide between the efficacy of gum-water and leeches on the one hand, and that of antimony and purgatives on the other; or, indeed, respecting the propriety of any remedy whatever.

540. The pathological views of HOFFMANN, and the modifications of them by SAUVAGES and CULLEN, although entirely based upon solidism, were favourable to rational modes of practice. These views, in the varying explanations of them furnished by HEBERDEN, FORDYCE, and others, have very generally guided practitioners in this country in the treatment of typhoid fevers, until Dr. HAMILTON introduced a modification of the usual practice, or induced them to have a more frequent recourse to purgatives than had previously been ventured upon. That these remedies, especially when judiciously selected and combined, do not produce the mischievous effects in typhus which BROUSSAIS supposes them to produce, even when given in cases the most favourable to his views, I am convinced by experience, and many of his disciples are at last opening their eyes to the fact. MM. BRETONNEAU, ANDRAL, and others, more or less partial favourers of his doctrine, have recently so far discarded the practical tenets of their school as to venture on the exhibition of these medicines; and, as M. CHOMEL justly remarks, have found that the dread of them so long entertained is unjust, and that they may be employed early, in many cases of typhus, with great benefit. Where, however, there is reason to suspect the existence, or even the commencement, of ulceration, the inpropriety of having recourse to them, unless with the circumspection and in the manner hereafter to be mentioned, cannot be doubted. But ulceration seldom occurs before the twelfth day of the disease; and if they have been judiciously employed previously, I believe that it will very

rarely take place either then or at a later period.

541. The humoral pathology, although superseded very generally by solidism, since the days of HOFFMANN, still continued to be partially adopted by some practitioners in different parts of the Continent. It has been lately revived in a too exclusive manner in this country. Among those who have espoused views of this kind may be mentioned Dr. STOKER, Dr. CLANNY, and, still more recently, Dr. STEVENS, each of whom has endeavoured to establish the early predominance of morbid states of the blood. These views have been already partially discussed, and I have now nothing farther to add respecting them than that the changes of the blood for which Dr. STOKER argues are those which have been above stated (§ 520), and which refer merely to its external appearances. Dr. CLANNY insists chiefly on the diminution, in typhus, of the carbonic acid, which he supposes the blood to contain in health. He recommends the use of fluids containing or evolving this gas, as effervescing draughts, Seltzer water, &c. M. CHOMEL states that he gave this practice a trial in the *Hôtel Dieu* during two years, and that, although the cases in which he employed it were not numerous, they satisfied him that it did not influence the usual results, and that he preferred, therefore, to try other means, the inefficacy of which had not been so fully shown. Of the treatment of Dr. STEVENS, in respect of this class of fevers, I entertain similar opinions to those expressed above (§ 387). In two cases of low nervous fever to which I was lately called, at a period, however, too late to expect benefit from any treatment, I prescribed the remedies this writer has advised, but without any effect.

542. If the *rational method of treatment*, or that which is modified according to the form, state, or stage of the disease, is not much more successful than that which is dictated in the spirit of system or of empiricism, it has at least this to recommend it, that it brings the results of science to bear upon existing pathological states, both vital and structural. Although not admitting so readily of the usual tests of success as more empirical methods, the experienced physician will readily form a tolerably accurate idea of the circumstances either promoting or preventing favourable results. He will make due allowances for the forms and periods of the disease, the characters of the epidemic, the influence of season, and for the numerous circumstances appertaining to individual cases; and he will at once perceive that the means that are beneficial in one epidemic, or in one form of fever, or in certain cases, will be most injurious in others. In the present state of our knowledge, the rational method of cure is that which is most appropriate to the different varieties and stages of fever. According to it, *indications* or intentions are derived from a due estimate of existing symptoms and signs, and of the pathological conditions evinced by them. While it comprises every method of cure, and all kinds of means, it adapts them to the states of the disease and of the patient. The judicious physician employs, according to circumstances, remedies the most opposite; and, in different cases, or in different periods of the same case, he has recourse to seda-

tives, to refrigerants, to evacuatants, to tonics, to astringents, to stimulants, or to antiseptics. He neglects no means, but adopts none exclusively; and while interpreting the value of symptoms, and inferring the morbid states producing them, he endeavours to select and to combine the medicines whose known operations are such as are most likely to remove these states, or to prevent the accession of others usually supervening in the course of the disease, and increasing its danger. I will now proceed to consider, 1st. The treatment appropriate to the different stages of typhoid fever; 2dly. The modifications required by its different forms and complications; and, 3dly. The means recommended in a special manner, and the circumstances or states of the disease in which they may afford benefit.

543. *A. The Treatment appropriate to the stages.*—*a.* In the *premonitory stage*, and while that of *invasion* is not fully formed, the future fever may be checked or prevented by the shower-bath, followed by frictions of the surface; by an emetic, or by a warm stomachic purgative; or by a warm or vapour bath; or by all these following in succession; and in some cases, also, by warm diluents or diaphoretics; but this result cannot be depended upon.—*b.* When the *stage of invasion* is pronounced, bleeding, hot stimulants, &c., are hurtful, or even dangerous. Tepid and warm diluents, and the warmth of bed, are the most suitable means. If vomiting accompany this stage, it may be increased by tepid and emollient diluents. If nausea only be complained of, and if there be little pain, tenderness, or tension in the hypochondria and epigastrium, an emetic may be given, and its action promoted by these means. This treatment will generally shorten the chills, &c., characterizing this period, and favour a relaxation of the surface, or the occurrence of moderate reaction.

544. *c.* In the *stage of excitement* the treatment must altogether depend upon the degree in which reaction is developed, and the manner in which the brain, the lungs, or the digestive canal appears to suffer. If the fever does not present, early in this state, the characters of low nervous fever to their full extent, or those of an adynamic or of a putrid or septic kind, then a small or moderate *blood-letting* may be prescribed; but the effects at the time of the operation should be carefully observed. If the patient be young or robust, previously healthy and well fed, then a more copious depletion may be practised, if he be seen early. Even in the lower states of this fever, if any of the viscera just named be prominently affected, a *local depletion*, either by leeches or by cupping, may be employed. But if the period of excitement be far advanced; if the fever be simple or mild; if it have passed the tenth day; and if it be the true or exanthematic typhus, unattended by inflammatory associations; blood-letting will seldom be of service, and it may interrupt the regular and favourable course of the disease, particularly the latter form of it. In a large number of cases in which M. Louis states blood-letting to have been tried, and in which it appears to have been indicated, the advantage procured by it seems to have been slight; but sufficient to increase, to a small amount, the proportion of recoveries, and to

diminish the duration of the disease. *Emetics* have been advised also in this stage; and, in cases where the chills return on successive days, or frequently alternate with flushes, I believe that they will be found of service. *INDENBRAND* directs them in the first, second, or third day, or even later; having premised a blood-letting in the cases indicating it; and prefers a large dose of ipecacuanha, with a grain of tartar emetic. Next to emetics, *purgatives* are of advantage. At an early period, or before the eighth or ninth day, a full dose of calomel, either alone or with rhubarb, may be given; or jalap, with cream of tartar; and their action promoted by moderate doses of the neutral salts, or by manna, tamarinds, &c., according to circumstances. These clear away morbid secretions and mucous sordes from the digestive surface; which, if allowed to remain, would favour the occurrence of the morbid changes in the intestines. If, however, the bowels have been much relaxed, and still continue so, it will be preferable to give an occasional dose of hydrargyrum cum creta, with rhubarb, and ipecacuanha, which will promote a healthy state of the mucous surface, and facilitate the evacuation of morbid secretions. If the bowels be only gently open, the circumstance is favourable; but an inordinate action of them must be moderated by the above medicine, or by others hereafter to be mentioned, lest intestinal ulceration and perforation be the ultimate result. At the same time, care should be taken not to produce a sudden change or constipation, otherwise the cerebral or nervous symptoms will generally be much aggravated, and a tendency to effusion on the brain be produced. *Diaphoretics*, suitable to the state of the symptoms, either variously combined, or associated with diuretics, may be given from time to time. Of these, the more refrigerant, with small doses of camphor, will be most serviceable; and either some one of those in the Appendix (F. 431, 436, 440, 818, 865), or the following, may be prescribed:

No. 225. R Camphoræ rasæ gr. ss.—j.; Potassæ Nitratis gr. iij.; Pulv. Acaciæ gr. ij.; Muclag. Acaciæ q. s. M. Fiat Pilulæ ij. quartis horis sumende.

No. 226. R Mist. Camphoræ ℥j.; Liq. Ammoniac Acetatis ℥j.—ij.; Ammoniac Hydrochloratis gr. iv.; Sirupi Limonis ℥j. M. Fiat Haustus, quartâ quaque horâ capiendus; vel interdum, secundis horis, pilulæ et haustus, alternis vicibus, sumantur.

545. *d.* In the *nervous stage* the debility is more real; irritability is more exhausted, and the sensorium more severely and uniformly affected. The functions of the skin, and frequently those of the bowels, are also more disturbed than before. The *indications* are to support or stimulate the system, according to the forms the disease assumes. *Blisters* may be employed in this stage—seldom before. They favourably impress the nervous system, check the tendency to diarrhœa and affection of the intestinal mucous surface, and render the skin more perspirable. They are most serviceable at the commencement of this stage; and are best applied on the nape of the neck, behind both ears, or on the calves of the leg. *Camphor* is now one of the best remedies that can be exhibited. While it promotes nervous power, it relaxes the skin, and does not increase inflammatory action, but rather tends to allay it, particularly the nervous and cachectic forms of it,

which alone can exist in this disease. It should be given in larger doses in this stage, more especially of the malignant or putrid form. From twelve to twenty grains may be exhibited in the twenty-four hours. HILDENBRAND advises, in the latter part of this stage, medium doses of camphor; or one grain every two hours, with an infusion of *arnica* and *angelica root*. He considers that these lessen the stupor, giddiness, and delirium; act favourably on the skin; and prevent the tendency to diarrhœa. *Emetics* are sometimes beneficial in this stage, when they have been neglected in the previous one, or contra-indicated. *Purgatives* are of service only when the bowels require assistance. They should be given with the intention of evacuating morbid matters, of preventing the injurious impression made by such matters upon the intestinal mucous surface, and of promoting a healthy action of the abdominal emunctories. Hydrargyrum cum creta and rhubarb, and the infusion of the latter with the milder saline substances, in a state of effervescence, are the most appropriate. These preserve the tone of the digestive mucous surface, while they enable it to throw off fœcal collections. Their action may be occasionally promoted by emollient and gently laxative enemata. I doubt much the propriety of exhibiting *calomel*, or any of the drastic purgatives, in this stage; and I believe that the more active neutral salts exhaust the strength and produce watery stools in this period, particularly if they be exhibited in any quantity. It is in the common, or synchoid form of fever, or at the commencement of this, that they may be employed. In the latter stages of low fevers, calomel and cathartics are apt to increase the intestinal symptoms, or to determine an irritative action of the bowels, liable to terminate in the lesions already noticed.

546. *e.* When the disease has reached its *acme*, or is approaching the fourteenth day, the treatment should very much depend upon the predominant symptoms, upon what has been already done, and on the effects observed. If no unfavourable symptoms are present, mild saline *diaphoretics*, as camphor mixture, with liquor ammoniæ acetatis, &c., or the former with the alkaline bi-carbonates and citric acid, or lemon juice, in effervescence, and mild demulcent diluents, are all that are required. The chief intention at this stage is to favour a genial perspiration. The temperature of both medicines and drinks should not be lower than tepid. If the disease is complicated, particularly at this period, or is proceeding irregularly, the treatment must be varied, as will be hereafter shown. If a crisis take place, or the more urgent symptoms gradually subside, the means should vary with the degree of vital depression evinced. Both tonics and stimulants should, at first, be mild, in moderate doses, and suited to the state of the pulse, and of the skin and bowels. At first, a cold infusion of *cinchona*, or the decoction, may be given, with the solution of the acetate of ammonia, or with either of the alkaline bi-carbonates and citric acid, in effervescence. The infusion of *valerian* may also be substituted for the cinchona, and given as directed above. The *regimen, diet, and convalescence* should be managed with strict reference to the forms and complica-

tions of individual cases, as will be hereafter shown.

547. *B. The Treatment of the Varieties and Complications of Typhoid Fever.*—*a.* In the *simple typhoid, or nervous fever*, when it commences as described above (§ 459), the period of excitement being characterized by little or slight reaction, *blood-letting* is seldom beneficial; or local bleeding, in a situation indicated by the prominent affection, will only be required. If the pulse be very rapid, or soft, and open; if the prostration be great, and the tongue assume a dark colour; and particularly if this state exist at the commencement of the disease, vascular depletions will be injurious. The indications enumerated above (§ 132, 133) will farther serve to point out when they may or may not be resorted to. An *emetic* is always of service, particularly if there be nausea; and if vomiting be spontaneous, it should be moderately assisted, as already advised. The bowels should be evacuated early in the disease by mild *purgatives*. Those already mentioned are the most appropriate, or fresh castor oil may be used. They may be repeated occasionally, with the views I have stated, but with due caution, lest they induce too great exhaustion, or favour the supervention of intestinal disorder. While the heat of skin continues, *tepid or cold sponging* the surface is grateful to the patient, diminishes the restlessness, and favours the operation of *diaphoretics* during this state. If diaphoresis occur, it should be promoted by mild, *tepid diluents*, either simple or medicated, in the manner about to be noticed. If copious perspirations occur, especially about the acme of the disease, or at a critical time, they should not be arrested unless they increase the exhaustion, or are attended by signs of septic deliquescence. In the *nervous stage* the treatment directed above should be employed (§ 545).

548. *a. Prominent affection or consecutive inflammation of the respiratory organs*, in the nervous form of typhoid fever, requires the utmost discrimination on the part of the practitioner for its successful treatment. The subject has been admirably elucidated by Dr. STOKES, in his truly excellent published lectures on fever. The chest should be carefully examined by the stethoscope, in order to ascertain, as accurately as possible, the state of pulmonary disorder, and to determine whether the symptoms referred to this organ be symptomatic, or dependant upon inflammatory action or active congestion. The able pathologist just mentioned remarks that when the bronchial surface is chiefly affected, there is much more lividity of the countenance than when a portion of the substance of the lungs is diseased. This symptom will generally verify the reports of auscultation. But the treatment will entirely depend upon the nature of the bronchial affection. If the dyspnœa and other pulmonary symptoms depend upon inflammatory irritation rather than upon increased secretion from the mucous surface; if there be heat of skin, more or less vascular reaction, and if the patient be young and robust, *bleeding*, general or local, will be necessary, according to the severity of the symptoms and stage of the disease. If, however, these symptoms depend chiefly upon a copious secretion from the bronchial surface, as will be shown by the stetho-

oscope, bleeding will be most injurious, and very decided means of an opposite nature will be requisite in order to prevent contingent apoplexy. In this latter case, extensive counter-irritation, the *mistura ammoniaca*, or the *decoctum scenega* with *camphor*, *ammonia*, the *tinctura camphora composita*, or other stimulating expectorants, must be resorted to, according to the urgency of the case, particularly if lividity of the face exist. When the strength is very much reduced, *wine* will also be necessary, with light nourishment. The temperature of the surface should be kept up. Dr. STOKES very properly directs the patient to be enveloped in soft flannel. When the bronchial affection is more strictly inflammatory, and the secretion does not interrupt materially the functions of the lungs, antimonials may follow the bleeding. But in either case, if the symptoms referred to this organ, particularly the dyspnoea, or the cough, become urgent, and be attended by the tracheal rattle, an *emetic* of *ipeacuanha*, or of sulphate of zinc, should be immediately exhibited. In this state Dr. GRAVES, whose extensive resources, in matters of difficulty, I have had frequent occasion to notice, has tried the application of *moxas* in the course of the eighth pair of nerves, and the use of the sulphate of quinine and opium in enemata; these latter exerting a powerful influence, in his opinion, in lessening excessive secretion from the bronchial surface. If the substance of the *lungs* be affected, a single moderate blood-letting or local depletions may be prescribed, if the patient be robust and the disease not far advanced. If the bowels be not materially disordered, antimonials may afterward be given; but they should be combined with anodynes. *Ipeacuanha*, with *calomel* or *camphor* and opium, or extract of poppy, is, perhaps, preferable in most cases. *Diaphoretics* in frequent doses are always of service, and may be conjoined with diuretics. After depletions have been carried sufficiently far, or if the lungs are affected very late in the disease, *blisters*, *sinapisms*, or the *warm terebinthinated embrocation*, placed on the chest, and *camphor*, *ammonia*, *ipeacuanha*, or other expectorants, with *hyoscyamus*, or extract of poppy, are the principal means we possess. When in this complication the skin is cool and pale, the pulse very weak and small, and the features collapsed, the warm expectorants, as *polygala*, *ammoniacum*, *ammonia*, *camphor*, the stimulating tonics, and *wine* should be given, according to the peculiarities of the case.

549. *β. Predominant affection of the intestinal mucous surface* should be treated by means similar to those advised in this complication of synochus; and the more especially, as the latter fever, when thus characterized, either passes into, or is very nearly allied to the typhoid form. In the early stages of this complication, a combination of small doses of *hydrargyrum cum creta*, *rhubarb*, and *DOVER'S powder*, with compound cretaceous powder, given every three or four hours, is generally of service. If the constitutional symptoms will permit, and if this affection appear at an early period of the fever, a local depletion should be premised, and a blister or sinapism be afterward placed upon the abdomen. The terebinthated epithem, applied sufficiently hot, and covered so as to

prevent evaporation, if properly managed, is the most efficacious means, more particularly if the abdomen be tense, tender, or tympanitic. In this latter state, an injection with *asafoetida*, or with the extract of rue, or with from two drachms to half an ounce of spirits of turpentine in addition, will give great relief.

550. In a far-advanced stage, *diarrhoea*, especially if attended by tension, pain, or flatulent distention of the abdomen, requires great attention. If the medicines just recommended prove not of service, the *chlorurets*, particularly the chloruret of lime, may be given, with *camphor*, and extract of poppies, &c. Mucilaginous injections, containing sirup of poppies, or laudanum, or compound tincture of camphor, may also be administered, and a rubefacient epithem placed over the abdomen. If *hæmorrhage* from the bowels occur, it may be ascribed chiefly to exudation from the softened mucous surface, as shown by the post-mortem appearances; and *acetate of lead* with opium, or *acetate of morphine*, or extract of poppy, should be exhibited, either in the form of pill, or with the pyroligneous acetic acid in strong camphor julep. The lead has been recommended, in these cases, by Drs. BARDESLEY, GRAVES, and STOKES. I have resorted to it in these several combinations, and have given it in two or three instances with creasote. I have likewise employed, by the mouth and in enemata, the spirits of turpentine, which generally proves the most active remedy of any in such circumstances. In some hopeless cases it has succeeded contrary to expectations. In one, however, that recently occurred to me, although it arrested the hæmorrhage for a time, there was a return which carried off the patient. If the disease be far advanced, or the powers of life much reduced, the turpentine should be given in small or moderate doses, and its effects carefully watched. I have also prescribed it in conjunction with creasote, the acetate of lead and aromatics, in similar circumstances.

551. *γ. Prominent affection of the brain* may arise in the course of typhoid fever, either from congestion within the head, or from the depressed state of nervous power, unconnected with inflammatory action, or even with vascular determination. This circumstance, long believed by pathologists, has been fully confirmed by M. LOUIS, who found that the presence or absence of delirium has little or no connexion with perceptible organic lesion of the brain. If, however, there be increased heat or severe pain of the head, spastic contractions of some muscles, flushed face, injected eyes, or other indications of active disorder of the cerebral circulation, particularly in the stage of reaction, the hair should be removed, and local depletion resorted to. The head ought to be kept cool by cold sponging or lotions. If delirium be attended by these symptoms, the same means are required; and if it be, at the same time, low, insensible, or muttering, a blister should be applied to the neck and nape, or behind the ears, or to the calves of the legs, or a sinapism may be substituted in the latter situation. Whenever the affection of the head is connected with increased determination to it, especially in an early stage, stimulating antispasmodics, as *ammonia*, *musk*, or *camphor* in large doses, cannot be of ser-

vice, and may be injurious. The last of these, however, may be used in small doses with nitre, and it may be increased according to the degree of stupor and coolness of the scalp. If the delirium depend upon exhausted nervous power; if it be attended by stupor, by a weak, soft, and very quick, or somewhat slow pulse; by a moist skin, or copious perspiration; or by extreme prostration, particularly after the eighth or tenth day, or in the nervous stage; camphor, in doses of from one to three or four grains every two, three, or four hours; or the preparations of *valerian*, or of *serpentaria*, or of *arnica*, or *ammonia*, or of *ether*, or *wine*, or *opium*, may be severally employed as circumstances will suggest. In other respects, the treatment of this state, and of sopor and coma, its frequent attendants and sequents, should be directed as explained in the articles *COMA* (§ 16, 19) and *DELIRIUM* (§ 16, 17). *Retention of urine* is very apt to occur in this state; therefore, in it especially, but also in all others, attention ought to be paid to the circumstance. If an undue accumulation of water in the bladder be detected upon examining the hypogastrium, it should be immediately drawn off.

552. *δ*. In the most severe form of nervous fever (§ 461) blood-letting is seldom of service, unless at the commencement of reaction, or from the vicinity of the most affected organ. When the skin is very hot, *tepid sponging*, *diaphoretics*, *external derivatives*, and *emollient diluents*, with *nitre*, or small doses of the *hydro-chlorate of ammonia*, are the most appropriate. The infusion of *valerian* may be given as the disease passes into the nervous stage, either with the *compound tincture*, or with camphor, and *hydro-chloric ether*, or other stimulants. HILDENBRAND advises the *arnica montana*, with camphor, in this state. If exhaustion increase, and coma come on, these medicines, or others of a similar kind, may be prescribed in larger doses, or at shorter intervals; and a blister applied to the vertex, or occiput, or to the nape, or a large sinapism to the epigastrium or insides of the legs. LALLEMAND and MACKINTOSH have adduced instances of benefit, in the comatose state, from pouring boiling water on the lower extremities. *Musk*, the *ethers*, preparations of *cinchona*, or any of the stimulants already mentioned, may likewise be tried, in various combinations, in this stage, or an infusion of *green tea* may be given in the usual manner.

553. *ε*. If the disease be sudden in its attack, or *apoplectic*, care should be taken to ascertain whether or not this character arise from weakened nervous energy of the brain, or from vascular congestion. When a pale, collapsed countenance and eyes, weak and small pulsation of the carotids, and coolness of the scalp indicate the former, restoratives will be necessary. But when there are increased temperature of the head, and excited action of the carotids, although the countenance be pale, a small or moderate blood-letting, local or general, or even a cautious repetition of it in young or robust persons, will generally be required. The same remarks equally apply to the occurrence of *paralysis*. If the paralysis appear at an advanced stage, even local depletions may be injurious. In this case we must trust chiefly to blisters and other external derivatives, and to the means already stated (§ 551).

554. If in the early stage of this, or, indeed, of any other form of typhoid fever, the thirst be urgent and attended by vomiting, desire of cold fluids, and heat of skin, stimulants are generally injurious. If tenderness of the epigastrium accompany these, inflammatory irritation, or erethism of the gastro-intestinal mucous surface should be inferred. In this case *leeches* ought to be applied; and cold or iced drinks and saline medicines, particularly the nitrate of potash or the hydro-chlorate of ammonia, frequently exhibited. A combination of camphor mixture, the solution of the acetate of ammonia, nitrate of potash, and spirits of nitric ether, will generally be serviceable in these circumstances. Effervescing draughts are productive of little benefit, as the extrication of fixed air distends the stomach, and either causes it to react upon and throw off its contents, or gives rise to much distress and pain. If irritability of the stomach still continue, a large blister may be applied over the epigastrium. Dr. STOKES advises, in the more obstinate cases, the raw surface to be sprinkled with a small quantity of the acetate of morphia. I have rarely found the warm turpentine embrocation fail of removing this state of disorder when properly employed.

555. *ζ*. When *singultus* occurs in the stage of reaction, it is generally connected with the foregoing state of the stomach, and particularly with irritation about the cardiac orifice. In this state the treatment just advised is the most appropriate. When it appears in the nervous period, or later, it depends upon exhausted nervous energy, and requires stimulants, antispasmodics, and anodynes. Camphor, ammonia, the ethers, musk, valerian, opium, and their preparations, variously combined, are the most serviceable.

556. *η*. *Diarrhœa* is one of the most frequent precursors of disease of the intestinal mucous follicles; yet should it not be rashly interfered with, and still less abruptly arrested, particularly when it occur early, or at a critical period. I have imputed the affection of the intestinal mucous surface in great part to the morbid condition of the blood; this surface being one of the channels by which effete, or injurious materials, pass out of the circulation during the course of fever. It is evident, therefore, that if we shut it up without opening others, the alterations of the blood will increase, and occasion serious organic changes, and ultimately a fatal issue. The most rational procedure, when diarrhœa is an early complication, is not to interfere with it, unless it become severe or continue long, and then it should be moderated rather than arrested, and by such means as will increase the depurating functions of the skin, the kidneys, and liver, and remove the irritation excited in the digestive mucous surface and follicles. The remedies most likely to produce these effects are actually those which have been found most serviceable in this state of disease. Hydrargyrum cum creta, compound ipecacuanha powder, camphor, nitre, mild anodynes, variously combined with demulcents, emollients, and diluents, are the most generally of service. In more advanced states of this complication, and in later stages of fever, those medicines which have been already noticed (§ 156), as well as some about to

be mentioned, may be resorted to. When the pulse is small, very frequent, and weak, and the strength exhausted, diarrhœa must then be arrested, otherwise it will speedily terminate life. Astringents, opiates, absorbents, restoratives, wine, &c., are all requisite in this case.

557. *θ. Tympanitic distention of the abdomen* may occur early in this fever, and be attended by thirst, by a desire of warm diluents, by tenderness on pressure, particularly in the lower part of the right side of the abdomen, and by diarrhœa. When these symptoms are present, disease of the intestinal mucous follicles may be inferred. In this case a number of leeches, according to the strength of the patient and stage of the fever, should be applied, and followed by the warm turpentine embrocation on the abdomen. If tympanitis and diarrhœa appear late in the disease—particularly if the stools be foul, watery, or mucous—ulceration of the intestinal surface should be dreaded, and the means already advised (§ 156) should be resorted to, or the chlorurets given in the infusion of valerian, or in emollient vehicles, with camphor, anodynes, &c. From one or two to four or five drachms of spirits of turpentine may be prescribed once or twice, or even oftener in some cases, in a suitable vehicle, if these fail; or this substance, or asafetida, or extract of rue, with some anodyne, may also be administered in mucilaginous enemata from time to time. In most cases of flatulent distention of the intestines, there is great disposition to ulceration of the aggregated mucous follicles—if, indeed, it has not already commenced—and both morbid conditions are greatly aggravated by the continuance of the flatulent state. The *intention*, therefore, is to procure the discharge of flatus by means which may, at the same time, sheath and soothe the irritable mucous surface, and restore the lost tone of the capillaries of the diseased part; and whatever operates in this way will be productive of benefit. It is only by a judicious combination of agents that this effect can be attained; and those just mentioned seem the most efficient, especially when the skin is cool, the pulse feeble, and the prostration extreme; and, in this state, the more energetic stimulants and tonics, or wine, or opium, may also be employed, according to the peculiarities of the case. (See § 155–159.)

558. *ι. The occurrence of perforation of the intestines, and consequent peritonitis*, should not be overlooked in the enteric complication, or other severe forms of low nervous fever. Peritonitis seldom arises except from this cause, for large patches of the mucous surface, with FEVER'S glands, may be destroyed by ulceration; and yet the peritoneum will be unchanged. When, however, diarrhœa has been suddenly arrested early in the disease by an injudicious use of astringents, general peritonitis and effusion may result without perforation, and even without ulceration. But this is only one of several bad consequences which may proceed from injudicious interference. If, in an advanced stage of fever, and after thirst, diarrhœa, tympanitis, and great prostration of strength, the patient suddenly complain of pain in some part of the abdomen, extending over it, with tenderness, increased distention, and rapid sinking of the powers of life, peritonitis

has occurred. In this case large doses of opium, to palliate the patient's sufferings, are the only means that can be used with any benefit. Dr. STOKES, who has very ably elucidated the subject of peritonitis from this cause, and its treatment, directs one grain of opium to be given every hour, or two hours, until a decided effect is produced by it; and afterward at longer intervals. (*Dublin Hosp. Rep.*, vol. v.; and *Dublin Jour. of Med.*, vol. i., p. 125). When effusion of the intestinal contents into the peritoneal cavity occurs, the result must be fatal. But when adhesion of the peritoneum to the opposite surface takes place previously to the perforation, or when the perforation is speedily followed by a limited inflammation and effusion of lymph, recovery is possible. The formation of coagulable lymph can hardly, however, be expected in peritonitis occurring in the course of fever, as the states of vital action and of the circulating fluids are generally incapable of producing it.

559. *b. Treatment of Putro-adynamic Fever (§ 472).*—The phenomena which especially characterize this variety may appear either at an early stage of fever or at an advanced period; they may be the concomitants, or early consequences of depressed vital energy, and imperfect powers of reaction; or the results of vascular reaction being so great, relatively to the state of vital influence, as to exhaust both the irritability of contractile parts, and the tone of the extreme vessels. In either case, alterations of the circulating fluids, and deficient vital cohesion of the soft solids speedily follow, and coexist with these changes. In conformity with this view, with the pathological facts stated above (§ 523), with a recognition of the characters of epidemics which have been observed in modern times in different countries, and with the results of personal observation, it may be safely inferred that the treatment of this fever should mainly depend upon the state of vital action early in the stage of excitement, and the period of the disease in which the putro-adynamic signs appear; and that, in a practical point of view, it will be, therefore, advantageous to divide this variety of typhoid fever into, 1st. The *consecutive putro-adynamic*, or that form which is contingent on more or less manifested reaction; and, 2d. The *primary putro-adynamic*, or that which is attended by imperfect, or no reaction, and in which the characteristic phenomena appear early in the disease. It should, however, be recollected that both these forms may occur in the same epidemic, or that either may predominate; and, moreover, that the first or contingent state of putro-adyndamia is sometimes met with in all epidemics, whether the fever be common synochoid, typhoid, or exanthematous, owing to the causes stated above, and with a frequency relative to the prevalence of these causes (§ 502–504).

560. *a. The stages of premonition and of invasion* of this variety are scarcely different in their characters from those announcing nervous or typhus fever. The same means as have been advised above (§ 543) may, therefore, be resorted to, with the intention of preventing the farther progress of disease, or of rendering it more mild. When the symptoms of invasion are either indistinct or protracted, the consequent fever is often rendered much

less dangerous than it otherwise might have been, by the adoption of the measures already detailed, and more particularly by exhibiting an energetic *emetic*, and by promoting its full operation by warm or tepid mucilaginous diluents. Tepid sea water, or a weak solution of common salt in a tepid state, has been employed with advantage for the purpose either of promoting the action of the emetic, or of producing full vomiting when there has been nausea or sickness.

561. *β.* In the *consecutive putro-adyamic*, or when the *stage of excitement* is more or less developed; when the pulse is frequent, full, or sharp; the skin hot, and thirst considerable, or if an internal heat be felt, vascular depletion may be practised, but with due reference to the circumstances of the patient, and to the period which has elapsed from the time of invasion. So long as the characters of putro-adyamia have not appeared, these symptoms fully warrant a cautious recourse to depletion; and in young, robust persons even a repetition of it. If rigours and shiverings are followed by inordinate or tumultuous reaction, the necessity of larger depletions is obvious. But, even in this case, they should not be carried too far, or to the extent of producing syncope; otherwise, in attempting to avoid the exhaustion consequent upon excessive action, a quantity of blood may be withdrawn too great for the diminished power of tonic contraction possessed by the blood-vessels, the vessels being incapable, owing to the loss of their tone, to accommodate themselves to, or contract sufficiently upon their contents, when the reduction of these contents is great—and thus collapse of vascular action, and of vital power, may follow.

562. *γ.* In the *primary putro-adyamic*, or in cases attended by indistinct signs of invasion, and by imperfect reaction, we can hardly venture upon depletion, unless indications of congestion or prominent affection of an important organ present themselves. In this instance, local depletions or dry cupping may be tried. If petechiæ appear early in these cases, or if the pulse be very compressible, very small, or broad and open; if the skin be cool, damp, or unnatural, yet not hot; if the tongue be flabby or covered by a dirty mucus, although the fever is evidently not far advanced, or is very recently passed the stage of invasion, then bleeding should not be attempted. In this case very different means must be employed; and with an energy proportionate to the prostration of strength attending these symptoms. If petechiæ, or vibices, or blotches have appeared on the skin, they will furnish an additional indication, particularly if they assume a dun, or dark, or livid colour, and will indicate the propriety of having recourse to the tonics, stimulants, and antiseptics, and the combinations of them about to be noticed.

563. *δ.* In *either form* of this fever—in the *first*, after depletions; in the *second*, after the operation of an *emetic*, which should be given at any time during the invasion, or for three or four days afterward—the bowels ought to be freely evacuated by either of the mild *purgatives* mentioned above, and by the occasional use of laxative enemata; and frequent but small doses of *nitre* may be afterward exhibited in the saline medicine already prescribed, or of

the *hydrochlorate of ammonia* in camphor mixture, or any other suitable vehicle. These latter are more especially indicated if any heat is felt in the region of the stomach, and if the tongue is red at its edges and point. If there be increased heat of skin, tepid sponging the surface with the weak nitro-hydrochloric solution, or with a mixture of pyroligneous acetic acid, rose-water, and camphor mixture will prove both grateful and beneficial. It is seldom, even in the primary putro-adyamic, that *tonics* are productive of much benefit very early in the disease. But, when exhibited with *refrigerants*, they are often of great service. The infusion or the decoction of cinchona, either with the solution of the acetate of ammonia and nitrate of potash, or with the hydrochlorate of ammonia, a few drops of hydrochloric acid, and sometimes also with hydrochloric ether, is the kind of tonic which I can recommend from experience as being the most suitable to an early stage of adynamic fever.

564. It is in this variety of typhoid fever, more especially, that the question as to the superior efficacy of alkaline medicines and of the non-purgative salines, or of mineral and vegetable acids, becomes a matter of extreme importance. Of the latter I can speak from observation; of the former I have not yet made sufficient trial to enable me to form a satisfactory opinion. It were to be desired that Dr. STEVENS, who has so strongly advocated the use of alkaline and saline substances in this fever, would furnish us with that sort of evidence of their efficacy which would justify an early and decided recourse to them; and that those who have ample means furnished them of settling the question at issue would at last put it beyond the reach of cavil. That these substances are beneficial, at least several of them, is fully shown by the experience of successive ages and of numerous writers. This is the case in respect of nitre, hydrochlorate of ammonia, and chlorate of potash, of the excellent effects of which I am convinced by repeated observation. But the superiority of alkaline carbonates over acids has not yet been proved. It is also doubtful whether or not the benefit found to result from the former has not chiefly proceeded from the medicines with which they have been combined. At present we are guided, in some measure, by what we know of the physiological action of these substances. The fixed alkaline bi-carbonates redden the blood when carried into it, but they relax the tone of the digestive mucous surface. Nitre produces a similar change in the blood, and resists any tendency to decomposition. Acids constrict the mucous and contractile tissues, impart firmness to the coagulum, but render the blood more dark than natural. With these imperfect data, the experience derived from accurate observation ought to be our chief guide; and whether we adopt acids in the earlier stages of the disease, and alkalies subsequently, or reverse this order, or even prescribe, in conjunction with neutral salts, either an acid or an alkali in excess, much difficulty will be felt in ascertaining how much is due to either of these means, and what may be legitimately imputed to other remedies, with which we may be morally bound to combine them in order to render their beneficial operation more certain. When

certain remedies, which have been particularly recommended in this form of fever, come under review, these substances will receive farther attention.

565. In various states of putro-*adynamic* fever, *external derivatives* will be required, as in the other varieties. When blood-letting is necessary at the commencement, they should follow this operation, particularly when prominent affection of an important organ exists. As to the choice of derivatives, little need be added to what has been already advanced. If blisters be adopted, attention is sometimes required to prevent spreading or sphacelating sores. They should, therefore, be applied only until they cause redness of the surface, when they may be followed by a warm poultice. Equal care is necessary to prevent sphacelation of the parts pressed upon in bed, and the occurrence of foul sores from the contact of the morbid excretions, or from both causes conjoined. The means likely to counteract or remedy this occurrence have been stated above (§ 166).

566. *ε*. In the *modifications* of this fever, noticed above (§ 476), a decided recourse to the same medicines as are necessary in the advanced stages of the regular form must be had, more particularly when signs of colliquation are early and prominent. The intention in this case is to arrest the progress of the changes of the blood, by supporting the powers of life, and promoting the functions of excretion. If it should be found possible to correct in a more direct manner the state of the circulating fluids, this indication ought also to be adopted, and the means which operate in this way resorted to. In conformity with the former indication, full vomiting should be induced, if it have not already taken place, and a mild stomachic purgative afterward given. This latter ought to be repeated according to the state of the bowels, and the appearance of the evacuations, which will furnish indications for the employment also of enemata, and indicate such as are most appropriate. In the worst forms of erysipelas, and in diffusive inflammation of cellular structures, I have found equal parts of the decoction of cinchona, and the compound infusion of senna, with tartrate of potash, carbonate of soda, and compound tincture of cardamoms, an excellent purgative, and I see no reason against its use in this state of *adynamic* fever. After the bowels have been freely evacuated, decoction of cinchona, or a strong infusion of valerian, with chlorate of potash, and chloric ether, may be prescribed, according to the severity of the disease. Of the good effects of the decoction of cinchona with the compound tincture, nitrate of potash, and carbonate of soda, I can also speak from experience. When the prostration of strength is extreme, a pill containing two or three grains of camphor should be taken with each dose of either of these, at short intervals.

567. Other tonics, and different combinations of them from these now mentioned, will frequently be productive of great benefit, when morbid excretions have been evacuated. However specious the arguments adduced by some writers against the employment of *acids* in the putro-*adynamic* states of fever, it cannot be denied that good effects have been produced by them, especially when exhibited with pow-

erful tonics. The infusion or decoction of cinchona, with hydrochloric acid, or with nitrohydrochloric acids, and chloric ether (formerly CLUTTON'S febrifuge); the sulphate of quinine with sulphuric acid, and HOFFMANN'S anodyne; and pyroigneous acid in large doses, with camphor, the solution of the acetate of ammonia, and tonic or aromatic infusions, or the infusion of serpentaria or of arnica, are the most energetic, and may severally be tried, according to the peculiarities of the case. A solution of camphor in acetic acid was a favourite medicine with many writers on putro-*adynamic* fever, and was employed by them both internally and externally.

568. Dr. STEVENS'S saline treatment is most appropriate in this form of fever. He directs twenty grains of the chloride of sodium, thirty grains of the carbonate of soda, and eight of the chlorate of potash to be given every two or three hours—or more or less frequently according to the urgency of the case—dissolved in water, in the advanced stages. He believes that, when these salts are prescribed before the stomach has ceased to perform its functions, they will not irritate the alimentary canal, but will be absorbed into the circulation and correct its morbid state. One or two table-spoonfuls of common salt may also be administered occasionally in a tepid gruel enema. The strength should, at the same time, be supported by strong beef tea, or the regimen about to be recommended.

569. *ζ*. If putro-*adynamic* fever be attended by *predominant affection* of any organ, local depletions, followed by external derivatives, will be necessary, particularly in an early stage of the fever. At a later period, external derivation, and the other means advised for the complications of nervous fever, according to their seat, should be employed. In this variety, however, a more liberal use of tonics, conjoined with the antiseptics just mentioned, is generally required. When this or any other form of typhoid fever is complicated with *asthenic inflammation of the fauces or pharynx*, or both, the means already recommended are quite appropriate. In these cases, deglutition is very difficult, and sometimes impossible. Recourse to external derivatives and to injections is then urgently required. The action of the bowels should also be solicited by purgative enemata, unless diarrhœa exist; and the medicines that are indicated should be administered in clysters, and in sufficiently large doses. As the patient is generally unable to gargle his throat, advantage will sometimes accrue from syringing it with any of the tonic mixtures above prescribed, or with a solution of the chloruret of lime or of creasote; and if a part, or the whole, or either of these should be swallowed, the more benefit will be derived.

570. *η*. If this variety become complicated with *diarrhœa*, disorganization of the digestive mucous follicles and surface will rapidly take place, if the treatment be not prompt and judicious. The means already advised (§ 549, 550) for this complication must be adopted in this case. If the diarrhœa occurs at an early period, it will generally be moderated by tonic infusions, with the nitrate of potash, or with the hydrochlorate of ammonia, and the compound tincture of camphor. A combination of ipecacuanha, ni-

tre, camphor, and opium, or extract of poppy, will also often diminish or remove it. If *hæmorrhage* supervene from the bowels, these medicines will sometimes be sufficient to remove it. In more urgent cases, the energetic remedies previously directed (§ 550), or the pyrolygneous acetic acid, with camphor and creasote, or turpentine, &c., should be prescribed by the mouth, and in enemata. When diarrhœa or hæmorrhage characterizes putro-adyamic fever, the alkaline carbonates will frequently aggravate or perpetuate it, and render convalescence protracted. In other respects, the treatment directed for the complications of nervous fever, and for its last stages, is also suitable to this; these stages requiring either the measures just described, or several of those about to be noticed, with a more or less direct reference to the putro-adyamic state, or various combinations of the substances already enumerated (§ 548-555).

571. *c. Treatment of exanthematous Typhus* (§ 485).—The *premonitory* and *invading periods* of this fever should be treated as recommended above (§ 543), with the view of arresting or rendering more mild the procession of morbid phenomena.—*a.* In the *stage of reaction* the indications are, (*a*) to moderate excessive excitement; (*b*) to guard important organs from the effects of prominent action. If full vomiting has not occurred previously, it should be excited by an emetic at the commencement of this stage, or on the first, second, or third day of it. If, however, inflammatory signs have become evident, particularly if the lungs are affected, a moderate *blood-letting* should precede the emetic. The eruption, which generally appears in this period, is usually followed by slight alleviation of the symptoms, and should therefore be promoted by mild, tepid diluents, which may be made either diaphoretic, mucilaginous, or acidulous, according to circumstances. As to *blood-letting*, in this disease it is pernicious in many, if not in most cases; and not merely in the nervous, but even in this stage. In the mild and regular typhus it is superfluous; but when a highly inflammatory character marks this period, or when local action becomes very prominent or excessive, it must not be omitted, otherwise the local affection may run into disorganization, and the nervous stage will be rendered more protracted or dangerous. The amount, repetition, and mode of depletion will depend upon the peculiarities of the case. When the bowels are open in this stage, *purgatives*, unless of the mildest kind, are unnecessary. Severe purging is prejudicial, as it derives from the skin, interrupts the regular course of the disease, and risks the production of the enteric complication. Tonics and stimulants are also injurious.

572. *B.* In the *nervous stage* the disease has induced a state of exhaustion, and the system requires to be supported, and even gently excited. HILDENBRAND recommends an *emetic* early in this period, if it have not been given previously; and *blisters* to be applied about the seventh or eighth day, when the nervous stage commences. *Camphor*, with the solution of the *acetate of ammonia* and *nitre*, forms one of the best medicines that can now be exhibited. The quantity of camphor, however, should not, at first, exceed one grain every two hours, or a

grain and a half every three hours. *Arnica* was one of the medicines most commonly employed in Germany during the prevalence of this fever in that country early in the present century. HILDENBRAND states that its operation is stimulant, alterative, and, in large doses, emetic; and that it does not promote, but rather prevents diarrhœa. In typhus it lessens the stupor, giddiness, and delirium, and increases the cutaneous transpiration; but it is useful only when the inflammatory character is quite gone. It should be given in the form of infusion, in a quantity short of producing nausea. This most able and experienced writer advises also, in the course of this stage, the use of volatile stimulants, especially the infusions of the roots of *angelica* and *imperatoria*, and of the flowers of the *calamus aromaticus*.

573. In the typhus epidemic, in the military hospitals in Vienna and surrounding countries, during the late war, where it was impossible to prescribe for the cases individually, the following plan was pursued by HILDENBRAND with great success in the simple and regular disease: On the first day of the fever an emetic was administered, and succeeded by diluent diaphoretic decoctions. About the seventh day, when the typhomania and debility were increased, the skin and tongue dry, and the belly distended, blisters were put upon the calves of the legs, and eight ounces of an infusion of two drachms of the flowers of arnica, and as much angelica root, with a little of HOFFMANN'S anodyne, were given daily, two table-spoonfuls being taken every two hours, alternately with camphor powders. Stimulants, in this fever, should be prescribed in frequent but small doses, rather than in large quantities. Cinchona and other tonics are superfluous as long as the disease is mild and regular. But they, together with wine, &c., are required if the putro-adyamic state appears in this stage.

574. *γ.* If the preceding stages have been prudently treated, and if the disease has been regular and mild, nothing more is necessary in the way of medicine, as the *period of crisis* approaches, than to promote the evacuations attending it; and as the chief of these is perspiration, mild diluents, and the diaphoretics in common use, or those just mentioned, are to be continued. All medicines should not be abandoned immediately after a crisis. Stimulants, however, should be milder, and given at longer intervals. HILDENBRAND advises the camphor and arnica to be given up, and the infusion of angelica to be continued for some time. As *convalescence* advances, the treatment should be chiefly dietetic and regimental.

575. *δ.* The *irregular forms of typhus*—the modifications and complications—require appropriate means, or variations of the procedure now recommended. If the *inflammatory character* is violent, a more active antiphlogistic treatment is necessary. But the existence of deficient power, and the knowledge that the nervous stage must follow, should influence the practitioner. For an inflammatory state of the brain, or the semi-apoplectic state, bleeding generally and locally must be adopted, to an amount which the circumstances of the case will suggest. When the lungs are affected, this practice, aided by antimonials, blisters, and

diaphoretics, is equally necessary. If the inflammatory state be not entirely removed, and if it is not safe to bleed more, or if this state be prolonged into the nervous stage, external derivatives and antimonials are to be chiefly confided in. The same practice is applicable to the association of *hepatic disease* in this stage. The affection of the intestinal mucous surface requires the same treatment as was recommended in synochoid and nervous fevers (§ 549, *et seq.*). Sometimes the *gastric* or *bilious* character predominates, particularly in summer and autumn, owing to impurities in the *prima via*, and accumulations of bile in the hepatic ducts and gall-bladder. Emetics are necessary in these cases especially, unless there are indications which forbid them; and mild purgatives, in the inflammatory stage—in the nervous, aperient clusters—should be preferred.

576. *e.* In the nervous stage various irregularities often occur. If this character is excessive, or has taken place suddenly, large and repeated doses of volatile stimulants are necessary. Camphor, ammonia, ether, musk, cinchona, serpentaria, wine, opium, and blisters are severally useful, when judiciously combined. Phosphorus has been recommended for this state, but HILDENBRAND found it useless. During this stage, a passive, asthenic, or nervous kind of inflammatory action may occur, particularly in the mucous surface of the intestines and in the mucous follicles; but it sometimes also affects the brain and lungs. When it attacks the *intestines*, there is a painful feeling excited by pressing the abdomen; the pulse is small and irregular or unequal; the belly is tympanitic or tense, and the stools very frequent and morbid. For this state, a moderate or small local depletion; blisters, sinapisms, or hot turpentine embrocations, followed by warm poultices over the abdomen; camphor, with hydrargyrum cum creta, and DOVER'S powder, in large quantities of mucilage; or camphor with ipecacuanha, nitre, and opium; mucilaginous enemata, with extract of poppies, &c.; and the other means already mentioned (§ 550), should be chiefly relied upon. If this form of inflammation, or of inflammatory congestion, attack the *liver*, tenderness and fulness in the right hypochondrium, and jaundice generally accompany it, and a very dangerous complication results. Local depletion is sometimes of use, but as frequently it is of little service. Mercurials, excepting, perhaps, the hydrargyrum cum creta, are still less efficacious. Blisters over the hypochondrium and epigastrium; frictions with rubefacient liniments in this situation; rubefacient applications on the insides of the thighs; emollient and aperient enemata, if the bowels require to be assisted; camphor, with nitre or sulphate of potash, and anodynes; diuretics conjoined with mild diaphoretics; and the nitro-hydrochloric acid given internally with the spirits of nitric ether, or used externally as a lotion or wash, may severally be productive of benefit.

577. *ç.* The nervous inflammation of the brain is indicated by sopor and profound typhomania, and should be combated by blisters on the head, by camphor, by arnica, and the means directed for this affection in nervous fever (§ 551). If tightness of the chest and dyspnoea occur in the nervous stage, congestion of the weakened vessels of the *lungs* may be inferred.

In this state a small bleeding, to the amount of four or six ounces, may be directed in some cases, and followed in all by blisters on the chest, and antimonials conjoined with camphor.

578. *η.* If the *putro-adydynamic* character supervenes and predominates as the nervous stage proceeds, the debility, equally with the morbid state of the blood, requires attention. The preparations of cinchona, either with mineral acid, or with alterative neutral salts, large doses of camphor, wine, opium, and the other means directed for the various phases and complications of this condition, will be required, according to the peculiarities of individual cases. If *diarrhœa* or *dysentery* comes on in this state, opium in large doses, but at distant intervals; warm dilute wine, with spices and other aromatics; mucilaginous and farinaceous liquids, or gruel with common salt, taken in small quantities, but often, and administered in enemata, with sirup or extract of poppies; and the other remedies noticed above (§ 556), should be prescribed. If *singultus* or *meteorismus* occur, they should be treated conformably with the principles already explained (§ 557). Swellings of the parotids are unpleasant accidents, even when critical. They should be checked, at first, by keeping the bowels moderately open, and cold applications to them. If this end be not accomplished, then suppuration should be promoted by stimulating poultices; and the abscess should be early opened, in order to prevent contamination of the surrounding cellular parts. If gangrenous sores appear in any part, the means directed above (§ 166), more particularly the chlorides, creasote, powdered bark, turpentine, &c., either severally, or variously combined, or in the form of wash, epithem, or poultice, ought to be promptly and assiduously employed.

579. *iii. Of certain Medicines, &c., in Typhoid Fevers.*—*a.* *Antimonials*, especially JAMES'S powder and tartar emetic, are frequently of service in the early stages of fever; the latter for its emetic operation, and its febrifuge or contra-stimulant action during excitement; and the former for this last effect, in connexion with its diaphoretic influence. The remarks already offered respecting these medicines (§ 162) are applicable to the use of them in the fevers under consideration. It is chiefly in the early periods, in the more inflammatory states, in the pulmonary complications, and either in aid of, or as substitutes for blood-letting, that they should be employed, more particularly the potassio-tartrate of antimony. However, the results of RASORR'S practice, and the recent trials made of this medicine by Dr. GRAVES in the advanced stage of typhus, indicate the propriety of having recourse to it, at a later period, in much more liberal doses than have been hitherto considered safe. This able physician, reasoning from the good effects of the medicine in delirium tremens, was induced to resort to it in a case presenting a quick, failing pulse; a black, dry, tremulous tongue; tympanitis; low, muttering delirium; startings of the tendons, and nervous agitation. He prescribed four grains of tartar emetic in eight ounces of camphor julep, with a drachm of tincture of opium—a table-spoonful to be taken every second hour. The patient vomited after the second dose; and, after the fourth, he fell into a calm sleep,

and soon recovered. Besides the good effect of this medicine, that of vomiting at this stage of fever, as recommended by many of the older writers, is shown by this case. Dr. GRAVES refers to other instances (*Lond. Med. and Surg. Journ.*, vol. vii., p. 541) in which tartar emetic and opium produced decided benefit in most unfavourable states of the advanced periods of low nervous fever, and of exanthematic typhus. The combination of the potassio-tartrate of antimony with nitre is most appropriate in the stage of excitement; but, in the nervous stage, opium seems indispensable to the good effects of the antimony.

580. *b.* Of other *antiphlogistic* and *contra-stimulant* means, it is unnecessary to add anything to what has been already advanced. The contradictory opinions entertained as to the propriety or amount of depletion are readily explained, when the various forms of typhoid fever, and circumstances of the case, are taken into consideration, in connexion with the intentions with which *blood-letting* on the one hand, and *restoratives* on the other, are resorted to; and with the fact that both are very frequently required, not only consecutively, but even simultaneously. This circumstance was well known to very many of the numerous writers on these fevers during the last three centuries, both in this and in foreign countries. They well knew and strenuously inculcated the fact, even as late as the days of CLARKE, that, in order to prevent the accession of the putro-dynamic state, it is necessary to bleed, and to use other antiphlogistic remedies with decision, early in various fevers and epidemics. And, next to bleeding, *nitre* and the *hydrochlorate of ammonia* were held in estimation, for their effects in lowering morbid reaction at the commencement of typhoid fevers, and in preventing putridity in advanced stages. Thus, while *nitre* was conjoined with antimonials, ipecacuanha, small doses of camphor, or with the spirits of nitric ether, to fulfil the former intention, and to promote perspiration and the action of the kidneys, it was given with tonics and stimulants, to produce the latter indication. The writings of DELIUS, HILLARY, HAENEL, WOOD, RASORI, and many others show us how very little we have hitherto improved upon their practice in these fevers. The same remark applies to the use of the *hydrochlorate of ammonia*, whose operation as a refrigerant antiseptic and tonic ranks it as one of the best and most generally applicable of the many remedies employed in fever.

581. *c.* As to the use of *alvine evacuations*, we have arrived at similar conclusions to those very generally acted upon during the seventeenth and eighteenth centuries, but partially lost sight of towards the close of the latter. The good effects of *emetics* at the commencement of typhoid fevers were almost universally admitted, until BROUSSAIS banished them from his code of therapeutics. That circumstances sometimes occur which either render them unnecessary, or even forbid them altogether, has been allowed; but very sufficient evidence has been adduced of their good effects, more particularly in the periods of premonition and invasion, and even early in that of excitement. Many writers of great experience, especially CHEYNE, TUOMY, STOLL, SANDFORD, REIL, HIL-

DENBRAND, HUFELAND, &c., have advised them in the advanced stages of these fevers; and although they are rarely employed in these periods by practitioners in this country, I believe that they will often prove of service even then, when judiciously resorted to, in exanthematic typhus. The injurious effects imputed to them by MARCUS, WENDELSTADT, BROUSSAIS, and others are to be referred to the employment of them in the gastric complication, and in other circumstances which contra-indicate their use.

582. The operation of *purgatives* in low fevers is now well understood; the indiscriminate use of them encouraged by the writings of HAMILTON having been checked and tempered by the partial adoption of the views of BROUSSAIS. And yet I believe that the particular state of the intestinal mucous surface that exists in these fevers may be increased by a neglect of this class of medicines; and that, when appropriately combined, many of them are calculated to prevent, or to alleviate the morbid condition which the disciples of BROUSSAIS imagine them to produce. A tolerably active purgative early in excitement, or in the other circumstances above noticed, both lowers excessive action and removes morbid excretions, which, if allowed to remain, would prove a cause of irritation and contamination to the frame. In cases, however, where the vascular excitement is attended by vital prostration, either early or late in the disease, the use of purgatives requires much caution. When excitement is considerable, *calomel* with jalap, or with rhubarb, will be given, at first, with advantage; but, in other circumstances, the calomel should be withheld. When, with excitement, there is considerable pulmonary affection, the potassio-tartrate of antimony may be added to the purgative adopted, as advised by Dr. MCCORMAC, and, indeed, very generally adopted in practice. But when vital depression is the predominant feature of the disease, we should be as cautious in the use of purgatives as in having recourse to bleeding. The evacuation of the serous portion of the blood by means of the former is nearly equally depressing with the latter operation. In the advanced stages, and especially when putro-dynamic signs begin to appear, the blood-vessels, owing to the loss of a great portion of their tonic contractility, cannot accommodate themselves to the evacuation of much of their contents, in whatever way it may be effected; for the column of blood in the vessels is no longer presented to the contraction of the ventricles in that state of tension which favours its healthy circulation. If the bowels, however, require the aid of a purgative during a state of prostration, it ought not to be withheld; but it should be so selected as to produce no greater evacuation than may appear requisite, and be so combined as to leave a tonic or salutary impression upon the digestive mucous surface. In such cases, equal parts of the compound infusions of gentian and senna, or an infusion of cinchona and rhubarb, or the compound decoction of aloes, or rhubarb and carbonate of soda, or the purgatives already mentioned (§ 150, 151), or some of those prescribed in the *Appendix* (F. 180, 181, 205, 216, 252, 433), may be resorted to. In the putro-dynamic form, and in the advanced

states of typhoid fever, purgatives ought to be always combined with tonics and aromatics. They should never be given excepting very manifestly required, and then in moderate doses, and combined as now advised, particularly when there is diarrhœa, or evacuations of blood, or meteorismus. However, rhubarb, or turpentine, in small or moderate doses, with aromatics, will often be of much service in such cases.

583. *d.* There are several *stimulants* of great use in low fevers; and which, owing to their peculiar or febrifuge operation, may be given with great benefit in that state of excitement which is attended by vital prostration, as well as in more advanced stages of the disease. Of these the most applicable and beneficial is *camphor*. This substance is most generally adopted, and has received the encomiums of most writers on typhoid fevers, and more particularly of RIVERIUS, STOLL, FERRO, HOME, MARCUS, THOMANN, GEBEL, REIL, SCHLEGEL, HORN, and HILDENBRAND. I have prescribed it not only in these, but also in pestilential, exanthematic, puerperal, and common continued fevers; and am satisfied as to its good effects, either when exhibited alone or when combined with other appropriate medicines, and given in proper doses. In the *stage of excitement*, the dose, and the medicines which should be associated with it, should have reference to the state of vital power, to the mildness or severity of the disease, and to the nature of the prominent affection or complication. In this stage, particularly if vital power is not much lowered, it may be given in frequent doses of half a grain, or a grain, with a weak solution of the acetate of ammonia, or in a mixture with it and spirits of nitric ether, or with nitre (F. 494, 496), or with hydrochlorate of ammonia (F. 431), or with antimonials (F. 493), or with any two or more of these. It may be also exhibited in some circumstances with advantage conjoined with calomel. If vital power is much depressed in this stage, the dose of the camphor may be increased, and the antimonial or the calomel omitted, or given merely at the outset. In some one or other of these combinations, it will prove of benefit, whatever complications the fever may present. As the disease passes into the *nervous stage*, and more especially as this stage passes into extreme exhaustion, the dose of camphor should be increased, and it may then be conjoined with tonics, various stimulants, antiseptics, &c., as arnica, cinchona, serpentaria, valerian, angelica, opium, sulphate of quinine, the chlorides, musk, aromatics, &c., according to the period and peculiarities of the disease. Many of the best writers in Germany prescribe it, early in the nervous stage, with arnica, or with acetic or citric acid. HAUTERSIERK, CALLISEN, LUDWIG, BONNEVAULT, FRANK, JÄGERSCHMIDT, and HUFELAND direct a solution of camphor in acetic acid to be taken internally, and used externally, early in most states of typhoid fever. With the pyroligneous acetic acid, the camphor may be conjoined with still greater benefit. The inflammatory state of any organ, supervening in the course of typhoid fevers, does not contra-indicate the use of camphor, if given appropriately to the degree of vascular action and of vital power.

584. *Arnica* has been very much employed

in Germany in low fevers, and in the nervous stage of typhus, yet it has not received a satisfactory trial in England nor in France. STOLL, FISCHER, COLLIN, FERRO, MERCIER, FRANK, RICHTER, HECKER, HILDENBRAND, and other high authorities recommend it generally, as directed above (§ 572). QUENTIN prescribes an infusion of it with valerian. The flowers and the root are most commonly employed, and usually in the form of a weak infusion (F. 222, 223).

585. In the low nervous form of typhoid fever, as well as in the nervous stage of exanthematic typhus, or in that stage and state of the disease for which the German physicians prescribe arnica, *valerian* may be employed with advantage. MATTHÆI, FRIZE, REIL, THOMANN, and others recommend it. I have given an infusion of it in several cases, and made it the vehicle of other medicines, particularly the chlorate of potash, camphor, the alkaline carbonates, serpentaria (F. 269, 270), &c. It is indicated in such states of fever as require a gentle tonic and stimulant of the nervous influence, especially when the nervous symptoms are predominant, although the head be cool and the pulse weak. In these circumstances it may be conjoined with camphor, tonics, &c.

586. *Serpentaria root* was praised by FRIZE, STOLL, REIL, MARCUS, and others in the advanced stage of low fevers, and in the circumstances just mentioned. It is still used, when the skin is cool or the pulse is weak, and when warm stimulating tonics are required. It is most serviceable in the form of infusion, with aromatics and tonics (F. 262, 416, 826). *Angelica root* was recommended by REIL, *imperatoria root* by HOFFMANN, and the root of *calamus aromaticus* by HILDENBRAND. They are very rarely employed in this country, although they are of service, particularly in the form of infusion, as vehicles for other medicines, and on account of their warm, diaphoretic, and stimulant effects. They may be employed variously combined with each other, or with camphor, tonics, &c., and are indicated in the same circumstances as require the use of arnica, viz., in the low nervous and putro-adyamic states. Their infusions are good vehicles for tonics, the chlorates, or alterative salts. I have sometimes prescribed them with chloric acid and chloric ether, or with the chloride of sodium and chlorate of potash.

587. *c. Cinchona and other tonics* have been praised by HUXHAM, LIND, LANGRISH, GRANT, WESTPHAL, SIMS, VALLISNERI, CASSON, FORDYCE, and most of the writers on fever during the last century, and by many contemporary authors; while others have attributed more or less mischief to their use. When the various forms of typhoid fevers, their complications, and the very different pathological states in the successive stages of their course are considered, this contrariety of opinion is easily explained. When the nervous stage has appeared, and when the putro-adyamic state is pronounced, whether early in the disease, as in the putrid or septic variety, or in the advanced stages of the nervous and exanthematic, the preparations of *cinchona* and the *sulphate of quinine* are the best tonics that can be selected, both for the permanence of their action and for their influence in arresting the disposition to colliqua-

tion that pervades the fluids and soft solids of the frame. In the early states of the disease, and where the propriety of having recourse to tonics is a matter of doubt, the *infusion of bark*, with the solution of the acetate of ammonia, and spirits of nitric ether, or the *decoction of cinchona*, with nitre and hydro-chlorate of ammonia (F. 437, 438), will generally prove serviceable.

588. *f.* The propriety of having recourse to *acids* in the states of low fever just alluded to has recently been disputed; and if the effects produced by them on the blood be considered, as shown by the experiments of FRIEND, ELLER, GIANELLA, HALLER, &c., and as stated in the article BLOOD (§ 135, 136), rational doubts of their salutary influence may be entertained; yet the experience of most writers is in favour of them, particularly in fevers of a low character. SPANGENBERG, HUXHAM, LANGRISH, WOOD, MURSINNA, ROWLEY, BOYER, RADEMACHER, SCHLEGEL, HORN, FORDYCE, BANG, MILLAR, FRANK, HUFELAND, &c., recommend the *mineral acids*, especially the hydrochloric, in the circumstances mentioned above. From a careful observation of their effects in many cases, I believe that they will prove beneficial in some cases and injurious in others, according to the period and state of fever, and the mode of prescribing them. If they are given before the blood has become materially altered and the vital energy much exhausted, but after requisite vascular or alvine evacuations have been carried sufficiently far, while the skin is still warmer than natural, and while the pulse is broad, open, and compressible, the mineral acids, with tonic infusions, will generally be serviceable. In this state the infusion or decoction of cinchona may be given, with hydrochloric acid and chloric ether; or the sulphate of quinine, with infusion of roses and sulphuric acid, or also with sulphuric ether. When the prostration is considerable, this latter may be the more energetic medicine. In more doubtful cases, particularly when the heat of surface is great, the infusion of cinchona or of valerian may be given, with the nitrate of potash, or with the *nitrate of soda*, a few drops of nitric acid, and the spirits of nitric ether; and when the skin is cooler, either of these infusions, or some one of the others already mentioned, may be prescribed with equal parts of the *nitro-hydrochloric acid* and the tincture of serpentaria.

589. In the treatment of typhoid fevers, it should never be forgotten that the state of the circulating fluids depends chiefly, if not entirely upon that of the organic nervous influence, and that agents which apparently deteriorate the blood may yet be of use by administering to this influence. The *carbonic acid* gas was supposed by JANSENN, FORTIER, and PERCIVAL to act as an energetic tonic, when taken into the digestive canal; and they therefore directed the use of those fluids which contain it most abundantly, and even advised it to be thrown up the rectum. A similar practice was lately recommended by Dr. CLANNY, with the view of supplying the blood with this substance. But M. CHOMEL has shown the inefficacy of this practice (§ 538). The acids which have appeared to me most serviceable in the early period of the adynamic, nervous, or putro-adynamic forms, are the hydrochloric and the pyroligneous acetic, particularly when giv-

en in the decoction of bark (F. 388), or in either of the warm stimulant infusions mentioned above. When the nervous or putro-adynamic states are far advanced; when the temperature is low, and the skin lurid or discoloured, I believe that whatever benefit follows the use of mineral acids depends chiefly upon the salutary efforts of nature, or the substances prescribed at the same time. In the state just mentioned, the more energetic tonics and stimulants, in conjunction with camphor, the chlorate of potash, opium, wine, &c., are much more deserving of confidence. Besides cinchona and sulphate of quinine, other tonics, as cascarilla, calumba, gentian, &c., may be used; but they are inferior to bark, and ought to be given chiefly in conjunction with substances appropriate to the peculiarities of the case. The *willow bark* has been recommended by OTTO, SCHLEGEL, WHITE, and HUFELAND, but it does not appear to be equal to cinchona.

590. *g.* The *chlorates*, &c.—The *chloride of potassium* (muriate of potash) was first employed, under the name of digestive salt, by SYLVIVUS; and, owing to its febrifuge properties, it afterward obtained the appellation of febrifuge salt of SYLVIVUS. It was given in doses of from one to two or three drachms; and, although its action is stimulant, aperient, diuretic, and antiseptic, it has seldom been used in modern times. It is of service in the low stages of fever, and when there is evident change in the circulating and secreted fluids; but it is inferior to the *chlorate of potassa* in these states. This latter salt was recommended by GARNETT and some other writers, but at no time has it been generally used. I have prescribed the chlorate of potash in several diseases since 1819, and consider it a valuable medicine, especially in the advanced stages of typhoid fevers. When excitement or vascular reaction is about to pass into the nervous stage, and when inflammatory determination has been removed, either of these salts, but the latter especially, will be prescribed with benefit. The chlorate may be advantageously conjoined with tonics and camphor; or it may be given in doses of five or seven grains, every two or three hours, in tonic infusions, or in larger quantities at longer intervals. A solution of *chlorine* or of *chloric ether*, or of both, may be used in the same states for which the chlorate of potash or the chlorides are here recommended.

591. The *chloride of sodium*, or common salt, although sometimes used in various forms, but commonly as an aperient and antihelmintic by the older writers, has recently been seldom resorted to, excepting in enemata, in the treatment of low fevers. Formerly *putridity* was much insisted upon as a characteristic of certain states of fever; for, owing to the intensity and concurrence of the exciting causes, to the treatment, and to the influences in operation through the course of the disease, these changes of the fluids and soft solids, which, although not strictly putrid, yet somewhat resemble it, or even approach it, were common occurrences in the course of the inflammatory as well as of the adynamic varieties. These changes, inasmuch as they consist, in some measure, of an incipient dissolution of the vital cohesion of the tissues and of the healthy condition of the fluids, quickly passing, with the

disappearance of life, into manifest decomposition, were not altogether inappropriately termed putrid; and, for want of a more suitable name, they may still retain the denomination. With the modern disuse of this term, and from a disbelief of the possibility of putridity taking place in a living body, the operation of medicines in preventing or counteracting it was denied. Thus an *antiseptic* property was denied to medicines, although it could not be doubted that many substances had the power both of averting and of remedying the changes usually termed putrid. This power was imputed to their influence upon the nervous system, particularly the cerebro-spinal part of it. I have, however, shown at other places, by experiments performed by myself and others, that numerous substances are quickly conveyed into the circulation, where they directly change the state of the circulating fluids and secretions, and affect the organic or ganglionic nervous influence.

592. Conformably with this view, the older opinion as to the operation of antiseptics on the living as well as on the dead body—that certain substances prevent or counteract the changes usually denominated putrid or septic—seems well founded. There can be no doubt that the circulating fluids are contaminated or altered in the course of fever, owing to the *superabundance* of certain constituents, and the *loss* of others necessary to the continuance of health. The impeded functions of the lungs, the skin, liver, and kidneys, in the early stage of the disease, will occasion the former of these changes, and the stop put to the functions of digestion and assimilation—to the sources of supply—will produce the latter. That the chloride of sodium is necessary to the healthy state of the blood cannot be doubted; it therefore follows that the privation of it, for a number of days, during the treatment of fevers, will materially favour the morbid condition which the fluids assume in the advanced stages. But as other substances, as the chlorate of potash, hydrochlorate of ammonia, nitrate of potash, and nitrate of soda, act on the blood and on the economy in a similar manner to the chloride of sodium, although not so beneficially, universally, and permanently as this last, which has been so bountifully supplied by nature, we are enabled to account for the benefit derived from the use of them in the advanced stages of fever by writers in the sixteenth and seventeenth centuries. It seems very probable that the common salt taken so abundantly with our food, after having produced the effects arising from its neutral state, is decomposed by the nervous or vital influence, or by the electricities circulating through the frame; and that each of its constituents performs ulterior offices in the economy that are necessary to the continuance of health, and enters into new combinations, produced by the actions of the respective organs in the circulating and secreted fluids.

593. If this view be just, the insufficient supply, or the privation of this salt in the early stages, while the discharge of it continues by the excretions, in either its neutral or its decomposed states, will cause a deficiency of it in the blood in the advanced periods of fever, and will give rise to farther changes both in the circulating and in the secreted fluids. In conformity with this opinion, a modification of

the medical and regimenal treatment usually recommended in typhoid fevers should be adopted. It is not improbable that the evils resulting from a total privation of a substance so necessary to the healthy discharge of the functions as the chloride of sodium is, would have been more generally manifest in these diseases if other substances, acting somewhat similarly upon the blood and on the system, had not been commonly employed in the treatment of them. I have been led, by the antiseptic properties of certain medicines, to have recourse, in the latter stages of low fevers, to the most energetic of them, particularly the nitrate of potash, the chlorate of potash, the hydrochlorate of ammonia, camphor, and the terebinthines, cinchona, &c., in various combinations, either with each other or with different stimulants and tonics, with the view of exciting the nervous influence, of supporting the powers of life, and of counteracting the changes frequently terminating in a dissolution of the vital crasis and cohesion of the fluids and soft solids. But in fevers which are characterized by excessive action at the commencement of excitement, and by extreme exhaustion, loss of irritability, and deprivation of the fluids in the latter stages, a too early recourse to some of these medicines may increase the morbid action, and aggravate local determinations; while a too cautious reserve of them, either as to quantity or as to the period of fever, may allow the diseased changes to proceed without interruption to a fatal issue. It is, therefore, imperatively required of us that we should determine, by attentive observation, both the exact period in which medicines of this description should be commenced with, and the particular substances that should be first employed. As respects the kinds of fever just alluded to, as well as those forms which are either nervous or more uniformly putro-adyamic at earlier stages, we are at no loss for means which are both refrigerant and antiseptic, and which may be employed from the commencement, either when excitement is most excessive, or when it is entirely absent, if due care be taken in the mode of prescribing them. By this early attention, particularly in putro-adyamic and inflammatory putrid fevers, to those means which may best preserve the fluids from the changes they are apt to undergo, especially when these fevers are left to themselves or injudiciously treated, the advanced stages are rendered much more mild, and even manageable. The more refrigerant of the substances, formerly termed antiseptics, as nitrate of potash, nitrate of soda, hydrochlorate of ammonia, &c., when duly administered in the early course of fever, and combined with, or followed by those which are more stimulant and tonic, as camphor, cinchona, chlorate of potash, arnica, &c., as exhaustion and signs of putro-adyamic appear, will generally prevent the more dangerous changes in the fluids from taking place. The *hydrochlorate of ammonia* is now seldom used internally, although HOFFMANN, JACOB, BARCHUSEN, LOESCKE, TISSOT, WERLHOF, MONRO, HIRSCHL, HILLARY, M'CAUSLAND, GMELIN, and others have recommended it highly in putro-adyamic fevers. I have frequently employed it, and Dr. CONWELL has found it of great service in the fevers of

India. SCHMIDT prefers it in such cases as are attended by diarrhœa.

594. About the time when M. LABARRAQUE discovered the *chlorinated soda* and *lime*, cases of fever of a putro-adyamic or malignant form were frequently occurring in an institution to which I am consulting physician. I had made trial of various methods of treatment, but found camphor, in large doses, variously combined, and aided by other means according to the peculiarities of the case, the most successful of any. Shortly afterward, M. LABARRAQUE'S process for preparing these chlorides was published at Paris, and as early as 1825 I procured them from Mr. MORSON, for the use of this and another institution to which I was physician. I employed them internally in enemata, and externally, and as disinfectants; and the results were such as have induced me to have recourse to them ever since in the various circumstances and diseases in which I have recommended them in this work. The *chlorinated soda* is a valuable medicine in all the typhoid forms of fever, when judiciously prescribed. It may be given early in the putro-adyamic variety, when excitement is imperfect or low, and the skin discoloured, or petechiæ are appearing, and continued throughout the disease. But when vascular reaction is considerable, or local determination prominent, particularly in the nervous and exanthematic varieties, this substance should be withheld until these states are subdued, or about to lapse into the nervous stage. At first, it ought to be prescribed in small doses, so as not to offend the stomach: in from ten to fifteen drops of the solution, as prepared by LABARRAQUE, every three or four hours in camphor julep, or in an aromatic water. As the disease passes into a state of exhaustion or of manifest putro-adyamia, or when there are a lurid skin, low, muttering delirium, stupor, meteorismus, black sordes on the tongue, teeth, &c., the supine posture, unconscious, offensive evacuations, petechiæ, blotches, a disposition to gangrene in parts pressed upon, coma, &c., it should be given in larger doses, or more frequently, and in tonic infusions or decoctions, or with camphor, serpentaria, or other stimulants and tonics. I have seen it produce of great benefit in such cases, but it should be commenced before these symptoms appear, and be persisted in, as its good effects are seldom manifest in less than three or four days, or more; and it should not supplant the use of wine, opium, suitable nourishment, and other means which the stage of the disease and peculiarities of the case may suggest. It should also be frequently administered in enemata; and the surface of the body ought to be often sponged with a stronger solution of it in warm water, with the addition of camphor. M. CHOMEL has lately given the chlorinated soda an extensive trial; and he states that it has proved more successful in low fevers than any other means, when perseveringly employed. Dr. GRAVES has also recently employed it, and has found it extremely serviceable. It acts, first, on the tissues with which it is brought in contact as a gentle stimulant and antiseptic, and is most probably partially decomposed in the digestive organs, and reduced to the state of common salt. In this state it is carried into the circulation, where it supplies the waste of

this substance that has taken place in the early stage of the disease.

595. The *chlorinated lime*, in doses of one or two grains, may be also employed with great advantage. When exhibited in solution, it will be preferable to commence with half a grain every hour, or with a grain every two hours, gradually increasing the quantity as the stomach may tolerate it. It is best adapted to the more extreme cases of putro-adyamia, and especially to those attended by urgent diarrhœa and meteorismus. In these it may be conjoined with camphor and other stimulants. It was employed by Dr. REID, of Dublin, in low fevers and in dysentery, a few months after the period of my having first had recourse to the chlorinated soda. It may be prescribed in the same circumstances and combinations as the latter, but is not so generally appropriate, nor does it admit of so early, or of so prolonged an exhibition.*

596. *h. Alkalies and alkaline carbonates* have been employed in various states of typhoid fever, and frequently with service. The *sesquicarbonate* and other *preparations of ammonia* have been very generally resorted to when diffusable stimuli have been required. In the early stages of these fevers, the sesqui-carbonate may be used with advantage to make a neutral saline mixture with the pyrologeneous acid, and either the alkali or the acid may be given in excess, or the mixture may be taken while effervescing. The preparations of ammonia are most useful in the nervous and exanthematic varieties of typhoid fever, and, in conjunction with camphor, or with tonic infusions, in the nervous stage. In the putro-adyamic state they have seldom appeared to me to have any good effect, unless combined with these or other tonics.

597. The *sesqui-carbonate of soda* and *bicarbonate of potash* are seldom used unless to form neutral *citrates* or *tartrates*, and to obtain the fixed air given out during the combination. The advantages of this latter are, however, by no means considerable; but the salts themselves are of service, by supplying, in some respects, the place of that commonly employed. The *carbonate of soda* has been occasionally used, and is recommended by Dr. SREVEVS as an ingredient in his saline powders. In the more adynamic states of typhoid fevers, or in the intestinal complications, the carbonate of soda should be given in a tonic infusion or decoction, with camphor, and with opium, or extract of poppy, or compound tincture of cam-

* Dr. REID mentions an important fact illustrating the cause of putro-adyamic fevers, a cause which exists to a greater extent than is supposed, especially in large cities, although in a much less degree than in the instance about to be adduced. At Valladolid, during the war in Spain, the palace of the "Holy Inquisition" was appointed for the barracks of a British regiment. Under the colonnade was a well, from which water could be drawn into the uppermost stories. This water had a sweetish decayed taste; but, for the want of better, the soldiers used it both for drinking and cooking. No other regiment in the garrison was so unhealthy; and the prevailing disease was putrid fever, of which there was not the slightest symptom in any of the other regiments. At last the reason was discovered: skeletons were found in the well, and several were observed with pieces of the flesh adhering to the bones. If the chlorides of soda or of lime had been then known, or if that which had been long previously recommended been employed, the mortality from this fever, and from putro-adyamic dysentery, would not have been so great as it proved during the Peninsular campaigns.

phor, to prevent it from relaxing the digestive mucous surface, and from increasing the diarrhœa. Unless it be thus combined, or conjoined with the chloric salts which Dr. STEVENS directs, it may not only aggravate the affection of the bowels, but also favour relapses, or cause the disease to pass into the dysenteric complication. An *acetate of soda*, formed by pyroigneous acid, with an excess either of the acid, or of the alkali, according to the state of disease, and taken while effervescing, or afterward, appears to me, from the few cases in which I have had an opportunity of using it, to deserve a more extensive trial.

598. The salts employed by Dr. STEVENS, viz., the chloride of sodium, the carbonate of soda, and the chlorate of potash, cannot be supposed to act, even upon the digestive organs, in the states in which they are prescribed, without undergoing some change from their mutual action, and from the fluids with which they mix. Indeed, the results may be assumed to be chlorates of soda and of potash, and carbonate of soda, taking the proportions of the individual salts into consideration. When these salts are taken into the stomach during the middle and latter stages of typhoid fevers, the passage of at least a portion of them into the circulation may be expected, and the loss of the saline ingredients of the blood in the early stages, argued for above (§ 592), will be supplied. Upon this principle, and for the reasons there stated, this method deserves a more extensive trial than it has hitherto obtained; and when the nature of the salts, and the modes of their operation are considered, it does not seem to differ materially from that by means of the chloride of soda, first adopted by myself. There are certain points upon which Dr. STEVENS very strongly insists, and which are partly contradicted and partly confirmed by former observers: these are, 1st. The superabundance of acid in the excretions; 2d. The influence of all acids in rendering the blood dark and grumous; and, 3d. The mischief produced by them in the latter stages of fevers. Now, without disputing the accuracy of the first statement, although a confirmation of it is required, I will admit the truth of the second; for it agrees with my own experiments, and with those performed by writers early in the last century, to whom I have referred in the article BLOOD (§ 135). That acids will be injurious in the latter stages of fever, seems a rational inference from these experiments, in connexion with the dark and morbid state of the blood at that time; and yet numerous writers have recommended them, and adduced proofs of their good effects even in the most malignant states of remittent, continued, and exanthematous fevers. The muriatic or hydrochloric, citric, and pyroigneous acids have been severally employed in these states, and found of service; but they have also frequently failed. That the blood is black and dissolved in scurvy cannot be doubted, yet the advantages derived from citric acid have been great, unless some remarkable delusions as to the causes and treatment of this disease have existed;* and such actually appears, in some

measure, to have been the case. The truth, however, seems to be that, while the pathologists have lately been occupied exclusively with the living solids, Dr. STEVENS has concerned himself only with the blood, and kept too much out of view the influence of life, especially as manifested in the organic nervous system, upon both the circulating and secreted fluids.

599. As far as my own observations enable me to form an opinion as to the respective merits of these acids, and of the alkaline carbonates and salts, I conclude, 1st. That the *acids* may be of service early in fever, while vascular excitement is considerable, although vital power may be weak; that they seldom will be injurious in this period, as long as the skin continues warmer than natural and the blood preserves its colour; and that but little confidence should be placed in them when the surface is at, or below the natural temperature, or materially discoloured, unless they be conjoined with substances calculated to excite the powers of life. 2d. That the *carbonates of soda and potash*, the solution of *chlorine* and the *chlorides*, are preferable in the middle and latter stages, more especially when the blood appears morbid, the skin discoloured, and the excretions offensive; but that the sub-carbonates should not be trusted to in the last stages of typhoid fevers, unless conjoined with substances calculated to support the vital energies; and that, at this period, *chlorine*, the *chlorates*, and *chlorides* should be preferred, as being more tonic, stimulant, and antiseptic than the carbonates. 3d. That the *sulphate of soda*, the *phosphate of soda*, and the *sulphate of magnesia* are severally of service in the stage of excitement, when they may be given, at first so as to act gently on the bowels, and afterward in small doses, as refrigerants or alteratives; and that the *chlorate of potash*, the *citrates*, and *acetates* may likewise be employed with the latter intentions. And, 4th. That circumstances may occur, in which it will be advantageous to exhibit the neutral salts with ei-

the same causes, and often occurred simultaneously in the same camp, army, fleet, or ship; that the causes were chiefly putrid water, mouldy and adulterated bread, diseased and unwholesome flesh, vegetable and animal exhalations, insufficient nourishment, and the depressing passions; and that the protracted use of salted provisions of a good quality was but little concerned in producing either of these diseases. During the seventeenth and eighteenth centuries, trading vessels were provisioned as cheaply and as sparingly as possible, and fleets and armies were provided by contractors, who enriched themselves and those who passed their supplies at the expense of the lives of thousands. Bread which was actually nauseous; the flesh of animals dead of epizooties; provisions which had been either salted for years, or nearly half putrid; numbers sleeping in a small space and in imperfectly renewed air; the constant evaporation from the too frequently washed decks; water kept in wooden casks until it became blackish, inky, stinking, and nauseously putrid, were causes of fever often in protracted and simultaneous operation. I have never been in a ship in any other capacity than as a passenger; but some of my voyages have been long, and have afforded me occasions of witnessing, even at the commencement of the nineteenth century, the existence of some of these causes. For many years matters have been altered, especially in the navy. The mutiny at the Nore; the advance of knowledge; the stricter attention to the supply, preparation, and quality of the provisions; the preservation of water in iron tanks, and some other subordinate circumstances, have done more to banish putrid fevers, dysentery, and scurvy from our fleets than the use of citric acid or any other antiscorbatic or antiseptic; and I have no doubt that the prevention of these causes, and the general adoption of the chlorides, will be found the most certain means of preventing and of curing these diseases.

* From several opportunities of observation, I am of opinion that scurvy has been often confounded with putro-adyamic fever; that both diseases formerly proceeded from

ther an acid or an alkali, as the chloride of sodium, with a vegetable acid, as prescribed by MORGAN; or with soda, as advised by STEVENS; or to prescribe saline substances with an excess of either of their constituents, as the chlorates with an excess of acid or of alkali.

600. *i. Opium, &c.*—Much difference of opinion has existed as to the propriety of giving opium in typhoid fevers. But when we find SYDENHAM, POLIDORI, ROLFINCK, SCHLEGEL, VAN HOVEN, HOME, HORN, MARCUS, LATHAM, STOKES, GRAVES, &c., favourable to the practice, the grounds of dissent from it ought to be carefully examined. There are circumstances and states of fever which forbid its use, but there are others which as imperatively require it; and I believe that the objectors err grievously in not discriminating between them, and in not studying either the conditions which contraindicate it, or the modes of exhibiting it in the cases that would be benefited by it. SYDENHAM considered that it prevented coma or stupor, when given after vascular and alvine evacuations had been judiciously employed. ODHELIUS, GILCHRIST, HOME, and GRAVES combined it with antimonials, and the propriety of the practice cannot be doubted, in the circumstances in which they employed it. In the present day, the indications for the exhibition of opiates have been so ably stated by two accomplished physicians—DR. LATHAM and Dr. W. STOKES—that whatever I may advance as to this subject must, in great measure, be an echo of their observations. When the disorder of the sensorium outruns the other symptoms; when by venæsection or topical bleeding, or by alvine evacuations and refrigerants, the general and local symptoms are relieved, but the delirium still continues; when to this state are added tremours, subsultus tendinum, and unrestrained evacuations; when there has been, at first, high vascular excitement, and large evacuations have been required to guard the brain or other organs from mischief, and wild delirium has followed; if the patient has previously been in a delicate or nervous state; if he has been addicted to an excessive use of spirituous or vinous liquors, particularly the former; if the habits of the patient and his occupations have been such as to inordinately excite and exhaust the sensorium; or if the anxieties, the toils, or the debaucheries of life have previously injured the health, and more especially the state of nervous energy; in these several circumstances should opiates be resorted to in the advanced progress of typhoid fevers, and of synchoid fever that has passed into the nervous or typhoid state. On most of these, Dr. LATHAM has insisted with great precision and force, and I entirely subscribe to the value of his remarks. Dr. STOKES remarks that *three* circumstances call for the use of opium in fever: 1st. Where there is persistent watchfulness; 2d. Where an inflammatory condition of the brain has existed and been subdued, but delirium or other nervous symptoms still remain; 3d. Where an excited state of the sensorium exists without heat of scalp, or remarkable throbbing of the arteries of the head; and to these I may add a fourth, Where there are much relaxation of the bowels, unrestrained evacuations, tremours, watchfulness, or delirium, or subsultus tendinum.

601. The *mode* of exhibiting opiates is sometimes of great importance. In many cases, one or two grains of solid opium may be given, either alone, or with camphor and nitrate of potash. The combination with camphor is to be preferred when there is much adynamia, and no inflammatory determination to the brain. When the bowels are very remarkably disordered, ipecacuanha may be added to these. The *acetate of morphia* is often superior to pure opium, when given in doses of from a quarter to half a grain, with camphor, or with aromatic spirits, or warm spices, as Cayenne, &c., particularly in cases of extreme prostration. The *hydrochlorate of morphia* may be preferred, if the chlorates are also prescribed. Opiates are sometimes of service when exhibited in small mucilaginous enemata. HILDENBRAND, who is averse from the use of opium in the exanthematic typhus, unless under circumstances manifestly indicating it, very justly remarks that, when it is determined upon, it should be given in a full or large dose, once or twice repeated after a proper interval, rather than in small and often-repeated doses.

602. Other *narcotics* may be prescribed in certain states of typhoid fever, but they are not so deserving of confidence as opiates. The extracts of *poppy* and *hyoscyamus* are occasionally useful, particularly when opium disagrees; but even in such cases, the acetate of morphia, prescribed as just directed, will be of service. BREERA praises *belladonna* in the states of fever indicating the propriety of having recourse to opium. This narcotic is sometimes useful in the delirium attendant on erysipelas of the scalp. Mr. BLACKETT (*Lond. Med. Repos.*, vol. xix.) recommends it in similar circumstances. It seems deserving of trial in the states of nervous fever mentioned above, and in the nervous stage of exanthematic typhus.

603. *k. The use of wine and of some other stimulants* requires much discrimination. It has been supposed by some writers that *wine* is contra-indicated where there are delirium; a dry, black, or red tongue; red or suffused eyes; or much heat of surface. This is partly true; but one, or even more of these symptoms may be present, and yet wine will prove of great benefit. Indeed, wine may be exhibited in the same circumstances as require the use of opium. When the delirium is of the kind above stated (§ 600), and is accompanied with the same phenomena, &c.; when the state of the tongue is the result of extreme adynamia, inflammatory determination having been subdued; when the suffusion or redness of the eyes is the result of want of sleep, and is attended by a cool scalp; and when the heat of skin exists chiefly on the trunk, and is attended by indications of putro-adynamia, then wine will be given with benefit, and it is even indicated. This subject has been very ably canvassed by some contemporary writers, particularly by Drs. WILSON, PHILIP, ALISON, GRAVES, STOKES, and TWEEDIE, whose experience gives weight to their opinions, and they very nearly concur with me in the propriety of exhibiting wine with due precaution even in these circumstances, as well as in others which are less doubtful. GILCHRIST, HEISHAM, HALLS, WENSEL, HARLES, MATTHÆI, HUFELAND, HORN, and others, even notice the influence of wine in reducing the heat of skin,

in fevers tending to putro-adyndamia, and my own experience confirms the observation.

604. The *indications* for the exhibition of wine in the typhoid states of fever may be reduced to the following: (*a*) When the patient has been proceeding favourably, and the pulse suddenly becomes weak, very soft, or irregular; the skin cool or damp; the countenance collapsed; and the strength prostrated; (*b*) When the patient complains of a feeling of exhaustion, and expresses his wish for wine or support; (*c*) When vital depression occurs unexpectedly or suddenly, or without any evident cause; (*d*) When the depression is owing to injudicious depletions, or excessive evacuations, or to the depletions or other means required to subdue inflammatory determinations at an advanced stage, or to protracted or excessive diarrhœa, or to hæmorrhage from the bowels, or from any other part; (*e*) When, with these symptoms, the abdomen becomes tympanitic, and the exhaustion increases; (*f*) When the delirium is low, muttering, and constant, and attended by tremours, or subsultus tendinum; the surface, and particularly the scalp, being cool, the pulse soft, weak, or small, and the posture supine; (*g*) When petechiæ or vibices of a dark hue, and other signs of putro-adyndamia appear, the scalp being cool and the action of the carotids not materially excited; (*h*) If early convalescence be slow, unattended by local affections of an inflammatory tendency, and owing chiefly to debility; (*i*) If, with one or more of the foregoing indications, or with a soft pulse, moist tongue, or cool skin, in the latter stages, it be ascertained that the patient has been addicted to spirituous liquors, or to wine in excess; (*k*) and if the character of the epidemic be of a low kind, and if the early excitement be attended by weak vital resistance, and soon pass into exhaustion, then the propriety of having recourse to wine or other ætieve stimulants, with requisite precautions, cannot be disputed.

605. The *kind* of wine, its *quality*, and its *quantity*, are deserving of particular attention. Old sherry, Madeira, and white hermitage, of the best quality, should be preferred. The red and acid wines are most apt to disagree, yet port and red hermitage are useful in some cases, particularly when diluted and conjoined with aromatic spices in the form of negus. NAVIER recommends Champagne; but it is suitable only to the stupor or coma attendant upon an extreme state of adynamia. The *quantity* of wine given in the twenty-four hours should depend upon several circumstances; but it may vary from four or five ounces to sixteen or twenty. Dr. BATEMAN thinks that it should not exceed a pint; very much larger quantities have, however, been given with benefit; but these are only the exceptions from the general rule. Regard ought to be had to the age and previous habits of the patient, as well as to the state of the disease. Young persons are readily excited, and should take only the smaller quantities. Older patients, and those especially who have been habituated to much wine or to spirituous liquors, often require the full amount just named. The use of it ought always to be commenced in small quantities, and increased as the indications may guide the practitioner. In all cases, it should either be

diluted or given in the patient's food, and the effects carefully watched. Dr. TWEEDIE justly observes that, if the patient relishes the wine, if he is tranquilized by it, and if there is a gradual and steady improvement in the symptoms, without any marked excitement after it has been taken, benefit will result from it. On the other hand, if the pulse or heat of the skin are much or quickly raised by it, if the face becomes flushed, and the patient restless or incoherent, wine is either improper or the quantity has been too great. If, after having been stimulated, he soon lapses into the previous state of exhaustion, or seems weaker from each successive dose, no advantage will be obtained from it. When wine has produced the desired effects, it should be gradually withdrawn.

606. Other *fermented liquors*, particularly when bottled, and even *brandy*, have been used in the circumstances indicating the use of wine. I have employed bottled stout with benefit; it is an excellent vehicle for the carbonate of soda or of potash, or for small doses of the hydrochlorates, or for both conjointly, and is most appropriate to the advanced stage of putro-adyndamic fever. Spruce beer, ginger beer, and Seltzer water may severally be employed, and in a similar manner. Brandy ought to be much diluted, and is best suited to those who have been habituated to spirituous liquors. In cases attended by a protracted or colliquative diarrhœa and extreme prostration, the brandy should be burned, and given in some thin sago or arrow-root.

607. *Yeast* has been frequently recommended in typhoid fevers. Dr. STOKER considers that it may be given in all the stages in which it can be retained by the stomach, even when the existence of inflammatory complications prevents the use of other stimulants; and that it is generally easily taken alone or with any other medicine, or in any vehicle that may be deemed advisable. In the worst forms of typhus, when it is most needed, he states that it is rarely rejected, but, on the contrary, is much relished; and that it is moderately laxative, often superseding the use of purgatives. If it prove not sufficiently aperient, he gives a little tincture of jalap in it; and if the bowels are too much relaxed, a few drops of tincture of opium are added to each dose. It appears to Dr. STOKER to correct the morbid contents of the alimentary canal, and the consequent symptoms of putrescence, petechiæ and black tongue being more effectually removed by it than by any other means. He has, therefore, substituted it for bark and wine, when they could not be employed on account of inflammatory symptoms, and has conjoined it with them when there was no such counter-indication. He prescribes the yeast in doses of two table-spoonfuls every third hour, with an equal quantity of camphor mixture. If administered in enemata, three times the above dose may be employed. Dr. STOKER, whose experience of this treatment has been long and most extensive, observes that instead of increasing the tendency to tympanitic distention by promoting fermentation, as may be objected, it actually prevents the accession of this symptom; and that in the most obstinate instances of typhoid tympany he has found enemata of yeast and asafoetida the most efficacious remedies.

608. *Other stimulants* require little attention. *Musk* has been recommended by the FRANKS, GEBEL, GMELIN, MARCUS, HORN, STOKER, and others in cases of true adynamia—of extreme prostration, with much affection of the sensorium. It may be prescribed in the same circumstances as admit of the use of wine: THOMANN, however, found it quite inefficacious. It should be given in large doses to be of any service—from ten to fifteen grains, with camphor or ammonia, or other medicines which the peculiarities of the case will suggest. *Phosphorus* and *phosphoric acid* have likewise been employed; they do not appear to possess any claims to particular notice, but may be injurious if too liberally or inappropriately administered. I have seen benefit derived from the infusion of *green tea* when the stupor or coma has been great; and I believe that strong *coffee* has sometimes proved useful in similar states: it has been recommended by ZAMBELLI and GRINDEL. The warm *spices*, especially *capsicum*, are often of service, and may be given in considerable doses in the latter stages of typhoid fevers, but chiefly as adjuvants or corrigents of other remedies. The *spirits of turpentine* are frequently productive of benefit when prescribed in small doses, with aromatics or spices; but a large dose may be attended by very serious consequences when exhaustion is extreme. It is an excellent medicine in enema, with castor oil, chloride of sodium, or other purgatives when the bowels require to be opened; and with asafetida, or extract of rue when there is much typanitic distention. Substances of a similar kind, or the usual carminatives, have been directed in enemata by THOMANN and HUFELAND, in order to remove this symptom; but the injection just recommended is the most certain in its effects. The means noticed above (§ 158) may also be resorted to. When there is hæmorrhage from the bowels, these are generally efficacious; if they fail, a solution of the acetate of lead in pyroligneous acid, with the addition of creasote, may be thrown up in any vehicle which the peculiarities of the case may require.

609. Many practitioners are averse from giving stimulants or tonics in typhoid fevers, from a fear of thereby aggravating or inducing inflammatory determinations. But even where the nervous inflammations noticed above (§ 495) may be presumed to exist, and particularly in an advanced period of these complications, a judicious use of stimulants is actually necessary. It is a well known fact, and well expressed by Dr. W. STOKER, that, at a certain period of inflammatory affections, stimulants become antiphlogistics; and this is more especially the case in respect of these affections when they occur in the course of fevers; the nervous energy is then depressed, irritability is most remarkably impaired, the fluids changed, and the whole constitution incapable of manifesting the phenomena, or of developing the lesions, constituting true or sthenic inflammation and its consequences. A spurious or asthenic state of action only, quickly passing into disorganization, can possibly take place in these circumstances; and it can be remedied solely by stimulating and antiseptic means. These facts are frequently placed before our senses, and demonstrated by the treatment found most

beneficial, as well by that most injurious in malignant sore throat.

610. *l. Various external means* have been suggested for typhoid fevers; some of the most serviceable of them have already been noticed. The *cold affusion* over the general surface is very rarely admissible in this class of fevers; but, applied to the head only, it is often of manifest service when the determination to the encephalon in the early stage of excitement is great, or when the delirium is high or maniacal, or attended by increased heat of the scalp and excited action of the carotids. In these cases it lowers morbid action remarkably, and procures sleep. *Tepid bathing* and *sponging* are favourably noticed by BROCKLESBURY, WOLFF, JACKSON, HALLE, BRANDIS, and others. *Tepid* or *warm sponging* with a solution of the chlorides, or of the nitro-hydro-chloric acids, or of camphor in pyroligneous acid, are deserving of general adoption. Tepid or warm *aromatic baths*, or sponging the surface with infusions or decoctions of aromatic plants, have been employed by MARCUS, HORN, HARLES, and DUPIN. KERKES advises *warm aromatic embrocations* to be placed over the abdomen when there is diarrhæa or meteorismus. The use of *blisters* has been sufficiently noticed; they may be applied over or near the affected organ when the affection consists chiefly of congestion or impaired action. In other circumstances they may be used as derivatives. This remark is applicable to the use of *sinapisms*, and to the warm turpentine embrocation. CALLISEN recommended *boiling water* to be used as a blister and derivative; and the idea has been adopted by some recent writers. One of the most beneficial external means that can be employed is a liniment, consisting of the compound camphor liniment, with soap and Cayenne; this may be rubbed gently but assiduously over the hypochondria, or insides of the thighs, twice or thrice daily. I have occasionally resorted to this treatment for upward of twenty years, and often with great benefit. Several of the *liniments* prescribed in the *Appendix* may be used; but the Cayenne should be added, particularly when sensibility and consciousness are impaired. *Dry cupping* may also be tried as a derivative during the early or middle stages of the disease. In the putro-dynamic state it is seldom admissible.

611. iv. As to the *Prophylactic Measures* that may be resorted to in typhoid fevers, it is unnecessary to add anything to what is stated above (§ 117, *et seq.*), and in the article INFECTION; the means there recommended are quite applicable to these diseases.

612. v. The *Diet and Regimen* in typhoid fevers are particularly deserving of attention; both ought to be suited to the stage and form of the disease.—*a.* In the early period of excitement the air should be pure, dry, cool, and without any current; the apartment should be large and open, the bed without curtains, and the air renewed, without exposing the patient to any chill. Barley water, fresh whey, rice gruel, or common gruel, with a little salt when the excitement is low, or when thirst is not much complained of, may be employed as the usual beverage. The temperature of the drink and of other ingesta should be tepid, or somewhat above it. If bronchial or catarrhal symp-

tonas are present, warm, mucilaginous, and mild diaphoretic drinks should be allowed. It is improper in this stage to attempt to excite perspiration by warm coverings. If stupor is present in this stage, the external senses may be stimulated, and neither light nor noise need be excluded.

613. *b.* In the *nervous stage* the air of the apartment should not be too cool, and the bed-clothes ought to be warmer. A uniform temperature, and the purification of the atmosphere, must be always attended to. A cold, moist air, and currents of air, during this stage, induce diarrhœa, bronchial or pulmonary congestions, or other dangerous complications; while a too warm, close, and impure air, particularly when breathed by a number of persons, favours the development of putro-dynamic changes. The greatest cleanliness is requisite. Neglect of this produces gangrenous sores and ulcers, particularly where pressure is made or slight bruises have been inflicted. The tongue should be scraped, and the teeth and mouth washed with salt and water, or gargled with them or with the chlorides, if the patient can do so. The hair may be cut off in the early stage; but the removal of it in this may be injurious, if the adynamia is extreme, and the scalp cool at the time.

614. In the *nervous stage*, bland, very digestible, and fluid nourishment may be allowed. The drinks should be mucilaginous, and gently warm. Whatever food or drink is used, whether gruel, thin arrow-root, &c., or weak animal soups, broths, beef tea, &c., should contain the usual quantity of salt, for the reasons stated above (§ 593). If the treatment by the chlorides, &c., is adopted, this becomes a matter of less importance. Fruit tends to produce diarrhœa, and is seldom admissible. Wine, as advised above, is generally required, particularly when this stage passes into extreme prostration; and may be given in the nourishment adopted, or in soda water, Seltzer water, &c., diluted with warm water, or with tepid fresh whey. If brandy be used, it may be given in the same vehicles, or in weak black tea, in a state of much dilution. In the true typhus, stimulating the external senses is more necessary in this stage than previously; and it is often beneficial, as HILDENBRAND and NAUMANN advise, to rouse the patient's moral sentiments and affections, and to disperse his fugitive and chaotic ideas, by recalling former associations and objects of affection or of ambition. In extreme cases, however, the physical powers should be excited at the same time as the moral, otherwise the latter will be appealed to in vain. In a case of putro-dynamic fever in which I took great interest, these united means proved successful in rallying the energies of life, under peculiarly unfavourable circumstances. During an expected crisis, a greater warmth of the bed-clothes is proper, and warm whey or other appropriate fluids should be given to encourage salutary evacuations (§ 167).

615. *c.* During the *abatement* of the disease, the importance of diet and regimen increases, as treatment by medicine is now gradually abandoned. Nourishing food of easy digestion, taken in small quantities, pure air, and wine in some cases, are generally required; but these should be strictly prescribed as to kind, quan-

tity, and frequency, according to the peculiarities of the case. As *convalescence* becomes established, the animal broths and soups may be succeeded by a little solid animal food of the lightest kind. The dangers to be apprehended during recovery have been fully stated above (§ 168), their causes assigned, and the means of preventing them pointed out (§ 169). Little farther is, therefore, now required. But it will be most useful to recollect that the management of convalescence should have some reference to the particular form and complication of the disease. In the exanthematic typhus, the danger of consecutive disorder is the least, particularly if it have run its course regularly, and terminated by crisis. After low, nervous, and putro-dynamic fevers, affections of the brain, liver, bowels, lungs, and mesenteric glands are not unusual, particularly when the patient has been prematurely exposed to changes of weather, to irregularities of diet, &c., and when the treatment has been injudicious during early convalescence, or too soon relinquished. In all the varieties, the risk of these affections is increased by the complications which the fever presented, the organ which was prominently deranged remaining longer weak, or more susceptible than others of being disordered by excitation or by injurious agents. Therefore, in cases where the predominant disorder has been expressed on the encephalon, particular care should be taken to preserve the sensorial functions from early excitement or irritation, or undue exercise. Where the respiratory organs have been much affected, premature exposure to cold, or to changes of temperature, &c., ought to be guarded against; and where the digestive organs have manifested the onus of morbid action, the return to a full or stimulating diet should be long delayed, and the most digestible food only ought to be taken, and in moderate quantity. (See farther on this subject, § 167-170; and art. *DEBILITY*, § 36-46.)

[It is a disputed point whether typhoid fever is ever arrested or broken up by medication. Dr. NATHAN SMITH remarks that he never was satisfied that he had succeeded in cutting short the disease in a single instance, and that he had never seen a case terminate within fourteen days from its first attack.* Cases, he says, have often occurred where the distress and sufferings of a patient have been alleviated in less than half that time; but the morbid action has not ceased, nor a healthy one of the secreting surfaces been established, and a natural appetite restored, within the time above mentioned. Dr. MINER, on the other hand, tells us that, when called within twenty-four hours after the attack, he never fails in subduing the disease in two or three days at farthest; and that, taking cases together, he succeeds in producing a resolution in one case in eight or ten.† Dr. M.'s treatment in typhoid fever consisted chiefly in slow and moderate purging with calomel, for the purpose "of changing action, and preparing for a subsequent supporting and tonic course." The calomel treatment was continued for a period varying from five to seven days, when the system was generally prepared for the use of stimulants and moder-

* [Essay on Typhus, p. 70.]

† [Essays on Fevers and other Medical Subjects, p. 105.]

ate tonics. In cases of great prostration, Dr. M. recommends the use of powerful stimulants, as cantharides, capsicum, alcohol, arsenic, oil of turpentine, phosphorus, &c.; although he states that ordinary cases only require, after the preparatory process, a light and moderate, though uniform support, with wine, cinchona, and small doses of opium. Dr. M. alludes to the great difference in the severity, violence, and rapidity of the disease in different towns and seasons; being so mild in some as to require scarcely any treatment, and so severe in others as to prove fatal in many instances under the most judicious plan. We have formerly seen many cases of typhoid fever treated after the stimulant plan recommended by Drs. MINER and TULLY of Connecticut, especially with very large doses of brandy and opium, and we are yet to be convinced that it is not a practice attended with peculiar hazard, if not often leading to fatal consequences. Dr. N. SMITH has truly observed that it does not follow of course that this disease in all cases requires remedies, or that a patient should necessarily take medicines because he has the disease. Where typhoid fever goes on regularly in its course, without any symptom denoting danger, it is now generally agreed that the expectant plan is by far the best, and that powerful means are liable to do great mischief. If bleeding is resorted to, it should be at an early period of the disease, and then not *coup-sur-coup*, as recommended by BOUILLAUD; and leeches or cups may be used with advantage in local complications, or inflammation of particular organs. Where there is great pain in the head in the commencement, or severe pulmonary engorgement, the loss of from twelve to sixteen ounces of blood will often afford great relief, and enable the patient to go through the disease with greater safety; but as a general rule, bleeding will not be required, for it rarely produces any considerable change in the disease, neither rendering the pulse slower, nor perceptibly diminishing the heat of skin. Emetics have been recommended in this disease, especially antimonials, by Dr. JACKSON, on the contra-stimulant plan; but their use is considered by others as not unattended with danger. The same remark will apply to the use of cathartics. We are to bear in mind that one of the most constant of the pathological conditions is inflammation of the follicles of the small intestines; that their mucous coat is in a state of intense hyperæmia, or actual ulceration, and that irritating substances, whether of food or medicine, are calculated to increase the local affection, and thus aggravate the disease. In mild cases, it is better to adopt Dr. SMITH'S plan of leaving the disease to cure itself, confining the patient to farinaceous food and simple diluent drinks, with occasional mild laxatives. Where there are nausea, sickness, and oppression at the stomach, this writer recommends emetics of *ipecacuanha*, *cupatorcum*, or *sulphate of zinc*, and cautions against the use of antimony as a highly dangerous agent. The typhus fever has been treated with eminent success at the Bellevue and other hospitals of this city, by giving *ipecacuanha*, in one or two grains, every two hours, until the tongue became moist, and then allowing wine, porter, ammonia, camphor, in moderate quantities,

guarding against local accidents by leeching, cupping, blistering, and fomentations, and merely regulating the bowels by enemata, and occasional doses of oil.

Dr. E. HALE agrees with NATHAN SMITH and others in relation to the treatment of typhoid fever, and remarks that it "is very doubtful whether any treatment has any direct tendency to remove the disease; and that active treatment in this form of fever never does good, but invariably does harm; exhausting the patient without removing the disease, and therefore rendering him less able to throw it off by the inherent energies of his own constitution." Dr. H., therefore, condemns all active interference, and the whole class of antimonials and salines, and medicines designed to equalize the circulation, as calculated only to disturb and irritate the patient; while tonics, he observes, only tend to increase the fever. Where the stomach is disordered, as it often is at the commencement, a gentle emetic may be given to correct it; and if the bowels are costive, or the dejections morbid, mild cathartics are required; a light, farinaceous, and milk diet, and cooling, soothing drinks. Where there are symptoms of local inflammation, they are to be combated by bleeding, leeches, or blisters, as circumstances require. Above all, the patient is to be kept quiet, avoiding everything that has a tendency to excite, or to call into energetic action any function of the body, or any faculty of the mind; always remembering that, however mild the disease may at present appear, any imprudence may suddenly throw the patient into a state of great danger. The patient may take, as a placebo, a little of the acetate of ammonia and spirits of nitre, or opiated tincture of camphor; or some mild vegetable infusion, especially if there is any tendency to diarrhœa. "The frequent repetition of antimonials," says Dr. HALE, "or DOVER'S powder, day after day, is enough to drive a well man into a fever; and even spiritus mindere-ri, or mucilage of gum Arabic, if too often repeated, or too long persevered in, might throw him into a state of nervous irritation, dangerous to the physician at least, if not to the patient."

Dr. BELL recommends cold bathing, or sponging the skin with cold water; cold applications to the epigastrium and head, and the free circulation of cool air in the room of the patient.* Where nausea is present, he would

* [Dr. NATHAN SMITH speaks very highly of the use of cold water externally and internally in the treatment of typhus (typhoid) fever, and says that where the patient desires cold drinks, they should be allowed *ad libitum*. Dr. S. was accustomed, in cases where the patient was too weak to be removed from bed and placed in an erect position, to dash from a pint to a gallon of pure cold water over his head, face, and body, the bed-clothes being turned down, and the patient reclining on a straw bed; as soon as the heat about the head and body began to return, the water was again applied in a similar manner, and repeated with sufficient frequency as to keep the surface at such a temperature as to feel cool to the hand of a healthy person. Dr. S. remarks that it is not very material what the temperature of the water is, if it be below blood heat, excepting that it be cold enough to produce some shock where there is much stupor or coma, the effect being chiefly produced by evaporation. Several cases are related by Dr. S. (*loc. cit.*) where striking benefit resulted from the application of cold water in this disease. The following is one in point: "J. B., a strong, robust man, aged between thirty and forty, had been sick a fortnight when I first visited him; his pulse was frequent, his heat great, and his mouth exceedingly parched, so much so that he could not sleep but for a

give an emetic, for the purpose of producing secretion and exertion; and, in the advanced stages of the disease, where the secretion of mucus is excessive and almost suffocating, he thinks emetics calculated to afford at least temporary relief. Attempts should be made to quicken the action of the depurating organs, and for this purpose calomel should be administered in small doses, to aid the liver and bowels; turpentine, nitre, and hydriodate of potash, to act upon the kidneys; senega and squills, the lungs; and, where bronchitis is present, calomel and the senega snake-root are particularly useful. Pure fresh air powerfully contributes to free the lungs from their morbid bronchial exudation, quicken the capillary circulation, with its accompanying processes of decarbonization and oxygenation of the blood.

Dr. STOKES has derived an indication for the use of stimulants, especially wine, in typhus fever, by auscultating the heart; and believes that where there is diminished impulse, as well as feebleness of the first sound of the heart, these agents may be advantageously employed; and the results of his observations show that these take place on or about the *sixth day*. The directions of Dr. ARMSTRONG in relation to perseverance in the use of *wine* in typhus fever are worthy of attention. If the tongue becomes dryer, the pulse quicker, the skin hotter, the breathing more humid, or the patient more restless, it does harm; but if the tongue becomes moister, the pulse slower, the skin cooler, the breathing slower and deeper, and the patient more tranquil, it does good. We are not to forget the importance of administering, at regular intervals, small quantities of farinaceous food for the purpose of sustaining the strength, as many patients doubtless succumb for the want of suitable nourishment. We have found wine whey, with well-prepared arrow-root, an admirable cordial, and nutrient in these cases. We have rarely found *opium* necessary or useful in the treatment of typhoid fever, when given alone; and as it tends to check the secretions, and to increase the heat of the skin and pain in the head, it must be used with caution. When combined with calomel or ipecacuanha, it may do good in some stages of the disease; and especially if diarrhœa be present, it is often necessary to check the discharges; and to meet this indication, we generally combine it with ipecacuanha and camphor. We are, however, satisfied that this article has done much injury in the treatment of typhoid fever in New-England, especially when given as a stimulant, and without regard to the circumstances of the case or the true pathology of the disease. Neither is any de-

very few minutes at a time without being awakened by a sense of thirst. His feet were very cold. This individual had been badly treated, and his friends had been prevented from changing his linen and bed-clothes by the physician, who had fears that he would take cold. The patient was first shaved, an operation which had not been performed for something like a fortnight; he was then slipped down in the bed, so as to drop his feet into a vessel of warm water and soap, where they were rubbed till they became clean and warm. The bed and body linen were then changed, and he was properly placed in bed. The effusion of cold water was commenced over the head and breast, and repeated sufficiently often to keep down the heat. The distressing thirst was removed at once; he became convalescent the next day, and recovered without any farther medical treatment." (*Med. and Surg. Memoirs*, p. 93.)

pendance, so far as we have observed, to be placed on mercury, given so as to produce its constitutional effects; the disease running its course unabated, even after salivation had taken place. Dr. SMITH relates many such cases where he had been called in consultation; the convalescence commencing several weeks after the establishment of salivation, and the patient slowly recovering eight or ten weeks from the time of attack. *Mercury* is no specific for typhoid fever, and can only be used as a valuable auxiliary to other means. Too much attention cannot be paid to ventilation, cleanliness, and the due regulation of the diet.

The treatment of *typhus* fever is to be regulated by the same general principles which have already been laid down as applicable to the management of the *typhoid* variety. After they are fully formed, both would seem to have a determinate course to run, and therefore, to a certain extent, are not amenable to the resources of our art. We are therefore driven to the necessity of endeavouring, by proper measures, to diminish the severity of particular symptoms, and thus contribute not only to the comfort of the patient, but, at the same time, prevent or relieve local complications, which, unchecked, would endanger life. How often do patients under an attack of fever succumb to excessive evacuations, or functional disorders of particular organs, which, by suitable measures, might have been arrested or rendered innocuous! We are satisfied, moreover, that in the treatment of our continued fevers, as well as other diseases, far too little attention is paid to *hygienic* means, both in the way of precaution and cure. As typhus fever is now acknowledged, on all hands, to be a contagious disease, too much attention cannot be paid to ventilation and cleanliness, for these are the only certain and absolute disinfectants known; the *chlorides* being the next best substitute, where these are wanting. But as the former are in all cases practicable, their neglect, in every instance, is inexcusable and culpable. Wherever *petechial typhus* has become epidemic and peculiarly fatal, it has been under circumstances where these conditions have been wanting; as among the crowded inmates of hospitals, infirmaries, and poorhouses, or the dirty lanes and alleys of large cities. From neglecting the removal of the excretions and evacuations of the sick, and the admission of fresh air into the apartment of the patient, we have known repeated instances, in the healthy mountain districts of New-England, where watchers and others visiting the sick have contracted the disease, and they, in their turn, communicated it to others, and so it has been extended over wide districts of country, and, in fact, become a perennial endemic. We have no doubt whatever that, with suitable precautions, the disease might eventually be checked, and even extinguished, especially in places where there are no local causes for its extension and perpetuation. As to particular remedies in the treatment of typhus fever, sufficient has already been offered. Bleeding is not generally applicable in any stage of the disease, though cups and leeches may be applied to advantage for the relief of local complications. The heat of the surface should always be moderated by cool or tepid sponging, and the chlo-

ride of soda may sometimes be employed for this purpose with great benefit. The effervescent draught will often be grateful to the patient, and tend to allay morbid irritability of the stomach. The drinks should be water, or rennet whey, or some simple vegetable infusion of a bland or slightly tonic nature. Where there is much prostration, *wine* and *camphor* are the best stimulants; to be succeeded by *quinine*, when the fever subsides and the skin becomes cool; animal food, in small quantities, being also substituted for farinaceous. Where there is insomnia, and the patient is in danger of exhaustion from agitation and nervous restlessness, opiates, especially *morphine*, or the *opiated tincture of camphor*, will prove of great benefit; but they are hazardous, if there is much confusion of intellect, attended with great suffusion of the eyes and countenance. We do not entirely proscribe the use of *emetics* and *purgatives* in these cases, although we think them rarely useful, and only adapted to the removal of particular accidental conditions of the system. Stimulating diaphoretics may often be employed with advantage, to reduce the heat of the skin by perspiration, and aid the recuperative energies of nature; but great judgment is necessary in adapting them to the peculiar circumstances of the case.*

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* [See GERHARD on Treatment of Typhus Fevers, in *Am. Jour. Med. Sci.*, vol. xx., p. 289.]

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FEVER, PUERPERAL; *see* PUERPERAL DISEASES.

FEVER, SCARLET; *see* SCARLATINA.

FEVER, YELLOW; *see* PESTILENCES.

FIBROUS TISSUE—ALTERATIONS OF THE CLASSIF.—SPECIAL PATHOLOGY—*Morbid Structures*.

I. i. OF THE FIBROUS SYSTEM GENERALLY.—*A. The Fibrous System* consists, 1st. Of *fibrous membranes—membrana fibrosa*—as the peritoneum, the cerebral and spinal dura mater, the fibrous capsules, the sheaths of tendons, aponeurotic expansions, the sclerotic, the capsule of the corpora cavernosa penis, and of the clitoris, &c., the tunica albuginea, and the membranes proper to the spleen and kidneys; 2dly.

Of *fibrous cords*, which in the fibres are formed into fasciculi—*organa fibrosa fascicularia*. Several of the former should be viewed as compound structures, as the dura mater, the tunica albuginea, the fibro-synovial sheaths, &c.; but the fibrous tissue constitutes their chief basis. With the exception of the fibrous membranes of a few glandular organs, it is easy to demonstrate that all the fibrous structures are connected together, and that the periosteum is the centre and basis of connexion. This tissue consists of whitish, or grayish, shining, satiny fibres of great fineness and strength. These are interwoven in various directions, in the first division of this tissue, and are placed parallel and very close to each other in the second. Their cohesion is very great. Hence the fibrous tissue is the strongest in the body. Although it must be inferred to possess vessels and nerves, yet neither have been actually traced into it. That it is endowed with vital properties cannot be denied; but it manifests them obscurely in health, but often very remarkably in the course, or as a consequence of certain diseases. Its physical properties are most perfect when the powers of life are energetic, and are much impaired when these are depressed or exhausted. During prolonged debility, and in cases of extreme vital exhaustion, the cohesion of this tissue is diminished, and laceration or extension of it takes place with less violence. During constitutional disorder, or contamination of the system by specific maladies, and in the scrofulous or gouty diathesis, it often becomes the seat of morbid action, and then evinces vital properties in a most evident manner. Injuries and irritations of this tissue, particularly when the vital functions are impaired or disordered, are often the source of the most violent and dangerous affections. The fibrous tissue, however, is, with the exception of the periosteum and the capsules of joints, not very prone to disease; and even when these are affected, a scrofulous or syphilitic taint has been the cause.

2. *B.* Leaving out of consideration the congenital alterations of this tissue, I will briefly notice those changes of it which are usually the result of disease.—*a.* Fibrous parts are seldom *thinner* than natural or atrophied.—*b.* *Thickening* is much more frequent, and is evidently the result of slow inflammatory action.—*c.* They may also be *expanded* or *distended* by morbidly increased bulk of the organs which they envelop. We occasionally meet with this change in the fibrous coverings of the spleen, kidneys, articular capsules, &c. When the expansion arises from the accumulation of fluid, it is generally attended with thinning; and then, in some cases, the distention is chiefly in one part only, in the form of a sac, or is irregularly elongated. But the expansion may also be conjoined with thickening, as when it has proceeded from the changes consequent upon an inflammatory state of the contained parts in which the fibrous envelop itself had participated, as in diseases of the spleen, &c.—*d.* The articular ligaments and capsules, however, are frequently *elongated* and expanded without any internal change, and merely from diminished tone or vital cohesion, in some cases so much so as to give rise to dislocations.—*e.* Fibrous parts may be also too *short* or too nar-

row. *Morbid contractions* are observed in tendons and ligaments, and are generally the result of inflammatory irritation consequent upon great extension, cramp, &c.—*f.* The changes of *colour* met with in this structure are generally associated with change of organization, excepting in jaundice. The morbid colours most frequently observed are, various shades of yellow, seldom brown, and rarely black, as in melanosis.

3. *C.* The *continuity* of this structure is sometimes destroyed, but generally from wounds, sudden extension, as in dislocations, and external violence of any kind. Continuity may likewise be destroyed by purulent collections, by tumours, and various morbid depositions between its fibres; but there is here, with a few exceptions, rather an expansion of the structure than actual breach of continuity. Incised wounds of this tissue heal, in general, with tolerable ease in a healthy state of the system. But this is by no means the case when the habit or constitution is in fault, or when there is obvious disorder of the stomach and liver; and the difficulty is still farther increased if the injury is attended with loss of substance, or when the tissue is lacerated. In these latter, the continuity of structure is in some measure supplied with cellular tissue, which becomes very dense by degrees, but never altogether tendinous. Hence the disposition to rupture or dislocation that exists so long, and, indeed, ever after such accidents. The chief exception to this is presented by the periosteum on some occasions, where it seems to have been quickly restored.

4. *D.* The *texture* of fibrous parts is changed generally by *inflammation* and its effects. But this disease is not frequent in fibrous structures, excepting the periosteum, the articular ligaments and capsules, and the dura mater. In all these parts, however, it more frequently follows external injuries than arises spontaneously. When it is spontaneous, it is almost always merely a concomitant of other diseases of a constitutional kind, such as *scrofula*, *syphilis*, *gout*, and *rheumatism*. The inflammation of this structure is rarely of an acute kind, excepting in some forms of gout and rheumatism; and in these the inflammatory state is consequent upon, and subordinate to a morbid condition of the organic nerves, rather than identical with that which is caused by external injuries, or which assumes the phlogistic character. These specific forms neither pass through the same phases, nor terminate as common phlogosis. The inflammation, also, proceeding from the scrofulous and syphilitic taint possesses the characteristic features of those specific diseases.

5. *a.* The course of inflammation is much more frequently slow, and often the phenomena are so indistinct as to be overlooked. The changes thereby induced are generally co-ordinate with the activity and degree of the inflammatory action. *Redness*, in various degrees of depth, and attended with different states of vascular injection, is usually present. In some cases, there is a diffused rose-red, especially when the inflamed tissue has access to the air. In others, more or less large and numerous red spots or irregular streaks are observed. In many, the inflamed part has a more or less

yellowish colour, and if it be naturally glistening, this appearance is entirely lost. After chronic, or often-repeated attacks of inflammation, other discolorations are sometimes remarked, the parts being either dark gray, brownish, livid, or even blackish.

6. *b. Swelling* is seldom remarkable in inflamed fibrous structures. But if the inflammation continue long, or if it recur frequently without complete resolution, fibrous organs, or the cellular tissue surrounding fibrous structures, are generally greatly swollen, and their boundaries indistinct, with a gelatinous fluid infiltrated into the adjoining texture, giving it a reddish, soft, and oedematous appearance. When the intensity of the inflammation is very high, it runs tediously into suppuration; the swelling and oedematous infiltration of the adjoining cellular substance at first increases, while the fibrous tissue wastes, the effused fluid, at various points, afterward assumes a puriform appearance, increases, is concentrated, and at last more or less destroys this structure, the swelling at the circumference of the part becoming somewhat diminished.

7. *E. Ossification* is frequently observed in the fibrous structure, particularly in the ligaments and dura mater, and less frequently in the periosteum, the tendons, the fibrous membrane of the spleen, and but rarely in the other parts of this system. It is to be viewed as a consequence generally of slow inflammation, and occurs in different forms; as in some cases only the fibro-cartilaginous base of bone is deposited in plates, or roundish flat prominences; more frequently phosphate of lime is secreted either in distinct spots or small masses surrounded by a circle or plexus of vessels, or in the form of splinters; or, lastly, in larger masses, involving the fibrous tissue equally throughout. If the articular ligaments undergo this change, they are then usually *shortened*, occasioning *stiffness* of the joint, or more or less complete *anchylosis*, according to the extent of the ossification. An *earthy mass*, less resembling bone than chalk or gypsum, consisting principally of the urate of soda—*gout tophus*—is often deposited in the ligaments, in the neighbouring aponeurosis, and periosteum of one or several joints, in gouty persons, at first in a soft state, but gradually becoming hard, and often in large quantity.

8. *F. Sphacelation, or gangrene*, rarely occurs as a termination of inflammation. It is met with primarily in those fibrous parts which are well supplied with blood-vessels, viz., the periosteum, dura mater, fibrous envelop of the spleen, &c. In the tendons, aponeurosis, and articular ligaments, it very rarely occurs primarily, excepting when they are exposed to the air by wounds or ulcers, in which case they often are destroyed and exfoliate, together with the surface of the bones and cartilages. Fibrous structures, however, are often attacked with mortifications in conjunction with, or in consequence of gangrene of the adjoining parts. Anthrax sometimes extends to, and destroys fibrous tissues, and when mortification attacks a limb, the articular ligaments participate so entirely that a spontaneous separation often takes place at a joint. *Exfoliation of tendons* may occur in whitloes, or during suppuration from punctured or poisoned wounds, as in dis-

section, &c. I have seen three such instances. *Fungus hamatodes* seated in fibrous parts is not rare.

9. *G. Adventitious productions* are but rarely observed in the fibrous system.—*a. Encysted tumours* seldom form in it, if we except those bursal tumours which occur on the tendinous sheaths and articular capsules, and partly between the tendinous fibres of the aponeurosis, and especially on the elbow-joint and knee-cap, and which have their origin in the mucous bags placed in these situations.—*b. Tubercular formations* are equally rare in fibrous parts. Serofulous deposits are, however, occasionally found in the dura mater and periosteum.—*c. Sarcomatous and fungous tumours* are more frequent in fibrous structures, particularly in the periosteum. Fungous growths on the tendons are more rare, as are the sarcomatous swellings upon the articular ligaments.—*d. Carcinoma, or cancer*, does not occur primarily in this system, but attacks it secondarily equally with other parts.

10. *H. The changes observed in the contents of cavities formed by fibrous membranes* are frequently marked and important. Morbid collections, as a watery serum, a gelatinous fluid, puriform matter, blood, &c., are not infrequently found in the aponeurotic sheaths surrounding or separating the muscles in the cavities of joints. The *synovia* also varies exceedingly; sometimes it is deficient in quantity, so much so as to occasion stiffness, creaking, or a peculiar noise of the joint. More commonly it is in unusual quantity, particularly in all inflammatory states of the synovial membrane, but occasionally without any distinct inflammation, as in the knee-joint, in rheumatic, rickety, or syphilitic subjects. Sometimes the effusion exists to such a degree that the joint is more or less swollen, or even dislocated, or its use prevented. This local state of disease has usually been called *dropsy of a joint, hydrops articularum, hydrarthrus melicæria*. The synovia is occasionally turbid, reddish, watery, albuminous, gelatinous, &c., as well as increased in quantity.

11. *I. Substances adventitious to the situation* have occasionally been found in the cavities of joints.—*a. Blood* is rarely observed; but, *b. Pus* occurs more frequently, it either having been produced within the joint itself, from an acute inflammation of the synovial membrane, and of the bony cartilages and ligaments forming the joint, or having made its way into the cavity from without. I have, however, seen cases where pus has rapidly collected in one or more joints after *phlebitis*, or after the absorption of this fluid from other and distant parts. It has been supposed that the pus, in such cases, has been secreted or deposited in the cavity of the joint, as it has passed into the circulation from the situation where it was primarily formed, without previous inflammation of the joint itself. But the presence of this morbid secretion in the blood may have excited inflammatory action of the synovial membrane, rapidly passing into the suppurative stage. In most of such cases, the parts containing the pus have been found eroded, and have presented other changes, usually consequent upon inflammation, even when vascular injection has been absent. The question is, whether such chan-

ges have taken place previously or subsequently to the secretion of pus in the joint? That the more advanced of them are consequent upon the production of this fluid may be admitted; but that inflammatory injection and action preceded and quickly produced the purulent collection seems most probable.

12. *c. Cartilaginous concretions*, which have grown from the inner or expanded surface of the synovial membrane, by necked appendages, and been subsequently broken off, are occasionally found in the cavities of joints, either entirely loose, or attached to them by thin threads. They are at first soft, then mostly cartilaginous, sometimes partly cartilaginous and bony; more rarely altogether bony; usually rounded, but occasionally flattened or angular, and varying much as to size and number. LIEUTAUD has adduced instances of *quicksilver* having been found in the cavities of joints; but such occurrences must have been rare, and are now never observed. (See art. PERIOSTEUM.)

13. ii. INFLAMMATION OF THE FIBROUS STRUCTURE OF THE JOINTS may occur primarily in this part, or extend to it from the lining synovial membrane, which, like other serous membranes, inflames readily, and in which the inflammation of joints most frequently commences. Inflammation of joints, implicating their fibrous structures, generally arises from external injuries, from metastasis of inflammation from other parts, from pus or morbid secretions absorbed into the circulation, from syphilis, gout, rheumatism, &c., and occasions reddening, swelling, softening, &c., of the synovial membrane.* If the inflammation be not resolved, there is a consequent secretion into the cavity of the joint, sometimes of a fibrinous lymph, occasioning ankylosis, but more frequently of a puriform matter, or of a fluid, which, after being retained there, assumes a puriform character, and which often softens or erodes the cartilaginous coverings of the heads of the bones. Frequently, also, inflammation of joints commences in the fine membrane lining the cartilages, or in the articular extremities of the bones themselves. This commonly occurs from the scrofulous and syphilitic taints, and gives rise to the *Caries articularum centralis vel interna* of RUST. When the disease originates in the synovial membrane or bones, the fibrous, fibro-cartilaginous, and even the bony parts of the joints themselves, are sometimes co-affected. This is especially the case when the causes act violently on the joint, and affect equally all the tissues composing it, as after a violent injury, such as a penetrating wound, compound dislocation, or fracture extending into it. In all such cases, an acute and progressing general inflammation of the joint takes place, on which ankylosis, abscess, or caries is usually consequent.

14. A. In the scrofulous and rheumatic, however, a more undecided and chronic state of inflammation occurs, either spontaneously or

from injuries, occasioning changes in the joints, which, according to their extent, seat, and symptoms, have been called *morbus coarctus*, *hip disease*, *claudicatio* or *lumeness*, *luxatio spontanea*, or *spontaneous luxation*, *fungus articularum*, *articular fungus*, *white swelling*, &c. However, with all these names, it is essentially the same disease. The joint is more or less remarkably swollen, less moveable than in the healthy state, and always somewhat bent. The swelling is, at certain parts, hard, firm, elastic; at other parts more doughy, or even obscurely fluctuating. The integuments, to the last, even when sinuses are formed, remain unchanged; although sometimes slightly varicose, with a hardened state of the subjacent cellular and adipose tissues. The muscles surrounding the joint often appear pale, and, together with the adjoining cellular substance, infiltrated with lymph. The articular ligaments are more or less swollen, of a dull hue, frequently without any distinct fibres, hardened in some parts, and softened in others, and often consolidated with the surrounding cellular structure. They are also whitish in some patches, and in others discoloured, generally converted into a mass containing minute cavities filled with lymph, a gelatinous fluid, or ichorous pus. The internal articular ligaments, the cartilaginous coverings of the bones, and the synovial membrane are entirely or partially destroyed. The bones either primarily or secondarily affected are, in a greater or less degree, inflamed, softened, swollen, and become internally carious; or they are but little swollen, tolerably hard, yet superficially eroded, or destroyed by caries. Owing to this carious state of the heads of the bones, whether attended with swelling or not, dislocation takes place. The articular cavity contains at first a large quantity of thickish, albuminous-like, often a pale reddish synovia; and, in later stages of the disease, if the joint be more or less destroyed by suppuration, a thin, frequently foul-smelling pus, mixed with blood, cartilage, and cartilaginous fragments, fill up entirely or partially the cavity of the joint (Orro).

[It is worthy of note in this connexion, that *fibrous transformations* sometimes take place; as in the cellular, serous, muscular, vascular, and pseudo-membranous tissues. These changes are believed to commence generally, if not always in the cellular tissue, and thence extend to other textures, with greater or less rapidity, according to the part affected. This change would seem in some cases to be physiological, as in the vessels carrying on the fetal circulation, which, after the birth of the child, are converted from proper vascular tissue into dense, fibrous cords, thus closing the vessels, while at the same time their texture is changed, by a process, doubtless, of an inflammatory kind.]

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* [Inflammation of the fibrous tissue of the joints, although generally excited by cold, is undoubtedly connected with some peculiarity in the constitution which disposes certain individuals to be affected in this way; and recent observations would seem to prove that this peculiarity consists in the existence in the blood of an abnormal quantity of *lithic* and *lactic acids*, especially the former, as it is effused in considerable quantity in rheumatic and gouty inflammations, and also from the circumstance that so many parts are attacked indiscriminately in quick succession.]

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FLATULENCY.—SYN. Φύσα, Φύση, *Flatuositas*; *Flatus*; *Flatulentia*; *Aërifluxus*, *Sauvages*. *Pneumatosis Ventriculi*, et *Pn. Enterica*, J. P. Frank. *Pneumatosis*, Chomel. *Limosus Flatus*, Good. *Flatuosité*, Fr. *Die Blähung*, Windigkeit, Germ. *Flato*, Ital.

CLASSIF.—I. *Class.*, Disease of the Digestive Function; 1. *Order*, Affecting the Digestive Canal (*Good*). I. CLASS, I. ORDER (*Author in Preface*).

1. DEFIN.—*An undue formation and accumulation of air in the stomach or intestines, with frequent rejection of it.*

2. It is of some importance to ascertain the source of the flatus which is often formed so abundantly in the digestive canal. JOHN HUNTER first supposed that air is sometimes exhaled from the blood by the vessels of secreting surfaces; and, if we view merely the results of the experiments of M. EDWARDS upon respiration, and the absorption and exhalation of various gases by the lungs, in connexion with the secretion of air into the swimming-bladder of fishes, this opinion will appear not ill founded, even independently of the support it derives from pathological observation. In such cases, we have reason to infer that it is not air, as it exists in the surrounding atmosphere, that is thus exhaled, but its constituent gases. The

experiments performed by MM. GÉRARDIN, MARGENDIE, and CHEVREUL have thrown much light upon the question as to the source of the gases found in the digestive canal, as well as upon their composition; and have shown that they are partly exhaled from the digestive mucous surface. It would appear, from the researches of these writers, that they consist, in the stomach, of nearly three parts in four of azote, the fourth part being oxygen and carbonic acid; and, in the intestines, of carbonic acid, azote, carburetted hydrogen, and hydrogen, in various proportions. It may, therefore, be inferred that the air which collects in the digestive canal is derived from three sources: 1st. From the common air swallowed with the food; 2d. From the changes or decomposition of the ingesta, and of the contents of the canal generally; and, 3d. From the occasional exhalation of gaseous fluids from the mucous surface during certain states of local and constitutional disorder. The oxygen found in the stomach, amounting to eleven parts in a hundred, is most probably derived from the first of these sources. It is, however, either absorbed from this situation, or combines with other substances, as none is found beyond the pylorus. The azote and carbonic acid may be attributed partly to the last source; while a portion of both, and the whole of the hydrogen and its compounds, may be assigned to the second. The air, which is generated so rapidly, and eructated so frequently during acute inflammatory diseases, particularly in gastritis, hepatitis, &c., must be exhaled from the irritated mucous surface, inasmuch as there is no other source existing in such circumstances to which it can be attributed, especially when the constant vomitings and frequent evacuations from the bowels have left nothing in the *prima via* capable of furnishing the enormous quantity of air which is often ejected.

3. Flatulency, since the time of CULLEN, has been very generally viewed as a symptom of dyspepsia, and of other diseases. But I agree with SAUVAGES, GOOD, and several other writers, in considering it to be occasionally a primary disorder. Whether it be idiopathic or symptomatic, its phenomena, and the disorders consequent upon it, are different according to the part of the alimentary canal in which the flatus is generated or confined. I shall therefore treat of this affection, *first*, as respects the stomach and esophagus—*Flatulentia ventriculi*; and, *secondly*, with reference to the intestines—*Flatulentia intestinorum*. But although it may be seated in either the stomach or the bowels more particularly, it very frequently exists in both at the same time.

4. I. FLATULENCY OF THE STOMACH will be considered at this place, (a) in respect of its idiopathic occurrence; (b) as a symptom of other disorders; and (c) with reference to the disturbances it tends either to induce or to aggravate.—A. *Primary or idiopathic flatulency of the stomach* is met with chiefly when the stomach is empty, or after the process of digestion in this viscus is completed; and is seldom associated either with impaired appetite or diminished powers of digestion. It is most troublesome in the morning before breakfast, or during long fasting; or when an unusually protracted period has elapsed between meals. In

such cases the flatus often rises into the œsophagus, producing much uneasiness and often distress, owing to its excretion being prevented by the spasmodic constriction of the upper part of this tube. In swallowing, also, the more solid ingesta, the bolus meets the flatus in the œsophagus, and is interrupted or impeded in its passage to the stomach. In such circumstances, a conflict sometimes arises between the descending ingesta and the ascending flatus, and a very painful *spasmodic dysphagia* is thereby induced, until the eructation of air gives relief, and allows the transit of the bolus into the stomach. In this form of the disorder, the air most probably is exhaled, at least in great part, from the internal surface of the organ. In other respects the patient's health is not deranged, and the functions of digestion, defæcation, and assimilation are regularly and perfectly performed. In other instances, slight defect of organic nervous power, owing to sexual indulgences, or to sedentary occupations, is the only pathological state to which this affection can be imputed.

5. *B.* The *remote causes* of flatulency are the nervous and hypochondriacal temperaments, and all the influences and habits which depress or exhaust the energy of the organic nervous system, or lower the tone of the digestive canal, especially sedentary occupations; excessive mental exertion and anxiety; venereal indulgences; intemperance in eating and drinking; the ingestion of cold fluids, particularly when the body is overheated; exposure to a cold air, or to cold in any way, while the stomach is empty, or while fasting; neglect of the functions of the bowels; the use of bulky or flatulent vegetables, or of fruits prone to undergo fermentation, especially cucumbers, melons, salads, &c.; irregularities of diet, and previous or existing disease. Fast eating and imperfect mastication often give rise to flatulency, by the quantity of air which is generally swallowed on such occasions, and by the imperfect or slow digestion which usually results.

6. *C.* *Symptomatic flatulency of the stomach* is extremely common.—(a) It is almost a constant attendant upon *indigestion*, and (b) often accompanies general *debility*.—(c) It is also frequent in *hypochondriasis* and *melancholia*, and (d) in the numerous forms of *hysteria*. In this last, the flatus often rises into the œsophagus; and while the reaction of the coats of the stomach propels it into this tube, spasmodic constriction of the part just below the pharynx confines it for a time, and causes a distressing feeling of suffocation, &c.—(e) Flatulency is an almost constant symptom of *inflammatory* and *organic affections* of the stomach.—(f) It generally ushers in an attack of *gout*; and (g) it both precedes and attends *asthmatic affections*.—(h) It is a common phenomenon of all the functional, inflammatory, and organic diseases of the liver, and is very characteristic of accumulations of bile in the gall-ducts and gall-bladder, and of *torpor of the biliary organs*.—(i) It often, also, occurs in the *functional and inflammatory disorders of the bowels*, and sometimes in affections of the other abdominal viscera.—(k) It not infrequently even accompanies *chronic diseases of the brain*, and (l) the *adynamic and malignant forms of fever*.

7. *D.* The *phenomena* usually characteristic

of flatulency vary somewhat with the diseases of which it is a symptom. In the course of digestion, flatus escapes with or without noise, and often with an acid, bitter, nidorous, or fetid odour. Sometimes it is without either odour or taste, and at other times it retains the smell and flavour of the ingesta. When constriction of the cardia, or of the lower part of the œsophagus, prevents eructations, or when the coats of the stomach are so weakened or so over-distended as to be incapable of reacting sufficiently, *tympanitic* fulness of the epigastrium and hypochondria, with a painful sense of distention, or severe *gastrodynia*, frequent respiration, and heavy pain or oppression in the lower parts of the chest, are generally complained of. If eructations occur, especially for some hours after a full meal, acrid or rancid matters, or portions of undigested food, are frequently regurgitated at the same time, and impress the palate and pharynx with an acrid and irritating sensation, or produce an unpleasant, dry cough, by affecting the epiglottis and larynx. *Cardialgia* is then often associated with this symptom, or precedes the eructations. When flatulency precedes or attends organic lesions of the stomach, or obstructions of the liver or pancreas, the symptoms caused by, and associated with it are often severe. Disordered action of the heart, anxiety, hiccough, *gastrodynia*, &c., being not uncommonly observed.

8. *E.* The *disorders induced or aggravated* by flatulency of the stomach are various in different habits and constitutions. When the stomach is much distended by flatus, and especially when the œsophagus admits and retains for a time the air in its lower part, the feeling of oppression, dull pain, and the other symptoms just mentioned, are increased; the actions of the diaphragm are impeded, and the regularity of the circulation through the cavities of the heart is interrupted by the pressure of the over-distended organs. Hence the intermissions and irregularities of the pulse, the sense of anxiety, flutterings, feeling of suffocation, and palpitations, so often associated with, or consequent upon affections of the digestive organs. WHYTT attributes *incubus* to flatulency of the stomach, and, I believe, very justly. In delicate, nervous, and hysterical females, various symptomatic disorders, besides those now stated to arise directly from this cause, are often experienced. The modes of dress, particularly the very straight corsets used by this sex, aggravate the disorders consequent upon flatulent distention. Severe pains of the left side, congestions of the lungs or of the brain, headaches, convulsions, faintness, vertigo, and several anomalous complaints often thus originate, not only in females, but also in males, especially those who are sedentary, hypochondriacal, and debilitated. In this class of persons more particularly, the pressure of the distended stomach prevents the due action of the bowels, and either impedes or interrupts the passage of faecal matters from the cæcum, along the transverse arch of the colon. Thus costiveness, and functional disorders of the cæcum and large bowels are occasioned, and are often followed by displacement of parts of the colon, and by inflammatory and organic lesions. It is obvious that an aggravation of disorder will

be occasioned by flatulence, where any of these affections already exist.

9. *F. Infants* are very liable to flatulence, particularly when their natural food is taken too greedily, or when it disagrees and becomes acid on the stomach. In some cases, a portion of air may be swallowed by sucking; but, however occasioned, the eructations that occur are often accompanied by the regurgitation of a considerable portion of the ingesta. Flatulence is, however, most distressing and injurious when it affects infants brought up without their natural sustenance, or during the period of weaning. In them, acidity of the *prina via*, watery diarrhoea or costiveness, or both alternately, morbid, offensive evacuations, with severe griping pains and emaciation, terminating not infrequently in marasmus and mesenteric disease, are often observed.

10. II. FLATULENCE OF THE INTESTINES may be either *primary* or *idiopathic*, or *symptomatic*, but most frequently the latter.—A. The *primary form* of intestinal flatulence is evidently itself but a symptom, if we trace the disorder up to its origin, or but one of the various phenomena resulting from debility of the digestive canal—from deficient energy of the ganglionic nervous system. In this form, however, the flatus is either expelled from time to time, *per anum*, or accumulates and gives rise to borborygmi, or to tympanitic distention of the abdomen; but these symptoms seldom become very urgent in this state of the disorder unless some other affection supervenes. The bowels are generally costive, sometimes irregular; and the secretions poured into the digestive canal, both from its own surface and from the collatitious organs, are deficient, and occasionally even morbid; the flatulence and imperfect functions of these parts being the almost coætantaneous effects of the impaired influence of the organic nervous system. The air which collects in this part of the digestive tube is to be ascribed chiefly to alterations of its contents, and to exhalation from the mucous surface. This form of flatulence may continue long without any other material disorder, excepting slight debility, want of activity, costiveness, &c.; and it may occasion in a short time some one of the various serious diseases about to be noticed.

11. *B. Symptomatic intestinal flatulence* is a common complaint. It is a frequent result of *costiveness*, or imperfect digestion in the bowels, particularly in the duodenum and cæcum; and of a deficient or morbid secretion from the intestinal mucous surface and from the liver. When the quantity of air collected is great, colicky symptoms, obstinate constipation, and irregular action, or atony of the muscular fibres of the intestines, are the usual consequences. The coats being unable to contract regularly, or sufficiently to expel the air, or obstructions being opposed to the ejection of it, various effects of a serious kind often result. Portions of the bowels react with much violence upon the distending cause, while other portions are distended until the contractile power of the muscular coat is almost altogether lost. Thus spasmodic constriction in one part, and paralytic distention in another are produced; and the organic sensibility of the nerves of the canal are remarkably excited or altered. Flatu-

lent *colic* is the consequence; and if this be not relieved, intus-susceptions, ileus, or inflammation of a portion of the bowel, may ultimately supervene. If, in addition to imperfect or morbid secretion, the tone of the muscular coat is still farther reduced—when its power of reacting upon the collection of flatus is lost more generally or completely, *meteorismus* or *tympanitis* will be produced, and the abdomen will be tense, painful, or tender, and the fecal evacuations either altogether suspended or interrupted, and hard or scybalous.

[Flatulence after eating is one of the most common symptoms attending an inflamed condition of the stomach. It is not unusual to meet with patients in whom the appetite is good, but who are totally unable to satisfy it, from the degree of distention and oppression which are consequent on eating. Sometimes the fulness is felt in the throat, at others in the region of the stomach itself, so that the patient is obliged to remove all restraint in the way of dress, corsets, &c., from the body; and these symptoms often come on after taking the smallest quantity of food, as well as after a hearty meal. This state of distention is particularly marked and frequent where the gastric distress is consequent upon an affection of the heart.]

12. Intestinal flatulence is a most common symptom in *hysteria*, and is in it generally indicated by borborygmi, in *inflammations of the bowels*, in *dysentery*, in functional and organic affections of the cæcum [and colon], in *hepatic disorders*, especially *bilious colic*, in the *colic from lead*, and in the bowel complaints of *children*. It is very frequently met with in the advanced stages of *typhoid fevers**; and, as I have shown, it is one of the indications of extreme adynamia with predominant affection of the bowels. HIPPOCRATES remarks (*Coac. Prænot.*, l. i., 46) that inflation of the abdomen, without rejection of the flatus, is a dangerous sign; and the accuracy of the opinion must be admitted. In low fevers the accumulation of air is often extremely great; and while it is an indication of danger, it tends to increase it by impeding the functions of respiration and circulation, as well as by exhausting the vital tone of the intestines.

13. *C. Inflation of the bowels*, particularly of the *colon*, gives rise to various symptomatic disorders, when it reaches a considerable height; and it not infrequently occasions the same affections as arise from flatulence of the stomach. Respiration and circulation are both often deranged by this cause; and congestions of the veins and sinuses of the brain consecutively induced. Hence vertigo and headaches often follow a sense of oppression in the chest, and irregularity of the heart's action. Hypochondriacal and hysterical symptoms are always aggravated by collections of flatus in the bowels; and these latter are favoured by costiveness. Hence the advantages resulting in these diseases from the use of stomachic or tonic aperients. The colon may be also partially

* [The *small intestine* was distended with gas in 14 cases of typhoid fever examined by LOUIS, and the *large intestine* in one half the cases, and generally to a very remarkable degree; while, at the same time, its parietes either preserved their natural thickness, or were thickened, as we see in the case of the small intestines, when, in consequence of strangulation, it becomes distended with fecal matter.—(*Researches on Typhoid Fever.*)]

displaced, and adjoining parts injuriously pressed upon by collections of flatus in the large bowels.*

14. III. Although flatulency very often is limited to either the stomach or bowels, presenting the pathological relations just explained, yet it also frequently extends almost simultaneously to both, or affects one or other more or less prominently. In this case, the effects produced by it will vary accordingly, and depend upon the degree in which it exists. Flatus, moreover, is generated in other situations, as in the *uterus*, in the *urinary bladder*, and even in the *shut cavities*, but in very rare instances, particularly as respects the latter of these. In these parts, it is either exhaled from the vessels furnishing the secretions poured out on their internal surfaces, or developed in consequence of the changes which these secretions undergo during their retention. The formation of air in serous cavities is never, I believe, observed, excepting as a result of inflammatory action in some part of their surface that has given rise to a secretion of a sero-albuminous fluid; and it is not improbable that the air is produced by the partial decomposition of the albuminous portion of the secretion. These occurrences are more particularly noticed in other places.

15. IV. TREATMENT.—A. In the *primary states* of the disorder, attention to *diet*, and gentle *tonics*, with mild *aperients*, will generally restore the healthy functions of the stomach and intestines in a short time. If much distress be experienced from the retention of the flatus, the addition of a *carminative spirit* or oil, as those of anise-seed, pimenta, nutmeg, or cardamoms, to the above, will give relief; but the frequent use of heating spices may be injurious in other circumstances, particularly if the complaint depend upon chronic inflammatory action of the digestive mucous surface, as is frequently the case. The practice of rejecting the air, either upward or downward, should not be indulged in, for, although momentary relief is thereby obtained, an increased disposition to generate it is produced, and the evil augmented. It is only when air collects to the extent of producing much disorder, that its expulsion should be procured. In this case, any of the numerous carminatives in common use may be given, if they be not contra-indicated by the presence of inflammation. In some such instances, however, the more energetic of them may be exhibited with advantage in enemata. The extract of *rue*, or any of the *essential oils*, may be thus prescribed. HUFELAND and others advise warm, dry *aromatic epithems* to be applied over the abdomen in these cases, and THUNBERG rec-

ommends the *cajuput oil* to be rubbed upon this part, or to be given internally, when the state of the circulation and of the animal heat indicates the propriety of exhibiting carminatives. *Charcoal*, as suggested by J. P. FRANK, and *magnesia*, if not the most efficacious, are among the safest means that can be used. The same may be said of *camphor*, and the *terebinthinates*, and the plants which owe their efficacy to either of these principles. The *trisnitrate of bismuth* is often of great service, particularly when conjoined with small doses of *ipecaacuanha* and *hyoscyamus*.

16. Whenever flatulency of the stomach or bowels is unconnected with inflammatory action; when the pulse is soft or weak, or not increased in frequency; when the abdomen and hypochondria are not painful on pressure; when the tongue is moist or pale, and not red at its edges; and when there is no unusual thirst, then carminatives, antispasmodics, stimulants, and tonics, combined with one another, and with absorbents and aperients, will give relief, and they may be either given by the mouth or administered in enemata. But even in these cases, our chief dependence should be placed upon suitable tonics, with the use of the cold salt-water bath, and attention to the secretions and excretions, for the cure of the complaint. If an attentive view of the case suggests the existence of inflammatory irritation in any part of the alimentary canal, the *nitrate of potash*, and the *carbonate of soda* or of potash, with *demulcents* or *emollients*, and weak camphor mixture, will be most appropriate. In these cases, external *derivatives*, gentle frictions of the abdominal surface, with warm *rufescent liniments*, as recommended by WHYTT, the application of hot terebinthinate embrocations or epithems, or fomentations as used by DARWIN, will be of great service. When the complaint is connected either with slight inflammatory action, or with imperfect secretion, especially of bile, or with both, as observed in numerous instances, *deobstruents* and *mild purgatives* will be required. In such cases, the blue pill, or PLUMMER'S pill, or the hydrargyrum cum creta, ought to be given at bedtime, with soap, ipecaecuanha, and taraxacum.*

17. B. *Flatulency in infants or young children* ought to be treated chiefly by appropriate food and regimen and by mild purgatives. *Magnesia in dill water*, or in *fennel water*, or in *anise-seed water*, will frequently give relief; but an alternative, as the hydrargyrum cum creta, will generally be required on alternate nights. The warm or tepid bath, followed by frictions of the abdomen with some warm liniment; enemata with a little common salt, and some carminative water, and an occasional dose of castor oil, with warm clothing, and pure, dry air, will also be productive of benefit.

18. C. In the more decidedly *symptomatic states of the complaint*, the treatment should be chiefly directed to the disease on which it depends. But in these states it is generally most urgent, and hence requires the adoption of means calculated to procure immediate relief. If those

* [A remarkable case lately occurred in our practice, in which there was a stricture of the colon from cancerous degeneration of its coats, so that the calibre was at length entirely closed, not even admitting the passage of air. Life was apparently protracted for the space of about two weeks after the canal was closed. The most remarkable symptom attending the case was the enormous collection of air in the large intestines, both above and below the seat of the stricture, and which could not be relieved by any measures employed. If the air was evacuated by means of the long tube, a few minutes sufficed for its re-accumulation. The disease was found to be situated in the sigmoid flexure of the colon, commencing in the peritoneal coat and muciparous follicles, and afterward extending to the muscular and villous coats, which became hypertrophied, hardened, and at length ulcerated. Scirrhus of the pyloric orifice is also attended with a great degree of flatulency, as well as all other organic affections of the intestinal canal.]

* [Galvanism will often be found useful in these cases, as the complaint often depends on impaired function of the ganglionic system of nerves; a remedy so well fitted to stimulate this portion of the nervous system to increased action, must powerfully tend to restore those organs which it supplies to a healthy state.]

already described, employed according to the peculiarities of the case, prove inefficacious, it has been recommended by REICH, PAMARD, THILLOW, and PIORRY, to draw off, or to facilitate the escape of the flatus by a siphon, or by the introduction of a flexible hollow tube into the rectum. In most instances of difficulty, I have found the terebinthines with aperients, enemata with either spirits of turpentine or extract of rue, and terebinthinate embrocations or liniments applied to the abdomen, succeed in procuring the expulsion of the flatus, by exciting the action of the muscular fibres of the canal. When this complaint depends chiefly upon debility, and is associated with other disorders proceeding from this source, the means advised in the articles COLIC, COSTIVENESS, and DEBILITY, according as it may present more or less of the features of either, should be prescribed, and diet and regimen ought to receive due attention.

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FŒTUS—DISEASES OF THE.

CLASSIF.—GENERAL PATHOLOGY.

1. The *fœtus* is liable to a greater number of diseases than has generally been supposed. Some of these, together with the lesions of the fœtal appendages, have been noticed in the article ABORTION, § 10. As these diseases occasion various malformations, congenital alterations, abortions, or even the death of the fœtus, a brief enumeration of them will be useful in various points of view, but particularly as indicative of the sources in which several maladies of infancy originate.

2. i. The *Causes* of fœtal disease are, as respects the *mother*, violent or prolonged mental emotions; imperfect or unwholesome nourishment; excessive fulness or deficiency of blood; a morbid state of this fluid, produced by food, medicines, or disease; alteratives, as mercury, &c., in large doses, or too long continued; attempts at procuring abortion; the use of straight corsets; injuries, falls, or blows on the abdomen; a cachectic state of constitution, particularly the syphilitic and scrofulous taints; constitutional or other diseases, as eruptive, periodic, or continued fevers; tubercular consumption, &c.; drunkenness and venereal excesses during pregnancy; a laborious life, or inordinate physical exertion, and pre-

vious lesions of the ovaria, uterus, or fœtal appendages. The chief causes as respects the father are predisposing only, with the exception of the syphilitic and scrofulous taints. There is every reason to believe that, if the father is aged, or debilitated, or suffering from constitutional or local disorder, associated with sexual exhaustion, at the period when impregnation is effected, the fœtus will be weakly formed, and thereby predisposed to disease, especially when the mother is exposed, during utero-gestation, to the more energetic causes, or to those just enumerated.

3. ii. The *Diseases* observed in the fœtus, either consequent upon one or more of the above causes, or occurring without any assignable cause, are, 1st. *As respects the cerebro-spinal system*—effusions of fluid in the ventricles, or in the spinal canal, or between the membranes, giving rise to hydrocephalus, spina bifida, imperfect or arrested formation of portions of the brain or spinal cord, to inflammatory congestion of the membranes or of portions of the brain or cerebellum (LOBSTEIN), with spasmodic contractions of the limbs, &c.; 2d. *As regards the thoracic viscera*—inflammation and suppuration of the thymus gland (VÉRON); tubercles in the lungs in the early stages (BILLARD, LANGSTAFF, and myself), and in a state of softening (HUSSON); inflammation of the substance of the lungs and of the pleura; dropsy of the pleural cavities; hydro-pericardium, and malformations of the heart; 3d. *As respects the abdominal viscera*—inflammation, and even ulceration of the internal surface of various parts of the alimentary canal; tubercles in the liver (HOOGHEVEN, HUSSON), in the mesentery (OELLER), and in the spleen (BILLARD); inflammations of the liver (BRACHET, VÉRON); of one supra-renal capsule (ANDRAL), of the peritoneum (DESORMEAUX, VÉRON), of the small intestines (BILLARD); dropsy of the peritoneal cavity in various degrees (DUGÈS); enlargement of the mesenteric glands; accretions of the peritoneum, and of several viscera, from chronic inflammation (ANDRY, and myself); retention of urine, and excessive distention of the bladder, ureters, and pelvis of the kidneys, from obstructions to the discharge of it in the liquor amnii (SANDIFORT, MOREAU, PIL. PINEL, A. COOPER, CHAUSSIER, DUGÈS, &c.); rupture of the bladder (DUGÈS); lesions of the kidneys, and other parts of the urinary apparatus (RUYSCH, HOFFMANN, WRISBERG, VROLIK, BOETSCHLER, DENIS, BOIVIN, &c.); and obliterations of canals, and occlusions of their outlets, as of those of the alimentary canal, and of the urinary and generative organs; 4th. *As respects the general frame*—intermittent fevers, smallpox (DEUTEL, &c.), and other eruptive fevers (ANDRY); syphilis and jaundice (HEY, ANDRY, BAUMES, &c.); and 5th. *As regards external parts*—malformation of the palate, mouth, and lips; dislocation of various joints, and even of the hip joint (DUPUYTREN, CHAUSSIER, NORTH); contractions of muscles; fractures, gangrene, &c., of the limbs (JOERG); hardening of the cellular tissue (UZENBEZIUS, MAURICEAU, STRATFORD, &c.); anasarca, and œdema of one or more limbs (GARDIEN, DUGÈS, ANDRY, &c.); hydrocele (ANDRY); various tumours and nævi; and several affections of the skin (GOECKEL, LEDEL, OELLER, CHAUSSIER, ANDRY, &c.).

4. My limits prevent me from remarking upon these; but it may be mentioned that MAURICEAU was born with the smallpox, and that jaundice may arise in the fœtus, 1st, from the same causes as induce it in the adult; and, 2dly, from jaundice in the mother. M DUGÉS mentions that a lady was subject, during pregnancy, to colic and jaundice from biliary calculi; and, in four instances, the children were born deeply jaundiced. I attended, some years since, a lady in tubercular consumption, who was delivered, in the seventh month, of an emaciated and very small fœtus, that died a few days afterward. On examination, the lungs were found loaded with tubercles, and the mesenteric glands enlarged. M. TONNÉLÉ found an enormous fungoid tumour (*fungus hæmatoïdes*) on the right side of the head of a fœtus; and M. VOISIN, a polypus adhering to the posterior part of the palate. The existence of worms in the bowels of the fœtus has been asserted by some writers, and denied by others. The evidence is not sufficiently conclusive either one way or another.

5. iii. The *Death of the Fœtus* may take place from the greater number of these diseases, or from lesions of the placenta, umbilical cord, or membranes (see ABORTION, § 10). Although there are numerous exceptions to the rule, the more vigorous the fœtus, the stronger and more lively will be the sensations of its movement. It is evident that the existence, and far less the nature of the fœtal malady, cannot be ascertained before delivery; yet, in some instances, it may be suspected from what is known of the causes. An attack of ague in the fœtus is usually made manifest to the mother, but does not generally cause abortion. The feebleness and slowness of the fœtal movements, after the fifth month, are indications of impaired strength of the fœtus, which should not be overlooked. The total cessation of motion; a feeling of uncomfortable weight gravitating to the side on which the patient lies, and of general uneasiness and coldness in the lower part of the abdomen; flaccidity of the abdominal parietes subsequent to a certain degree of tension; fœtor of the breath, pallor of the countenance, lividity of the eyelids or surrounding circle, and flaccidity of the breasts, generally denote the death of the fœtus; and when the pulsation of the heart cannot be heard on auscultation, this event may be inferred with certainty.

[CONGENITAL DISEASES OF THE SKIN.—Of congenital diseases of the skin, *petechia* have been noticed by ANDRAL (*Anat. Path.*, vol. ii., p. 417), CRUVEILHIER (*Anat. Path.*, liv. xv.), and ANDRY. *Ichthyosis* is often transmitted to the offspring, as related by MARTIN (*Philos. Trans.*, vol. xlix., p. 21), where six children were similarly affected, the celebrated "Porcupine family." A fœtus affected with this disease is in the Anatomical Museum at Berlin (STEINHAUSEN, *De Sing. epiderm. Deformatione*, Berlin Gaz. Med., 1831, vol. ii., p. 10). For an analysis of SCHMIDT'S "*Descriptio Ichthyosis Cornæ Congenitæ in virgine Observata*," see *Am. Journal Med. Sci.*, Nov., 1831. *Pemphigus*.—A case of congenital pemphigus is related by LOBSTEIN (*Journ. Comp. du Dict. des. Sc. Med.*, vol. vi.) ; several, also, by HINTZ (*Bull. des Sci. Med. de Ferrussæ*, xi., 47), GÖECKEL, SEDD (*Eph. Cur. Nat*), and DESORNEAU (*Art. Œuf Humain*,

Dict. de Med., 1st edition, ANDRY). For a very remarkable case, attended with pustules and scrofulous tumours, see *Rec. per. d'Obs. de Ch. Med. et Pharm.*, 1756, vol. i., p. 167. *Syphilis*.—This disease is often found to affect the newborn child. We have seen several well-marked cases; and Dr. FRANCIS (*Med. and Phil. Reg.*) has also recorded several. Cases have often been recorded in our medical journals; and cases 7, 9, 10, 11, and 12, in CRUVEILHIER'S liv. xv., are those of syphilitic phlyctenæ and pustules. Mr. HEY, of Leeds, has written a valuable paper on the venereal disease in the fœtus in utero (*Med. Ch. Trans.*, vol. vii.); and so, also, has BERTIN (*Treat. on the Venereal Disease in New-born Children, Pregnant Women, and Nurses*, Paris, 1810). For several cases, see BECK'S "*Med. Juris.*," and Am. ed. of GUY'S "*Forensic Medicine.*" *Variola* has been frequently observed in the new-born fœtus, as in cases related by RAYER, MARC (*Dict. des Sci. Med.*, vol. xvi., p. 71; three cases), JENNER (*Medical Chir. Trans.*, vol. i., p. 269), DENEAU (*Journ. Heb.*, vol. viii., 2d series, p. 56), HUSSON (*Rev. Med.*, vol. xi., p. 151), NOBLET (*Arch. Gen. de Med.*, vol. xii., p. 126); and the celebrated MAURICEAU is said to have been born with five or six distinct pustules. DAVIS (*Princ. and Prac. of Obst. Med.*, 1834, p. 891) has referred to cases by SMELLIE, MAURICEAU, BLAUD, J. HUNTER, BAKER, and ROBERTS. See a paper, in *Med. Comm.*, 1799, by Dr. PEARSON, on "the Effects of Variolous Infection in Pregnant Women," in which several instances of this affection are recorded; also, WATSON, in *Philosoph. Transact.*, vol. xlvi., p. 235; and BILLARD on "*Diseases of Infants*" (STEWART'S translation, 1842). *Rubcola* has been observed at birth, according to VOGEL, ROSEN (*Dis. of Children*, l. xiv., p. 255), and BILLARD (*Dis. of Inf.*). For a case in which congenital vaccine tubercles were observed on the arm, see *Med. Chir. Rev.*, Jan., 1830. Dr. WARREN relates an instance (*Am. Journ. Med. Sci.*, Feb., 1828) where a fœtus was poisoned by opium taken by the mother. *Elephantiasis* was observed twice in the lower limbs by M. CHAUSSIER, at the Maternité, in Paris, out of 23,000 children born there. ALARD has also recorded instances. *Sclerema*, or hardening of the cellular tissue, is a frequent disease in new-born children in Paris. ANDRY states that 600 children died of it annually at the *Hospice des Enfants Trouvés*; and BILLARD observes that 240 were admitted with it, in one year, into the same hospital. According to the latter writer, there are two varieties of the disease, the *adematosa* and *concreta*, and both arise from an accumulation of a highly coagulable serum in the subcutaneous, adipose, and intermuscular cellular tissue. See *Mem. de la Soc. Roy. de Med.*, 1784; UNDERWOOD on *Dis. of Children*; works of MATTHEW BAILLIE, and BOST. *Med. and Surg. Journ.* for 1829 (case by Dr. STRATFORD). We have observed this affection in several instances, chiefly in the offspring of intemperate mothers. According to GOOD, *erysipelas* has, in some instances, been observed in new-born children (*Study of Med.*, vol. ii., p. 260). *Icterus* is not an unfrequent occurrence in the fœtus, though it is not certain that the yellowness depends on the presence of bile, though the experiments of M. CHEVREUL render it probable. See ANDRAL

(*Anat. Path.*, WEST's translation, vol. i., p. 583), LOBSTEIN (*Rep. d'Anat. Path.*, vol. i.), and OLIVIER (*On the Spinal Marrow*, &c., vol. i., p. 209, 2d ed.); also, MORGAGNI (COOKE'S *Trans.*, vol. ii., p. 176). DESORMEAUX, BILLARD, and ANDRY have likewise recorded instances of this affection. *Congenital absence of the skin* has been noticed by RAYER, PLOUQUET, JOERG (*Bib. Med.*), and others. NÆGLE relates a remarkable instance, where the epidermis all peeled off from a new-born child (*Journ. des Progrès*, ANDRY). RAYER has recorded a case of *congenital development of the papillæ* (*Mal. de la Peau*, vol. iii., p. 613). *Leucopathia*, or absence of colouring matter in the skin, hair, and eyes, is sometimes congenital; and PRICHARD relates a case, from BUCKINGHAM'S *Travels*, where a perfectly black offspring was born to white parents in the valley of the Jordan (*Nat. Hist. of Man*). Several writers mention the existence of *congenital warts*, as M. OLLIVIER d'Angers (*Arch. Gen. de Med.*, vol. xxxv., p. 74), A. T. THOMPSON (*Atlas of Delineations of Cutaneous Diseases*, p. 100), ORTO (*Path. Anat.*, p. 113, note 5), LOBSTEIN, BILLARD, and others. For a remarkable paper on *navi*, or "telangiectasis," by JOHN WATSON, of New-York, see *Am. Jour. Med. Sciences*, May, 1839. See, also, MM. ALBERT and RAYER, "On Diseases of the Skin," and M. TARRAL, in *Arch. Gen. de Med.*, Sept. and Oct., 1834. Cases are on record of the *congenital absence of the hair and nails* (RAYER, ORTO, p. 118). And *congenital deafness* is too well known to need particular description. For an account of three cases, with dissection, where it arose from malformation, the reader may consult *Med. Chir. Review* for January, 1836. See, also, *London Medical Gazette*, February, 1840, p. 793, and GRAEFE and WALTHER'S *Jour. fur Chirurg.*, xix., 1. *Congenital malformations of the eyes* are by no means infrequent. For a very full account of them, see ORTO'S *Path. Anat.*, by SOUTH, and a work "On the original Malformation and total Want of Eyes in Man and the lower Animals," by B. W. SEILER, Dresden, 1834, and an analytic review of the same in *Med. Chir. Rev.* for April, 1834. For cases of congenital tumours growing on the cornea, see WARDROP (*On Dis. of the Eye*) and MIDDLEMORE in *Med. Chir. Rev.* *Telangiectasis* of this membrane is mentioned by GRAEFE; congenital *staphyloma* of the cornea, *cataract*, and *amaurosis* by most writers on diseases of the eye. A case of *congenital leucoma* is recorded by KIESIR (HIMLY and SCHMIDT'S *Oph. Bib.*, vol. iii.); of *arcus senilis* by MORENHEIM; and ANDRY (*Journ. des Progr.*, vol. i., 1830, p. 195) gives an account of a case of *complete obscuration of the cornea of both eyes* in a new-born child, the cornea being of a pearly white colour. *Congenital nasal polyypus* has been noticed by ANDRY, and a case is mentioned in the *Catalogue of SCHEMERRING'S Mus.*, p. 77, as deposited in that museum at Berlin. There may be either an imperfect development of the mouth (*atelia*) or an entire absence (*astomia*). Of the former, see a case by M. LITRE (in *Mem. de l'Acad. Roy. des Sci.*, 1701). *Congenital hare-lip* is too well known to need remark. In some cases (MECKEL) the lower lip is divided instead of the upper (see BILLARD). Cases of *muguet* (*aphtha*) in the new-born child have been related by M. VERON, and described by CRUVEILHIER

(*Anat. Path.*, 15 livraison). For cases of *torticollis*, and other congenital deformities of the muscular system, see *Dict. des Sci. Med.*, vol. xxxiv., p. 182. A case of *deficiency of the abdominal parietes* in an infant is related by Dr. MONTGOMERY in *Dublin Med. Trans.*, n. s., vol. i., 1830; also by MILLET, in VONDERMONDE'S *Journ.*, May, 1756, where the contents of the abdomen had passed out of a round hole in the umbilical region. See a case by Dr. CAMPBELL in *Am. Journ. Med. Sci.* for Nov., 1836; and one by Dr. CURRELL, in *Ibid.*, 1838;* and a note to Am. ed. of GOOCH'S *Lectures on Midwifery*, p. 282, by the editor.

CONGENITAL AFFECTIONS OF THE SKELETON.—MECKEL has described these (*Man. of Gen. and Descr. Anat.*, DOANE'S ed., vol. i.) to consist in, 1. Congenital deficiency of the cartilages of the ribs; 2. Deficiency of vertebrae, or of some parts of them, as in *spina bifida*; 3. Absence of sternum; 4. Openings, at the lower part of the body, of the bone, or in the xiphoid appendage, or fissure of that appendage; 5. Deficiency of the usual number of ribs, shortness, consolidation, anomalous curves, or supernumerary ribs; 6. The congenital conditions of the bones of the head and face, in acephalia, encephalocele, hydrocephalus, and hare-lip; deficiency of the humerus, or one or both bones of the fore-arm; 8. Total or partial deficiency of the bones of the hand; increased number of the fingers; 9. Loose connexion of the ossa pubis; 10. Total or partial deficiency of the bones of the thigh, or one or both bones of the leg. (See ORTO'S *Path. Anat.*) A case of extreme *smallness of the head* is recorded by CRUVEILHIER (*Anat. Path.*) and others; of *congenital lateral depression of the chest*, by DUPUYTREN (*Rep. d'Anat.*, vol. v.) and by BILLARD (*On Infants*). *Mollities ossium* has been noticed in the fœtus by SOEMMERING (*Catal. Mus.*, p. 75); by PINEL (*Medecine Eclairée par les Sci. Phys.*, vol. i., p. 3); by CHAUSSIER, and by BOURGNEAUD (*Ann. de la Soc. Med. de Montpellier*, vol. i., pl. i., p. 182). A case of *congenital gibbosity of the pelvis* is mentioned in VELPEAU'S *Tokology*, and one also in BAUDELOQUE. A well-marked case of *fungus hamatodes* in a new-born fœtus is related by Dr. TONNELE (*Journ. des Progr.*, vol. xiv.; *Med. Chir. Rev.*, Oct., 1829). For a similar case of *fungus hamatodes* in a child seven weeks old, see the same journal for Jan., 1834. *Tumours* of various kinds, as *purulent*, *bloody*, *lardaceous*, *encysted*, *steatomatous*, &c., have likewise been observed upon children at birth. CÆSAR HAWKINS has published in the *Med. Chirurg. Trans.*, 1839, vol. xxii., a valuable paper on a "Peculiar Form of Congenital Tumours of the Neck," which contains all that is known on this subject. See, also, ORTO, *Path. Anat.*, p. 173, 198, 370 (SOUTH'S transl.). Cases of *congenital spontaneous fractures* in the fœtus may be found in the *Dict. des Sci. Med.*, art. "Maladies du Fœtus," p. 62. For a case in which 113 fractures were discovered, seventy being of the ribs, see *Bull. de la Fac.*, No. 3, 1813. A case of fracture in the clavicle of the fœtus, caused by the mother striking herself against a table when seven months pregnant, is recorded in the same work, 1825, p. 178.

* [Similar cases are related in *Am. Jour. Med. Sci.* for Feb., 1833, p. 346, and for Nov., 1838, p. 192.]

Cases of spontaneous fracture are also related in *Journ. des Prog.*, vol. vii., p. 247; *Nouv. Obs. sur la Prat. des Accouch.* (ANDRY, *Suite des Conj. Phys.*, 1708; and BLUNDELL (*Midwifery*) gives a case where there were four fractures in one fœtus. BILLARD relates an instance of a congenital false joint (*On Infants*, obs. 85). Cases of luxation have been described by HIPPOCRATES as occurring to the fœtus in utero; and CHAUSSIER has related an instance (*Dict. des Sci. Med.*, art. "Fœtus") where both thighs, both knees, both feet, and three fingers of the left hand were luxated. Cases are also reported in *Gaz. Med.* for 1835; BRESCHET's *Rep. Gén. d'Anat.*, vol. v., part i., p. 110; *Dict. de Med.*, 2d ed., vol. v., p. 95; also by M. M. GERDY (in his *Report*, Lyons, 1820), and by BILLARD and CRUVEILHIER. *Congenital shortening of the arm* has been noticed by OLLIVIER (*Moelle Ep.*, vol. i., 2d ed., p. 51), OTTO, and MECKEL; and DUGES in *Med. Ep.* of Montpellier, July, 1826, has published a paper on congenital palsy.

Spontaneous amputation of the limbs of the fœtus in utero is a phenomenon occasionally met with in practice; and it has been very ably treated of by Dr. MONTGOMERY, in *Dublin Journ. Med. Sci.*, vols. i. and ii., 1832, and in his work on *Pregnancy*; also by Dr. SIMPSON, in *Dub. Journ.*, Nov., 1836, vol. x., p. 220. There is a case related by VASSAL in the *Gazette Medicale*, 1835, where a fœtus was born with only one arm, the scapulo-humeral articulation being covered with a circular cicatrix. The humerus, radius, and ulna were found in the patient's bed. A similar case is related by Dr. FITCH in the *Am. Journ. Med. Sci.* for May, 1836. In this instance, the foot came away on the 17th of March, and the fœtus on the 5th of April following, when the stump was found perfectly healed. Similar cases are related by CHAUSSIER (*Dict. des Sci. Med.*), and by BILLARD (*Arch. Gén. de Méd.*), and by ANDRY. See, also, ST. HILAIRE's work on *Monstrosities*; GARDIER, in *Journ des Acc.*, vol. ii., p. 173; NEWHAM, in *Med. Repos.*, vol. iii.; SIEBOLD's *Journal*, vol. xvi., No. ii.; *Am. Journ. Med. Sciences*, Aug., 1839; *Arch. de Méd.*, vol. xvi., p. 444. The congenital deformity of *club-foot*, with its three varieties, *varus*, *valgus*, and *pes equinus*, will be found fully described in modern works on surgery, especially by LITTLE, STROMEYER, DETMOLD, MUTTER, and BOUVIER (in *Mem. de l'Acad. Roy. de Médecin*, Paris, 1838). See, also, CRUVEILHIER, liv. ii., and *Med. Chir. Trans.*, vol. ix., pl. ii., p. 433.

CONGENITAL AFFECTIONS OF THE INTERNAL ORGANS.—These have been briefly alluded to by our author. *Encephalocele*, or tumour of the head, has occurred in two instances in our own practice; cases, also, are related by BILLARD (79th *Obs.*, 1st ed.) and by CHAUSSIER. An instance is recorded in *Am. Journ. Med. Sci.*, vol. iv., of *parencephalocele* upon the occiput. *Congenital hydrocephalus* is of too frequent occurrence to need remark, as cases of it have occurred within the observation of most practitioners. LACHAPELLE and DUGES, however, state that they met with it only 15 times in 43,555 labours. See BRESCHET, in *Dict. de Médecine*, 2d ed.; GÆLIS on *Hydrocephalus*; RAMSBOTHAM's *Prac. Obs. on Midwifery*; CRUVEILHIER's *Path. Anat.*, liv. xv.; HOUSTON, in *Dublin Hospital Reports*, vol. v., p. 327; OTTO's *Path.*

Anat., p. 378; and LEE, DENMAN, DEWEES, and most modern authors on obstetrics. The *apoplexy of new-born children* has been ably treated of in *Dict. de Med.*, 2d ed., and well illustrated by CRUVEILHIER, in *Anat. Path.*, liv. 15, 16, 17. According to this able pathologist, one third of those who perish in the progress of labour die of apoplexy, and blood is found effused within the cavity of the arachnoid, and most commonly on the cerebellum. A case of *absence of the cerebellum* is represented by CRUVEILHIER, pl. v., liv. 15; also, *atrophy of the convolutions of the brain* (AGNESIA). BRESCHET gives an account of an idiot, who lived till his 15th year, in whom both cerebral lobes were totally wanting (*Rep. d'Anat. Path.*). The *tongue* may also be congenitally deformed, as too large, too small, too wide, too long, &c. Dr. S. HARRIS has described an interesting successful surgical operation for the removal of *chronic congenital enlargement of the tongue* (*Am. Journ. Med. Sci.*, vol. vii. See *Dict. des Sci. Med.*, vol. xxvii., and BARTHOLINUS's *Hist. Anat.*, and *Mem. de l'Inst. National*). *Congenital rancula* has been noticed by BILLARD; *absence of the epiglottis* by MORGAGNI; *hypertrophy of the tonsils* by ANDRAL; and *complete absence of the pharynx* has only been observed in acephalous monsters; an interesting malformation of it is related by Dr. HOUSTON in *Dub. Hosp. Rep.*, vol. v.; and ANDRAL observes that it often ends in a *cul de sac*. *Congenital malformations of the œsophagus* are not uncommon, and Sir A. COOPER has recorded an instance where it was entirely wanting; the pharynx terminating in a *cul de sac*, and the stomach having no cardiac orifice. Similar cases are related by M. M. BILLARD, *Journ. Comp. du Dict. des Sci. Med.*; MARTIN, *Obs. de Sci. Med.*, Marseilles, 1825; and one by BLUNDELL, *Obstetrics*, p. 50, where the œsophagus terminated in a ligamentous cord. *Cases of ulceration of the muciparous follicles of the œsophagus and stomach* are related by BILLARD (*Mal. des Enf.*, p. 298, obs. 20, 21, 2d Fr. ed.). *Deficiency of the diaphragm* has been observed by DIEMERBROECH, as recorded by LIETAUD, *Obs. Anat. Med.*, obs. 792.

The following *malformations of the stomach* have been related, viz.: 1. Total absence. 2. Deficiency of cardiac orifice. 3. Separation from duodenum. 4. The great extremity wanting, the œsophagus entering the left. 5. Division by central contraction into two cavities. 6. Extreme smallness, so as not to exceed the size of the small intestine. 7. Great size, so as to fill almost the whole abdominal cavity. 8. Lateral transposition in common with the other viscera. 9. Considerable contraction of the left orifice, with absence of the pyloric valve (FLEISCHMAN). *Congenital gastritis* (follicular ulcer) has been met with fifteen times by M. BILLARD, and in repeated instances by CRUVEILHIER, as represented in his *Anat. Path.*, plate 3d, fig. 4, 5, 6 (15 fasc.). Cases of follicular ulceration of the stomach, œsophagus, pharynx, and mouth are recorded by this writer, and by M. DENIS in his *Recherch. Anat. et de Phys. Path. Sur plusieurs Maladies des Enfants Nouveau-nés*, 1826, p. 139. Cases of *congenital arachnitis, gastritis, and gastro-encephalitis* are related by BROUSSAIS, *Ann. de la Méd. Physiol.*, p. 139. The *intestines* are also subject to congenital malformation, as they may

be longer or shorter than natural, diminished or increased in caliber, the convolutions wanting, the canal forming a straight tube from the stomach to the rectum. A case of *extreme atrophy of the intestines* is related by Dr. FRANCIS, in STEWART'S BILLARD, p. 602.

For cases of *malformation of the duodenum*, see *Ed. Med. Mem.*, vol. v.; BILLARD (*Mal. des Enfants*, p. 362, 390, obs. 43; *Journ. Comp. du Dict. des Sci. Méd.*, vol. xxiv., p. 58). BILLARD has also described congenital *inflammation of the ileum*, attended with hypertrophy of the mucous membrane, and Dr. FRANCIS, of New-York, has described, in the *American Med. and Ph. Reg.*, vol. i., a case of diverticulum from the ileum in a man aged thirty-five, who died of enteritis. Analogous malformations of various kinds of the *cæcum, colon, and rectum* are related by MECKEL, LITRE, BILLARD, BAILLIE (*Morb. An.*), CRUVEILHIER, ASCHERSON, RUDOLPHI, and others. Dr. FRANCIS states that an instance came to his notice some years ago, of the small intestines, so called, being in reality the larger, while nearly the whole tract of the colon and rectum was diminished in caliber, so as scarcely to admit the passage of a crow quill (*Stewart's Translation of Billard*).

Instances of *congestion and inflammation of the intestines* have been related by BILLARD. ANDRY states that DOLCUS and SCHRICHTER have met with bundles of worms in the intestines of the fœtus, and that ROSES (*Dis. of Children*) mentions two affected with tænia. The *abdominal glands* have been found diseased in the fœtus by OCHLER and CRUVEILHIER, who have represented them (*An. Path.*, liv. 15, obs. ii.). Cases of *lateral transposition of the viscera* have been recorded by BAILLIE (*Morb. Anat.*), MERY,* DAUBENTON, PAYNE, BLEGNY,† RIOLANUS,‡ OTTO,§ PARISOT,|| RALEIGH, WARREN, SNOWDEN,¶ BLUNDELL, JAMIESON, and HoustON.** For cases of partial transformation of the viscera of the abdomen, see *Ed. Med. and Surg. Journ.* for July, 1839 (SIMPSON); also, *Ibid.*, vol. xvi. (REID). *Hernia* in the new-born infant is frequently met with, both of the *inguinal and umbilical* kind, the first of which is sometimes complicated with *hydrocele*. A case of *strangulated congenital hernia* is recorded by Dr. HUNT (*Lond. Med. and Phil. Journ.*, Oct., 1828), in which an operation was successfully performed. BILLARD relates a case of hernia in a female infant, where the left ovary passed through the left ring and inguinal canal, and the uterus was drawn to the left side of the bladder. For instances of *diaphragmatic hernia*, see BAILLIE'S *Morb. Anat.*, CLARKE'S *Transl.*, vol. ii., p. 118; *Journ. Hebd.*, Feb., 1835 (ANTHONY); CRUVEILHIER, fasc. 17; *Dublin Journ.*, July, 1839 (MURPHY); *Ed. Journ.*, July, 1839 (SIMPSON); *Anat. Path.*, cent. vi., vol. iii., p. 287 (BARTHO-LIN); *Bull. de la Fac.*, vol. ii. (CHAUSSIER); *Ed. Med. and Surg. Journ.*, 1821; *Path. Chir.*, Paris, 1831, p. 128 (CLOQUET); *New-York Journ. Med. and Collat. Sci.*, vol. iii., 1844 (DARLING). Con-

genital peritonitis is also a frequent occurrence, according to BILLARD (*Mal. des Enfants*) and DUGES (*Rech. Sur les Mal.*, &c., des Nouveau-nés, Paris, 1821). See a most elaborate paper on this subject by Dr. SIMPSON, in *Ed. Med. and Surg. Journ.*, Oct., 1838, who has presented numerous cases of this accident in the new-born. See, also, *Dict. de Méd.*, vol. xv. (DESORMEAUX); MORGAGNI, *De Sed.*, &c., ep. 67; *Journ. Gen. de Méd.*, vol. cii., 1828; CRUVEILHIER, liv. xv., p. 2; ANDRAL, *An. Path.*, vol. ii., p. 737; *Guy's Hospital Reports*, No. V. *Ascites* is sometimes congenital, as well as *anasarca and hydrothorax*. See DUGES, in *Mem. de l'Acad. R. de Méd.*, vol. i.; *Journ. de Med. Chir. et Pharm.*, vol. xvii., p. 180; CRUVEILHIER, *An. Path.*, liv. xv., obs. 4, 5, 2; *Arch. Gén. de Méd.*, vol. viii., p. 383 (M. OLLIVIER d'Angers), case of encysted dropsy of remarkable size.

The *liver* has been found absent, small, or double, softened, indurated, lacerated, or containing pus, granular tubercles, topi, &c. For a case where it was entirely wanting, consult *Am. Journ. Med. Sci.*, Nov., 1839 (KIESELBACH). For an instance of double liver, see MORGAGNI, ep. 48-55. For other morbid conditions of this viscus, see *Monograph "On Diseases of the Fœtus,"* in *Am. Journ. Med. Sci.*, vols. xxvi. and xxviii., by W. C. ROBERTS, of New-York, to whose learned research we are much indebted in drawing up the present notice. To the same elaborate article we refer for congenital pathological states of the *gall-bladder, spleen, &c.*

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* [*Mem. de l'Acad. des Sci.*, 1658.]

† [*Zoo Gallie*, June, Ann. i., obs. ix., p. 129.]

‡ [*Disq. de Trans.*, part. and, 1652.]

§ [*Path. Anat.*, p. 24, Note.]

¶ [*Arch. Gén. de Méd.*, June, 1839. *Med. Chir. Rev.*, 1836. *Am. Journ. Med. Sci.*, May, 1836.]

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FUNGOID DISEASE.—SYN. *Hæmato-cerebriform Disease*; *Milt-like Tumour*, Monro. *Soft Cancer*, Auct. var. *Spongoid Inflammation*, Burns. *Medullary Sarcoma*, Abernethy. *Carcinoma spongiosum*, Young. *Fungus Hæmatodes*, Hey, Wardrop. *Fungoid Discase*, A. Cooper. *Fungus Medullaris*, Maunoir. *Matière cérébriforme*, Auct. Gall. *Carcinome mou et Spongicuz*, Roux. *Tumeur Encéphaloïde*, Laennec. *Fongus Médullaire*, Lobstein. *Carcinus Spongiosus*, M. Good. *Carcinome Sanglante*, Cancer mou, Fr. *Der Blutschwamm*, Germ. *Bleeding Fungus*.

CLASSIF.—3. Class, Sanguineous Diseases; 4. Order, Cachexies (Good). IV. CLASS, IV. ORDER (Author, in Preface).

1. DEFIN.—A tumour, or tumours, consisting of a whitish, pulpy, brain-like substance; generally soft, circumscribed, elastic, or obscurely fluctuating; giving rise to large vascular growths, which bleed profusely; always connected with constitutional vice, contaminating the frame, and terminating fatally.

2. i. DESCRIPTION.—This is the most malignant formation to which the body is liable. When it appears covered only by the integuments, and has not yet acquired considerable bulk, the surface of the tumour which it forms is smooth, generally equal, and not discoloured; it is commonly soft and elastic, and communicates to the touch an obscure sense of fluctuation. When removed from the body, the hæmatoid tumour is generally circumscribed, and more or less rounded: it frequently possesses a capsule of condensed cellular membrane.—A. M. LAËNNEC has divided the disease into, 1st, the encysted; 2dly, the irregular and non-encysted; to which he has added, 3dly, the interstitial impregnation of organs by the cerebriform substance. This last is not mentioned by Mr. WARDROP, who has described this disease with great accuracy. M. LAËNNEC has never met with it in the lungs. It may be, therefore, considered as a rare form of the disease. When divided, the substance soils the knife, and is composed of an opaque, whitish, homogeneous matter, resembling, in colour and

consistence, the cerebral pulp. Hence the name, encephaloid, given it by the French pathologists. It softens after exposure for a short time to the atmosphere; and when the softer part is washed away, or when the mass is compressed, a filamentous or fine cellular tissue remains.

3. B. The consistence of the hæmatoid tumour varies in different cases, and sometimes in different parts of the same mass, being sometimes more dense than the firmest brain, at other times as soft as the brain of a fœtus, as the milt of a fish, or even not much firmer than custard. According to M. LOBSTEIN, the different degrees of softening is owing to the progress of the disease; and this appears to be generally the case. In the first stage, or that of crudity, the melanoid tumour has the consistence of a firm brain, or of the conglobate glands; in the second, the consistence is less, being that of the fœtal brain; in the third, it approaches that of milt or custard: to these may be added a fourth, when the tumour is situated externally, or near the surface of an organ or part, viz., that attended with ulceration and the rapid production of bleeding fungi from the ulcerated part.

4. C. The colour of this production varies sometimes in the same mass. It is commonly of the colour of the brain; occasionally portions of it are redder, and exhibit more of a fleshy appearance; and in other cases, parts of it resemble a clot of blood. When the hæmatoid mass is encysted, it is readily detached from its capsule; and, in the early stage, is often divided into several lobes, placed closely together, and separated by an extremely fine cellular tissue, which seems to convey the vessels for its nutrition. In the advanced stages, the division into lobes disappears. The non-encysted form is, however, more common, particularly in the viscera. The masses constituting this formation vary from the size of a pea to that of the head of a fœtus at the full time.

5. D. The medullary structure, although the general, is not the only form observed in the primarily diseased mass. Some of the fungoid productions are composed of distinct parts, provided with cellular capsules, and differing in size, colour, and consistence. Some of these parts resemble slightly-softened glue; others have earthy particles mixed with the pulpy cerebriform matter; many present insulated portions of the colour and consistence of boiled yolk of egg. As the tumour increases, the softening and disorganization characterizing the successive stages of its growth take place. Disorganization generally commences in the central parts: cavities now form in it, chiefly containing blood; and, when the blood is washed away, and the tumour is placed in water, numerous membranous shreds and filaments are seen floating in these cavities.

6. If the fungoid mass is situated near the surface of any internal viscus, discoloration of, and adhesion to the part covering it, followed by ulceration, take place. But the ulcerative process, instead of giving rise to loss of substance, produces a fungous growth, and, as well as when the tumour forms exteriorly, the increase of bulk, which had hitherto been slow, now becomes rapid. The fungus which thus forms is soft, easily torn, of a dark red or pur-

ple colour, of an irregular shape, and bleeds profusely when slightly injured; and differs from the firm, dense structure of the cancerous fungus. It resembles, when small, the softer kinds of polypous vegetations which form on mucous surfaces. When the primary hæmatoid tumours are situated towards the surface of the body, they increase in size more rapidly than when seated internally. They generally soon lose their uniform round and smooth appearance; they project very considerably, and at last become irregular at their surface. Their consistence diminishes, particularly in the projecting portions, where the soft elasticity passes into obscure fluctuation. The veins running over or from the diseased mass assume a varicose appearance; an erysipela-tous-like redness of the prominent parts supervenes, followed by lividity, adhesion of the integuments to the tumour, ulceration, and soft, reddish fungous excrescences. The growth of the tumour is now remarkably rapid. The surface of the fungi exudes a thin fetid sanies, often with blood, which is sometimes discharged in great quantity; hence arose the name *fungus hæmatodes*, which applies only to the advanced stage of the malady. When the fungus is very large, its more prominent parts often lose their vitality, and separate in most offensive sloughs.

7. In some cases the voluntary nerves have been connected with the diseased mass, and have participated in the change of structure; but they have not been found changed beyond the limits of the tumour. In the eye, the optic nerve is always changed in structure; and in a case referred to by Mr. WARDROP, the anterior crura nerve passed into the centre of the diseased mass, and was so completely lost in it that it was impossible to distinguish between the two structures. This appearance being general whenever large nerves enter into the hæmatoid tumour, has led M. MAUNOR to infer that the cerebri-form matter composing it is nothing else than a morbid accumulation of the nervous pulp. This opinion is combated by M. LOBSTEIN, who avers that he has met with cases in which, particularly in early stages of the disease, the nerves passed through the tumour without experiencing any change. I am, however, disposed to doubt this, at least as respects the fully developed disease: if they pass *through*, I believe, from the dissection of a case which occurred to me, that they are always changed, and identified with the morbid mass: if they merely pass *by* it, or between insulated portions of it, no change will be observed.

8. The most remarkable characteristics of this disease are, 1st. The frequently simultaneous occurrence of a number of the tumours constituting it in different parts of the body; the least connected with each other, either by structure or function; and, 2d. That when an apparently isolated mass of the disease is met with in an extremity and extirpated, it always soon afterward manifests itself in some distant part, either externally or internally, the subsequent disease being even more rapid in its progress than that preceding it. The simultaneous appearance of the hæmatoid tumours, or their successive manifestation, although sometimes observed to take place in the course of the absorbent system, seem not to be always

propagated through this medium; for, in case of the diseased mass appearing first in one of the lower extremities, the subsequent occurrence of it may not be in the glands above the originally affected part, but in some distant or internal organ, as in the lungs, liver, in an upper extremity, &c. This was well evinced in a most remarkable specimen of the disease which came before me several years since in a lad of about fifteen, who presented in all the extremities, upper and lower, in the parietes of the thorax and abdomen, in his neck and head, a number of those tumours, certainly not under fifty. They varied from the size of a walnut to that of a large orange; many of them were of simultaneous origin, and those which were the latest in appearing did not occur in the seat of the glands of the absorbents leading from the primary tumours. A somewhat similar, and still more remarkable case, in respect of the great extent and number of the tumours, both internal and external, I had lately an opportunity of seeing frequently with Mr. BUSHELL.

9. Often, however, when the original mass is advancing through the changes I have described, the absorbent glands become affected by the disease, and the internal viscera, and the whole constitution, are contaminated; or, perhaps, it would be more correct to say that the original contamination is thereby so far heightened as to occasion a more general formation of this diseased structure. When the absorbent system is affected, Mr. WARDROP states that usually one or more glands swell in the vicinity of the primary tumour, and that this takes place sometimes at an early period of the disease, and occasionally not until the primary tumour is far advanced. In some cases the diseased glands grow to a great size, while in others they are but slightly enlarged. Occasionally the primary affection makes little progress, while the disease of the glands advances rapidly. The structure of the glands thus secondarily affected is entirely converted into the cerebri-form matter, exhibits a homogeneous pulpy mass, and is contained in a cellular capsule. Mr. WARDROP has never observed a fungus arise from the diseased gland.

10. This morbid production may appear in one part only, or in several at the same time, or in distant parts successively. The tumours which first appear may be called *primary*; those which occur afterward, either in the absorbent glands, or in remote parts, may be named *consecutive*. But the disease may terminate fatally without any more than a single mass being developed. Mr. LANGSTAFF has adduced an instance of this. The primary tumour may be small, and the subsequent productions most extensive, or the reverse.

11. There is scarcely any organ or part of the body exempt from this disease. The extremities, the mammae, thyroid gland, the testes, ovaria, uterus, the lungs, the liver, pancreas, spleen, the stomach, the intestines, the urinary bladder, prostate gland, the mesentery, omentum, the eye, the brain, the spinal cord, the nerves, the glands, the heart, the muscular parts of the trunk, the bones, &c., have all been found affected with this malignant disease. It seems to commence in the cellular tissue; but as it is developed, the proper texture of parts to

which it extends is either converted into it, or is absorbed in proportion as it is increased.

12. ii. PROGRESS AND DURATION.—*a.* The progress of the disease may be divided into four stages. In the *first*, the tumour has the consistence of the conglobate glands; in the *second*, it is much softer; in the *third*, the softening is still greater, and amounts to a state of semi-liquefaction, and gives the sensation of fluctuation; in the *fourth*, ulceration or vascular fungi arise. Signs of general cachexy appear in the second or third stage, and are very decided in the fourth.—*b.* The duration of this malady is generally some months at least; and it may continue for two or three years. In the early stages, it is not usually attended by febrile action or much pain; and it may exist for a considerable time without occasioning emaciation; but there is always more or less debility. Acceleration of pulse and emaciation appear in the advanced stages, often accompanied with effusion into the adjoining cavities, particularly when an internal organ is the seat of the malady, as the liver, uterus, &c. In the *third* and *fourth* stages, the vital functions are very manifestly affected. The stomach loses its power, or rejects the ingesta. The patient experiences most severe pain; and the energies of life decline. The complexion often assumes a livid, earthy, or peculiar yellowish hue, or pale straw colour; the pulse becomes smaller and weaker; and at last the patient sinks, generally without either delirium or insensibility having existed for any considerable time before death.

13. iii. DIAGNOSIS AND COMPLICATIONS.—This disease was confounded with cancer until the commencement of this century, when BURNS and HEY first remarked the difference between them. They are still considered by some Continental pathologists, and by Dr. CARSWELL, as varieties or modifications of the same constitutional malady; and there are several circumstances which both favour and militate against this opinion. They both occur in similar habits of body and temperaments; they often arise spontaneously, or without any manifest cause, or are traced to the same exciting agents; they are both dependant upon constitutional vice, as well as upon perverted organic action and secretion in their seats; and they both undergo somewhat similar local changes, and occasion an increasing contamination of the fluids and soft solids. Moreover, as I have stated in another place (see article DISEASE, § 141-144), and as Drs. KERR and CARSWELL have justly remarked, both may co-exist, or the carcinomatous may pass into the fungoid formation. Dr. CARSWELL observes that numerous examples might be given of scirrhus, medullary sarcoma, and fungus hæmatodes, as they are commonly called, originating in the same morbid state, and passing successively from the one into the other in the order in which they have been named. Indeed, these varieties are sometimes met with not only in different organs of the same individual, but even in the same organ.

14. The points, however, of dissimilarity are very striking, as remarked in the article referred to (§ 141-144), and, notwithstanding these circumstances, are sufficient to constitute them distinct diseases. As these points have not

been brought into view by the able writers just mentioned, and as they deserve a fuller notice than I have bestowed on them in the sketch indicated above, I shall here state them more fully.—*a.* There is no relation between the hard, incompressible texture of scirrhus, in which carcinoma commences, and the cerebriform, elastic, and soft substance constituting fungoid disease.—*b.* Carcinoma commences in scirrhus, which confounds in one mass all the tissues which it invades, and often without much increase of bulk, although with augmented density; fungoid disease always consists of a more or less evident tumour, which seems to destroy every trace of any other structure.—*c.* Carcinoma, even in an advanced stage, when fungous projections sprout from its ulcerated parts, presents but little vascularity; whereas the fungoid disease possesses large vessels and vascular cavities, so that it derives one of its most common names from this circumstance.—*d.* Fungoid disease attacks organs in which true carcinoma has not hitherto been seen to originate, as the lungs, the liver, the brain, the spinal cord, and the nervous trunks.—*e.* Cancer affects the aged, fungoid disease the young; and the former is attended with more pain at the commencement than the latter; and, *f.* as MM. MAUNOIR, LOBSTEIN, and VELPEAU have remarked, there is something peculiar in the cachexy attending carcinoma, that is not observed in the fungoid malady; for it is not unusual to see persons labouring under this latter affection possessing their natural colour. This, I believe, occurs most frequently when some external part only is affected, or when the disease has not invaded the digestive or assimilating organs, or when absorption of the morbid matter has not taken place to a great amount. In a case now under my care, the healthy complexion is preserved, and yet neither the able practitioners who have seen it nor myself have any doubt as to its nature.

15. M. LOBSTEIN asks, with reference to the question of the identity of these two maladies, whether, admitting that true cancer sometimes gives rise to the fungoid formation, it therefore follows that this latter is the same as cancer? May there not exist, simultaneously, tuberculous degeneration of the lungs, fungoid disease of the liver, and fibrous tumours in the womb, without inferring the identity of these three morbid formations? Fungoid disease, therefore, appears, from its vascular relations, from its peculiar structure, and from its early characters, its advanced course and terminations, to be a distinct malady, although it may be consequent upon, or complicated with other alterations of structure. When it occurs in young subjects, it is always *primary*, or is not preceded nor attended by the carcinomatous formation. But in persons past the meridian of life, in whom only scirrus-cancer, or carcinoma, is met with, the fungoid structure is sometimes produced *consecutively*, or in an advanced stage of it, and thus occasionally exists as a secondary complication with that disease, or as one of the advanced changes of structure consequent upon the constitutional vice. The question, therefore, as to difference, is reduced to this, that when fungoid disease attacks young persons, it is always a primary and distinct malady; and that when it affects persons ad-

vanced in life, it is either primary, or consecutive of, and complicated with carcinoma (see art. DISEASE, § 141-144). In a few instances, other morbid formations besides this have been found associated with the cerebriiform structure, as fibrous tumours, serofulous matters, pus, melanosis, hydatids, osseous and earthy deposits, &c.*

16. iv. CAUSES.—*a.* The predisposing causes of fungoid disease are, debility of constitution, early age, and peculiarity of diathesis. Children, and persons who have not passed the meridian of life, are much more frequently affected by it than persons in the decline of life.†

* Besides the distinctions I have insisted upon above, SCARPA and BERARD have added others, which I may here notice at length. The cerebriiform or fungoid structure, when fully developed, is a milk-white pulpy substance, studded with rose-coloured points—scirro-cancer has the appearance of the skin of brawn, and is traversed by numerous cellulo-fibrous radii, or bands. The former comprises a number of arterial vessels, that increase with the softening which it undergoes; extravasations of blood take place in its substance, and the ulceration of its advanced stage is accompanied with hemorrhage, which is often repeated, and frequently profuse; the latter is nearly deprived of vessels; sanguineous extravasation is seldom observed in it, and the ulceration to which it gives rise is rarely attended by any considerable hemorrhage. The cerebriiform substance is often found in the veins of the diseased part—sometimes nearly filling them—and occasionally, also, in those in the vicinity; a similar circumstance is very seldom observed in scirro-cancer. The cerebriiform disease attacks primarily all the systems, tissues, and organs of the body; the primary seat of carcinoma is much more limited. The former attains a great size, is lobulated, and presents a characteristic elasticity and softness; the latter never reaches a great size; it even sometimes assumes the appearance of diminished bulk, with increased density, and has neither a rounded outline nor elasticity. Fungoid tumours frequently coexist, even primarily, in several organs, occasionally in considerable numbers; carcinoma is generally solitary. The cerebriiform disease softens into a rose-coloured *bouillie*; scirrus assumes the form of a *jelly*. In their progress to the surface, the first stretches to the skin, and renders it thinner without adhering to it; the second cements itself to the integuments, which no longer admit of motion, but are firmly attached to the diseased mass. The progress of ulceration in this is remarkably slow; in that very rapid. In the one, the period which elapses from the commencement of ulceration is often as long or longer than that which preceded this change; in the other, the period subsequent to ulceration is disproportionately short, and the lesions consequent upon it are of a much more acute and violent character, though the pain is may be less.

It is in the early stage, or state of crudity, that these two maladies are distinguished from each other with greatest difficulty. The fungoid structure has not then attained the white colour it subsequently acquires. It is at first semi-transparent, firm, and divided into numerous lobules. Its vascularity is also not so great as at an advanced stage. But, although it thus resembles scirrus, to conclude from this that they are identical diseases, is to admit that the same lesion will give rise to two kinds of structure that essentially differ. But this stage of fungoid disease is very short; and, in cases where a number of tumours are developed in different parts of the body, they all have the same cerebriiform structure. Malignant disease may, however, present the complicated states above mentioned, the same tumour consisting partly of the carcinomatous and partly of the cerebriiform structure. In addition to these, it may even comprise other morbid products disseminated through it, or collected in one or more places—in one part an adventitious fibrous tissue, in another a fibro-cartilaginous formation, in a third tubercular matter, in a fourth multilocular cysts containing various substances—here a gelatinous secretion, there a milky fluid, this a reddish or bloody matter, that an osseous or a cretaceous deposit. These, as well as the cerebriiform products thus accidentally or occasionally comprised in carcinomatous or malignant tumours, are not the constituents of carcinoma, but contingent formations consequent upon the morbid nutrition and secretion constituting the local disease.

† Prof. GROSS (*Path. Anat.*, vol. i, p. 190) remarks that "encephaloid is emphatically a disease of early life, being most generally observed in children under the age of ten years. Occasionally, indeed, it makes its appearance soon after birth. In a few rare instances I have seen it in adults, and in persons far advanced in life; and I have also thought that it was more common in females than males. However

Those of the lymphatic and nervous temperaments, of a serofulous constitution, of a sallow or pale complexion, and of a lax fibre, with a flabby state of the soft solids, and languid circulation, are oftentimes its subjects. As to the influence of sex, sufficient data have not been furnished to admit of an opinion; but the most of several cases which I have seen have occurred in males. The same may be said of the influence of climate; but, like cancer, it seems to be most prevalent in countries the inhabitants of which partake largely of animal food. It has even been supposed that eating much pork predisposes to it. An hereditary disposition to it may be admitted with more truth. General debility is, however, its most common antecedent.—*b.* The exciting causes are often unknown. Sometimes an external injury, as a blow or bruise, has occasioned it, often after a long period. Most of the cases which I have seen appeared to have arisen chiefly from a poor and unwholesome diet, aided by cold and moisture.

[This disease attacks generally those of a strumous habit of body, though it sometimes occurs in those who have been originally healthy, but whose constitutions have been broken down by anxiety, and suspense of mind and body, and want of attention to the due performance of the natural secretions. ASTLEY COOPER has remarked (*Diseases of the Testes, Observ. on the Structure, &c.*, Phil., 1845) that from such causes a slight feverish state results, the tongue becomes white, and streaked with white in its middle; the appetite and the digestion defective, probably from the secretion of gastric juice being unnatural; the bowels are costive, from a defect in their secretions; the bile is absorbed, instead of being poured into the intestines, and the eye is, consequently, yellow, the pulse quick; the cheek flushed, while the skin is otherwise sallow; the nervous system becomes irritable, and the patient has no longer comfortable and composing rest. In this state of the constitution, a slight bruise or sprain, or any cause of irritation, is liable to produce an unhealthy local action, and peculiar and unnatural adventitious depositions are frequently the consequence. When the local disease has existed for some time, the absorbents become irritated, and they convey the diseased action to their glands from the irritation increasing their power of absorption; other structures then become affected, and similar diseases occur even out of the line of absorbent irritation, as if the blood had become tainted with the matter, and then the disease attacks various parts of the body; for the same constitution will produce the local action even under accidental, if continued irritation.

That the disease is dependant on both constitutional and local action, is shown by the following facts: that there is a disposition to its formation in different parts of the body at the same time, proving its constitutional origin; and that there is also a peculiarity in the local action, is proved from the wound caused by the extirpation of the diseased part often healing in the kindest manner, yet afterward

this may be, it is certain that I have seen five instances in the former to one in the latter." Prof. G. also thinks it of more frequent occurrence in some districts than in others; but to what this may be owing is as yet unknown.]

the complaint recurs in this or some other part of the body; which is a proof that the local action differs from common inflammation; and that when the disease returns, it is after common inflammation has ceased (*loc. cit.*). Sir ASTLEY also thinks that the state of the blood also favours the production of the disease, for, when drawn from the arm or from the fungous disease itself, it coagulates very weakly, from want of healthy fibrin; and the serum is large in quantity, and of a deep yellow colour.]

17. v. The PROGNOSIS is extremely unfavourable. If the malady is developed so as to admit of precise recognition, a fatal issue may be delayed a short time by a tonic or restorative treatment, but can never be averted. Ex-tirpation, or amputation, has been attempted, but with no benefit, and often with disadvantage. Although the diseased part be removed in this way, its source is still in the constitution, and it soon afterward is developed in some other situation, generally in an internal viscus, the nearest to the seat of the extirpated part. If it exist also in an internal organ, the shock occasioned by the operation accelerates its growth and fatal progress.

18. vi. ORIGIN.—Many writers on this disease, and especially the French pathologists, suppose that the diathesis in which the disease originates is connected with the cancerous taint; and that the fungoid is only an advanced stage, or higher grade of carcinoma. MM. MAUCOIR and LOBSTEIN are opposed to this view; and my opinion, as just stated, coincides with theirs. Although both diseases are distinct as to the *kind* of action, as to the form of the morbid structure that results, and as to some of the circumstances in which it takes place, yet the *manner* in which they both arise may not be different; their morbid actions being similar in some respects, but different in others. Hence the alliance occasionally observed between them, as in other diseases generally connected, but specifically different. The opinion, therefore, which I have stated as to the origin of CANCER (§ 25, 26), and the remarks there offered, are, in part, applicable to this disease. Dr. HODGKIN has endeavoured to show that fungus hæmatodes and carcinoma originate in a cystiform serous membrane. That they thus arise in some instances may be admitted; but I agree with Dr. CARSWELL in the opinion that they were often formed independently, and where cysts cannot be detected; and that, even where cysts have existed, their formation in the cellular tissue external to the cysts has been demonstrated. The views of M. ANDRAL have been stated in the article just referred to, and in that on DISEASE (§ 138). M. CRUVEILHIER believes that this, as well as some other lesions, are the results of the deposition of morbid products in the cellular tissue of organs, the venous capillary system furnishing these products.

19. Dr. CARSWELL is of opinion that the formation of the fungoid and carcinomatous substance takes place in the blood, whether it be found in this fluid alone or in other parts of the body at the same time; and he adduces the facts, 1st. That the morbid substance is found in the vessels which ramify in these malignant tumours, or in their vicinity; 2dly. That it is found in those vessels which communicate with

the diseased part of an organ; and, 3dly. That it is met with in vessels having no direct communication with an organ affected with the same disease. The veins, however, and venous capillaries are the only parts of the vascular system in which the diseased substance is found; sometimes in contact with the internal surface of the vein, or occasionally united with it by means of thin, colourless fibrin, or even of very minute blood-vessels, as in the case of the cerebriform matter. In the articles referred to, I have stated that, when this morbid substance is detected in the blood, it has been absorbed, as in the case of other morbid secretions; and the accuracy of the opinion seems to be supported by the fact that it is found only in the veins and absorbents; but Dr. CARSWELL believes that this is not the case, as there are instances in which the venous blood alone was the seat of the disease. If such be actually the case, an obvious difficulty presents itself; but various sources of deception arise in the course of minute researches, and mislead even the most careful. That the blood is early affected in this and other malignant diseases, I fully believe; but that the cerebriform matter is formed in it, and afterward deposited in the parts which are its seats, cannot be supported by the history and progress of the local and constitutional affections. If it were previously formed in the blood, wherefore is it often deposited only in one situation? wherefore is it not excreted by the emunctories? wherefore does it not always affect a number of parts simultaneously? wherefore is it never found in the arteries, and so frequently in the absorbents and veins proceeding from the seat of disease? These and other questions that may be asked cannot be answered consistently with this doctrine. I therefore entertain the same opinion as was stated by me in the articles already referred to, and believe that, like carcinoma, it essentially depends upon a debilitated and otherwise morbid state of the system generally, and that the vital actions of the part or parts primarily and especially affected are depraved; that the nutrition, organic sensibility, and the secreting function of these parts are remarkably altered, and that the morbid product which results is partially absorbed into the circulation, and contaminates the fluids and soft solids, sometimes exciting a similar morbid action in other situations.

20. Conformably with the best ascertained facts connected with the appearance of the cerebriform matter in the vessels, it would seem that, at a somewhat advanced stage of the disease, or when this structure becomes more or less softened, the molecules of it pass into the veins and absorbents leading from the part in which they have been formed; that they there sometimes are aggregated into masses sufficiently large to admit of their recognition; that, although these masses are generally found merely in contact with the internal surface of the veins, they sometimes adhere to it by means of the fibrin which collects around them, as in every other instance in which a semifluid or partially concrete substance, or a secreted matter of greater consistence than the blood, passes into the circulation; and that, when they thus adhere to the internal surface of the veins, minute vessels are ultimately developed in the fib-

rinous envelope which has been formed around them. The principal changes observed in the blood of those affected by this disease, and which I have had an opportunity of remarking in two cases after death are, an unusual thinness; a deficiency of fibrin and red particles; a state of partial anæmia, and imperfect coagulation. This state has been also remarked by BECLARD, VELPEAU, ANDRAL, and KERR, whose observations respecting the presence of the cerebriform matter, surrounded by a fibrinous envelope in the venous blood, fully confirm the view I have taken of its origin in this situation, and militate against its primary formation in this fluid. (See articles CANCER, § 26, and DISEASE, § 141.)

21. vii. TREATMENT.—This is a subject on which much cannot be said with any hope of advantage. Surgical treatment is of no avail, and strictly medical means of very little more. Whatever excites pain or irritates the local disease tends to promote its growth, and whatever lowers constitutional power only lays the system more open to contamination. The intentions, therefore, which we should propose to ourselves, when entering upon the treatment of this malady, are, 1st, to support the powers of life, and thereby to resist as long as possible the extension of the disease; 2dly, to promote the secretions and excretions, as auxiliary to the first indication; and, 3dly, to palliate the sufferings of the patient.

22. A. The first of these is founded upon the evident and admitted fact that the disease is dependant upon, and associated with debility, and upon the results of observation; and the means which may be employed to fulfil it need not be materially different from those specified in the article CANCER (§ 29, *et seq.*). Although no medicine has hitherto proved successful in curing the malady, yet new remedies, or novel combinations of those that are old, should nevertheless be directed against it. Besides, judicious means have often prolonged life, or enabled the system to resist its progress for a time. Conformably with these views, the preparations of cinchona; the sulphate of quinine; the preparations and compounds of iron, particularly the ferri ammonio-chloridum, and the tincture of the sesquichloride; sarsaparilla; bitter tonic infusions or decoctions, with liquor potassæ, or the alkaline carbonates; and the preparations of iodine, may be severally used, and combined with some one of the more energetic narcotics, particularly the acetate or hydrochlorate of morphia, or conium, or belladonna, or aconitum. The preparations of iodine are the most successful of any means I have employed in resisting the progress of this morbid formation. The ioduret or iodide of iron and the iodide of potassium should be selected, and taken internally in small or moderate doses. The external use of iodine is often injurious. In a case of this disease, affecting chiefly the stomach and some others of the abdominal viscera, lately under my care, a combination of the acetate of morphia and creasote palliated the urgent symptoms after other means had failed. In the still more recent case of a lady from Wales, who came to town on account of malignant disease of the stomach, that probably partook of the fungoid character, from the size of the tumour and other symptoms, this combi-

nation proved serviceable. This lady had been treated with great discrimination by Mr. SERPH, of Welshpool. During her stay in London, the acetate of morphia in a dilute aromatic spirit always afforded relief; but, when the disease had advanced farther, and after her return home, it had but little effect. Mr. SERPH, therefore, at my request, gave her the following during the paroxysms of suffering with great benefit:

No. 227. R Morphiæ Acetatis, gr. ij.; Creasote ℥xij; Pulv. Glycyrrh. et Pulv. Acaciæ, ʒā q. s. ut fiat massa æqualis, quam divide in Pil. xij. Capiat unam, omni horâ, urgenti dolore.

23. When the diseased part appears about to ulcerate, and afterward especially, it should be protected from external injury or irritation; and if the bleeding from it be copious, or the discharge offensive, a solution of creasote in weak pyroligneous acid or spirits of turpentine will prove the most efficient styptic and corrigent. The chloride of lime may likewise be employed. In addition to the other tonics just enumerated, the chlorate of potash may be tried in the decoction of cinchona. If iodine be prescribed, it should be continued for a long time. The iodide of potassium may be given in the compound decoction of sarsaparilla, with conium, aconitum, or any other narcotic, if much pain be felt. During the course of treatment, the secretions and excretions should be regularly promoted; and if the bowels be sluggish, their actions ought to be promoted by a tonic or stomachic aperient, repeated according to circumstances. The other means, which have been recommended in the article CANCER (which see), are equally appropriate in this and other malignant formations.

[Sir ASTLEY COOPER remarks, that "when this complaint is once formed, no medical or local treatment, in the present state of our knowledge, seems to have any influence in curing it. Improving the general health may delay the fatal termination of the case, and the diminution of the local increased action may retard the progress of the complaint, or lessen its violence; but more is not to be expected. Instead, therefore, of having recourse to medicines which have always heretofore failed, it behoves medical men to direct their minds to the trial of the numerous agents which chemistry and botany have of late so abundantly discovered and simplified, and a store of which is always accessible. There is reason to believe that whatever can, in future, remove the disease must have a specific or peculiar power; and that the mere lessening an augmented, or increasing an enfeebled action, will do but little towards effecting a cure. Those medicines, therefore, that have been tried and failed should be put aside as useless, and a new one sought in the tribe of medicines recently discovered, or newly combined."—(*Loc. cit.*)

The compounds of iodine and arsenic have recently been tried in the treatment of this disease, and in some cases with promising results; farther trials, however, are needed to determine whether they exert any specific control over it. The combinations of iodine and mercury are also well worthy of trial. Experience has proved that, as a means of improving the general health, the bichloride of mercury, combined with the tincture of bark and

rhubarb, or the concentrated decoction of sarsaparilla, is one of the best medicines that can be employed in this affection.

Mr. DONOVAN, of Dublin, has lately introduced a new preparation of arsenic, mercury, and iodine, which has been successfully employed in *lupus* and some obstinate chronic cutaneous affections, and which seems well worthy of trial in the "fungoid" disease. It is prepared by mixing of water, $\mathfrak{z}i$.; protoxide of arsenic, gr. \mathfrak{j} .; protoxide of mercury, gr. \mathfrak{ij} .; iodine (converted into hydriodic acid), grs. $6\frac{1}{2}$.* This is the *liquor hydriodatis arsenici, et hydrargyri*, and may be given as follows: \mathfrak{R} . *Liquoris hyd. arsen. et hydrarg.*, $\mathfrak{z}ij$.; *Aqua destillata*, $\mathfrak{z}ijj$. ss.; *Sirup. zingiberis*, $\mathfrak{z}ss$. M. Div. in 4 doses, of which one may be taken night and morning. This will give $\frac{1}{15}$ th of a gr. of protoxide of arsenic, and $\frac{1}{4}$ th of a protoxide of mercury to each dose, along with $\frac{2}{3}$ ths of a grain of iodine, which, being in the state of combined hydriodic acid, will be much diminished in energy of medical effect. The quantity may be gradually increased, although we have found this a sufficient dose to begin with. It should not be given with *tincture of opium*, or the *sulphate, muriate, or acetate of morphia*, for all these produce immediate and copious precipitates in it. We believe, from some late trials, that this will be found a very valuable remedy in the above disease, as well as others of a malignant character.—(*Dublin Med. Journal*, vol. xvii.—CARMICHAEL, *Lectures, in Dublin Med. Pres.*, March 4, 1840, p. 153.) The proto-chloride of mercury and quina is also well worthy of trial in cases where there is a constitutional taint, attended with debility, especially in strumous habits; a grain of this preparation may be given three times daily until the mouth is slightly affected. The ter-chloride of carbon is another medicine which has recently been employed with considerable benefit in the Middlesex Hospital, London, in cases of cancer and other malignant affections. Applied locally, in the proportion of $\mathfrak{z}j$. to a pint of water, it is found to relieve pain, produce sleep, and remove fætor from the swelling. Given internally, in from one to three drops, three times a day, it allays nervous irritability, removes anxiety of mind, invigorates and raises the spirits, and improves the functions generally.—(*Pharm. Journ.*, Oct. 1, 1843, p. 170.)]

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FURUNCULAR ERUPTIONS.—*SYN. Furuncular Inflammations; Furuncles. Furunculi; Furunculus, Sauvages. Pynma, Willan, Good. Phlysis Furunculosa, Young.*

CLASSIF.—3. Class, 2. Order (Good). 7. Order, 1. Genus (Willan). IV. CLASS. IV. ORDER (Author).

1. DEFIN.—*Inflammation of the cellular appendices penetrating the reticular texture of the corion, arising from disorder of the digestive organs, and modified in character by the state of constitutional power, and the condition of the circulating fluids.*

2. The true skin or corion is penetrated by small conical prolongations derived from the cellular tissue underneath. With these, the vessels and nerves proceed to the superficies of the corion to form the papillar tissue and vascular rete. When inflammation commences in one or more of these prolongations, furunculus or boil, hordeolum or sty, and anthrax or carbuncle, are the results; but in these, the surrounding true skin, with the subjacent cellular tissue, participate to a greater or less extent with the progress of inflammation. M. RAYER remarks that, left to themselves, these affections always terminate in the mortification and subsequent expulsion of one or more of the small cellular cones of the dermal tissue, which are then designated by the title of cores. This termination is generally ascribed to the resistance offered by the fibrous corion to the expansion of the cone of inflamed cellular tissue, and to the consequent strangulation of it; but the cores are probably the condensed tissue surrounding the matter which is formed in the inflamed tumour, and which is thrown off after this matter is discharged. It is even possible that the inflammation in this affection commences in the vessels themselves which accompany the cellular elongations or cones; and that the disease is actually a limited angeitis, or arteritis, of one small branch, the cellular substance sloughing in consequence of its supply of blood being cut off, from an impervious state of some of the minute ramifications.

[* The process of preparing this composition, as given by Mr. DONOVAN, is as follows: "Triturate 6.08 grains of finely levigated metallic arsenic, 15.38 grains of mercury, and 50 grains of iodine with one drachm measure of alcohol, until the mass has become dry, and, from being deep brown, has become pale red. Pour on 85 of distilled water; and after trituration for a few moments, transfer the whole to a flask; add 3ss. of hydriodic acid, prepared by the acidification of two grains of iodine, and boil for a few moments. When the solution is cold, if there be any deficiency of the original 3viii., make it up exactly to that measure with distilled water; finally, filter. Each drachm of this solution, of course, contains one eighth of a grain of protoxide of arsenic, one fourth of a grain of protoxide of mercury, and four fifths of a grain of iodine (converted into hydriodic acid); fifteen drops would be sufficient dose to begin with."]

3. The varieties of furuncle are generally dependant upon disordered states of the digestive functions, and the characters which they assume vary with the states of vital action and of the circulating fluids. When furuncle occurs in a tolerably sound constitution and healthy condition of the blood, it assumes a *sthenic* character, and constitutes *furunculus*, or the *common boil*, or *sty* when it is seated in the eyelid. But, when it affects the aged or debilitated, or previously diseased, or the cachectic, or those in whom the circulating fluids are impure, and the vital actions languid or imperfect, it puts on an *asthenic* form, and gives rise to two varieties; one of which has been noticed only by M. GUERSENT and myself, and which may be called *Asthenic Furuncle*; the other has been usually named *Anthrax*, or *Carbuncle*.

I. **STHENIC FURUNCLE**—*Boil*; *Furuncle*; *Phyma Furunculosa*, Good; *Furuncle*, Clou, Fr.; *Die Beule*, Germ.

4. This species is characterized by small inflammatory swelling of the skin and subjacent cellular tissue; this swelling being circumscribed, conical, hard, red, hot, and painful; and terminating in the formation of a small quantity of matter, and the expulsion of dead cellular tissue.

5. i. **SYMPTOMS**.—This affection begins in a small, hard tumour, most frequently seated on the hips, buttocks, thighs, back, nape of the neck, and 1 armpits. The tumour becomes conical, painful, of a vivid or violet red colour, and reaches, in a few days, the size of a large walnut. From the fifth to the eighth day it points, the apex becoming white and soft. It soon afterward breaks, and discharges a little sanguineous pus, the outer part of the slough being exposed through the small opening. The core or slough is generally expelled two or three days afterward, and the pain then ceases, the swelling subsides, the cavity left by the core fills up, and in a few days the opening closes, a cicatrix only remaining. One boil is often followed by others, which follow a similar course, and attain various sizes. They may succeed one another more or less rapidly; but they are seldom attended by fever, unless they are large or numerous. When they form in the perinæum, or near the anus, difficulty of voiding urine is often felt. In other situations, they may affect the lymphatics proceeding from their seats, and the adjoining glands.

6. ii. **CAUSES**.—The application of blisters, frictions with irritating liniments or ointments, inattention to personal cleanliness, the use of sulphureous or alkaline baths, and various antecedent or associated affections are the usual causes of this eruption. Furuncle is often consequent upon the decline of, or convalescence from fevers, the exanthemata, and inflammatory disease of the skin; and it often seems to depend upon weakness, or chronic inflammatory irritation of the digestive organs, or upon the accumulation of sordes in the *prima via*. In some cases, however, it occurs without appreciable antecedent disorder.

7. iii. **TREATMENT**.—But little is required for this complaint beyond attention to the digestive organs. Accumulations of mucous sordes and faecal matters ought to be freely evacuated by an aperient, consisting of equal parts of the compound infusions of gentian and senna, with a neutral salt or alkaline carbonate. A bread

and water poultice, or any other soothing and relaxing application may be kept on the part. If the boil be large and the pain considerable, the division of the skin at the most prominent part will be of service. When a succession of boils appears, an emetic may be given, and its operation promoted by the infusion of chamomile flowers. The above stomachic aperient may be afterward continued daily, or on alternate days. If the eruption still appears from time to time, gentle tonics may be prescribed. Dr. FOSBROOKE recommends large doses of sulphuric acid. Mr. COPLAND HUTCHISON informed me that he found the liquor potassæ, or BRADISH'S alkaline solution, in any bitter tonic infusion, most beneficial in these cases. The extract of taraxacum may be added to a mixture or draught of this kind, and an alterative pill given at bedtime, and continued for some days.

8. II. **HORDEOLUM**—*Stye*; *Phyma Hordeolum*, Good; *Sclerophthalmia*, *Σκληροφθαλμία*; *Orgeolet*, Fr.; *Gerstenhorn*, Germ.—is a small inflammatory tumour or boil in the free edge of the eyelids, most frequently near the inner angle of the eye. It is in every respect a similar affection to furuncle, the difference arising entirely from the nature of its seat. It is seldom larger than a grain of barley, and is generally smaller, as its name indicates. Its causes, progress, and treatment are in all respects the same as those of common boil. This and the preceding variety of furuncle are most common in young persons, just before or soon after puberty, and in adults who eat largely and take much spirituous liquors. In scrofulous constitutions, and persons addicted to intemperance, they assume a chronic form. In such cases, local applications, with camphor, are of service.

9. III. **ASTHENIC FURUNCLE**—*Atonic Furuncle*; *Furuncle Atonique*, GUERSENT—consists of a small circumscribed swelling of the skin in one or several situations, with or without livid discoloration, followed by a very small purulent phlyctæna at the summit, and by softening, destruction, and large perforation of the corion underneath, and preceded and attended by much debility and low fever.

10. This affection was described by M. GUERSENT in 1823, and early in the same year I saw two cases of it, with Mr. PAINTER, in a low street and ill-ventilated apartment in Westminster. Both occurred in unhealthy children in the same family, and terminated fatally. The bodies were inspected after death. Since then I have seen only three other cases, but I have met with others somewhat similar, consequent on the application of leeches. All the instances which have occurred in my practice, as well as those seen by M. GUERSENT, were in children much weakened by previous disease; or in those affected by gastro-intestinal irritation, or by chronic disorder of the bronchii, or asthenic inflammation of the substance of the lungs. There have always been, both before and after the appearance of this eruption, well-marked symptoms of adynamia, and coma has generally come on before death.

11. i. **DESCRIPTION**.—This eruption appears chiefly on the trunk, the lateral parts of the neck, and insides of the thighs. In the cases which I have seen, the number of furuncles was considerable—not fewer than five or six;

and in two cases there were about twenty. They commence in small, circumscribed, and hard swellings of a livid tint, but sometimes nearly colourless. At a farther advanced stage, very small purulent phlyctenæ appear in their summits, that break, and leave the skin underneath of a grayish colour, softened and perforated as in common furunculi. They discharge at first a serous, sanguineous, or ichorous fluid. The tumours soften and disappear, and the perforations of the corion enlarge rapidly, producing, in two or three days, holes in the integuments, varying from three or four, to six or seven, or even eight or nine lines in diameter. These perforations are perfectly round; their margins are not elevated, nor thickened, nor injected, and they entirely resemble the holes made by a drill or auger. The cellular tissue is not thrown off in the form of a core, but is destroyed by a rapid ulceration, or phagedenic absorption. The bottoms of the ulcers have a grayish or sanious appearance, and are nearly dry; there is no discharge from them, nor have they any tendency to scab; and the perforations of the integuments frequently proceed down to the muscles or aponeuroses, the peculiar structure of which may often be seen at their bottoms. The skin forming their margins is pale and somewhat softened, and the cellular tissue immediately beneath the cutaneous margins is often destroyed to the extent of one or two lines. In the variety of asthenic furuncle following the bites of leeches in cachectic and debilitated children, which is the most common, the perforations of the skin are at first triangular, but their progress is nearly the same as that of the spontaneous variety, and as they enlarge they become entirely circular. The ulceration attending upon the advanced stage of disease is seldom very painful. Having reached the extent just described, it remains stationary for a longer or shorter time, and in the more unfavourable cases shows no disposition to reparation. When it evinces a disposition to heal, the bottom is more moist, somewhat redder, and more vivid; the perforated margins of the skin become more closely connected with the subjacent tissues, granulations arise and elevate the bottom of the ulcer, and the perforation is lessened. Thus a depressed cicatrix is formed, as in other cases where the skin has been destroyed.

12. In the two cases in which I had the opportunity of seeing the appearances after death, no attempts at reparation were visible in the ulcerated perforations, which went down to the muscles as if the part had been removed by an auger. There was no injection or inflammatory appearances in the margins. The chief alterations were moderate emaciation, congestion, and injection of the membranes of the brain, with slight serous effusion; congestion of the substance of the lungs, with limited hepatization in an early grade; patches of injection in the digestive mucons membrane, other parts being pale, and enlargement of the mesenteric glands. M. GUERSENT has not mentioned the internal lesions he may have observed; but those just noticed throw not much light upon the affection, and are of frequent occurrence after other diseases. In most of the cases I have treated there has been low ner-

vous fever, with more or less manifest affection of the gastro-intestinal surface, or of the head or lungs. The perforations are always uniform in character, although varying somewhat in size; they are peculiar, and are hardly ever modified from the state above described; they appear analogous to the perforating phagedenic or atonic ulcers sometimes seen in the stomach.

13. ii. TREATMENT.—The means of cure should necessarily be directed chiefly to the constitutional disorder. This should be removed by the preparations of cinchona; by the sulphate of quinine; by the mineral or vegetable acids; by camphor or ammonia; by the decoction of bark with nitre, and spirits of nitric ether; by the infusion of valerian or casearilla with the chlorate of potash, or chloride of ammonia, and chloric ether; by camphor julep with the chloro-sodiac solution; or by similar remedies, aided by means calculated to relieve internal complications, as alteratives, external derivatives, and mild stomachic purgatives. Neither leeches nor blisters should be applied, as the former are liable to multiply the perforating ulcers, and the latter are apt to produce sphacelation. The semicupium, however, with much salt and mustard in the bath, may be used. Removal to a dry, healthy atmosphere, or to the sea-side, or to an elevated situation, and light nourishment, are also beneficial. The most efficacious local applications are, the solutions of the chlorinated soda or lime; creosote; the dilute acids; pyrolygneous acid, with camphor and creosote; poultices of powdered bark, with spirits of turpentine; and the balsams and terebinthines, especially Peruvian balsam, or equal parts of it, or of copaiba, and of turpentine.

III. CARBUNCLE.—*Ανθραξ*, Hippocrates; *Anthrax*; *Carbo*; *Persicus Ignis*; *Carbunculus*, Celsus; *Phyma Anthrax*, Good; *Charbon*, Fr.; *Karbunkel*, Germ.; *Furuncular Anthrax*.

14. Carbuncle appears in the form of a hard, painful, circumscribed tumour of a deep red colour, with a sensation of burning heat, terminating in gangrene. M. RAYER states that it is an acute inflammation affecting simultaneously several of the contiguous cellular cones penetrating the reticulations of the true skin. It is not improbable that the vessels themselves, particularly the arteries, are more or less implicated in the inflammation.

15. i. PROGRESS.—Anthrax occurs most frequently in the nape of the neck, or above the nape, on the back, shoulders, buttocks, thighs, and sides of the trunk. It often commences in a small tumour, of a few lines in diameter, the apex of which is sometimes covered with a sanguinolent vesicle. In other cases it is much larger from the beginning, and it then generally advances with greater rapidity. As it spreads, so it becomes more prominent and penetrates more deeply; and, in seven or eight days, it is often as many inches in diameter. Its colour deepens to a violet or bluish tint, and it is hard throughout, until the cellular tissue of the central parts passes into gangrene. Its base afterward continues to spread, the circumference remains hard, and the centre softens and fluctuates very obscurely. The heat is still burning, the pain is tensive, and both are now referred chiefly to the base of the tumour. When

left to itself, the skin covering the anthrax becomes thin and soft after some days, and is perforated in several places. It then discharges a little bloody pus, or ichorous matter, with small shreds of mortified cellular tissue. It occasionally sphacelates to a much greater extent, and its surface becomes dark, black, and insensible. For some days afterward, new perforations are formed, through which whitish sloughs of cellular substance are passed. The openings enlarge or run into each other, give passage to a thick, sanguinolent matter, and sometimes emit a fetid odour. The sloughs are at length detached, the discharge increases and becomes thinner, and the pain and heat diminish. When the destruction of the integuments is considerable, the superficial fascia are often denuded, eroded, and even perforated, the surrounding skin being livid, bluish, thinned, and partially detached from the parts underneath. If a favourable change in the part takes place, granulations appear; and a cicatrix, which is always irregular, depressed, and puckered, and continues long dark, or brownish red, is formed, partly by the ulcerated surface, and partly by the union with it of the loose flaps of skin.

16. The constitutional symptoms are generally severe, and often precede the local lesion. Indeed, anthrax rarely occurs excepting in habits of body evincing more or less cachexy, with sanguineous plethora, and disorder of the digestive functions. For some days before its eruption, the patient complains of anorexia and increased disorder of these functions, and of lassitude, chills, or shiverings. With the development of the tumour, the febrile commotion increases, and presents the usual concomitants of inflammatory fever. If sphacelation takes place, or if the ulceration be protracted, the attendant fever assumes gradually an adynamic character; and in delicate, old, or very cachectic persons it is nervous or adynamic from the commencement.

17. Various *internal affections* may also be complicated with the external disease. Congestions or inflammations of the liver or of a portion of the lungs, enlargement of the spleen, and gastro-intestinal disorders, are the most frequent associated complaints. When anthrax is seated in the neck, cerebral symptoms are often present. If it occur in the lateral or anterior parts of the neck, dyspnoea, cough, headache, and even serious affections of the larynx or trachea, are experienced. If it take place in the parietes of the chest, the most severe pleuritic and pulmonary symptoms sometimes supervene, from the extension of the inflammation internally to the pleura, and thence even to the lungs. When it attacks the abdominal parietes, peritonitis has even occurred in a similar manner. Anthrax may also be associated with some other external eruption, especially with the common furuncle, which may either precede or accompany it.

18. ii. CAUSES.—Anthrax is most common in spring and summer, according to M. RAYER. It is certainly most frequent in persons past the meridian of life, and in females about the total cessation of the menses. High, rich, or gross living, with insufficient exercise, and a full, gross habit of body, predispose to it, and even more directly produce it. Causes which de-

range the digestive and biliary functions, the application of acrid or stimulating matters to the skin, neglect of personal cleanliness, and the bites of insects, most commonly excite it. It is often a sequela of smallpox, measles, and typhoid fevers, and it is a common attendant upon plague, and sometimes even appears in the latter stages of the putro-adynamic form of typhoid fever.

19. iii. DIAGNOSIS.—Carbuncle is to be distinguished from the common boil, by the latter having only a single opening, and being smaller and more conical; and by several occurring in succession. The former, on the contrary, is broader, less acuminated, is perforated by several openings, is darker and more gangrenous, and is generally single when occurring as an idiopathic disorder. According to DUPUYTREN and RAYER, however, anthrax is a tumour formed by the conglomeration and confluence of several furuncles. Carbuncle has very generally been confounded with malignant pustule, or anthracion. The latter belongs to a different order of affections of the skin, and is described, as well as distinguished from anthrax, in the article PUSTULES.

20. iv. TREATMENT.—This should be commenced with the exhibition of an *emetic*, the operation of which may be promoted by a tepid infusion of chamomile flowers. A full dose of *calomel* and JAMES'S *powder* should afterward be given, and the free action of the bowels promoted by *purgatives*. Whenever the pulse is strong, full, or hard, *blood-letting*, according to the age and habit of the patient, is requisite, particularly early in the disease. *Leeches* ought also to be applied around the base of the tumour, and the bleeding from their bites encouraged by tepid fomentations. A repetition of the local depletions may be required even oftener than once. *Diaphoretics*, with the potassio-tartrate of antimony and *opium*, if the pain and burning be very severe, should afterward be given, and the bowels kept open by the occasional exhibition of a purgative. When the attendant fever is of a low form, or when gangrene has taken place, and suppuration continued for some time, especially when the patient is aged, of a cachectic habit, or is addicted to intoxication, or is greatly debilitated, the decoction of *cinchona*, with the *alkaline carbonates*; the *sulphate of quinine* with *camphor*; tonic infusions with *hydrochloric acid* and *chloric ether*; and the means advised in putro-adynamic fever, should be prescribed, with light nourishment, wine, &c.

21. The *local treatment* should consist chiefly of refrigerant applications in an early stage of the swelling. Compresses moistened with equal parts of pyroligneous acid and rose-water, to which some camphor has been added, should be constantly applied from the commencement. They generally relieve the pain and burning heat. If the inflammation still proceeds, a *crucial incision*, completely across the swelling and down to its base, as advised by DUPUYTREN and RAYER, should be made. This will give instant relief by the loss of blood, and by removing the strangulation of the vessels and cellular tissue. It also averts gangrene, facilitates a healthy suppurative action, and hastens granulation and recovery. The actual and potential cauteries formerly advised are now rarely employed. Several American writers recommend the ap-

plication of blisters over the swelling, the discharge from the surface favouring a return of healthy action in the diseased part.

[The treatment of carbuncle by the *crucial incision*, early performed, and carried down to the base of the tumour, has now been practised many years by American physicians, and with great success. It is the practice uniformly recommended by Dr. MOTT and other distinguished surgeons; and a case is related by the late Dr. JOHN JONES, of New-York, in which he speaks of the advantage gained by the crucial incision, in alleviating the sense of constriction, as far back as 1795 (*Surgical Works*, p. 173). The same practice proved very successful in the Bellevue Almshouse, New-York, between the years 1817 and 1821 (C. DRAKE, in *N. Y. Med. Repository*, N. S., vol. vi., p. 462). We have uniformly treated carbuncle by free crucial incision for many years past, and have not lost a patient. We have, however, at the same time, used tonics, as quinine, internally, with porter and animal food.

The treatment of carbuncle by *epispastics* may be claimed as purely American. They were, it is true, long ago employed by RIVERIUS as counter-irritants in this disease, applied in the neighbourhood of the affected part, but Dr. PHYSICK, the originator of the treatment, applied them directly to the part itself. This eminent surgeon, however, reposed less confidence in them during the latter part of his life than formerly, for he remarks as follows: "From the great power of blisters in checking mortification, I once entertained high expectations of their utility in the treatment of anthrax. But though I have found them serviceable in abating the burning pain attending the inflammation, they have not shown any power in counteracting its progress to mortification."—(*Phil. Jour. of the Med. and Phys. Sciences*, vol. xi., p. 175.) Dr. PHYSICK was in the habit of employing blisters in anthrax for the purpose of relieving that severe burning pain which so generally attends the complaint, and he represents the relief to be very great, but rarely continuing beyond twenty-four hours, thus rendering their re-application necessary. He applied them in every stage of the disease, whenever there was much pain, and generally with good results. Dr. REYNELL COATES thinks that, although blisters may sometimes accelerate rather than retard the mortification of the centre of the carbuncular tumour, where they very seldom produce vesication, yet that they appear to circumscribe the inflammation, and thus prevent the extension of the disease. This writer suggests that the proper period for their employment is the commencement of the second stage, and the most suitable cases, those in which the extent or location of the tumour interdicts the use of the knife, and which show a strong tendency to spread indefinitely, or to become complicated with diffuse inflammation of the cellular tissue. "A blister has been known almost immediately to cause a complete line of demarcation when the mortification of an anthrax of the worst character was rapidly spreading. There is a most interesting anonymous case of this character in the *N. E. Jour. of Medicin and Surgery*, vol. ix., p. 337. The tumour was seated over the first cervical vertebra, so as to extend some inches on the scalp.

Very dangerous cerebral symptoms supervened, but they yielded readily to the blister."—(COATES, Art. *Anthrax*, in *Am. Cyclop. of Pract. Med. and Surgery*, vol. ii., p. 31, et seq.)

Some have recommended the *actual cautery* in the treatment of carbuncle, but the late Dr. PHYSICK preferred the *caustic potash*, on the ground that the ulcers resulting from burns are always unhealthy and peculiar, and have a strong tendency to form irregular, callous rugæ in the cicatrices, and almost always heal with difficulty; whereas ulcers resulting from the caustic alkali are simple, healthy, granulating sores, cicatrize readily, and leave a smooth surface, productive of little deformity. The commencement of the second stage is the proper time for the application of this remedy, or when orifices begin to form in the skin, and it should be carried to that extent as to destroy the vitality of all that portion of the *cutis vera* which would necessarily become gangrenous if it were omitted. The late Dr. DAVID HOSACK, of New-York, treated this disease very successfully, on the tonic and supporting plan; giving the patient a nutritious and stimulating diet of animal food, while, at the same time, he administered snakeroot, bark, wine, and porter freely; washing the tumour frequently with spirits or brandy, and keeping constantly applied to it a poultice composed of bark and yeast.—(*Med. and Phil. Reg.*, vol. ii., p. 388.) We have lately treated a very aggravated case successfully by the same measures, in addition to the crucial incision, which was made at an early period of the disease.]

22. When anthrax is *complicated* with any of the internal affections indicated above (§ 17), the treatment ought to be decided, and appropriate to the morbid associations, as the progress of the complication is generally rapid, owing to the unfavourable state of constitution giving rise to this kind of local disease. During *convalescence*, sulphureous baths, and the apertient sulphureous mineral waters, with strict attention to the functions of the digestive organs, and to *diet and regimen*, are usually productive of benefit. I have found the following medicines of service, when the patient cannot resort to suitable mineral waters:

No. 228. R Infusi Sennæ Comp., Infusi Gentianæ Co., Ææ ʒij. Sode Carbon. gr. xij.; Spirit. Ammon. Arom. ʒss.; Tinct. Cardamom. Co. ʒj. M. Fiat Haustus, alternis noctibus sumendus.

No. 229. Potassæ Bitart. in Pulv. ʒj.; Sulphuris Præcipitat. ʒiij.; Confect. Sennæ ʒij.; Sirup. Zingiberis q. s. ut fiat Electuarium molle, cujus capiat Coch. j. minimum, horâ somni quotidie.

BIBLIOG. AND REFER.—i. FURUNCLE.—*Celsus*, De Re Medica, l. v., c. 28.—*Bichat*, Anat. Générale, t. iv., p. 687.—*Fosbrook*, in Edin. Med. and Surg. Journ., vol. xviii., p. 64.—*Daynan*, Rev. Médicale, Sept., 1829, p. 416.—*Rayer*, Théoret. and Pract. Treat. on Diseases of the Skin, by R. Willis, p. 542.—*Lassus*, Pathol. Chirurg., t. i., p. 16.—*Richerand*, Nosogr. Chir., t. i., p. 123.—*W. Gibson*, Institutes of Surgery. Philad., 8vo, 1824, vol. i.—*Chelius*, Handb. der Chir., b. i., p. 74.—*M. Good*, Study of Med., by Cooper, vol. ii., p. 350.—*F. G. Boissacq*, Nosographie Organique, t. iv., p. 91.—*J. Green*, Pract. Compend. of Dis. of the Skin. Lond., 1835, p. 268.

ii. ASTHENIC FURUNCLE.—*Guersent*, in Archives Générales de Médecine, t. i., p. 336.—I find, upon reference to the *London Medical Repository* for July, 1823, p. 32, that I described this eruption in the London Medical Society at the commencement of that year; and that soon afterward M. GUERSENT's paper respecting it appeared in the *Archives*. It was thus noticed, for the first time, almost simultaneously by this physician and myself.

iii. CARBUNCLE.—*Celsus*, lib. v., sect. 28.—*A. Tosi*, De Anthrace seu Carbunculo Tractatus, 4to. Venet., 1576.—*C. P. De Herrera*, De Carbunculis Animadvers., 4to. Piu

- tis, 1604.—*T. D. Mitchell*, New-York Med. and Phys. Journ., 1815, vol. ii., p. 64.—*J. B. Beck*, in *Ibid.*, 1823, vol. ii., p. 37.—*D. Hosack*, Essays on Various Subjects. N. Y., 1824, vol. ii., p. 256.—*A. Cooper*, Lectures, *Lancet*, vol. i., p. 245.—*Sonson*, in *Dict. de Méd. et Surg. Prat.*, t. iii., p. 26.—*Morjolin*, *Dict. de Méd.*, 2d edit. Paris, 1833, art. *Anthrax*.—*Dupuytren*, *Leçons, Lancette Française*, Mars, 1833.—*Rayer*, *Opus cit.*, p. 549.—*R. Coates*, in *Amer. Cyclop. of Pract. Med.*, vol. ii., p. 29.—*J. Green*, *Opus cit.*, p. 270.
- [AM. BIBLIOG. AND REFER.—*John Jones*, *Surgical Works*, edited by *Dr. Mease*, 8vo. Phil., 1795.—*R. W. Hall*, *Translation of Larrey's Surgery*. Balt., 1814.—*T. D. Mitchell*, *Anthrax successfully treated*, New-York Med. and Phys. Journ., N. S., 2 vols., p. 64, 1815. New-Eng. Jour. of Medicine and Surgery, N. S., vol. vi., p. 339. Boston, 1820.—*C. Drake*, in *New-York Medical Repository*, N. S., vol. vi., p. 462, 1821.—*P. S. Physick*, *A Case of Carbuncle, with some Remarks on the Use of Caustic in that Disease*, in *Phil. Journ. of the Med. and Phys. Sci.*, vol. ii., p. 172, 1821.—*J. B. Beck*, *A Case of Anthrax successfully treated*, in *New-York Med. and Phys. Journal*, vol. ii., p. 37, 1823. *David Hosack*, *Essays on Various Subjects*, vol. ii., p. 256. New-York, 1824, 3 vols. *Lectures on Pract. of Physic*.—*D. C. Freeman*, *A Case of Anthrax*, in *New-York Med. and Phys. Journal*, vol. iii., p. 252, 1824.—*P. S. Townsend*, *Letter to Dr. Hosack, on a Case of Anthrax*, New-York Med. and Phys. Journal, vol. iii., p. 335, 1824.—*W. Gibson*, *Institutes of Surgery*, vol. i. Philad., 1824.—*Reynel Coates*, in *Am. Cycl. Pract. Med. and Surg.*, vol. ii., p. 32.—*D. M. Reese*, *Am. Ed. of Cooper's Surg. Dict.*—*A. S. Doane*, *Am. Ed. of Good's Study of Medicine.*]

END OF VOL. I.

DICTIONARY

OF

PRACTICAL MEDICINE.

GALL-BLADDER AND DUCTS.—*SYN. Biliary Passages; Channels of the Excretion of Bile. La Vésicule et les Canaux du Fiel; Les Voies d'Excrétion de la Bile, Andral. Die Gallenblasse, Die Gallengang, Germ.*

CLASSIF.—GENERAL PATHOLOGY—Morbid Structure: SPECIAL PATHOLOGY.

1. The intimate connexion, anatomically and physiologically, existing between the liver—the organ secreting the bile, and the digestive canal—the organ for whose functions the bile is chiefly destined, necessarily involves the passages which convey it from the former into the latter, as well as the reservoir of this secretion, in many of the diseases seated in either the one or the other. The affections of the liver, whether functional or structural, are thus often extended to the gall-bladder and ducts; and those of the stomach and duodenum not infrequently proceed in an opposite direction to the same parts. But the bile itself may excite disease in the parts through which it passes, and in which it is for a time retained. It will, however, be necessary to take a view of the alterations observed of this secretion, before noticing the effect they sometimes produce in the biliary passages.

1. OF THE ALTERATIONS OF THE BILE.

2 The changes of the bile have been found independent of any alteration in the liver, or in the gall-bladder or ducts; and, in most of the lesions of these parts, the bile has been unaltered in appearance or in quantity, and most probably also in quality. It would seem, therefore, that the most apparent and the most serious lesions of the liver are not always those which most derange the secreting action of this organ. The conditions which most affect the state of this fluid are such as are either beyond our powers of observation, or seated in the blood. Indeed, there is every reason to suppose that the liver performs, as I many years ago argued in another work, an eliminating function as respects the blood; and that it separates elements from this source, which would be injurious if allowed to accumulate, and elaborates them into a secretion necessary to digestion and assimilation. Alterations in the quality and quantity of the bile, therefore, in a great measure depend upon the blood, and upon the quantity of those constituents which the liver eliminates from this fluid and elaborates into this peculiar secretion.

3. *A.* The only alterations which can be detected in the bile upon simple inspection are differences in colour and in consistence.—*a.* It pre-

sents every shade of colour, from a whitish pale straw colour to the deepest black. The lightest tints have been most frequently observed in cases of anæmia or chlorosis, or where the blood has been thin, watery, pale, or devoid of red particles, the liver being small, pale, and containing little blood. The dark colour is most common where the blood is thick, dark, or black, and abundant; and when the liver is congested, and the biliary passages loaded with bile.—*b.* The consistence of this secretion varies from the fluidity of water to the thickness of half-melted glue, or of tar, or even of pitch. The deeper its colour, the greater is its consistence; but there are numerous exceptions to this.

4. *B. Chemical analysis* shows that the constituents of the bile vary greatly in their proportions. As the liver approaches more completely to the fatty condition, the more entirely is the bile deprived of its resinous elements. It sometimes, particularly in cases of fatty liver, consists chiefly, or almost entirely, of water and albumen. In other instances, the yellow matter, the resin, or the cholesterin is the predominant principle. It is this change in the proportions of the component parts of the bile that gives rise to its consistence, as well as to *Biliary Concretions* (see that article).

5. *C. Physiological experiments and various diseases* evince material alterations in the qualities of the bile. This secretion, taken from some dead bodies, produces no other inconvenience, when introduced into a living animal, than a slight local irritation; while that taken from others occasions much more serious consequences, and even death itself. In some cases it may be tasted with impunity; in others it produces pustules, ulcers, or vesications on the tongue and lips. It has been observed, in dissections of persons who have died of pestilential yellow fever (see *PESTILENCE*), that the bile has excited a painful or burning sensation, followed by excoriation of such parts of the examiner as had come in contact with it. A similar effect is not infrequently produced in the rectum, and around the anus, from the passage of bile which has been long retained and accumulated in the biliary passages. Numerous other proofs of an increased acrimony of this fluid, arising either from the state in which it is secreted, or from changes that have taken place in it during its retention, might be adduced if they were required.

6. From these considerations it may be in-

ferred, (a) that accumulations of this secretion, in either the gall-bladder or ducts, will arise from impaired contractility, or from mechanical obstructions at the outlets, or from the viscid or morbid state of the secretions itself; (b) that the bile itself will sometimes occasion very serious disease in the gall-bladder or ducts, owing to an acrimony acquired by it in the way just stated (§ 2); and (c) that, when the bile is thus accumulated or retained, as well as altered in quality, the consequent disorder, either in the biliary passages, or in the digestive canal, when it has reached the latter situation, will be the more severe. The difficulty, however, of forming a correct opinion as to the complaint, when the gall-bladder or ducts are its seats, should not be forgotten; for, owing to the relations noticed above (§ 1), it often is impossible to distinguish disease of either the one or the other from that of the liver or duodenum, unless the passage of bile into the intestines is altogether interrupted; and even then the exact nature and extent of lesion are equally difficult of recognition.

[ANDRAL remarks that the bile, although in some instances so bland that it might be "touched and tasted with safety," yet, under other circumstances, "it caused pustules and ulcers on the tongue and lips, and when introduced into the living body, has produced more serious consequences than even death itself" (*Path. Anat.*). DR. JOHNSON, also, observes that the colour and taste of the bile are sometimes surprisingly altered, it being of all colours, from bottle-green to jet-black, and has been so acrid as to set the teeth on edge (*On Trop. Climates*, vol. i., p. 32). Our countryman, DR. RUSH, has likewise noticed the irritating quality of the bile in producing excoriations on the skin of those engaged in dissection. It is owing to these changes, undoubtedly caused by intense and long-protracted heat, that bilious diarrhæas are so frequent in tropical climates. When muriatic acid is added to human bile it becomes of a green colour (STEWART'S BILLARD): a fact noticed by DR. MACLURG in his work entitled "*Experiments on the Human Bile*" (Lond., 1772). That the bile has a neutralizing effect upon the muriatic acid of the stomach is established by the experiments of PROUT and other physiologists. The existence of acid in the intestines, and the effect it has on the bile, are shown in the dissection of a child that died of cholera infantum, made by DR. HORNER, of Philadelphia (*Path. Anat.*, p. 171), in which disease there is often some bile secreted, although in general there is a suspension of it. "Yellow bile," he says, "was found in the jejunum, but green in the colon;" to explain which phenomenon he adds, "We know that frequently, in cholera, the alvine discharges are in a state of fermentation, and are sour: is this process confined to the colon? if so, the rationale is, that the bile retains its natural colour in the small intestines, but becomes green in the large, from meeting there with accescent matters, made so by fermentation." Other facts could be adduced, were it necessary, to show that one of the causes of an altered colour in bile is the presence of acid.]*

* [Healthy bile is a fluid of a green colour, bitter taste, and nauseous smell. The bile which flows from the liver is of a lighter colour; that obtained from the gall-bladder is

II. INACTION OF THE GALL-BLADDER AND DUCTS.

—*Accumulation of Bile in the Gall-bladder and Ducts from local Asthenia.*

CLASSIF.—I. CLASS, I. ORDER (Author).

7. CHARACT.—*Fulness, weight or uneasiness in the epigastrium and hypochondrium; flatulence or symptoms of dyspepsia; a pale, slightly lurid, or muddy complexion; scanty or morbid excretion of bile in the stools, frequently with debility and depression of mind.*

8. i. When the functions of the liver, or those of the stomach and duodenum, are impaired, the gall-bladder and ducts necessarily participate in the disorder; and the bile is liable to accumulate in them. The accumulation may arise from one or more of the following conditions: 1st. Impaired tonic contractility of the coats of the gall-bladder, and perhaps, also, of the ducts. 2d. A congested or tunefied state of the mucous membrane at the outlet of the common duct and in the duodenum. 3d. In-spissation of the bile in the gall-bladder and ducts from the morbid state of the secretion, or from the absorption of its more fluid parts while retained in these situations. 4th. Spasm of the ducts themselves; and, 5th. Temporary or constant occlusion of the ducts from inflammation, or from the presence of biliary calculi, either in them or in the gall-bladder.

9. A. The first of these pathological states is of frequent occurrence, in a moderate degree. When the contractility of the coats of the biliary passages or of the gall-bladder is impaired, in connexion with torpor of the liver and debility of the stomach and duodenum, the bile is imperfectly excreted, or it accumulates in these situations. The consequent distention, or the irritating properties the bile acquires by the retention, or some other cause, excites the contractility of these parts, and occasions the collected secretion to be thrown into the duodenum, where it produces more or less disorder, owing to its acridity, and to the very intimate and extensive relations of this intestine with the rest of the œconomy. When the bile has thus accumulated, a very gentle aperient will often be the cause of a violent action on both the stomach and bowels: this secretion, particularly if rendered acrid by long retention and

less fluid, and greener, on account of the more fluid part having been absorbed; and it is more viscid, owing to its containing mucus. According to SCHULTZ, bile, when fresh, is always alkaline; when of thick consistence, one ounce required one drachm of acetic acid for its neutralization; when more fluid, the same quantity was neutralized by $\frac{1}{4}$ or $\frac{1}{2}$ drachm of the acid. According to BERZELIUS, bile contains 90.44 per cent. of water; 8.00 per cent. biliary matter with fat; with a small quantity of mucus and salts of soda and lime. DR. PROUT'S analysis corresponds very nearly to that of BERZELIUS. THENARD, in 1806, first discovered two new substances in bile, *picromel* and *resin*. In 1000 parts he found 875.6 to be water; 30 of biliary resin; 75.4 of picromel; 5 of yellow colouring matter; and a small proportion of salts of soda and lime, with a trace of oxide of iron. GMELIN regards the biliary matter of BERZELIUS as a compound of several other substances; among the constituents of bile of the ox, he enumerates *cholesterin*, *elaic acid*, *stearic acid*, *chloric acid*, *biliary resin*, *taurine*, *picromel*, *colouring matter*, *osmazome*, *casein*, *albumen*, and *numerous salts*; and in human bile he found *cholesterin*, *biliary resin*, *picromel*, and *elaic acid*. It is very probable, however, as suggested by BERZELIUS, that the bile in its natural state is a simple fluid; this appears from the results of chemists; its tendency to undergo changes being so great, that the action of different re-agents upon it converts it into different compounds, according to the processes employed to extract them. exactly as bile and fats are converted into sugar and fatty acids by the action of the oxides of lead and zinc.]

by the influence of temperature or season, giving rise to all the characters of bilious cholera when its rapid flow into the duodenum has been thus procured.

10. *B.* That congestion, or a tumefied condition of the mucous membrane of the duodenum, will occasion accumulations of bile in the ducts and gall-bladder, is at least extremely probable; for the aperture of the common duct in this viscus being thereby narrowed, a diminished discharge of bile into it will result, particularly if this secretion be thicker or more viscid than natural. In cases, therefore, of acute or chronic duodenitis, or of irritation of the internal surface of the duodenum, particularly if there also exist spasm either of this viscus or of the common duct, an impeded or interrupted flow of bile into the digestive canal, with consequent accumulation of it throughout the biliary passages, with or without jaundice, will very generally supervene.—(See art. DUODENUM, § 12.)

11. *C.* That the bile becomes inspissated and often more acrid by retention in any of its passages may likewise be conceded. The fact is even demonstrated, not only by observation during the life of the patient, but also by the appearances after death. In such cases, it is with some difficulty that the secretion can be forced along the ducts, or from the gall-bladder along the cystic canal. In an inactive state of the liver, the hepatic ducts are unable to discharge the bile which passes into them; and this fluid, during its collection and retention, is liable to be partially absorbed. Owing to this absorption, or to the state of the secretion at the time of its production, or to both, inspissation, viscosity, and increased acrimony of it may take place before it passes out of the liver, or reaches the larger ducts or gall-bladder; and even concretions may form in it from the same circumstances, in any of these situations.—(See art. CONCRETIONS—Biliary.)

12. *D.* Spasm of the common or cystic duct may give rise to retention, and be followed by the same series of changes as have been just mentioned; but the evidence of the occurrence of spasm is much less complete than that of the other pathological states. It seems, however, probable that the passage of an acrid secretion along the cystic and common ducts will so irritate them as to give rise to spastic constriction of them. This effect is produced upon other canals by irritating matters; and it may therefore be inferred that a similar result will accrue in this situation from the operation of these agents. That it does occasionally take place, has been demonstrated in some instances by *post-mortem* inspections. That inflammation of the ducts is often followed by accumulation of bile in the gall-bladder and hepatic ducts will be shown hereafter; it may, however, be stated that a persistence, or a higher grade of the same cause—the acridity of the bile—as sometimes occasions spasm or constriction of the ducts, will even induce inflammation of them and its consequences. It has been often found, upon examination after death, that collections of bile have arisen from tumours, or morbid enlargements of the pancreas, pressing upon, or even obliterating the ducts, particularly the common duct. Several instances of this kind have occurred to me in practice. That biliary concretions in the common,

the cystic, or the hepatic ducts often produce similar effects is a sufficiently established fact in pathology.

13. *ii.* The *symptoms* of accumulations of bile in the gall-bladder and ducts from impaired action are, fulness and uneasiness in the epigastrium, extending to the right hypochondrium, sometimes attended by a sense of weight, distention, and of coldness in the pit of the stomach, and by pain or uneasiness about the lower angle of the shoulder blades; flatulency, oppression, or acidity of the stomach; a pale or sallow complexion; a dark circle round the eyes; a loaded, pale, or yellowish tongue; diminished clearness of the skin; a soft, slow, weak, or languid pulse; lassitude or debility; inability of exertion; constipation, colicky pains, or an irregular state of the bowels, with deficiency of bile in the stools; loaded or dark urine, with a more or less copious sediment; occasionally pain in the eyes and forehead; and mental depression, with disinclination to mental or physical employment.

14. *iii.* *COMPLICATIONS.*—This complaint may be symptomatic of other affections, particularly of those already alluded to. It may also occasion various associated ailments. When arising from previous disorder of the stomach or of the intestines, or of the liver itself, the primary affection will be more or less increased by it. The associated ailments, with some of which it often stands in the relation either of cause or of effect, are chiefly indigestion, constipation, diarrhoea, jaundice, colic, hypochondriasis, agues, rheumatism, gout, herpetic and other cutaneous affections, enlargements of the spleen, asthmatic seizures, dropsy, and palpitations or other irregular actions of the heart. I have often had occasion to observe that, when any of these complaints was attended by the symptoms characterizing this affection, if a purgative succeeded in procuring copious bilious evacuations, a very beneficial effect speedily followed. In many of these morbid associations a very gentle aperient has produced a very violent operation, but the result has always been most salutary. A lady was subject for some time to palpitations, intermissions of the pulse, with great uneasiness at the *præcordia*. Various opinions were given as to the nature of the disease. Having been consulted, I observed several of the symptoms indicating accumulations of bile on the biliary passages. A moderate dose of calomel, to be taken at bedtime, and a mild purgative draught in the morning, were prescribed. Violent catharsis followed, and the disordered action of the heart disappeared. In 1822, I was requested by a practitioner to see a patient with him labouring under a severe attack of asthma. He had been purged, but without relief. I inferred from the symptoms that accumulations in the biliary passages had favoured the accession of the seizure; and therefore prescribed, in addition to other means, five grains of calomel, with one of ipecacuanha, and five of the extract of henbane, to be given at night, and a stomachic aperient in the morning. The former of these procured an irruption of acrid bile into the duodenum to such an amount as to occasion violent cholera, the morbid bile, in passing through the rectum, occasioning severe scalding and excoriation around the anus. A military officer, who had

suffered several attacks of ague, was seized with it in London, during an easterly wind in March. The practitioner who attended him had prescribed purgatives, and the sulphate of quinine, without benefit. I recommended a bolus to be given at bedtime, containing twenty grains of calomel, five of JAMES'S powder, and three of camphor, in conserve of roses; a purgative draught in the morning, and persistence in the use of quinine. Before the purgative draught was taken, violent bilious purging came on, and he had no return of the ague. I could adduce, if it were requisite, numerous instances illustrative of the importance of attending to the association of the morbid state now under consideration with other ailments. I know of no disordered condition which so generally predisposes, or so frequently gives occasion to other and more severe diseases as this.

15. iv. The Remote Causes of accumulations of bile are numerous, and not fully recognised by writers. From my own observations in this climate, as well as in warm and other countries, I believe that they will be found to be the following: (a) *Predisposing*.—A warm, moist, low, and miasmatic climate; mental depression, anxiety, and grief; general debility, and weakness of the digestive organs; the bilious, melancholic, or phlegmatic temperaments; sedentary occupations, indolence, and confinement; insolation; too full living, and the use of too much animal food; indulgence in wine or spirituous liquors; and venereal excesses.—(b) The *exciting causes* are, the sudden or protracted abstraction of the heat of the body, especially when in an inactive state, as sleeping with too few clothes, or in a damp bed, and the ingestion of cold drinks or ices; neglect of the bowels; and agues, or previous disorder of the biliary apparatus.

16. v. TREATMENT.—The means to be employed for the removal of this disorder are so evident as scarcely to require remark. Cases, however, occur in which some discrimination as to the choice of medicines for the evacuation of the accumulated secretion is necessary. In general, the milder purgatives should be first prescribed; and, if these fail, the more energetic may be employed. It often happens, particularly when the bile has become inspissated, or when the gall-bladder and ducts have had their contractility much impaired by over-distention, or by any other cause, that the repeated exhibition of chologogue purgatives is necessary. But in other cases, especially when the bile has acquired acrid qualities, the gentler means will be the least likely to produce the severe effects often following the first dose of a purgative, after the disuse of this kind of medicine for some time. Accordingly, five grains of blue pill, or of PLUMMER'S pill, may be given at bedtime, and a mild aperient draught the following morning. The evacuations should be inspected, and the repetition of these, or the selection of more active means, determined upon from the appearances they will present. If it should be necessary to repeat the purgative frequently, the mercurial ought to be given with caution, or only on each second or third night, and either of formulæ 205, 266, or of the following, should be taken on the following morning, and on the intervening nights, until all biliary collections have been removed:

No. 230. R Infusi Sennæ Comp., Infusi Gentianæ Comp., Æā ʒvj.; Potassæ Sulphatis ʒj.—ʒss.; Extracti Taraxaci ʒss.—ʒij.; Tinct. Cardamom. Comp. ʒss. M. Fiat Haustus, horâ somni vel primo mane sumendus.

No. 231. R Infusi Calumbæ, Infusi Sennæ Comp., Æā ʒvjss.; Sodæ Carbon., gr. xv.—ʒj.; Extr. Taraxaci ʒij.; Tinct. Cardamom. Comp. ʒss. M. Fiat Haustus ut suprâ sumendus.

No. 232. R Potassæ Bitart. in pulv. ʒss.—ʒvj.; Confect. Sennæ ʒss.; Sirupi Zingiberis q. s. ut fiat Electuarium molle, cujus dimidium sumatur horâ somni, vel mane nocteque.

17. The above are generally sufficient to accomplish the ends in view. But sometimes they fail, although repeated, to procure a sufficient evacuation of bile, or to remove all the symptoms depending upon collections in the biliary passages. When this is the case, a full dose of calomel, with JAMES'S powder or camphor, or ipecacuanha, or with the compound camboe pill, or the compound extract of colocynth, may be given at night; and either of these draughts, or a solution of neutral salts, in the morning. An emetic is often beneficial in such circumstances, before these measures are resorted to. When there appears reason to believe that the accumulation of bile arises from active congestion of the duodenum, particularly when the symptoms of inflammatory indigestion are present, or when the indications of spasm in the ducts seem to exist, calomel is generally necessary, and it may be repeated with advantage. The combination, also, of ipecacuanha or antimony with the purgative taken at night promotes the action on the biliary organs. In some obstinate cases, when it was necessary to repeat the purgatives frequently, I have given colchicum in either of the above draughts with effect. Besides these, frictions with stimulating liniments over the right hypochondrium and epigastrium, or a blister, the nitro-hydrochloric acid lotion, or the emplastrum ammoniaci cum hydrargyro, in the same situation, may be prescribed. A healthy air, or change of air, regular exercise, particularly horse exercise, early hours, and the use of the Cheltenham mineral waters, or the artificial mineral waters of Seidenschütz or of Pullna, with attention to diet, will materially promote the action of the biliary apparatus. The treatment is, in other respects, similar to that advised in the articles on CONSTIPATION and INDIGESTION.

III. EXCESSIVE DISTENTION OF THE GALL-BLADDER.

18. i. It is not often that the accumulation of bile in the gall-bladder is so great as to give rise to an external tumour, as its discharge into the duodenum generally occurs before it reaches this extent. But cases sometimes are seen in which a very distinct tumour is formed by the distended gall-bladder in one of the following situations: 1st. In the epigastric region, and a little towards the right side; 2dly. Immediately below the cartilaginous margins of the right ribs; 3dly. Lower in the hypochondrium, and directed either downward, or upward, or even backward, but most frequently rising into the epigastrium; and, 4thly. Descending down either towards the umbilicus, or to the crest of the ilium, or between these situations. The distention of this viscus arises, (a) from inflammation and tumefaction, or thickening, &c., of the coats of the common duct, occasioning more or less narrowing or

complete obstruction of its canal; (b) from similar lesions, or tumours, in the duodenum, implicating the termination of this duct; (c) from the arrest of a biliary calculus in the same situation; (d) from tumours in the pancreas, pylorus, or adjoining parts, or even in the liver itself, pressing upon this duct; (e) from the entire obliteration of the duct, in consequence of either of the foregoing lesions; and (f) possibly from spasmodic constriction, or from the accumulation of thickened bile or mucus in the canal. Of these five alterations, all but the last have been observed by me in *post-mortem* examinations. The last, very probably, has existed in some of the cases in which the tumours have disappeared with more or less rapidity.

19. The tumour, thus formed by an excessively distended gall-bladder, may, α . continue during the remaining life of the patient; β . or disappear after a longer or shorter time, its subsidence being either slow or rapid. This latter event may proceed either from the removal of the obstruction in the common duct, whether this have been spasm, inflammation, or any of the more mechanical obstacles just mentioned, or from the gradual absorption of more or less of the bile in the bladder. When absorption of the contents of this viscus proceeds, an additional quantity not passing into it, the tumour will disappear slowly and gradually. Instances have occurred, however, in which the coats of the gall-bladder, owing to the great distention, or to the acrimony of the contained fluid, have become inflamed or ulcerated, and have subsequently been perforated or ruptured, the contents being effused, either into the peritoneal cavity, giving rise to intense and rapidly fatal peritonitis, or into some other viscus with which the gall-bladder had previously formed adhesions. Cases of this kind have been recorded by SCHENCK, BERTIN, ALBERTI, SALMUTH, BONET, DESJARDIES, PORTAL, FRANK, DOUBLE, and PORRAL. The accumulated bile may even be poured out externally, owing to the adhesion of the gall-bladder to the abdominal parietes and to the inflammation, ulceration, and perforation having proceeded from the former to the surface of the latter. HORSTIUS, BLOCH, AMYAND, and DE HAEN have detailed cases of this description.

20. Although calculi lodged in the common duct most frequently occasion distention of the gall-bladder, yet this cause may exist without this effect being observed; or it may have been present and have gradually subsided. M. DUPLAY (*Journ. Hebdomad.*, t. iii., p. 14) has adduced a case in which this duct was completely obstructed by a calculus, the hepatic ducts and their radicles having been much dilated, and yet the gall-bladder was atrophied, and reduced to a simple canal with thickened parietes. Inflammation of the gall-bladder had most probably supervened in this instance, and been followed by thickening and constriction of its coats, with absorption of its contents. M. PETIT thinks that inflammatory engorgement and tumefaction of the liver is often concerned in producing accumulation of bile in the bladder; and that, when the resolution of the inflammation is followed by a copious secretion of this fluid, before the congestion or tumefaction and obstruction of the common duct have

been removed, the distention of the gall-bladder will often be excessive. From whatever cause it may arise, the accumulation is often remarkable. In a case related by Mr. GIBSON (*Edin. Med. Essays*, vol. ii., p. 352), the tumour was so large as to reach over to the left hypochondrium, to force out the false ribs of both sides, and to occasion great difficulty of breathing. The common duct was found, after death, obstructed by concretions, and the gall-bladder contained eight pounds of thick bile. YOUNG (*Philos. Trans.*, vol. xxvii.) found in the body of a middle-aged female a similar obstruction, and nearly the same quantity of thick bile in the gall-bladder. Parallel instances, to which references are made at the end of this article, are recorded by VESALIUS, GOLDWIZ, HUESINGER, HAUTESIERK, AMYAND, VETTER, KRAEFF, VAN SWIETEN, DUVERNEY, PEZOLD, WIEDEMANN, and others.

21. The contents of a distended gall-bladder do not always consist of bile. In rare instances, purulent matter, or numerous biliary concretions, have been collected in it. The former has generally passed into it from an abscess in the liver, either along the ducts or subsequent to adhesions formed between the external surfaces of the liver and gall-bladder. MORGAGNI and FANTONI found it distended by air.

22. ii. DIAGNOSIS. — A tumour arising from accumulations of bile in the gall-bladder may be mistaken for an *abscess of the liver*, or for *encysted dropsy*, or for a *tumour containing hydatids*; and, if an opening were made into it, in the supposition of it being either of these, a fatal result would immediately ensue, unless adhesions had previously formed between the gall-bladder and the parietes of the abdomen, which rarely take place. It, therefore, is very necessary to distinguish between these diseases and an excessive distention of the gall-bladder. — (a) The diagnosis between this latter and *abscess of the liver*, pointing externally, is often difficult. In a case which I had an opportunity of seeing, the surgeon was about to puncture the tumour, when, delay having been suggested, and chologogue purgatives prescribed, the tumour disappeared after a copious discharge of bile. A similar case was lately reported in one of the London Medical Journals. M. PETIT, having been consulted in a case that had been considered abscess of the liver, had commenced with the operation for the removal of its contents; but as soon as he had divided the integuments the tumour became soft, and instantly afterward subsided. He closed the incision and proceeded no farther, telling the assistants that this occurrence had shown him the nature of the disease, and that copious bilious evacuations would soon take place. This directly occurred, and the patient recovered. The symptoms distinguishing between these two lesions are the following: 1. The rapid appearance and circumscribed form of the tumour, with manifest fluctuation throughout its extent, when it proceeds from the gall-bladder. 2. The softness and mobility of the integuments over the more prominent parts of the tumour; and the absence of a diffused swelling or hardness at the circumference, and of œdema, or of an emphysematous feel, when it is thus produced. 3. Abscess of the liver is consequent upon in-

flammatory symptoms referable to this viscus. The tumour it occasions forms slowly, is attended with great swelling, and tension in the parts adjoining, and is at first diffused, hard, and imperfectly defined. Fluctuation is very obscure, occurs late in the progress of the swelling, and is confined to the centre, the circumference being hard and tumid. 4. There are always febrile symptoms attendant upon this disease; but they are seldom observed in distention of the gall-bladder, unless inflammation has supervened. 5. Pain in suppuration is pulsatory, in the other it is not, and it generally intermits. 6. Shivering is more frequently present in suppuration, or continues longer, than in distention of the gall-bladder; and it terminates in perspiration, which rarely occurs in the latter. 7. A distended gall-bladder presents more of the appearance of a deep-seated encysted tumour than of abscess.—(b) The swelling from *encysted dropsy* is larger, and the fluctuation more distinct than from a distended gall-bladder.—(c) The same remark, however, does not apply to the *encysted tumours* that contain hydatids. Between both these and distention of the gall-bladder the diagnosis is often very difficult, unless the appearances of the evacuations and of the skin are closely observed. In the latter the stools are devoid of bile, are white or clayey, &c.; the urine is very dark, loaded, and clouded; and the skin discoloured or jaundiced. In the former the stools are rarely without bile, and the other symptoms are seldom observed, as there is no interruption of the passage of this secretion into the duodenum, nor suppression of the function.

23. iii. The *Treatment* of excessive distention of the gall-bladder should not be materially different from that advised for the common occurrence of impaired action of the biliary passages (§ 16). The alkaline carbonates, the spirits of nitric æther, and the extract of taraxacum, in liberal doses, either in camphor julep, or in the medicines prescribed above (§ 16), or in the decoction of taraxacum, will often be serviceable, especially when the use of them is steadily persisted in, is varied according to circumstances, and is aided by the external remedies already mentioned (§ 17). When the distention seems to arise from the arrest of biliary concretions in the common duct, or, indeed, from any other cause, the liquor potassæ, castile-soap, the biphosphate of soda, antimonials in small doses, anodynes, the warm bath, and oleaginous aperients, as olive oil, &c., will be the most useful. *Emetics* are dangerous; but laxatives, mild purgatives, and aperient enemata are beneficial, and should be continued from time to time. In all cases of biliary obstruction the means enumerated at another place (see art. CONCRETIONS—Biliary, § 14, et seq.) will be very appropriate. The most suitable *beverages* are, the common imperial drink, or a solution of equal parts of the bitartrate of potash and biphosphate of soda, dissolved in a weak decoction of marsh-mallows, or of taraxacum, with a little orange peel, &c.; or warm whey, or soda water, or spruce beer. The factitious waters of Seidschutz, or of Geilnau, or of Marienbad, or the mineral waters of Seidlitz, of Leamington, or of Scarborough, are often of service both in this and other forms of biliary

obstruction. But I believe that there is no mineral water more beneficial than that most common of all mineral waters, namely, sea water, when it is taken in sufficient quantity, and persisted in for a reasonable period.

IV. INFLAMMATION OF THE GALL-BLADDER AND DUCTS. *Hepatitis Cystica*, Sauvages; *Cholecystitis*, Hildenbrand.

CLASSIF.—II. CLASS, III. ORDER (Author).

24. DEFIN.—*Deep-seated acute pain in the epigastric region, extending to the right hypochondrium, and backward, generally with vomiting of a greenish bile, frequently with jaundice, and always with symptomatic fever.*

25. i. The *Symptoms* of inflammation of the gall-bladder or ducts are extremely fallacious. This disease may be either acute, sub-acute, or chronic; and, in either of these states, it is generally consecutive of inflammation of the concave surface of the liver, or of obstructions of the ducts, or of the irritation of biliary concretions; and hence its approach is slow and insidious, or the symptoms attending it are merely an aggravation of those produced by the antecedent disorder. This is especially the case when it occurs in a chronic or sub-acute form. Chills or rigours may or may not occur; but they are generally preceded by pain, more or less severe and acute, in the situation mentioned above. Vomiting is frequently present, and the matters ejected are often greenish. There is great tenderness at the epigastrium, and pressure is apt to excite vomiting. Severe colicky pains are felt in the upper regions of the abdomen; and jaundice sometimes appears suddenly. The attendant fever is characterized by a small or constricted pulse, by evening exacerbations, by a very dark, turbid, and scanty urine, and by thirst. The stools are generally devoid of bile. These are the most constant symptoms of inflammation of this viscus; but they are not altogether to be depended upon, for they are usually present in hepatitis, and even in duodenitis or gastritis. Another circumstance which adds to the difficulty of diagnosis, besides its mode of accession, is its frequent *complication* with these diseases, or with dropsical effusion, especially in the abdominal cavity. But inflammation of the gall-bladder or ducts is often consequent upon excessive distention; and, when this is the case, the characteristic symptoms commonly follow a more or less distinct tumour in some one of the situations I have noticed above; and the nature of the complaint is thereby made manifest; jaundice, and white stools, with very dark urine, being then seldom or never wanting.

26. ii. *Changes consecutive of Inflammation of the Gall-bladder, &c.*—These are various. I shall take a brief view of the most common.—(a) *Suppuration, ulceration, and softening* are not infrequent. The gall-bladder may be almost filled with *pus* from inflammation of its internal surface; but the admixture of *pus* with the bile and ulceration are more common. Cases of this kind have been noticed by VETTER, MORGAGNI, AMYAND, WALTER, MORAND, FRANK, BAILLIE, SÆMMERING, MARTIN SOLON, and ANDRAL. The ulceration may pass into *perforation*, or even *rupture*, without any very considerable distention of the viscus having previously occurred, the bile being effused in the peritoneal cavity or into some adjoining viscus in the man-

ner already noticed (§ 19). In cases of ulceration and rupture, softening is not often absent; and probably it favours the latter occurrence.—

(b) *Gangrene* is a very rare occurrence. I have seen it mentioned only by J. P. FRANK.—(c) When inflammation either commences in, or extends to the more external coats of the gall-bladder, *adhesions* of it take place to adjoining parts. It has been seen adhering to the peritoneum, by BLOCH, PETIT, &c.; to the omentum, by WALTER; to the duodenum, by LUDWIG, FRANK, PORTAL, REYNAUD, myself, and others; to the colon, by WALTER, &c.; and to the liver, by ANNESLEY, myself, and several writers. These adhesions may exist either with or without distention, or the presence of biliary concretions; but either or both are often observed or have manifestly existed at one period or other of the disease.—(d) *Thickening* of the coats of the viscus is evidently a consequence of inflammation in some one of its grades. It has been remarked by SCHMALZ, WALTER, J. P. FRANK, SÆMMERING, ANDRAL, and myself. STOLL and LEVEILLIE have noticed the thickening, conjoined with a *cartilaginous induration*.

—(e) *Ossific deposits* in its coats have been found by RHODIUS, WALTER, MURRAY, GRANDCHAMP, MOLLINELLI, BAILLIE, and ANDRAL.

27. There are various other alterations of the gall-bladder which do not necessarily arise from any grade or mode of inflammation, and which may be noticed at this place.—a. The gall-bladder may be *hypertrophied* in respect both of its capacity and the thickness of its coats. The simple distention arising from obstruction of the common duct cannot be justly called hypertrophy, although some French pathologists have thus denominated it.—β. *Atrophy*, or wasting of it, is not uncommon, even as a consequence of chronic inflammation affecting either itself or the ducts, particularly the cystic duct. Instances of this change are recorded by MORGAGNI, WALTER, ROSSI, SÆMMERING, HUFELAND, and ANDRAL. In these cases the passage of bile into or from it having been prevented, the portion of this fluid contained by it has been absorbed, and the functions of the viscus having ceased, its structure has gradually wasted until it has almost disappeared.—γ. Instances in which the gall-bladder has been either congenitally *wanting*, or has *disappeared* from antecedent disease, have been adduced by FERNELIUS, MARCELLUS DONATUS, SCHENCK, HUBER, MORGAGNI, JAEGER, LUDWIG, SANDIFORT, ZEIGLER, BALDINGER, LEMERY, BOULET, TARGIONI, TOZZETTI, LITRE, WIEDEMANN, OTTO, DENDY, &c. That this viscus may entirely disappear in the same manner as it becomes atrophied, may be admitted. When only atrophy has occurred, there is still some little cavity left; but when the bladder has disappeared, the cystic duct is reduced to a fibrous chord terminating in a mass of cellular tissue.—ε. The coats of the gall-bladder may, moreover, be infiltrated with serum, or contain *tuberculous* or *calcareous matters*.

28. iii. The *Ducts*—the *hepatic, cystic, and common*—are liable to all the changes noticed with reference to the gall-bladder, to distention, obstruction, inflammation, thickening, ulceration, softening, perforation, rupture, hypertrophy, atrophy, obliteration, &c. The *symptoms*, however, attending these lesions during

life are very equivocal. The symptoms proceeding from inflammation closely resemble those enumerated as indicating inflammation of the gall-bladder. Most of the changes to which the ducts are obnoxious are the effects either of concretions obstructing and irritating them, or of inflammation having extended to, or been excited in them. Inflammation, whether it extends to them from the duodenum, or from any other part, or arises from the acrimony of the secretion passing along them, is equally accompanied by swelling of their coats, and by more or less complete obstruction of their canals, often with softening or ulceration. *Constriction or narrowing* from this cause has been observed by BONET, HOFFMAN, MEAD, BIANCHI, BRUNING, CRICHTON, BAILLIE, ANDRAL, &c., and complete *obliteration* of one or other of them has been remarked by myself and most of the writers referred to in this article. *Ossification* of them has been seen by BONET and SÆMMERING. *Dilatation*, principally of the common and hepatic ducts, is recorded by SCHENCK, DUVERNEY, MORGAGNI, WALTER, RICHTER, DUPLAY, ANDRAL, and TODD. *Rupture* of these ducts has occurred to WOLFF, ANDRAL, and others. References to all the foregoing lesions will be found at the end of the article.

29. iv. *Spasm of the Bile-ducts*.—The existence of this disorder has been presumed rather than proved. Without denying, however, its occurrence, particularly when acrid bile, or gall-stones, are passing along the ducts, I believe that it seldom takes place unless from these causes, and in connexion with inflammatory irritation. The instances of sudden appearance of jaundice sometimes met with have been imputed to spasm of the ducts; but, although spasm may occur independently either of inflammation or of biliary concretions, yet the pathological state producing jaundice is most frequently seated in the liver itself. The affection, therefore, which has been generally ascribed to spasm of these canals should be rather imputed to either of the above causes, or to any two of them: 1st, to inflammatory irritation without calculi; 2dly, to the irritation produced by calculi; 3dly, to irritation caused by acrid bile; 4thly, to spasm chiefly; and 5thly, to either of the foregoing in connexion with spasm. It is hence most difficult to distinguish spasm from inflammation of the ducts, or either of these from the passage of gall-stones. Indeed, the symptoms indicating the latter are in no respect different from those attending upon most of the cases generally imputed to spasm. A sudden, sharp, deep-seated, and severe pain at the pit of the stomach, darting back to the right side of the spine, or to the lower angle of the right shoulder-blade, and to the hypochondrium, occurring in paroxysms, and often followed by rigours, coldness of the extremities, &c., are felt in both. Nausea and vomiting are sometimes also present. When, however, the disorder proceeds chiefly from spasm, pressure gives relief of the pain in the epigastrium, as well as of the colicky pains usually felt at intervals in the abdomen. The patient commonly turns upon his belly, or lies partly on the right side, and partly on the abdomen. This, in connexion with the slight affection of the pulse, chiefly distinguishes spasm from inflammation of the ducts. In other re-

spects the symptoms are nearly the same as those stated to indicate the passage of the gallstones.—(See art. CONCRETIONS—*Biliary*, § 8.)

30. V. TREATMENT.—*Inflammation of the gall-bladder and ducts* should be treated in a nearly similar manner to other inflammations, but with reference to the organization and functions of the part. The *first intention* should be, to remove the inflammation; the *second*, to procure a free and healthy flow of bile into the duodenum. *Blood-letting*, both general and local, is always requisite; and generally tends to the fulfilment of both indications. Immediately after the first blood-letting, a full dose of *calomel*—from five to twenty grains—according to the age and strength of the patient, with JAMES'S powder and opium or *hyoscyamus*, may be given with few exceptions. Experience has proved the propriety of exhibiting one or two doses of this medicine in cases where these parts have been either partially or chiefly implicated, and the experiments of Mr. ANNESLEY have demonstrated the influence of a large dose of calomel in diminishing inflammatory irritation of the stomach and duodenum: an effect which, if produced in these viscera, will probably extend to the gall-ducts. If a repetition of the bleeding should be necessary, the calomel, antimony, and opium may be repeated immediately afterward, as this combination has a most decided effect, when thus exhibited, in diminishing vascular action, and in equalizing the circulation. Mild *aperients* and *cathartic enemata* may subsequently be given; and, having thereby procured evacuations, medicine of a *deobstruent and relaxant kind* should be prescribed. The *alkaline carbonates* with *taraxacum*; the *borate of soda*, in the *decoction althææ*, with small doses of *ipecacuanha*, and of the powder or the extract of the leaves of *belladonna*; and the *nitrate of potash* or *hydro-chlorate of ammonia*, in camphor mixture, with large doses of the *spirits of nitric æther*, are the most appropriate medicines; but they should be given in repeated doses, and so as not to offend the stomach.

31. Of the *external applications*, the most efficacious are the warm *terebinthinated embrocation*, *warm poultices*, *fomentations*, and afterward a plaster consisting either of the *emplastrum ammoniaci cum hydrargyro*, or chiefly of the extract of *belladonna* and *camphor*, according to the peculiarities of the case. Having removed inflammation, and relieved the more urgent symptoms, by these or similar means, a due flow of bile into the duodenum should be promoted by small doses of blue pill, or of PLUMMER'S pill, the liquor potassæ, or the carbonates of soda or potash, or the borate of soda, or the acetate of potash, or the extracts or decoction of taraxacum or of chelidonium, or the æthers, &c., variously combined. A gentle action on the bowels, by emollient and oleaginous medicines, should be continued for some time. If pain of a spasmodic kind recur, *belladonna*, or *hyoscyamus*, or opium, or *colchicum* may be given with these; and if the irritation seem to be owing to the presence of gall-stones, the combination of the spirits of turpentine, with sulphuric æther, as advised by DURANDE, STRAUB, WITTING, QUARIN, and others, or with alcohol, as recommended by PERCIVAL, or with the spirits of nitric æther, as directed by WOLFF, may be tried. An anodyne may also be given

with either of these combinations, especially *hyoscyamus*, or *belladonna*. *Colchicum*, with the alkaline carbonates, has proved of great benefit in some cases in which I believed the biliary passages to have been implicated in the inflammation of the associated viscera; and *hydrocyanic acid*, given in full doses with olive oil, or with almond oil and camphor julep, has afforded great relief where there was every reason to suppose that gall-stones or spasm was the cause of suffering. The treatment in other respects, as well as the diet and regimen of the patient, are altogether the same as are fully detailed in the articles CONCRETIONS—*Biliary*, and JAUNDICE.

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GANGRENE.—*SYN.* *Gangræna*; *Sphacelus*; *Mortification*.—Γάγγραινα (from γράω, I eat or devour). *Gangrene*, Fr. *Der Brand*, Germ. *Gangrena*, Ital.

CLASSIF.—IV. CLASS, IV. ORDER (*Author*, in *Preface*).

1. DEFIN.—*Death of a part or the whole of an organ.*

2. The terms *gangrene*, *sphacelus*, and *mortification* are usually applied to the same condition, especially by Continental writers. Dr. CARSWELL has pointed out certain distinctions between them, restricting the first appellation to incipient mortification, and the second to the last stage of this lesion. He has thus made mortification to be the generic term. This is in accordance with the meaning usually attached to the terms in this country; but, as mortification is the last result of the morbid state—is no longer a disease, but its termination—I have preferred the first of these appellations; and especially as it is the most appropriate to the changes generally comprised under these terms, and as it is usually applied to a lesion which, in respect of its nature and treatment, comes much more within the province of the medical practitioner than that which the terms *sphacelus* and *mortification* are generally employed to represent. Formerly, *gangrene*, particularly in its medical relations, was considered merely as a consequence of inflammation; but a more extended view of it has been taken by some Continental writers; and, still more recently, it has been treated by Dr. CARSWELL in an able and comprehensive manner. The *division* of this subject must necessarily have an intimate relation to the principal causes which produce it. In considering, therefore, the *pathological relations of gangrene*, I shall view it successively, 1st. As a consequence of inflammation; 2dly. As a result of local or general debility or exhaustion, interesting chiefly the organic nervous influence; 3dly. As an effect of obstructed circulation; 4thly. As produced by various physical agents; and, 5thly. As occasioned by poisonous substances.

3. I.—PATHOLOGICAL RELATIONS OF GANGRENE.—I. GANGRENE CONSEQUENT UPON INFLAM-

MATION.—All parts susceptible of inflammation may become gangrenous in consequence of it; but there are various circumstances that cause this change to be more common in some tissues or parts than in others. The *vascularity* of a part disposes it to inflammation, and, consequently, to a gangrene. Hence, cellular and mucous tissues are much more liable to it than fibrous and serous structures. The latter never experiences it until the cellular tissues by which they are nourished have undergone a similar change. The *sensibility, excitability, and susceptibility* of a part have also a great influence in producing it; the disposition to inflammation, and to gangrene as one of its results, being in proportion to the grades of these properties with which an organ or structure is endowed. The *situation of a part or structure* at a distance from the centre of vital or nervous influence, and of circulation, has also some influence in favouring the termination of inflammation in gangrene. Also, intense grades of inflammation in these parts may proceed until this result takes place, without causing death; whereas inflammations of the more vital and central organs, as the heart, brain, &c., put an end to life before this change has supervened.

4. *Various pathological states* dispose not only to inflammation, but also to the supervention of gangrene; the most important of these are, *a.* Disorder of the digestive organs, especially impaired energy of the organs most directly influenced by the organic nervous system; *b.* A weak and irritable state of constitution; *c.* Exhaustion by previous disease, particularly by fevers and epidemic maladies; *d.* Interruptions of the excreting functions, and of the depurative action resulting therefrom; morbid conditions of the blood, as in typhoid, malignant, and exanthematous fevers, in erysipelas, and in scurvy; *f.* Pre-existent, functional, or structural changes in a part, as impeded circulation, congestion, &c.; *g.* Interrupted circulation in an adjoining organ, or obstructed return of the venous blood from the part affected. These conditions not merely predispose to inflammation, but also modify its characters, and favour most remarkably the occurrence of gangrene, especially when more than one of them are in operation, as in erysipelas, in which we generally observe the inflammatory action supervene on marked disorder of the digestive and excreting functions, on a morbid state of the circulating fluids, and on disordered circulation in the part.

5. The *causes* which induce inflammation also influence its termination in gangrene, but to a much less extent than those already noticed, unless they be of a disorganizing or poisonous kind, when they more properly fall under a different head. *Intensity of the exciting causes* relatively to the excitability and susceptibility of the part, have some influence, especially when it is great, the consequent vascular reaction, in connexion with the morbid impression made by the cause upon the vital properties of the part, often rendering inflammation more acute and severe, and thereby more prone to exhaust vital power, or to pass into gangrenous disorganization. But agents which excite inflammation without producing a mechanical, chemical, or poisonous operation, do not very remarkably favour the occur-

rence of gangrene, independently of this circumstance, and of those already enumerated. The disposition to terminate in gangrene will doubtless be increased by the *intensity of the local and general vascular action* relatively to the state of constitutional power; but such intensity of action will itself, in a great measure, result from the circumstances already enumerated. In a word, therefore, the causes of inflammation passing into gangrene, are those stated above, in connexion with peculiarity of temperament, constitution, and habit of body, and with the intensity of local and general vascular action, relatively to vital resistance or power characterizing the inflammatory state.

6. *A. Of the Phenomena of Gangrene from Inflammation—a. In respect of particular Tissues and Organs—a. Of the Integuments.*—When inflammation is about to pass into gangrene, very evident changes take place in the *colour, temperature, sensibility, and vital cohesion* of the part. The redness becomes darker, or changes to a livid, violet, purplish, or black hue. The morbidly increased temperature and the augmented sensibility of the inflamed part are remarkably lessened, and the pain has disappeared from it, and extended to the surrounding structures. The vital cohesion of the part is much weakened, although its density is sometimes augmented. Vesicles also appear on the surface, owing to the effusion of serum, or of a sanguinolent serum under the cuticle. These changes become more manifest as the gangrene passes into its second stage or sphacelus. The colour becomes gray, yellowish gray, greenish, brown, or black, or various intermediate shades. The vesicles are now enlarged, or the cuticle is entirely separated by the effusion of a bloody serum beneath it, which escapes and leaves the skin loosely covered by it, or partially denuded and discoloured. The integument crepitates on pressure, is puffy, soft, cold, and insensible. It soon afterward emits a cadaverous and offensive odour, indicating that the gangrened part is quite dead, and is undergoing decomposition.

7. The emphysema and fetor of the part are proofs of the gangrene having arrived at complete mortification and putrefaction; but the part may be completely dead without these phenomena being observed. Among the chief changes that occur after gangrene has taken place, are the *spreading and limitation* of it. The former is increased by whatever depresses the organic nervous power or contaminates the blood; and, as long as it continues, the dark red or livid discoloration attending it extends farther and farther, and gradually disappears in the surrounding sound skin. The latter change is promoted by whatever restores nervous energy, increases vital resistance, and promotes the assimilating and excreting functions. As soon as it commences, the livid or dark-red discoloration of the circumference or margin of the gangrened part is more narrowed. Ulceration commences at the margin of the inflamed part, and separates from it in the form of slough, the portion which had become gangrenous. The loss which is thus occasioned is partially repaired by the exudation of coagulable lymph, which, becoming organized in the form of granulations, assume more and

more of a membranous form, and constitute, in its complete state of reparation, the cicatrix. A favourable change in the part and in the constitutional affection may occur at an early period of gangrene, and the result may be still more felicitous. In this case, the dark-red or livid colour of the affected part becomes more circumscribed, and assumes a brighter tint, the swelling subsides, and the temperature gradually returns; all the functions, as well as the organization, are preserved. Gangrene of the skin always implicates, to a greater or less extent, the subjacent cellular tissue; but this latter may be the primary and chief seat of this change.

8. *β. Gangrene of the cellular tissue.*—This tissue is more frequently, more extensively, and more rapidly affected by gangrene than any other part, more particularly where it is most abundant or is covered by aponeurotic expansions, which prevent contaminating fluids from reaching the surface. Gangrene of this tissue is either *diffused or circumscribed*. In the *diffused form* it generally occurs in external parts, and most commonly follows erysipelas and diffused inflammation of the cellular tissue from abrasions, wounds, punctures, and the inoculation of morbid or putrid matter, as by wounds in dissection. In these cases the inflammation spreads rapidly and extensively, terminates quickly in gangrene, and often extends to the blood-vessels, tendons, aponeuroses, and lymphatics; these resist for a longer time the disorganizing process, and are often seen, especially in the extremities, running in the midst of decomposed cellular tissue, and of effused fluids. If the inflammation affect the interior of a considerable venous or arterial trunk, particularly that which chiefly supplies a limb, the circulation through it is interrupted by the lymph effused in its canal, and the entire part beyond the seat of obstruction is struck by gangrene. In the internal viscera gangrene very seldom occurs in a diffused form, unless in cases where erysipelas extends to the fauces and pharynx, or in the more malignant cases of angina.

9. *Circumscribed gangrene of the cellular tissue* is seen in that connected with the integuments, in the common boil, and in carbuncle. When gangrene is observed in the cellular tissue of internal organs, it almost always is circumscribed. When the *submucous tissue* is its seat, it generally is in spots or patches of various dimensions, and is consecutive of inflammation which has commenced in the mucous membrane, and extended thence to the submucous tissue. In such cases, particularly in dysentery, considerable portions of the mucous surface are detached, owing to gangrene of its subjacent tissue. Although gangrene of the *subserous cellular tissue* is more or less circumscribed, yet it is often extensive; but, in these latter instances, the serous membrane is also implicated. This is especially the case when the sub-peritoneal tissue is the seat of lesion. It is rarely, however, that the inflammation of it, which terminates in this manner, commences in the peritoneum, unless in some cases of strangulation from hernia or intussusception. It commonly either originates in the cellular tissue itself, or extends to it from adjoining parts. Indeed, this is always the case

in respect of the sub-peritoneal tissue of the lumbar, iliac, and pelvic regions.

10. *γ. Mucous membranes* are sometimes found gangrenous, but not so frequently as was supposed by the older writers, who mistook softening discoloration from the imbibition of morbid secretions, and even albuminous exudations thrown out on their surfaces in the form of false membranes, for sphacelation. Gangrene of this membrane is generally circumscribed, often very limited, and seated chiefly in the throat, the lower part of the ilium, in the cæcum, the sigmoid flexure of the colon, and in the rectum. The inflammation producing it commences, and is chiefly seated, in the mucous tissue itself, or in the follicles, or in both. The gangrene may be limited to either of these, or may extend to both, and even to the subjacent cellular tissue. Where thus changed, the mucous membrane at first presents an ash gray or grayish yellow colour, which often changes to brown or black; but the gangrened part may be tinged by the secretions or other substances applied to it, especially by the bile, or by the blood. The part surrounding the slough is generally congested, of a brownish red, or of a purple, or livid hue. Dr. CARSWELL remarks that, when the inflammation has been confined to the agminated, or PEYER'S follicles, and when the greater part, or the whole of the follicle has sloughed, little congestion or inflammatory redness may remain. If these glands are already the seat of disease—as in continued and hectic fevers, consumption, &c.—a slight attack of inflammation may destroy their vitality, and little or no vascularity may be observed around them after death. The mucous surface of the *bronchi* is rarely the seat of gangrene, and only consecutively of inflammation of adjoining parts. Gangrene of the mucous surface of the *uterus* and *vagina* is not infrequently seen in dissections after puerperal fevers. (See PUERPERAL DISEASES, and UTERUS.)

11. *δ. Serous membranes* are the seats of gangrene only consecutively of this, or of some other cause, as suppuration, ulceration, &c., in the subserous tissue, as noticed above (§ 9). When ulceration of any part of the digestive canal extends to the peritoneal surface, this membrane, having lost the supply of blood from the subjacent tissue, sometimes experiences sloughing at the bottom of the ulcer, and consequent perforation. But this is observed chiefly when the ulcer is large, and the patient's habit of body cachectic, and most frequently in the lower part of the ilium. The *pleura* is more rarely the seat of gangrene than the peritoneum; and the costal *pleura* is still more rarely affected than the pulmonary *pleura*. Gangrene of the latter is met with as a result of the softening of tubercles situated immediately underneath the *pleura*, or of gangrene of a subjacent portion of the lungs. The serous membranes of the brain are gangrenous only as a consequence of severe injury, particularly when the membranes are exposed, and when the part is affected by erysipelas or hospital gangrene. This latter cause of gangrene of the cerebral serous membranes has been noticed by Mr. COPLAND HUTCHISON. When the serous membrane is sphacelated, it assumes an ash gray or slate colour; but it

may be variously tinged by bile, blood, or morbid matters; it is also soft and spongy, and is readily detached from the surrounding tissues, which are usually more or less injected.

12. *e. Fibrous tissues* become gangrenous only in consequence of this lesion in the immediately adjoining parts. The *muscular tissue* is very rarely seized by gangrene after inflammation. The muscular tunics of the digestive canal are sometimes, however, thus affected, owing to the extension of gangrene from the associated tissues, as in the case of sloughing ulcers commencing in the internal coats of the tube. If recovery take place after a portion of the muscular tunic has been thus destroyed, the cicatrix which is formed contracts, as Dr. CARSWELL has stated, and the diameter of the canal is permanently lessened. The *heart* is, perhaps, never even partially gangrenous while life continues; and the *arteries* and *veins* are never the seat of this change until the surrounding cellular tissue and cellular coats of these vessels are destroyed by it. Gangrene of the *brain*, of the *lungs*, of the *liver*, of the *spleen*, of the *kidneys*, of the *uterus*, &c., is noticed in the articles devoted to the pathology of these organs.

13. *b. The changes which take place in the capillary circulation*, when the inflamed part is about to pass into gangrene, have been observed by several pathologists, but by none with so much care and precision as by KALTENBRUNNER (*Exper. circa Statum Sang. et Ves. in Inflamm.*, At. Mon., 1826, p. 82) and GENDRIN (*Hist. Anat. des Inflamm.*, t. 1., p. 31, *et passim*). According to their researches and my own observations, the *capillaries* lose their tonicity and vital cohesion, become distended, or even ruptured, or allow the exudation of a portion of their contents. At the same time, the *blood* in the distended capillaries ceases to circulate; changes from a dark red to a dark brown or black hue; and coagulates; its globules uniting, adhering to the internal surface of the vessels, and filling their canals. A similar change takes place in whatever blood may have been effused into the areolæ of the tissues during the acme of the inflammatory state, or the passage of it into gangrene. This alteration of the blood and of the capillaries causes the livid, purple, or black hue of the affected part; and the loss of vital cohesion, and exudation of the serum, occasionally with some of the dark colouring matter of the decomposed blood, produce the soft, pulpy state attending the passage of gangrene into sphacelus. With the cessation of circulation, the sensibility is quickly lost; and when the part is deprived of its vitality, incision of it neither excites sensation nor causes loss of blood. Absorption, also, entirely ceases in the gangrened part, but proceeds with activity at the margins of the living and sphacelated tissues, as shown by the local and constitutional phenomena, and by the separation between the living and dead parts, which is partly occasioned by this process.

14. *B. Terminations, &c.*—The changes that take place in the margin of the living inflamed part are important, as upon these depends the occurrence of one or other of the following phenomena: 1st. The limitation of the gangrene, and separation of the diseased part; 2d. The spreading of the gangrene, and the contamina-

tion of the circulating fluids; 3d. Dangerous or fatal hæmorrhage; and, 4th. Ulceration.—(a) The *entire separation of the gangrened part*, in a state of sphacelus, is caused by the production of coagulable lymph in the inflamed parts surrounding the gangrene. This lymph prevents the decomposed fluids from contaminating the surrounding tissues, by agglutinating not only the areolæ of these tissues, but also the orifices or canals of the minute vessels. It also promotes the coagulation of the blood in the larger vessels, and thereby prevents the occurrence of hæmorrhage. It lastly, as the separation is perfected, becomes organized in the tissues which it agglutinates or in which it is effused, and is essential to the healing of the part.—(b) The *spreading of the gangrene* arises from the local and constitutional vascular action being so weak, or asthenic, or otherwise so morbid as to be incapable of forming coagulable lymph, whereby the contaminating influence of the decomposed fluids and sphacelated tissues upon the surrounding parts may be resisted, the minute vessels agglutinated, their fluids coagulated, and absorption prevented. When this result is observed, the vital power of the part or of the constitution is in fault: and either a cachectic habit of body or a morbid state of the blood has preceded the occurrence of gangrene, as in erysipelas, scurvy, fever, &c.—(c) *Hæmorrhage* may attend either of the preceding states of sphacelation. In the former, it arises from an imperfect coagulation of the blood in the large vessels at the margin of the living inflamed part, the lymph not being sufficient to obstruct its extremity or to coagulate the blood in it with the requisite firmness. In the latter the hæmorrhage is much more frequent, as these circumstances obtain much more generally and to a greater extent in it than in the former.—(d) *Ulceration* may follow either internal or external gangrene. In these cases, organization of the coagulable lymph that is formed, or granulation, does not take place; but absorption of it with the tissue in which it is deposited proceeds gradually. It is owing to this that perforation of hollow organs follows sphacelus. When the mortified part is retained, owing to its situation, or is not thrown off, it becomes macerated, or reduced to shreds by the fluids poured out by the surrounding vessels. A partial absorption may occur in these cases, and, by contaminating the circulating fluids, terminate life in a short time, or place it in imminent danger. In some instances, as intromissions, adhesions of the opposed margins of the living inflamed parts may take place, with perfect union, the sphacelated portion being evacuated. A dead part of lung may also be thrown off by the bronchi.

15. When gangrene, in its earlier stage, is arrested, and terminates in restoration of the healthy state, the blood begins to move in the obstructed capillaries, and the circulation, especially at the circumference, becomes more and more active. The globules of the coagulated blood seem to separate, and to pass into the currents of the minute canals; sensibility gradually returns; and the colour of the part becomes less dark or livid. The temperature also rises; and the absorption of the effused fluid commences. At last, the size and firmness of the part, with all its functions, are restored.

16. ii. GANGRENE FROM LOCAL OR GENERAL DEBILITY—*from Exhaustion of Organic Nervous Power*.—Depression of the organic nervous or vital influence is the chief pathological element or precursor of this form of gangrene, which, owing to this circumstance, is contingent on certain adynamic diseases, as typhoid fevers, scurvy, noma or gangrenous thrush, and other maladies attended by extreme asthenia. This variety is often preceded by increased sensibility, heat, and injection of the part. The last of these characteristics is the most common, and is frequently caused by pressure, as observed in the parts on which patients rest in bed, by friction, puncture, and the irritation of morbid secretions. The application of leeches, blisters, or the tartarized antimonial ointment to debilitated or cachectic children often produces it. But it occasionally appears, and proceeds rapidly, without any very manifest antecedent or attendant inflammatory action—certainly without increased action of a sthenic kind—particularly in very unhealthy children, and in persons affected by scurvy, or the low putro-adynamic states of fever. In these, very slight causes will occasion engorgement of portions of the integuments, or of internal viscera, followed by the changes already described as constituting gangrene and sphacelus; and local congestions will sometimes occur, and be followed by loss of vitality, without any obvious cause, or any obstruction to the circulation, or manifest increase of vascular action in the part; whatever action may appear being of an irritable, asthenic, or extremely weak kind. The gangrenous or asthenic form of *furunculæ*, and the humid or phagedenic sores met with in the mouth, gums, cheeks, genitals, &c., of unhealthy children, are illustrations of this variety, the chief characteristics of which are, depressed organic nervous or vital power; imperfect or asthenic vascular action, both previous to and attendant upon the gangrenous lesion; and a poor or vitiated state of the circulating fluids. (See SCURVY, and THRUSH—*Gangrenous*.)

17. iii. GANGRENE FROM OBSTRUCTED CIRCULATION.—The *arteries* may be incapable of conveying blood to, and the *veins* of returning it from a part. In the preceding varieties of gangrene, the organic nerves and capillaries are the primary and chief seats of the lesion. In this variety they are consecutively affected, owing to the obstruction which causes it either cutting off their supply of blood or preventing the return of it. The changes which take place in either case are somewhat different, particularly as to the order of their progression. When the blood is sent in insufficient quantity to, or is entirely prevented from arriving at an organ or part, the effect upon the nervous and vascular organization of it must be such as to cause its atrophy or death; for the fluid requisite to nutrition and life is no longer supplied to it. But when the return of the blood is obstructed by lesions of venous trunks, or by tumours pressing upon them, or by disease of the heart, an undue accumulation of blood takes place in the capillaries and veins beneath the seat of obstruction; the blood stagnates more or less; the capillaries are distended beyond their powers of reaction, and their tonicity is exhausted; effusion supervenes in the more porous and

yielding tissues; the organic nervous and vital power of the part, already impaired by the stagnation of the capillary circulation and the venous properties of the blood, are still farther depressed by the progressive effusion and distention; and at last, if the obstruction become complete, the vital manifestations of both nerves and capillaries are entirely extinguished. The varieties which thus proceed from these different pathological states require separate notices.

18. *A. Gangrene from obstruction of Arteries.*—A *ligature* placed around an arterial trunk, when the circulation is not supplied by collateral or anastomosing branches; the *rupture* of the internal and middle coats of an artery, occasioning obstruction of its canal; *inflammation*, followed by the accumulation of fibrinous lymph in its interior, and obliteration of the vessel; and *ossaceous* or fibrinous deposits in its coats or in its cavity, are the circumstances which give rise to this variety.—*a. Gangrene from rupture of the internal coats of an artery* has been described by Professors TURNER and CARSWELL. The rupture of these coats is obviously the result of previous disease. But, however produced, it is manifest that the lacerated part, with the lymph effused from it, will often prove a nucleus around which a fibrinous coagulum will form, and increase until the circulation in the vessel is entirely obstructed. The gangrene will be merely contingent upon this occurrence; for the coagulum may not entirely obstruct the vessel; or the obstruction may be complete, and yet the circulation may be carried on by collateral, or by enlarged anastomosing vessels. An abstract of one of the cases detailed by Mr. TURNER will illustrate the progress of gangrene from this cause, as it agrees with one which I had an opportunity of seeing, and in which amputation was performed. About half an hour after rupture of the popliteal artery no pulsation could be felt in any of the arteries of the foot, nor in the ham. The foot was cold. No pain was excited by pressure on any part of the limb; but cramp-like pains were felt in the calf of the leg. The following morning the foot was pale and cold, and the integuments below the ankle were entirely void of sensation, even when pinched or tickled. The muscles of the foot seemed to have lost their power of contraction. The next day mottled purple patches appeared on the instep and forepart of the ankle, and gradually extended over the whole foot, till the surface, by the fifth day, was entirely livid. With the progress of discoloration, the foot swelled slightly, became œdematous, and seemed somewhat warmer. On the seventh day, several tense, globular vesications appeared on the foot, some filled with reddish, and others with pellucid serum. They increased in number, and extended to the calf of the leg. About the ninth day, the soft parts above the ankle were livid, the discoloration proceeding upward to the calf of the leg, and soon afterward nearly to the knee. The soft parts adjoining the discoloured skin were swollen, and very painful on pressure, but no redness nor any inflammatory line between the gangrened and living parts appeared. The discoloured parts were completely insensible. The patient had been much reduced by his previous illness; but with

the progress of the gangrene, weakness, tendency to faint, copious sweatings, quick and feeble pulse, became very prominent symptoms, which were followed by cough, laborious breathing, and death upon attempting to sit up in bed. The coats of the artery were found torn, thickened, and the canal filled by fibrin, lymph, and coagulated blood.

19. *b. Inflammation of the internal coats of an artery*, particularly of one or more considerable branches, is followed by effects similar to those just described; especially if the obstruction of their canals, by lymph and coagula, be complete. Gangrene from this cause has been noticed in the article on *Inflammation of ARTERIES*, § 29. It may occur in internal viscera, as well as in external parts, although the evidence of its existence in the former is not so complete as may be desired. The gangrene that sometimes attacks a portion of the lungs may probably arise from this cause, but there is no satisfactory proof of such being the case. It does not, however, appear unreasonable to infer that, in some constitutions and habits of body, inflammation may extend from the substance of the lungs to the blood-vessels themselves—arteries or veins—and that the inflamed part may rapidly pass into gangrene, owing to the obstruction of the circulation in one or other of these vessels. Of the occurrence of gangrene of a limb from inflammation originating in a large artery there can be no doubt, as several instances of this kind are on record. In these cases, the consequent obstruction of the main trunk may be sometimes attended by a partial collateral circulation, which, although insufficient to preserve the vitality of the whole limb, yet may preserve that of a considerable part below the place where the vessel is obstructed. A case illustrating this fact is recorded in the *London Medical Repository*, vol. xviii., p. 119.

20. *c. Gangrene from fibrinous or ossaceous formations in arteries.*—*Senile gangrene*—*Idiopathic, dry, or spontaneous gangrene.*—When these formations are so extensive as to prevent the circulation through the main arterial trunks of a limb, a different route is often not established; the diseased state of the smaller vessels, especially those in connexion with the affected trunks, indisposing them to become the collateral channels of circulation. When an arterial trunk is thus obliterated or obstructed, the gangrene generally commences with a dark brown, purple, or black spot in one or more of the toes, frequently without any previous swelling, or any increased heat or sensibility. Occasionally, a pricking or tingling sensation is felt in the discoloured toes, which are colder than natural, and often numb. The purple or black discoloration soon gains the whole of one or more toes. There is no increase of their size, but rather a diminution of it; and seldom pain on pressure. In some instances, however, increased temperature, sensibility, and bulk of the affected toes precede the changes just described. The discoloration proceeds gradually to all the toes, and thence over the back and sides of the foot. It sometimes extends as high as the knees; but death generally takes place before it reaches thus far. It is seldom preceded or attended by much swelling of the parts, which the gangrene successively in-

vades; but there are occasionally seen a dark redness of the skin, with heat, pain, and slight puffiness or tumefaction. In many instances, particularly when the accession of the disease has been slow, the parts are even wasted before they are struck by gangrene; and, when this has been the case, they are afterward shrunk, indurated, and dry. In more sudden and rapid attacks, where the obstruction is less complete than in these, Dr. CARSWELL justly remarks that considerable congestion is induced, with the effusion of more or less serosity, whereby the bulk of the foot, and, more frequently, of the leg, is augmented; but even in this case, the toes, the primary seat of the disease, are not increased in size. It is in the progress of the disease upward that congestion or œdema occurs; that the skin becomes tense and painful; and that the febrile symptoms, if they have not yet appeared, supervene, increase rapidly, aggravate the local affection, and hasten death.

21. This form of gangrene seldom occurs before sixty, very rarely before fifty, and never in young persons. The obstructions found on dissection are ossification of the arteries of the affected limb, and often also of other parts of the body; and a fibrous tissue formed either in the coats or in the canals of the vessel. In these latter cases, the artery is sometimes converted into a solid or ligamentous cord. Occasionally ossific spiculæ or deposits project into the canal of an artery, solid fibrin having collected around them (see art. ARTERIES, § 63). Instances of gangrene from disease of the arteries are recorded by SAVIARD, HEBREARD, ANDRY, CHAVALIER, BEGIN, HODGSON, CRUVEILLIER, AVISARD, MARJOLIN, SYME, and others mentioned in the REFERENCES of this article. Two cases of the disease from ossification together with obliteration of arteries have occurred in my own practice. It has been supposed that ossification of the principal arteries of a limb will, of itself, produce gangrene; but it will not have this effect unless some other cause of obstruction, as narrowing of the canal, fibrous formations, &c., be conjoined with it. The appearances in my own cases, as well as in those recorded by the other writers referred to, demonstrate this fact. In some of those the obstruction was not limited to the arteries, but was seated also in the veins. In the one examined by M. BRULATOUR, the arteries above the seat of gangrene were partially ossified, their caliber diminished, and their channels filled by solid fibrinous deposits. The coats of the veins were thickened, and fibrinous coagula adhered to their internal surface. The lesions of both arteries and veins were evidently the consequences of inflammatory action of a subacute or chronic kind.

22. *Gangrene from Obstruction of Veins.*—

Gangrene may arise from this cause, both in external and internal parts; but especially in the latter.—a. It rarely occurs in the former, as the veins are so numerous, even in the extremities, as to admit of a collateral circulation, although many of them may be obstructed. I had, however, an opportunity of attending a case with Mr. DAVIES (*Lond. Med. Repos.*, vols. xxiii., p. 451, and xxiv., p. 51), in which gangrene of the foot and great part of the leg took place, owing to interrupted circulation

in the veins of the limb. On dissection, the femoral vein was found inflamed in the highest degree, and its coats thickened. It was full of coagulated blood. This state extended throughout the iliac vein into the cava, nearly as high as the diaphragm. All the small veins of the diseased limb seemed in a similar state.

23. *b. Internal gangrene* is often owing to pressure upon the veins, especially in cases of hernia and intussusception. But, in other instances, this cause is rather inferred than demonstrated. Dr. CARSWELL thinks that gangrene of portions of internal viscera, from the pressure of indurated tumours, is not uncommon, particularly in the lungs, liver, and intestines; but it seems to me that the cause is seated as often within the veins as external to them; that the obstruction frequently consists in obliteration of their canals, either from previous inflammation, or from coagula formed in them. This is evidently the chief cause of many cases of gangrene of a portion of the lungs; both veins and arteries running between, or in the vicinity of excavations becoming obstructed, owing to the extension of the morbid action to them. But inflammation or obstruction, particularly of the veins, may have been induced by the transit of tubercular matter, or other morbid secretions, into them, which may either inflame their internal membrane or coagulate the blood in them; the consequent obstruction causing sphacelated ulcerations and cavities, or extending those which may have already commenced. In phthisis, attended by a very copious offensive expectoration, containing portions of softened cellular substance and tuberculous matter, or by a dirty brown, or greenish, or grayish sputum, with a gangrenous odour, the existence of one or other of these lesions may be inferred. In cases of adventitious, cancerous, or other malignant formations, either the pressure of the tumour upon the adjoining veins, or the absorption of a portion of the morbid secretion, causing coagulation of the blood or other obstruction in the veins, sometimes gives rise to mortification of portions of the morbid mass, which may fall off in a state of gangrene or sphacelus.

24. In gangrene from intussusception, the veins of the mesentery are pressed upon just at the points where the external and internal folds of the duplicate forming the invaginated portion of the intestine terminate superiorly. The consequence of this pressure or stricture is congestion of blood in the incarcerated part, and inflammation at the point of pressure or stricture. When the inflammation is attended by the exudation of coagulable lymph, the adhesion of the strangulating and strangulated portions, just at the point of stricture, is the result, and the latter portion is evacuated in a gangrenous or sphacelated state, and either in one or in successive portions. When the part is only gangrenous, it generally still retains its form, and the coats may be easily traced in it after maceration. The diameter of the intestine frequently experiences no diminution at the point of separation and union; and recovery may be complete, although a very large portion of the bowel may be lost in this manner. (See art. COLIC and ILEUS, § 38.)

25. *C. Gangrene from Disease of the Heart.*— It occurs principally in the lower extremities,

contingently upon impeded circulation in the veins with effusion of serum into the cellular tissue. Its progress is often slow; but it may be rapid. It is always consequent upon œdema or anasarca of the limbs, scrotum, and labia pudendi. When gangrene is likely to appear, the previously white, tense, and shining skin becomes mottled with dull red or purplish spots, owing to the congestion of congeries of cutaneous veins. To these succeed bullæ or phlyctenæ, from the effusion of serum under the cuticle. Upon the bursting of these, the skin underneath is dark brown or livid, and is soon converted into an ash gray slough. Increased pain and redness are sometimes present, and either precede or accompany the separation of the dead part. Previously to the injection of the cutis, the temperature of the limb is usually very low; but as this change takes place, and as sloughs form, both the heat and the sensibility of the part are considerably augmented. Febrile symptoms, as well as local inflammatory action of an asthenic kind, often appear in various grades, and the disorganization supervenes and extends with increased rapidity. The gangrene may attack several parts of a leg, or even both legs, but it very seldom appears in the feet or toes. It rarely implicates any other tissue than the cellular, always beginning in the more superficial parts of it, to which this lesion is chiefly confined. In addition to the interrupted circulation through the heart, the veins are inordinately pressed upon by the serum accumulated in the cellular areolæ between them and the stretched integuments; and the return of blood through them is thus farther retarded. The distention, also, of the cellular tissue by the serum impairs the vital cohesion and power of resistance it previously possessed, and disposes it to experience a state of asthenic inflammatory action, terminating rapidly either in gangrene or in some one of those sloughing abscesses described in the articles ABSCESS and CELLULAR TISSUE.

26. iv. FROM LESION OF NERVES.—Gangrene has been supposed by modern pathologists to be sometimes occasioned by the loss of nervous influence, from injury or disease of the spinal cord, or of the nerves of a limb. TOMMASINI has even supposed that the inflammation of the nerves of a part is the cause of gangrene in all cases of acute inflammation terminating in this manner. But we have no proofs of the accuracy of these views. Indeed, facts militate against them. There are numerous instances of the loss of the cerebro-spinal nervous influence of a limb, without much detriment to the functions of circulation, nutrition, and animal heat in it, when it has not been subjected to pressure. These functions are entirely dependant, as I have shown many years ago (*Lond. Med. Repos.*, May, 1822), upon the supply of the organic or ganglionic nerves to the arteries, and are but slightly influenced by the cerebro-spinal nerves of the limb. Besides, many cases of inflammation of nerves have been observed, but gangrene has been very rarely seen to supervene, and even then it has arisen from the extension of the inflammation to adjoining parts, more particularly to the blood-vessels. Phlebitis, and even arteritis, especially the former, are most prone to occur in females soon after childbirth; and the great

majority of the cases of these diseases I have seen were consequent upon flooding. A similar cause is influential in the production of neuritis; and I have witnessed instances where the affection of the limb was evidently this latter at the commencement, but complicated with disease of the blood-vessels in an advanced stage. One of these occurred in the practice of Mr. JOHN DAVIES, and was seen by me several times. In it gangrene came on; the limb was amputated by this very able practitioner, and the extent of lesion ascertained upon examination after death. M. DUCÉS (*Rev. Med.*, t. iii., 1824, p. 177) mentions a case of neuritis in a female after parturition, complicated with flooding. The upper portion of the sciatic nerve was the seat of the disease, and the parts in the immediate vicinity soon became livid and œdematous. The dissection demonstrated inflammation of the nerve and gangrene of the adjoining tissues. A similar case is adduced by M. MARTINET (*Rev. Méd.*, Juin, 1824). In it, besides distinct marks of inflammation of the superior part of the sciatic nerve, gangrene of the adjoining structures was observed after death to a considerable extent below the diseased portion of nerve, the affection of the nerve having been anterior to the gangrenous alteration.

27. v. GANGRENE FROM VARIOUS PHYSICAL AGENTS.—(a) Severe contusions, or other local injuries; (b) powerful stimulants or irritants, or other chemical agents; and (c) excessive heat or cold—either directly or indirectly—cause the death of the parts on which they act.—A. The first of these falls within the province of the surgeon. It may, therefore, be only remarked that, when the injury is very severe, nervous influence and circulation may be so entirely annihilated as to prevent the return of action, and to cause the immediate death of the part. Contusions from spent shot, &c., are often followed by this effect. But when the injury is less violent, the capillaries of the part have their tonicity impaired, and become congested; reaction of the larger vessels supervenes, owing to the consequent obstacle to the circulation, and to the effects of the injury on the adjoining parts, and increases the congestion of the capillaries; and the effect of this reaction upon the injured and congested capillaries is to exhaust their remaining vital endowment, and to produce gangrene of the part. In these cases, the surrounding tissues are inflamed; a separation of the gangrened portion takes place as soon as its vitality is altogether extinguished, and as the lymph effused by the inflamed capillaries limits the extension of the lesion; and the whole phenomena are the same as in sphacelus from very acute inflammation.

28. B. Powerful stimulants, irritants, and chemical agents produce gangrene somewhat differently, according to their modes of action on the living tissues. Stimulants act more especially upon the nervous endowments of the part, and, by excessive excitation, exhaust them; but they cannot induce gangrene unless they destroy the vital properties of the capillaries; and they can effect this only by previously causing intense inflammatory action, the consequent gangrene being the effect rather of this action than of the stimuli which excited it, although the frequency, and, indeed, certainty

with which the result will follow the cause, will much depend upon the kind of stimulus. Thus, both liquor ammoniæ and spirits of turpentine will inflame the parts to which they are employed; but inflammation produced by the former will often pass into gangrene, and that caused by the latter will very rarely terminate in this manner. The same remarks apply to irritants. These act more directly upon the capillaries, the gangrene being always a consequence of inflammatory action, in some one or other of its states produced by them. Chemical agents, according to their nature, are often more complex in their operation; some of them both exciting the vital actions and altering the intimate organization of the part. Acids, alkalies, various neutral salts, both mineral and alkaline, &c., excite, and soon exhaust or extinguish the vital properties of the parts with which they come in contact, with a rapidity and to an extent according to their concentration or activity. When much concentrated, especially alkalies and acids, they destroy the organization of the part before its vital properties fully evince the effects produced upon them; the surrounding tissues, however, becoming inflamed, in consequence of the injury inflicted, and of the interruption of the circulation at the point where the obstruction of the vessels by the action of these agents commences. Alkalies produce gangrene very differently from acids. The former soften, dissolve, and combine with the ultimate organization of the part, and render its fluids still more fluid; the latter constricts, corrugates, and condenses the structure, and coagulates the fluids in it. Both ultimately destroy the intimate constitution of the solids and fluids, and thereby annihilate the properties or functions resulting therefrom; but in the different ways just stated. The surrounding parts become inflamed, owing to the obstruction at the limits of disorganization; the vascular action varying somewhat in degree, and perhaps also in kind, with the nature of the agent, the extent of injury, and the circumstances proper to the individual. When sphacelation results—for sphacelation is the effect rather than gangrene, particularly when these agents are concentrated—the colour varies according to the agent and quantity of blood in the part on which it has acted. A lighter colour of the dead part is produced by alkalies than by acids; a dark brown or black hue following the latter, particularly when applied in a concentrated state to mucous or vascular tissues. Alkalies generally produce a grayish, yellowish gray, or ash colour of the parts which they destroy.

29. *C. Gangrene from Extremes of Temperature.*
 —a. *Excessive heat*, if it be no greater than 220° or 230°, vesicates the part, and produces gangrene by the inordinate excitement of the nerves of the part, and the consequent vascular action. Higher grades of heat excite the nerves and capillaries still more intensely, and exhaust their vital properties with greater rapidity, the contingent sphacelus appearing more quickly and extending more deeply. In proportion as the temperature is increased, so is the consequent gangrene more entirely the result of the operation of heat, and less the effect of inflammatory action; the higher grades annihilating the vital properties, as well as destroying the structure of the part before reaction

can take place in it. But, in most instances, unless death follow in a very short time, inflammatory injection and reaction in the surrounding tissues appear, and increase the extent of the gangrene and of the consequent sphacelus. When the injury is not such as to occasion death in two or three days, the sphacelated part is separated from the living, and an abundant suppuration takes place from the living inflamed surface; but this seldom occurs in less than five or six days. The loss of substance is generally only partially repaired; a fibro-cellular tissue being formed, which contracts as it becomes more fully organized, occasions deformity, and interrupts the functions of the part.

30. *b. Intense cold* acts very differently from excessive heat in the production of gangrene. It affects chiefly the vital functions of the organ, and does not occasion disorganization, although it causes congelation of the fluids and soft structures. Gangrene seldom follows a diminution of temperature short of producing congelation, unless as a consequence of the inflammation intermediately occasioned. When the cold is great, the parts exposed to it, especially those farthest removed from the centre of circulation, have their vascularity diminished, and become pale, constricted, and numb. Motion and sensibility are afterward lost, and the parts are even frozen in the more extreme cases. If the exposure to the cold continues, the congelation advances, the functions sink progressively, and a state of apathetic lethargy comes on, terminating in unconsciousness and death (see art. *COLD*). In this case, gangrene is not developed. It is not until the frozen part is thawed or exposed to heat that gangrene is manifested. The vitality, reduced or extinguished by the diminution of temperature, cannot be restored in all the affected tissues. The blood becomes again fluid, but it has lost its crasis, and separates into serum and coagulum in the smaller vessels. Sensibility, motion, and animal life do not return. The skin covering the part assumes a livid or brownish red colour; phlyctenæ appear on its surface, with gray, purplish, or black spots, indicating the passage of the gangrene into sphacelus. The living parts closely adjoining the gangrene are now injected and inflamed; the vascular reaction which they experience exhausting the remaining vital properties, especially of the capillaries, and extending the mortification, as in gangrene from inflammation. In slight cases, although congelation may have taken place, the circulation and sensibility of the part is often restored; a tingling or pricking sensation is felt; reaction supervenes, and even becomes excessive; and, owing to previous reduction of vital power and the consecutive action, exhaustion of the affected structure, followed by lost power of the capillaries, diminished cohesion of the tissues, coagulation or other change of the blood in them, and by gangrene, soon afterward appears. In these cases, the external changes are altogether similar to those just described; but the extent of mortification depends upon the constitution of the patient, and the violence of the antecedent and attendant inflammation.*

* [LARREY calls cold the *pre-disposing* cause of this species of gangrene, and relates numerous instances where,

31. VI. GANGRENE FROM POISONS.—The poisonous substances to which attention will be here directed, are, 1st. Diseased vegetable productions; 2d. Diseased or decomposed animal matters; and, 3d. The poisons generated by certain animals. *A. Gangrene from Diseased Grain* is sometimes seen among those who live chiefly on rye. Of the general effects of this and of other grains when used in a diseased, unripe, injured, or mouldy state, some notice is taken in the article ERGOTISM. But the influence of *spurred rye* in causing gangrene requires a particular notice at this place. *Spurred rye*, when used with the sound grain as food, produces, according to the quantity, somewhat different effects—either *convulsive* ergotism, or *gangrenous* ergotism. But both these species of disorder may be associated, or the former may be followed by the latter, either of them existing in various grades. Indeed, the gangrenous disease is generally preceded, or even attended, by some degree of spasmodic affection.

32. *A. Gangrenous Ergotism—Necrosis ustulaginea, SAUVAGES—Gangrène des Solognois*—as been observed both sporadically and epidemically. It has been supposed that the epidemics which appeared in various parts of Europe during the middle ages, and were denominated *Ignis Sacer, Saint Anthony's Fire, Mal des Ardens, &c.*, were occurrences of this variety of ergotism in a severe as well as epidemic form. The gangrene and separation of the limbs mentioned with respect to them countenance this supposition. It was not, however, until the epidemic of Hesse, in 1596, that the effects of spurred rye on the economy were fully recognised by physicians. In 1630, an epidemic gangrene appeared in Sologne, and was traced to this cause by THULLIER. Subsequent occurrences of this malady, in different parts of France, Switzerland, and Germany, have been described in connexion with this cause, by PERRAULT, DODART, BRUNNER, NOEL, LANG, DUHAMEL, SALERNE, READ, and others. The experiments performed by TRESSIER in 1780, and the facts detailed by JANSON in 1818, have farther elucidated this subject.

33. Gangrenous disease from the use of spurred rye generally commences with vertigo, faintness, diminished sensibility, and slight convulsive or spasmodic movements—with the chief symptoms of spasmodic ergotism (see ERGOTISM). But it is sometimes not preceded by any of these. In this case it is ushered in by lassitude and weakness of the lower extremities, with deep-seated pain, increased by heat, and aggravated during night. There are occasionally, at this period, slight swelling, but without redness; and, in some instances, even a wasting of the extremities. The temperature, motions, and sensibility of the parts are afterward lost, although the deep-seated pain

still continues. The integuments now become wrinkled from the shrinking of the parts contained by them. Phlyctenæ appear on the surface; the skin assumes a violet, livid, or black hue—not, however, in all the places affected, but first in the heel, feet, or various parts of the thighs or legs. Sometimes the gangrene extends from the upper portions of the limbs to their extremities; or from the more internal structures to the integuments; and in other cases it proceeds from the toes upward. When it reaches the trunk, and often before it advances so far, the patient sinks. It generally proceeds gradually, and is not limited to the lower extremities, the upper being often infected. When it is arrested, an inflammatory circle forms around the dead part; and at the points of separation an abundant and very fetid suppuration is established. The gangrened portions are dry, hard, and shrunk. A whole limb may be thrown off in this state without the loss of a drop of blood.

34. Gangrenous ergotism seems, from the early effect produced by its cause upon the nervous system—from the spasmodic contractions, insensibility, weakness of mind, and fatuity often accompanying it—to arise, in a great measure, from lesion of this system. The circulating fluids are evidently also deteriorated; the affection of the nervous system being probably caused by the change in the blood. Whatever that change is, it may be supposed to affect also the blood-vessels, particularly those most removed from the centre of the circulation. But the vessels as well as the internal viscera of persons who have died of this disease have not been investigated. In this state of ignorance as to the morbid appearances after death, several opinions have been hazarded as to the nature of the alterations which terminate in this manner. Some suppose that inflammation of the blood-vessels is produced; and others contend that the existence of inflammatory action is not indicated by the descriptions given by observers of the disease. Without the data furnished by the minute examination of the blood-vessels and nerves after death, all speculation as to the nature of the disease must be inconclusive.*

35. *B. Gangrene from Diseased or Decomposed Animal Matters.*—Mortification may take place from these causes in one or other of the following circumstances: 1st. It may result from the absorption of gangrenous or morbid matter from a different part of the same frame; in which case the consecutive gangrene is generally seated in some internal organ, as the lungs, spleen, liver, &c. 2d. It may follow the application of putrid or diseased matter to an abraded surface, or by puncture, as in dissection, wounds, &c. 3d. It may be occasioned by exposure of a wound or sore to foul air, or by the constitutional affection produced by the respiration of air loaded with decomposed animal matter, as in hospital gangrene; and 4th. It may follow the contact of a diseased secretion, either with or without abrasion of the cuticle. I

during the campaign in Russia, although the soldiers made no complaint in the very coldest weather, yet as soon as the temperature had risen from ten to twenty degrees, they began to experience the effects of the cold, and those who had opportunities of warming themselves by fires suffered in the greatest degree. They first began to complain of pain in the feet, and of numbness, heaviness, and prickings in the extremities. The parts were scarcely swollen, and of an obscure red colour. In some cases a slight redness was perceptible about the roots of the toes and on the back of the foot. In others, the toes were destitute of motion, sensibility, and warmth, being already black, and, as it were, dried.]

* [*Gangrenous Ergotism* has been rarely observed in the United States; an early number of the Medical Repository contains an account of several cases of the disease in New-England, but since that time (1804) no well-authenticated cases have been placed on record. The quantity of ergot contained in any sample of grain is seldom sufficient to lead to any injurious consequences.]

shall consider separately gangrene occurring in each of these ways.

36. *a.* When mortification follows compound or other fractures, or amputations, inflammation, &c., a similar occurrence to that which I have noticed, when treating of abscesses (see art. *ABSCESS*, § 25), may take place—a portion of the sanious fluid may be carried into the blood, and give rise to internal gangrene, without any appearance of previous inflammation of the consecutively gangrened part. Upon examination after death, this part is found in some instances livid, brown, or black, in one or more circumscribed portions, and somewhat condensed, particularly if the lungs be the organ thus consecutively altered; and in others of a dirty gray or slate colour, and soft or pulpy. Occasionally this latter state appears to have been the advanced stage of the former. In several cases the diseased part is reduced to a sanious or almost fluid condition, and changed to a reddish brown or dark brown colour. In all these states, the surrounding tissues may not be at all changed; the gangrened portions varying in size and in number. In these cases, the sanious matter which has passed into the circulation has induced congestion of a portion of an internal parenchymatous organ, and so impaired the vital properties of the congested capillaries, as well as of the organ itself, as to cause them to pass directly into a state of gangrene, without intermediate reaction of the vessels, either in the affected part or in the surrounding structures. The above states of *consecutive gangrene* I have seen after sphacelation affecting the extremities, or parts pressed upon in low fevers, especially those covering the sacrum.

37. *b.* The application of putrid or morbid matter to an abraded or punctured part often produces a septic or contaminating effect, especially upon caechectic or previously disordered constitutions. Putrid vegetable or animal substances, and various morbid secretions, when thus applied, may occasion, in the first instance, erysipelas, or diffusive inflammation of the cellular tissue, quickly passing into gangrene. The wounds received in dissections, particularly of stale subjects, or of bodies dead more than twenty-four or thirty hours, are sometimes followed by gangrenous inflammation of the cellular tissue, attended by irritative or low fever. The disease caused by wounds or punctures received in the examination of recently dead bodies, particularly those who have died in the puerperal state, or from inflammation of serous membranes, although much more dangerous than that which occurs in the foregoing circumstances, is seldom attended by gangrene, even in fatal cases (see *POISONS—Animal*); or if it be, this lesion is the least important part of the malady.

38. *c.* Wounds, injuries, and sores are not infrequently affected by gangrene in circumstances favourable to the contamination of the air, to imperfect ventilation, and to the production of humidity, in the apartments where persons thus injured are confined. *Hospital gangrene* is most frequently generated in this manner; for, although the fluids of the diseased part will produce it when they come in contact with an abraded surface, or possibly, even, when they are for any time applied to the sound skin, yet I believe that it is chiefly owing to the

solution of putrid animal miasms in the humidity of the surrounding air that the disease is communicated in the wards of a hospital. Hence the mischief of wetting the floors of wards too often, when numbers are confined in them with injuries, &c., as respects the production both of erysipelas and of gangrene. I am of opinion that the close and foul air generated by the discharges from suppurating or gangrenous surfaces will favour the production of gangrene in injured parts, by lowering vital power and deteriorating the circulating fluids; and thereby inducing a state of system similar to that in which putro-adyamic fever originates, or by which it is characterized.

39. When *hospital gangrene* commences in a sore or part with which the foul air comes in contact, it is evinced by a change of colour, which, however, differs in different cases. In some it begins with a certain degree of pallor, and the exudation of a dirty, pale gray matter, occasionally interspersed with specks of blood. In other instances it presents a livid hue; and in nearly all it is swollen and painful. The surrounding parts soon undergo similar changes; the integuments have an erysipelatous appearance, and, with the subjacent cellular tissue, are soon converted into spongy, dirty gray sloughs. The separation of the sphacelated parts is generally attended by an exudation of blood, or by more copious hæmorrhages, owing to the adynamic state of constitution preventing the inflamed part from forming coagulable lymph, whereby the extension of the gangrene may be limited, and the hæmorrhage prevented. The state of asthenia or putro-adyamia, produced by the causes just named (§ 38), favour the extension of the mortification, the farther contamination of the blood, and the recurrence of hæmorrhage. When a considerable vessel is destroyed, the absence of coagulable lymph gives rise to losses of blood, which farther sink the patient; and a recourse to the tourniquet, in order to arrest the bleeding until the vessel is tied, accelerates the death of the limb, which soon becomes swollen, completely sphacelated, and intolerably offensive.*

40. *d.* The morbid fluids and secretions of several of the lower animals often produce very serious effects when applied to the denuded surface, or even to the sound skin; and these effects are generally attended or followed by gangrene of the part with which they come in contact. The occurrence of *Malignant Pustule* (see the article) is an illustration of this fact. The application of the blood or raw flesh of a diseased animal to a part will often occasion gangrenous inflammation of it, although the flesh of these animals may be eaten with impunity when cooked. Of this, various instances have been adduced by MORAND, DUPUY, LEURET,

* Mr. COPLAND HUTCHISON, in a most instructive chapter on Hospital Gangrene, in his *Surgical Observations*, details a case of a man who had been the subject of extensive exfoliation of the left parietal bone, exposing the *dura mater* to the extent of two square inches and a half, and who was infected by hospital gangrene of the exposed part. In about three days the *dura mater* was destroyed and the brain itself attacked. The brain came away, broken down in its structure, as if it had been mixed with dark-coloured vinegar, and emitted a disagreeable, sour, gangrenous smell. The man lost half a tea-cupful of brain before fever and delirium came on. He died on the tenth day from the attack of the gangrene. The whole of Mr. C. HUTCHISON'S observations on this disease are results of most extensive experience, and are very interesting.

HAMONT, and others. I believe that, in all cases of the production of gangrene by morbid secretions and other fluids, whether of the lower animals or of man, the local as well as the constitutional effects produced by them are most virulent, when they either proceed directly from the living animal, or act very soon after death; and that they are less injurious when they have undergone the changes constituting incipient putridity or decomposition.

41. *C. Gangrene from poisons generated in healthy animals*, as in the viper, rattlesnake, &c., commences and proceeds with amazing rapidity, upon insertion of the poison, and with remarkable depression of the vital manifestations of the constitution, as well as of the part thus inoculated. The insertion of the poison induces intense pain, which rapidly extends; swelling and hardness of the cellular tissue; dark redness of the point of injury, soon followed by a spreading livid discoloration; and diminution of temperature. The skin is rapidly covered by phlyctenæ; the cellular tissue becomes soft, and crepitates on pressure; and the puncture discharges an offensive sanious fluid. Almost immediately upon inoculation of the poison, and co-ordinately with the rapidity and extent of the local action, an intense effect is produced upon the whole frame (§ 50).

42. II. OF THE CONSTITUTIONAL SYMPTOMS OF GANGRENE.—The states of vital manifestation throughout the system vary somewhat in each of the forms and circumstances in which gangrene and sphacelus appear. I shall, therefore, take a very brief view of those which are usually seen in most intimate union with each of these forms.—*A. Mortification from inflammation* presents no uniform relation to the severity of the local action, or of the sympathetic constitutional disturbance, although such relation obtains in a general way. Inflammation of much intensity in a constitution previously debilitated, or in a habit of body already cachectic, or during a deteriorated state of the circulating fluids, is always more or less liable to terminate in gangrene. Its occurrence, also, in a highly sanguine, irritable, and plethoric state of the system, particularly when this state has been induced by living highly or by the excessive use of intoxicating liquors, is a no less unfavourable circumstance; and, equally with the foregoing liabilities, should be taken into account when symptoms indicative of this termination appear. In the former class of occasions in which gangrene may occur, the inflammation, although slight or limited, may nevertheless be excessive, relatively to the state of vital power and of resistance to injurious impressions or actions; in the latter, there is always a disposition to intensity of action so great as to quickly exhaust the vital properties of the vessels, if this intensity be not promptly reduced, and the consequent exhaustion either anticipated or promptly met by local or general means appropriate to the peculiarities of the case.

43. To detect the commencement of gangrene in any internal viscus is by no means so easy as it has been represented by many writers, who, merely copying or compiling from one another, have thereby often perpetuated error. The *sudden sinking*, so often insisted upon, attends various other pathological conditions be-

sides gangrene; and, even when it is observed in connexion with this lesion, it may be the attendant of that change in the state of vital power, of which gangrene is only one of the remote consequences. When this symptom appears somewhat suddenly, it indicates one or more of three states: *α*. It may depend upon the depression of organic nervous power, generally as well as locally; *β*. It may arise from commencing gangrene; *γ*. And it may be caused by the passage of morbid or putrid matter into the blood. The *pulse* varies on the accession of gangrene, with the previous grade of local action and of attendant fever. When action has been very high, the pulse retains its frequency, but becomes weak, small, soft, and very compressible, and ultimately irregular, intermittent, or even slow, just before death. When there has been but little previous fever, the pulse is very feeble, undulating, unequal, intermittent, and slow; but it is readily affected, in either case, by mental or physical impressions. The *animal heat* sinks rapidly with the pulse when gangrene supervenes; the extremities becoming cold, and the surface covered with a clammy perspiration or sweat, which is cold and raw as dissolution draws near. If the antecedent symptomatic fever have been slight, the *mind* may be undisturbed to the very last; if severe, delirium, picking at the bed-clothes, stupor, coma; accumulations of mucous sordes on the tongue, teeth, and lips; fetor of the breath, and even of the body; and unconscious evacuations, for a longer or shorter time before death, are not infrequent.

44. Besides these, various other symptoms appear, but without any uniformity or constancy. These are, faintness or syncope, particularly when the head is raised; hicough; vomitings, sometimes without severe retchings, or a passive rejection of matters from the stomach; a peculiar gangrenous odour exhaled from the body, and from the excretions; a sunk, collapsed, pinched, and cold state of the features; a dusky, lurid, and sometimes a jaundiced appearance of the skin; tympanitic distention of the abdomen; offensive eructations; an emphysematous state of parts; wandering delirium, especially at night, or various passing delusions; tremblings or shudderings; and restlessness, or laborious, hurried respiration. An offensive gangrenous odour of the expired air is very remarkable when gangrene occurs in the lungs; but it may accompany this lesion in any other part, if a portion of the morbid or decomposed matters pass into the circulation. In this case, all the excretions—pulmonary, cutaneous, intestinal, and urinary—will be rendered more or less offensive, and they may even exhale a gangrenous or putrid fetor.

45. *B. In mortification from debility*, or from *deficient or unwholesome food*, not only are the vital manifestations generally impaired, but the fluids and solids also are frequently in a state of obvious disease before gangrene occurs, particularly in low fevers, scurvy, &c. In such cases, the general adynamia, as well as the deterioration of the fluids and solids, are rapidly augmented with the accession of this lesion, and most of the symptoms already noticed are also superadded. The pulse, temperature, and mental powers are affected in the manner just described. The previous and attendant asthe-

nia, and the consequent alterations in the blood—which is incapable of coagulating as it escapes from the diseased part—favour the recurrence of hæmorrhage, the extension of sphacelation, and the farther contamination of the fluids from the transit of purid matters into the circulation, by preventing the formation of coagulable lymph. The more obvious effects of these states are, accelerated sinking of the vital functions, offensive diarrhœa, and various other contingent phenomena, mentioned above (§ 44), as indicating approaching dissolution. When *inflammation of the nerves* seems connected with the production of gangrene, great pain, high irritative fever, watchfulness, &c., precede the sinking irritability of stomach, and weakness or irregularity of pulse, attendant upon this change.

46. *C.* When *obstructed circulation in the arteries* occasions gangrene, the symptoms depend very much upon the cause of obstruction.—*a.* If *acute arteritis* (see ARTERIES, § 27, *et seq.*) produce it, severe inflammatory or irritative fever precedes it, and, on the accession of it, changes into fever of a lower type; watchfulness, sometimes delirium, and most of the symptoms already noticed, supervening.—*b.* When *ligature or rupture of an artery* causes gangrene, the constitutional affection is not severe at first; but in two or three days, or in a shorter time, fever of a low type appears, with more or less disturbance of the nervous system, occasionally with delirium, discoloration of the general surface, and sinking of the vital powers, until either dissolution follows, or restoration and separation of the gangrened part takes place.—*c.* In cases of gangrene from *ossification and obstruction of the arteries*, the constitutional symptoms increase slowly until they ultimately indicate great prostration of the vital powers. In some instances, the progress is at first slow, and afterward very rapid. In an early stage of the gangrene, slight irritative fever is sometimes observed; but discoloration of the surface, diarrhœa, sinking, hiccough, irritability of stomach, and the other usual attendants on sphacelation, afterward appear; the progress of the constitutional affection being seldom arrested, or the separation of the dead parts effected.

47. *d.* Whatever peculiarity *gangrene from obstruction of the veins* presents as to the constitutional symptoms belongs entirely to the nature of the obstruction. If inflammation of the veins have occasioned it, the symptoms, local and general, of phlebitis will have preceded it, and the advanced phenomena will not differ from gangrene consequent upon internal inflammations, excepting that the powers of life will be more disposed to rally, and to separate the dead from the living parts. Gangrene caused by *pressure upon the veins* often takes place without any previous or attendant febrile action; the vital depression and other symptoms of this lesion supervening upon the congestion, serous infiltration, &c., more immediately produced by the obstruction.—*c.* *Internal strangulations*, however, and *intus-susceptions* of a portion of the intestinal canal, give rise to a different train of symptoms. In these, the pressure acts also upon the nerves and arteries; and the exquisite pain and tenderness, irritative fever, restlessness, and vomitings,

followed by cessation of pain, by singultus, eructations, faintness, cold sweats, extreme weakness of pulse, &c., indicate the accession of gangrene.—*f.* *Interrupted circulation through the heart*, occasioning gangrene, is not preceded by febrile symptoms: the constitutional changes in this variety at first depend upon the disease of the heart, and become subsequently associated with those arising from impeded circulation of blood in the veins, serous infiltration, and the consequent pressure and gangrene. The progress of the local and constitutional affection is slow, but sometimes rapid at an advanced stage.

48. *D.—a.* The *action of heat* upon the constitution in producing gangrene is proportioned to the violence and extent of local injury. Excessive burning pain, hard pulse, thirst, and the usual attendants upon symptomatic inflammatory fever, follow the less violent injuries from this cause, heighten the local inflammation, and exhaust the vitality of the affected vessels. When gangrene is about to occur, or has supervened, the fever changes to the nervous form, often with delirium or mental agitation, followed by stupor, or convulsions when children are the subjects of this injury. In very severe burns, or where a very large surface has been scalded, these latter symptoms immediately follow the shock sustained by the constitution, from the extensive local injury inflicted; and often terminate fatally in a period varying from a few hours to two or three days. The severity and character of the constitutional affection, however, vary with the state of the patient and the situation of the injury. When the injury is over the great cavities, its effect is much more severe, *cæteris paribus*, than on the extremities.

49. *b.* *Gangrene from cold* is often attended by very slight constitutional disorder, when only the extremities have been exposed or affected, or when the cause has been removed soon after these parts had become benumbed or frozen. But when the whole body has been exposed to cold, particularly in a state of repose, or when the exposure has continued long after these effects have been produced, lethargy, stupor, insensibility, frequently passing into death, generally supervene in succession. It is when local inflammation or reaction appears in the previously benumbed or frozen part, or in the living tissues adjoining, that fever takes place. But as soon as the inflamed part becomes gangrenous, the fever assumes the nervous character. In this variety, however, as well as in that from burns, the degree of consequent adynamia depends very much upon the previous state of the patient, physically and morally; upon the severity of the injury; and upon the extent of the gangrene, and the rapidity of its accession and extension. Where want, improper food, and intemperance have already produced their effects on the frame, the constitutional commotion attendant upon the injuries produced by the extremes of temperature generally presents more of a nervous character throughout than in other circumstances, with a rapid, small, weak, and irregular pulse; and frequently with tremour, delirium, or even both, or with more or less agitation.—*c.* *Chemical agents* affect the system chiefly by the inflammation they excite in the part to

which they are applied; unless the injury is extensive or violent, when the symptomatic effects will nearly resemble those caused by extensive burns (§ 48).

50. *E. Gangrene from poisons* is always preceded and attended by severe constitutional affection.—*a.* That occasioned by *spurred rye* is generally preceded by lassitude, faintness, weakness of the senses, vertigo, spasms, and symptoms of general adynamia, manifested both in the vital and animal functions. Sleep is prevented by the severe pains in the limbs. The powers of mind are generally impaired; and, with the appearance of gangrene in the extremities, all these symptoms are increased, until the patient sinks into insensibility, or dies in a state of syncope.*—*b. Gangrene from putrid or diseased animal matters* is preceded, as well as attended, by the severe constitutional effects described in the articles on *Diffuse Inflammation of the CELLULAR TISSUE*, *ERYSIPELAS*, *Malignant PUSTULE*—either of which may be produced by these matters—and more fully elucidated in those on *Putro-dynamic FEVER* and *Animal Poisons*.

51. *c. Hospital gangrene* is always attended by adynamic fever; and, in the circumstances alluded to above (§ 38), it is often preceded by more or less depression of nervous and vital power, although rarely by prominent febrile symptoms. Derangement of the digestive functions, sometimes diarrhœa, a quick and feeble pulse, and physical and mental depression generally usher in and attend the early progress of this gangrene. Dr. HENNEN states that men who had borne amputation without a groan shrunk at the washing of their sores, shuddered at the sight of a dead comrade, and even predicted their own dissolution, sinking into sullen despair. Towards a fatal close, prostration of all the vital manifestations, faintings, diarrhœa, vomiting, hiccough, delirium, discoloration of the general surface, insensibility, coma, cold clammy sweats, involuntary evacuations, &c., successively appear.

52. *d. The poisons of reptiles* occasion a sense of sinking at the epigastrium, oppression in the præcordia, laborious breathing, vertigo; pains in various parts of the body, particularly in the stomach, bowels, and head; vomitings, diarrhœa; impaired vision and sensation, with a small, feeble, or intermittent pulse. To these succeed extreme sinking and anxiety at the epigastrium and præcordia, great thirst, syncope, singultus, offensive fœtid breath, a jaundiced or sallow state of the skin, coldness of the extremities and of the general surface, clammy sweats, insensibility, and death, unless the progress of vital depression be arrested by the most energetic means.

53. III. PROGNOSIS.—The prognosis, although generally unfavourable, varies with the different circumstances in which gangrene presents itself, and the extent to which it has proceed-

ed.—*a. Gangrene consequent upon inflammatory action* is commonly fatal when an internal organ is affected, especially when the general excitement suddenly subsides, the pulse becoming quickly feeble, small, or thready; the features pinched or collapsed; the surface lurid, sallow, or livid; the respiration laborious or difficult; and the perspiration or other excretions fœtid and gangrenous. Singultus, rejection of the contents of the stomach without effort, syncope, and involuntary evacuations, are indications of the near approach of dissolution. But all these phenomena are often manifestations merely of that state of local and general derangement, of which gangrene is the immediate result, rather than of gangrene itself—at least of gangrene to any extent; for dissolution may take place before this lesion is fully developed. When this form of gangrene is external, its extent is less an indication of danger than the character of the constitutional disorder and the disposition evinced by this lesion to extend. In all cases, the habit of body, the age, modes of living, and previous health of the patient, and the exciting cause and character of the previous inflammation, should be taken into account. If these are favourable, if vital action be not very depressed, and if a disposition to form coagulable lymph and to arrest the disease appear, recovery may be expected.

54. *b. Gangrene from debility, from disease of the nerves, and from obstructions of the arteries or of the veins*, should receive a guarded, if not always an unfavourable prognosis; for in these circumstances, although some cases may recover, the great majority will terminate fatally. When it occurs from *ossification and obstruction of the arteries, or from disease of the heart*, a fatal result will surely follow; although it may be deferred for some time in a few instances.—*c.* When it is produced by any of the more common *physical agents* noticed above, a much more favourable event may be anticipated, unless the intensity of the cause, and the extent to which it has acted, have given a very severe shock to the system, have depressed vital power beyond the ability of resistance, and induced low nervous fever with cerebral affection.

55. *d. Gangrene from the use of spurred rye* requires a cautious opinion as to the result; for when the disease produced by this agent has given rise to this alteration, matters will frequently have gone too far to admit even of amelioration. Nor is the prognosis very different when the deleterious effects of any of the *animal poisons* mentioned above have become so manifest as to be attended by gangrene. The most energetic means alone can then arrest the progress to dissolution; and these may be rejected from the stomach, or fail, even when retained, of rallying the powers of life. In every circumstance in which gangrene occurs, irritability of the stomach is a most dangerous symptom. In *hospital gangrene*, however, removal of the patient to a pure air, and an appropriate treatment at an early stage of the disease, will be attended by success in the majority of cases.

56. *e.* Of all the circumstances that should be taken into consideration in forming a prognosis, none is of greater importance than the disposition evinced by the surrounding parts to limit the extension of the gangrene by the for-

* [The dry gangrene prevailed among horned cattle in some parts of Pennsylvania, and in Orange County, New-York, in the years 1819 and 1820; and the late Dr. MEASE fully established the fact that the disease was caused by the use of the *green grass (poa viridis)*, the seeds of which were extensively affected with the *smut*, or *ergot* (*Domestic Encyclopedia*, vol. ii., p. 52; vol. iii., p. 196). Dr. ARNELL has more recently published a very interesting account of the same disease, confirming the statements of Dr. MEASE (*The Plough Boy, and Journal of the Board of Agriculture*, by S. SOUTHWICK, vol. iii., p. 41).]

mation of coagulable lymph. This should be viewed as a most favourable occurrence, particularly when the local alteration has not proceeded very far, nor depended upon disease of the heart, as it indicates restoration of vital power and consequent vascular reaction, whereby the injury may be arrested and partially repaired. On the contrary, spreading of the gangrene is most unfavorable, 1st. As producing a greater extent of exposed surface and of injury, by which the constitution will be injuriously impressed; 2d. As arising from progressive sinking of vital power; and, 3d. As favouring the passage of a portion of the dead or morbid matters of the sphacelated part into the circulation, and the consequent contamination of the whole frame: circumstances exerting a most powerful influence in hastening a fatal result, especially if asthenic inflammation, general adynamia, or an animal poison have occasioned the gangrene.

57. IV. TREATMENT.—i. The means of cure in gangrene refer, *first*, to the removal of the pathological condition which occasions it; *secondly*, to the state of vital action in the vicinity of the dead part; and, *thirdly*, to the state of constitutional disturbance.—A. If gangrene have been caused by inflammation, especially if it have proceeded to sphacelation, the state of constitutional power will then have become so far impaired after the more sthenic forms of inflammatory action, and so much the more reduced after the asthenic, as to require a very different mode of treatment from that which would have been quite appropriate before the gangrene had taken place.—a. Although the part is about to pass, or has just passed into gangrene, after the more sthenic states of inflammation, *blood-letting* may still be practised, but with caution, particularly in robust or plethoric persons, or when the pulse still continues hard or strong, or when the gangrene is external. In these circumstances, excessive vascular action, if not subdued by a moderate depletion, would exhaust the remaining power of the vessels of the part or of the surrounding tissues; and the extension of the lesion would be thereby caused with as great rapidity as in cases characterized from the commencement by deficiency of power. It is very different, however, when the gangrene has followed the more asthenic states of inflammation, or occurred in persons living in unhealthy situations and in very large cities; or when it has appeared in the dissipated and intemperate. Bleeding cannot be resorted to in these circumstances, and even lowering *purgatives* should be avoided. Yet recourse to purgatives is indispensable; the warmer or more restorative kinds, or a combination of them with tonics, being most appropriate. In some instances, particularly when biliary collections may be presumed to have formed in the gall-bladder or ducts, and when the part is merely in the incipient stage of gangrene, an *emetic* will precede the exhibition of a purgative with much benefit, especially in autumn.

58. b. It is principally when gangrene has just commenced, and been caused by the more acute forms of inflammation, in young or strong persons, that the *antiphlogistic regimen* should be prescribed; or while the pulse still retains tone, and the surface presents an increase of

temperature, the local change not having yet become associated with a general diminution of vital power. In this state, *diaphoretics*, conjoined with *opium* or other *anodynes*, are also of much service, particularly after morbid secretions and faecal accumulations have been freely evacuated by purgatives. They equalize the circulation, and, if judiciously selected, they improve the state of the blood; while the narcotic allays the morbid sensibility of the nerves of the part, and the general irritability of the system attending the early progress of this lesion. The nitrate of potash, carbonate of soda, with the spirits of nitric ether, and tincture of opium or of henbane, may, therefore, be prescribed in the camphor mixture, if the temperature of the skin continues above natural; or the same medicines may be given in the decoction of bark, or in the infusion of valerian, if the heat of the skin be somewhat less. When the abdominal secretions are morbid, two or three grains of calomel, with as many of JAMES'S powder, may be taken at night, and a stomachic aperient the following morning, the solution of the acetate of ammonia, with the acetate of morphia in camphor mixture, or any aromatic water, being used during the day.

59. c. Internal gangrene is very rarely attended, even at its commencement, by a state of vascular action requiring antiphlogistic remedies. It is chiefly when gangrene follows local injuries, in robust constitutions, and violent inflammation, or when it is attended by considerable excitement, that the above or similar measures are necessary. In other circumstances—as when it is consequent upon asthenic action, or when the antecedent inflammatory fever has assumed a lower grade—the treatment ought to be different, or modified according to the states of action and of vital power. Surgical writers on gangrene, even up to the present time, have concerned themselves chiefly with the external manifestations of this lesion, without sufficient reference to the states of vascular action and of vital energy—to the changes in the organic nervous influence in the circulating fluids, and in the abdominal secretions, which both favour its occurrence, hasten its progress, and modify its conditions. Hence the treatment of it has been viewed by them in a one-sided and imperfect manner. Instead of agitating the question as they have done, even for ages, as to the propriety of bleeding, or of giving bark at the commencement or during the progress of this lesion, they should have endeavoured to ascertain, if they did not know, and they should have informed us if they knew, the circumstances requiring the one or the other, and the stages in which either ought to be employed. It is a matter of some astonishment to see practical writers of the present day differing so widely on this subject as they do, some prescribing bleeding, others cinchona, and many condemning all things besides their own methods or medicines, without considering the pathological states for which either mode of treatment is most appropriate. The most important means of cure—whether bleeding, stimulants, or tonics, amputation, external applications, &c.—have been recommended for gangrene without sufficient reference to the states of vascular

action and of vital power, or to the effect which either of them may produce upon these states, and upon the disposition to limit or to extend the local disease; or to the influence they may exert in favouring the contamination of the circulating fluids, or in depurating the blood, and in promoting the functions of the principal secreting and excreting organs.

60. *d.* If the pulse be weak or soft, and the skin cool or moderately warm, the preparations of cinchona, serpentaria, and the hydrochlorate of ammonia; or the sulphate of quinine with camphor or aether; or the infusions of cascarilla, or of valerian, or of calamus aromaticus, with the chlorate of potash and chloric aether, will be requisite. At the same time, the excretions should be promoted by stomachic purgatives, as the compound infusions of gentian and senna, with the alkaline carbonates and ammonia. In a case which was ably treated by Mr. MORLEY, of New Cavendish-street, to which I was called, this treatment was immediately efficacious. When diarrhœa is present, opium should be added to these tonics; or the chlorate of lime may be prescribed. In cases where the attendant inflammatory fever is about to pass into the nervous or putro-adyamic states, especially if the gangrene have gone on to sphacelus, the exhibition of these, or of other tonics and stimulants, should not be delayed too long, otherwise the adjoining vessels may not be enabled to exert that degree of sthenic action requisite to the formation of coagulable lymph, whereby the extension of the lesion may be limited, and the absorption of morbid matters and the consequent contamination of the blood prevented. The stomach may become so irritable, when vital depression is not arrested sufficiently early, as not to retain the medicines most likely to be serviceable. This occurrence should be as far as possible prevented, as being most dangerous in itself, and as favouring the passage of morbid matters into the circulation. When it has appeared, I know nothing more efficacious in diminishing it than ammonia, large doses of Cayenne pepper, and opium, generally combined, and given in the form of pill. Warm wine and water, or brandy and water, with Cayenne, or other hot spices; or the acetate of hydrochlorate of morphia, with aromatics, may likewise be employed. Upon the whole, inflammatory gangrene, at an advanced stage, or gangrene consequent upon asthenic inflammation, or attended by the usual symptoms of adynamic fever, requires a very similar treatment to that which I have advised in the advanced periods of *Putro-adyamic Fever* (see that article).

61. *B.* The constitutional treatment of *gangrene from debility and deterioration of the circulating fluids* (§ 16) consists chiefly in the exhibition of tonics and stimulants; of the chlorates of potash and of soda; of camphor, musk, and ammonia, with opium and capsicum; and of the other restoratives mentioned above (§ 60); and differs in no respect from that advised in diffusive inflammation of the *cellular tissue*, in the adynamic states of *erysipelas*, and in the typhoid forms of *fever*.

62. *C.* When *disease of the nerves* threatens the production of gangrene, the morbid sensibility usually present requires the exhibition of opiates in large doses, frequently with camphor,

or ammonia, or the carbonates of the fixed alkalis and warm aromatics. Even on the threatened accession of this lesion, local depletions may be still required. Purgatives are generally beneficial. Warm anodyne fomentations may be applied to the limb at this period; and the other external remedies, of which mention will be made hereafter, should be afterwards employed, particularly if the part pass into sphacelation. In other respects the treatment should be conducted conformably with the principles developed above.

63. *D.* The treatment of *gangrene from obstructed circulation*, through either the vessels or the heart, depends much upon the seat and cause of obstruction. If inflammation of the arteries and veins be concerned in producing it, the means of cure ought to have reference to the states of vascular action and of vital energy, as in gangrene from inflammation; but, in respect to phlebitis especially, vital power and resistance should be so liberally supported as to enable the vessels to form coagulable lymph, in order to limit the extension of the lesion and prevent the contamination of the fluids. When it is caused by *strangulation* of or *pressure* upon the veins, the treatment must entirely depend upon the states of vascular action and of vital power. The former ought not to be allowed to continue high, nor should the latter be permitted to sink, without having recourse to means to support the one and to lower the other. For senile gangrene, or that arising from *ossification* of, and impeded circulation in the arteries, little beyond palliation of the urgent symptoms can be effected. The same remark applies to that caused by *disease of the heart*. Opium or the salts of morphia, either alone or conjoined with camphor, musk, ammonia, or similar substances; the alkaline carbonates, or the bi-borate of soda, with anodynes; tonics, antispasmodics, or stimulants, conjoined with these; attention to the digestive and excreting functions; the horizontal position; and farinaceous or milk diet, may be severally employed in both these forms of gangrene.

64. *E.* *Gangrene from physical agents* should be treated according to existing states of local and general action and of vital power, which have been shown above to differ very materially, according to the severity, seat, and duration of the injury. That caused by *burns* requires blood-letting, if the vascular excitement be great. But action, in these cases, although high, is seldom attended by much power. Therefore vascular depletion should be practised in moderation and with caution; the nervous excitement and irritability of the system requiring the chief attention; for, if allowed to proceed, they increase remarkably the severity and extent of the local injury. When the shock sustained by the constitution has been severe, depletions will be injurious. In these cases, restoratives ought to be administered, generally with opium or other anodynes. These latter are required in most cases, and they should be aided by such local means as will allay the painful heat and sensibility of the part. In severe injuries of this kind, the alarm of the patient and the excitement directly produced by them commonly occasion an appearance of vascular reaction which may mislead; but it

generally subsides in a short time, especially if a full dose of opium is administered. When febrile action appears at a later period—after the immediate shock and alarm have subsided—and is symptomatic of the local inflammation, general or local depletions, purgatives, and diaphoretics are then necessary. The internal treatment of gangrene produced by cold, as well as of that caused by chemical agents, should be directed conformably with the principles already stated.

65. *F. Gangrene from poisons* requires more, perhaps, than any other form of this lesion, the use of internal remedies.—*a.* That occasioned by *spurred rye* is evidently connected with a deteriorated state of the circulating fluids, the affection of the nervous and vascular systems being consequent upon this state. Therefore the means of cure should be directed to the removal of this condition; and those already mentioned (§ 60, 61) may be tried with this intention, especially the combination of the chlorides with antispasmodics or tonics and narcotics. The opinions of writers who have had some experience in the treatment of this disease are very contradictory. Some advise emetics, blood-letting, and antispasmodics; others, narcotics and antispasmodics; and many, stimulants and tonics. This diversity is most probably the consequence of the different effects produced by the same means of cure in successive stages of the complaint, and in epidemics presenting somewhat different characters, the changes thus arising obviously requiring a modified treatment. The means, however, which I have here suggested, or camphor, opium, and the alkaline carbonates, seem most deserving of confidence in this variety, particularly if aided by frictions, warm stimulating fomentations, and the warm bath, the alkaline bi-carbonates or common salt having been dissolved in the water. The patient's strength should be supported by light, nourishing, and wholesome food.

66. *b.* The gangrene produced by *animal substances* in a state of disease or of decay, should be treated very nearly as recommended in the articles on *Diffusive Inflammation of the CELLULAR TISSUE*, and on the adynamic state of *ERYSIPELAS*. The therapeutical indications are the same, namely, to excite and support vital power, and to allay irritability, and thereby to prevent the extension of disorganization by enabling the vessels to form coagulable lymph. With these intentions, combinations of tonics, antiseptics, and anodynes are resorted to, especially after morbid secretions have been evacuated by stomaehic purgatives, and by enemata; and camphor, capsicum, and the acetate of morphia are prescribed when nervous excitement or vascular irritability are very prominent. Ammonia, musk, chlorate of potash, sulphate of quinine, and warm aromatics, or spices, are generally beneficial, and may be given in various forms of combination, and in conjunction with opiates, according to the peculiarities of the case.

67. *c.* *Hospital gangrene* is the most common variety, and therefore the most important of this species of disorganization; in none has a greater difference of opinion existed as to the most appropriate method of cure. It is obvious that a *prophylactic* and *curative* treatment

should be based only upon a correct idea of the causes in the various circumstances in which this formidable malady presents itself. These causes are, 1st. A cachectic and debilitated state of constitution, generally connected with disorder of the digestive canal and liver. 2d. A low, humid, and miasmatic atmosphere, and a damp and an ill-ventilated place of residence. 3d. Insufficient or unwholesome food, and the use of impure water. 4th. An air loaded with putrid miasms or animal exhalations, as that of crowded hospitals, camps, ships, and transports; and, 5th. The contact of animal matter or of diseased secretions or discharges, as in using unclean sponges, &c. From what I have seen of the disease in foreign hospitals, soon after the last war, I infer that, although the fourth and fifth of these are the most common exciting causes, the others are often more or less influential, either in predisposing to it, or in directly producing it, especially after severe injuries and operations, or when aided by the depressing passions; and that the causes commonly giving rise to typhoid or putro-ady-namic fever will often occasion it, especially in crowded surgical wards of hospitals.

68. *a.* The opinion of DELPECH as to the origin of this form of gangrene, which is very nearly the same with that which I have now advanced, has been called an "irrational conjecture, quite destitute of truth," by Mr. S. COOPER. M. DELPECH's views are derived from extensive and diversified observation, in both civil and military hospitals, and are neither irrational nor destitute of truth. It surely is not becoming to condemn with harsh censure what cannot be answered by sound argument. Many of the surgical writers upon this malady have hardly looked beyond the local origin of it, and have limited their curative measures too strictly to the gangrened part. Others have, with greater justice, relied on constitutional treatment, without, however, neglecting such local means as have been found serviceable. The utmost diversity of opinion also exists as to what internal and external remedies are most beneficial. The very inefficient and inappropriate medicines but too often used internally by surgeons in this disease, have proved a principal cause of their distrust of this method of cure; for whenever the expected result did not follow the means employed, the cause of failure was not attributed to such means, but to the nature of the malady. It is a matter of astonishment that, with all the reverence with which the doctrines and practice of JOHN HUNTER have been viewed, the most important of both have been very generally neglected in the treatment of this and other external lesions connected with constitutional disorder. This able man stated, as axioms in pathology, that a certain degree of vital tone or energy is requisite for the formation of coagulable lymph, by which the spreading of inflammation and sphacelation will be prevented; that where, owing to deficiency of vital energy, vascular action is incompetent to the formation of coagulable lymph, these lesions will extend, and the morbid fluids will contaminate the surrounding tissues; and that, in order to avoid these consequences, means should be used to increase the vital power of the vessels in the diseased part, and thereby to enable them to

form coagulable lymph, by which disorganization will be arrested. Although the state of the circulating fluid is overlooked in these views, yet they are correct in the main, and form the basis of a rational and successful practice in this and several other maladies.

69. *β.* Before I proceed succinctly to state the practice I would recommend conformably with these opinions, and with the results of observation, I shall briefly notice the constitutional means advised for this disease by some experienced writers. On the first manifestation of hospital gangrene, *emetics* are recommended by POUTEAU, DUSSAUSSOY, BRIGGS, THOMSON, and HENNEN, and are evidently of service at this period, when there are signs of biliary derangement. *Blood-letting* is considered injurious or productive of little benefit by BLACKADDER, THOMSON, and BOGGIE, while Dr. HENNEN and Mr. WELBANK consider that moderate depletion is serviceable early in the attack, and in strong plethoric persons; and that the risk of the disease attacking the lancet wound may be prevented by accurate closure, and by allowing the bandage to remain undisturbed until the cicatrix is completely formed. *Purgatives* are directed by Dr. BOGGIE and other writers, but they should be warm and stomachic, or conjoined with tonics, stimulants, or aromatics, and exhibited early in the disease. It is chiefly after morbid secretions have been evacuated by the early exhibition of emetics and purgatives that advantage from tonics and stimulants will be most apparent; and it is probably from an insufficient attention having been paid to this circumstance that so much difference of opinion exists as to the propriety of using these latter remedies.

70. *Cinchona* alone, or in various states of combination, is praised for its good effects in this disease by BOYER and numerous experienced writers, while HENNEN and WELBANK consider that it is injurious. It is recommended in conjunction with the alkaline carbonates by VAN WY and SAVIARD; and with camphor, by FLAJANI. *Camphor* is much used in this form of gangrene by Continental practitioners. POUTEAU, CONRADI, WENZEL, and ONTYD prescribe it in large doses. I have seen much advantage derived from it; but I prefer to give it in the forms of combination to be mentioned hereafter. *The arsenical solution* is directed by OTTO. It may be employed in similar states of constitution to those in which cinchona or sulphate of quinine may be prescribed. *Arnica, cascarrilla,* and various other stimulants and aromatics are recommended by various authors, but they are useful merely as adjuvants of other more active means. *Acids* are noticed in favourable terms by Mr. S. COOPER, and several other writers; but I have much doubt of any benefit being derived from their internal use. *The hydrochloric and nitric acids,* or a combination of both, promise most advantages of this class of medicines. Of the propriety of exhibiting *opiates* there can be no doubt; and most writers agree on this point, and differ only as to the period of having recourse to them. Dr. THOMSON prefers them in the form of DOVER'S powder.

71. *γ.* From observation of the results of different modes of practice in hospital gangrene, rather than from my own actual experience, I

would advise the adoption of a practice consonant with the views stated above. Having evacuated morbid secretions and fecal accumulations by emetics and warm stomachic purgatives, and directed a small or moderate blood-letting in such cases only as are attended by excessive action and signs of plethora, I would advise the decoction of bark or the sulphate of quinine in modes of combination appropriate to the peculiarities of the case. If vascular action continue very much excited, the decoction of bark may be conjoined with the nitrate of potash, the solution of the acetate of ammonia, and the spirits of nitric ether, or with the hydrochlorate of ammonia and chloric ether. When vascular action presents diminished tone, the sulphate of quinine may be exhibited in the compound infusion of roses, or in the form of pill with camphor. Where the pulse is weak and quick, the evacuations offensive, and the disposition of the gangrene to extend very evident, the decoction of bark should be combined with the chlorate of potash and compound tincture of bark; and if anxiety, pain, or irritability be present, the tincture of opium or the hydrochlorate of morphia may be added. The great frequency of pulse and loaded state of the tongue generally observed in hospital gangrene, even indicate the propriety of having recourse to these and similar remedies, or to wine in some cases. Regard should also be paid to the previous habits of the patient; and persons addicted to spirituous liquors may be allowed them, but in duly prescribed quantities. If the stomach become irritable, the treatment I have advised above (§ 60) may be employed, or spiced wine may be given; or soda water, spruce or ginger beer, or Seltzer water, may severally be made vehicles of tonic, stimulant, cardiac, or aromatic substances.

72. If diarrhoea appear, and threaten to exhaust the powers of the constitution, opium, or the compound tincture of camphor, should be given in full doses, with the tonic and antiseptic remedies already mentioned; or the chloride of lime may be used internally with tonics and aromatics, or with camphor and the warm spices, or administered in mucilaginous and emollient enemata. If delirium supervene, exhaustion of nervous power, with or without deterioration of the circulating fluids, may be inferred to exist; and camphor with opium, or henbane, the decoction of bark, with the alkaline carbonates and tincture of serpentaria, wine, and the other remedies recommended for *Putro-adyynamic* FEVER, and the low forms of DELIRIUM (see these articles), should be prescribed with a decision commensurate with the urgency of the case. Camphor, in order to be beneficial in hospital gangrene, ought to be taken either in frequent or in large doses. If vascular action be much excited, it will be advantageously conjoined with the nitrate of potash, or nitrate of soda, or the alkaline carbonates, or other saline refrigerants. If vascular action be weak or impaired, and vital power manifestly reduced, it should be combined with the preparations of cinchona or of serpentaria, or with the chlorides and aromatics. *Cascarrilla, einchona,* or *arnica* may be severally employed in similar forms of combination, appropriate to the circumstances of the case.

73. In this form of gangrene especially, proph-

ylactic measures, founded upon a knowledge of the causes specified above (§ 33), should be strictly enforced; and as soon as the disease manifests itself, the patient should be removed into a well-ventilated and dry apartment, and the mind encouraged by cheering prospects, and by the confidence of the physician in the extent of his resources. The local treatment ought to proceed as will hereafter be noticed, conjointly with the above constitutional means of cure.

74. *d.* When gangrene follows the bites of serpents, the viper, or other reptiles, the constitutional symptoms will then be characterized by depression of vital action and power so extreme as to threaten immediate dissolution, and to require the exhibition of ammonia, camphor, capsicum, cajeput oil, and other energetic stimulants in large and frequent doses. In cases of this description, recourse should be had to local means (§ 78) immediately upon the receipt of injury.

75. *ii. Local Treatment.*—*a.* Topical measures ought to be directed with the following intentions: namely, 1st. To restore the tone of the extreme vessels in or surrounding the gangrened or sphacelated part; 2d. To procure the separation of this part as soon as it passes into sphacelation; and, 3d. To prevent the contamination of the circulation and surrounding tissues by the morbid matters proceeding from its decomposition. Substances calculated to accomplish either of these ends will generally also attain the others. Their application should, however, not be delayed either until the gangrened part pass into sphacelation, or after this result has taken place, but should be brought in aid of constitutional treatment. Before the discovery of the chlorides and creasote, numerous substances were recommended to arrest the progress of gangrene, and to fulfil the intentions just stated. In cases of internal gangrene, measures of this description can but rarely be employed. In gangrene of the lungs, however, the inhalation of the fumes of creasote, or of the chlorides, or dilute chlorine, has proved of more or less service. A judicious use of these in external sphacelus is frequently productive of decided benefit, as they fulfil all the above indications. Next to them in efficacy are the turpentine and the balsams, especially the spirits of turpentine and the Peruvian balsam. When there are much pain and irritability of the part, opium may be added to the local applications. Many other substances have been recommended to be used topically in gangrene, but I must refer to the well-known work of Mr. S. COOPER for a sufficiently detailed account of them. A glance at the opinions of surgical writers on gangrene will readily show that each has been sufficiently disposed to enhance his own favourite application by depreciating those recommended by others, so that the inexperienced practitioner is bewildered amid contradictory evidence on the subject. The substances already mentioned, especially LABARRAQUE'S fluid, strong solutions of the chlorides, or of creasote, or of pyroligneous acid conjoined with creasote and spirits of turpentine, with or without this latter, are the most generally applicable. They may be used in the form of wash or lotion, or on the surface of any of the several kinds of poultices commonly prescribed.

76. *b.* In gangrene from *animal poisons*, the local treatment need not differ materially from that now advised. In this variety, as well as in others, different means have been recommended. The application of arsenic has been directed for *phagedenic gangrene*, by FABRICIUS HILDANUS and ZINKE; the actual cautery, by CELSUS, MICHEL, LÖEFLER, MURRAY, and others; powdered bark, with turpentine, by KNACKSTEDT; these latter substances, conjoined with the hydrochlorate of ammonia, by DUSSASSOY; the sesquioxide of iron, by BRANDIS; charcoal, by MARCUS, BEDDOES, and BORNEMANN; the pyroligneous acid by SIMONS; and a strong mixture of camphor in thick mucilage, spread over the part, by SCHNEIDER. In this form of gangrene, more, perhaps, than in any other, it is important completely to exclude the external air from the diseased surface; at the same time, the intentions with which external remedies are employed (§ 75) should be strictly observed. Therefore, while the morbid secretions of the part should be prevented from accumulating, or be corrected by the antiseptics already mentioned, the access of air ought to be excluded by means best calculated to fulfil this end, and to be also the vehicles of antiseptic and stimulating remedies. A thick mucilage may, perhaps, be as advantageously used in this way as any other substance. But this intention is important not only in a curative, but also in a prophylactic point of view. It is observed by nature in all external sores presenting a disposition to heal. When an eschar can be formed by any application, the end here kept in view may be accomplished by it. Indeed, the substances frequently resorted to in the present day, particularly the nitrate of silver, the actual cautery, and the stronger acids, as the nitric or hydrochloric, are beneficial by their operation in this manner, as much as by the stimulus they impart to the diseased surface.

77. *c.* The *hæmorrhage* that often takes place upon the separation of the sloughs in phagedenic or hospital gangrene may be arrested either by the means just mentioned, or by the application of the spirits of turpentine containing creasote, or of strong pyroligneous acid with the acetate of lead, or of a concentrated solution of the chloride of lime, or of any of the strong metallic salts.

78. *d.* In cases of the bites of poisonous reptiles, or even of the inoculation of virulent or morbid matter, the application of cupping glasses, or of other instruments by which the air may be exhausted over the seat of injury, was recommended by CELSUS, and in modern times by Sir DAVID BARRY. The ancients, especially the Egyptians, resorted to suction for the removal of these and other poisons, when introduced by bites or wounds; and the practice is general even in the present day, in uncivilized countries; the fact having been well known to them, that the individual administering this sort of aid will not himself be injured, if no abrasion exist on his tongue or lips. The common procedure in these countries is immediately to place a ligature above the part where the poison has been inserted, when this can possibly be done, and next to have recourse to suction for its removal. I have seen this practice resorted to on two or three occasions with success. When, however, it has been too long

delayed, or cannot be adopted, ammonia, spirits of turpentine, and various stimulating substances may be applied to the part, as advised in the article Poisons. If gangrene have taken place, the local remedies noticed above are the most appropriate.

79. iii. The *Diet and Regimen* in gangrene must necessarily be regulated according to the peculiarities of the case; but, in general, a mild, spare, and digestible diet only should be prescribed. If the patient enjoy not a pure and dry air, he should, if possible, be removed to a situation possessing this advantage. His mind should be encouraged, and his confidence ensured by the attention of his attendants and the bearing of his physician.

[In treating the gangrene of old people, our remedies should be directed to renovate the nervous influence of the capillary vessels, especially of the part affected, for it is doubtless owing to the loss of nervous energy in these vessels that they lose the power of preserving the vital properties of the blood; and this fluid, consequently, becomes decomposed in the vessels. It is a mistake to suppose that this disease always results from ossification of the arteries, for we meet with it, as WEDEMEYER has remarked, where these vessels are not ossified; nor does such a state of the arteries always produce gangrene; the treatment, therefore, is to be based on a different pathology. M. DEPUYREN supposes that *gangrena senilis* is of an inflammatory nature, and is best treated by antiphlogistic means and cold water; and that amputation is advantageous in this and certain other conditions of gangrene, in which its propriety has not been commonly admitted. In its treatment, it is necessary to bear in mind that gangrene, once commenced, is a cause of more inflammation, and, by consequence, of its own farther extension; and hence *amputation* is proper when mortification is spreading, when it is *slow*, and has occurred without any known cause (JOSSE). It is necessary, also, in treating gangrene with success, to distinguish gangrenous inflammation from gangrene, as pointed out by Mr. TRAVERS.* The former is inflammation, of which the termination or event is gangrene; and, of course, it must be treated, in its earliest stage, by antiphlogistics, both local and general; but in cases where gangrene depends upon strangulation, or arrested circulation from a change in the structure of parts, or to decomposition from heat, cold, or chemical agents, the inflammation is evidently the result of the gangrene, not its cause, and is a conservative process set up to circumscribe and throw off the gangrenous part. We here find the gangrenous part dry, shrunk, and mummied; and where a conservative process is established, the line of demarcation is announced by the deposition of adhesive matter, which is followed by ulcerative action, beginning upon several points, and proceeding along this line until separation is effected, the construction of granulations out of the adhesive matter constituting the third process, and thus advancing the final stage of repair, viz., the fabrication of the new surface.

To facilitate this process, the health, of course, is to be maintained in its utmost vig-

* ["An Inquiry upon Constitutional Irritation," &c., by BENJ. TRAVERS. London, 1835.]

our, in order that the proper *materials of repair* may be furnished in sufficient quantity and of a healthy quality. And it is an important circumstance in these cases that the health is often but little interrupted, so that the system is able to take and apply the support which the case calls for. In true gangrene, then, we have a limb, for example, dry, cold, pallid, shrunk, and insensible; while in gangrenous inflammation we have the same part swollen, moist, livid, vesicated, and acutely painful; the adhesive inflammation is wanting, and we are wisely directed by the best surgical writers not to amputate until a barrier is established; going upon the sound principle that, if the system does not possess sufficient conservative power to destroy or check inflammation, it has not power to initiate a healing one, and, consequently, that the same mischief would fall upon the stump. The typhoid symptoms consequent on gangrenous inflammation—the livid and cadaverous complexion, deficient alvine and urinary secretions, thirst, brown or black furred tongue, hiccough, cold, clammy skin, anxiety, and muttering delirium—point with unfailling accuracy to the proper remedies—ammonia, wine, camphor, opium, quinine. The distinction above pointed out is an important one, as regards the treatment of this frequent and often embarrassing affection.

There are several distinct varieties of gangrene, occurring in infants and young children, which occasionally come under notice, and require much judgment on the part of the practitioner. These are, *gangrene of the gums and mouth*, including the *cheek*, which rapidly spreads, and destroys the structure of the surrounding tissues; this is sometimes called *gangrenopsis*, or the erosive gangrene of the cheek; *mortification of the external parts of generation* in female infants and children (*herpes*, or vesicular inflammation of the labia, not unfrequently terminates in this form of gangrene); *gangrene of the skin*, described by BILLARD under the name of *gangræna neonatorum*; and, lastly, the gangrene which occasionally follows erysipelas in infants.

Of these, the *canerum oris*, or gangrenopsis, occurs the most frequently in this country, and it sometimes has been known to prevail epidemically in some of our public institutions for the reception of children,* and is generally connected with imperfect nourishment, want of cleanliness, and an impure atmosphere. It occurs, moreover, among children of lax and debilitated habits, and of a strongly-marked lymphatic temperament. For the most part, it commences upon the centre of the internal surface of one of the cheeks, which becomes swollen, hard, dark-red, and shining; at length it ulcerates; and as the ulceration extends, a livid spot, surrounded by a red areola, makes its appearance on the external surface, at the spot where the tumefaction is greatest, which as-

* [Dr. COATES states that there was at one period, in the Children's Asylum of Philadelphia, among the 240 inmates, 70 affected with gangrene of the mouth. On dissection, the mesenteric glands, as well as those of the neck, were found enlarged and hardened; and tubercles existed in the lungs in every instance. In nine cases reported by Dr. JACKSON, of Philadelphia, the disease occurred in the course of, or subsequent to, an attack of remittent or bilious fever. According to our observation, the disease generally is preceded by gastro-intestinal irritation; a fact also noticed by MARSHALL HALL, CONDIE, and others.]

sumes a dark hue, and spreads, with greater or less rapidity, until the whole cheek is involved. In arresting gangrene of the mouth, it is important to remove the patient immediately into a pure and dry atmosphere; observe strict cleanliness; and allow such diet, of a nourishing kind, as will prove least irritating to the digestive organs; mercurial preparations are to be entirely withheld, as it is believed that they tend to develop the disease; quinine may be cautiously given; if local inflammation exists, leeches are to be applied; and where there is tumefaction of the cheek, a blister over the tumour will prove beneficial; the gangrene is to be arrested by applying, twice a day, to the parts affected, a strong solution of *sulphate of copper* (ʒij. to ʒiv.), or a solution of *sulphate of zinc* (ʒi. to ʒi. of water), or the *nitrate of silver*, either in pencil or solution. We have known the last-named agent to arrest this disease in several cases very promptly. Dr. B. H. COATES states (*North Am. Med. and Surg. Journ.*, vol. ii.) that he treated 170 cases, within three months, in the Children's Asylum of Philadelphia, very successfully, by using the following as a local application: *R Sulphate of Copper*, ʒij.; *Pulv. Cinchona*, ʒss.; *Water*, ʒiv.; to be applied twice a day to the full extent of the ulcerations and excoriations. The cinchona serves to retain the sulphate longer in contact with the edges of the gums. Simple ulcerations and small gangrenes, adds Dr. C., as well as troublesome excoriations, when not in the last stage, yielded promptly to this remedy, the good effect being generally visible from the first application. Dr. PARISH recommends, in similar cases, the following lotion: *R Sulph. of Zinc*, ʒi., *Water*, ʒij.; dissolve, and then add of pure *Honey and Tincture of Myrrh*, each ʒij.; to be applied in the same manner. Dr. MORTON thinks that caustic potash and nitrate of silver possess very little control over the disease. DUNGLISON states that *creasote* was found to be an admirable local application in the gangrene of the mouth which occurred as an epidemic in the Philadelphia Almshouse in 1833, incisions being first made through the gangrenous sloughs: *R Creasote, Alcohol*, āā ʒss., M.; to be applied by means of a pencil. The sulphuric and hydrochloric acids are also useful local applications. The *actual cautery, chloride of lime, and tincture of iodine* have also been used with benefit in this disease. We have seen good effects from poultices impregnated with *chloride of soda* or *pyroligneous acid*. The *chlorine water, chloride of soda*, and especially the *chlorate of potassa* (ʒi. ʒij.) in 12 hours, according to the age of the patient), may also be administered internally with much advantage. Where the mineral acids are employed externally, they should be applied with a brush, as often as once an hour at least. We need scarcely allude, in this connexion, to the well-known practice of Dr. PHYSIC, of applying blisters over the affected and a considerable portion of the sound parts, for checking the progress of gangrene: a practice which experience has proved to be extremely beneficial. In our typhoid fever, as well as in paralysis, and cases of confinement from fractures, &c., gangrene is very apt to occur on the back and hips; and in such cases, all that can be done is to cover the sores by *adhesive plaster*, and place bolsters or cushions

under the body, so as to change the position of the patient, and restore circulation to the injured part.

In the treatment of the different forms of gangrene, then, we are not to lose sight of the pathology of the disease—to bear in mind that, where it results from acute inflammation, it may be traced to a complete stagnation of blood in the vessels of the part, and the consequent loss of that vitality which was previously depressed, thus causing such a loss of plasticity in the blood as to prevent the effusion of organized lymph, by which the extension of the gangrene might be limited. We see the same result brought about by some general depressing cause, which lowers the power of the whole system, while acting upon some one part especially. Here measures are to be taken to increase the plasticity of the blood; in other words, to excite a *sthenic*, inflammatory condition which did not exist previously. It is necessary, we repeat, not to confound *sthenic* and *asthenic* forms of inflammation, in both of which, although there is a depressed vitality of the solid tissues affected, yet in the former there is a great increase in the plasticity of the blood, causing a tendency to the effusion of coagulable lymph, or of its modifications, which tendency is deficient or imperfect in the latter, in consequence of a want of the due elaboration of the fibrinous element of the blood. As, then, the production of fibrin is necessary for reparation as well as the original formation of tissue, we must carefully watch for the indications of its presence in sufficient or insufficient amount, and regulate our general treatment accordingly.]

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GASTRODYNIA. See article STOMACH—Altered Sensibility of.

GASTRO-ENTERIC DISEASE.—*SYN. Gastro-enteritis. Gastro-entérite. Broussais.*

CLASSIF.—GENERAL PATHOLOGY.

1. The diseases of the stomach and intestines are treated of in separate articles. But not infrequently both the stomach and intestines are more or less affected at the same time by inflammatory irritation or action, either primarily, or consecutively of other diseases, although not in the same manner or in the same degree. Inflammatory disorder coexisting in the stomach and intestines, although not so common as M. Broussais has contended, is certainly very frequently observed, especially in connexion with

other complaints. Even when appearing as the consecutive ailment, its importance is often so great as to require attention to be directed chiefly to it in forming the intentions, as well as in selecting the means of cure.

2. Of the modern writers on Medicine, none has entertained juster views on the subject of gastro-enteric disorder than Dr. W. STOKES, who has remarked that the pathology of the digestive canal has been but imperfectly understood in these countries, and that, consequently, a mode of practice productive of injury to human life has been too generally adopted. Several causes have conduced to this: 1st. The importance that has been long attached to disorders of the liver; 2d. The empirical or routine practice, introduced by the writings of HAMILTON and ABERNETHY; and, 3d. The distrust with which the doctrines of BROUSSAIS have been viewed, owing to the unwarranted generalizations of which they in a great measure consist. If the school of BROUSSAIS have thus gone too far in attributing importance to gastro-enteric disorder, the writers and practitioners in this country have erred as remarkably in overlooking it almost entirely. When we consider the connexions of the digestive mucous surface, with the rest of the organization, by means chiefly of that system of nerves which supplies it, and the important functions which this surface performs, we may infer that irritations, or inflammatory excitement, commencing in this quarter, will often be reflected on distant but related organs. In childhood, and in early life, while the susceptibility of the system is at its maximum, the disorders consequent upon gastro-enteric irritation are diversified, of frequent occurrence, and often serious; and at later epochs of existence, although they may not be so obvious nor so common, yet they are occasionally attended by danger. It becomes, therefore, a matter of extreme importance in medical practice to trace the connexion, the priority, and the procession of morbid action in those parts of the system which are most intimately related to the digestive canal. The practitioner will find, on numerous occasions, disorder of this part associated with that of the cerebro-spinal nervous system, of the respiratory organs, of the heart, of the liver, or of the skin; and although the affection of the digestive canal will sometimes be consequent upon, or coetaneous with either of these related disorders, yet a different order of succession will be much more frequently observed.

3. I. *Connexion of Gastro-enteric Irritation or Inflammation, with Affections of the Cerebro-spinal Axis.*—Affections of the brain and spinal cord are often complicated with disorder of the digestive canal. In many cases, the latter is merely functional, and depends entirely upon the intensity and extent of the former; but much more frequently the affection of the brain is induced by irritation of the gastro-enteric surface. In children this latter occurrence is remarkably common; and even in adults, a slight degree of disorder of the stomach is often followed by headache, somnolency, and incapability of mental exertion. The occasional dependance of epilepsy in adults, and of convulsions in children, upon morbid action in the digestive canal, is fully shown in the articles upon these diseases. Inflammation of the mem-

branes, or of the substance of the brain, and acute hydrocephalus, sometimes also supervene upon gastro-intestinal irritation; and, in the course of their development, render obscure, or entirely mask the primary ailment; for, as LALLEMAND has remarked, as soon as the cerebral affection mounts to such a pitch as even partially to obscure sensibility, the existence of disorder in the digestive canal is ascertained with great difficulty. I believe that the majority of cases of the affection, recently denominated spinal irritation, are caused by gastro-enteric disorder; chronic irritation in this latter situation being propagated to the spinal cord through the medium of the ganglial nerves communicating with the roots of the spinal nerves. It is of great importance to keep these pathological states in recollection, and to ascertain as far as may be their priority; for when affections seated in the cerebro-spinal axis are consequent upon gastro-intestinal irritation, a treatment directed for the removal of the former, without reference to the nature of the latter, may, especially if it be of an exciting nature, aggravate and perpetuate the mischief.

4. This principle has been carried to an extreme length by M. BROUSSAIS, who has proscribed the use of purgatives even in the more dangerous affections of the brain, from the mistaken idea that purgatives will necessarily increase the already existing irritation of the digestive canal, of which he supposes the cerebral disease to be almost always a consequence. This doctrine comprises two assumptions: 1st. That the affection of the brain necessarily depends upon pre-existent irritation of the digestive canal; and 2d. That the exhibition of purgatives will increase this irritation, and thereby aggravate the cerebral disease. As to the first of these, it may be answered, with perfect truth, that the procession of morbid action he contends for is only occasional or contingent upon concurrent circumstances; and, as respects the second, the converse of the proposition is probably the more correct; for a judicious exhibition of purgatives will frequently remove irritation of the digestive canal, especially if it be caused by unwholesome ingesta, or morbid secretions, or fecal accumulations; and even when it cannot be referred to either of these, but rather to the state of vascular action in the digestive surface, the augmented secretion procured by refrigerant or mild purgatives may promote its resolution or diminish its intensity.

5. II. *Connexion of Gastro-intestinal Irritation with Disease of the Respiratory Organs.*—a. The association of gastro-enteric irritation with most of the complaints observed in the respiratory organs, is of greater frequency than is generally supposed. Diseases being so universally described by writers and teachers as species of unvarying form, and without sufficient reference to diversity of character and complication, their more important connexions and associations with other maladies are completely neglected, and are unknown to the young practitioner until obtruded upon him in practice. The complication of *bronchitis, catarrh,* and other affections of the respiratory organs, with gastro-enteric irritation, has been noticed when treating of these disorders. With respect, therefore, to these, I have only now to remark that I have seen both forms of disorder follow coe-

taneously upon the exciting cause, and that the prior existence of the gastric disorder has often predisposed to the bronchial or pulmonary disease, a very slight exciting cause being sufficient to produce the latter when the former is present.

6. *b.* During a number of years, I had almost daily occasion, at the Infirmary for Children, to enter against the names of some of the patients *gastro-catarrhal fever*, or *gastro-bronchitic irritation* or *inflammation*, according to the features of the case, as the names of the affections for which they were admitted. In these it was difficult, if not impossible, to determine which was the primary disorder; but it was always evident that the complication was attended by much danger, the more especially as it occurred chiefly in debilitated or delicate children, and often extended to the bronchi of both lungs. In many instances the affection of the mucous membrane appeared to be universal, and the progress to a fatal issue was very rapid. Gastro-enteric irritation, although it can scarcely be considered as a cause of *tubercular consumption*, unless when it has continued long, is a very frequent concomitant of the early as well as of the advanced stages of this malady. I have often observed that when the former has been aggravated by improper diet or treatment, the latter has also been exasperated. (See TUBERCULAR CONSUMPTION.)

7. *c.* Even the occurrence of *pneumonia* may be favoured by disorder of the digestive canal; and in this case the pneumonia may assume a nervous or low character, constituting the *Pneumonia nervosa* of the older writers. The association of disorder of the digestive mucous surface with affections of the respiratory organs, although more generally neglected than might have been expected from the state of science at the present day, has long attracted some attention, as evinced by the notices taken of it by the older and modern writers, by the names *Stomach Cough*, *Verminous Cough*, and *Dyspeptic Phthisis*. In *hooping-cough* it is often difficult to decide whether the digestive or the respiratory mucous surface be the most affected: the vomiting in which paroxysms of cough terminate in various affections of the chest is, perhaps, as much owing to attendant gastric irritation as to the convulsive action of the respiratory organs. In all cases, therefore, in which we have reason to dread the origin or association of pulmonary or cerebral disease, with gastro-intestinal irritation, inquiries ought to be made for the symptoms by which this latter is indicated. When pain, tenderness, or tension at the epigastrium, or in the abdomen, are present, and particularly if the pain be increased on pressure, or be attended by nausea, flatulency, or acrid eructations, or occasional vomiting, and an irregular state of the bowels, the existence of gastro-enteric inflammation should be inferred, and the treatment ought to be directed to its removal. The means of cure, also, required for the pulmonary complication, should be so devised as not to increase, if they may not diminish, the gastric irritation. The diet of the patient ought to be prescribed with similar intentions. When pulmonary affections are thus complicated, the treatment of them by means of tartarized antimony is frequently injurious, particularly in children, as tending both

to aggravate the gastric disorder and the nervous depression often attendant upon them. Even when pneumonia is thus associated, the tartar emetic may be dispensed with; and, as Dr. W. STOKES justly advises, the strength of the patient must be supported by a farinaceous food, jellies, and broths, even while local depletions and external derivatives are being employed. The connexion of gastro-enteric irritation with tubercular consumption is one of the most important topics in practical medicine, and one which has been imperfectly understood, and, with a very few exceptions, overlooked by writers in this country. As the subject, however, belongs especially to this disease, in its practical bearings, it is considered under that head.

8. III. *Gastro-enteric Irritation* often induces severe disorder of the vascular system.—This, perhaps, is the most common occurrence met with in practice. The febrile disturbances consequent upon irritating ingesta are so frequent, and so generally admitted, as hardly to require notice. Among children they are constantly appearing, and almost as constantly are removed by means appropriate to the cause of irritation. If this be indigestible substances, an emetic or purgative will be the most efficacious, and by no means the most unsafe treatment that can be adopted, notwithstanding the horror entertained by BROUSSAIS and his followers of these medicines. In such cases the disorder subsides on the removal of its cause; but when it is induced by the inordinate use of stimuli, or by other causes that have either ceased to act, or admit not of so ready a removal, it will be better to leave the case to nature than prescribe this treatment. In these circumstances, *refrigerants*, cooling *diaphoretics*, and mild *sedatives*, with *emollients*, are the most appropriate. The nitrate of potash, or the nitrate of soda, the alkaline subcarbonates, the muriate of ammonia in small doses, sulphate of potash, and ipecacuanha, are severally of use, particularly in mucilaginous or emollient vehicles; but the bowels should be kept freely open by mild oleaginous or refrigerant purgatives.

9. I have already insisted upon the fact that purgatives or laxatives, when judiciously selected, will rather diminish than increase gastro-enteric irritation. Some doubts may exist as to the operation of calomel in this way, but an extensive and diversified experience of this substance, and the experiments performed with it by Mr. ANNESLEY, have convinced me that in full doses it diminishes irritation and inflammation in the stomach and small intestines, while it increases, or even excites these morbid states in the large bowels, and depresses nervous power, or augments the general insensibility and irritability of the frame, especially if frequently exhibited, or continued for a considerable time.

10. IV. The *Connexion of Gastro-enteric Disorder with Fevers* is sufficiently illustrated in the articles on these diseases. It has formed the basis of M. BROUSSAIS's pathology of fever. Little, therefore, need be added at this place respecting it. The fact, however, must be admitted that gastro-enteric inflammation, in more or less manifest grades, is one of the most prominent and constant phenomena of the invasion of exanthematous fevers; and that a somewhat similar state of vascular injection

or irritation exists at this period in the stomach and upper portions of the intestinal canal to that which subsequently appears on the cutaneous surface, the former, however, subsiding as the latter becomes developed. This is satisfactorily proved by the character of the symptoms, more particularly by the nausea, vomiting, epigastric tenderness, redness of the fauces and edges of the tongue, &c. A somewhat similar condition most probably exists in the early stages of typhus and other fevers; but it is in the advanced periods of these that the gastro-intestinal surface becomes most prominently affected. In exanthematous fevers also, particularly in delicate and cachectic subjects, or when the eruption has not been fully evolved, or has been delayed or suppressed, or has prematurely disappeared, the gastro-enteric disorder not infrequently is the most serious part of the disease, in respect both of the lesions in which it is prone rapidly to terminate, and of the cerebral affection which it occasionally superinduces. It must not, however, be supposed from this statement that I consider gastro-enteric irritation or inflammation to be the proximate cause or primary pathological condition of fevers. I merely contend that it is often one of the most prominent and important of the several lesions observed in their early stages, but is produced by changes still earlier in the chain of morbid causation.

11. There can be no doubt of the fact insisted upon by BROUSSAIS and other French pathologists, that erythema, or inflammatory injection of the gastro-intestinal mucous surface, is a very general phenomenon in fevers, and that it may, and very often does exist without pain, or even tenderness on pressure; but however intense and prominent it may appear amid the various lesions characterizing these maladies, it is certainly not the cause of the changes and symptoms attributed to it by these writers. Inflammatory irritation of this part, as severe as that observed in any form of fever, may exist without fever at all, and still more without the extreme prostration which they believe it to occasion. The intestinal mucous surface suffers merely in common with all other tissues of the body in the progress of essential fever; but it is much more obnoxious to alterations than any other part, owing to the nature of its organization, to its relations with other viscera, and to the numerous and diversified causes of irritation to which it is constantly exposed, particularly the morbid secretions, and the incongruous and exciting substances continually passing over it.

[When we consider that many of the early phenomena of fever are indicative of primary inflammation of the mucous membrane of the stomach, as loss of appetite, nausea, sickness, tenderness at the epigastrium on pressure, foul tongue, offensive breath, &c., and when, in addition to these, we find, in the progress of fever, suppressed, excessive, or otherwise altered alvine secretions, tympanitis, hæmorrhage from the bowels, &c., all of which point unerringly to derangement of the intestinal mucous membrane, we shall not be surprised at the extensive popularity which the theory of BROUSSAIS enjoyed for many years, nor wonder that it is still regarded with favour by many practitioners of the healing art. The mode in which this

writer explains most of the other symptoms met with in fever, as the frequent pulse, elevated temperature, disturbed sensorium, altered secretion of bile, urine, &c., as resulting from the sympathies by which the stomach and intestines are connected with other parts of the system, is in a very high degree plausible and ingenious, and the appearances found on dissection in a large majority of cases would seem to confirm the conclusions at which he has arrived with respect to the cause of febrile affections; and yet we hold with COPLAND that the gastro-intestinal affection is by no means the cause of fever, but rather one of the effects of that general derangement of the functions which go under that name. We believe, moreover, with HODGKIN, that BROUSSAIS has rendered great service to medicine in the treatment of fever, by directing increased attention to the advantages of local depletion, and to the importance of abstaining from all needless irritation of the alimentary canal. To the profession in our own country, especially, have the labours of BROUSSAIS proved of immense benefit, as may be seen in the comparative disuse of emetics and cathartics, in treatment of fevers, as compared with the practice of physicians previous to the dissemination of his writings, and in the banishment of that excessive *polypharmacy* which once characterized the management of febrile affections. Let his name, then, be held in all honour, as a benefactor of the race—as one of the great luminaries in the firmament of medicine; and while we avoid his exclusiveness, and guard against the fascination of his brilliant, but too sweeping conceptions, let us not neglect his store of important and well-observed facts, nor fail to be profited by his boundless enthusiasm, industry, and perseverance.]

12. V. *Connexion of Gastro-enteric Irritation with Hepatic Disorder*, &c.—a. I have insisted, in the article DUODENUM, on the importance of attending to disorders of the upper portion of the intestinal canal, and of distinguishing between them and the affections of the biliary organs. Disorders of the stomach extending to the duodenum and jejunum, or even farther, have been often treated in this country for diseases of the liver; and it must be admitted that the difficulty of forming a diagnosis between them is great. But the disorders of these portions of the alimentary canal, which are thus liable to be mistaken, are not so uniformly inflammatory as Dr. W. STOKES appears to believe, in his very acute observations on this subject; or, if they be, the inflammation is greatly modified by its connexion with nervous asthenia, or other morbid states. When, however, gastro-enteritis is really present, two great evils result, as this able physician has remarked, from mistaking it for affections of the liver: one, the neglect of the actual disease; the other, its exasperation by means supposed capable of removing the hepatic disorder. The consequence is, that the gastro-enteric irritation, being increased by the inappropriate treatment adopted, extends along the ducts, or by nervous and vascular connexion, to the biliary apparatus; and thus the disease, which was in the first instance incorrectly supposed to exist, is actually superinduced by the means erroneously resorted to for its removal.

M. BROUSSAIS has insisted upon inflammations of the liver being always consecutive of gastro-enteric inflammation. This, however, is one of the several generalizations at which he has arrived from insufficient data. But until he wrote, the fact that irritation of the digestive canal, allowed long to exist, or to go on to inflammatory action, frequently induces chronic hepatitis, was entirely overlooked. There can be no doubt that prolonged and frequently repeated over-excitement of the digestive canal by a too rich, stimulating, or full diet, or by spirituous or fermented liquors, is often followed by hepatic disease; but, as shown in the article LIVER, other causes, besides gastro-enteritis, are concerned in producing it. One of the most common circumstances in the production or exasperation of intestinal irritation, and of the ultimate supervention of chronic hepatitis, is the improper or too frequent use of acrid purgatives: a practice to which I have traced a number of the cases of hepatic disorders which I have seen in a warm climate, and more recently in this country, particularly among persons who have returned from the East Indies, or from other places within the tropics.

13. The occurrence of diseases of the liver, and even of abscess of it, consecutively upon chronic diarrhœa and dysentery, has long attracted the attention of most practitioners in warm climates. In many of such cases, although there may have been reason to suppose that the hepatic disorder preceded, or even caused the intestinal affection, there can be no doubt that the persistence of this latter, or the exasperation of it by a purgative treatment, has rendered the former more acute and manifest. Some difference of opinion exists as to the mode in which the gastro-enteric disorder is propagated to the biliary organs. Some suppose that the excitement is sympathetically extended to them, this extension being favoured by the associated functions of these different organs. Others believe that the inflammation has spread from the mucous surface of the duodenum to that of the biliary ducts. Instances have been adduced by ANDRAL, RIBES, BOUILLAUD, and REYNAUD, which favour the inference that inflammation commences in the radicles of the mesenteric veins, and extends along the vena porta, and its ramifications in the liver. This, however, must be a circumstance only of occasional or rare occurrence. I have, however, long since supposed that the more acute attacks of inflammation of the substance of the liver, and the purulent collections frequently formed in it, in the course of chronic dysentery, have been superinduced in this manner. Upon the whole, it may be inferred, that in complications of gastro-enteric with biliary disorder, either lesion may have been primary; but that in this climate, especially, the gastro-enteric more frequently precedes than follows the hepatic affection. In warm climates the converse of this probably obtains, although not to the extent very generally believed by many practitioners who have written on intertropical diseases.

14. *b.* That disease of the mesenteric glands is generally induced by the frequent recurrence or persistence of gastro-enteric irritation and inflammation, often connected, however, with

various other elements of disorder, is sufficiently evident, and now very generally admitted. And yet I have seen, especially at an early period of my practice, this malady treated by purgatives, sometimes of a very acrid nature. The enlargement and obstruction of these glands depending chiefly on the affection of the digestive mucous surface, can be remedied only by the previous removal of this latter affection, and by the prevention of its recurrence. When this end is obtained by local depletions, by refrigerants conjoined with the alkaline subcarbonates, ipecacuanha, and demulcents, and by suitable diet and regimen, the consecutive disease of the glands often gradually disappears.

15. VI. *The Connexion of Gastro-enteric Inflammation with Diseases of the Skin* is much more general than practitioners in this country suppose. It is chiefly owing to the irritation of the digestive mucous surface in various grades of severity that the cutaneous affection resists so long the treatment prescribed for its removal. I have repeatedly seen cases of eczema, and of other obstinate diseases of the skin, complicated with the slighter and more chronic grades of gastro-enteritis, the latter being even so prominent as to be indicated by epigastric pain and tenderness; yet arsenical, or other irritating medicines, were exhibited in no small quantities; and, although they were evidently exasperating both the internal and external affections, they were continued with a perfect belief of their applicability. Upon the adoption, in these cases, of general or local depletions, of refrigerant medicines, of warm and medicated baths, and of a light and appropriate diet, all disorder has soon after disappeared. The chief reasons of diseases of the skin proving so obstinate are, 1st. This form of complication; 2d. The inflammatory diathesis and vascular plethora characterizing them; 3d. The neglect of these pathological associations, and the adoption, in consequence, of inappropriate means of cure; 4th. Inattention to diet and regimen, particularly as respects the use of animal food and stimulating beverages and articles of diet; and 5th. An insufficient observation of the states of assimilation and excretion, with the view of perfecting the former and of promoting the latter.

16. VII. *Chronic Gastro-enteritis is often associated with Affections of the Genito-urinary Organs, and with Gout.*—We sometimes observe leucorrhœa and other uterine disorders connected with gastric irritation; the former most frequently being induced, or favoured in its occurrence by the latter. Difficult or scanty menstruation is occasionally traced to the same cause. In these cases, the means calculated to relieve the disorder of the digestive mucous surface are generally most efficacious for removing the sympathetic affection. A similar association of the disorders of the digestive and urinary passages is sometimes also observed; but it is unnecessary to do more than to refer to it. How far gastro-enteric irritation may influence the states of urinary excretion has never been so fully illustrated as is to be desired. What we know of the subject is derived from the researches of Dr. PROUT; and it is to be hoped that this scientific physician will proceed in his investigations into it. There can

be no doubt that a state of chronic irritation or of inflammatory erythism of the digestive mucous surface, will so impede the functions of digestion and assimilation as to cause a superabundance of materials in the blood, calculated to excite or to disorder the actions of the kidneys, and requiring to be eliminated from the circulation. When this disorder of the gastro-enteric surface is attended, as it not infrequently is, with a craving or morbidly excited appetite, food is taken in larger quantity than it can be digested; and much imperfectly formed chyle is carried into the blood, where it excites disorder of the liver, of the kidneys, and of the skin, in the course of the excretion of the unassimilated matters by these organs. To this source may be traced, in many instances, not only the morbid conditions of the urine, and of the kidneys themselves, but also the production of an attack of *gout* in a regular or irregular form.

17. The *therapeutical indications*, and even the *means of cure*, for these various gastro-enteric complications, may be readily inferred from what has been stated above. More precise information will, however, be obtained as to these topics, and as to the *causes* of the gastro-enteric disorder, by referring to the articles *GOUT, INDIGESTION, INTESTINES, STOMACH, &c.*

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GLANDERS.

CLASSIF.—III. CLASS, III. ORDER (*Author: see Classif. in Preface*).

1. DEFIN.—*Vascular injection, and chancrey sores of the membrane of the nose, frontal sinus, and parts adjoining, with a profuse offensive discharge, and pustular eruptions, or tubercular and gangrenous ulcers in various parts, preceded by constitutional disorder, attended by fever of a low or malignant character, and produced by contagion.*

2. Glanders until lately was considered exclusively to belong to the horse, the ass, and the mule [also to dogs, sheep, and goats]. Within this few years several cases have occurred, showing that it may be communicated to man, in either the acute or chronic form. About twelve years ago, in the course of a discussion at the Medico-Chirurgical Society, I stated that the fact of the disease having been thus communicated had been proved by cases that had occurred in Germany. The cases to

which I then alluded were published in *Russ's Magazine* for 1821. Since then, cases have been observed in this country, and published by Mr. TRAVERS, Mr. BROWN, and Dr. ELLIOTSON. It is to this last gentleman, however, that we are most indebted for a full elucidation of the subject, by his able researches. The frequency of the occurrence of the disease in the human subject justifies the notice that will be taken of it in this work.*

3. *Acute and chronic glanders* are contagious among the animals just mentioned; but, from the facts adduced by Mr. COLEMAN, Dr. ASHBURNER, and Dr. ELLIOTSON, it evidently appears that the disease may be generated anew when horses are shut up in a confined space for a long time, as on board transports. The characteristic symptoms of the disease in its acute form in the horse are, intense inflammation of the pituitary membrane, attended by erosions which soon pass into chancre-like sores; swelling of the lips and nose; rapid extension of the ulceration, giving rise to a purulent and disagreeable discharge, which often passes to a purplish, or bloody, and horribly fœtid sanies; subsequently, gangrene of the nasal membrane, with increased discharge, sometimes with slight hæmorrhage; swelling and pain of the sublingual glands; inflammation of the conjunctiva and nasal eyelid, quickly passing into a livid and swollen state, with an offensive sanious discharge; and fever of a putro-adyamic or malignant character. As the local changes extend to the adjoining parts, respiration becomes laborious, and the superficial vessels congested, the animal dying in a few days, or after a longer or shorter interval. If the disease is protracted, the symptoms sometimes relax, but the state of the pituitary membrane and the character of the discharge show that it has degenerated into a chronic form. Pustules may also appear in the progress of glanders, with gangrene of the external parts of the face, and tumours with swelling of the extremities, the disease being thus associated with farcy, which is a modification of it.

4. The *farcy glanders* generally appear in the form of small tumours about the legs, lips, face, neck, or other parts of the body; these tumours vary in size, and in the rapidity of their progress to ulceration. They sometimes create little inconvenience, particularly in a chronic state; but at other times they are large, painful, numerous, and rapid in their course. They are at first hard; soon become soft, burst, and degenerate into foul ulcers, with abrupt edges, and of a pale, glossy appearance. Lines of communication are generally observed between these tumours or ulcers, particularly when seated on the insides of the limbs: these lines are inflamed and enlarged absorbents.

5. I. DESCRIPTION OF GLANDERS IN THE HUMAN SUBJECT.—Dr. ELLIOTSON remarks that

* [This disease has attracted much attention during the last ten years (see "Bibliography"), and in that time it has been abundantly proved that the acute form at least is contagious, and may be communicated by the nasal secretion, by the expired air, the blood, and the tissues of the dead body. It may also be conveyed from one human subject to another (*Gaz. Médicale*, 1844). The period of incubation of the poison varies from two to eight days; the disease, when acute, may prove speedily fatal, or may run 30 days; the chronic, however, rarely lasts longer than the latter period.]

glanders may appear in the human subject in different forms. 1st. In that of *simple acute glanders*; the disease attacking the nasal cavities and adjoining parts. 2d. In that of *acute farcy glanders*; the malady appearing in various parts in the form of small tumours, giving rise to foul ulcers, suppuration, &c. 3d. These varieties may exist separately, or they may be both produced at the same time, or the one may precede the other. 4th. Each of them may also occur in a *chronic form*, and in this form, also, may exist separately or be conjoined. That the acute true glanders and the farcy glanders are the same disease is proved by the fact that the matter deposited in the tumours characterizing the latter, or that coming from the nostrils in the former, gives rise to either of these varieties, or to them both conjoined; or, in other words, that simple acute glanders may proceed from the matter of farcy or from its own discharge, and that farcy glanders may arise from the discharge from the nostrils in simple acute glanders.

6. i. *Simple Acute Glanders* appear to commence with rigours, headache, irritability of stomach, depression of spirits, prostration of strength, stiffness and severe constant pain of the joints, aggravated on motion, and great thirst. The patient, moreover, complains of much heat about the nasal organ and windpipe, accompanied with a copious viscid discharge. The nose and surrounding parts become swollen, hot, excoriated, and of a bright red or livid colour; one or both eyes are inflamed, or completely closed; a profuse tenacious mucus, at first of a deep yellow, but afterward of a bloody or dark sanious appearance, exudes from one or both nostrils, sometimes also from the eyes; and several hard phlyzaceous pustules appear on the nose and adjacent parts, and on the neck, trunk, arms, thighs, and legs. The temperature of the skin is increased; the pulse is remarkably frequent, soft, and weak, or undulating; the respiration rapid, weak, and shallow; the tongue dry, rough, and brownish-red; thirst is unquenchable; the stools are watery, or slimy and offensive; the voice is weak, and the mind incoherent or wandering. Copious offensive sweats, a livid or gangrened state of the nose or of adjoining parts, delirium, tremours, and restlessness, are also observed; followed by sinking of all the vital powers, disappearance of the pulse, and death within a very few days; the fœtor from the discharges, and from the whole body, towards the close of the disease, being insupportable.

7. Upon inspection post-mortem, the morbid appearances, especially those which are external, are greater on one side of the body than on the other. The lungs are engorged with dark fluid blood; the bronchi are livid, congested, and partially filled with a dark, frothy mucus; the nostrils and frontal sinuses contain a glutinous matter, of a brownish colour, and the lining membrane is studded with ulcerated white tubercles or granules; irregular ulcers, or white circular chancres, sometimes also exist in the upper parts of the air-passages; purulent deposits are occasionally found in some of the internal viscera; and the mucous surface of the digestive canal is softened and discoloured at various points. White tubercular formations, resembling those found in the membrane

of the nose, sometimes also exist in the mucous membrane of the large bowels.

8. ii. *Acute Farcy Glanders* seems to commence with severe pain in the joints and limbs, and with the other symptoms attending the invasion of the preceding variety. Small tumours arise in different parts of the body, but are more numerous on one side than on the other, and have a glossy red appearance, which soon changes to a dark brown. They also affect the head, or even the face, and chiefly on one side. They are painful, soon crack on the surface, and exude a thin acrid sanies: they vary in size, and are generally accompanied by phlyzaceous pustules in different parts of the body. Perspiration is free, copious, and fœtid; and the stools are watery, offensive, or otherwise morbid. The fauces are injected, and of a purplish hue; thirst is great; the tongue foul, loaded, and dark-coloured; the pulse quick, and easily compressed, afterward small, and scarcely perceptible; and the other symptoms attending a fatal termination soon afterward appear, as in the preceding form. On inspection after death, the tumours are found deeply seated. On removing the gangrenous integument covering them, a layer of brown glutinous matter is seen covering small white tubercles, having the same appearance as those found in the frontal sinuses and nasal cavities in acute simple glanders. These tubercles on the forehead or scalp are generally connected with the pericranium; but, on the limbs, with the fasciæ. In some cases, on dividing the larger livid or gangrenous tumours down to the bone, the muscles appear decomposed, are of a dark colour, exhale a peculiar fœtid odour, and contain specks of purulent matter, as it were infiltrated through their substance. Underneath these muscles, clusters of circular gray tubercles are also found, firmly attached to the periosteum, and resembling those that are more superficial, as in the pericranium, &c. The muscles generally, even those remote from the tumours, are blanched, flabby, or softened, and the cellular tissue is infiltrated with a yellowish serum. The Schneiderian membrane, frontal sinuses, and parts adjoining, are sometimes thickened or studded with white tubercles. The blood is dark, fluid, and decomposed; and the heart flabby and pale.

9. When *acute farcy* is conjoined with *acute glanders*, the affection of the nares and respiratory organs, the phlyzaceous pustules around the nose and mouth, and the consequent fœtid, sanious discharge and disorganization, are associated with the foregoing phenomena; but the constitutional symptoms are not thereby otherwise changed than in being aggravated, or rendered more malignant or more rapid in their progress to dissolution. In such cases, the morbid appearances of the nares, fauces, and respiratory surfaces attending the acute glanders are superadded to those characterizing acute farcy.

10. iii. *The Chronic Forms of Glanders*.—Simple chronic glanders is confined chiefly to one nostril, and is characterized by a glutinous and very offensive discharge, the fœtor being peculiar, and remarkably disagreeable. There are itching, a constant desire to blow the nose, and a sensation of stuffing. In the slightest state of the disease, these may be the principal symp-

toms; but in an advanced stage, or in severer cases, there are pain between the eyes and down the nose, suffusion of the eyes, and ulceration of the Schneiderian membrane; the discharge being copious, puriform, or sanious. These symptoms are usually preceded by shiverings, giddiness, and by weakness and pains of the limbs; and are followed by more or less constitutional disturbance. As the disease proceeds, purulent collections form in different parts. There are, moreover, loss of appetite, nausea, swimming or pains of the head, occasionally wanderings of the mind, pains in the back and limbs, thick, discoloured, or fetid urine, and slimy, or otherwise morbid evacuations. From this state the patient may slowly recover, after an indefinite period, or may sink gradually, from prostration of all the vital powers, with appearances of contamination of the circulating and secreted fluids.

11. *Chronic farcy glands* are generally preceded and accompanied by chills or rigours, and aching pains through the body and limbs, resembling rheumatism. Tumours gradually form about the face, trunk, and limbs; these break, and give rise to an unhealthy discharge; and are attended or followed by disease of the absorbents and glands, or by purulent collections in the joints, or in various parts of the body. The disease may commence in this manner, and thus terminate; or it may pass into the state of chronic glanders; or, in other words, the affection of the respiratory passages characterizing simple glanders may be superadded; or it may commence in this latter form, and be followed by the symptoms more especially marking the chronic form of farcy. In either case, the matter produces, as shown by the experiments of Mr. COLEMAN and others, acute glanders or farcy indifferently.

12. *iv. The Nature of this Disease* may be inferred from the history here given of it. It is evidently the result of a specific morbid matter, contaminating the surfaces and parts to which it is applied, affecting the organic functions, and giving rise to the changes characteristic of it. The state of the blood has not been sufficiently attended to in the history of the cases which have been put upon record. In several of those that occurred in Germany, the blood taken at an early period of the disease appeared to be cupped or buffed; but it afterward seemed deficient as to crasis, or partially dissolved, and very dark. In the variety of farcy, the absorbents, as well as the glands, appear to be much affected, probably owing to the passage of morbid matter along them; but there is much yet to learn as to the history of the disease and the lesions which it occasions, and still more as to its treatment.

13. *v. The Prognosis* of the acute varieties of glanders is extremely unfavourable, all the cases observed in the human subject having terminated fatally.* The chronic states of the malady seem not much less dangerous. Two or three, however, of those which have been recorded appear to have recovered. In one of those mentioned by Mr. TRAVERS, the patient was cured by means one of the principal effects of which was to produce frequent vomiting. Dr. ELLIOTSON remarks, in his last paper on this

disease, that its occurrence in the human subject is by no means of extreme rarity; and that, since the publication of his former paper, upward of a dozen cases had been mentioned to him by medical men.

14. *II. TREATMENT.*—Our knowledge of the treatment of this malady has not been much advanced by the experience we have hitherto had of it in the human subject. The *prophylactic means* are, however, made sufficiently evident by the recognition of its *cause*. There can be no doubt that it is communicated to man only by contact of the morbid matter proceeding from another person or animal suffering from it; and it would appear that the infection is most certainly produced by this matter being brought in contact with an abraded or punctured surface. Whether or not it is capable of producing the disease by being applied to the unabraded mucous surface, or by merely contaminating the air breathed by the unaffected, is certainly not proved as respects the human subject, although there are a few facts which seem to favour the affirmative conclusion. As regards, however, the horse and ass, there can be no doubt of the frequency of this mode of infection; and, indeed, of the possibility of the disease being generated *de novo*, when circumstances such as those already alluded to (§ 3) contaminate the atmosphere in which a large number of those animals are confined.*

15. The *method of cure* is not so evident as the means of prevention. It may, nevertheless, be directed with the following *intentions*: 1st. To arrest the progress or change the character of the local affection; 2d. To moderate or modify the constitutional disturbance accompanying it; and, 3d. To counteract the contamination of the fluids and soft solids taking place in its progress, and to support the powers of life. These indications require means for their fulfilment possessed of energy proportionate to the violence of the disease; and while the local symptoms are attacked, the constitutional powers should be assisted in opposing their extension. With these views, the more volatile stimulating antiseptics, or warm aqueous vapour conveying their fumes, may be inhaled, or diffused in the patient's apartment. Solutions of the chlorides may be sprinkled around; or pyroigneous acid, with creasote and camphor, or spirits of turpentine, may be scattered over the bedclothes, or put into an inhaler with warm water, and the fumes inspired. Any of the terbinthinates may be similarly used; and solutions of either of these, or of the chlorides, may be frequently injected, or employed as gargles. The chlorate of potash, or LABARRAQUE'S antiseptic solution, may also be tried internally; and stimulating diaphoretics prescribed early in

* [The results of observations in Paris show that the glanders is not a highly contagious disease; for of one hundred horses exposed to the contagion, it is stated that only seven or eight suffered; and, on one occasion, when more than six hundred glandered horses were collected together at Alfort, not one of the persons who had charge of them took the disease. This affection is so frequent in Ireland, that Dr. GRAVES is of opinion that the Legislature is called on to imitate the example of the Prussian government in placing glandered horses under the surveillance of the police (*Clinical Lect.*, Am. Ed., by Dr. GERHARD, p. 314, 1842). We have heard of but few cases of the disease in the human subject in this country, although it is frequently met with in horses; and as little precaution against it is used, we infer that the susceptibility to it is not as great as has been represented.]

* [Since this was written several cases have recovered under the use of creasote and turpentine.]

the disease. The vapour bath, with the fumes of camphor diffused in it; the warm bath, containing a sulphuret, or consisting of water in which aromatic and stimulating herbs are infused; the nitro-hydrochloric acid, or chlorine baths, &c., are severally describing of trial. Terebinthinate embrocations, as warm as they can be endured, may also be applied externally; or turpentine may be given internally in small and often-repeated doses, with aromatics, &c. The various means detailed in the article FEVER (§ 559, *et seq.*), with reference to the treatment of the typhoid varieties, may likewise be resorted to.

16. Dr. ELLIOTSON mentions (*Med. Gazette*, vol. vii., p. 655) that the veterinary surgeon of the 13th light dragoons treated this disease in the horse by putting a quantity of scalded bran, mixed with Venice turpentine, into a horse-hair bag, and tying it over the horse's head; the whole body of the animal being wrapped at the same time in a large blanket wrung out of boiling water, and covered with several horse-cloths. This treatment procured a profuse sweat, and a free discharge from the frontal sinuses and nostrils, and promoted the healing of the ulcerations. Dr. ELLIOTSON also states, in his last paper on this disease, that the sedulous injection of a solution of creasote up the nostrils removed the whole of the symptoms, in a case of chronic glanders in the human subject, after a very few weeks. Mr. STORRY (*Veterinarian*, vol. vii., p. 145) adduces cases in which fumigation with carbonic acid gas appeared beneficial in glanders occurring in the horse; but other means, as calomel, aloes, &c., were also employed.

[In one instance, Mr. TRAVERS succeeded in effecting a cure by the frequent administration of emetics. RAYER recommends the immediate excision of the swollen glands in the early stages of the disease; and also mercurial frictions. He also thinks highly of the acetate of ammonia in large doses, and repeated purgings. As to topical treatment, he advises the free incision and subsequent cauterization of the pustules and abscesses, while the patient's strength is supported by tonic drinks, wine, &c. The oil of turpentine has recently been given with success in a case of glanders in the horse (*Lond. Lancet*, No. 390, p. 689).]

17. In the chronic, as well as in the acute states of the malady, tonics or stimulants combined with purgatives, particularly cinchona, or the sulphate of quinine, capsicum, and camphor, with aloes, &c.; antiseptics, as the chlorides, hydrochloric acid, or chloric ether, creasote, and pyroligneous acid; warm alterative diaphoretics, especially guaiacum, mezerion, senega, sassafras, sarsaparilla, variously combined; the terebinthines, balsams, &c., and fumigating or medicated warm baths, may severally be prescribed and varied, appropriately to the characters of the case. The excessive thirst always attending the disease will be most beneficially quenched by a liberal use of soda water, spruce or ginger beer, Seltzer water, &c., which may be rendered still more cooling by the addition of small quantities of nitre, or of the carbonates of the alkalies; or they may be made the vehicles of several internal medicines.

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[Case of Glanders, *Med. Chir. Review*, vol. xxvi., 1837, p. 500, from *Medicinisches Jahrbücher*.—BROWN, Case of Glanders, *Ibid.*, July, 1837, p. 246, from *Dublin Jour.*, May, 1837.—JAMES JOHNSTON, Case of Glanders in the Human Subject, *Ibid.*, Oct., 1837, p. 359, from *Provincial Trans.*—Opinions on Contagion of Glanders, *London Lancet*, Aug. 5th, 1837, and *Med. Chir. Rev.*, Oct., 1837, p. 500.—Discussion at the French Academy on the Nature and Treatment of Glanders in Man, *Ibid.*, Oct., 1837, p. 518.—Cases of Glanders in Man, *Ibid.*, July, 1838, from *Medicinisches Zeitung*, Mai, 1837.—ANDRÉ, On Glanders in Human Subject, *Ibid.*, July, 1839, p. 233, from *Memories de l'Académie*.—J.M. NORRAT and BAULEY, Report on the Work of Deville on Glanders, in *Ibid.*, Ap. 1840, p. 543, from *Revue Medicale*.—J. B. TYTLER, Cases of Glanders in Man, *Med. Chir. Rev.*, July, 1841, p. 279, from *Ed. Monthly Jour.*, June, 1841.—A. GRAHAM, *Ibid.*, p. 280.—DELACHORPE, Cases of Glanders, with Remarks, in *Med. Chir. Rev.*, Jan., 1842, p. 188, from *Revue Medicale*.—M. BERARD, On Transmission of Glanders from one Human Subject to another, *Ibid.*, Ap., 1842, p. 532.—H. M. HUGHES, Cases of Glanders in the Human Subject, *Med. Chir. Rev.*, July, 1843, p. 233.—M. RENAUT, On Transmission of Glanders by the Blood, *Ibid.*, Oct., 1843, p. 523.—YOWATT and PERCIVAL, The Veterinarian, or Monthly Journal of Veterinary Science, Lond., 1844.—JOHN FIELD, Posthumous Extracts from his Veterinary Records, Lond., 8vo, p. 236, 1844.—Review of the above Works, in *Med. Chir. Rev.* for Jan., 1844.—J.M. RAYER and BRESCHET, Review of their Work on Glanders, in *Med. Chir. Rev.* for July, 1840, and in *Brit. and For. Med. Rev.* for July, 1838; also, *Gaz. Medicale*, 1840.—It seems that, from 1837 to 1840, no fewer than 27 persons have died in Paris of the Glanders. See *Med. Chir. Rev.* for Oct., 1844.—ROBLY DUNGTSON, in *Cyclop. of Pract. Medicine*, Philad., 1845, art. *Glanders*. Dr. D. treats of the disease under the name of "Equinia Glandulosa."—*London Lancet*, June 20th, 1833.]

GLOSSITIS. See TONGUE.—Inflammation of. GOUT.—SYN. ΑΡΘΡΙΤΙΣ (ἀπὸ τοῦ αρθρον); αρθριτικη νοσος, Hippocrates, Aretæus. Arthritis, Auct. var. Ποδογρα, Hippoc. et Aret. Ποδογρα (των ποδων ἀγρα, Lucian). Podagra, Auct. var. Ποδαλγια, Gr. Morbus Articularis, Pliny. Chivagra; Arthritis Podagra; Morbus Dominorum; Gutta, Radulphus, Bartholin, &c. Febris Podagrica, Vogel. Podagra Arthritis, Parr. Arthrodynia podagrica, Swediaur. Cauma podagricum, Young. Arthrosia podagra, Good. Goutte Arthric, Fr. Gliedersucht, gichtschmerzen, Fussgicht, Germ. Gotta, Ital. Gota, Span.

CLASSIF.—I. Class, Febrile Diseases; 2. Order, Inflammations (Cullen). 3. Class, Sanguineous Diseases; 2. Order, Inflammations (Good). III. CLASS, IV. ORDER (Author in Preface).

1. DEFIN.—Constitutional disorder, giving rise to a specific form of inflammation; often favoured by original or hereditary constitution; appearing after puberty, chiefly in the male sex; returning after intervals; generally preceded by, or alterna-

ting with, disorder of the digestive or other internal organs; and characterized by affection of the first joint of the great toe, by nocturnal exacerbations and morning remissions, and by vascular plethora; various joints or parts becoming affected after repeated attacks, without passing into supuration.

2. I. *Gout* is one of the diseases, the nature and treatment of which were best known to the ancients. In modern times, however, the morbid relations and associations of the disease, and its various modifications have been more fully elucidated, and its treatment assigned, accordingly, with greater precision. But attempts at distinguishing its various manifestations, locally and constitutionally, and with relation to the numerous disorders arising in the gouty diathesis, have induced modern writers to make so many divisions of it, and to arrange its forms and states so differently, as to render its study somewhat perplexing to the inexperienced. This is one of the greatest objections that can be urged to the works of MUSGRAVE, GUILBERT, and some others. The arrangements adopted by some of the best writers on the disease are, however, very similar; and I will not materially depart from them. Those of CULLEN and GOOD nearly agree, and that of Sir C. SCUDAMORE and of Dr. MACKINTOSH is quite the same. Differing, therefore, but little from these writers, I shall consider, 1st. *Acute gout*; 2d. *Chronic gout*; and 3d. *Irregular gout*. The forms described by authors under the appellations of *regular, acute, inflammatory, chronic, irregular, nervous, atonic, lurking atonic, primary asthenic, primary fixed, anomalous, wandering, internal, visceral, retrocendent, misplaced, latent, masked, emphysematous, flatulent, disguised, aberrant*, &c., will be appropriately considered under one or other of the above heads.

3. i. HISTORY OF ACUTE GOUT.—A. *Of the Symptoms premonitory of the Paroxysm*.—Although the gouty paroxysm may attack suddenly a person apparently in good health, especially on the first occasion of its appearance, it is more frequently preceded by symptoms of disorder referrible chiefly to the digestive organs. I believe that if the cases in which it is said to have appeared suddenly were investigated, it would be ascertained that more or less disorder had existed for some days before the seizure, although not so as to have excited any concern in the mind of the patient. The most common symptoms of premonition are, flatulence, oppression after a meal, irregular appetite; heartburn, with acidity of stomach, sometimes with acid or acrid eructations; costiveness, irregularity, or, more rarely, an irritable state of the bowels; scanty, deep-coloured urine, becoming turbid or thick on cooling, or sometimes copious or pale urine; a sense of soreness, or occasionally of coldness, at the epigastric region; itching or irritation of the skin; drowsiness, or frequent yawning, restless or unrefreshing sleep, more rarely nightmare; general lassitude and depression of spirits. In some persons, the symptoms of gastrointestinal irritation are still more manifest, the tongue being loaded, red at its point and edges, the epigastrium tender, and the stomach oppressed after a meal. In many cases, increase of corpulency; scanty, thick urine; drowsiness, especially after eating, and a sense of

general fulness and oppression, have preceded the paroxysm for a longer or a shorter time, accompanied by several of the preceding symptoms. The appetite is frequently craving; and when indulged, is often followed by nausea, or vomiting of acrid matter, or by heartburn, flatulency, acrid eructations, &c. The premonitory symptoms vary in different persons, and depend much upon idiosyncrasy. Dr. MACKINTOSH justly remarks that persons subject to gout are warned of a fit by some sensation or symptom peculiar to themselves individually; one feeling heat, pain, and dryness of the eyes; another, heat, redness, and swelling of the nose; a third, an unusual craving for some particular kind of food, or some peculiar feeling at the stomach, &c. Palpitations or internal flutterings; severe cough, with mucous expectoration; irritability of the bladder, the urine being loaded with mucus; a discharge from the urethra, with scalding or difficulty in passing the water; unusual lassitude, and inaptitude for mental exertion; peevishness, irritability of temper; depression of spirits, more rarely an unusual hilarity; and various other symptoms severally precede the paroxysm in different cases.

4. With more or less of these indications of constitutional disorder, the patient often experiences chills or rigours, followed by heat, flushings, headache, and the sensations referrible to the part about to be chiefly affected. These sensations, however, may have already appeared; but they are now more evident, and are increased during the night. The patient complains of weakness, tenderness, achings, numbness, prickings, or shooting pains, with spasms, or a tingling sensation, in the limb; or of stiffness and weakness of the joints. A dark hue of the skin; fulness of the veins; swellings of the feet after exercise; disappearance of an accustomed moisture from the soles, with remarkable dryness and heat; and frequent change of position of the legs and feet, especially in bed, with general restlessness, are among the more constant precursors of the fit. One or both feet, particularly the soles, and the balls of the great toes, become burning hot: sometimes, however, they are cold, and are kept warm with difficulty; frequently the chilliness and coldness of the extremities alternate with feverishness, flushings, flying pains, and vertigo. Some of these symptoms, particularly the twitchings or cramps in the limbs, are felt chiefly when about to fall asleep, and are attended or followed by restlessness or watchfulness. Local signs of premonition are most common in persons who have experienced previous attacks. Where concretions have formed, severe pricking pains, with increased tenderness, are generally present. In those of an inflammatory diathesis, or who are plethoric, exposure to cold, or other exciting causes, may induce internal disease, with all the characters of idiopathic inflammation, which may continue for a longer or shorter time, and suddenly subside, being quickly followed by a regular paroxysm of gout; such instances, however, belong to a form of the disease hereafter to be noticed.

5. B. *History of the regular Gouty Paroxysm*.—A. The first fit of gout, although commonly preceded by more or less of the above symp-

toms, sometimes occurs while the patient is in apparent health ; but, even in this case, there have been indications of an inflammatory diathesis, or of vascular plethora, with slight disorder of the digestive organs. Most frequently he is suddenly awakened about midnight, or at one, two, or three in the morning, with severe throbbing pain in the affected part—commonly the ball of the great toe of one foot, attended by heat, stiffness, and a sense of distention and weight. These sensations increase to burning, with an actual augmentation of the temperature of the part, and with occasional severe stounding, or darting pains up the limb. Restlessness, watchfulness, and fever increase, or continue till about six or seven in the morning ; when a gentle perspiration breaks out, followed by abatement of the symptoms, and some sleep in the slighter cases. The integuments of the part affected are swollen, slightly red, sometimes shining as if varnished ; and the veins proceeding from it are remarkably full. In severe cases, but slight remission of the symptoms occurs for two or three days. More commonly, however, the symptoms abate in the day, but return, often with increased violence, at night, or shortly before midnight, and last till about five or six in the morning ; the integuments have now become of a vivid or scarlet red, and admit of slight pitting on pressure. The pain is shooting, throbbing, intense, and gnawing, with an unpleasant sense of heat, burning, or weight. The least compression or touch of the joints cannot be endured.

6. *b.* The constitutional symptoms of the paroxysm vary with the severity of the attack and the previous health of the patient. Fever is generally present, and commences as stated above. It is attended by restlessness, thirst, loss of appetite, oppression at the præcordia, flatulent distention of the stomach, with abdominal pain, costive or irregular bowels, morbid evacuations, and scanty high-coloured urine, depositing a pink or brickdust sediment after standing, and sometimes containing mucus. The pulse varies, but is generally full or hard, and quicker than natural. Pain, heat, and tenderness of the epigastrium, with spasmodic sensations referrible to the stomach, are frequently complained of, and are attended by sour eructations, or vomiting of acrid or acid matters, sometimes mixed with bile, and causing unpleasant irritation of the pharynx and fauces. The tongue is furred or loaded, the papillæ erect, and the edges and point red. The stools are offensive, mixed with mucus, sometimes pale or clayey, but more frequently foul, blackish, or of an olive green. The symptoms altogether evince more or less irritation of the gastro-intestinal mucous surface, with obstruction or vitiation of the biliary and intestinal secretions. In old cases, and in persons far advanced in life, the attendant fever is much less inflammatory, and sometimes partakes more or less of the nervous character. In most instances, the nervous system evinces disorder by irritability of temper, increased sensibility, restlessness, and darting pains in the course of the nerves, very generally attended by violent cramps or spasmodic contraction of the muscles of the affected limb, and sometimes followed by the sudden transition of the disease from one limb to the other. Almost any change of

posture produces this spasmodic action, and the severe pain attending it. Sir C. SCUDAMORE states, that of 120 cases, cramps occurred in 90, with more or less severity, either upon the accession of the paroxysm, or during its height, or at its close, or even during all these periods.

7. *c.* A first attack may continue from two or three days to ten or twelve. The œdema remains a short time after the inflammation, which disappears with desquamation of the cuticle of the part, and much itching. Sometimes the disease appears in the other foot, giving rise to the same succession of disorder, often with greater severity and prolonged duration. Sir C. SCUDAMORE thinks that the first attack is more frequently mild in men than in women ; and states that of 198 cases, the great toe of one foot only was affected in 130 ; the great toe of both feet in ten ; the great toe and instep in three ; the instep of one foot in five ; the instep of both feet in three ; one ankle in ten ; both ankles in one ; the ankle and instep of one foot in four ; the right knee and left hand in one ; the back of one hand in two ; and the wrist in one ; various parts of the lower extremities, especially of the feet, being affected in the rest. He farther remarks that, in hereditary gout, the great toe is mostly the part first affected ; and that the exceptions to this seat of a first attack are chiefly met with in persons who have acquired the disease.

8. *d.* The frequency of the returns of the fit depends upon the constitutional tendency, the treatment, and the regimen, and mode of life of the patient. Although the disease generally returns to the part previously affected, the other foot seldom escapes. Each succeeding seizure is usually more severe and of longer duration than its antecedent, and the attendant constitutional affection more serious. Exceptions, however, to this may occur when the disease has been treated with judgment, and the patient has been careful of his health. The intervals also become shorter, and the parts affected more numerous ; but the fits are most apt to recur early in the spring or late in autumn, probably owing to the variability of the weather at these seasons ; but they may occur at any season. The malady generally acquires strength with each returning fit, both as to the number of parts affected, and as to the duration and degree of suffering caused by it ; the susceptibility to it increasing both locally and constitutionally with the repetition of the attacks.

9. *e.* In some persons the gout seizes only the feet ; but, in more numerous instances, in its progress, several parts are attacked in the same paroxysm ; the gouty inflammation affecting different places in succession, or at the same time, with equal or various degrees of severity. The feet, ankles, knees, and elbows are occasionally thus successively or simultaneously attacked ; together with the ligaments, the bursa mucosa, sheaths of tendons or aponeuroses. In the older cases, even the shoulders and hips are sometimes affected. The disease often suddenly leaves one part, and as instantly appears in another ; but it occasionally commences in one situation before it departs altogether from the other. This rapid transfer of the morbid action from one part to another, either of the same or of a different limb, is one of the most characteristic phenom-

ena of gout. When it thus passes to the opposite limb or extremity, some indications of the disease have often existed previously in that part. In a few instances, the chief suffering of the patient is in the day; in others, both day and night are passed in equal pain; but in most cases, particularly in the more recent attacks, the night is the period of greatest distress. The redness and œdematous swelling are most remarkable in the foot, hand, and elbow. In the ankle, knee, wrist, &c., there is little redness, excepting in small patches, and the swelling is caused by effusion into the sheaths of tendons, and into the bursæ; the latter often being greatly distended, painful, and exquisitely tender. In the more severe cases the veins of the limb are large and full, and unusually numerous near the affected part. The pain in gout is peculiar—is severe, burning, throbbing, shooting, or stounding, and otherwise modified in different cases, as stabbing, cutting, boring, or gnawing.

10. *C. The Sequelæ of Acute Gout* respect, 1st. The effects of the disease in aggravating previous derangement, or inducing disorder of internal organs; and, 2d. The alterations produced by it in the part affected.—*a.* Severe attacks of gout impair vital power in the digestive, biliary, and nervous organs; or they may be said, with greater accuracy, to weaken still more the previously debilitated organic nervous influence. Hence occasionally result a numerous train of dyspeptic symptoms; hypochondriasis, and torpid or otherwise deranged function of the liver; inaction of the cæcum and colon, causing a sluggish state of the bowels and morbid evacuations; increased liability to apoplectic and paralytic seizures, or to cramps, wandering pains, &c. SYDENHAM supposed that gout disposed to the formation of urinary calculi; and numerous cases have been recorded in which either they or gravel in the urine alternated with the gouty paroxysm. This connexion has received support from the observations of MORGAGNI, SCHURIG, BUECHNER, SHROEDER, MURSIINA, HEIM, and FORBES; but Sir C. SCUDAMORE states that irritation of the urinary organs and gravel occur rather before and during the paroxysm than in the interval; and that calculus of the bladder is a very infrequent complaint among gouty persons; of 231 of whom five only were so afflicted. This, however, does not altogether disprove the connexion; as renal calculi may have existed in some, if not in many of these. He, however, adds that the urine of gouty persons deposits, without any exception, at some period or other, either gravel or the pink or brickdust sediment. There can be no doubt that the gravel is formed either in the kidneys or in the urinary bladder; and if this be granted, a strong argument will be thereby furnished in favour of the occasional supervention of calculi.

11. *b.* The most frequent consequence of acute gout, as respects the local affection, is the passage of it into the chronic form; but before this degeneration may have taken place, several lesions of the tissues composing the part affected may be produced by acute attacks. These are, weakness, stiffness, and lameness of the joint, with a snapping or grating sensation upon motion, owing to imperfect secretion of the synovial fluid. The ligaments and mus-

cular aponeurosis become thickened, stiff, or inelastic, and tender. The secretion from the sheaths of the tendons is thickened or otherwise vitiated, causing a knotty and thickened feel upon examination, sometimes with contraction and rigidity. The bursæ mucosæ are enlarged, and either distended or soft and yielding to the touch. The contents of the small bursæ are sometimes inspissated so as to form hard tumours; and the deep-seated textures of the joints become thickened and apparently consolidated. The veins of the feet and legs are often either enlarged or varicose; but these, as well as various other changes, as concretions, &c., are chiefly the result of the chronic disease.

12. *ii. CHRONIC GOUT.*—*a.* This state of the disease is characterized by the inflammation and pain being more slight, irregular, and wandering than in the acute; by the faint redness of surface, the permanent distention and œdema of the part; by impaired power of motion; by its more continued duration, and association with disorder of the digestive organs; by the languid or oppressed circulation; and by general irritation of the nervous system. It is generally a consequence of one or more acute attacks, either when the paroxysm has not passed off with a regular crisis or evacuation, or when repeated seizures have so enfeebled the constitution as to render it incapable of manifesting sthenic action. It may, however, appear primarily, constituting the *Primary Chronic Gout* of J. P. FRANK. In this case, instead of severe paroxysms occurring at distant intervals, the seizures are much milder, but much more frequent, prolonged, and irregular. Primary chronic gout is more common among women than men, and in them, especially, seldom affects the great toe; sudden swelling and pain, with but little of the appearance of the gouty inflammation, affecting chiefly the instep or ankle, or the wrist or hand. When chronic follows acute gout, the various parts which had been inflamed in the paroxysm of the latter continue affected, either alternately or in conjunction; but the pains are more wandering, and have now and then a rheumatic or nervous character.

13. *b.* Whether primary or consecutive, *chronic gout* presents the following *local symptoms*: A sense of alternate heat and coldness is felt in the affected part, and is much increased at night. There are often numbness and an uneasy sense of fulness and weight. The muscles and joints feel weak, and cramps of the lower limbs occur chiefly at night, when falling asleep. Startings and restlessness are generally also complained of. The surface of the part is either of a pale reddish colour, or of the natural hue, or of a purplish tint, the discoloration being sometimes transient. The parts are tender; shooting pains pass along the nerves; motion is difficult and painful; and the energy of the limb very much impaired. The bursæ and the sheaths of tendons are more frequently affected in the chronic than in the acute gout, occasioning puffiness and distention. Œdema is generally present and permanent, attended by fulness of the veins. Even in the slightest cases, aching and a sense of heat are felt in the ankles after walking.

14. *c.* The *constitutional symptoms* are remark-

ably diversified by the temperament and habits of the patients, the situation and degree of the local disease, and by the nature and extent of the internal associated disorder. Numerous dyspeptic symptoms and uneasy sensations referable to the stomach, as craving for food, nausea, oppression after a meal, flatulency, heartburn, a sense of coldness at the stomach, transient pains or spasms of the muscles of the abdomen or chest; a costive or irregular state of the bowels, with morbid or offensive stools; a deficient or unhealthy biliary secretion; and hæmorrhoids, with evacuations of blood, are often present. Feverishness or irritation follow too full a diet, or stimulating food; and a sallow or slightly yellow cast of countenance, with uneasiness or pain in the hypochondria, and deficiency of bile, are not infrequent. The urine is various, being sometimes scanty, high-coloured, or thick, or occasionally abundant and dilute; it generally deposits a pink or lateritious sediment. Palpitations and flutterings of the heart are very common, particularly when there is much flatulency. Sleep is broken, disturbed by unpleasant dreams, and unrefreshing; the temper is irritable, and the mind hypochondriacal, imaginary or trifling ills occupying the attention. In some cases a chronic dyspeptic cough, or an increased secretion of mucus in the trachea, is complained of. Many persons, especially females, are exquisitely sensitive, and have their ailments increased by vicissitudes of atmosphere, especially by cold and humidity. In prolonged or severe cases the system often becomes cachectic; the limbs weak, stiff, and wasted, and the abdomen large. Although the patient's appetite may be natural, yet he is neither nourished nor strengthened by his food, which may even increase both the constitutional and local affection.

15. *d.* The *concomitants or consequences* of prolonged chronic gout are thickening and consolidation of the tissues of the affected part. The veins of the limb often become varicose, and increase the aching and fulness of the part, or cause purplish blotches of the surface, and, although rarely, ulceration of the skin. *Gouty concretions* occur only in a few cases, and arise from the effusion of a whitish fluid, the watery portion being absorbed. Mr. MOORE remarks that this effusion occurs not only during the fits, but also in the intervals; that it is not enclosed in a cyst, but usually lies in the cellular membrane, in the bursa mucosa, or in the cavities of joints. In the sheaths of tendons these concretions are generally hard or stony; in the bursa they are likewise hard, and in the cellular tissue their consistence varies. They may also form between the cuticle and cutis, where they vary in consistence, or even occasion intractable deep ulcers, as in a case related by Mr. HERBERT BARKER. When they are situated within the capsular ligaments, the cartilage is absorbed, and one or more phalanges distorted. Sir C. SCUDAMORE mentions several such cases. When the concretions cause ulcerations, the chalk-like matter is constantly secreted in a fluid or semifluid state, and accumulates in the bottom of the ulcers.*

* "An officer of temperate habits, who had undergone much active service, was, for some years before his death, *ætal.* 45, much affected with gout; many balls of chalk

surrounding surface is usually of a red colour, shining, and the seat of severe burning pain, symptoms occurring in paroxysms, with remissions or intervals of various duration. In such cases, erythema or erysipelas may be associated with the local affection. Although the concretions generally appear in the joints and surrounding tissues, they may occur in other situations, either simultaneously or otherwise. MORGAGNI mentions their formation in the breast of a patient suffering from hereditary gout. In the case detailed by Mr. BARKER there was a gouty concretion, of the size of a horse-bean, deposited on the left side of the nose. Dr. ELLIOTSON met with a case in which they formed in the ears. Their chemical constituents seem to be lithic acid combined with soda, potash, or ammonia, but mostly with soda, and with a little animal matter. They are of a light or whitish gray colour; insoluble in cold, and partially insoluble in boiling water.

16. *iii.* IRREGULAR GOUT.—Under this head may be arranged the various states of disorder either occurring in the gouty diathesis, or connected with the appearance of the gouty paroxysm, or following its sudden cessation in an external part. In this extended acceptation of the term, *irregular gout* will comprise the brief consideration of those derangements to which the names *anomalous, imperfect, internal, visceral, misplaced, displaced, retrocedent, transferred, metastatic, wandering, flying, disguised, masked, &c.*, have been applied. I shall therefore consider, 1st. Those specific or anomalous disorders appearing in the gouty diathesis, and followed by a complete or imperfect external gouty affection; 2dly. The derangements consequent upon the sudden cessation of the gouty paroxysm; and, 3dly. The various anomalous or disguised affections affecting persons of the gouty diathesis, without being followed or attended by any manifestation of external disease. It has been urged by some modern authors, and even by the latest writer on gout, Dr. BARLOW, that several of the forms just alluded to are merely internal disorders occurring in gouty persons, and differing in their nature and treatment, in no respect, from those usually observed; or, in other words, that these internal affections possess no specific gouty character. This is true in one point of view only, but not in others; for it must be admitted that the gouty are even more liable to internal diseases than healthy persons, and that these diseases will often pursue the usual course in the former as well as in the latter. That the gouty are very liable to nervous and functional disorders, especially those implicating the digestive and excretory functions, and that those disorders often present nothing peculiar, are generally admitted; but that many of the affections which either precede or follow the external manifestation of gout, or that appear in the gouty diathesis, differ very materially from those observed in other persons, is shown by the following circumstances: 1st. Gouty inflammations of the eye are very different in their visible characters, their seats, and

were removed from his hands, and he could write on the table with the point of his finger. Ulcers had also formed on his feet, which usually discharged an ounce of fluid chalk in the 24 hours."—(*Catal. of Prepar., &c., in the Museum of Fort Pitt, &c., p.* 167.)

their consequences, from common ophthalmia; and every one possessed of due powers of discrimination will admit that they require a different mode of treatment. 2dly. The knowledge we possess, however imperfect it may be, as to the changes and appearances consequent upon fatal internal disease in gouty persons, is conclusive of a material difference between them and those following more common maladies; and, 3dly. The *jurantia* and *ludentia* in the former are often very different from those in the latter.

17. *A. Specific or anomalous affections often precede the external manifestation in a complete or imperfect form of acute or chronic gout.* They may be either in every respect similar to other affections of the same seat, or very different and peculiar. In the former case, the external appearance of gout seems critical, and has been viewed as such by many writers; in the latter, it appears as the external manifestation of a constitutional disorder previously implicating the functions or sensibility of one or more internal organs. In perusing the older writers, numerous instances present themselves of gout supervening upon, and appearing critical in inflammatory and severe internal complaints. MORGAGNI considered himself cured of an ophthalmia that had resisted treatment, by an attack of gout. Dr. BAILLIE mentions a case of palpitation of the heart disappearing upon the occurrence of the gouty paroxysm, but these are not rare occurrences. Indeed, palpitations of the heart are frequently symptomatic of the disorder of the digestive organs ushering in the seizure. Affections of the urinary organs, erysipelas, asthma, and other diseases have likewise been removed by a regular fit of gout. One of the most interesting illustrations of the succession and critical influence of gout upon dangerous internal disease occurred to a medical gentleman whom I attended in 1824. He was seized in the evening with symptoms of complete congestive apoplexy, for which he was bled and purged, but without restoration of his consciousness. On the following morning gout suddenly appeared for the first time, with great intensity in the ball of the great toe of the right foot, and instantly removed all the apoplectic symptoms, the mental functions being perfectly clear and undisturbed on my seeing him very shortly afterward. When gout assumes a regular character, such antecedent affections appear merely as unusual precursors of the paroxysm, ushering in either the first seizure, or an attack in persons who had been previously affected by it.

18. *B. Retrocedent or displaced Gout; recedent, or transferred, or metastatic Gout; Podagra retrocedens; P. retrograda, CULLEN; P. complicata, GOOD.—a.* During the gouty paroxysm in either its acute or chronic form, it sometimes happens that an internal organ becomes suddenly and dangerously affected, the external disease being either much mitigated or having entirely disappeared. It has been disputed whether the internal disorder arises from the suppression or subsidence of the external affection, or whether the latter disappears in consequence of the occurrence of the former. Either may take place, as evinced by the succession of morbid phenomena in different cases; the development of disorder in an internal

organ deriving it from external parts in some instances; and the suppression of external manifestation of a constitutional disease determining it to an internal predisposed viscus in others. When retrocession occurs in the height of an acute paroxysm, the superinduced malady is generally also acute, and rapid in its course; but when it takes place in the chronic form, it is often less severe and more prolonged. The internal affections which thus arise are generally caused by the patient's imprudence by his habit of body and temperament, by previous disorder, or by injudicious treatment and management. The stomach is most liable to be affected, severe pain and spasm, with sickness, being complained of. The intestines may be also attacked, either alone or in conjunction with the stomach, with all the symptoms of acute inflammation; either form of disease often pursuing a violent or rapidly fatal course. Severe pain in the head, and symptoms of inflammation of the brain and its membranes, stupor, coma, apoplexy, epilepsy, or palsy supervene in some cases, especially in those who have previously evinced a tendency to these maladies. In other instances, affections of the chest appear, particularly dyspnoea, sense of suffocation, oppression at the præcordia, with or without cough or expectoration. In some, pain or constriction in the region of the heart, violent palpitations, oppressed breathing, urgent anxiety, syncope, or leipthymia, &c., occur, indicating a serious affection of the heart or pericardium. In a case of this description recorded by Mr. BROWN, and which terminated fatally some months after the disappearance of gout, the pericardium was thickened, and contained six ounces of bloody serum; the heart was greatly enlarged, and its substance was pale, soft, flaccid, and attenuated, its internal membrane being of a deep violet colour; honeycombed ulcers were also observed at the root, and in the arch of the aorta. Other diseases of an inflammatory, spasmodic, or nervous character, or of these mixed, may follow the disappearance of the external gouty affection, more particularly dysentery, hepatitis, peritonitis, and various affections of the urinary or uterine organs. Dr. CULLEN mentions strangury, catarrhus vesicæ, and hæmorrhoidal affections among those not infrequently alternating with gout; and instances have occurred to myself, as well as to Sir C. SCUDAMORE, Mr. HOWSHIP, and many others, of the transference of the morbid action to the kidneys, causing suppression of urine, or inflammation with partial suppression; or to the neck of the bladder with severe spasm, or even to the prostate gland. Mr. HOWSHIP mentions that when gout is transferred to the kidneys, the urine becomes albuminous as well as scanty. Dr. HOME states that a gentleman who exposed himself to cold and wet, while affected by gout in the feet, was in a few hours afterward affected by enteritis, which proved fatal in twelve hours; and Sir C. SCUDAMORE mentions that Dr. PARRY met with two instances of extravasation in the brain in the same winter, after repelling gout from the extremities by immersing them in cold water.*

* [Gout is sometimes transferred to the spinal marrow, where it causes inflammation and softening of its substance, attended with a variety of anomalous symptoms, and termi-

19. *b.* The information we possess as to the lesions produced by the transference of the morbid action to an internal part is extremely imperfect; many who have the opportunity not giving themselves the trouble to inquire respecting them, or supposing that little or no alteration may be expected in such cases. Others, again, believe that the changes consist chiefly of those produced by inflammatory action. Without disputing that the consecutive affection is frequently inflammatory, I have seen it, in several instances, possessed of a distinctly nervous and spasmodic character, or consisting chiefly of remarkable depression of power, with the abolition of the function of the organ principally affected, and most intense suffering. A medical friend some years ago, whom I attended in the disease, took, contrary to my wish, and previously to removing biliary accumulations and morbid excretions, a large dose of colchicum, and was very shortly afterward seized with violent pain in the stomach, a sense of sinking, and languid, small pulse, the gout having instantly disappeared from the foot. I soon afterward found him in the ut-

nating often in hemiplegia. Such a case lately occurred under our treatment, in an old gentleman of seventy, who had all his life been subject to frequent and painful gouty attacks, but which had, in consequence of a more temperate mode of living, nearly disappeared. The disease came on gradually, with a painful sensation through the upper dorsal vertebra, shooting through the chest, and causing embarrassed respiration, disturbed sleep, sediment in the urine, &c. These symptoms gradually increased till complete paraplegia ensued; and after lingering about a year and a half from the commencement of the spinal affection, he sank under the disease. Dissection revealed softening of the spinal marrow opposite the lower cervical and upper dorsal vertebra, and other appearances indicating an inflammatory condition.

Dr. GRAVES has also described cases of disease of the spinal cord connected with, and apparently caused by, gout, in some of which the symptoms were very similar to those above described. In one instance the patient was subject to attacks of severe colic, preceded or followed by a gouty affection of the feet. After several of these attacks, he became affected with great weakness of his wrists, with pains in his fingers, particularly in the last joints. As the disease progressed these pains became more intense and extensive, till at length paralysis of the upper extremities came on, which was soon followed by that of the lower. Shortly after the paralytic affection had thus decidedly shown itself, he had an attack of gout in his feet (a circumstance which also occurred in our own case), and this was followed by several others in succession. After each attack of pain in the feet, the paralytic state of all the limbs increased, and if he gained a little strength in the intervals between these attacks, a recurrence of the paroxysms always made him worse than before. On examination after death, the spinal cord was found to be softened to the consistence of thick cream, opposite to the last cervical and first dorsal vertebra.

The eye, also, according to Dr. TODD (*On Gout, Rheumatic Fever, &c.*, Lond., 1843), is liable to be secondarily affected in gout, but only after severe attacks of the disease in other parts where the diathesis is thoroughly established. It attacks most of the various textures of the eye in succession, and ultimately destroys vision. The conjunctiva and the sclerotic are first affected, then the choroid and iris, the latter of which forms adhesions to the neighbouring parts, and these intercept the rays of light. It is probable that the retina also suffers. Mr. WARDROP thinks that the eye may be primarily attacked in gout, and gives a case in illustration of a gentleman who suffered from arthritic inflammation of the eye, accompanied by severe pain in the head, which was relieved by sinapisms to the feet so powerful as to cause ulceration. A connexion between apoplexy and gout has long been known; the urethra and bladder are also peculiarly obnoxious to the disease; but the affection of these parts generally precedes the development of the gout in the joints, and is relieved when it appears externally. The bronchitis which occurs in gouty subjects seems to be of the same kind. These diseases, under such circumstances, are most readily relieved by bringing back the gout, by stimulating epithems to its original seat.]

most agony, and prescribed large doses of camphor, with other diffusible stimuli, and mustard cataplasms to the feet. The gout as instantly returned to the extremities, and the affection of the stomach disappeared. A medical man, lately resident in Crawford-street, experienced, in 1830, an imperfect attack of gout in the feet. When I saw him, it had just forsaken this situation, and in twenty-four hours it successively had attacked the bowels, in the form of most violent colic, the diaphragm, and lungs, causing the most urgent dyspnoea; and, lastly, the head, in a slight degree. The disease then appeared in one foot, and afterward transferred itself to the other. In these cases the phenomena of internal disorder were those of severe nervous affection, probably also connected with congestion, or irregular determination of blood; and the treatment founded on these views procured relief in them all.

20. Formerly the internal affections thus connected with the disappearance of gout were too exclusively viewed as nervous, and treated as such, notwithstanding the indications of inflammatory action sometimes attending them. More recently, and even at the present day, a very opposite opinion has been promulgated. Dr. GREGORY, of Edinburgh, supported this latter opinion, and was followed in it by Dr. BATEMAN and Dr. BARLOW. Fully admitting the inflammatory character of these consecutive affections in some cases, I must strenuously contend that it does not constitute the principal feature of them in others. In several instances, three of which occurred in medical men in this city, any inflammatory state could not be inferred either from the sensations of the patients, or from any symptom that I observed; and as the treatment founded upon the gouty and nervous characters of the disease was successful, there is no reason to infer that a latent inflammation had existed in these cases. That inflammatory and congestive affections of various internal viscera often occur in such circumstances cannot be disputed; but the practitioner should be prepared to meet also with very different and often anomalous disorders—to find some attended by the most intense suffering and distress; others by a feeling of sinking or dissolution; others by distressing anxiety, terror, and irritation; others by spasmodic action and morbid sensibility; and, lastly, others by constant pain, internal heat, distention, tenderness, and other indications of inflammatory action. In some, the pulse is weak, irregular, fluttering, small, or intermittent; in others, excited, frequent, irritable, but regular, or full, strong, and energetic. I have even seen it all these in succession in the same retrocedent affection, and within a few hours. Some cases, even where the same organ is implicated, are attended by constant pain, a sense of increased heat or of burning, remarkable tenderness, and excited pulse; and others by remarkable depression, great languor, a sense of coldness or of weight, or oppression, a weak and languid pulse, and a feeling of vital exhaustion and of impending dissolution. Of the pathological relations of these different morbid conditions more particular notice will be taken hereafter (§ 40-42).

21. *C. Disguised or lurking Gout—anomalous,*

imperfect, internal, visceral, nervous, masked, or misplaced Gout—*Podagra atonica*, CULLEN; *Podagra larvata*, GOOD. The gouty diathesis may be generated in a constitution too weak to develop the local affection in the extremities. When this is the case, various disorders affecting internal organs, most frequently those of digestion and excretion, arise, and often assume anomalous or Protean forms, with functional or nervous characters, and even congestive or inflammatory states, as in retrocedent gout. In that variety, the internal disease is preceded by, and is rapidly consecutive of the disappearance of an external gouty affection; but this variety is frequently unattended by any such affection, however slight or fugitive, although it may occur. It has been too generally inculcated that the disorders appearing in the gouty diathesis have nothing peculiar in their character, or different from those observed in other circumstances. This subject has been already sufficiently adverted to with reference to retrocedent gout; and the observations there made are equally applicable to those affections which appear in the lurking or disguised manner now being considered. When, in connexion with the generation of the gouty diathesis, the constitutional powers have been greatly impaired, and the functions of excretion weakened, numerous internal disorders result, whether the patient may have experienced a fully formed fit of this disease or not. A fastidious or impaired appetite; a sense of distention and flatulence; acid or acrid eructations, or nausea or vomiting; spasmodic constriction, or most painful oppression at the epigastrium; costiveness and violent colic; mental depression, anxiety, or hypochondriasis; palpitations or other irregularities of the heart's action; hemicrania, vertigo, and various affections referred to the head, or even palsy, epilepsy, or apoplexy; nervous excitement and irritability, with a sense of depression, and several other affections, sometimes present themselves, either with or without slight manifestations of gout in one or other of the external situations above enumerated. That those complaints are favoured by, and very often occur in the gouty constitution, cannot be, and, indeed, is not doubted. The question only is, whether these be of an inflammatory, or of a nervous, or of a mixed, or of a specific or peculiar character. That they are functional, chiefly, cannot be disputed; but that others of a more decidedly inflammatory or congestive kind may occur, as in cases of retrocedent gout, seems to be most consonant with the phenomena observed in different cases, and with the pathology of the disease, according to the view of it hereafter to be exhibited. Dr. HAYGARTH has recorded two most interesting instances of misplaced gout, causing arthritic carditis in the one case, and enteritis in the other; and, although an attack of gout had not been experienced for many years, moderate depletions, and sinapisms applied to the extremities, were followed by the external gouty disease.

22. It is not unusual to hear persons who are advanced in life, and who have ceased to have their usual attacks of gout, complain of various nervous or functional disorders of so remarkable and peculiar a kind, as to convince them that gout is affecting or wandering through

the system without developing its usual effects. Sir C. SCUDAMORE very justly observes that some gouty persons are affected with severe colic upon accidental exposure to wet and cold, or from acid or indigestible articles of diet, and that almost invariably these attacks are spasmodic, and not inflammatory; hot brandy and water, or compound spirit of ammonia, giving relief. It should, however, be recollected that the continuance of pain may cause congestion of, or inflammatory determination to the affected part. The internal complaints occurring in the gouty diathesis are generally attended by sensations so distressing, and often so peculiar, as to excite suspicions of their nature in the mind of the patient, and to cause him to desire an attack of gout, however severe, in the extremities, believing that it will remove the internal and more dangerous sufferings. Sir C. SCUDAMORE defines these affections "to be disordered functions of internal organs in a gouty constitution, and thereby modified in their character;" and in this opinion he has been followed by Dr. BARLOW and others. Dr. CULLEN, and those who preceded him, distinguished these complaints by the term "misplaced gout;" and, as it will appear in the sequel, the difference between the ideas intended to be conveyed by these terms is more apparent than real; for the one, in admitting that such complaints are modified by the gouty diathesis, concedes all that is contended for by those who distinguish them by applying to them, without circumblocution, a term indicating at once their most important features and relations.

23. II. DIAGNOSIS.—A. *Acute Gout* may be mistaken for *acute rheumatism*, which it may approach more or less near, when the latter affects the joints, or for common inflammation of these parts. It seldom happens that more than one part is affected, and still more rarely that more than one is attacked at the same moment in the first fit of gout. This character, however, cannot be extended to acute rheumatism. In the former there is much more disorder of the digestive organs, precursory of the attack, than in the latter, and the remission from pain and fever during the day is much more distinct. In *gout*, serous effusion into the cellular tissue is early in the fit, and to the extent of admitting of slight pitting on pressure; the veins are turgescient in the vicinity of the affected part; the pain is pungent, severe, burning, stounding, lancinating, or peculiar; the surface is inflamed, deeply red, shining as if varnished, turgid, and exquisitely tender; the temperature of the part is very much increased; and the urinary secretion is remarkably disordered, generally depositing a quantity of the pink or lateritious sediment, consisting of the lithate of soda, the tinging substance being the purpurate of soda. These symptoms are either absent or slightly marked in acute rheumatism.

24. The hereditary character of gout; the frequency of it in the plethoric, sanguine, and irritable constitutions, and at an advanced age; the sudden incursions of the fit; and the commencement of it in the small joints, farther serve to distinguish it from rheumatism. Although gout may affect the knees, shoulders, elbows, &c., after repeated attacks, or in its chronic form, it rarely commences in these sit-

uations, whereas rheumatism generally begins in the shoulders and larger joints. It is sometimes, however, observed that the patient, on recovering from the one disease, may be attacked by the other, upon exposure to its exciting causes; and a person who early in life has lived frugally and laboriously, and been subject to attacks of rheumatism, has, at a more advanced age, lived fully and indolently, and been attacked by gout. In either case, the patient himself has no difficulty in distinguishing between them, and the experienced practitioner will have as little, however much he may be at a loss to convey his ideas respecting their diagnosis to others. It is not so much by any one mark as by the concurrence of several circumstances, connected with the causes, the constitutional disturbance, antecedent and existing, and with the local characters, that a correct diagnosis can be formed. *Common inflammation of the joints* cannot be mistaken for acute gout, if the character of the pain, the state of constitutional disorder, and the urinary secretion receive attention. The continued or unremitting state of the symptoms, and the course, progress, and termination of the disease, will also serve to distinguish them.

25. *B. Chronic Gout* may be distinguished from *chronic rheumatism* by several of the circumstances already adverted to. The former is much more frequently preceded by the acute disease, and by disorder of the digestive and excreting functions, and is very much oftener attended by swelling, thickening, or nodosity of the affected parts than the latter. However, cases not infrequently occur in which gout, in its more chronic form, very nearly resembles chronic rheumatism, there being but little disorder of the above functions attending them. In forming a diagnosis, the temperament, habit of body, age, and mode of living should be taken into consideration. Dr. HAYGARTH observed that only 14 patients out of 300, ill of chronic rheumatism, had swelling in the seat of disorder. It should, however, be recollected that when chronic rheumatism affects the bursæ mucosæ and thecæ of tendons, particularly those of the knee joint, considerable tumefaction takes place. Although the gout, in its chronic form, is still more fugitive than when acute, and thus approaches nearer to the nature of rheumatism, yet it is much more disposed to seize the hands and feet than that disease, as well as to be more solitary in its situation. The parts which have been often affected with gout become very susceptible of changes of temperature, and, in this respect, partake of the rheumatic character. Sir C. SCUDAMORE thinks that it is only in this way that any propriety can be attached to the expression *rheumatic gout*, and conceives that gouty and rheumatic inflammations cannot both exist in the same part at the same time, although they may occasionally co-exist in different parts; as when a patient suffering gout in the usual situations is seized with rheumatism in the muscles of the neck, or in the shoulder, or other parts, in consequence of exposure to currents of cold air, &c. When gouty concretions form, the nature of the complaint will be sufficiently evident.

26. *C.* It is a matter of great difficulty to discriminate between the internal affections

characterizing *irregular gout*, and similar affections unconnected with this disease, as may be inferred from what has been already advanced on the subject. It is only by applying sound principles of pathology to the investigation, guided by much acumen and experience, that we can expect to distinguish between them. When called to a patient advanced in life, of the irritable and nervous temperament, complaining of violent sufferings, or of various nervous and functional disorders, or of severe spasmodic affection, we should endeavour to ascertain, from the state of the pulse and the temperature of the surface, from the sensations produced by a minute examination, from the appearances of the excretions, and from the history of the case, especially with reference to its causes and to previous attacks of gout, and to any hereditary predisposition to it, the exact pathological condition upon which the symptoms depend. The existence or non-existence of inflammatory action, or the degree in which either may be mixed up with spasm or morbid sensibility, should be ascertained. Many writers, both previous to, and contemporary with Dr. CULLEN, considered debility and spasm, with altered sensibility, to be more characteristic of retrocedent and misplaced gout than inflammatory action; and this opinion seems to have been too generally, and often injuriously adopted. But I am convinced that, in more recent times, the opposite doctrine has been too exclusively confided in, and with little less injury as to the results. The practitioner, in all such cases, should be guided by pathological inferences derived from the phenomena characterizing individual cases; and if he find the pain fixed, the pulse excited, or hard, or oppressed, the skin hot, and the parts tender or painful on pressure, he will deduce the existence of inflammatory action; whereas, if the pulse be weak, small, irregular, or indistinct, and compressible; if the skin be cool, the countenance collapsed or anxious; the surface relaxed and perspirable, the parts tolerant of pressure, and if no unnatural sound be detected on auscultation and percussion, he will infer the presence of functional disorder merely or chiefly, or of spasm, or of depression of nervous power, with altered sensibility.

27. III. PROGNOSIS.—The prognosis should vary with the form which gout assumes.—*A.* In the *regular acute disease* a favourable opinion may generally be given, if the internal organs betray no serious lesion of function or of structure. The subsidence of sympathetic fever, improvement in the excretions, the urine ceasing to deposit a sediment, or losing its high specific gravity; a return of the appetite, and of the spirits; desquamation of the inflamed cuticle, with disappearance of the swelling, are indications of recovery. The sudden transference of severe affection from one part to another, especially if accompanied with painful sympathy of the digestive organs, or with nervous symptoms and exquisite susceptibility, or with irregular fever, and with persistent disorder of the excretions, are signs of a difficult and intractable disease. In this form of gout especially, the prognosis should be influenced chiefly by the state of the excretions; for as long as the stools and urine continue morbid, other signs of amendment will prove delusive.

28. *B.* The prognosis in *chronic gout* is more unfavourable than in the acute, as respects subsequent immunity from the disease. As to recovery from the seizure, the circumstances just stated will influence the opinion of the practitioner, as in the acute variety. In every case, however, the state of constitution and of internal organs, and the effects produced by treatment, should be taken into account in deciding respecting the duration or the event of the disease.—*C. Internal affections*, occurring either in the gouty diathesis or upon the sudden disappearance of the external disorder, are always unfavourable in proportion to their severity, and the vital importance of the parts in which they are seated. When the heart, the brain, or the stomach and intestines are the seats of *retrocedent* or *misplaced gout*, the patient should be always considered in the utmost danger, especially if he be far advanced in life, if nervous energy be much impaired, and if judicious treatment has not immediately produced the desired effect. Cases of this description, however, not infrequently recover when appropriate and decided means have been promptly resorted to, and when the constitution of the patient has not been remarkably injured.

29. IV. CAUSES OF GOUT.—*i. Predisposing Causes.*—These may, as in other diseases, become exciting causes, owing to continued or energetic action.—*a. Hereditary disposition* has always been viewed as most influential in the production of gout. CADOGAN, however, attached too little importance to it, and CULLEN too much. It is very probable that it will evince various grades of influence in different classes or states of society—that it will seem of greater importance in those who live regularly, soberly, and laboriously; and of much less in those who are indolent, luxurious, or dissipated. Sir C. SCUDAMORE states that of 213 persons afflicted by gout, 84 could not trace it either to the father's or mother's side. But it is probable, conformably with what has been just stated, that an unusually large proportion of non-hereditary cases will be met with among the indolent and luxurious inhabitants of a large metropolis. Of the hereditary cases, 62 were derived from the father, 29 from the mother, 14 from both father and mother, 14 from the grandfather, &c. When both parents have had the disease, a greater number of the children will experience it. Where one parent only has had it, the child or children having the greatest resemblance to that parent will be most liable to it.

30. *b. Adult age*, particularly from 25 to 50, is the period at which gout most frequently first appears. Sir C. SCUDAMORE states that of 209 cases, 25 had the first attack between 20 and 25 years of age; 38 between 25 and 30; 41 between 30 and 35; 37 from 35 to 40; 18 from 40 to 45; 25 from 45 to 50, and 11 between 50 and 55. Gout is rarely met with before puberty. HIPPOCRATES first stated this fact, and it has been confirmed by SYDENHAM and many other writers. HEBERDEN never saw an instance of it. Dr. SCUDAMORE mentions a case at 8 years of age. I treated one, many years ago, at 11, and am at present attending a boy of 9, recovering from a severe attack in the foot. Very early seizures have generally been observed where the hereditary

predisposition has been strong. In the two cases just alluded to it existed in both parents, and in one of them there was great precocity of intellect. In some cases, where the disease appeared very soon after puberty, premature or excessive venereal indulgences seemed to me to have aided in its production.

31. *c. The male sex* is much more disposed to gout than the female. HIPPOCRATES mentions the non-liability of females until the cessation of the menses. This, however, is not correct; for cases occur at an early age in the plethoric through indolence and high feeding, and in those who have not had children. I met with an instance of it in a female of 27 years of age, who was thus predisposed. Dr. GREGORY observed, in his lectures, that females subject to gout had experienced menorrhagia, or had become plethoric from ingurgitation; and Dr. CULLEN has remarked that robust and masculine females, before the menses have ceased, or those in whom they have been very abundant, are not infrequently attacked. The instances of gout which I have seen in this sex, previously to the change of life, have been chiefly in those who had suffered frequent or excessive menstrual evacuations, who had lived very fully and indolently, and who had not been pregnant. The relative immunity of females is evidently owing to their temperance, to their periodical evacuations, and to the discharges and secretions connected with child-bearing.

32. *d. Habit of body and temperament.*—Gouty persons are said to have capacious and circular chests, with large full veins, and loose solids; but to this rule there must evidently be numerous exceptions. SYDENHAM remarks that the gross and corpulent, and those with large heads, are most frequently affected. J. P. FRANK states that the *gouty conformation* consists of a large and full body, voluminous head, large bone, and thick skin. Sir C. SCUDAMORE found that of 226 males, 64 were tall and corpulent, 41 middle height and corpulent, 25 short and corpulent, 28 middle stature and bulk, 14 tall and middle bulk, 21 short and middle bulk, &c.; and that of 28 females, 9 were tall and corpulent, 8 short and corpulent, 4 middle height and corpulent, and 4 short and slight. Corpulence usually precedes the disease, and often increases with the progress of it. The gouty generally possess good constitutions, abused by indulgence. The sanguineo-nervous and irritable temperaments are the most liable to be attacked by gout, although other diatheses may be also affected. CADOGAN ascribed gout to three causes, which generally act conjointly, namely, *indolence*, *intemperance*, and *vezation*. Taking these in their wide signification, their importance cannot be controverted. In whatever *station of life* they prevail, particularly indolence and intemperance, gout will appear as one of the most frequent results; hence it is not infrequent in butchers, innkeepers, and publicans; and in butlers, coachmen, and porters in wealthy families, as well as in the more easy classes of society. It is, in short, met with in all occupations which conduce to inactivity and repletion.

33. *c. Venereal excesses* are among the most unequivocally predisposing causes, especially if associated with the intemperate use of animal

food and of wine; for while the former species of excess exhausts the nervous power, the latter occasions plethora, and both combine to impair the functions of digestion, assimilation, and excretion; hence the ancients said that gout was the daughter of Bacchus and Venus. The wines which favour most the production of gout are Champagne, new port, and the clarets; but other wines have more or less influence, and are more productive of the disease than malt or spirituous liquors.* Strong malt liquor disposes to it even more than spirits. Dr. CULLEN justly remarks that gout never attacks those following laborious occupations, or who live chiefly on vegetable food, or use neither wine nor other fermented liquors. SCHENCK, VAN SWIETEN, and other authors have adduced numerous instances of persons who, during a life of luxury and indolence, had been subject to this disease, but had never afterward suffered from it when their circumstances required them to live abstemiously and laboriously. In countries where animal food and vinous or intoxicating liquors are little used, gout is almost unknown. The habit of partaking of a great quantity or variety of animal food is not less influential than other kinds of intemperance in causing the disease. Severe study has been considered to predispose to it; but this cause is merely apparent or indirect, others of a less doubtful kind also existing. The depressing passions are not without influence, inasmuch as they weaken nervous energy and the functions of digestion and excretion. A cold and variable climate favours also, in some degree, the formation of the gouty diathesis; and the changeable weather in spring and autumn, and the cold winds and humid atmosphere of these seasons have a similar effect. The disease is comparatively rare within the tropics, unless among those who have indulged in those habits which are most influential in predisposing to it; and yet two of the severest cases I ever saw occurred nearly under the equator in Africa.

34. *f.* Functional disorder of the digestive organs is one of the most universal causes of gout. Many of the causes already noticed, and of those about to be mentioned, act partly by weakening these organs and favouring congestion of, or inflammatory determination to the mucous surface. It is not, however, a state of inflammation of this surface, but rather of vascular erethism, that is thereby generated. Hence the appetite, instead of being impaired, is often increased; and the patient is prompted to take more food than the stomach and collatitious viscera can digest and assimilate. When the appetite is impaired, owing to the digestive mucous surface having assumed a more inflammatory state, frequent attempts are but too often made to excite it by stimulating and savory articles of diet; and the mischief is thereby augmented. Even where func-

tional disorder only exists, inflammatory irritation is superadded, attended by the severer symptoms of indigestion; by acrid eructations; by painful distention and soreness of the epigastrium; by congestion and impaired action of the liver; by interruptions of the passage of bile into the duodenum, accumulations of it in the gall-bladder and ducts, and a redundancy of its constituents in the blood; by acidity of the *prima via*, and an imperfect elaborated or unhealthy chyle; and ultimately, as will be hereafter shown, by a morbid state of the circulating fluids. But these are merely accessories to the formation of the gouty diathesis; other conditions, particularly vascular plethora, being also required; and this state, with the various other elements of the gouty constitution, is that which is generated, in a greater or less degree, by the causes now passed in review.

35. *ii.* *Exciting Causes.*—While the foregoing causes act chiefly in generating the gouty constitution or predisposition, those about to be mentioned are mainly concerned in exciting or developing the paroxysm. The sudden repletion and inflammatory excitement of the vascular system, in connexion with irritation of the digestive mucous surface, produced by excessive indulgences at the dinner-table, frequently occasions a fit in a few hours, when the morbid diathesis is already formed; and when the excess is repeated, particularly in quick succession, the morbid effect rarely fails to take place. Champagne excites an attack more certainly than any other wine. A lady under my care, and who had not passed her thirtieth year, always suffered more or less on the following day, after taking a single glass of Champagne; but the excessive use of any wine, especially if new or of inferior quality, will produce a seizure. The use of malt liquor during dinner, and of port wine afterward, will excite it, if active and regular exercise be not taken. Strong malt liquors and spirits will often have a similar effect, especially if much animal food be habitually eaten. It is not only indulgence in wine or other exciting liquors, or the admixture of them, that is injurious; for a great quantity and variety of animal food, and of highly-seasoned dishes, which they excite the stomach to receive until it is overloaded, are equally prejudicial. Acidity of the *prima via*, from the imperfect digestion of the mass of different substances partaken of, inflammatory irritation of the digestive mucous surface, disorder of the biliary secretion and excretion, vascular plethora excessively or suddenly increased on each of such occasions, and the accumulation of excrementitious and irritating matters in the blood, are the common consequences of these indulgences. In many cases, not merely acid, but acrid or acro-rancid combinations are formed by the imperfectly digested substances and the disordered secretions poured into the alimentary canal; and these increase or perpetuate the irritation of the mucous surface, while they exert upon the organic nerves a noxious influence, which is more or less manifested throughout the digestive circle, as well as the extreme parts of the frame.

36. Neglected or constipated bowels, and interruption of any of the excreting functions, will occasionally be followed by an attack, with-

* [Dr. ALISON remarks (*Outlines of Pathology and Practice of Medicine*, Am. Ed., Phil., 1844, p. 219) that "those who drink fermented liquors to excess, as the London coal-heavers, although in other respects, particularly as regards exercise, in circumstances generally favourable to avoiding the disease, are frequently affected by it;" and Dr. W. BUDD (*TWEEDIE'S Lib. of Med.*, 2d Am. Ed., iii., 587, Philad., 1842) states that "malt liquors tend, even more than wine, to produce a gouty diathesis," a remark which is confirmed by the experience of other accurate observers.]

out any cause having occurred that could have acted in any other way than this. Cold seems to operate, partly by suppressing the excretions, and partly by depressing nervous power. Its effects in exciting a paroxysm, whether applied to the general surface, or to the extremities, or to any part, are well known. Fatigue and external injury not infrequently produce an attack; and the injured part is usually the seat, especially in cases of sprains, contusions, or concussions. The passions of the mind, also, have no mean influence. All powerful mental emotions, whether exciting or depressing, will excite a paroxysm; but anger or vexation has this effect in a very remarkable manner. The ancients made Anger to be the midwife of Gout; and CADOGAN considered vexation, in its wide signification, as one of his three great causes of the disease. The depressing passions, particularly fright, severe grief, anxiety, &c., may either occasion an attack, or cause its retrocession, or give rise to a misplaced affection, or to some one of the irregular states of the disease noticed above, particularly in persons who have been formerly affected. Besides these, mental and bodily labour, especially when they abridge the requisite duration of sleep; the sudden cessation of habitual evacuations and excretions, as of the catamenia, hæmorrhoids, the *sutor pedum*, &c.; cold, flatulent fruits or vegetables, and acidulous liquors or beverages; sudden changes of diet or regimen; and whatever disorders the digestive and excreting organs, or suddenly impresses the nervous system, may excite the gouty paroxysm, either when the predisposition has been fully formed, or when an attack has been experienced. It is from a combination of two, or several, or even of many causes, that the disease is occasioned, especially if it appear independently of any hereditary taint. In a few instances, this taint seems almost sufficient to produce it, without the aid of any manifest intemperance. This remark was made by GALEN, and HALLER and others have confirmed it. Cases sometimes, also, occur of persons entitled by both parents to be subject to the disease, who have escaped it, although they lived intemperately. QUARIN states that he knew two brothers, sons of gouty parents; one of them lived soberly and laboriously, yet was horribly affected with gout; the other exposed himself to its common causes, and altogether escaped it; but these are rare exceptions from the general course of events. It appears that females frequently acquired gout in ancient times, inasmuch as SENECA (*Epist.* 95) mentions the circumstance as a proof of the depravity and luxury of his age.

37. V. THE PATHOLOGICAL CONDITIONS on which gout depends may be inferred from what has been already advanced as to its causes and phenomena.—*a.* The older writers imputed it to a peculiar morbid humour existing in the blood. This *materies morbi* has been somewhat differently explained. GALEN considered that it may be phlegm, or a mixture of phlegm and bile, or even blood, or all these, or simply a crudity of the circulating fluids; and that the gouty concretions arise from the crude humours. PSELLUS believed that it is a thick humour generated and collected by an atony of the nutritive faculty. ALEXANDER TRALLI-

ANUS contended that the defluxion of humours occasioning gout is various, according to the local changes and symptoms existing in different cases—that they are bilious, phlegmatic, melancholic, or even sanguineous; and that these occasion pain by getting between the tendons and ligaments, and distending and irritating them. AETIUS maintained the disease to arise from a redundancy of humours caused by weakness of the part affected. CÆLIUS AURELIANUS assigned the remote cause of gout with great accuracy, and explained its nature in a nearly similar manner to the preceding writers. PAULUS ÆGINETA considered that a preternatural humour and a weakness of the parts combine in producing the disease; and that the remote causes, which he enumerates very correctly, generate indigestion and a cacochymy, whence proceed various morbid humours, which are bilious, melancholic, or sanguineous, but, for the most part, pituitous and crude, owing to excess of food and want of exercise. He attributed tophi, or chalk-stones, to thickness and viscidty of the humours, and the chronic or protracted forms of the disease to the admixture of several of these humours.

38. The doctrine of the humours, and the manner they give rise to arthritic complaints, have been fully explained by MACROBIUS (*Saturnalia*, vii., 4). Mr. ADAMS, in the learned notes to his translation of PAULUS ÆGINETA, remarks that the theory of the humours, notwithstanding its being at present in little repute, accords better with the phenomena of the disease, and is a more successful guide to practice than any hypothesis recently advanced. A similar preference to it has been given by SPRENGEL. It should also be mentioned that the ancients, particularly those just noticed, recognised the hereditary character of the disease, and peculiar diathesis of gouty persons. The opinions of the Arabian writers are not materially different from those just stated. The most interesting production on the disease that has appeared was written by DEMETRIUS PERAPOMENOS, about the middle of the 13th century, and was published at Paris in 1558. He states the remote causes of gout to be long-continued indigestion, repletion with food, drinking too much wine, venereal excesses, indolence or unaccustomed exertion, and retention of the natural secretions; the venereal excesses, especially, weakening the tone of nervous parts. These causes give rise to imperfect digestion, and the accumulation of excrementitious superfluities requiring to be evacuated from the system. When these excrementitious matters are retained, morbid humours are produced and collected in the affected joints. This very ingenious writer farther remarks that, when crudities or morbid humours are formed in the system, those parts which are vigorous cast them off; but that those that are weak are unable to accomplish this; and hence collections of such humours take place in them.

39. *b.* Many of the writers of the 16th, 17th, and 18th centuries were induced, by the appearance of the urine, and the concretions formed in the joints, to account for the phenomena of the disease upon chemical principles. PARACELSUS first, and HOFFMANN and others long afterward, ascribed the local and constitutional affections to the presence of tar-

taric salts in the blood: an opinion very generally adopted until the middle of the last century. More recently, FORBES, PARKINSON, WOLLASTON, HOME, BRANDE, and others have endeavoured to show that there is always a redundancy of uric acid in gouty persons; and, as will be shown hereafter, there can be no doubt that the constituents of this acid exist in them in excess. But this species of change is merely one of the elements of the gouty condition. The connexion of the disease with plethora was very justly insisted on by Dr. CULLEN; and Dr. PARRY conceived that the paroxysm had a salutary influence in reducing a plethora relatively great, in restoring the balance of the circulation, and in determining the blood from internal and vital parts to the extremities. Here, again, is a part adduced for the whole of the mischief. Dr. SURTON supposed that the cause of disorder is seated in the alimentary canal; but he attempted nothing beyond this very indefinite explanation. BROUSSAIS is more precise, if he be not more correct, in stating gout to be one of the several morbid manifestations depending upon inflammatory action in the gastro-intestinal mucous surface. In this opinion he has been pretty closely followed by ARMSTRONG, MACKINTOSH, and several writers of his own country. Dr. BATEMAN, Sir C. SCUDAMORE, and Dr. BARLOW have ascribed the disease to vascular plethora. Dr. BARLOW, especially, insists upon its inflammatory and plethoric nature, but pushes his doctrine too far; while he overlooks the connexion of plethora with other morbid conditions.

40. c. It is indispensable to a correct view of the subject, to comprise all the elements forming the constitutional and local affections to which the term gout has been applied. If we analyze the numerous phenomena preceding, constituting, and following the disease; if we connect these with the causes most essential to their production, and if we refer to those agents which increase or diminish the severity of the symptoms, we must necessarily arrive at the conclusion that gout does not depend upon one morbid condition only, but upon several; that neither the superabundance of excrementitious matters in the blood, arising from imperfect or effete assimilation—from the ultimate results of animalization; nor vascular plethora, absolute or relative; nor gastro-intestinal irritation; nor gastro-hepatic disorder, is individually sufficient to explain all the changes constituting the disease; although they may be sufficient, when viewed in connexion. But, even when thus considered—especially if we push the analysis sufficiently far—some antecedent and concomitant lesions must be inferred. If we view the several causes in the connexion and succession in which they usually give rise to gout, we must necessarily conclude that the organic nervous energy is impaired or exhausted by them; and that, as the organic class of nerves bestows its influence on the digestive, the secreting, and excreting functions, exhaustion of its powers will impair the functions of the organs which it supplies. The necessary consequences of such impairment will be imperfect digestion and assimilation, torpor of the liver and bowels, impeded and disordered secretion and ex-

cretion, redundancy of excrementitious matters in the circulation, and vascular plethora, arising from deficient excretion, and from a continued supply of nourishment, aided by a stimulated appetite. These may be viewed as the elements of the gouty constitution or diathesis; and, when it is formed, the local action will be excited by either, or by several, of the causes mentioned above (§ 35, 36). That most of these causes affect the organic nervous influence more or less directly, is shown by the impaired or otherwise disordered functions of the organs more especially endowed by this system. To functional disorder and morbid sensibility succeed the accumulation of effete and irritating matters in the blood, and excited vascular action, either local or general, or both. These matters aggravate the morbid sensibility and irritation, particularly in situations most prone, by previous disorder or debility, to experience either or both.

41. It is, however, not easy to explain satisfactorily wherefore the morbid action should manifest itself in the extremities, and assume peculiar characters, otherwise than by referring both circumstances to the previous change produced in the system—to the antecedent diathesis, either original or acquired; and to the morbid condition of the nerves, and of the exhalations and secretions of parts most remote from the centres of nervous power and of circulation. Weakness of the remote nervous ramifications will necessarily influence the circulation and secretions of the parts which they supply; and when the blood abounds with excrementitious matters, the exhaled and secreted fluids will necessarily possess preternatural or morbid properties, which will affect the sensibility of the extreme nerves, and irritate the tissues in which they are deposited. There are various phenomena, especially the sudden transition of the affection—which is sometimes as quick as electricity—from one part to another, that cannot be explained otherwise than by referring them to the organic nervous system. If we consider the intimate connexion that exists between this system and the rest of the economy, and particularly the influence which it exerts upon the vascular system, which it supplies throughout, and view both in their intimate relations with one another and with the rest of the frame—if we contemplate them as intimately interwoven together—as possessing numerous and diversified communications with all the viscera and compound structures—we shall easily conceive that the altered sensibility existing in one part of this nervous circle may readily be transferred to other and distant parts, with the varying state of nervous influence, and with the several causes which may suppress it in its existing seat, or drive it to other organs; that a change in the state of the organic nervous influence, when preternatural or intense, may very obviously affect the capillary circulation and vascular action; and that, both nerves and capillaries being thus affected, the exhalations and secretions of the part will be also changed, particularly when the fluids circulating to it are in excess, or abound with excrementitious matters; the alteration of the fluids, both circulating and secreted, exalting the morbid sensibility and vascular irritability, and perpetuating the suf-

fering until the cause is removed or both conditions are exhausted.

42. If this view be correct, several disputed matters connected with the disease will be more readily explained. For when the predisposition or diathesis is formed, and the organic nervous influence is morbidly affected in one or several parts, and the vascular system is inordinately repleted, causes affecting either the one or the other will not infrequently transfer the morbid action from one seat to another. The local affection of gout being the external manifestation of a constitutional disease, the suppression of it in one part will often be followed by its appearance in another; and its spontaneous extension to a new situation will as frequently derive it from its former seat; for as long as the constitution continues in fault, nervous power being impaired, the vascular system overloaded, and the blood abounding in excrementitious matters, some organ must experience more or less prominent disorder. This view of the nature of gout farther enables us to account for the primary seizure of an internal part or viscus; for, in proportion to the deficiency of nervous power, or to the abundance or vitiation of the circulating fluids, or to the weakened or congested state of some viscus, will the disposition to a misplaced or lurking form of gout exist; the vital manifestations being incapable of developing the disorder in the extremities, owing either to their impairment, or to the extent of the derangements just mentioned, or to both circumstances conjoined.

[Dr. PROUT has made it appear in the highest degree probable that *urea* and *lactic acid* are chiefly derived from the decomposition of the gelatinous textures of the body, and *lithic acid* and its compounds from the albuminous principles, not only of the chyle and blood, but also of the albuminous textures. He supposes, also, that when, on account of the imperfect assimilation of alimentary matters by the stomach and primary assimilating processes, the chylous principles are not raised to that standard of perfection by which they are fitted to become component parts of the blood, the healthy kidney possesses the power of selecting and disorganizing such imperfectly developed chylous matters, and of converting them into the *lithate of ammonia*, which he thinks is the origin of most of the common *yellow* amorphous sediments occurring to healthy individuals from slight errors in diet, &c. Now, as *lactic acid* is believed by Dr. PROUT to be the characteristic feature in *rheumatism*, so also he supposes the *lithic acid*, developed principally during the mal-assimilation of the albuminous textures, to be the characteristic feature in *gout*; and that when the *lactic* and *lithic acids* are developed together, as they often are, showing that the mal-assimilation involves both the gelatinous and albuminous textures, the accompanying disease partakes of a mixed character, constituting what may be properly called *rheumatic gout*, a form of disease which is more deep-seated and obstinate than either *gout* or *rheumatism* alone. According to these views, as he has remarked, the *lactic* and *lithic acids*, considered with reference to *rheumatism* and *gout*, may be regarded somewhat in the light of *matrices morborum*; or, strictly speaking, the undue presence of these acids in the urine or elsewhere, under

certain circumstances, may be viewed as indices of the existence of certain diseased actions going on in the primary tissues of the body, and which are known by the names of *rheumatism* and *gout*.

If we compare the symptoms of these diseases with those described under the article GLANDERS, which are acknowledged to be produced by the introduction of a morbid poison into the blood, the above views of Dr. PROUT will not appear altogether groundless or improbable. The early phenomena of that disease (glanders) closely resemble those of rheumatic gout; the pains and swellings of the large joints, with copious perspirations of offensive odour, are among the first symptoms; and Dr. WILLIAMS records a case, admitted into St. Thomas's Hospital, of London, which was actually mistaken for rheumatism (*On Morbid Poisons*). "Acute glanders in the human subject," says this writer, "is ushered in by an attack of primary fever, with or without rigours. This is followed by pains in the limbs, so severe as often to be mistaken for an attack of acute rheumatism." A consideration of these and other facts has inclined us to believe that, both in *gout* and *rheumatism*, general nutrition is disturbed, not by mere local disease, nor by an impression on the nervous system, but by the development of a morbid matter in the blood, which visits every part to which that fluid is distributed, but which is attracted by some textures much more than by others, but is, from unknown causes, subject to be suddenly repelled upon other tissues, and those, too, of a more vital nature.

It is also the opinion of Dr. WILLIAMS (*Principles of Medicine*, Philad., 1844) that *gout* depends on the production in the system of an excess of *lithic acid*, which, being a highly azotized compound, is abundantly generated in those who take a large proportion of animal food, and in whom the digestive and assimilative processes are impaired. Hence it is produced by high living and sedentary habits. As it is one of the lower forms of animal matter into which the higher principles, fibrin, albumen, gelatin, &c., tend to pass in their progress towards dissolution, hence it is produced in excess where there is more azotized matter than is wanted for the reparation of the textures, or than the vital assimilating powers can appropriate for this purpose; but as PROUT remarks, it results also from the decay of the textures, especially during febrile or inflammatory irritations, during and after which copious deposits of the lithates are seen in the urine. According to this able pathologist, the morbid effects of an excess of *lithic acid* will vary considerably, according to its amount and other circumstances. The kidneys being the proper excretories by which it is eliminated from the blood, these organs sometimes suffer from the irritation which it causes; hence *nephralgia* and *nephritis* may occur; or the water and alkali secreted with it in the urine may be insufficient to hold it in solution, and it may be deposited in the form of sand or gravel, or calculus in the kidneys or bladder, and various irritations and obstructions in the urinary apparatus may be the result. "But sometimes," Dr. W. remarks, "the kidneys may fail in their power of elimination; the *lithic acid* and its compounds thus

accumulate in the blood, and may cause various irritations and functional derangements (irregular gout), until at length some circumstance fixes the irritation on a limb, and a fit of regular gout is the consequence. In this fit, if perfect, inflammation is exerted with more or less febrile disturbance, which subsides as a copious deposit takes place in the urine, showing the removal of the morbid matter. The more acute and fixed the inflammation, and the smarter the fever, the more abundant is the deposit, and the more free is the patient from disease afterward. On the other hand, when the inflammation is low, changing its place, and with little fever, it generally carries long, and the system is not relieved. It is when gout thus lasts long, or frequently recurs, that often its material so accumulates in the joints as to be deposited in the form of a plastery or calculeous matter, consisting of *lithate of soda* (chalk-stones of gout). This chronic form of gout is connected with a more or less permanent disorder of the digestive or assimilative functions, which renders its treatment more difficult or less successful than that of the more acute forms of gout. In such cases (chronic) *lithic acid* seems to be engendered in great abundance, being often thrown off in large quantities in the urine for an indefinite period, yet never leaving the body free. Such cases are commonly either hereditary, or those which have been rendered inveterate by intemperate habits or neglect of proper treatment.*—(*Loc. cit.*)

The hypothesis that gout is caused by the presence of *lithic acid* in the blood, was proposed near the end of the last century by Mr. MURRAY FORBES, who supposed that this agent was prone to become deposited in the small vessels of tendons, ligaments, &c., under the influence of some stronger acid, either taken into the stomach or formed in the process of digestion. Dr. TODD, however, who admits that the same causes which favour the development of the lithic acid diathesis will promote the gouty one—that indolence, good living, want of exercise, deficient cutaneous action, are equally favourable to the production of both states of constitution; and that the lithic acid diathesis is that which passes most readily into

* [According to LIEBIG, whose theory is advocated by Dr. BENGE JONES, the presence of *lithic acid* in the system is due to the deficiency of oxygen; and in the natural state, under the influence of a due supply of oxygen, this substance nearly or altogether disappears, being decomposed by oxygen into urea and carbonic acid; so that in healthy urine its quantity is very small, and in the carnivorous animals, which are largely supplied with oxygen, it disappears altogether. He supposes the free acid, which exists in the system, to be *lactic acid* derived from the stomach, and that this and other non-nitrogenous compounds present in the blood attract the oxygen, and hinder its action upon the lithic acid. (*Lithic acid*, LIEBIG believes, is formed from blood or muscular fibre by the action of oxygen and water; for, he says, the elements of *lithate of ammonia* and of *cholcic acid*, with one equivalent of water and one of oxygen, make up the formula of blood.) For objections to this theory, the reader may consult TODD, "*On Gout and Rheumatic Fever*," p. 69.

The *British and For. Med. Review* (vol. xvi.) suggests that *lithate of soda* is the morbid agent, because this substance is separated from the blood in gouty deposits, from the known connexion of gout with biliary as well as urinary derangements, and from the beneficial results of treatment directed to both these secretions. "Under the influence of particular substances," it remarks, "*lithic acid* has a tendency to accumulate in the blood; and it seems to us quite possible that, so long as it retains its uncombined form, gout may not result; but if, by a deficiency in the secretion of bile, *soda* also be allowed to accumulate, the two will combine, and *lithate of soda* will be formed."

the gouty—nevertheless is of opinion that the presence of an undue quantity of lithic acid in the system, even although accompanied with the formation of a free acid, is not sufficient to account for the formation of gout, as we meet with many instances in which these conditions are present, even for a considerable period, without giving rise to any of the symptoms of gout. Brickdust sediments, he remarks, are among the most common of those that are found in the urine: "a slight disturbance of the digestive process, or a febrile cold, will increase the quantity of lithic acid; in young persons such sediments are very common; in fevers they appear, at first, in the urine, then disappear, and their reappearance sometimes seems critical. In none of these cases do symptoms of gout occur, even when the disposition to the deposit is of long duration. I have known these deposits to show themselves for weeks and months without producing any symptom of gout. In hysterical women, the lithates and lithic acid are deposited in large quantity; and in diseases of the liver, chronic as well as acute, the proportion of this acid is very much augmented." According to this writer, an adequate theory of gout should explain, 1. The frequent accompaniment of a large quantity of lithic acid with the disease; 2. The occasional occurrence of gout, when this acid cannot be formed in undue quantity, as in the cases of gout appearing in low states of the system; 3. It must account for the formation of a large quantity of free acid in the system, as appears from the undue acidity of the digestive organs and the sweat; and, lastly, it must explain the pathognomonic character of the disease, namely, the formation of lithate of soda in various parts of the body. In the present state of our knowledge, Dr. T. thinks it impossible to determine the correct theory of gout; but that it appears highly probable that the gouty matter is, in the first instance, derived from the stomach or duodenum, inasmuch as a disturbance of the functions of those parts is an invariable antecedent or accompaniment of the fit; and as such derangements are generally accompanied with an undue development of *lactic acid*, he deems it fair to conclude that it may be the primary disturbing agent. If the views of this writer are to be received, we are then to believe that the matter of gout is a compound, derived from a product of unhealthy action of the stomach and duodenum, which being absorbed into the blood, unites there with some element of the bile which has been suffered to accumulate through the defective secretory action of the liver. "As the same causes which induce these two states will give rise to a lithic acid diathesis, we find it usually associated with them. But the former may exist without the latter; and therefore gout may show itself without the occurrence, at the same time, of a preternatural quantity of lithic acid." Such an organic compound, he believes, may exist in the blood in variable quantity, and for an indefinite period, contaminating the whole frame, as well as the offspring, and thus give rise to the gouty diathesis; or this matter, ever present in the system, may be liable to periodical accumulations, which can only be got rid of by periodical paroxysms.

Our countryman, Dr. RUSK, has furnished

some able observations on this disease, characterized by the same boldness and originality of views as distinguish all his medical essays (*Med. Inq.*, vol. ii., p. 247). Defining it to be a disease of the whole system, affecting the ligaments, blood-vessels, stomach, bowels, brain, liver, lymphatics, nerves, muscles, cartilages, bones, and skin, he, nevertheless, held that it was a primary disease only of the solids; chalk-stones, dropsical effusions, &c., being only the effects of a morbid action in the blood-vessels, as maintained by CULLEN. The remote and exciting causes of the disease, which are pointed out with great minuteness by him, do not differ essentially from those given by COPLAND; he, however, supposes that females are quite as subject to gout, though not in the extremities, as males, and that *tea* is a powerful predisposing cause. He speaks of having treated it in the native American Indian, and of its occurring occasionally among those who make no use of fermented or distilled liquors. Its hereditary character he held to depend upon the propagation of a similar temperament from father to son, which sometimes passes over one generation to appear in the next. In every instance he believed it to be induced by general predisposing debility, which may have been occasioned by indolence, great bodily labour, intemperance in eating, excessive venery, acid aliments and drinks, strong tea and coffee, fermented and distilled liquors, grief, anxiety, and other depressing mental emotions, &c. That form of gout which appears in the ligaments and muscles, he supposed is always brought on by the use of spirituous drinks; and whatever form the disease assumed, he believed it to consist simply in morbid excitement accompanied with irregular action, or the absence of all action, from the force of stimulus, precisely as occurs in fevers. The doctrine of a specific acrimony, or morbid poison, he rejected as unphilosophical and improbable. This was in accordance with his general theory of disease, namely, that however varied morbid actions may be by their causes, seats, and effects, they are all of precisely the same nature. According to this writer, there is not a disease in the whole catalogue of nosology but what is mimicked by the gout, its symptoms being manifested in the ligaments, the blood-vessels, the viscera, the nervous system, the alimentary canal, the lymphatics, the skin, and the bones; in short, "it is an epitome of all diseases." Instead, therefore, of being a primary affection of the joints, Dr. Rush understood by the name, gout, a disease consisting simply in morbid excitement, invited by debility, and disposed to invade every organ and tissue of the body.—(See *Loc. cit.*)

43. VI. TREATMENT. — i. The *opinions of the ancients*, as to the treatment of gout, are in many respects as deserving of notice as those of modern writers; indeed, there is little difference between the views of some of the former on this subject and those of the latter. As at the present day, so in ancient times were cold applications to the part, and colchicum internally, advised by some and condemned by others; so also, as may be seen from the *Tragopodagra* ascribed to LUCIAN, were numerous nostrums lauded for the complaint, as well as a rational treatment pursued by the

regular practitioners of physic; and so also, as at the present day, the habits and irregularities of the patient brought discredit on the science of the physician, and led to the too general adoption of the opinion of OVID, that

"Tollere nodosam nescit medicina podagram."

44. HIPPOCRATES recommended purgatives by the mouth and by injection, and cooling applications to the part. In the more chronic cases, he advised means similar to the moxa of the Japanese. CELSUS also prescribed refrigerant applications to the affected part; but he likewise had recourse to warm fomentations conjoined with anodynes, and to depletions. ARETÆUS seems to have trusted chiefly to hellebore, and to applications of wool moistened with various substances, as oil, oxycrate, &c. GALEN commenced the treatment of gout by evacuating offending matters by bleeding and purging; he afterward had recourse to discutient applications. CÆLIUS AURELIANUS directed blood to be abstracted from the part by scarifications, and sponges squeezed out of hot water, or oil and water, or a decoction of fenugreek, to be afterward applied. He also prescribed gentle emetics and aperient clysters. He disapproved of burning the parts, and of the indiscriminate use of narcotics; but advised warm bathing, spare diet, emollient ointments, and afterward gentle exercise. He enjoined complete abstinence from the commencement of the attack; and at its decline he prescribed a medicine nearly the same as the Portland powder. ORIBASIUS confided chiefly in bleeding and purging, especially in plethoric persons, and in the spring. AETIUS evacuated redundant humours by these means, and afterward endeavoured to strengthen the parts.

45. ALEXANDER TRALLIANUS adopted a treatment which he viewed as appropriate to his pathology of the disease. In cases proceeding from a bilious humour, as indicated by burning heat and the absence of swelling, he prescribed chologogue purgatives, consisting chiefly of cathartics and bitters conjoined, and cooling anodyne applications to the affected parts, with spare diet. When occasioned by a phlegmatic humour, indicated by the absence of heat and redness, he considered calefacients to be beneficial, and refrigerants injurious, and recommended a combination of purgatives and attenuants, as hellebore, thyme, cumin, &c. After purging, he directed warm attenuants internally, and calefacient anodyne cataplasms to the external affection. When there was general fulness of blood, or determination to the affected joint, he advised blood-letting, and abstinence from wine and animal food, and discutients to the part. He has remarked that some insist upon taking medicines to allay at once the violence of their pains, not choosing to submit to a methodical treatment, but that he does not approve of this practice. For this purpose, he adds, the *hermodactylus* is particularly trusted to; and he admits that it seldom fails to remove a paroxysm; but he also affirms that it occasions more frequent returns of it. The identity of hermodactylus and colchicum is highly probable, as maintained by PROSPER ALPINUS, Sir H. HALFORD, and others. ALEXANDER has farther stated that some endeavour to correct the prejudicial effects of this medicine by adding to it cumin, mastic, or ginger,

thinking that its action is narcotic ; but this he affirms to be a mistake, for in that case it could not prove cathartic. He admits, however, that these things may correct its bad effects upon the stomach ; and he therefore prescribes a combination of the hermodactylus with aniseed, pepper, and myrrh, or with aloe, scammony, elaterium, colocynth, &c. He preferred, however, the *coronopodium* (which Mr. ADAMS, in his learned commentaries on PAULUS, believes to be the buckthorn plantain, or *plantago coronopus*), as it procures evacuations and relief from pain without injuring the stomach.

46. PAULUS ÆGINETA advised a nearly similar method to that adopted by ALEXANDER. He employed chologogue purgatives for the evacuation of bilious humours, when he inferred gout to arise from this cause ; and numerous cooling and anodyne cataplasms to the affected part, with a refrigerant and diluent diet, avoiding repletion and the use of heating dishes or liquors, as well as mental emotions and venereal indulgences. In the sanguineous form of the disease, and in the first attacks, he enjoined blood-letting and purgatives ; the latter consisting chiefly of a combination of colocynth, aloe, black hellebore, and scammony. Some, he has remarked, have recourse to purging with hermodactylus ; but it is bad for the stomach, producing nausea and anorexia, although it removes the disease very speedily. In gout from a mixture of humours, he also had recourse to depletions in early attacks ; but, after frequent seizures, he considered the loss of blood injurious. Besides these, he directed a variety of both internal and external means, many of which deserve adoption, and are similar to those hereafter to be noticed. With respect to *prophylaxis*, he advised a moderate use of wine, exercise, and frictions of the joints, morning and evening, with oil triturated with salt.

47. The opinions of the Arabian physicians differ not materially from those of the Greeks. SERAPION, AVICENNA, and RHASES recommended evacuations and the hermodactylus. HALY ABBAS directed blood-letting in cases proceeding from sanguineous plethora, and used cooling applications to the joints. For the bilious defluxion, he prescribed emetics and drastic purgatives, consisting of scammony, aloe, colocynth, and hermodactylus ; and, for the serous or phlegmatic defluxion, very nearly the same means, the local applications being varied. The treatment adopted by ALSAHARAVIUS was almost identical with that pursued by ALEXANDER, PAULUS, and HALY ABBAS.

48. DEMETRIUS PEPAGOMENOS has justly remarked that the *prophylaxis* of gout is easily prescribed, but followed with great difficulty. It consists in great moderation in eating and drinking, and in avoiding indigestion. Viewing the disease as one of repletion, he ordered evacuations for its cure, consisting of emetics, blood-letting, and purgatives, and with a very judicious reference to the form and stage of the disease. He forbade the use of strong emetics ; but vomiting by gentle means he had recourse to at the commencement. In early attacks, and at their beginning, when there was evidence of plethora, he prescribed blood-letting ; but he considered it prejudicial in other circumstances, or much inferior to active pur-

ging. He was favourable to the use of hermodactylus as a purgative, and combined it with aromatics. In other respects his treatment was similar to that of ALEXANDER.

49. The reader will observe, from what has been just stated, how little has been added to our knowledge of this subject by the numerous productions that have appeared since the revival of learning in Europe ; and that, although there is much that is trifling, a little that is absurd, and something that is questionable in the doctrines and treatment of gout adopted by the ancients, there is also much deserving of commendation and adoption.

50. ii. *Treatment of Acute Gout.* — The indications are, 1st. To avert a threatened attack ; 2d. To alleviate the symptoms during the paroxysm ; and, 3d. To prevent the return of the disease, by suitable regimen and medical treatment, after the paroxysm has ceased. — A. In order to avert, or to render more mild a threatened attack, the *premonitory symptoms* should be treated promptly and judiciously. Much suffering and injury to the constitution have arisen from the idea that the paroxysm is a salutary effort of nature, and that the prevention of it may be followed by serious consequences. There is, however, some truth in the opinion, for, as I have shown, the external affection being the outward manifestation of constitutional disease, the suppression or prevention of it in an external part may lead to results still more severe than the impending attack. But it is the suppression of the paroxysm by means which leave the constitutional disorders untouched, or which increase them, that is injurious, and not the prevention of it by remedies directed to the removal of these internal disorders themselves in which the attack originates. A large dose of an acro-narcotic, as of colchicum, veratrum, or veratria, aconitum, &c., has often the effect of suppressing the morbid sensibility, and with it the irritative vascular action of the seizure ; and thus frees the patient from the impending suffering for a time. But it leaves the internal disorders, of which the external is merely a part, in the same state as before, or even increases them ; inasmuch as it tends to weaken organic nervous power, to irritate the digestive mucous surface, and to impair the functions of excretion ; and the consequence is, either a more frequent return of the precursory symptoms of the attack, or the supervention of some serious visceral disease. The means, therefore, to be had recourse to, in order to avert the paroxysm, should be those only which are calculated to remove the internal derangements, in which it originates. These derangements we have seen to be, weakened organic nervous power ; a torpid state of the functions of the liver, with accumulations of bile in the biliary passages and liver ; congestion of this viscus ; fecal accumulations in the large bowels ; collections of mucous sordes on the digestive mucous surface ; vascular erythsm, or inflammatory irritation of the surface ; and the superabundance of excrementitious matters in the circulation. Means, therefore, which will remove these conditions, and prevent their recurrence, will the most effectually avert both a threatened paroxysm and a return of the disease.

51. Guided by those views, general *blood-let-*

ting may be employed in robust and plethoric persons. If signs of congestion of the head or of the liver be present, or of inflammatory irritation of the digestive mucous surface, local depletions may be substituted, or used in addition to the general evacuation. The quantity of blood taken away should depend upon the age and strength of the patient, and other circumstances of the case. Hæmorrhoidal or other spontaneous evacuations ought to be encouraged by aloetic purgatives, &c. If the tongue be much loaded, and if heartburn, acrid eructations, or nausea be complained of, neither pain nor tenderness of the epigastrium being present, an *emetic* will generally be of service. But if vascular depletion be indicated, it should be premised. Emetics have been recommended by CELSUS, FABRICIUS, HILDANUS, GESSNER, STOLL, SCUDAMORE, and others; they will be found most serviceable as here advised; in other circumstances they are doubtful means, and require much discrimination. If indigestible matters remain in the stomach, emetics should not be withheld; but when there are pain and tenderness at the epigastrium, with determination to the head, they may be injurious. In almost every case, *purgatives* should be prescribed, although the bowels may have been said to be regular or open; for collections of morbid secretions in the biliary organs, and of fecal matters in the cells of the colon, may nevertheless exist. Therefore a full dose of *calomel*, with *camphor* or with JAMES'S *powder*, or with both, may be given at bedtime, and a stomachic purgative the following morning. The draught here prescribed I have found most efficient, especially when the bowels are very sluggish; and the frequent repetition of it is attended by no disadvantage:

No. 233. R Infus. Gentianæ Comp., Infus. Sennæ Comp., ãã ʒj.; Magoes. Sulphatis ʒjss. (vel Sodæ carbon. ʒj.); Tinct. Cardamom. Co. et Tinct. Sennæ Comp. ãã ʒjss. M. Fiat Haustus, quamprimum mane sumendus.

52. If the excretions continue to present or assume morbid appearances, a small dose of blue pill, or of hydrargyrum cum creta with soap, or a full dose of calcined magnesia, should be taken at bedtime, and the above draught in the morning, until they assume a natural character. If the precursory symptoms continue nevertheless, I agree with Sir C. SCUDAMORE in considering that the constitution is labouring under the causes of the paroxysm, almost as much as if the attack had been developed, and that the treatment required during the paroxysm should be resorted to. If the means here recommended restore the functions to a healthy state, abstinence or moderation in diet, regular exercise, especially on horseback, mental quietude, and early hours, should be strictly observed.

53. B. The *Treatment of the Paroxysm* should be varied according to the age, strength, and habit of body of the patient, to the predisposing and exciting causes, to the duration and characters of the paroxysm, and to the frequency and severity of the previous seizures.—*a. Blood-letting* is required in the plethoric and robust, and in early attacks, when the constitution is unbroken, and the inflammatory diathesis evidently exists. In these circumstances, it has been advised by CELSUS, GALEN, ALEXANDER, HORSTIUS, RIVERIUS, JUMELIN, LE TELLIER,

SYDENHAM, PATTEN, HUXHAM, CULLEN, HOSACK, MUSGRAVE, MACBRIDE, DE VERNEVILLE, HEBERDEN, SCUDAMORE, &c. It has been too strongly insisted upon by HAMILTON, RUSH, and BARLOW, while it has been considered injurious by TRAMPEL, BARTHEZ, HALLE, and GUILBERT, unless when the inflammatory action is very manifestly developed in some internal organ; or in strong plethoric persons, when the general vascular excitement is very great. The practitioner should be guided as to the extent of the depletion by the circumstances above alluded to; keeping in view the fact that the disease is one more of irritation than of inflammation; that the vascular excitement is, in great measure, the consequence of the morbid sensibility, and will subside as it is subdued. *Local depletions* are often preferable to general blood-letting, particularly when tenderness or fullness of the epigastrium or hypochondria is present, and will generally be sufficient to remove hepatic congestion and vascular excitement of the gastro-enteric mucous surface. When blood-letting is clearly indicated, it should not be delayed, as the benefit it is calculated to afford will be diminished very materially by delay, the debility consequent upon unmitigated irritation rendering the deferred depletion of little or no avail.*

54. *b. Alvine evacuations* are of less doubtful efficacy even than vascular depletion. *Emetics* are sometimes of service at the commencement of the paroxysm, when the symptoms indicating (§ 51) the propriety of resorting to them are present. In some cases they mitigate the attack, while in others they have little or no effect upon it. They ought to be employed with caution. When the case requires both vascular depletions and an emetic, the latter ought not to be exhibited until the former has been carried into effect. *Purgatives* are of the most unequivocal benefit. Many of the empirical remedies employed against the disease are serviceable only in as far as they increase the alvine excretions. As vascular congestion of the liver and accumulations of

* [We have found mild antiphlogistic measures generally sufficient to relieve gouty attacks, and blood-letting rarely required unless in a very plethoric state of the system, and when the fever is high: we should bear in mind that there is danger in carrying this remedy too far, from its tendency to prevent a crisis. Local blood-letting will rarely be called for, as the inflammation will, in a large majority of cases, speedily subside, by keeping the part warm and still; by covering it with cotton, wool, or oiled silk; or by the application of soothing lotions. As a general rule, we are satisfied, from considerable experience, that the antiphlogistic treatment of gout should be of the mild kind, as purgatives, calomel, or blue pill, combined with antinomy or saline medicines; but no permanent relief will take place until the urinary deposits commence. Venesection we hold to be admissible but in certain cases, and under the circumstances pointed out by our author. Dr. BARLOW, of Bath, England, referring to the states of the system under which gout is developed, maintains the existence of three kinds of *plethora*, one in which the nutritious function is redundant without much affecting the self-adjusting powers of the system, or without much diminution of the excreting functions; the second, with some diminution of the excreting functions taking place, chiefly in constitutions deficient in natural vigour, or impaired by predisposition to disease; and the third, with impaired action of the excreting functions, indicated by sallow, dingy complexion, harsh, dry skin, slow, inert, and constipated bowels, and high-coloured, fetid urine. According to Dr. B., acute or regular gout occurs in connexion with one or other of the first two forms of *plethora*, and these cannot be satisfactorily or effectually removed without the employment of blood-letting; he, accordingly, recommends that evacuation, both general and local, especially in young persons or those of middle age, and of average vigour of constitution.]

bile in the biliary passages are often connected with the production of the fit, such purgatives as promote the circulation in this organ, and increase its excreting function, should be selected. With this view, from five to ten grains of calomel, with four or five of JAMES'S powder, may be given at bedtime, and the draught prescribed above (§ 51) early on the following morning. If these do not act in the course of a few hours, a dose of magnesia, and of sulphate of magnesia in any aromatic water, may be taken, and repeated until the bowels are freely opened. Purgatives were actively employed in gout by the ancients, *veratrum* and *hermodactylus* having been chiefly used with this intention. RHAZES advised a cathartic to be repeated eight times. RIVERIUS, RIEDLIN, THILENIUS, CADOGAN, and most English writers, have recommended them. SCHRÖDER preferred the preparations of rhubarb; and these, conjoined with magnesia, or any of the other purgatives in common use, may be prescribed. Sir C. SCUDAMORE prescribed the *colchicum* in the first aperient draught, giving from one to two drachms of the acetic preparation, neutralized by magnesia, and conjoined with the sulphate of magnesia. This medicine he repeats at intervals of four, six, or eight hours, according to its action and the urgency of the symptoms.* Although this is among the mildest of the preparations of colchicum, especially when its acetic acid is neutralized by magnesia, yet I have seen it, in this dose, productive of serious effects; and it is more likely to be injurious when it fails in acting upon the bowels; for in this case its influence is exerted upon the nervous system, and not upon the excreting functions, the morbid sensibility being partially suppressed by it, but the source of disorder remaining untouched. The consequences are, either a frequent return of the fits, or a continuance of the internal affections in aggravated forms, or the supervention of some one of the irregular states of the disease. Where biliary accumulation or congestion of the liver exists, a large dose of colchicum, unless conjoined with an active stomachic purgative, may, in the early stage of the paroxysm, so suddenly suppress it as to give rise to the serious affections alluded to under the head of retrocedent and misplaced gout (§ 18, 21). This is no supposititious case, for two such instances have fallen within my own observation, one of which has been already adverted to (§ 19).

55. In early fits of the disease, when much inflammatory excitement exists, *colchicum* may be conjoined with the cooling saline purgatives and with magnesia, as Sir C. SCUDAMORE advises; but the dose should be much less than just mentioned, and ought seldom to exceed half a drachm of any of the fluid preparations; and it should not be given more frequently than thrice in the day, until the effects are observed, as even in this quantity I have seen it have, in some constitutions, a very remarkable seda-

tive influence, producing even serious symptoms. In several persons, and three of these members of the profession, I have observed that even twenty drops of the mildest preparations of colchicum could not be taken without most distressing internal irritation, and a sense of sinking being produced. This effect still more frequently occurs in the atonic or chronic states of the disease. Therefore, when the patient is either advanced in life, or has suffered repeated attacks, or is possessed of weak constitutional power, the combination of colchicum with antacids, and warm stomachics, or the tinct. colchici compos., will be most appropriate; and either the infusion of senna or of rhubarb, or the decoction of aloes, may be added to them in such quantity as may be required to operate freely on the bowels.

No. 234. R Infusi Caryophylor., Infusi Sennæ Comp., ʒʒ ʒvj.; Magnes. Calcinatæ ʒj.; Vini Colchici ℥xxv. (vel Aceti Colchici ʒss.); Spiritus Pimentæ ʒss. M. Fiat Haustus, ter in die sumendus.

No. 235. Infusi Aurantior. Comp., Infusi Rhei, ʒʒ ʒvj.; Magnes. Carbon. ʒj.; Tinct. Colchici ʒss. (vel Tinct. Colchici Comp. ℥xxv.); Tinct. Cardamom. Comp. ʒj.; M. Fiat Haustus, sextâ quaque horâ sumendus.

No. 236. Decocti Aloës Comp. ʒvj.; Aquæ Menth. Virid. ʒivss.; Tinct. Colchici ʒss.; Spirit. Ammoniæ Arom. ʒj. M. Fiat Haustus.

No. 237. Sodæ Carbon. ʒss.; Vini Colchici (vel Tinct. Colchici Comp.) ʒss.; Infusi Sennæ Comp., Infusi Aurant. Comp., ʒʒ ʒvj.; Tinct. Lavand. Comp. ʒj. M. Fiat Haustus.

56. It will often be necessary, especially when the countenance is sallow or bilious, the hypochondria and epigastrium full, or tender on pressure, to exhibit on alternate nights, or even every night, a dose of calomel, or of blue pill, with JAMES'S powder. But care should be taken that the mercury does not produce its specific action, which very generally will be prevented by the active exhibition of the purgatives just mentioned. Where much febrile excitement exists, JAMES'S powder, or some other antimonial, with or without an anodyne, according to circumstances, should be prescribed; and if nervous power be much reduced, two or three grains of camphor may be either substituted for these, or conjoined with them. The colchicum may be given in the form of pill, the powder being combined with camphor and the watery extract of aloes, or the aloes and myrrh pill, three or four doses being taken in the twenty-four hours, and as much of the purgative as will operate sufficiently on the bowels. The action of colchicum is exerted chiefly on the digestive mucous surface and liver, the secreting functions of which it manifestly augments. When it does not pass quickly off by the bowels it is partially absorbed, and increases the functions of the kidneys. It was employed by the ancients, and physicians of the middle ages, and entered into the composition of most of the gout specifics of every epoch. STÖERCK introduced it into regular practice in modern times, and used it chiefly as a diuretic. Mr. WANT brought it into use in 1815 as a cure for gout. Since then it has been very generally, and but too often injudiciously employed in this and in other diseases.

[Dr. WILLIAMS supposes that the efficacy of colchicum depends more on its purgative than its diuretic effects; but we find it increase, in a very notable manner, the quantity of lithic acid and urea in the urine, as well as its other solid contents. This we hold to be the great

* ["Scudamore's Mixture" is prepared as follows: R Mag. Sulphat. ʒi.—ʒij.; Sodæ in Aqua Mentha f. ʒx.; addo Acet. Colchici f. ʒi.—ʒiiss.; Sirup Croci f. ʒi.; Magnesiæ ʒviij. Mz. Dose, three table-spoonsful every six hours till free evacuations are produced. Dr. MACINTOSH recommends a saturated solution of the seeds in wine, in doses of from 20 to 120 drops, conjoined either with the same quantity of Tinct. Hyoscyamus, or with a half or third part of the sedative solution of opium.]

object in the treatment of gout, and the colchicum is to be given in such quantities as the stomach will bear, taking great care not to cause nausea or diarrhoea. It should be given with alkalies, or carbonated alkalies, to help carry off the lithic acid. We have found the wine of the root or the seeds, freshly prepared, the best form of administration, always combining it with some alkali. If much fever is present, it should be given with salines or antimonials; if there is acidity and flatulence, with magnesia; and if the bowels are torpid, with the sulphate of magnesia. If there is much nervous irritation, a full dose of DOVER'S powder should also be given.]

57. Cathartics are not equally suited to all cases. Where the bowels are very torpid, the liver congested, and the tongue loaded, they (see *Appendix*, F. 181, 266, 378, 430) are necessary, and it is chiefly by them that we can remove the excrementitious matters abounding in the circulation. But in other instances, particularly when these disorders do not exist, or when the bowels are easily relaxed, or are irritable, and when the patient is nervous and debilitated, aperients or laxatives, and saline medicines with the alkali in excess, or calcined magnesia with or without colchicum, will be more serviceable than active purgatives, unless conjoined with tonics, aromatics, or stimulants. Neutral salts, taken so as to act gently upon the bowels, have generally also a refrigerant effect; and, being partially absorbed, exert a beneficial influence on the circulation and functions of the kidneys. When the saline medicine is conjoined with an alkali or with magnesia, these effects are still more manifest, and not only are the intestinal discharges increased, but the urine is rendered more copious and natural. Colchicum, judiciously combined with these, will often allay pain, bring down the pulse, and promote the secretions from the liver and kidneys; but if it occasion depression or nausea, it should be discontinued. Although purgatives are unequivocally beneficial when employed as here advised, yet SYDENHAM, WARNER, and most French writers have condemned the use of them in this disease. Even HEBERDEN does not appear favourable to them. This, however, evidently has arisen from either an injudicious use of them, or inappropriate modes of exhibiting them.

57.* *Diuretics* are beneficial in this disease, in as far as they promote the removal of excrementitious matters from the circulation. The saline substances already alluded to, and the alkalies, are, upon the whole, the most preferable of this class of medicines. Of the former, the citrates of potash and of soda, the acetate of potash, and the sulphates of soda and magnesia, are to be preferred; and of the latter, the fixed alkalies and magnesia. M. MAZUYER recommends potash and its acetate, from an opinion that the presence of uric acid in the blood is a principal cause of the disease. Alkalies in various forms have been long recommended in gout. In the form of soap, they have been prescribed by BOERHAAVE and WHYTT. Their carbonates were used by TOZZI, QUARIN, BLANE, GARDNER, WOLLASTON, and others. The alkaline earths have, however, been preferred by several writers, especially when acidity of the *prima via* existed. WHYTT and BLANE were

favourable to lime-water, and to preparations of chalk, in these circumstances. Magnesia, both calcined and carbonated, has been generally employed, and is preferable, upon the whole, to any other absorbent, inasmuch as it acts gently upon the bowels and kidneys, without weakening the digestive mucous surface. Its effects in removing the morbid state of the urine in gouty subjects, which have been so well described by Dr. PROUT, and noticed above (§ 6, 14), are very remarkable. The liquor potassæ, or BRANDISH'S alkaline solution, exhibited in a bitter infusion, with the extract of taraxacum, or in the decoction of taraxacum, will also be found useful, especially when chronic disorder of the liver is present; small doses of blue pill, or of PLUMMER'S pill, with soap, being given at bedtime, and the emplastrum ammoniaci, or the emplastrum picis compositum, conjoined with it, being placed on the epigastrium and right hypochondrium. The preparations of squills, or the spiritus ætheris nitrici, may be given with the saline and alkaline substances just noticed, when the urine is scanty.

[Dr. WILLIAMS observes (*Principles of Medicine*, Phil., 1844), "the lithic acid of gout has a tendency to accumulate in the body, and to cause local and general irritations, functional derangements, &c., and that hence it becomes a chief indication to counteract its irritating properties and promote its elimination from the system." The medicines which are most efficacious in doing this are alkalies, or their carbonates, or their vegetable salts, with colchicum, or iodide of potassium, saline mineral waters, and alterative aperients. These increase the action of the kidneys and intestinal canal, and drain off the offending matter from the system.]

58. *d. Diaphoretics* during the paroxysm have been recommended by some writers and disapproved of by others. There can be no doubt of perspiration being a favourable evacuation in this, as in many other diseases, inasmuch as excrementitious matters are thereby removed from the system. QUARIN remarks that those who sweat much, or void much urine, are rarely afflicted with gout; and the reason is obvious. Sir C. SCUDAMORE states that sudorifics should be given with some caution, as they tend to debilitate the stomach; and this is doubtless the case with respect to the common preparations of antimony, although RHODIUS RIVERIUS, VICAT, BRANDIS, and HUFELAND prescribed them when inflammatory fever accompanies the paroxysm; and in this state they are beneficial, especially when conjoined with gentle refrigerants and narcotics. DOVER strongly recommended his celebrated powder in this case; but he employed nitre, instead of the sulphate of potash of the more modern preparation. *Camphor*, however, in doses and combinations appropriate to the circumstances of the case, is a most unexceptionable medicine, inasmuch as it has an anodyne effect, while it promotes the exhalations and secretions. It may be conjoined with JAMES'S powder, or with mercurials, or with anodynes, or with all of them, according to existing pathological states. It has been almost entirely overlooked by recent writers on the disease, although it was recommended by LENTIN, CHRESTIEN, COLLIN, BANG, and OSLANDER. I have prescribed it frequent-

ly, especially in the more chronic and irregular forms of gout; and found it, particularly in conjunction with opium, or the acetate or muriate of morphia, a most valuable remedy. The decoction of *guaiacum* was much employed by SABAROT, TODE, WEISMANTEL, GRUNER, SMETIUS, THEDEN, AASKOW, ACKERMANN, DUNCAN, and BALDINGER; but it is more suitable to the atonic or chronic states of the disease than to the acute. It is, however, sometimes useful, conjoined with alkalies and anodynes, after the bowels have been freely evacuated, in old cases and in debilitated habits. It is most beneficially exhibited in the form of compound decoction, as prescribed in the Edinburgh and Dublin Pharmacopœias; or in that of the ammoniated tincture, when debility is considerable.

59. *Warm baths and vapour baths*, simple and medicated, have been long recommended as diaphoretics for the removal of gout in its various forms. ACTUARIUS, ZACUTUS LUSITANUS, LENTIN, GIRAULT, QUARIN, BRANDIS, ALBERS, SCHACHER, RULAND, PALLAS, WAIZ, MOLWIZ, OLIVER, and INGRAM prescribed them. Sulphuretted baths, warm salt-water baths, and aromatic warm or vapour baths, have been favourably noticed by THILENIUS, QUARIN, ALBERS, and HUFELAND. The simple vapour bath was much praised by MARCARD and BLEGBOROUGH; and warm baths prepared from a decoction of emollient herbs, by PELARGUS and others. The camphorated vapour bath promises to be more serviceable than any of these, although they are severally of advantage when appropriately used.

60. If the patient be young and robust, or suffering a first or early attack, or if the constitution be not materially impaired, and especially if vascular excitement and pain be very great, the several means already noticed may be so prescribed as to produce decided antiphlogistic and refrigerant effects. The *antiphlogistic treatment*, to the fullest extent, has been advised by LANGIUS, WERLHOF, HUFELAND, BARLOW, and others; and in the circumstances just specified, or even in others more equivocal, it is more or less beneficial. *Refrigerants*, as nitre, hydrochlorate of ammonia, &c., have been given internally by MARCUS and others; and in the above circumstances, they may be serviceable; but in persons of weakly habits, and in the more protracted cases, their effects should be carefully watched. In most instances, the saline aperients and diuretics prescribed above prove sufficiently refrigerant; and the more cooling diaphoretics, particularly camphor julep, the solution of the acetate of ammonia, and spirits of nitric æther, have a similar effect.

61. *c. Narcotics* have been long employed during the height of the paroxysm, both internally and to the affected part. AETIUS, ZACUTUS LUSITANUS, MAYERNE, DE LAUNAY, and many others have recommended them. *Opium*, either in its crude state, or in the form of DOVER'S powder, or of SYDENHAM'S laudanum, has been preferred by DE HEIDE, DOEMLING, NUNN, WARNER, MATTHÆI, KINGLAKE, MARCUS, SUTTON, GUILBERT, &c. Several writers have, however, chosen either the black drop or BATTLE'S solution, while contemporary practitioners have recourse more frequently to the acetate or hydrochlorate of morphia. More advantage, how-

ever, will accrue from the judicious combination of the opium with other remedies than from a selection of either of these preparations. Opiates ought never to be prescribed until fecal accumulations and morbid secretions have been evacuated. If prescribed earlier, or otherwise improperly used, they are liable to the same objections as have been urged against colchicum, one of the effects of which, it should be recollected, is anodyne. Dr. CULLEN remarks that, although they mitigate the severity of the fit, they occasion its return with greater violence; but this objection holds equally strong in respect of all narcotic and anodyne substances employed without sufficient regard to the removal of those morbid conditions of the internal viscera upon which the disease chiefly depends. It is, therefore, indispensable to a successful treatment to evacuate morbid matters previously to the use of these medicines, and to promote the action of excreting organs while we employ them. In weakly habits, or where there seems to be a state of asthenic or irritative action in the fit, and particularly if the external affection shifts its seat, the opiate should be conjoined with camphor, in doses proportioned to the urgency of the nervous symptoms or of vital depression. This combination will promote the cutaneous excretion, the camphor preventing any tendency to the retrocession or suppression of the paroxysm that may exist, or that the opium may occasion. HAMILTON, PLENCIZ, and some other writers, have advised calomel to be conjoined with the opium. When chronic disease of the liver is present, the practice is judicious; but purgatives should also be prescribed, and the effects carefully watched. The mercurial ought to be withdrawn when relief is obtained, or as soon as it evinces its specific action. Where there is much febrile excitement, the opiate will be usefully conjoined with JAMES'S powder, or other antimonials, or with ipecacuanha and refrigerants. The acetate or hydrochlorate of morphia should be preferred when opium occasions headache, gastric disorder, or other unpleasant effects; and either may be given with aromatics, camphor, &c., according to the peculiarities of the case. A large dose of the extract of *white poppy* may be directed in similar circumstances.

62. *Aconitum* has been recommended chiefly by Continental physicians, and is certainly a medicine of greater efficacy than is generally supposed in this country. It has been favourably noticed by STOELLER, BOEHMER, REINHOLD, STOERCK, QUARIN, STOLL, VOGEL, COLLIN, MURRAY, THICKNESS, WARBURG, ZADIG, BARTHEZ, and BRERA; but it is more appropriate to old or chronic cases, or to weak habits of body, than to recent attacks attended with general vascular excitement. The powdered leaves or the extract may be used. Besides its narcotic effect, it produces a very decided action on the skin. *Belladonna* has likewise been prescribed by ZIEGLER, BOETSCHER, and MONCH; *Conium*, by PERCIVAL, SOLENANDER, COSTE, and THICKNESS; the *Humulus Lupulus*, by FREAKE; and the *Lactucarium*, by DUNCAN and SCUDAMORE. *Hyoscyamus* is, however, preferable to either of these, when it is desirable to avoid constipation of the bowels. I have, however, seen the belladonna very serviceable in two or three in-

stances; and in these it produced its specific eruption on the skin.

63. *C. Local Treatment in the Paroxysm.*—*a.* Leeches have been applied to the inflamed part by WERLHOF, DE HAEN, BOYER, and MACKINTOSH; and even *scarifications* have been advised by SALMUTH, THILENIUS, RIEDLIN, HOFFMANN, BAUER, REUSNER, and WATTS. Sir C. SCUDAMORE remarks that he has seen, in a few cases, the application of leeches followed by the sudden transition of the inflammation to the other limb, indicating that the constitutional causes were not relieved by the local loss of blood; and that he has generally found the debility of parts and œdema both greater and more lasting after this practice. In three instances where he directed blood to be taken from the distended veins near the foot, an increase rather than diminution of pain was the consequence in two, and much local weakness in the third of them. *Blisters* applied to the affected part have been recommended by BOUVART, RIEDLIN, and STEVENSON. TREMPER considers them injurious; and Dr. CULLEN admits the occasional efficacy both of them and of urtication, but considers them hazardous. They are sometimes, however, useful in the more chronic or asthenic states of the disease. *Moxa*, as a local application to gouty joints, has been resorted to in eastern countries from time immemorial, and appears to have been known to HIPPOCRATES and subsequent ancient writers. Among the moderns, BOSE, TEN RHYNE, THILENIUS, PECHLIN, THEVENO, ACERBI, PALLAS, KAEMPFER, VALENTINI, and INGRAM have noticed it. Sir W. TEMPLE (*Works*, vol. iii.) derived benefit from it in his own case.

64. *b. Fomentations and poultices*, both simple and medicated, have been long advised for gout. HORNING and RIEDLIN have directed fomentations with an infusion of tobacco; and KUNRATH, poultices with the leaves of hyoscyamus; but although they may relieve the pain, they relax and weaken the parts. ALEXANDER TRALIANUS has stated that they occasion a chronic state of disease, and favour the formation of concretions. Poppy fomentation, the vapour of hot water impregnated with aromatic herbs, and various emollient herbs and flowers used in the form of poultice, have been recommended. GRULING has advised the application of the infused flowers of the sambucus; but it is very doubtful whether any of these is truly beneficial. Sir C. SCUDAMORE, however, remarks that a poultice made with bread, scalded with boiling water, pressed through a strainer to dryness, and then rendered sufficiently soft by the addition of one part of alcohol and three of camphor mixture, rendered agreeably lukewarm by the addition of a sufficient quantity of boiling water, and applied by means of linen rags. He remarks that if the temperature be higher it is less beneficial; and if it be lower, it is liable to the objections urged against cold applications. [A very useful embrocation may be made by combining equal parts of the *aque acetatis ammoniæ* and common spirits, or equal parts of vinegar and spir-

its. PRADIEU recommends a linseed poultice, covered with a considerable quantity of an aromatic balsamic tincture. In this the foot and leg are enveloped, and the whole being covered with flannel and secured by a roller, is allowed to remain so for twenty-four hours. ROGERS and STUKELY recommend oleaginous lotions, or even immersing the affected limb in oil.] *Warm pediluvia* have been resorted to, but are injurious while the inflammation remains. Sir C. SCUDAMORE has seen the symptoms reproduced by their employment at the decline of the paroxysm, and has adduced instances where they caused a metastasis of the local affection. Combed wool, and various other applications, made with a view to accumulate the warmth and promote the perspiration of the part, have been very much resorted to; and I have seen much relief obtained from soft flannel wrung out of warm water, wrapped about the part, and closely covered by oil-skin; but this practice is open to the objections already noticed.

65. *c. Local refrigerants* have received the sanction of HIPPOCRATES, CELSUS, CAMERARIUS, ZACUTUS LUSITANUS, KOLHAAS, KECK, VANDER HEYDEN, BARTHOLIN, PECHLIN, BERGIUS, LAUZANI, PIETSCH, and KINGLAKE. Dr. HEBERDEN states that the celebrated HARVEY applied cold in his own case. Dr. GOOD followed his example in his early attacks, and while the vigour of his constitution was not materially impaired; afterward, when the disease appeared with more debility and irritability of the system, he judiciously refrained from this practice. In strong persons the application of cold will afford relief, and it may not be injurious; but in other circumstances it is hazardous. MARCARD, and numerous writers since his time, have shown its bad effects; for, like all other means tending to relieve the local affection, while the constitutional disorder remains untouched, it may cause the transition of the disease to some other situation, either external or internal. The application of *veratria* or of *aconitine* to the part, in the form of ointment (*Veratriæ* gr. x-xv.; *Adipis præpar. siv.*), has been recommended by Dr. TURNBULL, but it is liable to the objection just urged. The leaves of the *Cactus Opuntia* have been used as a poultice by PAULE and PAPEN, and relief has been derived from the common cabbage leaf. I have seen a steak of raw beef, applied either while still warm, or immediately after it was cut from the recently-killed animal, produce remarkable relief, and without any consequent inconvenience. It is deserving of farther trial. These two latter are popular remedies in some countries.* External applications of an active

* The following list of substances, although adduced satirically in the *Τραγοποδαγγρα* of Lucian, was actually employed by the ancients in the external treatment of gout:

“Terunt plantagines, et apia . . .
Et folia lactucarum et sylvestrem portulacum.
Alii narcubium; alii potamogetonem;
Alii urticas terunt; alii symphytum;
Alii lentes adferunt ex palustribus lectas;
Alii pastinacam coctam; alii folia persicorum,
Hyoscyanum, papaver, cepas agrestes, mali punici cortices,
Psyllium, thus, radicem ellebori, nitrum,
Fœnum græcum cum vino, gyrinum, collamphacum,
Cyparissinam gallam, pollen hordeaceum,
Brassica decoctæ folia, gypsum ex garo,
Stercora montane capræ, humanum oleum,
Farinas fabarum, florem asi lapidis:
Coquant rubetas, mares-araneos, lacertas, feles,
Ranas, hyænas, tragelaphos, vulpeculas.

kind are generally either of little benefit, or are hazardous in the nervous or debilitated; in persons liable to painful affections of the stomach and bowels; in those subject to palpitations or irregular action of the heart, or to disorders referrible to the encephalon, and in those complaining of diseases of the lungs, or of asthmatic attacks. The tepid lotion and poultice advised by Sir C. SCUDAMORE, and liniments of oil of almonds and camphor liniment, or tepid epithems are, upon the whole, the safest and best.

66. *D. The diet and regimen during the paroxysm* should be strictly regulated. In this form of gout, especially, the diet should be spare, cooling, and chiefly farinaceous. Boiled bread and milk are praised by Sir C. SCUDAMORE, but it sometimes produces acidity, which, however, may be prevented or corrected by the admixture of a small quantity of calcined magnesia. Arrow-root, sago, or panada slightly spiced, will generally be sufficient as long as febrile excitement continues; but in nervous, debilitated, or irritable habits, a little Madeira or sherry, or a dessert spoonful of brandy may be added to these. As the paroxysm subsides in these constitutions, a little light animal food, and an additional allowance of wine may be permitted, particularly if the patient's previous habits require the indulgence. The best beverage during the fit is tepid whey, which may be taken in any quantity; it aids the operation of the medicines on the bowels and kidneys. A weak infusion of sassafras, weak black tea, thin gruel, barley water, or other diluents may be also used; but acid drinks should be avoided. Small quantities of the carbonate of potash may be added to these, and they may be rendered more agreeable by a few slices of orange or lemon peel. Grapes and ripe oranges may be likewise allowed, if they be not found to occasion flatulency or acidity. A very restricted diet in the fit has been strongly insisted upon by CELSUS, THRIVERIUS, RIEDLIN, PIETSCII, and CADOGAN, who have justly considered it an important part of the treatment; for, if nourishment be too liberally allowed, or if it be stimulating, from a mistaken notion of supporting the strength, the result will be merely the aggravation of the disease. The patient should not remain in bed for a longer period than is really necessary, but begin to use his limbs gently as soon as possible. SYDENHAM recommends that he should take exercise in a carriage even in the beginning of a fit; but this is seldom beneficial, and therefore unnecessary. An attack has been prevented by determined exertion, or by a long walk; but it has also been brought on by the same cause. Dr. SMALL advises the patient to walk abroad as soon as the inflammatory action has ceased, and argues that gouty persons owe their lameness more to indolence and fear of pain than to the disease. Sir C. SCUDAMORE, however, states that he has seen the too early exertion of the limb produce a relapse. When the

pressure of the bed-clothes cannot be borne, the part may be protected by a cradle.

67. *E. Treatment during Convalescence and in the Interval.*—Treatment ought not to be relinquished with the subsidence of the paroxysm, but directed to the restoration of the healthy state of the digestive and excreting functions, and of the strength of the weakened limbs. If these ends be not attained, the patient will be liable either to protracted convalescence, or to the speedy return of the fit. During recovery the appetite is often in a state of morbid excess, while the powers of digestion and assimilation are weakened. This seems to be owing to the vascular erethism of the gastric mucous surface, and requires the restraint of the physician, and the self-control of the patient. The meals should be light, and in moderate quantity. Where there is much debility, half a pint of asses' milk may be taken early in the morning, and repeated at night. Animal food ought to be sparingly indulged in, and soups, pie-crusts, pickles, and pastry of all kinds avoided, as they generally occasion, in gouty persons, acidity of the prima via. The stomach should not be required to perform more than its strength will permit of, nor goaded to exertion by stimulating or heating beverages. Where there is a tendency to plethora or vascular excitement of the digestive mucous surface, or to congestion of the liver, or to determination to the head, this caution ought to be carefully observed. It will, however, be necessary to restore the organic functions by an appropriate use of bitters or other tonics; but these medicines should either be postponed until the secretions and excretions are restored to a healthy state, or be conjoined or alternated with means directed to fulfil this intention. While the tongue continues loaded, mild purgatives or deobstruent aperients are necessary; but purgatives alone will frequently fail of removing this symptom and restoring the healthy functions of the abdominal viscera, unless tonics are also exhibited. The state of the tongue, in these cases, frequently depends more upon the constitutional disorder and debility than upon the state of the alimentary canal. It will, therefore, be preferable to conjoin tonic infusions with such a quantity of the infusion of senna or of rhubarb as will act moderately on the bowels; and to these either of the alkaline carbonates and the extract of taraxacum may be added. Craving of the appetite is to be referred to debility, or to the cause already adduced, and will generally be removed by tonics, judiciously combined with alteratives and laxatives.

68. In a large proportion of cases the treatment, during convalescence and in the interval, should consist chiefly of a restricted diet, abstinence from wine and heating liquors, and a careful regulation of the quantity of food to the degree of physical exertion used by the patient. When the stomach is much disordered, a diet consisting chiefly or solely of boiled milk, with bread or rice, will be most useful. In tolerably sound constitutions tonics will merely increase vascular plethora, especially if chalybeates be employed, unless active exercise be taken, and secretion and excretion be promoted. When there is chronic disease of the liver, or torpor of this organ, or biliary ob-

Quale metallum non exploratum est mortalibus?
 Quis non succus? Quis non arborum lacryma?
 Animalium quorumvis ossa, nervi, pelles,
 Adeps, sanguis, medulla, stercus, lac.
 Bibunt alii numero quaterno pharmaco:
 Alii octono; sed septeno plures.
 Alius vero bibens hieram purgatur:
 Alius incantamentis impostorum deluditur," &c.

struction, mercurial alteratives should be given at bedtime, and an aperient draught with taraxacum early in the morning. The emplastrum ammoniaci cum hydrargyro may also be applied to the right hypochondrium and epigastrium. In nervous, irritable, or debilitated persons the judicious use of tonics is beneficial. In many cases, the compound decoction of sarsaparilla, the mezereon being omitted, will prove gently tonic as well as alterative; but when the debility is greater, the sulphate of quinine, or the preparations of bark are preferable. The infusion or decoction of cinchona, or any of the other tonic infusions, may be prescribed with the alkaline carbonates, and the aromatic spirit of ammonia; and when the stomach is irritable, with an increased quantity of the carbonates, and taken during effervescence with fresh lemon juice. When the bowels are sluggish, a compound infusion of tonics and aperients may be given in the manner I have just advised, or any of the medicines directed above (§ 50, 56) may be used; or the compound decoction of aloes may be taken with the compound infusion of gentian, or with the infusion of cascarrilla, or with camphor julep, as recommended by Sir C. SCUDAMORE; an alterative pill, consisting of PLUMMER'S pill and soap, or of hydrarg. cum creta, the compound rhubarb pill and soap being taken at night. When there is no tendency to inflammatory action or congestion of the liver, debility of the digestive organs, as well as a sluggish state of the bowels, will be remedied by quinine conjoined with small doses of the purified extract of aloes, or with the aloes and myrrh pill, or with the compound rhubarb pill (see F. 575). The following draught may be used as a stomachic aperient, and varied according to circumstances; or the pills may be substituted, and taken at dinner or at bedtime, in a dose sufficient to keep the bowels freely open:

No. 238. R Corticis Cascarillæ contusi ʒij. Calumbæ Radicis concisi ʒss.; Rhei Rad. concisi ʒij. (vel Folior. Sennæ ʒij.); Semin. Coriand. contus. et Cardamom. Semin. contrit. aa ʒss.; Aquæ Ferventis ʒijx. Macera per horas duas, et cola.

No. 239. R Hujus Infusi ʒij.; Potassæ Carbon. ʒss.; Tinct. Aurantii ʒj. M. Fiat Haustus, primo mane, et meridie, cum succi limonis recentis cochleari, in effervescente impetu, sumendus.

No. 240. Pulv. Ipecacuanhæ gr. xij.; Pulv. Capsici ʒj.; Pulv. Rham ʒij.; Extr. Aloës purif. ʒj.; Extr. Fellis Bovini ʒij.; Saponis Duri ʒj.; Olei Cajuputi ℥xx. vel q. s. M. Fiat Pilule xl. quarum capiat unam, duas, aut tres, cum prandio, et hora somni.

69. The *adema* and debility of parts consequent on the fit are most marked after a relaxing local treatment, and are frequently such as to require medical aid. Mechanical support, by means either of a calico or flannel roller, according to the warmth of the season, is generally serviceable, especially if the veins are varicose, or the ligaments weak. The surface of the parts may also be sponged, night and morning, with a strong solution of salt in water, at a tepid temperature; and, having been wiped dry, friction should be applied for some time. Frequently, friction should be accompanied by the use of a stimulating and strengthening liniment, consisting of the compound camphor and soap liniments, with the addition of a little spirit of turpentine and cajuput oil; or *Formula* 308, 311, in the Appendix, may be employed.

70. F. The Empirical Treatment of Acute Gout

requires merely a brief notice.—a. The *cau médicinale*, WILSON'S *tincture*, and REYNOLD'S *specific*, are in most general use as specifics for the cure of gout. The composition of these, however, is not certainly known, although it is generally believed that they are preparations of colchicum of different degrees of strength. Their effects are very nearly the same as those of the tincture and wine of the roots of colchicum; for they all produce, in the dose of a drachm or a drachm and a half, diminished energy and frequency of the pulse, languor, nausea, sickness, terminating either in vomiting or in alvine evacuations, and relief of pain. If the dose be the least in excess—especially in some constitutions—syncope, extreme prostration, cold sweats, violent vomiting and purging, a small, feeble pulse, and alarming sinking or insensibility, are the results.* *Colchicum*, when employed merely with the view of preventing, or suddenly curing the paroxysm, and without reference to the removal of the morbid conditions of which it is the external manifestation, is liable to the same objections as are justly urged against the above secret medicines. The consequences of having frequent recourse to them vary in different constitutions, and with the habits and modes of living of the patient; but they commonly are, a much more frequent return of the fit or of the symptoms indicating its approach; impaired nervous power; debility of the digestive organs; torpor or irregularity of the biliary functions and of the bowels; headaches, and a variety of symptoms referrible to the encephalon. Besides these, I have met with instances of hypochondriasis, melancholy, mental delusions amounting to insanity, paralysis, and angina pectoris, evidently arising from this cause. I very recently saw a case of partial insanity, with Mr. SHUTE, occasioned by the use of WILSON'S tincture on the approach of the gouty paroxysm.

71. *Veratrum*, or the white hellebore, or some unknown species of *veratrum*, was much employed by the ancients in gout; and Mr. MOORE recommended a wine of this plant with lauda-

* [We have known "REYNOLD'S specific" speedily relieve the paroxysm of gout in numerous cases, its mode of action being similar to that of colchicum. SCUDAMORE states that it is a preparation of meadow-saffron in rum, with some colouring matter, more diluted than WILSON'S tincture, which is a concentrated preparation of colchicum in diluted spirits. Dr. CRAGIE pronounces them both equally inadequate to cure gout, as well as unsafe. "When given in small doses, they exercise no certain influence over the symptoms; in larger quantities they operate violently, both on the stomach and bowels" (*Elements of the Pract. of Physic*, vol. ii., p. 662, ed. 1840). WILSON mentions a case where an over dose of REYNOLD'S specific proved fatal. WILSON'S tincture was much employed by GEORGE IV., and is in much repute at the present day among the nobility of England.

"The best-informed practitioners of this country," says Dr. FRANCIS, "place more reliance on WILSON'S tincture, after venesection and moderate purgation, than upon any other of the numerous nostrums which have been so confidently recommended for the relief and eradication of this mysterious affection. According to the clinical Dr. M'LEAN, whose experience for fifty years has given him great opportunities of studying the complex character of gout, this valuable nostrum is best administered just previous to the invasion of the paroxysm, to the amount of some forty drops, blended with soda, say twenty drops of the solution of LABARRAQUE. Its purgative and sudorific influence is among its greatest means of relief, while its specific action is recognised by the removal of the paroxysm and the reduced condition of the sufferer. Benzoic acid (flories Benj.) has a peculiar influence on the gouty constitution as a solvent for arthritic enlargement and rigidity. Dr. KISSAM, of this city, gives strong testimony in its favour."]

num, believing it to be identical with the eau médicinale. Sir C. SCUDAMORE has referred to instances where it produced dangerous effects. It usually causes irritation of the stomach, with a distressing sense of heat, white tongue, thirst, and nervous depression; and, in a larger dose, severe vomiting and purging, with griping pains, and distressing sinking of the vital powers. In the more moderate doses in which it is prescribed, its effects are not so severe, but then it frequently fails of having any control over the symptoms. The *Gratiola officinalis*, or hedge hyssop, and the *Ranunculus flammula*, have likewise been employed; but they deserve little credit. A tincture of the former, however, has been said to produce effects similar to the eau médicinale. They are both very active irritants of the digestive mucous surface, and produce purgative and emetic effects. The *Elatarium* has been given by Mr. GREEN, in the infusion of senna, with a few drops of laudanum. It has generally produced slight vomiting and copious alvine evacuations, and speedily removed the fit. He recommends flannel, fleecy ho-siery, &c., to be laid aside, and leeches to be applied, when much inflammation exists in the affected part. The *Ballota lanata* has been employed by Professor BRERA in the form of decoction—half an ounce of it being boiled in a pint of water down to half a pint, which quantity is to be taken daily. It appears to promote the secretions and excretions.

72. Various other active Medicines have been employed with the view of removing the fit. Some of these are extremely powerful, and require much caution; others have little influence. The *Rhododendron chrysanthum* has been prescribed by HOFFMANN, KOELPIN, BUZOW, PALLAS, WEISMANTEL, and METTERNICH. It is used principally in the northern countries of Europe; and, when carefully exhibited, is a medicine of no mean efficacy, especially in the more chronic states of the disease. The decoction of *Solanum dulcamara* has been recommended by CARRERE, WANTERS, and PRESSAVIN; the decoction of the *Sambucus*, by FREITAG, BLOCHWITZ, and GARDANE; the *Erigeron Philadelphicum*, by BARTON; *Digitalis*, by HOFFMANN and GRAPPER; the decoction of the *Ilex aquifolium*, by FRIZE, REIL, DREYSIG, and BANDELOW; and the decoction of the *Hedera terrestris*, by DE HEIDE and CARTHEUSER. Of these, the *sambucus* seems most deserving of use, the berries and bark being the most active parts.

73. The above substances act energetically upon the digestive mucous surface, and promote the secretions and excretions; but when exhibited in large doses, they also inflame this surface, impair the organic nervous energy, powerfully affect the brain and the rest of the cerebro-spinal system, and lower the sensibility. They should, therefore, be given with great discrimination and caution. Where the powers of the constitution are materially weakened, and the organs of digestion in a state of irritation, they ought not to be employed. Their influence on the paroxysm is chiefly to be attributed to the above modes of operation—to the copious evacuations they procure from both the liver and digestive mucous surface—and partly to their action on the nervous system.

74. b. The Portland gout powder once had great reputation for preventing the return of a

fit. It consists of the roots of birthwort, and of gentian, and of the tops and leaves of germander, ground-pine, and centaury. These are well dried, powdered, and sifted, and mixed together in equal weights; a drachm being taken every morning fasting. Dr. CLEPHANE has instituted a learned inquiry into the origin and use of this powder. Having continued this quantity for three months, a dose of three fourths of a drachm is given for another three months, and half a drachm afterward for six months. This medicine differs but little from some mentioned by GALEN, CÆLIUS AURELIANUS, AËTIUS, and others of the ancients; and which appear to have been brought into notice for a time, and then to have fallen into neglect, owing to their pernicious influence. Indeed, CÆLIUS AURELIANUS remarks that he has seen gouty persons, who frequently used bitters, carried off by apoplexy; and the same remark is made by BOERHAAVE and QUARIN. Dr. CULLEN states that where the Portland powder has been long used the external manifestation of gout was not observed; but symptoms of atonic gout, or apoplexy, or asthma, or dropsy, supervened. He remarks that the prevention of the disease depends much on supporting the tone of the stomach, and avoiding indigestion; that costiveness, by occasioning this latter, is hurtful, and should be avoided; and that much purging is injurious. The aperients he recommends are, aloes, rhubarb, magnesia, and precipitated sulphur, as they may suit particular cases. Sulphur is recommended for the prevention of the fit by TULPIUS, RULAND, GRANT, GARDINER, and QUARIN. HUFELAND advises it to be conjoined with guaiacum, in a quantity sufficient to act moderately on the bowels. There is no doubt of sulphur and magnesia being both safe and efficacious in preventing the return of the disease, when aided by suitable diet and regimen.

75. c. *Chalybeates* have been considered as extremely efficacious in preventing the fit, especially when conjoined with the alkaline carbonates, and when the bowels are kept open during their use. The preparations of hop are also of service; but they require, equally with chalybeates, quinine, and other tonics, an abstemious and temperate diet, and exercise in the open air. Of tonic, stimulating, and heating medicines, given with the view of preventing the paroxysm, it may be stated that they are dangerous in the plethoric and robust, inasmuch as they increase vascular fulness and action; and that if they be resorted to, in such persons especially, abstinence, and the free action of all the emunctories, should be observed. In some cases—particularly in nervous, irritable, and delicate constitutions—a moderate quantity of wine, or either of the tonics in most common use, as the preparations of cinchona, or of the aromatic or bitter substances, or of iron, or of hop, &c., is almost indispensable; but the use of purgatives and the rest of the treatment should also be enforced.

76. ii. *Treatment of Chronic Gout.*—This state of disease has been shown to occur either primarily, or consecutively on the acute.—A. In the former case, the powers of the constitution are insufficient to produce the disease in a sthenic form; and either the nervous, or the lymphatic, or phlegmatic temperament is gen-

erally predominant. The *indications* of cure should be founded upon a careful estimate of the condition of the several functions, especially those concerned in excretion. Vascular plethora is seldom present in such a degree as to require general depletion. The imperfect performance of the digestive, assimilating, and excreting functions, and defective nervous power indicate the employment of medicines calculated to increase these functions. When the biliary secretions are scanty or obstructed, a full dose of calomel, of camphor, or JAMES'S powder, and hyoseyamus, may be given at bedtime, and a purgative draught at an early hour in the morning. To these may be added, during the day, saline, aperient, and diuretic medicines, with an alkali, or magnesia. It will frequently be necessary to soothe nervous irritation by the exhibition of a narcotic. The preparations of opium, especially DOVER'S powder, or morphia conjoined with camphor or aromatics, will generally give relief, especially after morbid secretions and excrementitious matters are evacuated. But they constipate the bowels; the other narcotics may, therefore, be tried. It will, however, be found frequently preferable to continue the opiate, and to obviate its effects by one of the stomachic aperients prescribed above, taken early each morning.

77. Tonics, and heating or stimulating medicines, tend rather to fix than to remove the disease, and are always injurious, if excrementitious matters have not been carried off. An alterative and aperient pill, as the hydrargyrum cum creta, Castile soap, and extract of taraxacum; or PLUMMER'S pill, with either of the same adjuncts, may be taken at bedtime, and a small or moderate dose of any of the preparations of colchicum in the morning and at midday, with any of the stomachic aperients as prescribed above (§ 50, 68). In this form of the disease especially, the tinctura colchici composita is a useful medicine. But either of the other preparations may be used conjoined with magnesia, or with any of the alkaline sub-carbonates, and with saline or stomachic aperients. Sir C. SCUDAMORE recommends a draught with compound tincture of benzoin and magnesia to be given once or twice a day, or the compound decoction of aloes, with an equal proportion of the infusion of cascarrilla or of gentian. When the secretions are restored to a healthy state, and debility of stomach, with general depression, is the principal ailment, gentle tonics, aided by suitable diet and moderate exercise in the open air, are necessary; but a too full and stimulating diet, or heating regimen, should be avoided. In the summer and autumn the warm sea bath, twice or thrice a week, will be serviceable.

78. *B. Chronic gout consequent upon the acute*, especially after repeated invasions of the latter have impaired the constitutional powers, is generally attended by obstinate disorder of the digestive and excreting functions, with more or less disturbance of the nervous system. Vascular plethora is oftener present in this variety of chronic gout than in the preceding; and the local affection is readily increased by the internal use of stimulants; but alterative aperients, conjoined with colchicum and diuretics, as just recommended (§ 77), will generally be efficacious. When the bowels are very

torpid, the purgatives mentioned above (§ 50, 54, 56) should be given in such doses as may be sufficient. Sir C. SCUDAMORE advises the addition of guaiacum to the purgative in such cases; and when little or no fever is present, it will prove beneficial. If congestion exist in the liver, head, or kidneys, cupping will be necessary. When pain in the stomach or tenderness in the epigastrium is complained of, leeches applied on this region, and followed by a rubefacient epithem, or blister, will be requisite. If the urine be scanty, high-coloured, and thick, cupping over the kidneys, and the use of active diuretics, will be of great service. Besides the saline substances already noticed, small doses of turpentine, or a decoction or infusion of the pine sprouts or tops, as directed by BARTHES, may be given at short intervals; or the preparations of juniper, or the sweet spirits of nitre, may be added to saline and alkaline medicines. When the liver continues torpid, or the bile deficient, and the urine thick, the compound calomel pill, with soap, should be given at night, and the extract of taraxacum added to the medicine prescribed during the day.

79. Having removed the more urgent phenomena, the treatment should be directed to the restoration of the healthy actions of the emunctories and of the digestive organs, as insisted on with reference to the other states of the disease. But unless an abstemious diet and temperate regimen be observed, and be aided by regular exercise in the open air, disorder of these organs will soon return, and the gouty affections afterward reappear. When the nervous system has become very susceptible, and the parts affected more or less changed in structure, the object, after the removal of the internal disorder, is to invigorate the nervous system, and restore the parts as far as possible to the healthy state. Unless this end be accomplished, so as to allow the patient to take sufficient exercise, recurrence of the disease can hardly be prevented; and although the digestive and excreting functions may be preserved in a healthy state, the affection will assume more or less of a rheumatic character; or rheumatism will be associated with it; and the patient will be injuriously impressed by every change of weather, and by every exposure. Where this state of disorder occurs, small doses of DOVER'S powder, either alone or with camphor, and a judicious recourse to aperients with tonics, will prove beneficial. *Sulphur*, either alone or with guaiacum, as recommended by HUFELAND, and the compound decoction of sarsaparilla, with the *liquor potassa*, or with *iodide of potassium*, or with both, aided by the external applications about to be mentioned, will also be serviceable in these cases.

80. *C. The local treatment in chronic gout* should claim attention as soon as the more urgent disorder subsides.—*a.* The vapour bath frequently increases the weakness of the parts; but sponging the surface with a strong tepid solution of salt in water is often of service. *Frictions* with slightly stimulating liniments, as the compound camphor and compound soap liniments conjoined, are generally beneficial; and to these may be added, in the more indolent cases, spirits of turpentine and cajuput oil. Frequent or continued frictions are of the

greatest benefit, and should be employed in the intervals between the use of liniments. When œdema remains, and the sensibility of the parts has subsided, the tincture of iodine may be applied over the surface with a camel's-hair pencil. *Electricity*, especially sparks drawn from the part, has been advised in such cases by QUELMALZ, NEIFELD, SCHAEFFER, BAUMER, DE HAEN, VOGEL, and SIGAUD LA FOND; and *galvanism*, by WALTHER and BISCHOFF. Of the efficacy of these, however, I can give no opinion. Suitable support of the parts by bandages, or by laced stockings, is generally of service. Of the use of mineral baths, &c., mention will be made in the sequel. But whatever external means are employed ought to be preceded and accompanied by internal treatment, otherwise little permanent advantage will accrue; or even the external affection may be thereby merely suppressed, and internal disease either produced or increased.

81. *b.* The *gouty concretions* are seldom removed even by the aid of external treatment. Mr. MOORE states that pressure ought not to be applied to them, and that their removal by the knife should not be attempted. He, however, admits that a small puncture of the cuticle may be made, and that caustic may be applied when they have penetrated the cutis. The application of cajuput oil was recommended by HUFELAND and ABRAHAMSON; but it is more advantageously used with the spirits of turpentine and the compound soap liniment. J. P. FRANK advises soaps rendered emollient in almond or other oils, with the addition of camphor. Sir C. SCUDAMORE directs the liquor potassæ, diluted by an equal quantity of almond milk, to be rubbed over the part twice or thrice daily; and calcined magnesia and liquor potassæ to be given internally in almond emulsion, or in any other vehicle suggested by the state of the internal functions. It is necessary, however, that this plan should be persevered in, and that the functions of the stomach and liver should receive strict attention. Regular exercise in the open air ought also to be taken, as advised by SYDENHAM, and found beneficial in his own case.

82. *iii.* *Treatment of Irregular Gout.*—I have shown above that gouty affections may be irregular in three different ways.—(*a*) The precursory disorder may be of an irregular, prolonged, or unusual character, and ultimately be followed by the external affection; (*b*) or the disease may commence in its usual manner, suddenly disappear, and affect some internal viscus; (*c*) or it may seize at once upon some internal organ, and either exhaust itself or be remedied by treatment, without any external affection appearing in its course, or it may destroy the patient. The *first* and *third* of these varieties require the same treatment, modified according to the character and seat of the internal affection. I shall therefore consider, in the first place, the means most appropriate to the disorders connected with the retrocession or suppression of the external affection.

83. *A. Retrocedent Gout.*—In no disease is discrimination, on the part of the physician, more necessary than in this; for upon the inference that is formed as to the existence of inflammation or of spasm, and as to the degree in which either is present, the life of the patient

depends—*z.* In nervous and weak constitutions a *spasmodic* or *nervous character* is generally predominant, as indicated by the weak, or irregular, or unaccelerated pulse, and by the ease derived from pressure, &c. In these, energetic stimulants or antispasmodics, with anodynes or narcotics, or even warm brandy and water, are required. In other cases, a mixed affection, or a state of congestion may be inferred; and in them the remedies just mentioned may not be injurious, but additional means are required, especially alvine evacuations, external derivatives, or even local depletions. When the retrocession appears to have been caused by indigestible matters, an emetic should be exhibited, conjoined with a warm cardiac, as capsicum, ammonia, or camphor; and, if nausea and vomiting be present, a full operation should be procured by warm water, or by the infusion of chamomile flowers. If the stomach or bowels are principally affected, a full dose of calomel, with camphor, hyoscyamus, or opium, should be given, and, two or three hours afterward, one of the purgative draughts already prescribed, which should be aided in its operation by a cathartic enema containing turpentine, asafoetida, or camphor. I have found Dr. WARNER'S arthritic tincture to be excellent in this state of disorder. If suffering still continue, the calomel, camphor, and opium may be repeated, after an interval short in proportion to the severity of the case; the feet should be plunged in hot water to which a large quantity of mustard flour and salt are added, or be enveloped in sinapisms; and flannels wrung out of very hot water, and soaked with spirits of turpentine, should be applied over the abdomen; or eroton oil rubbed over the stomach. Sir C. SCUDAMORE directs the saline draught, with colchicum, to be given and repeated; but I doubt the propriety of giving this medicine in cases of consecutive gouty affection of the stomach or intestines.

84. *b.* Although the internal affection will often assume a nervous or spasmodic character—especially in the constitutions mentioned in connexion with it, and at the commencement of the seizure, before vascular reaction has taken place—yet *active congestion* or *inflammatory determination* is not infrequent, particularly in more plethoric and irritable habits. Much care and discrimination are required to ascertain the presence or absence of these states; and either is to be inferred chiefly from the causes of retrocession, from the state of the pulse and of vascular repletion, and from the tenderness, fulness, or tension, and temperature of the regions containing the affected organ. The patient's sensations, and the symptoms connected with the excreting functions, ought also to be carefully estimated. If, from these, *inflammatory action* of the stomach, intestines, or kidneys be inferred, blood-letting, according to the strength and habit of body of the patient, must be promptly put in practice. But vascular depletions are neither so well borne in such cases, nor so successful, as for inflammations occurring primarily, or in previously healthy persons. The amount and repetition of depletion must depend entirely upon the circumstances of the case; but in every instance depletion should be aided by the derivatives and hot epithems just recommended. A full

dose of calomel, with a few grains of camphor, and two of opium, should also be administered, and repeated within two or three hours, if indications of relief are not observed. After one general blood-letting, local depletion by cupping or leeches may be employed, and repeated in severe cases, or in plethoric persons. In some instances the powers of the circulation can bear only local depletions. When much flatulent distention, and severe colicky pains, either attend the internal seizure, or remain after the above means are employed, equal parts of oil of turpentine and of castor oil (siv. to svj. of each) may be given on the surface of an aromatic water, with or without a warm tincture, or aromatic spirit; and an enema containing the same oil may be administered a few hours afterward, to promote its operation.

85. *c.* The internal attack, although nervous or spasmodic at its commencement, may become congestive, or even inflammatory, as vascular reaction supervenes. This fact should not be overlooked, for the seizure that is benefited by stimulants at the beginning, owing to this circumstance, may require depletions in its progress. The internal affection may even present a *mixed character*—one in which it is difficult to determine whether the nervous, or the spasmodic, or the congestive, or the inflammatory symptoms predominate. In these cases it will be necessary to have recourse to antispasmodics and narcotics, or anodynes, while vascular depletions and evacuations are being employed. Having treated several cases of retrocedent gout, and being thereby induced to observe closely, and to reflect upon the phenomena attending it, and the effects of the treatment adopted, I am morally convinced that exclusive views as to either the nervous or the inflammatory character of the internal affections are incorrect; and that it requires the utmost acumen on the part of the practitioner to discriminate between these states, and to detect their varying shades. In the more spasmodic forms of these affections, especially when implicating the stomach, opium and camphor are most valuable remedies; but I have seen great benefit also accrue from hydrocyanic acid, given in repeated doses with camphor and aromatics.

86. *d.* When the consecutive seizure is experienced in the *heart* or *lungs*, the same principle of practice should be observed. When the *heart* is affected, the restlessness, anxiety at the *præcordia*, and alarm of the patient are most distressing. I have lately seen two cases of this kind. In both the action of this organ was frequent, irregular, fluttering, and weak; in one, it intermitted every fourth beat, the three intervening strokes being successively weaker. In both these I am convinced, from the character of the symptoms, that depletions would have caused a fatal result. Camphor and opium, with aromatics and external derivatives, were prescribed for both, and in a few hours the affection was removed. In the cases, also, referred to above (§ 19), this and similar modes of practice were equally beneficial.

87. *e.* When *apoplectic*, *epileptic*, or *convulsive* seizures follow the retrocession of gout, vascular depletion is frequently requisite, especially in apoplexy. But, even in it, discrimination is

imperatively called for. If the head be cool, and the action of the carotids weak, an entirely opposite treatment to depletion is required. In the *epileptic* or *convulsive seizures* depletions are often unnecessary, and sometimes injurious. Even when manifestly indicated, they require much caution, and ought not to be prescribed in large quantity. In both the apoplectic and epileptic attacks, purgatives and cathartic enemata, energetic derivation to the lower extremities, and camphor, are beneficial; but narcotics should be withheld, especially in the former, although, when conjoined with antispasmodics and cardiacs, they are sometimes of service. When the retrocession of gout has been caused by cold, vascular depletion is more frequently useful than in other circumstances; but the utmost caution is necessary as to the extent to which it is carried. Derivations by sinapisms, mustard pediluvia, croton oil, &c., however, ought to be most actively employed.

88. *f.* If the *kidneys* or neck of the *bladder* are affected upon the retrocession of gout, the treatment will depend entirely upon the concomitant phenomena. If the urine be suppressed, or pain or tenderness be felt in the region of the kidneys, or numbness in one or both thighs, cupping on the loins, followed by a blister in the same situation, will be requisite; but the latter should be removed after a few hours, or sinapisms substituted. Derivation to the lower extremities, and small doses of camphor internally, with diuretics, ought also to be prescribed. Where the neck of the bladder becomes affected, leeches applied to the perineum, the semicupium, and the internal use of alkalies, with camphor and anodynes, or with mucilaginous and diuretic medicines, should be employed.

89. *B. Misplaced Gout* (§ 21), or those severe affections of internal organs which threaten the life of the patient, and are either followed by the regular disease, or run their course without any external affection, although occurring in persons who have previously had gout, must be treated very nearly according to the principles stated above. If vascular depletion require cautious discrimination in retrocedent gout, it still more imperiously demands it in cases of this kind.—*a.* Any internal organ may be the seat of misplaced gout, or, in other words, the internal viscera are disposed to severe disorder in gouty constitutions; but the stomach, bowels, heart, brain, [spinal cord,] and kidneys are most frequently affected. Gouty persons are often affected by spasms of the stomach and colic, after exposure to cold, or after partaking of cold, acid, or improper food. For these cases, large draughts of warm water, and stimulant and cardiac medicines, or warm brandy and water, are suitable means. In some, the disorder alternates between the *stomach* and *heart*; or the flatulence attending upon the affection of the former induces palpitation or otherwise disordered action of the latter, with inexpressible anxiety. A gentleman who had suffered attacks of gout, but had escaped them for some years, was subject to disorder of the stomach, to severe headaches, and to alarming and sudden affections of the heart, the action of which was fluttering or tumultuous, and the anxiety and suffering referable to it most distressing. He was lately seized with one of these attacks

at a party. He was assisted into his carriage, and was brought to my house after midnight. The affection approached the characters of angina pectoris, but I inferred its aggravation by flatulence; I therefore prescribed a warm, carminative medicine. While this was being procured, I directed the patient to swallow a few of the small pods of capsicum. Flatulent eructations and instant relief were the consequences. In a few minutes afterward he walked, unaided, to his carriage.

90. A gentleman well known in the profession had some years ago experienced imperfect manifestations of gout in the lower extremities, connected with affection of the digestive organs. Recently, after a severe domestic affliction, he was seized with distressing disorder of the stomach and heart, with anxiety, alarm, and nervous irritation. Dr. Roors and myself agreed as to its nature, and prescribed anodynes, with antispasmodics, aromatics, and alkaline carbonates. The excretions received due attention, and external derivatives (§ 83) were employed. While improving under this treatment, he was suddenly affected by an alarming increase of the disorder of the heart. His pulse had become weak, irritable, and intermitting; the impulse of the heart was feeble, but unaccompanied by any abnormal sound; his countenance was expressive of distress, and he was constantly changing his position. A draught, containing two drops of hydrocyanic acid with camphor, aromatics, and capsicum, was prescribed, and repeated in an hour, and derivations by sinapisms resorted to. He obtained relief in a few hours, and continued improving for two or three weeks afterward; when he had a second attack in the night, for which camphor and ammonia, with opium, were given him, and carminatives with magnesia. He was immediately relieved, and has continued afterward to improve; the subsequent treatment consisting of a combination of anodynes and restoratives, and of stomachic aperients.

91. *b.* When apoplectic or epileptic seizures, or diseases of the kidneys or bladder, thus occur in persons who have previously had fits of gout, the treatment should be guided according to the principles just developed. *Apoplectic and paralytic attacks* are very common in gouty persons far advanced in life, and who have been long without a regular paroxysm. In these, depletions are not so generally beneficial as in other circumstances, although they are often required; the energetic exhibition of purgatives and of cathartic enemata, and the application of sinapisms to the feet, &c., being much more generally appropriate. When *epilepsy or convulsions* appear in gouty persons, depletions are hazardous, antispasmodic and purgative enemata and derivation being much more useful. Whatever organ becomes diseased in such persons, the treatment must be guided by the state of the pulse, the signs indicating the nature of the complaint, and the age and strength of the patient; for although large depletions may be necessary in some cases, yet they will certainly destroy the patients in others, although the disorder and its seat are apparently the same. When the disease presents unequivocally inflammatory characters, or when the patient has been highly fed, or is plethoric and robust, blood-letting cannot be dispensed with;

the question being as to the extent to which it should be carried; and as to this, the practitioner must decide for himself, and be guided by the peculiarities of the case. In the gouty constitution, especially, it cannot be trusted to alone, or even principally, unless in robust and plethoric persons. When apoplexy is *complicated* with gout, the former occurring during the paroxysm, or without the disappearance of the latter, blood-letting and alvine evacuations should be prescribed with an energy suitable to the circumstances just adverted to. Such cases, are, however, comparatively rare. I have never known of an instance of epilepsy while the gouty paroxysm continued, although I have seen it take place upon the retrocession of the fit, and in gouty persons. VAN SWIETEN remarks that, in cases in which he has seen an epileptic seizure in the gouty, the occurrence of a regular paroxysm of gout has prevented a return of the epilepsy.

92. *c.* As to the employment of *colchicum* in cases of retrocedent or misplaced gout, recent writers have stated nothing in which the practitioner can confide. When the stomach is weak, the nervous power depressed, and the pulse irritable, it is generally injurious; when inflammatory seizures occur, either upon the sudden disappearance of the external affection, or in the gouty constitution, it may be employed; and the advantage proceeding from it will be in proportion to the degree of sthenic action indicated by the pulse. Yet cases will sometimes occur in which this medicine cannot be endured, although indications of vascular fulness and of increased action are present. A gentleman of regular habits, and of a full and large make, had the consequences of chronic gout in his lower extremities, but had not experienced a regular paroxysm for some years. My attendance was required on account of determination of blood to the head. The excretions were free, bilious, and natural. Desirous of removing the disorder by active alvine evacuations, I conjoined small doses of colchicum with the purgatives; but they occasioned a distressing sense of sinking at the epigastrium, and nausea. I soon afterward found that depletion could not be dispensed with; and nearly thirty ounces of blood were taken from the nape by cupping, without any tendency to syncope; and he soon recovered. In all cases of doubt, this medicine should be prescribed in small doses, which may be increased; but, as with digitalis, an accumulating effect may result, and it ought to be carefully watched. When, however, increased vascular action exists, in the irregular forms of the disease, it may be cautiously used.

93. Dr. BARLOW remarks "that the complex conditions and alleged varieties of gout are referable, not intrinsically to gout, but to the state of constitution in which it occurs." This is all that is meant; for no modern pathologist intends to convey any other idea than that internal affections supervening in that state of constitution which occasions gout are generally more or less modified by this circumstance. It is to the improvement of this state of constitution that treatment should be directed; and, after arriving at rational inferences as to its nature, the means of cure will readily suggest themselves. Having seen that the constitution

or diathesis, which has been called gouty, in order to prevent circumlocution, consists in debility associated with imperfect secretion and excretion, and, consequently, with fulness of blood, or with redundancy of excrementitious matters—the ultimate products of assimilation in the circulation—the treatment should obviously be directed with reference to the predominance of either of these states. Although what has generally been called misplaced gout may thus be viewed as internal affections occurring in the gouty diathesis, and although they sometimes present little deviation from those appearing in other circumstances, yet a very remarkable difference is often observed, the symptoms being very different, and often peculiar, and the *juvantia* and *lædèntia* being also different. The predominance of debility and spasm in many of these affections induced SPRENGEL, CULLEN, and SCHMIDTMANN to prescribe *musk* for them; and the success of the treatment is a presumption of the justness of their views, at least in respect of the cases in which it was employed. In addition to other stimulants and antispasmodics successfully resorted to in similar circumstances, most of which have been noticed above, I may state that a solution of *phosphorus* in æther has been advised by TRAMPFL and HUFELAND; *aconitum* and *nux vomica*, by STÖERCK, myself, and others; the spirits of *turpentine*, by THEODOSIUS and GOOD; and large doses of *olive oil*, by BREFALD, MARINO, and MALACARNE. If *turpentine*, however, be resorted to, castor or olive oil should be given with it, in a quantity sufficient to produce a full operation on the bowels; and the same combination ought to be administered as an enema, in order to promote this effect. Neither of these substances, however, nor camphor, ammonia, æther, opium, nor any of the other stimulants and antispasmodics previously mentioned, should be confided in alone, or unaided by active and persevering external derivation.

94. iv. *Of Mineral and Thermal Waters in Gout.*—Mineral waters are beneficial, 1st, by preventing a return of the paroxysm; 2dly, in cases of atonic and misplaced gout, by giving tone to the digestive and assimilating functions, and thereby either removing the internal affection, or enabling the system to develop the disease in the extremities.—*a.* Respecting the *Bath waters*, Dr. BARLOW makes several judicious observations. In gouty cases, he remarks, especially where the stomach is very weak, and requires some substitute for the wine and stimulants relinquished, the Bath waters give tone to the stomach, improve appetite, and renovate strength. They thus accomplish unequivocal good, not by the mere establishment of gout in the extremities, but by reducing it to its simpler and more manageable state, through the amendment effected in the general health. In general, it may be inferred, from what has been written on Bath waters in gout by FALCONER, GIBBES, BARLOW, and SCUDAMORE, that they are either injurious, or of little service, where plethora, disease of the liver, or determination to the head exists, and that these states should be removed before they are resorted to; but that they are of service in debilitated, nervous, and irritable habits; and for those anomalous or internal affections frequently attacking gouty

constitutions. When these affections occur in weak and nervous persons, and are unconnected with plethora, or active visceral disease, the internal and external uses of these waters are beneficial, especially if due attention be paid to the excreting functions. When gout has debilitated the limbs, and weakened the constitution, so that the nervous system is depressed, and the circulation languid, a course of warm sea bathing, with frictions of the weakened limbs, and sea air, may be tried, or may precede the use of the waters of Bath or Buxton. Where swellings are seated in the vicinity of the joints, the Buxton baths, or pumping of the Buxton waters on the affected parts, are generally serviceable, especially if proper friction and shampooing be used immediately afterward.—*b.* Sir C. SCUDAMORE observes that the waters of *Cheltenham* prove highly beneficial to gouty persons, particularly when conjoined with alteratives and proper regimen. When the precursory symptoms are tedious, or assume the form of what is usually called misplaced gout, their stimulating properties often excite a paroxysm, but it is generally slight. The water No. 4 seems most suitable to gouty patients, especially at the commencement of a course of these waters.—*c.* The waters of *Leamington* and *Harrogate* are not much inferior to those of *Cheltenham*, when they act sufficiently on the bowels, or when their operation is aided by aperients. They seem, however, in the circumstances just alluded to, to have considerable influence in exciting a fit of the disease.

95. *d.* The artificial mineral waters at Brighton, especially the *Scidschutz*, the *Marienbad*, the *Ems*, and *Carlsbad* waters, may also be employed in the more chronic or misplaced states of the disease. The waters of *Wiesbaden* are much used, both internally and externally, in a tonic or misplaced gout, as well as others of the *Nassau* springs; but they are not superior to the mineral waters of our own country.—*e.* PISO, ZECCHIUS, BAGLIVI, and SAUNDERS consider the warm mineral waters recommended in gout as little superior to common pump-water heated to the same temperature. They advise from half a pint to a pint of common water, of a temperature from 90° to 114°, to be taken, and succeeded by moderate exercise every morning, before breakfast. Dr. SAUNDERS states that, in anomalous gout, it allays the irritation of the stomach, and diffuses a generous warmth in the extremities; and that, if taken at night, it conduces to sleep.

[While the *Saratoga* and *Ballston* mineral waters have been recommended in cases of gout and rheumatism by some practitioners, others have not only doubted their efficacy, but even considered their use as highly dangerous. Among those who have entertained the latter opinion is Dr. WILLIAM MEADE, who has written a very excellent treatise on the chemical properties and medicinal qualities of these waters.* “I cannot agree,” says Dr. M., “with the generality of writers who recommend such waters as *Ballston* and *Saratoga* in cases of the gout, under any form of it, but more partic-

* [“An Experimental Inquiry into the Chemical Properties and Medicinal Qualities of the Principal Mineral Waters of *Ballston* and *Saratoga*, in the State of New-York,” &c., by WILLIAM MEADE, M.D. Phil., 1817, 8vo, p. 195.]

ularly in the atonic or retrocedent species of it ; where there is a regular fit of it, they are evidently improper ; and where it is unfixed, and attended with cramps in several parts of the body, severe pain in the stomach, &c., the certain consequence of drinking a cold saline purgative would be to fix it in the more vital organs instead of the extremities. A case of this nature occurred to me, while at Ballston, in a gentleman from the South, who consulted me, after having drank the water of the Congress Spring for some weeks, with great aggravation of a complaint which he described as seated in his stomach and bowels, attended with a discharge of blood from the intestines. Having some suspicion of the cause, I asked him whether he was subject to the gout ; to which he answered, that he had been a martyr to it for many years, but that he had had no regular fit of it for a long time, and was ordered to Ballston by his physician. Thus the history of his complaint was explained ; and after the most urgent symptoms were removed by proper medicines, he had nothing more to do than to refrain from the use of the waters, and to remove to some more eligible place.”—(*Loc. cit.*)

Dr. HOSACK recommends the Saratoga waters in the second stage and in atonic gout ; and other physicians think favourably of their use in almost—after aperients have been employed—every period of the disease. Their composition, also, as shown by analysis, would lead us to infer that they might prove serviceable in the treatment of this affection. They are known to contain chloride of sodium, carbonate of soda, hydriodate of soda, carbonate of lime, sulphate of lime, carbonate of magnesia, sulphate of magnesia, carbonate of iron, bromide of potash, and sulphur, and, in a gaseous state, carbonic acid and sulphuretted hydrogen.

Many of these agents are expressly recommended for the cure of gout, and there can be no doubt of their efficacy in the natural combination presented in these waters, if used with caution, and their operation aided by other medicines. The system is to be prepared for their use by magnesia or bleeding, saline cathartics and diuretics, and all febrile excitement reduced ; and gastric irritation, if present, in a measure relieved, before commencing them. In the advanced stages of gout, as well as in chronic rheumatism, marked by languor of the functions generally, cool skin, and feeble pulse, especially in cases of a neuralgic character, attended with deficient biliary and urinary secretion, we have found these waters, as well as the warm and hot springs of Virginia and North Carolina, of essential service. The good effects evinced on drinking the New-Lebanon waters, as well as those of some other of our thermal springs, are, doubtless, like those of Bath, mainly explicable on the principle of purity, dilution, and temperature. Dr. SCUDAMORE thinks that the Bath waters of England, which are very similar to those of New-Lebanon, are best adapted to the chronic form of gout, where there is great deficiency of nervous energy in the muscles, joined with languid circulation in the extremities, and stiffness, with aching pains in the joints upon motion. The temperature of the Lebanon Springs (74°) is

well adapted for bathing in cases of gout and rheumatism, possessing, in fact, a sedative influence, so desirable in these affections, and far preferable to the stimulating action of a bath of 100° FAHRENHEIT. The Saratoga waters are chalybeate as well as cathartic and diuretic, and this is to be recollected in prescribing them for the cure of disease. Where there is organic disease, or active inflammation of any organ, or much febrile excitement, their use will be contra-indicated ; but in functional derangement, and depraved general health, attended with the former conditions, they will be found to surpass in efficacy most, if not all, other remedial agents, if judiciously used, and for a sufficient length of time.

According to Dr. FRANCIS, of all the mineral waters of the United States, there is none to be compared with the hydroguretted or sulphuretted waters of Avon, in Livingston county, State of New-York. After the necessary antiphlogistic treatment by the lancet, by cathartics, antimonials, and the like, these waters, it is affirmed, are to be classed among the renovators best calculated for the building up the subdued gouty constitution. See Dr. FRANCIS'S “Observations on the Mineral Waters of Avon Springs.”

The “cold water cure” of Priessnitz has, of late, acquired considerable celebrity in the cure of gout and rheumatism ; and the evidence added in favour of its efficacy certainly proves that it affords, at least, in some cases, temporary relief. Captain CLARIDGE, in his work on hydropathy, remarks, “I declare, with a perfect knowledge of cause, and a deep conviction, founded on numerous and notable facts, that the sudorific process and cold water are the only means of curing this disease. Gouty subjects, who could find no relief whatever in medicine, were those that Priessnitz cured the quickest, however violent the complaint.” The patient is subjected, under this treatment, alternately to excessive sweats, by wrapping in wollen blankets, the application of the cold *douche* to every part of the body, as well as cold, wet bandages to the parts affected, and seat, or hip-baths, &c. ; the drinking of immense quantities of cold water, and as much exercise as the patient can possibly take ; these, together with entire abstinence of all stimulating condiments and drinks, and a regulated diet, appear to have produced favourable effects in many cases of this obstinate disease. This treatment, persevered in for five or six weeks, generally brings on copious eruptions or boils, which is called “a crisis,” when the treatment begins to be moderated. We have but few accounts of any accidents occurring under this mode of treatment ; but all that we know of the pathology of gout, and the effects of cold water externally applied, must lead us to doubt the safety—even if we admit the occasional efficacy—of this practice.]

96. v. The *Prevention of Gout* consists chiefly in the careful avoidance of the predisposing and exciting causes, and of acidity of the *prima via*. An abstemious diet, and a small quantity of animal food, are requisite. Some writers, as STARK, REDI, and LOBB, recommend the adoption of vegetable food only ; but this restriction is not necessary. Temperance is equally important ; unless it be strictly observed, no other means of prevention will be per-

manently of service. Regular exercise on foot or on horseback, so as to promote the excretions, is likewise beneficial. Moderation of all the passions and affections of the mind, and avoidance of too intense or prolonged mental application, have been insisted on by most writers; the latter, especially, by SYDENHAM and GOOD. If abstinence, however, be adhered to, and moderate exercise be taken, mental application is seldom injurious. Flannel clothing next the skin, by promoting the excreting function of this surface, is very serviceable. All vicissitudes of temperature, and exposure to cold, wet, humidity, or changeable weather, ought to be avoided. The feet should be kept dry and warm, and, with the legs and knees, be sponged every morning, as advised by SIR C. SCUDAMORE, with a strong solution of salt in water, of a tepid or slightly-warm temperature. If the limbs be weak, pained, or the parts thickened, frictions may be afterward used. DESSAULT directs the limbs to be well rubbed, night and morning, with the hands covered with strong worsted gloves; and states, that a man at seventy had gout, was cured, and remained free from it ever after, owing to this practice, although he lived to one hundred years. SIR W. TEMPLE says that no man need have gout who can keep a slave to rub him. Cold bathing is hazardous for gouty persons, unless active frictions be employed immediately afterward; but tepid or warm salt-water bathing is useful. Of the kind of food most serviceable in gouty cases, little farther need be stated than that the easiest digested is the best. Milk boiled, or warm from the cow, with bread or rice, should constitute a principal part of the food when the stomach is irritable, painful, or flatulent. Rich dishes and sauces, acids and pickles, pastry, heavy puddings, much butter, and the richer kinds of fish, as salmon, &c., should be shunned.

97. The medical means of prevention have already been noticed (§ 67). They consist chiefly of medicines calculated to promote the secretions and excretions, and restore nervous energy. Means producing this latter effect only are injurious, if they be not conjoined or alternated with those causing the former. Magnesia has been much employed as a prophylactic, and is among the medicines that can be employed either alone or with rhubarb. Its daily use has been dreaded since MR. BRANDE published the accounts of two cases, in which it formed concretions with the mucus of the intestines. But this occurrence is very rare, and, if more active purgatives be occasionally employed, not likely to occur. Lime-water and the alkalis have also been prescribed as prophylactics; but the alkalis, when continued long, weaken the stomach, and relax the digestive mucous surface. The use of a dinner-pill such as I have directed above (§ 68), or prescribed in the *Appendix* (F., 562), is more safe, and is generally beneficial.

[To the very full and satisfactory history of the treatment of gout by Dr. COPLAND, little can be added. The disease is, fortunately, less frequent in our country than in Europe; and yet sufficiently so as to afford most practitioners opportunities of testing the different modes of treatment recommended for its palliation or cure. Dr. RUSK, by his lectures and publica-

tions, did much to bring into vogue the practice of copious blood-letting in this disease, and the influence of his writings is still observed, especially among the older class of physicians. The other remedies recommended by RUSK were, *nitrate of potassa* (in cases of inflammatory action, where the stomach is not affected); *cool air*; *diluting liquors*; abstinence from *wine, spirits, and malt liquors*; and *blisters* (which he considered an invaluable remedy, after the reduction of the morbid action by evacuations). He mentions instances where a paroxysm of the disease has been cured by *fear and terror*.*

Where the gout is attended with a *feeble* morbid action in the blood-vessels and viscera, often occasioned by the neglect or too scanty use of evacuations in the first stage, a state of the system which is attended by a weak, quick, and soft pulse, Dr. R. was in the habit of resorting to opium in small doses; fermented and distilled liquors; æther; carb. ammonia; aromatics, as allspice, ginger, pepper, cloves, mace, and Virginia snakeroot, in infusion; oil of amber; cinchona bark; the warm bath; salivation, &c. As means of preventing the return of that state of the disease which is accompanied with *violent* action, Dr. R. recommends temperance; moderate labour and exercise; avoiding cold, by the use of flannel, &c.; moderate exercise of the intellectual faculties, and moderate indulgence of the venereal appetite; and, lastly, a regular state of the bowels. To prevent a return of that state of gout which is attended with a *feeble* morbid action in the blood-vessels and viscera, Dr. R. enjoins the use of a gently stimulating diet of animal food and wine; chalybeate medicines; the volatile tincture of gun guaiacum; ginger; suitable warmth; exercise; avoiding costiveness; agreeable mental occupation; the warm bath in winter, and the cold in summer; a warm climate, &c.

Dr. FRANCIS remarks that "gout, as met with in this country, is more frequently associated with rheumatism than, according to medical records, we have reason to believe it occurs in Europe. The combined forms of these two diseases, in individual cases, may have for their origin the consequences incident to peculiarity of climate, the sudden vicissitudes of heat and cold, dryness and humidity, the variations of temperature so remarkable at certain seasons of the year, as well as other agencies attributable to causes more or less depending upon biliary derangement and a depraved condition of the digestive organs. The extreme indulgence in animal food among all classes, while it predisposes to an inflammatory diathesis, seems also to aggravate or modify the several forms of rheumatism and gout, both by constitutional changes and by local influences. That gout, in a great majority of instances, exhibits unequivocal evidences of its inflammatory nature is too apparent to admit of dispute; and that a hereditary predisposition is often the primary cause of its occurrence is substantiated by facts of daily occurrence. Modern science strongly countenances the belief that increased mobility of the nervous system, and a vitiated state of the blood itself, are conspicuous among the dominant peculiarities of this disease, so annoying to the sufferer, so

* Med. Obs. and Inq., vol. vi., p. 201.

perplexing to the medical prescriber. On the other hand, we find gout affecting females to whom no charges of excessive indulgence either in eating or in drinking could be brought; whose lives were exemplars of the virtues, and whose social condition exempted them from the hardships of toil and the inclemencies of weather. In these cases we have, perhaps, no other alternative in looking for the cause of the affection than to transmitted taint. I have seen severe gout in females prior to the occurrence of the monthly lustrum; in cases of this nature, it might, perhaps, be thought that general plethora was a strong predisposing cause; in the male subject we sometimes encounter gout ere the twelfth year of age. Such instances lead us to infer that, while gout is, for the most part, actively inflammatory in its nature, the inflammation is peculiar in its kind. In nine cases out of ten, the cases of gout which I have witnessed have been associated with plethora; and that the gouty condition is not unmix'd with gastric disorganization, as the more immediate cause of the paroxysm, is too demonstrative to be resisted.

"The vast importance of blood-letting in gout is attested by daily experience; and the direful consequences of the preposterous practice of cold applications, as recommended by KINGLAKE and GOOD, cannot too forcibly be kept in mind. The antiphlogistic treatment of the disease, when not of the atonic form, seems recommended by every consideration of its constitutional character and its local effects."

Dr. ALEXANDER URE has lately published a very important paper, in the "Transactions of the Royal Medical and Chirurgical Society of London," on the use of benzoic acid for the removal of the tephaceous concretions or chalkstones of gout. By administering a scruple of benzoic acid an hour after a meal, the urine voided two hours afterward will be found, on adding a small quantity of muriatic acid, to yield a copious precipitate of beautiful rose-pink acicular crystals, which weigh about fifteen grains. These crystals are *hippuric acid*, and the quantity is, by atomic computation, equivalent to little more than one half the benzoic acid expended, so that the remainder must have made its escape by some other emunctory, probably the skin. By this singular interchange of elements, capable of being effected only by the aid of vital chemistry, we have an organic acid, containing eight atoms of azote and ten of carbon, replaced by one containing no less than 189 of carbon and only two of azote, and that even in what various eminent pathologists regard as a highly-azotized state of the system. Experience has fully established the fact, that by thus substituting hippurate of soda, a salt of easy solubility, for the very sparingly soluble urate of that alkali, the formation of gouty concretions may be altogether prevented.

We have met with several instances where the gout has been entirely eradicated by dropping the use of animal food and alcoholic drinks, and taking considerable exercise. In one instance of this kind the patient had been a martyr to the disease for forty years; but after changing his habits of living, he had no return of the complaint till his death, ten years afterward. We are satisfied, therefore, that however important medicines may be in the

treatment of gout, prophylactic measures are far more important, as they prevent the necessity of resorting to the former. The advantages of exercise in this affection are forcibly illustrated in the following statement of Dr. DUNGLISON: "In chronic gout, succeeding a severe attack of acute gout in the author's own person, he determined to see whether the morbid catenation could be broken in upon by a thorough change of all the influences surrounding him. With this view, he left the city (Philadelphia) with a friend, travelled to Boston, and crossed the country to Albany; returned home, at the end of a fortnight, perfectly restored, and remained free from any regular paroxysm of the disease for upward of three years." (*The Prac. of Medicine*, 2d ed., Phil., 1844.)

Considering gout to be intimately connected with depraved conditions of the alimentary canal, Professor CHAPMAN depends chiefly on active purging in its treatment: a very ancient practice, and in general reputed until proscribed by SVDENHAM. "For forty years," says Dr. C., "I have habitually employed purgatives in the paroxysms of gout, and with unequivocal advantage. Not content with simply opening the bowels, I completely evacuate, by purging, the entire alimentary canal, which, being accomplished, the distressing sensations of the stomach are usually removed, the pain and inflammation of the limb gradually subside, and the paroxysm, thus broken, speedily passes away. To effect these purposes, however, it is often necessary to recur to the remedy repeatedly."

—(*Lectures on the more important Eruptive Fevers, Hæmorrhages, and Dropsies, and on Gout and Rheumatism*. Philad., 1844). Dr. C. recommends, in general, calomel, or blue pill, to be followed by magnesia, or Epsom salts. The following mixture he thinks one of the most effectual of this class of articles, a table-spoonful of which is to be given every hour till it purges copiously: ℞ *Magnes. Calc.* ʒj.; *Sulph. Magnes.* ʒij.; *Tinct. Colch.* ʒjss.; *Aq. Cinnam. Simp.* ʒiij., ft. *Mist.* Dr. C. states that there are some cases of the disease attended with much gastric derangement and foul tongue, especially when acquired in miasmatic districts, and complicated with intermittent fever, where *emetics* are indispensable to a cure. The lancet is indicated by a strong febrile pulse, or irregular determinations of blood, and where local phlogosis is intense; and, in these cases, it should precede the use of cathartics, as well as all other measures.

Dr. C. states that the necessity of the lancet has been infinitely less since he has been in the habit of resorting to free purging, by which the increased pulse, the temperature, and other febrile symptoms, as well as the topical inflammation, are, in most cases, promptly removed. As the inflammation in gout is of a specific kind, it is less controllable by blood-letting than most phlegmasial diseases. As diaphoretics in this disease, Dr. C. recommends DOVER'S powder, and carbonate of ammonia, with laudanum, aided by wine whey; as diuretics, sweet spirits of nitre, with colchicum, and especially an infusion of digitalis. He speaks favourably, also, of LARTIQUE'S pills, which are made after the following formula: ℞ *Extract. Colocynth. Comp.* gr. iv.; *Rad. Colch.* gr. i.; *Fol. Digital.* gr. ss.; *Muc. Gum Arab.* q. s

ft. pill No. 1. two to be taken morning and night. As palliatives for the local affection, leeches afford the most prompt relief; and if these are not to be procured, tepid fomentations of poppy heads, the hop, chamomile flowers, &c., will be useful.

Professor CHAPMAN also remarks that he "cannot forbear to urge the value of our mineral and thermal springs, in their relations to every modification of the disease. Those of Europe, of a similar kind, have immemorially had an indisputable reputation in this respect, and to which I have reason to believe our own are still more entitled, from greater efficacy. The waters of Bedford in Pennsylvania, of Saratoga in New-York, and of the White Sulphur Springs in Virginia, are eminently calculated to repair the derangement of the primæ viæ, the liver, and kidneys incident to the disease; and the warm and hot baths, in the same neighbourhood as the last, are not less so to re-establish a healthy condition of the skin, very frequently dry and harsh, with a feeble capillary circulation; to invigorate the nervous system, nearly always out of order; and, above all, perhaps, are they serviceable in the cure of muscular weakness of the lower limbs, and the chronic swellings, rigidities, and other injuries of the articulations. The first is to be preferred in reference to the general affections named, and the second to relieve the topical lesions, especially when applied as *douches*, followed by frictions and shampooing. Nothing need be said of the influence of the long journey to reach these springs, or of the delicious climate of the locality, or of the charms of the society by which they are distinguished."—(*Loc. cit.*)]

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GRAVEL. See URINE, &c.

HÆMORRHAGE. — SYN. Αἱμορραγία (from *aiμα*, blood, and *ρῆγνυμι*, I break forth), Αἱμορροια (from *aiμα* and *ρῆω*, I flow), Gr.—*Sanguinis Profluvium*, *Sanguifluxus*, Auct. Latin. *Hæmorrhagia*, *Sauvages*, *Cullen*, &c. *Hæmorrhæa*, *Swediaur*, &c. *Cavina Hæmorrhægiæ*, *Young*. *Profusio*, *Linnæus*. *Hæmorrhagic*, *Flux de Sang*, Fr. *Das Bluten*, *Blutfluss*, Germ. *Emorrhagic*, *Flusso di Sangue*, Ital. *Hæmorrhagy*, *Bleeding*.

CLASSIF.—I. Class, Febrile Diseases; 4.

—Order, Hæmorrhages (*Cullen*). 3. Class, Sanguineous Diseases; 4. Order, Cachexies (*Good*). II. CLASS, III. ORDER (*Author in Preface*).

1. DEFIN.—The discharge or escape of blood from the vessels or channels in which it circulates in the healthy state of the body.

2. Hæmorrhage may take place from the heart, the arteries, the capillaries, or veins, in consequence of disease or of external injury. It may proceed from the capillaries without any obvious lesion, excepting an almost unappreciable dilatation of them; or from the vessels formed in adventitious productions, as from

fungoid, carcinomatous, and erectile tumours. It is more or less intimately connected with, and even dependant upon the state of vital power and of vascular action, and upon local or general plethora, especially when proceeding from capillary vessels.

3. Although the definition given above comprises all the various kinds of hæmorrhage, yet I will confine myself to the consideration of those states of it which fall more especially under the cognizance of the physician. When ever the red particles of the blood escape from the vessels to any very evident amount, hæmorrhage may be said to exist; and this inference is admissible in whatever situation the extravasation takes place, whether on mucous or serous surfaces, in the parenchyma of organs, or in any of the compound structures of the frame. All parts of the body may become the seats of hæmorrhage, excepting those which are extremely dense, as the bones, cartilages, ligaments, tendons, &c.

4. Although hæmorrhage may take place from any part of the circulating system in consequence of injury or of disease, yet it most frequently proceeds from the minute vessels distributed in mucous or serous membranes, or in the parenchyma of organs, as in exhalation or exudation from their extremities or pores. Before the time of *MORCAGNI*, as *M. CHOMEL* has remarked, it was ascribed to the rupture of a blood-vessel; and the same doctrine was very generally received until *BICHAT* and *LAENNEC* confirmed the views of this celebrated pathologist. Cases, however, often are met with in which it is very difficult to determine whether the hæmorrhage proceeds from exhalation or from a ruptured or diseased vessel; and, even on inspection after death, the most intimate examination is requisite to the ascertaining of its source.

5. The discharge of blood from capillary vessels, in the form of exhalation or exudation, has been very generally viewed as depending upon a state of those vessels different from that which constitutes inflammation. This doctrine has been recently controverted, particularly by *LEFEBVRE* and *BROUSSAIS*; and the following points, in which hæmorrhage closely resembles inflammation, have been adduced in proof of their very intimate connexion, if not of their identity: they both very frequently arise from the same predisposing and exciting causes; both are idiopathic or primary, and symptomatic or consecutive; both are either sthenic or asthenic, acute or chronic, active or passive; they both affect chiefly the same organs, and both require the same treatment. Notwithstanding these resemblances, hæmorrhage is far from being the same disease as inflammation, as will appear in the sequel (§ 13, 15).

6. In a great majority of instances, hæmorrhage is merely a symptom, contingent upon a variety of affections, the primary ailment being chiefly important to the physician. This is the case no less when it takes place as an exhalation from mucous surfaces, as when it occurs from disease of the vessels, or into serous cavities, or the parenchyma of organs. If we enter into an analysis of the pathological relations of hæmorrhages, we shall find that in comparatively few cases are they strictly primary or idiopathic. This term, therefore, must

have a relative acceptance as regards them. Even when proceeding from the capillaries of mucous surfaces, and when perfectly independent of organic lesion of the vessels or of that surface, hæmorrhage is a consequence of antecedent changes; and it is indispensable to the due consideration of the subject that the nature of these changes should be understood. They may be referred to four general heads, namely, 1st. To the states of organic nervous power and vital action; 2d. To the state of structure in which the hæmorrhage takes place; 3d. To the state of the circulating organs and vessels; 4th. To the conditions of the blood; and, 5th. To any two or more of these conjoined.

7. i. *Of the States of Organic Nervous Power, or Tone, and of Vascular Action, in Hæmorrhages.*—Although nervous power may be either excited or depressed in the seat of hæmorrhage, it is rarely the former, even when vascular action is increased, unless an irregular distribution or determination of it to the part take place, from its suppression in some other situation, or from local irritation. Vascular action, however, is much more frequently increased than depressed, not only in the part, but throughout the system; and this increase is generally much above the state of organic nervous power or tone. Owing to this circumstance—to the deficient tone of the extreme vessels, and to the imperfect resistance opposed by them to the increased action of the heart—is to be attributed, in part, the occurrence of hæmorrhage; or, in other words, vascular action overcomes the resistance opposed to it by the vital tone of the capillaries of the part in which hæmorrhage takes place. The frequent increase of action in this class of diseases induced Dr. CULLEN to arrange them among febrile complaints. But this increase is not general; and, even when it exists, it is often consecutive upon, or produced by the sanguineous discharge. When hæmorrhages are accompanied by excited action, the vascular excitement is frequently manifested chiefly in the parts affected, and in those adjoining them, in the form of active determination or congestion. Thus, in epistaxis, hæmoptysis, hæmatemesis, hæmorrhoids, &c., there is excited action in, or determination to the organs or structures in the vicinity of the surface from which the blood is discharged, although the circulation in other parts of the frame may be natural, or even below the usual standard. This circumstance, in connexion with the antecedent and concomitant phenomena of hæmorrhages, indicates an irregular distribution of vital action, generally attended by deficient organic nervous power or tone, an increase of vascular action in certain parts, and a diminution of it in others, rather than a state of general febrile commotion. In many instances, also, more especially in the symptomatic varieties, the extravasation is unaccompanied by increased action, and, as we shall see hereafter, is more frequently the result either of a morbid condition of the textures, or of the vessels themselves, or of impeded return of the blood, in connexion frequently with plethora, local or general, and with other morbid states about to be noticed.

8. While, however, we observe, thus frequently, an irregular distribution of vital action

through the frame, the increased action, when increase exists, being in the seat and vicinity of hæmorrhage, it must be admitted that febrile commotion also sometimes exists and ushers in the sanguineous discharge. It would seem as if, in many of these cases, the febrile excitement, accidentally produced, had given rise, owing to the increase of the *vis à tergo*, to the extravasation; the impaired tone of the extreme vessels being insufficient to antagonize the action of the heart.

9. In many cases, the hæmorrhage is altogether the result of irritation, particularly when applied to a mucous surface; but, in these, the sanguineous discharge is very slight, or is merely a part of the evacuation that takes place. Here the extreme vessels become enlarged or dilated, owing to that state of vital expansion which mucous and erectile tissues assume when subjected to irritants or stimuli. From the expansion thus induced, an increased momentum of blood in the enlarged capillaries, and the determination of the circulating fluid to this quarter, necessarily result. If we apply any irritating substance to a mucous surface, the nerves of the part are excited, their vital manifestations are at first augmented, and the capillaries are ultimately expanded or enlarged, the tissue assuming more or less of increased volume. This erectile state, which all vascular parts present in a greater or less degree, according to their vascularity, and the extent to which they are supplied with organic nerves, generally subsides when the irritation is withdrawn; but if it continues to act energetically, and especially if it affect the action of the heart, and thereby occasion general irritation or febrile commotion, the expansion of the extreme vessels may proceed so far as to solicit, upon hydraulic principles, so great a flux of blood through them as may overcome their power of vital resistance, or may occasion the exudation of this fluid through their pores, which, owing to their distention, acquire an increased diameter, and allow the red particles of the blood to exude. This result is still more likely to occur when organic nervous power is deficient or depressed, as it frequently is in the constitutions and circumstances in which hæmorrhages occur.

10. The effect thus produced by material irritants may take place from an excited state of the organic nerves supplying the tissue, the primary affection being in these nerves, and occasioning the vital expansion of the capillaries, the increased afflux of blood to these vessels, and all the contingent phenomena. Such appears to be the procession of morbid changes in many cases of active hæmorrhage of an idiopathic or primary kind. The first change takes place in the organic nerves of the affected part, and occasions the vital expansion of the capillaries, and thereby an increased flux of blood through these vessels and the larger trunks supplying them; the excited state of the nerves and the increased action of the vessels being propagated to the heart through the medium of the organic, nervous, and vascular systems. Thus febrile commotion is induced in the more active forms of hæmorrhage. If we attend closely to the symptoms in such cases, we shall find a sense of titillation and of increased heat, with throbbing of the vessels, &c., ushering in

the discharge of blood. These symptoms clearly indicate the first change produced on the organic nerves, and its effects upon the circulation of the part. At last the blood pours forth, and shows that the tone or power of resistance in the extreme vessels has so far yielded to the increased momentum of blood as to allow the escape of a portion of this fluid through the pores of these vessels, and of the tissues in which they ramify, the vital cohesion of the tissues either being originally weak, or having become weakened by pre-existent disease, as in the case of consecutive hæmoptysis, or of hæmorrhage occurring in the course of fevers.

11. From this it will be seen that, in active hæmorrhage, more or less excited action exists in the seat of the discharge; and when it commences in this seat, it is propagated to the heart in the manner above stated. The mere demand which is made upon the heart by the augmented afflux of blood solicited by the dilated and discharging capillaries is insufficient to account for the characteristic phenomena of disease, without calling into aid the organic nervous influence, and the reaction consequent upon the sudden depletion of the vessels during a state of plethora. It will explain increased rapidity of the pulse, but little more. While, however, I thus contend for the frequency of excited action in the seat of hæmorrhage, often confined chiefly to that situation or its vicinity, or extended more or less throughout the frame, and assuming various grades of activity, it must not be overlooked that this action is generally attended by impaired nervous power or tone, and weakened cohesion of the extreme vessels and tissues in which they ramify. In proportion to the feebleness of vascular action, and to the loss of vital tone and of cohesion of the capillaries and tissues, will the hæmorrhage present more of an asthenic or passive character. But there is no absolute or unvarying grade, to which the terms sthenic or active, and asthenic or passive can be applied; but every degree of action, as well as of diminished tone, either above or below the healthy standard, will present itself in practice. This association of excited vascular action and capillary expansion, with weakened nervous tone and vital cohesion, argued for above, is fully evinced by the state of the pulse, which, in most hæmorrhagic diseases, is broad, open, compressible, soft, and sharp; the parietes of the artery being felt as if yielding to the impulse of the heart, but quickly reacting upon the momentum with which the current of blood is propelled; thus imparting a sharp, or bounding, or jerking character to the pulsation.

12. It is not only an irregular distribution of organic nervous power, with vascular excitement and deficient tone, by which hæmorrhages are frequently characterized; but the diminished cohesion of the extreme vessels, and of the tissues in which they ramify, above alluded to, is often the prominent feature of the pathological conditions in which these diseases originate. This diminution of vital cohesion in the part is generally associated with debility; and with weak, although frequent, or even excited action of the heart, the phenomena varying with the state of action, or the degree of excitement, or, indeed, with the modi-

fied grades in which the different elements of this pathological state present themselves. In such cases, the dilated and congested capillaries, the deficient nervous power, and the generally weakened vital manifestations of the frame require, in their different grades, the accurate recognition and attention of the practitioner. In many cases of truly *asthenic* hæmorrhage, the frequency of the pulse is mistaken for excitement; but, in these, the frequent contractions of the heart are the necessary consequence of the loss of blood, and of the imperfect tonic contraction of the series of circulating vessels upon their contents—are the result of the loss of tension in the vascular circle, and of the facility with which the current is propelled in a relaxed and yielding channel.

13. ii. *Changes in the Structures, the Seats of Hæmorrhage.*—The escape of red blood from the vessels generally takes place upon those surfaces most engaged in exhalation and secretion, and in those structures which, owing to their natural laxity, furnish a slight support to the capillaries supplying them. Yet extravasation will not take place, as already remarked, during a healthy state of the part, or when its vital cohesion is undiminished. It generally supervenes in consequence of certain lesions of the action and organization of the vascular and capillary systems, or of the tissues which they supply, or of both together. But it should not be overlooked that a change in the state of the tissues will generally, sooner or later, affect the capillaries supplying them, while a lesion of the latter will also affect the state of the former. The question, therefore, chiefly regards the priority of affection, and the extent to which either becomes changed. But it should also be admitted that the lesion may be coetaneous and co-ordinate in both the capillaries, and in the tissues the seat of hæmorrhage.

14. Discharges of blood seldom take place to any amount, excepting in textures which furnish, from original conformation, or from diminution of vital cohesion, an insufficient support to the capillary vessels, and which imperfectly enable them to withstand the distending power to which they are subjected by the occasional increase of the heart's action, and of the momentum of blood passing through them, or by an impeded return of blood through the veins, or by general or local plethora. This important pathological fact is demonstrated by the occurrence of hæmorrhages as a consequence of softening of the mucous surfaces, or of cellular and parenchymatous structures, or of serous membranes, particularly when their vital cohesion has been diminished by constitutional disease, and when the impulse or action of the heart and arteries has been increased by any external or internal cause. The sanguineous discharges occurring in dysentery, scurvy, purpura hæmorrhagica, fever, &c., are familiar instances of the influence of deficient cohesion of the tissues in the production of hæmorrhage; and epistaxis, hæmoptysis, hæmorrhoids, &c., illustrate a combination of this state with increased vascular action, in which both the heart and arteries participate.

15. iii. *Of Changes in the circulating Organs and Vessels in the Production of Hæmorrhage.*—As to the state of the capillaries in hæmor-

rhage, it is unnecessary to advance much beyond what I have already stated (§ 13), because their conditions are very intimately associated with the states of nervous power and of vascular action characterizing the attack. In all the more idiopathic hæmorrhages the vessels cannot be said to undergo any rupture. Their minuter ramifications and extremities seem to be dilated, and their pores, whether lateral or terminal, so far enlarged by the deficient tone and cohesion of their parietes, and of the tissues in which they terminate, as to admit of the exudation of a large portion of the blood flowing through them. This state of the capillaries in the seat of hæmorrhage is, however, generally associated with other important changes in the circulation, and in the blood itself. The changes in the circulating organs vary in the different states of hæmorrhage. Those which precede and induce the discharge are generally different from those which accompany it, and ought to be carefully distinguished; they are principally the following: 1st. Increased action of the heart and general febrile commotion, as above explained—as in *active, sthenic, or febrile hæmorrhages*. 2d. Determination of blood to the seat of hæmorrhage, or active congestion of its capillaries and larger vessels, with symptoms of excited action of the part and its vicinity chiefly, as in *sub-acute* cases. 3d. Very frequent or very weakened action of the heart, with depressed nervous power, impaired tone of the circulation, and laxity of the soft solids, as in *asthenic, passive, or non-febrile hæmorrhages*. 4th. Impeded circulation, and consequent congestion of the venous system, arising from disease of the heart. 5th. Interrupted circulation through the liver, or impeded return of blood from any viscus or part, as in some *symptomatic hæmorrhages*.

16. The *first, second, and third* of these states have been sufficiently explained. In the *first and second*, however, the dependance of the hæmorrhage upon inordinate action and hypertrophy of the heart should not be overlooked, effusion of blood within the cranium or into the lungs being occasionally caused by this organic lesion. The *second* pathological state of the circulating system commonly precedes the discharge, or exists chiefly at its commencement, is frequently the immediate cause of the hæmorrhage, and is generally removed by it, as in epistaxis, &c. In the *fourth* of the above states the hæmorrhage is entirely owing to the venous congestion or plethora induced by the cardiac disease. Extravasations of blood from this cause generally assume states intermediate between active and passive. The obstruction to the circulation through some one of the cavities of the heart extends its influence to the venous capillaries, and these also become congested. The action of the heart and arteries being unimpaired, or even increased by the obstacle to the circulation through the veins, the congestion of the capillaries is thereby augmented, until at last their contents partially exude through their parietes or pores in the situations where they are of the greatest tenuity, or are weakest, or the least supported by the structures in which they are distributed. This form of hæmorrhage is analogous to the inflammatory action which

occasionally takes place under similar circumstances, and differs from it chiefly in respect of the states of vital cohesion and tone in the vessels and tissues affected, and of the fluids discharged from the diseased parts. Where inflammatory action is the consecutive affection, the organic nervous power of the part, and the tone of the capillaries have not been overpowered by the congestion or local plethora to which they had been subjected, but react upon the causes of distention. When, however, hæmorrhage is the result, we may infer, either that the tonic action of the capillaries has been overcome, and the blood has exuded through them, as just stated, or that the cohesion of the tissue has been so weakened as to deprive the capillaries of the necessary support, and thus to favour their dilatation and the consequent effusion; but it is very probable that this result more frequently arises from the co-existence of both these changes than from either of them singly. This reasoning equally applies to the hæmorrhages consequent upon obstructed circulation through the liver, or interrupted return of blood through any part of the venous system. A large proportion of cases of hæmatemesis, of intestinal hæmorrhages, of hæmorrhoids, of hæmoptysis, and of extravasations into parenchymatous organs, are caused in part, if not altogether, by this state of the circulation, although debility, vascular plethora, &c., are also often concerned, more or less, in their production.

17. iv. *Of the States of the Blood in Hæmorrhages*.—Changes in the circulating fluid, as to quantity and crasis, are more concerned in the production of hæmorrhage than modern writers have admitted. In the *first* of the pathological states of the circulating system (§ 15, 16) the blood possesses nearly its natural crasis; and, when vascular excitement is considerable, it often presents similar appearances to those in inflammation, and is not remarkably deficient in fibrin. In this state of the disease, especially, marked evidence of vascular plethora has preceded and ushered in the attack. In the *second state* of the circulation (§ 15) the blood may be of natural appearance, or it may participate slightly in the inflammatory or sthenic characters; or its crassamentum may be loose, and either large or small, for the quantity of serum. Its fibrin may be also more or less deficient. In this state, general as well as local plethora usually exists at the commencement of the seizure.

18. In the *third, or decidedly asthenic* pathological condition (§ 15), the blood is more manifestly altered than in either of the above. It usually does not separate into a firm coagulum. Sometimes no separation into crassamentum and serum takes place; and, if it does so separate, the former is loose, dark, or even black, particularly in its lower part, and readily mixes with the serum, in which it is occasionally sunk, appearing like a black deposit at the bottom of the vessel. In some cases the blood flows from the part like a dark cruor or sanies, without coagulating, or contributing thereby to the arrest of the discharge; in other instances it is pale, thin, and watery. The deficiency of fibrin in all these circumstances is very remarkable. In several, the serum is unusually albuminous. In this form, there may be gen-

eral or partial vascular plethora at the commencement of the attack; but I believe that a state of anæmia is sometimes present, particularly when the blood is pale, thin, and watery; at least there is an obvious deficiency of fibrin and of red particles. This state of the circulating fluid is sometimes primary; is not infrequently associated with a lax or delicate organization of the extreme vessels; and evidently contributes to the production of the hæmorrhage, the weak or lax capillaries giving a ready issue to the thin fluid, especially in its state of deficient crasis.

19. While the *first, second, and third* pathological conditions of the vessels above noticed—which may be considered as constituting the more idiopathic forms of hæmorrhage—are thus attended with various morbid states of the circulating fluid; some of these states, however, being proper to, or the usual concomitants of these conditions of the vessels, it should be recollected that each of these conditions insensibly passes into one another, and that each of those morbid appearances of the blood is variously modified and combined; so that hæmorrhagic diseases, in the different forms, states, and complications in which they present themselves to our notice, are occasionally accompanied with every morbid change comprised in the article on the *Pathology of the Blood*. Moreover, the appearance of this fluid varies, at different stages of the same seizure, with the quantity lost, and with the depression of vital power thereby produced; so that when the hæmorrhage has been to a very considerable amount, the proportion of serum becomes relatively much increased, owing to the rapid absorption of fluids into the circulation from the *prima via*, and different tissues and organs; the density of the coagulum being, at the same time, more or less diminished, and the quantity of fibrin remarkably lessened, as the sthenic passes into asthenic action, until, at last, fibrin can scarcely be detected in the more asthenic or passive forms of the disease.

20. Of the frequency of *plethora*, general or local, as an element of the pathological condition ushering in hæmorrhage, the practitioner should be fully aware, as the removal of this state is intimately connected with the prevention and judicious treatment of the disease. The quantity, as well as distribution of the blood in the system, the state of organic nervous power, by which local determinations of blood are chiefly produced, the degree of vascular action, and the turgidity of the part affected, vary with the *age* of the patient, with his constitution and temperament, and with the nature of antecedent or associated disorder. It may be stated as a general inference, that hæmorrhages are more referrible to excited action of the heart, to irritation in the seat of discharge, and to a dilated or morbidly erectile state of the capillaries, conjoined with increased action of arterial vessels, and, consequently, that they partake more of an acute, active, or sthenic character, the earlier the age of the patient. On the other hand, they more evidently depend upon obstruction to the venous and capillary circulation; on a softened, relaxed, or diseased state of the structure in which they occur; and on lesions of the vessels themselves; and, therefore, are more commonly of

a passive or asthenic kind, or, at least, present the lower grades of activity, the more advanced the periods of life at which they take place. As to the influence of *age* on the forms of hæmorrhage, my opinions are not very different from those of STAHL, in whose writings may be found much of what has more recently been advanced on the pathology of this class of diseases.

[M. ANDRAL has shown, by his late researches (*“Pathological Hæmatology,”* Am. ed., Philad., 1844), that the cause of hæmorrhage, in many instances, cannot be traced to any primitive lesion of the solids, but is owing to an absolute or relative diminution in the quantity of fibrin, as above stated. Thus, in scurvy and typhus fever, in which diseases the blood contains but little fibrin, hæmorrhage is a very common occurrence; while in phlegmasial diseases, where there is an absolute excess of this element, hæmorrhage is rare. The same is true in chlorosis, where the proportion of fibrin is relatively great. It is, then, a diminution of the fibrin relatively to the globules that predisposes to hæmorrhage, and the relation of these two facts is so constant as to justify the belief that the one is the cause of the other. It may be objected to this view, that the hæmorrhage induces the diminution of the fibrin in the blood; but the loss of blood, according to the observations of ANDRAL, must be very copious to produce that effect, and the same pathologist remarks that he has seen the fibrin diminish where the amount of the hæmorrhage could not explain that occurrence. But if the hæmorrhage produced a change of the blood in such cases, the *globules* should be found diminished in a larger proportion, even, than the fibrin; but so far from this being the case, the globules are most frequently in excess relatively to the fibrin. There are two very different conditions of the blood, then, which may predispose to hæmorrhage: the first being that in which the amount of globules has reached the highest limit of the physiological state, or has exceeded it, the fibrin meanwhile preserving its normal proportion, and standing at least as often below as above its average, as in cases of plethora, where there is always a greater or less disposition to hæmorrhage, especially to epistaxis. This occurrence always affords great relief, because the hæmorrhage diminishes the amount of globules of the blood without affecting its fibrin; the equilibrium between these two elements is thus spontaneously re-established, and hæmorrhage, with symptoms of plethora, is not renewed until an excess of globules is once more reproduced along with the blood. But there is a still stronger disposition to hæmorrhage where the quantity of fibrin is below the healthy standard, while that of the globules is natural, as in scurvy. In cases of hæmorrhagic diathesis, met with occasionally in some families and individuals, there is undoubtedly a relative diminution of fibrin, as compared with the globules, and the same is observed to be the case in purpura hæmorrhagica, and even scarlatina and typhoid fever, attended with petechiæ. ANDRAL has noticed the same condition in some cases of cerebral hæmorrhage, leading to a want of plasticity in the vital fluid. The cases in which the fibrin is only diminished relatively to the globules in

excess belong, by virtue of their symptoms, to the class of hæmorrhages called *active*; while the cases in which the fibrin is really or absolutely diminished, belong to that class of hæmorrhages called *passive*; so that this ancient classification, which has been rejected by some late pathologists, is ascertained to be founded in nature. ANDRAL has also shown that a mere diminution of the globules is not a direct cause of hæmorrhage, although we often observe this accident occur, with disastrous obstinacy, in persons who have suffered from excessive loss of blood; but here there is a diminution not only of the *globules*, but also of *fibrin*, to which latter circumstance the hæmorrhage is owing. If we bleed an animal to death, and divide the blood into several distinct portions, we find that the portions last drawn abound less in fibrin than those which first escaped. The fact, then, is well established, that profuse and repeated hæmorrhage exhausts the blood of its fibrin, so that at length it escapes from other outlets than those from which it at first issued. We have seen an instance similar to one related by ANDRAL, where the surface became covered with petechiæ during the continuance of a copious epistaxis that could not be arrested, although he had never before had such symptoms. In this manner, a hæmorrhage which has exhausted the system by its copiousness, and its frequent returns, finds a cause of its persistence and relapse in the new condition of the blood which it has created. Hence the danger of resorting to copious depletion for arresting or preventing hæmorrhage, as it may have the very effect of perpetuating its recurrence.—(*Loc. cit.*) According to ANDRAL, hæmorrhagic blood, as regards its physical properties, does not differ from that of the pyrexia.* It never presents any buffy coat, without inflammatory complication. The clot is generally large, and never small, except in cases of extreme poverty of the blood. It is generally remarkable for considerable softness, and when the hæmorrhage depends on a very great diminution of fibrin, the blood may be so little coagulable as hardly to form a true clot; or it may happen that, instead of this latter, there is nothing in the vessel containing the blood except some disconnected lumps suspended in reddish serum. This constitutes that dissolved state of the blood which we observe in some low fevers, and in cholera, and is doubtless connected with some modification of innervation, so subtle and obscure as to evade our most diligent investigations. MAGENDIE (*On the Blood*, vol. ii., p. 316) has produced a similar condition of the vital fluid, by injecting into the veins of living animals a concentrated solution of sub-carbonate of soda, attended also with the same symptoms as are met with in those adynamic forms of disease in which a similar state of the blood exists; and it is worthy of remark in

this connexion, that some pathologists have found an excess of alkaline matter in the imperfectly coagulated blood of persons who died of low fevers or scurvy. MM. ANDRAL and FRENAY have also observed the same fact in relation to the blood of scorbutic patients, and the former pathologist supposes that the different virulent and miasmatic substances which, on being introduced into the blood, diminish its coagulability, act upon the fibrin like the alkaline substances above mentioned; among these are the virus of the viper and rattlesnake, &c.; malaria from putrid animal and vegetable matter; the koino-miasm of contagious diseases; powerful emotions of the mind; severe shocks to the nervous system, as well as an impoverished diet, and impure air. We need but allude to the admitted fact that the nervous system exerts a powerful influence on the constitution of the blood, and that a lesion of innervation may deteriorate the blood just as an alteration of the blood may modify the nervous action. Prof. DUPUY, of Alfort, states that, by dividing the pneumogastric nerves in horses, the blood of these animals lost its property of coagulating, and it is well known that the blood is found dissolved in animals killed immediately after being violently driven. Does this fact seem to throw any light on the cause of those hæmorrhages which so frequently occur after long-continued and violent exercise!

A diminution of the fibrinous element of the blood seems to have characterized the great epidemics which prevailed in Europe during the middle ages, and which were characterized by gangrene, hæmorrhage from various parts, petechiæ, and ecchymoses; and the same remark will apply to the epidemic typhus fevers of our own country, particularly that malignant form of it called *spotted fever*.

As to the manner in which blood escapes from the vessels, MORGAGNI and BICHAT believe that it is, in general, the result of a process of exhalation, without the slightest lesion of the vessels from which it emanates; but as it is now believed that there are no exhalants, in the true sense of that term, we are forced to the conclusion that the blood may percolate through the sides of the vessels, as shown by the experiments of DUTROCHET of France, and of J. K. MITCHELL and E. D. FAUST of our own country. These experiments go to prove that all animal tissues are permeable to fluids and gases; hence we are justified in believing that most hæmorrhages not dependant on rupture are caused by a sort of exosmosis, diapedesis, or transudation, by which the elements of the blood escape through the coats of the vessels. We know not all the precise conditions on which hæmorrhage depends, but it may result from a modification of the blood itself, as above pointed out, or of the vessels, by which their coats become relaxed and patulous.]

21. V. REMOTE CAUSES OF HÆMORRHAGE.—*a.* *Predisposing causes.*—The frequency of hæmorrhages, especially their more active states, is greater in the sanguineous, the irritable, or the sanguineo-bilious temperaments, in plethoric constitutions, and in the serofulous diathesis, than in the nervous, lymphatic, and melancholic temperaments, and in spare habits of body. They are more common and abundant towards the completion of youth than at any other pe-

* [Dr. J. H. BENNET states that a very important change in the blood in hæmorrhagic diathesis consists in the structural alteration of the corpuscles. On one occasion, he examined the blood of a patient labouring under purpura hæmorrhagica, and found that the larger number of corpuscles were changed in form. Some were of an angular or oblong shape, others serrated, or notched at their edges, while numerous small shreds, or granules, were floating loose among them. In short, the blood corpuscles were broken down, and presented an appearance similar to what has been observed in specimens of putrid blood.—(*Lond. Med. Gazette*, Aug., 1842, p. 787.)]

riod; and they are comparatively rare in infancy and in old age. Females are more subject to them than males. They occur sporadically, and are more frequent in spring than at any other season, but are scarcely ever epidemic, although at Breslau they prevailed at one time to a remarkable extent, children having epistaxis, adults hæmoptysis, and the aged hæmorrhoids. There may be said to be a hæmorrhagic diathesis; inasmuch as hæmorrhages are more common in the offspring of parents who have experienced attacks than in others, and as they are often observed in several children or members of the same family. M. CHOMEL remarks that hæmorrhages from the rectum, urinary organs, and uterus, occur oftener in cold than in warm seasons; and that epistaxis and hæmoptysis take place more frequently in summer than in winter. I believe that this is the case, especially during dry states of the air. In childhood, hæmorrhage takes place chiefly from the pituitary membrane; in adolescence, from the bronchial surface; and in mature age, from the rectum, the urinary, and uterine organs. Whatever tends to increase the quantity of the circulating fluid is, so far as it has this effect, a predisposing cause of hæmorrhage; as too much or too little nourishing food, indolence, the suppression or retention of accustomed discharges, the neglect of requisite evacuations, and the loss of a limb.

22. *b.* The *exciting causes* are, sudden increase of temperature; great dryness, and the rapid diminution of the weight of the atmosphere; the use of alcoholic liquors or of other stimulants; violent mental emotions, especially anger, joy, &c.; too warm clothing, or too warm apartments; muscular exertions; quick walking or running; ascending heights; and various chemical and mechanical irritants. These causes generally give rise to the more active or *sthenic states* of the disease. Dr. PARR very justly disputes the rarefying influence of heat on the blood in the production of hæmorrhage, and refers the operation of this agent chiefly to the living solids. There can be no doubt of heat not only exciting the nerves, but also causing an expansion of the extreme capillaries, and increased fluxion to the parts affected by it. The usual causes of debility—as insufficient and unwholesome nourishment, the depressing passions, fatigue, contamination of the circulating fluids by impure or close air, poisonous injesta, exhausting secretions, masturbation, &c.—principally occasion *asthenic hæmorrhages*.

23. *vi.* The *SYMPTOMS* differ very remarkably, according to the situation and circumstances in which hæmorrhage takes place. They vary, also, with its extent and rapidity, according as it constitutes the principal lesion, or is a contingent and comparatively unimportant phenomenon. When extravasation takes place in the substance of an organ, the functions performed by such organ will be interrupted co-ordinately with its amount and rapidity; but when it occurs into one of the large serous cavities, little interruption of function is observed, until the effusion is so great as either to produce syncope or to embarrass the adjoining organs by pressure. Hæmorrhage from mucous surfaces is generally made manifest by its discharge through the outlets of the canals

in which it takes place. Yet, even in these cases, the extravasated blood may be retained, although its quantity is so great as to give rise to the most serious results. The *blood* itself presents all the appearances already described (§ 17, 18), according to the state of vital power and of vascular action, and the quantity and quality of this fluid. If it be contained long in any cavity or part, it will be coagulated, or grumous, or thick, dark, greenish, brown, or sanious, or otherwise altered, according to the situation, the period of retention, and the state of the patient. When extravasated blood passes through a large portion of the digestive canal, it is still more remarkably changed by admixture with the secretions, gases, and other matters in this situation. Hæmorrhage, as to quantity, varies from a few drops to several pounds.

24. *A.* The *symptoms* preceding and attending hæmorrhage differ so as almost to defy description. The more active and *sthenic* forms are preceded by signs of general plethora and of increased action; slight horripilations, and a frequent, full, open, and jerking, or bounding pulse often ushering in the attack. The more *asthenic* states frequently are unpreceded by any distinct premonition, and are unattended by vascular reaction; flaccidity of the soft solids, with a weak, soft, rapid, or expanded pulse, generally accompanying the discharge. In the *former* there is a sense of heat, tension, fulness, and throbbing, with slight or shifting pain at the commencement, and often actual increase of temperature in and near to the seat of hæmorrhage. In the *latter* these sensations are rarely felt, and increased temperature is not observed; general uneasiness, with pallor, shrinking, and coldness of the extremities, in various degrees, being common to both. In the *active* states the blood is florid, coagulates readily and firmly, and frequently ceases to be discharged as soon as the evacuation has proceeded so far as to remove the plethora and increased action occasioning it, the patient often feeling lighter and better from the attack. But this is by no means uniformly the case, as the hæmorrhage sometimes proceeds to a dangerous extent, not merely as respects the organ affected, but as regards the quantity of blood lost to the economy. This arises from the nature of the local lesion associating itself with the hæmorrhage, or from the vital depression caused by the discharge, or from the lost power of the capillaries, or from the difficulty with which local fluxion or determination of blood is arrested, when once established and an outlet given to it, particularly when the coagulating property of the blood is impaired, owing to deficiency of fibrin, or from two or more of these causes conjoined. In the *passive* states, on the contrary, the blood is dark, fluid, thin, or even pale, and incapable of coagulating firmly, or even at all. The powers of life sink still lower as the hæmorrhage proceeds, and become less capable of arresting it, until the relation subsisting between the action of the heart, the tonic contraction of the arteries upon their contents, and the quantity of the contents in respect to the power of vital reaction possessed by these vessels, is subverted; and the patient, in consequence of the subversion, experiences successive attacks of syncope, or suddenly expires.

25. In all cases where hæmorrhage proceeds so far as to depress the pulse, or does not stop after the plethora and increased action have been removed by it, and still more remarkably in the asthenic forms, pallor of the countenance and general surface, coldness of the extremities, a shrunk or empty state of the cutaneous veins, faintness or full syncope on assuming the sitting posture, are present, in a degree usually co-ordinate with the extent to which the discharge has proceeded.

26. *B.* The duration of hæmorrhage is extremely various. It may only continue a few seconds, or many hours, or even days. It may persist with slight intermissions for months, or even years. It may be continued, or remittent, or intermittent. When this last, it may be either irregular or periodic.

27. *vii.* The DIAGNOSIS of hæmorrhage requires but little remark, as the subject is more fully noticed hereafter. In cases of very sudden and copious internal hæmorrhage, causing syncope or sudden death, these results may be mistaken for the more common forms of syncope, or for death from apoplexy, or from disease of the heart. But the remarkable pallor of the lips, tongue, gums, and general surface; the smallness and emptiness of the jugular and superficial veins; the circumstance of the veins not filling beyond where pressure is made; and the history of the case previously to, and at the time of either of these occurrences taking place, will point out the nature of the disease, even although no external discharge of blood be observed.

28. *viii.* The PROGNOSIS entirely depends upon the situation and form of the hæmorrhage. It is extremely unfavourable when it takes place into the structure of an organ. It is equally so when it occurs into serous cavities. When it proceeds from mucous surfaces, the danger is generally very much less: it is, however, great, when it is symptomatic of structural disease of the vessels, or of any part of the circulating system, or of tubercular formations, and when it unequivocally presents asthenic characters. The prognosis is the most favourable when the hæmorrhage is primary or idiopathic; when it arises chiefly from plethora and excited vascular action; and when it is seated in mucous canals. The nearer to the outlets of these canals it takes place, the less is the risk from it. Epistaxis and hæmorrhoids are unattended by any danger, unless in cachectic habits, or when there is serious associated disease of related parts; or when protracted, asthenic, or uncontrolled by treatment. But the prognosis must be formed from the states in which individual forms of hæmorrhage present themselves in practice.

29. *ix.* DIVISION OF HÆMORRHAGES. — Discharges of blood have been divided, in modern times, into certain forms or states indicative of the circumstances in which they take place. Their separation into *active* and *passive* has been very generally adopted since the days of STAHL, who first employed this division; and these terms, or their correlatives, *Sthenic* and *Asthenic*, have been retained for the purpose of expressing the states of vital power and of vascular action upon which hæmorrhages principally depend in their more idiopathic states. They have likewise been very generally divi-

ded into *Idiopathic*, *Traumatic*, and *Symptomatic*, an arrangement to which, as well as to the former, attention should be paid both in pathology and in practice, and which has been very generally followed, even when the terms *primary*, *essential*, and *spontaneous* have been adopted with reference to the first of these, and *secondary*, *consecutive*, or *sympathetic* to the third. Hæmorrhages have also been classed into *Constitutional*, *Accidental*, and *Critical*. WILLIS arranged them into *critical*, and *morbid* or *non-critical*; DARWIN, into *arterial* and *venous*; and BRICHAT, into those proceeding *from rupture*, and those *from exhalation*. A much more elaborate arrangement has been proposed by LORDAT. He divides hæmorrhages into, 1st. Those proceeding from a *general fluxion*; 2d, from *expansion*; 3d, from *local fluxion*; 4th, from *adynamia*; 5th, from *loss of resistance* in the part; 6th, from *expression*; 7th, from *wounds*; 8th, from *sympathy*. MM. PINEL and BRICHETEAU have proposed a division of this class of diseases into, 1st. *Constitutional*; 2d. *Accidental*; 3d. *Vicarious*; 4th. *Critical*; and, 5th. *Symptomatic*. M. CHOMEL has arranged them into, *a*, *active*; *β*, *passive*; *γ*, *constitutional*; and *δ*, *accidental*. Dr. CARSWELL has classed them as follow: *i.* *Hæmorrhage from Physical Lesions*.—*A.* From solutions of continuity—*a.* Incised wounds; *b.* Puncture; *c.* Laceration; *d.* Ulceration; *e.* Mortification.—*B.* From mechanical obstacles to the circulation; *a.* Situated in the heart; *b.* In the blood-vessels.—*ii.* *Hæmorrhage from Vital Lesions*.—*A.* From a modification of the functions of the capillaries—*a.* In vicarious hæmorrhage; *b.* In hæmorrhage from erectile tissue.—*B.* From a diseased state of the blood—*a.* In scorbutus; *b.* In some forms of purpura; *c.* In some forms of typhoid fever.—*C.* From debility, in depending parts of the body. The chief objection to this ingenious arrangement is the neglect of the states of vital power and of vascular action more or less characteristic of the primary forms of hæmorrhage.

30. The following classification will be found to comprise all those states of hæmorrhage which fall within the province of the physician, and respecting which a full inquiry has been instituted above.

i. HÆMORRHAGE FROM PHYSICAL CAUSES.—*A.* From sudden diminution of the weight of the atmosphere; support being thus removed from extreme vessels, and from yielding tissues, &c., while the impulse, or *vis a tergo*, is undiminished.—*B.* From incision, puncture, or laceration of a vessel or vessels.

ii. HÆMORRHAGE FROM LESIONS OF VITAL POWER AND ACTION.—*A.* From excited action chiefly—*a.* Of the vascular system generally; *b.* Of the vessels in the seat of hæmorrhage principally, or from local determination.—*B.* From plethora—*a.* Associated with general excited action; *b.* With local action or determination. These constitute *active* or *sthenic hæmorrhage*.—*C.* From debility chiefly, hæmorrhage taking place in depending or relaxed parts.—*D.* From deterioration of the blood—*a.* Conjoined with debility and impaired action; *b.* With excited action and exhausted vital power, as in certain states of fever, &c. These constitute *passive* or *asthenic hæmorrhage*.

iii. HÆMORRHAGE FROM INTERRUPTED CIRCULATION.—*A.* Through the heart.—*B.* Through

the portal vessels.—C. Through other venous trunks. In all these, venous and capillary congestion precedes, and chiefly causes the discharge.

iv. HÆMORRHAGE FROM ORGANIC LESIONS.—

A. From alterations of the vessels themselves.—*a.* From inflammation, softening, rupture, &c., of their coats; *b.* From ossific or other morbid formations in their tunics.—*B.* From lesions of the tissues, the seats of hæmorrhage—*a.* From softening of the tissues; *b.* From ulceration; *c.* From tubercular formations, &c.; *d.* From mortification. The first and second of these orders comprise those forms of hæmorrhage which are usually denominated *primary, idiopathic, or essential*; the third and fourth, those which are commonly called *secondary, consecutive, or symptomatic*.

31. X. TREATMENT.—i. The treatment must have strict reference to the morbid conditions on which hæmorrhage depends, and according to which I have attempted to arrange the forms and states of the disease. In the observations, however, about to be offered, I shall allude merely to those varieties which chiefly require medicinal aid, and pass over those demanding the active interference of the surgeon.

32. A. *Hæmorrhage from physical causes*, particularly from puncture, incision, and laceration, seldom falls within the province of the physician; but when it does, as when occurring in any of the internal viscera, the principles which should guide him in other cases ought to direct him in this: inordinate action should be restrained, in order to diminish the effusion and to prevent its recurrence, and extremely depressed power cautiously restored, especially when life is thereby threatened, or when the system is incapable of producing coagulable lymph, by means of which a firm coagulum may be formed, and farther hæmorrhage be thus prevented.

33. When the hæmorrhage is caused by the sudden diminution of atmospheric pressure, the propriety of having recourse to blood-letting, unless vascular action be manifestly increased, is questionable. The removal of the cause, when the hæmorrhage is urgent, should alone be confided in. In slighter cases, the sanguinous discharge generally disappears soon after the vascular system has accommodated itself to the novel circumstances in which it is placed.

34. B. *Hæmorrhages from changes in vital power and vascular action* interest chiefly the physician, and require the utmost pathological discrimination and practical decision. Upon the opinion that will be formed as to the degrees of augmented action or of diminished power, or of vascular repletion or of asthenia, not only will the success of the treatment, but also the life of the patient, depend. And among the most difficult of the many difficult topics with which the practical physician will have to concern himself, none is more difficult or more important than to discriminate the pathological conditions just mentioned.

35. *a.* *Hæmorrhage depending upon, or connected with excited vascular action*, generally requires an antiphlogistic treatment; but with strict reference to the degree of action and of organic nervous power, and to the quantity of blood which has been lost. Of these states the practitioner should be capable of forming a cor-

rect estimate, and of directing remedies appropriate to them with a decision commensurate with the urgency of the case. When the discharge takes place from vital organs, he ought not to confide in a single remedy only, however energetic or appropriate; nor even in a succession of remedies; but should so combine his means as that the one may promote the operation of the others.—*a.* When the action of the heart and vascular system is increased, especially if the patient be young, plethoric, or robust, *blood-letting*, general, local, or both, and internal and external *refrigerants*, conjoined with *sedatives* and *astringents*, are indispensable. But the practitioner should be careful in discriminating between the broad, open, quick, and irritable pulse frequently attendant upon hæmorrhage with deficient vital power, or upon the reaction following large losses of blood, and the full, hard, and jerking pulse more commonly observed at the commencement of sthenic hæmorrhage. I have already shown, in the article BLOOD (§ 58), that copious losses of this fluid, especially when productive of vital depression or syncope, are generally followed by more or less of reaction. This reaction should be prevented from wholly supervening, or from reaching an inordinate pitch, lest it reproduce the hæmorrhage, and thereby endanger the life of the patient. When it occurs after large hæmorrhages, we should carefully determine, from the tone and character of the pulse, from its softness or compressibility, or action under the pressure of the finger, the degree of tone or vital power attending it. By thus endeavouring to estimate the exact state of the vascular action, attendant, as well as consequent upon hæmorrhage, the conclusions which will be arrived at will suggest the most efficient means of cure. In cases where the excited action has been preceded by a large loss of blood, we shall in vain attempt to restrain it by farther depletion; for it will be generally found that, however excited the action or frequent the pulsation, vital power is extremely depressed; and that a farther depletion will only render the heart's action more frequent and the pulse more irritable. It is in such circumstances, especially, that a decided but judicious use of sedatives, refrigerants, and astringents, such as will be hereafter noticed, should be resorted to.

36. In cases unattended by general vascular excitement, or in those characterized chiefly by local determination, vascular action being manifestly concentrated, more or less, towards the seat of hæmorrhage, and proportionately diminished in other places, a principal part of the treatment should be calculated to derive the blood from the organ affected, and to equalize the circulation. In such cases, *cupping*, warm *pediluvia*, and when vital power is much depressed, and the farther loss of blood cannot be afforded, *dry cupping*, should not be neglected. This last means I have found of great benefit when extensively or repeatedly resorted to.

37. In general, leeches are not appropriate means of depletion in hæmorrhages, although they may be of service in removing the local congestions or inflammatory irritation sometimes consequent upon them. Cupping should be preferred when local depletion is required; and in most instances in which blood-letting is

indicated, even in a small quantity, venæsection will be the preferable mode of performing it. Most of the older writers advised, for the removal of hæmorrhage, venæsection in the standing or sitting posture, and with a large orifice, with the intention of speedily producing syncope, believing that a coagulum would be more likely to form at the orifices of the bleeding vessels during this state. If the hæmorrhage proceed from one or more large vessels, as in wounds and injuries, the propriety of this practice need not be disputed. But when the blood is merely exuded from the mucous surface, as in most cases of internal hæmorrhage, this practice is of more doubtful efficacy; and, if it were generally adopted, even in young and robust persons, might be injurious, especially if the discharges had been already copious. Besides, the reaction consequent upon full syncope may cause a return of the effusion. It will, therefore, be preferable, in the majority of instances, to carry the depletion no farther than to produce slight faintness, avoiding the supervention of full syncope, and to give refrigerants or astringents and anodynes, so as to prevent subsequent reaction.

38. *β. Evacuations by emetics and purgatives* may be either beneficial or prejudicial, according to the peculiarities of the case. But the circumstances indicating or contra-indicating their use will be made manifest when I come to consider hæmorrhage with reference to its seats.

39. *γ. Refrigerants* are important agents in the control of sthenic hæmorrhage, and much discrimination may be shown in the selection of them for particular cases. In general, those which are astringent and increase the crasis of the blood should be preferred. The *mineral acids*, especially the sulphuric, the sulphates, the nitrates, the vegetable acids, particularly the acetic, and the internal and external application of cold, are severally useful in various circumstances. The most energetic, however, of these are the *sulphate of alumina* or the *super-sulphate of potash*, given in the compound infusion of roses, and the *acetate of lead*, with acetic acid; but in these the astringent is equally powerful with the refrigerant action. The *nitrate of potash* and the *hydrochlorate of ammonia* are useful refrigerants, but are most beneficial in the circumstances about to be noticed. Cold internally, as iced water or iced lemonade, &c., or externally, in any of the various forms of applying it, is a useful adjuvant of other means; but it should not be employed so as to give rise to reaction, or to favour congestion in the seat of the disease, consequences which may follow its injudicious use, internally as well as externally.

40. *δ. Astringents*, in active hæmorrhage, are most serviceable, after evacuations have been carried as far as circumstances permit. They should be either conjoined or alternated with refrigerants; and occasionally, also, with demulcents and sedatives or anodynes. Any of the individual substances belonging to this class of medicines may be employed, according to the urgency of the case; but, with the exception of the spirits of turpentine, the mineral are more energetic than the vegetable astringents. Of the former of these, the *sulphates of alumina*, of zinc, of copper, and of iron are

most frequently employed, either alone, or in vehicles containing diluted sulphuric acid. The tincture of the *sesquichloride of iron* and the *nitrate of silver* are also often used, both externally and internally; but these, and all the vegetable astringents, with the exception just made, are also tonic, and are less serviceable in active than in passive hæmorrhages. In the former, however, they are often useful; and, when given in doses so large as to occasion nausea, they have also a sedative action. The *acetates of lead*, with acetic acid, and the *acetate of zinc*, are, on account of their sedative action, among the most appropriate mineral astringents in active hæmorrhage.

41. The spirit of *turpentine* appears to have been employed by the ancients in the treatment of hæmorrhages. It was much used, both internally and externally, during the sixteenth century, but had afterward fallen into disuse. In the year 1817, I employed it internally in these diseases, and have since continued to prescribe it. (See my *Memoir on the Use of Terebinthinate Remedies in Disease*, Lond. Med. and Phys. Journ. for July and August, 1821.) It constricts the capillaries of the part to which it is applied; but, owing to its stimulating action on the nerves, sthenic vascular reaction frequently follows, which, however, soon subsides. When used in large quantity, these effects are proportionately great; and it thereby exerts a powerful derivative influence. When absorbed into the circulation, its astringent effects on the capillaries are also remarkable. Its action varies much with the dose, relatively to the vital energy of the patient. When the dose is large, it reduces the frequency and strength of the heart's action, especially when they are much increased; and hence it is an appropriate remedy in the more active forms of hæmorrhage, inasmuch as, with its constricting action on the capillaries, it weakens the *vis a tergo*. When given in smaller doses, and carried into the blood, it increases the tone and changes or modifies the action of the extreme vessels. From a very extensive experience of this medicine in hæmorrhagic and other diseases, I may add, that large doses of it should be prescribed with caution, when the powers of life are very much depressed; and that, when a considerable dose of it has been given in such cases, it ought to be carried off by stool. The existence of inflammatory action does not contra-indicate its use, as many have supposed from a misconception of its operation; for it lowers vascular excitement, and prevents effusion and the formation of coagulable lymph, especially when taken in sufficiently large or repeated doses. When the powers of life are much impaired, and after copious evacuations of blood, small and frequent doses of it only ought to be given, conjoined with tonics, aromatics, restoratives, &c.

42. *e. Sedatives and Narcotics* are severally beneficial in active hæmorrhages, but chiefly as adjuvants of more energetic means. The most useful sedatives, in this form of the disease, have already been noticed. *Hydrocyanic acid* and its preparations are sometimes of service, when much irritability, spasm, or restlessness attend or follow the hæmorrhagic attack. *Digitalis* is, however, more generally appropriate, inasmuch as it lowers the action of the heart

and increases the tone of the extreme vessels. The *scallæ cornutum* is possessed of undoubted efficacy in hæmorrhages, probably in consequence of its sedative influence on the circulation. *Narcotics*, especially opiates, are frequently serviceable in similar circumstances, but chiefly in combination with astringents and refrigerants. *Opium* may be conjoined with any of the substances comprised in these classes of medicines; or the acetate of morphia may be given with the acetate of lead, or the hydrochlorate of morphia with the tincture of the sesquichloride of iron. *Hyoscyamus*, *conium*, the *humulus lupulus*, *colchicum*, and other narcotics, have been severally recommended to palliate some of the contingent phenomena of the disease; but they require no farther remark.

43. *ζ. Diaphoretics* have been employed with the view of equalizing the circulation, or determining it to the surface of the body, especially when coldness of the extremities and skin accompanies the discharge. But the cooling diaphoretics should only be prescribed, as the nitrate of potash with the sweet spirit of nitre, and the solution of the acetate of ammonia with an excess of acetic acid. In order to derive to the surface, and to equalize the circulation, external derivatives, rather than stimulating diaphoretics, ought to be employed. The derivatives most to be confided in, in these cases, especially when the hæmorrhage is copious, are the hot turpentine epithem or embrocation, or sinapisms; but the former is much more quick and efficient in its operation than the latter.

44. *η. Demulcents*, especially the gums, were formerly much employed in hæmorrhage, but are now seldom used, unless as vehicles or adjuncts of more active substances. They are, however, of service in several forms of hæmorrhage, especially where it is desirable to diminish irritation in mucous passages or canals. Powdered gum, when applied to a bleeding vessel or surface, will sometimes arrest the discharge by promoting the coagulation of the blood.

45. *b. Hæmorrhages depending upon asthenia, or the more passive states of hæmorrhage noticed above*, should be attacked directly by means of astringents and derivatives.—*a. Blood-letting* is generally inadmissible, and *refrigerants* must be employed with caution, unless their astringent action be very considerable. Even *cold* should be cautiously prescribed. In some cases, the momentary impression of cold, as of iced water sprinkled on the back or on the genitals, is of service; but a prolonged application of it may be injurious, or even dangerous. The *vegetable astringents*, as possessing more or less of a tonic property, are especially indicated in the asthenic forms of hæmorrhage; and of these, the *extract of catechu*, *kino*, the preparations of *krameria*; *tannin* and *powdered galls*; the bark of the root or fruit of the *pomegranate*; the *simarouba* and *cinchona* barks; infusions of *oak bark*, or of the *uva ursi*, or of *roses*, or of the root of *tormentilla*, or *bistorta*; the *vegetable acids* also, especially the gallic and acetic; *creasote*, conjoined with the latter of these, or with some other vegetable astringent; the *ergot of rye*; the *terebinthinates*; the *balsams*, and *camphor*, are severally appro-

priate; and either of them may be prescribed with other means, according to the circumstances of the case. Of these, the spirit of turpentine, in small and frequent doses, with tonics, restoratives, and aromatics, is most deserving of confidence. The *mineral astringents*, especially those already noticed (§ 40), and the *tonic mineral salts*, may also be employed.

46. *β.* When hæmorrhage proceeds chiefly from, or is connected with a *deteriorated state of the circulating fluids*, the *chlorate of potash*, or the *chlorate of lime* may be prescribed with tonic or astringent infusions; and the nitrate of potash may be added, or taken alone in similar vehicles. The spirit of turpentine may also be given in small and repeated doses, with camphor and aromatics.

47. *γ.* In all the forms of asthenic hæmorrhage, *derivatives*, especially the hot turpentine epithem and sinapisms, are of great benefit. *Emetics* and *cathartics* are rarely indicated, although morbid secretions and fæcal accumulations ought to be evacuated. *Diuretics* are of service chiefly as adjuncts of more energetic means. *Anodynes* are rarely necessary; but *digitalis* is sometimes useful, conjoined with tonic astringents. *Opiates* are also occasionally serviceable, in similar combinations.

48. *δ.* In those *intermediate states of hæmorrhage* in which it is difficult to determine whether the active or the passive conditions predominate, and where there appears to be an irregular distribution of action and vital power, rather than general excitement or depression of either, *derivation by dry cupping*, by the warm *turpentine embrocation*, or by *sinapisms*, and the internal use of appropriate *astringents*, are chiefly to be relied on.

49. *c.* Those forms of hæmorrhage which may be denominated *constitutional*, and which partake more of the active than of the passive character, require much discrimination. They are generally dependant chiefly upon absolute or relative plethora; and ought not, therefore, as in many other cases of active plethora, especially when thus associated, to be early or officiously interfered with. This form should, therefore, be promoted when incomplete, or treated by depletions, and moderated or arrested when it becomes very considerable or excessive. When a constitutional hæmorrhage is abortive or prematurely arrested, sanguineous effusion may take place in the parenchyma of an organ, or in some dangerous situation. In this case, the morbid deviation should be combated by means calculated to restore the hæmorrhage to its former seat, to arrest it in the part consecutively affected, and to prevent the bad consequences likely to ensue in the latter situation. If the hæmorrhagic deviation—the change in the seat of constitutional hæmorrhage—is favourable, as when epistaxis or hæmorrhoids occur, instead of hæmoptysis, or hæmatæmesis, the interference of art ought not to be interposed, unless the loss of blood is very considerable or alarming.

50. *d.* When hæmorrhage depends upon *obstructed circulation in the heart, liver, or lungs*, and, consequently, upon venous plethora, the *indications* are, to remove this obstruction as much as possible; to diminish the fulness of the veins; to determine predominant action to

external parts, and to impart tone to the surface and capillaries affected. The means by which the *first* of these ends is to be accomplished are pointed out in the articles on the diseases of the organs just mentioned; and those which will accomplish the other intentions have been already noticed.

51. *c.* In all forms of hæmorrhage, the indications of cure, as well as the individual means, should more or less depend upon the causes, upon the seat, and upon the quantity of the effusion; and should, moreover, be modified by the symptoms, by the age, and the previous state and habits of the patient. For the hæmorrhages which mainly depend upon organic lesions, the treatment should be directed to the removal of these lesions; but, when the effusion is considerable, or takes place into the substance of an organ, immediate means ought first to be used to arrest it; and these means should be strictly appropriate to the states of vascular action and of vital power, conformably with the principles already developed. It is indispensable to the judicious treatment of hæmorrhage, to ascertain and to remove the remote and immediate causes; and to place the patient in a situation and circumstances favourable to the removal of the attack, as well as to the prevention of its recurrence. Hæmorrhage from the lungs, the stomach, intestines, and urinary organs, as well as into the parenchyma of internal viscera, and into shut cavities, are serious occurrences, and should be immediately arrested. When it proceeds from the nose or anus, it is seldom dangerous, and may be left to itself, unless it become excessive. Whenever the loss of blood, in whatever situation it occurs, is so great as to produce much debility, prompt measures should be employed to arrest it. If syncope takes place in such circumstances, the recumbent posture; the aspersion of cold water, or of a small quantity of eau de Cologne, or lavender water, on the face; or aromatic vinegar held at a little distance from the nostrils, will restore the patient. But if the hæmorrhage has been so great as to render these means insufficient, an immediate recourse may be had to the transfusion of blood from a healthy person. When convulsions supervene upon large losses of blood, opium, with camphor or other restoratives, should be prescribed.

[The treatment of hæmorrhage is often involved in doubt and uncertainty from our imperfect knowledge of its true pathology, as occurring in different cases. Those who regard it as evincing local congestion in every instance should ponder the remark of ANDRAL: "The existence of vascular congestion," says he, "is not essential to the production of every species of hæmorrhage. It is sufficient that the qualities of the blood should be so modified that its molecules lose their natural form of cohesion, in which case the blood escapes from its vessels with the greatest facility; and hæmorrhages occur at the same moment in different parts of the body, totally unconnected with the presence of any irritative or inflammatory action. Examples of such hæmorrhages are supplied in scurvy, in typhus, and other diseases in which there is a certainty that the blood has undergone such changes. How the vessels are modified so as to permit their con-

tents to escape is a mystery which we cannot divine; but so much is ascertained, that the blood, so far from accumulating in them, constituting congestion, is permitted to flow out as fast as it arrives."—(*Path. Anat.*) In such cases, experience confirms the truth of the theory, for we find remedies of a tonic or stimulating character, which restore tone and vigour to the relaxed vessels and general system, by far the most successful.

Dr. WILLIAMS (*Princ. of Med.*, Am. edition, Phil., 1844) regards hæmorrhage as frequently a result of plethora, congestion, or determination of blood; hence his treatment is deduced from such pathology. A moderate epistaxis, or hæmorrhoidal flux, needs no treatment, as it tends to relieve a previously existing hyperæmia; but when profuse, it needs to be restrained; the *sthenic*, by bleeding and revulsives; the *asthenic*, by styptics, tonics, and derivants. Some hæmorrhages must be instantly checked, as from the lungs, into the brain, or the parenchymatous tissue of any of the organs. In *active* hæmorrhage, as in the young, where there is a rich state of the blood, and an active condition of the nutrient function, prompt and copious blood-letting will be indicated, aided by other evacuates, as purgatives and diuretics, as well as by sedatives, as digitalis and hydrocyanic acid, and remedies which diminish the tonicity of the arteries, as antimonials. *Cold* is a very important remedy in hæmorrhage, connected with increased determination of blood; as a stream of cold water to the nose and forehead, or ice to the nucha in epistaxis, ice swallowed in hæmatemesis, and ice water injections in uterine hæmorrhage. Hæmorrhage is sometimes owing to a diseased state of the blood-vessels, rendering them inelastic and fragile, as from osseous or atheromatous deposit or aneurismal dilatation, which predisposes them to be ruptured by sudden congestion or determination of blood; or they become softened and lacerable by inflammation or mal-nutrition, as in the stomach by gastritis, the lungs by tubercles, &c. In all these cases we are to diminish the quantity of blood sent to them by blood-letting, and aid the effect by posture, pressure, cold and astringent applications, and means calculated to tranquillize the circulation. Thus, pressure on the carotids often relieves epistaxis; pressure on the abdominal aorta, or elevating the pelvis, uterine hæmorrhage; elevating the chest often checks hæmoptysis; and in all cases a cool regimen and perfect quiet are indispensable.

Styptics are peculiarly proper where the blood is deficient in fibrin, as by entering the circulation they cause contraction of the vessels, and some of them tend to coagulate the blood, and thus restrain the hæmorrhage (WILLIAMS). The most powerful of these are the acetate of lead, alum, sulphate of zinc, chloride of zinc, nitric and sulphuric acids. Other styptics, as nitrate of silver, sulphate of iron, and infusion of nut-galls, are also powerfully astringent, and are supposed to coagulate the blood, though Mr. WILLIAMS expresses some doubts on this point.* We are to remedy a deficiency of fib-

* (Mercury, the alkaline salts, iodine, and antimony are supposed to diminish the quantity of fibrin in the blood, the opinion, however, needs support by farther investigations. Mr. BLAKE (*WILLIAM'S Princ. of Medicine*, Am.

rin by assisting those functions on which its supply depends, particularly those of digestion, respiration, and assimilation, and by avoiding its expenditure in too much exercise and other exhausting processes. The diet should consist of meat, bread, eggs, milk, and other articles abounding in the protein compounds, and digestion may be aided by quinine and other bitter tonics, rhubarb, and especially the mineral acids, which, from their power in stopping passive hæmorrhage, and in augmenting the muscular strength, seem to promote the formation of fibrin more directly than by their mere operation on the digestive organs. The free access of pure cool air to the lungs is of the first importance, as it is indispensable to the formation of fibrin, a due supply of oxygen being the chief condition of healthy blood. Where the fibrin is deficient, from the presence of a febrile or putrescent poison in the system, it is hardly to be expected that any means will avail as long as it remains in active operation, as it interferes with the vital process by which fibrin is formed; but as soon as the influence of the poison subsides, as evinced by improvement in the symptoms, the quantity of fibrin increases, and this sooner than could be explained by any increase of nourishment taken (ANDRAL and GAVARRET). We may, in some instances, apply styptic remedies directly to the bleeding part, as in epistaxis, hæmatemesis, hæmorrhoids, and uterine hæmorrhage; but frequently the part is beyond the reach of direct applications, as in hæmoptysis, hæmaturia, &c. Here we have to resort to depletion and revulsives, conjoined with remedies that are found to restrain hæmorrhage, whether they operate by their introduction into the blood or by sympathy. If the views of LIEBIG are well founded, a diet of saccharine, amylaceous, or gelatinous articles must reduce the fibrin and albumen of the blood; and such food is found by experience to be the best in inflammatory diseases, where excess of fibrin is a chief element; but where the fibrin is deficient, as it is known to be in a large proportion of cases of hæmorrhage, it must be supplied by a diet of an opposite kind, and by means already pointed out.

Professor CHAPMAN has distributed all hæmorrhages under the titles *active*, *less active*, and *passive*, as indicating the several gradations of the hemorrhagic states; the symptoms varying as connected with one or the other conditions, and the treatment to be regulated accordingly.

ed., p. 132) has found the following results from injecting saline and other substances into the veins of living animals. The blood was found coagulated after the injection of the following substances: Liquor potassæ (firmly), carbonate of potass (firmly), nitrate of potass (firmly, blood scarlet), nitrate of soda, nitrate of ammonia, nitrate of lime, nitrate of baryta, chloride of calcium, chloride of barium, chloride of strontium, sulphate of magnesia, sulphate of copper, acetate of lead, arsenate of potass, nitric acid (strongly), narcotin (firmly), tobacco, strychnia (moderately), conium, hydrocyanic acid, euphorbium, and water in quantity.

The blood was not coagulated, or imperfectly so, after injection of caustic soda, carbonate of soda, sulphate of soda, ammonia, nitrate of silver, sulphate of zinc, sulphate of iron, phosphoric acid, arsenious acid, oxalic acid, infusion of galls, of digitalis, aloxan. "Some of these results," says Dr. WILLIAMS, "are different from what might have been expected: instance the decided coagulation with potass and its salts, especially nitre, and the fluidity with nitrate of silver, sulphate of zinc, infusion of nut-galls, which have been commonly supposed to possess a coagulating property."—(Loc. cit.)

Where profuse hæmorrhage occurs of an active and febrile kind, we are to endeavour to suppress the flow of blood, 1st. By reducing the force of vascular action by evacuations, and especially by bleeding, general and topical; 2d. By refrigerants, external and internal; 3d. By sedatives, as digitalis, prussic acid, &c.; 4th. By astringents, which constrict the mouths of the bleeding vessels; 5th. By revulsives, as stimulating pediluvia, sinapisms or blisters to the extremities. Our second indication is to prevent the recurrence of the affection by guarding against the exciting causes, and removing the pathological condition which disposes to its production. To this end tonics, as chalybeate medicines, exercise, pure air, and a regulated diet, are of the highest importance; and of these none is more efficacious than suitable exercise, owing to its influence in promoting the secretions and excretions, of renovating healthy action, and establishing a proper equilibrium in the circulation, thus obviating those local accumulations which prove the proximate cause of the effusion. If everything else fails, Dr. C. recommends an alterative course of mercury, in both forms of the disease, as tending to restore the healthy secretory power and remove visceral obstructions, the remote sources of the affection.

The purely passive hæmorrhages are of course to be controlled by correcting the general vitiation from which they proceed. The following remarks of Dr. C. are well worthy the consideration of the reader: "As it usually appears, I think, that too much importance is by many attached, in the management of vital hæmorrhage, to its suppression, great alarm is created by it in the individual himself, as well as in his friends, and from which the medical attendant is not always exempt. Every exertion is therefore made to check it, and this being accomplished, the anxiety which previously existed heedlessly subsides. Lulled into false security, the patient is too often permitted to revert to his former habits without any permanent plan of treatment, till again awakened to a sense of danger by a repetition of an attack, and in this way he proceeds till the complaint is often irremediably fixed. Now, the hæmorrhage, in itself, is comparatively of little moment; for the most part, indeed, beneficial, and the real object of attention should be the correction of the condition giving rise to it, and which by neglect, in numerous instances, leads to the most disastrous consequences."—(Loc. cit.)

There are several agents in the materia medica which seem to possess the power of invigorating the capillary circulation and the nervous system, such as arsenic and piperin; colchicum, quinine, salicine, and most of the class of mineral and vegetable tonics. These may be given, in small and oft-repeated doses, with great benefit in the hæmorrhagic diathesis, to strengthen the vital forces and produce a proper tonicity in the capillary vessels.

In the hæmorrhagic diathesis, the *sulphate of soda* has been found of signal service by Drs. OTTO, HAY, and others, when given in purgative doses. M. ANDRAL supposes that this agent retards the coagulation of the blood, and thus tends to the formation of a firm clot, when it is ultimately formed. We know that when coagulation is rapid the clot is loose, from the

quantity of serum it contains; and if the coagulation is slow, the particles of fibrin are more perfectly aggregated, thus increasing the firmness and density of the coagulum. That such coagulation is desirable in cases of hæmorrhagic diathesis is too obvious to need remark. We have derived great benefit, in these cases, from the *Pilula Plumbi Opiata* of the *Ed. Phar.* (*Acet. Plumb.*, gr. lxxii.; *Opii*, gr. xii.; *Cons. Rosa*, gr. xiv.; ft. xxiv. pill), in doses of from two to six in the course of a day. This combination seems not only to act on the blood in a favourable manner, but also to calm the action of the heart and the general circulation, subdue nervous excitement, and correct, in no slight degree, the degeneracy of the capillaries themselves. As *styptics*, we have had occasion to employ creasote, the nitrate of mercury, turpentine, and the nitrate of silver. This acts not only by its constringing the textures, but also by forming a coagulum of its own by its immediate action on the fluids in contact. It, however, often fails, especially in checking the bleeding from leech bites, which are best controlled by passing a fine cambric needle through the wound, and tying the skin thus included by a thread of silk or linen. The most effectual remedy, however, in the hæmorrhagic diathesis, is *pressure*, properly applied. The nitrate of silver, in powder, should be sprinkled over the bleeding surface, over which a bit of dry lint is to be placed, and over this several other pieces, so as to make a graduated compress, whereby pressure can be applied with power, and at the same time with great accuracy. If the oozing is found to continue, the compress is to be removed, and then readjusted with greater care. If the bleeding surface be situated on the arm or leg, the limb is to be supported firmly below the compressed point by a bandage accurately adjusted, avoiding, however, too severe pressure, which might lead to inflammation, ulceration, or sloughing. Dr. MOTT has succeeded in checking the most dangerous hæmorrhages from the division of large and deep-seated arteries, by crowding into the wound small bits of fine dry sponge, accurately applying the first piece on the wounded vessel, and then other pieces, of larger size, over this, and finally making steady and continuous pressure, for several days, by the hand of assistants, until granulation has taken place, when the bits of sponge are removed, piece by piece, without any danger of bringing on the bleeding, which might happen had the wound been filled by a single piece. Although this treatment properly belongs to the surgical department of hæmorrhage, yet we deem it too important to be omitted in this place. By this method, we have succeeded lately in a desperate case of hæmorrhage from the extraction of a tooth, in a young man of hæmorrhagic diathesis, and who had lost two brothers from bleeding—one in consequence of a slight cut on the forehead, and the other from losing a tooth—and after all other means had been tried, and the patient pronounced to be in a hopeless state. The dry sponge was firmly secured in the cavity of the alveolus by passing a strong thread around the two adjoining teeth, and crossing over the compress in the form of the figure 8. *Tannin* has recently been employed, with much success, in different forms of hæm-

orrhage, in pills of two grains each, combined with a small proportion of opium; one to be taken every hour. It is, however, more valuable as a local styptic than as an internal remedy. (See BRAITHWAITE, part vi., p. 180.)

We have found *turpentine* one of the most valuable remedies in almost every form of hæmorrhage. It is rapidly taken into the circulation, as manifested by its odour in the urine and breath, and exercises a decidedly astringent effect on the capillaries. It possesses, moreover, the important effect of operating more promptly than any other astringent, as we have often observed, in hæmoptysis which had resisted other remedies; and, with proper precautions, it may be given both in the active and passive forms of the disease. The profession is under great obligations to our author for presenting the claims of this article as an anti-hæmorrhagic remedy. *Matico*, a plant from South America, has been recently introduced to the notice of the profession as a powerful *styptic* by Dr. JEFFRIES, of Liverpool (*London Lancet*, Jan., 1839). As a local *styptic*, the leaves (whole or in powder) have been principally used; as a constitutional remedy, it is given in form of infusion (ʒss.—ʒj. to one pint of water), in doses of a wine-glass full three or four times daily. The tincture has been also used, made by macerating, for fourteen days, ʒijss. of the leaves in a pint of proof spirit. Dose, ʒi. to ʒiij, three times a day. It is a valuable remedy in hæmoptysis and hæmatemesis; also in gonorrhœa, leucorrhœa, menorrhagia, hæmorrhoids, epistaxis, and catarrh of the bladder. (BRAITHWAITE'S *Retrospect*, part viii., p. 37, part vii., p. 155, Am. ed.)

The fruit of the *green persimmon* (*Diospyros Virginiana*) is also well worthy of trial in cases of hæmorrhagic diathesis. It may be given in infusion, as recommended by Dr. METTAUER (in *Am. Journ. Med. Sci.*, Oct., 1842, p. 297), or in combination with other remedies. We reserve farther remarks on particular modes of treatment till we come to the different forms of hæmorrhage.]

52. ii. *Of Regimen and Prophylaxis*—a. In *active hæmorrhage* the patient should be removed to a cool apartment, and repose of body and mind enjoined. He ought to be so placed as that the seat of effusion is most elevated. The clothes should be taken off or loosened, and every obstacle in the way of external application removed. When the hæmorrhage has ceased, the same antiphlogistic regimen as was pursued during its continuance should be persisted in for some time, and gradually changed. If the effusion have been slight, and particularly if the pulse continue full or strong, venesection or cupping should be practised, or even afterward repeated, in order to prevent a recurrence of the hæmorrhage, or the superintention of congestion or inflammatory action in the part. When the discharge and the treatment have removed both the attack and the attendant general and local plethora, the practitioner should endeavour to ascertain still farther the pathological conditions from which the hæmorrhage proceeded, as well as those which remain after it, and to remove them. He ought also to enjoin the avoidance of whatever may cause plethora, or may determine the circulation to the seat of hæmorrhage, or weaken or-

ganic nervous power. If the symptoms indicating the recurrence of hæmorrhage appear, a full venæsection should be practised.

53. The *Diet* ought to be chiefly farinaceous, and ripe acidulous or mucilaginous fruits should be liberally allowed. The drink should be made slightly acid by vinegar, or any of the mineral or vegetable acids. This diet ought to be continued long after the attack. The strong or rich wines, all malt liquors, and spirits should be uniformly shunned.

54. *b. After passive hæmorrhage* the system should be strengthened by means the least likely to cause plethora; by regular and moderate exercise in the open air, near the sea; by sea voyages or short excursions, and by avoiding whatever is likely to favour congestion of the seat of the former effusion, and to depress the mind.

55. *c. The repetition of hæmorrhage*, whether of an active, passive, or intermediate character, ought to be carefully prevented, as two evils result from this circumstance independently of the danger directly connected with it; if the attacks are slight, they are apt to become habitual or constitutional; and, whether slight or severe, they cause disorganization of the part affected. When hæmorrhage has become habitual, it should not be prematurely suppressed without having recourse to vascular depletions in its stead, or instituting some external discharge; and even this latter may not be sufficient.

56. *d. Constitutional hæmorrhage*, when it is abundant and debilitating, should be treated, in the intervals, by a spare and cooling diet and regimen. Positions which will favour the flux of blood to the organ affected, or impede the return of it, should be avoided; and direct or indirect excitement or irritation of the part ought to be removed. Whatever tends to produce plethora, or to weaken nervous power and vascular tone, should also be shunned. (See art. CRISIS, for *Critical Hæmorrhage*; and ARTERIES and VEINS, for *Hæmorrhage symptomatic of Organic Lesions of these Vessels*.)

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HEMORRHAGES CONSIDERED WITH RESPECT TO THEIR SEATS.

57. In treating of hæmorrhage, as regards the situations in which it takes place, I shall notice it, *FIRST*. In parts which admit of the external discharge of the effused blood, as from the skin, and from the mucous surfaces; the latter of these comprising the most important of the diseases usually denominated hæmorrhagic. *SECOND*. In scrous or shut cavities, necessarily followed by a greater or less accumulation of the effused blood. *THIRD*. In the areolar tissues or parenchyma of the viscera. In discussing the particular forms of hæmorrhage according to this arrangement, due reference will be made to the vital conditions and morbid relations upon which hæmorrhages were shown, above, more or less to depend.

II. HÆMORRHAGE FROM THE SKIN.—*SYN.* *Hæmorrhagia per Cutem; Hematidrosis, Plouquet; Sucr de Sang, Chomel.*

58. DEFIN.—*An exudation of a sanguineous fluid from a part or the whole of the cutaneous*

surface, most frequently the former, without abrasion of the cuticle.

59. Hæmorrhage very rarely takes place from the whole of the cutaneous surface, and rarely even from a limited part. The effusion of blood under the cuticle, as in scurvy and purpura, &c., is different from the form now being considered, in which it is external to this tissue. When the hæmorrhage is from the cutaneous surface, generally it assumes the form of a sanguineous sweat or perspiration. The situations to which it is most frequently limited are the face or cheeks; the anterior parts of the chest and armpits; the mammae and mamillæ, the groins, the umbilicus; the palms of the hands and soles of the feet; and the heels, toes, and fingers. It may occur in these situations without any abrasion of the cuticle or change in the skin; but it also sometimes proceeds, both in these and in other parts, from cicatrices, nævi, or other alterations of structure.

60. Hæmorrhage from the cutaneous surface generally has been noticed by BEBERENIUS, TULPIUS, WEPFER, SCHENCK, GARMANNUS, RUYSCII, LENTIN, STAHL, PEZOLD, and RICHTER; and a few cases of it are given in the *Ephemerides Academia Naturæ Curiosorum*. I never saw an instance of it. My learned and scientific friend, Dr. W. HUTCHINSON, informed me that, during his residence in the Ukraine, he had a fine Arabian horse, whose sweat, upon most occasions of exertion, was sanguineous, and was nearly pure blood upon great exertion. It was general, and unattended by any other sign of disease. Hæmorrhage from the face has been observed by VOGEL and PELISSON. It has occurred in rare instances during epileptic convulsions; I have seen a case of this kind. Discharges of blood from the mammae and nipples are more frequent, and have been seen by SCHENCK, AMATUS LUSITANUS, MARCELLUS DONATUS, MERCKLINUS, VANDER WIEL, PANAROLUS, PAULLINI, BERLING, HOFFMANN, SCHURIG, TRIEON, DELIUS, RICHTER, WEGELIN, JACOBSON, and myself. Hæmorrhage from the umbilicus has occurred chiefly in young children, or during the first weeks or months of infancy. Cases of this kind have been noticed by FABRICIUS, SHUSTER, RADFORD, and others, and have generally terminated fatally. Mr. POVT has detailed a case which thus terminated, and which was the third in one family. Exudations of blood from the armpits, groins, and extremities, especially the fingers and toes, have been remarked by WEPFER, ZACUTUS, LUSITANUS, MERCKLIN, HAGENDORN, ASH, MUSGRAVE, AB-HEERS, RIEDLIN, BARTHOLINUS, ORLOVIUS, WHYTT, and THILENIUS. Hæmorrhage from cutaneous nævi, and from the cicatrices of ulcers, is not an infrequent occurrence, especially in females in whom the catamenia are suppressed. In this case it assumes the form of vicarious menstruation.

61. i. *Causes*.—Cutaneous hæmorrhages are evidently more or less connected with the state of the constitution and of the circulation. They have been seen at all ages, and more frequently in females than in males. They most commonly appear after the suppression or cessation of accustomed sanguineous or other discharges, more especially the menstrual. When they take place from the breasts, they often recur periodically, and replace the catamenia.

They are sometimes caused by great exertion, by violent emotions, by sudden terror or fright, and by great muscular efforts. MAYER states that he saw a case in which the hæmorrhage returned twice annually, about the equinoxes, upon muscular exertion.

62. ii. The *Phenomena* attendant upon cutaneous hæmorrhage have not been closely observed or described. In some cases, where the exudation was partial, pain and redness of the surface preceded it. In others, the blood has issued from a greater or less extent of the skin, in a manner similar to the perspiration, of which it seemed to constitute a part. It has varied in deepness of colour and in fluidity, as well as in quantity. Upon wiping it off, the skin has presented no change of structure, and has continued still to exude the blood from its surface. The discharge has seldom been of long duration, although it has frequently recurred. Where it has been vicarious of menstruation, and has proceeded from the mammae, or from nævi, or from a cicatrix, increased fullness, redness, and heat of the part have generally preceded it for a short time.

63. iii. The *Prognosis* of cutaneous hæmorrhage is generally favourable when it is partial, unless it be dependant upon internal disease. When it is general, it is not attended by danger. The soft solids and the blood itself are then generally more or less in fault; and this seems to be not less the case when it has been caused by violent mental shocks or sudden frights.

64. iv. The *Treatment* should altogether depend upon the states of vascular action and vital power, and ought to be conducted according to the principles developed above. If the hæmorrhage has followed the suppression of an accustomed discharge, the restoration of this latter ought to be attempted. If it has proceeded from fright or moral emotions, antispasmodics, restoratives, and sedatives should be administered. If it be evidently passive, and very abundant, it ought to be moderated or restrained by tonic astringents, internally and externally prescribed.

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III. HEMORRHAGE FROM THE NOSE.—SYN. Ἐπίσταξις (from ἐπιστάζω, I flow drop by drop); Ἀιμορροῦργία, Hippocrates; Hæmorrhagia, Jænnaus, Sagar, Sauvages; Hæmorrhagia Narinea, Hoffmann; Epistaxis, Vogel, &c.; Hæmorrhagia Narium, Sanguinis Stillatio, vel Stillicidium è Naribus, Auct. vr.; Hæmorrhagic nasale, Saignement du Nez, Fr.; Nasenblutfluss, Germ.; Bleeding from the Nose.

65. DEFIN.—The effusion of blood externally from the pituitary membrane.

66. There is no part of the body more disposed to hæmorrhage than the pituitary membrane, and none in which the recurrence of the discharge is productive of so little injury, as respects either this structure or the constitution. It is necessary to a due consideration of the pathological and therapeutical relations of epistaxis, to recollect that this membrane is supplied by the external and internal branches of the common carotid arteries; and that its blood is returned partly into the external jugular veins, and partially, by anastomozing branches of veins, into the anterior veins and sinuses of the cranium. The blood effused from the pituitary membrane may be discharged either by the nostrils, or by the mouth after having passed into the posterior fauces. This latter very generally occurs when the patient is in a supine posture; it then not infrequently flows into the pharynx, and is swallowed. If the quantity of blood is great which thus passes into the stomach, irritation of this organ, and of the intestinal canal, sometimes followed by vomiting of the blood, by a pseudo-hæmatemesis, or by melæna, not infrequently supervenes. On the other hand, blood may be discharged through the nostrils without having been effused by the pituitary membrane. This occurs when a sudden or profuse hæmorrhage takes place from the pharynx, bronchi, or stomach; but it is not, and therefore should not be confounded with epistaxis.

67. i. The *Phenomena of Epistaxis* are well known; but the signs of its occurrence, and the true pathological states ushering it in, are not so generally recognised or justly estimated. A. The *precursory symptoms* vary much according to the grades of vital action, of local determination, and of general or local vascular fullness, preceding and attending it; and upon these pathological conditions entirely depend the hypersthenic, sthenic, or asthenic, the entonic or atonic, the active or passive character of the hæmorrhage. In proportion as it partakes of a hypersthenic or sthenic form, the more manifestly will it be ushered in by one or more of the following symptoms: by pain of the head or face; by vertigo, stupor, or somnolency; by frightful dreams or restlessness; by redness or heat of one or both cheeks; injection of the eyes or lachrymation; by flashes of light before the eyes, or affections of the sight; deafness, or noises in the ears; increased strength of pulsation in the temporal or carotid arteries, and fullness of the veins;

and by a sense of fulness, tension, dryness, heat, or of titillation or itching of the nostrils. Not infrequently, especially in the more passive or asthenic states, the hæmorrhage occurs without any premonition, or merely after a slight touch or local irritation. The character of the pulse varies with the degree of vascular action and of vital power; and, in proportion to the grades of both, it is full, strong, and rebounding. According, also, as both action and power are weakened, the pulse becomes frequent, soft, compressible, open, small, and undulating. The older writers considered that a dirotic or rebounding pulse indicated the occurrence of this, or of some other hæmorrhage; but no great dependance can be placed upon this symptom.

68. *B.* The hæmorrhage may take place from one or both nostrils; but in the latter case it is greater from one than the other. The quantity of blood discharged may vary from a few drops to many pounds; and, in the more obstinate passive states, the patient may be reduced to the utmost danger, or may be carried off in a few hours, or days, according to the continuance or violence of the discharge. In some cases, a fibrinous and more or less firm coagulum attaches itself to the part whence the hæmorrhage proceeds, and occasionally hangs out of the nostrils over the upper lip, or down into the posterior fauces. As long as this remains attached the discharge continues suppressed; but when removed prematurely or otherwise, it returns, even with increased violence and danger. The disease may be *continued, remittent, and recurrent, or intermittent.* In this last case it may return irregularly or *periodically.*

69. *C.* The more active or simply *sthenic* epistaxis is often *symptomatic* or *critical* of several acute diseases, attended by increased action, especially the more inflammatory kinds of fever, and inflammations of the brain, or of the lungs, &c. The *passive forms* are frequently *symptomatic* of several cachectic maladies, and of the last stages of malignant or low fevers. Many writers, even as recent as the FRANKS, suppose that, in cases of epistaxis consequent upon enlargements or *obstructions of the liver,* or of the *spleen,* the hæmorrhage is generally upon the same side as the enlarged viscus.

70. ii. CAUSES.—*A.* Epistaxis occurs most frequently in children and young persons, especially in its more idiopathic states. It affects most commonly the sanguine, irritable, the plethoric, and florid; and those possessed of great talents, of delicate or relaxed fibres, of weak constitutional powers, and of much sensibility. After ten or twelve years of age, it is oftener observed in the male than female sex. It is not infrequent in males about the change to the decline of life; and then, as well as at later periods, often prevents more serious hæmorrhagic or inflammatory attacks. Epistaxis is also often dependant upon peculiarity of constitution or diathesis, and is consequently often hereditary, or observed in several of the descendants of the same parents, or members of the same family. At advanced ages, it is most common in those who live luxuriously and partake largely of wine or malt liquors. In the more mature periods of life, it is most frequently *symptomatic,* or dependant upon dis-

case of the heart, of the liver, spleen, or of some other viscus; or consequent upon the disappearance of some sanguineous or other evacuation.

71. *B.* The *exciting causes* are extremely numerous and diversified, for whatever favours an increased flux of blood to the head, and to the pituitary membrane, or retards the return of this fluid from these parts; or occasions general plethora; or weakens the vital cohesion of this membrane, or the tone of the vessels ramified in it, may occasion hæmorrhage from it, when the predisposition already exists.—*a.* The *external causes* are, injuries; irritants or excitants inhaled into the nostrils; stimulating vapours or gases; fractures of adjoining parts; exposure of the face to fires or furnaces, or of the head to the sun's rays, either uncovered, or with a black or metallic hat or cap.—*b.* The *internal causes* are, whatever increases the flow of blood to the head, as anger, shame, or other states of mental excitement or mental disorder; protracted study, and great exertions of the mind; stooping, or a low or depending position of the head; frequent sneezing; eatarrh; febrile, inflammatory, and exanthematous diseases; headaches, and rheumatic affections of the face; whatever retards the return of blood, as deep sighs, exertions of the voice, laughing, singing, crying, &c.; playing on wind instruments; severe cough, or difficulty of breathing; sudden terror; disease of the heart or adjoining large vessels; tumours pressing upon the jugular veins, or other causes of obstruction to the circulation in them, or in the subclavians; congestion of the lungs; neckcloths or collars worn too tightly round the neck, &c.; whatever causes absolute or relative plethora, as too full living, the ingurgitation of large quantities of wine, or other exciting liquors; the suppression of accustomed evacuations, especially the catamenial and hæmorrhoidal, &c.; whatever interferes with the equal distribution of the blood, as wearing tight clothes or corsets, obstructions in any of the large viscera, the gravid uterus, excessive distention of the stomach or bowels, or enlargement of the spleen, epileptic or convulsive seizures, cold applied to the extremities, suppression or retention of the natural discharges, and unnatural positions of the body; whatever weakens the tone of the vessels in the pituitary membrane and diminishes the crasis of the blood, as the advanced states of low fevers, scurvy, and other cachectic maladies, frequent returns of the complaint, &c.; whatever determines the blood to the superficial parts of the body, as diminished pressure of the air, high range of atmospheric heat, &c. The epidemic prevalence of epistaxis (which is of very rare occurrence) may be attributed to this last cause. (See MORGAGNI, *Epist.* XIV., ch. 25.)

72. *c.* The blood is chiefly exuded from the capillaries of the pituitary membrane, as in hæmorrhages from other mucous surfaces; but the question frequently agitated, as to whether it proceeds from arterial or venous capillaries, can hardly be solved, nor does it deserve the trouble of inquiry. J. P. FRANK observes that he has frequently seen a varicose state of the veins after cases of chronic epistaxis. The more important considerations as to the pa-

thology of the disease are those which relate, 1st. To the states of vascular action, and vital tone attendant upon it; 2d. To the constitution and habit of body of the patient; 3d. To previous attacks of hæmorrhage, either from the nose or from other parts; 4th. To antecedent and associated disorders, or to tendencies to be affected by dangerous maladies, as apoplexy, palsy, hæmoptysis, phthisis, &c.; 5th. To the causes, predisposing and exciting; 6th. To the probable consequences of an immediate arrest, or of a continuance of the discharge; and, 7th, To its critical influence.

73. iii. The Prognosis should have more or less reference to the circumstances just enumerated. It is generally favourable when the disease occurs in children, or persons about the age of puberty, who are otherwise healthy; but, if epistaxis affect the cachectic, the strumous, those who have evinced a tendency to affections of the lungs, or of the glandular and lymphatic system, or those labouring under disease of the heart, lungs, or spleen, or who are aged, the prognosis ought to be more guarded, inasmuch as the hæmorrhage may be difficult to restrain; or, when arrested, it may return, or may be followed by still more serious results, as by hæmoptysis, or by an aggravation of the associated malady, or by fatal syncope, upon using exertion or assuming a sitting posture. The more sthenic the epistaxis, the less the risk from it, unless it be prematurely restrained. But when it is manifestly asthenic and copious—if the means of cure fail, and if the blood is thin, dark, or does not coagulate—if the powers of life sink, and the skin and lips assume a pale or waxy hue, the prognosis should be unfavourable, in proportion to the prominence of these changes.

74. In persons who have arrived at or passed middle age, the above circumstances (§ 72) and considerations should especially have due weight; and even the contingencies of the attack—whether suppressed, or allowed to continue as far as the immediate safety of the patient will warrant—ought to be fully estimated. Where disease of the heart, especially passive dilatation of one or more of its cavities, or attenuation of its structure, or a disposition to apoplexy or palsy, or engorgement of the liver or spleen exists, an opinion of the immediate or ultimate consequences should be stated with caution. When slight epistaxis takes place in the plethoric, or in those addicted to indulgences at table, the circumstance ought to be viewed as indicating the danger of the habit, and the probable occurrence hereafter of apoplexy or palsy, if a more spare diet and suitable regimen be not observed. In forming an opinion of the terminations of nasal hæmorrhage, the remote consequences of the continuance or suppression of it upon related organs should be considered in connexion with the causes and the accompanying phenomena. When the epistaxis appears as a salutary evacuation of an overloaded vascular system, when it has been caused by full living or intemperance, or preceded by headaches, noises in the ears, injected eyes, affections of any of the senses, &c., the prognosis ought to have reference chiefly to the cerebral disease which it has averted; and the indications which it has

evinced should not be lost upon the practitioner, nor upon the patient.

75. iv. TREATMENT.—*a.* Upon visiting a patient with epistaxis, the first glance will often enable the practitioner to decide whether or not he ought to arrest it without delay. When the countenance does not at first furnish sufficient grounds for immediate determination, inquiries ought to be made as to the age, constitution, habits, and previous ailments of the patient; the causes which occasioned the attack; the symptoms ushering it in, and attending it; the quantity and appearance of the blood discharged, and the existing indications of internal disease, in order that a safe conclusion may be arrived at as to this and other parts of the treatment. When one or more of the following circumstances appear at all prominent, if the patient be robust or plethoric; if he have lived fully, and drunk wine or malt liquors freely or daily; if he have experienced active disease in the head, or attacks of congestion, or determination of blood to this part; and if headache, redness of the eyes or face, increased heat of the scalp, throbbing of the vessels, or a beating noise in the ears have ushered in the attack, and more especially if they still attend it, the discharge should not be arrested until the vascular system is relieved; and when this is accomplished, the epistaxis will cease of itself. If it should seem to cease prematurely, and particularly if the above symptoms still continue, depletions, purgatives, and an antiphlogistic regimen ought to be prescribed.

76. *b.* When it is desirable to arrest the discharge, the means of cure should be directed with the *intention*, 1st, of deriving the current of circulation from the seat of hæmorrhage; and, 2d, of constringing the capillaries of the pituitary membrane. With these views, the patient ought to be placed in a cool and airy apartment, with the head elevated, or held upright, and the feet plunged in warm water. The neck should be bared, and cold fluids aspersed over it and the face, or cold substances applied upon the nape, or upon the forehead. If these fail, evaporating or iced epithems may be placed over the whole of the head, or the cold affusion may be directed to this part, and an active cathartic exhibited. The most appropriate *cathartics*, in such cases, are calomel, with rhubarb or jalap, and the spirits of turpentine with castor oil; but a full dose of the latter may be given in two or three hours after the former has been taken. *Emetics* have been advised by Stoll, but they ought not to be given early in active epistaxis. They are most serviceable when the attack has been induced by an overloaded stomach.

77. *Bleeding* is required chiefly in the circumstances just alluded to (§ 75), and in the more sthenic forms of the disease; but it should not be neglected, in these circumstances especially. It may be necessary to repeat it, even oftener than once, and after longer or shorter intervals. The older writers recommended bleeding from the feet, and many modern Continental practitioners order leeches to be applied to the anus or to the vulva, when the epistaxis has arisen from the suppression of the hæmorrhoidal or catamenial discharge. When it has become habitual, or periodic, and

especially if it be vicarious of menstruation, the recurrence of the discharge may be anticipated by the application of leeches to the tops of the thighs, near the groins; by aloeic purgatives; by the semicupium or hip-bath, and by the exhibition of emmenagogues, especially bicarbonate of soda, with the aloes and mirrh pill. In other circumstances, *cupping* over the nape or mastoid processes is preferable to other modes of vascular depletion. When the quantity of blood discharged is too great to admit of the loss of more, *dry cupping* in the former situation should not be overlooked. In the great majority of cases, however, the sitting posture, with the head held backward; *cold* applied to the face, or a piece of cold metal placed between the nape of the neck and the clothes, and cooling drinks, especially those with *acids*, *nitre*, &c., will be sufficient to arrest the discharge.

78. *c.* When active epistaxis has proceeded so far as to require to be arrested, and has still continued, notwithstanding the foregoing means, the treatment then called for is also appropriate to the *passive* or *atonic* states of the disease. In these circumstances, the chief reliance must be placed upon astringents, applied to the pituitary membrane, and taken internally with tonics; upon pressure made locally; and upon the insufflation of substances into the nostrils that may promote the coagulation of the effused blood. A solution of the acetate of lead, or of the sulphate or acetate of zinc, or of the sulphate of iron or of copper, or of the sulphate of alumina, or of the vegetable or mineral acids, or of the pyroligneous acid with creasote, or of any of the numerous vegetable astringents (§ 40, 45), may be injected into the nostrils; or lint, moistened with either of them, introduced; but while astringents are being used locally, the exhibition of them internally should not be neglected. The acetate of lead, with acetic acid, and small doses of opium, may be given internally; or other astringents may be taken with tonics; or small doses of spirits of turpentine resorted to, in the manner above recommended (§ 41).

79. Finely levigated astringent powders, especially those of alum and of gall-nuts, may be blown through a quill into the nostrils; or substances of a glutinous nature may be employed in this manner, particularly powdered gums, as tragacanth or acacia; or astringents may be conjoined with these. Finely powdered charcoal may be employed in the same way. Pungent or irritating substances are often of less service than the powdered gums, which will, without exciting the Schneiderian membrane, favour the coagulation of the blood on its surface. Plugging the nostrils with lint moistened with some astringent solution is sometimes successful; but when the hæmorrhage proceeds from the more posterior parts of the nares, it will fail, unless the lint be pushed so far backward as to reach nearly to the pharynx. Care, however, ought to be taken that it does not irritate this part. J. P. FRANK advises a piece of the intestine of a pig, closed at one end, to be introduced into the nostrils, and injected with a cold fluid. Some writers recommend thick mucilage, others a paste with charcoal or with astringents, and others the white of egg, to be conveyed into the posterior nares, in or-

der to coagulate the effused blood. When a coagulum has formed, either spontaneously or by any of the foregoing means, it ought not to be disturbed for three or four days, or even longer, lest the hæmorrhage return.

80. *d.* Besides the above measures, others have been advised. In order to derive from the seat of hæmorrhage, ZACUTUS LUSITANUS directs the cautery to the lower extremities; CRESTIEN, warm pediluvia, with mustard flour put into the water; BORELLI, bruised nettles to the feet and hands; NIEMANN, blisters to the nape, and CHEZA to the arms; RIEDLIN, the exhibition of active cathartics; and CÆLIUS AURELIANUS, cupping on the occiput, GALEN on the hypochondrium, and FORESTUS on the extremities. With the view of constricting the extreme vessels, cold drinks are prescribed by HOFFMANN; cold injections through the nostrils, by MORAND and MORGAGNI; the immersion of the head in cold water by DARWIN; cold clysters, by LEUTHNER and ANDRIEU; and cold applications to the genitals, by DIEMERBROECK, THEDEN, and MERCIER. In addition to the local astringents already noticed, powdered agaric is recommended by ROCHARD; writing ink, by RIEDLIN; lemon juice, by BLANKARD; and spider's web, with vinegar, by CHESNEAU. The introduction of plugs moistened with spirits of wine is directed by MORGAGNI and RATH, and with the expressed juice of the common nettle by PRÆVOTIUS; and plugs consisting of dough, or chalk-paste, by AVICENNA and DIEMERBROECK. The injection of a strong solution of isinglass is prescribed by LENTIN; and carded lint, drawn or pushed into the posterior nares, is employed by AUDOUIN.

81. The internal use of the acetate of lead, with opium, is advised by REYNOLDS and LATHAM; of the phosphoric acid, by HERBER; of the aromatic sulphuric acid, by HUFELAND; and of the ergot of rye, by SPAJRANI, CABINI, RYAN, and NEGRI. The first of these may be employed in either the active or passive states of the disease; but the phosphoric acid is admissible only in the latter. In passive epistaxis, camphor, with opium; the spirits of turpentine, in small and frequent doses, with aromatics and restoratives; the chlorates of potash or of lime; the sulphate of quinine with camphor, &c.; asafetida with myrrh, and opiates in small quantity (SYDENHAM), are among the most energetic medicines that can be taken internally; but external means ought also to be resorted to.

82. *e.* If epistaxis be vicarious of menstruation, the return of an attack should be prevented only by endeavouring to restore the catamenial discharge. If it be periodic, especially in persons who have suffered from agues, congestion or enlargement of the liver or spleen should be dreaded; and if either be found to exist, deobstruent purgatives, followed by tonics, particularly quinine or the other preparations of cinchona, or FOWLER'S solution of arsenic, ought to be prescribed; but local depletions should be freely employed previously to these, whenever the liver is the seat of such disorder. When epistaxis occurs in aged persons, either the early suppression of the discharge, or its continuance, may be followed by serious results. It is generally connected with a disordered state of the circulation within the cranium in such cases. What has been stated

above will indicate the circumstances in which it will be advisable to interfere; but repeated blistering behind the ears, in some instances cupping in this situation, a seton in the nape, and other measures which the peculiarities of the case will suggest, with a suitable regimen, ought not to be neglected.

83. *f.* If the hæmorrhage from the nares seems to be *critical*, the observations offered in the article *CRISIS* are altogether applicable. When it appears in the last stage of low fevers, or in scurvy, or in purpura, and is merely the consequence of the lost tone of the extreme vessels, with diminished vital cohesion of the mucous surfaces, and a deteriorated state of the blood, the treatment directed for the passive form of epistaxis, or for putro-adyamic fever, is quite appropriate, if the discharge be so considerable as to require measures to be adopted for it.

84. *g.* The *after-treatment* of epistaxis is often of great importance, especially in persons of middle or advanced age. An attack, whether slight or severe, in those who live fully, ought to be followed by an antiphlogistic regimen. Where the discharge has prematurely ceased, blood-letting should always be prescribed. In order to derive permanent advantage from this treatment, abstinence, regular exercise in the open air, and a due subjection of the mental emotions, ought to be constantly observed. How fatally this may be neglected is shown by the following case: A gentleman, aged about fifty, of a very full habit of body, accustomed to live richly, and to take his wine freely, but not in excess, became subject to severe headaches. He afterward had an attack of epistaxis, which continued until the loss of blood was very great, although means were used to arrest it. He recovered, and remained well for many months; yet his usual diet and regimen were persisted in. His headaches, as may have been expected, returned; he became depressed in spirits, and disliked society; but no appropriate treatment was prescribed, or, at most, aperients only were directed. The indications furnished by the epistaxis were entirely lost upon the patient and his medical attendants; abstinence was not adopted by the former, nor precautionary blood-letting by the latter. The consequences may be readily anticipated. He shortly afterward was struck with apoplexy associated with hemiplegia, for which I was consulted just before his death. This is, however, not the only instance of the kind which has come before me in practice. I could state the particulars of several cases in which the neglect of the indications afforded by epistaxis has been followed by apoplexy, palsy, epilepsy, mania, and inflammation of the brain and its membranes.

[The art of the physician will generally be more advantageously displayed in removing the condition of the system which occasions this affection than in checking the hæmorrhage itself. In a vast majority of cases, we look upon it as a salutary effort of nature, which should rather be encouraged than checked, and the recurrence of which may be obviated by purging, low diet, revulsives, moderate exercise, and the avoidance of the exciting causes. The blood should certainly be allowed to flow where there is evidence of cerebral determination, or

vascular fulness and force, and the effect may be aided by a general antiphlogistic regimen. But under opposite circumstances the interference of art will sometimes be required, and the resources pointed out by our author will be ample for perhaps any emergency that may arise. In these cases, where the pulse is feeble, the skin cool and pallid, the general strength diminished, and the vital functions languid, we have ample reason to infer a diminution in the fibrinous element of the blood, and our measures should be shaped to supply this deficiency, as already pointed out under article *Hæmorrhage*. But in the mean time the hæmorrhage is immediately to be checked; the patient is, perhaps, already nearly exhausted, and the blood looks thin and of a light colour, as if diluted with water. We do not believe that any measures are to be depended on, under such circumstances, but actual plugging of the nostrils, which should be done either by dipping dossils of lint in a strong solution of the sulphate of alumine, carrying them high up by means of a plug, or by using the dry sponge, which is, perhaps, the more effectual. It has been recommended, where the bleeding proceeds from vessels situated very high up, to tie a piece of catgut to the sponge, carry it through the posterior nares by a probe, and out of the mouth, by which the sponge can be completely drawn up. But this will be found very difficult to execute, besides causing much discomfort to the patient. Mr. ABERNETHY states that he never failed in arresting the hæmorrhage by passing up a dossil of lint, wound round a probe, exactly fitted to the cavity of the nostril, and then withdrawing the probe and allowing the compress to remain for several days. Dr. NEGRIER, of Angers, has lately called attention to a very simple means of arresting epistaxis, which consists in closing with the opposite hand the nostril from which the blood flows, while the arm of the same side is raised perpendicularly above the head. This plan has proved successful in a great number of instances, and may be thus explained. When a person stands in the ordinary posture, with his arms hanging down, the force needed to propel the blood through his upper extremities is about half that which would be required if his arms were raised perpendicularly above his head. But since the force which sends the blood through the carotid arteries is the same as that which causes it to circulate through the brachial arteries, and there is nothing in the mere position of the arms above the head to stimulate the heart to increased action, it is evident that a less vigorous circulation through the carotids must result from the increased force required to carry on the circulation through the upper extremities (*Brit. and For. Med. Review*, Oct., 1842, p. 550). For cases illustrating the benefits of this treatment, see BRAITHWAITE'S *Retrospect* (Am. ed., No. 7, p. 88). Dr. BUCKLER has recommended what he terms *hæmostasis* as a remedy for hæmorrhage resulting from either rhexis, diapedesis, or from wounds inflicted on blood-vessels; * also to relieve inflammatory engorgement and remove simple vascular congestion, and restore the balance of the circulation. This consists simply in arresting the circulation in a portion of the body, as the arm or leg, by the application

* [*Maryland Med. and Surg. Jour.*, March, 1843, p. 265.]

of a ligature sufficiently tight to allow the blood to permeate the arteries, while the venous circulation is completely arrested. In this way a large amount of blood is withdrawn from the circulation, and is as effectually cut off from the brain and other vital organs as if it had been drawn in a basin. In this manner, Dr. B. contends that we can produce syncope, and exert a more powerful control over the heart's action than by the lancet, antimony, or digitalis, while we do not exhaust the vital forces, nor give rise to the ill consequences which the protracted use of most of the sedative agents is likely to do. The plan is at least worthy of trial in the different forms of hæmorrhage, as well as in the other cases pointed out by the writer.—(*Loc. cit.*)

Mercury, carried to the point of salivation, has been recommended by LATHAM, SOUTHEY, and others, as almost a specific remedy for obstinate hæmorrhage; but it certainly ought not to be indiscriminately employed; and in a cachectic or scrofulous state of the system would manifestly prove injurious. Where it proves useful, it doubtless does so by restoring the secretions, which are often deranged; and for the relief of which epistaxis occurs as a timely remedy. Where it is the result of metastasis, we are to endeavour to restore the original discharge, whether it be hæmorrhoidal or catamenial, and to relieve the original affection, of whose derangement it is merely symptomatic.

The ancients appear to have had nearly as correct views with respect to the management of epistaxis as the moderns; in proof of which we may refer to the works of HIPPOCRATES, CELSUS, and GALEN. "Since a trickling of blood from the nose," says PAULUS ÆGINETA, "indicates a fulness in the whole body, or in the head, being occasioned either by expression or contraction, and as a free evacuation would relax them, and diminish the quantity, it may be proper to evacuate where nature points. With this view, I have ventured, in cases of quartan epistaxis, to open the vessels in the nostrils with the reed called *typha*. We must not be contented with a small evacuation, but must take away blood in proportion to the strength. Spontaneous hæmorrhages from the nose in fevers, when critical, are not to be interfered with; but yet, if the flow of blood be immoderate, it ought to be restrained. In the first place, tight ligatures ought to be applied to the patient's extremities, and his head elevated. It would appear that a ligature to the privy parts is particularly adapted for restraining bleeding from the nose. The nostrils ought not to be wiped, nor the part irritated, so that a clot of blood may be allowed to form. Let the nose be cooled by a sponge soaked in *oxycrate*, and the nostril plugged up with a pledget dipped in some of the astringent applications." According to HIPPOCRATES, profuse bleeding from the nose indicates a disposition to convulsions, which venæsection is calculated to remove; and GALEN observes that convulsions are brought on by the unseasonable use of cold applications to stop the hæmorrhage, and recommends bleeding from the arm of the side from which the blood flows. AVICENNA recommends ligatures to the extremities, and cold and styptic applications to the nose and adjoining

parts. SERAPION agrees with most of the ancient authorities in commending a mixture of frankincense and aloes, applied on the down of a hare. He also directs to apply a sponge soaked in cold water to the temples and forehead. When bleeding at the nose occurs in a fever, RHASES forbids us to stop it unless it prove excessive; in which case he directs us to apply a cupping instrument, without scarification, to the hypochondrium; to tie ligatures about the testicles; to pour cold water on the head; and to drink cold water (ADAMS'S *Com.* in PAUL. ÆGINETA, p. 326.)

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[AM. BIBLIOG. AND REFER.—(See Bib. of "Hæmorrhage.")]

IV. HÆMORRHAGE FROM THE MOUTH AND THROAT.

—Syn. *Hæmorrhagia Oris*, *H. Faucium*, *Stomatorrhagia*, J. P. Frank; *Sanguinis Profluvium ex Ore*, *Hæmorrhoides Oris*, Vogel; *Hæmorrhagie buccale*, Fr.; *Mundblutfluss*, Germ.

85. A discharge of blood from one or more of the parts forming the mouth and throat.

86. Hæmorrhage may take place to a great or even fatal amount from the gums, the tongue, the fauces, or the pharynx, and even from the insides of the cheeks and lips. Blood is rarely, however, discharged from one or more of these parts unless in the advanced stages of cachectic diseases, or of malignant or low fevers.—a. RIVERIUS mentions a case in which four or five pounds of blood were discharged from the lips every month. Hæmorrhage from this part has been observed also by ZACUTUS LUSITANUS. J. P. FRANK met with a case in which it proceeded from varicose veins of the upper lip. I lately saw an instance of varicose veins of this part, but there was no hæmorrhage. Bleeding from the interior surface of the cheeks is generally owing to injury from the teeth or to tumours.

87. b. Discharges of blood to a small amount from the gums are very common, especially in the advanced stages of the diseases just adverted to, and more abundantly after suppression of accustomed discharges, as the catamenial or hæmorrhoidal. Vicarious menstruation may even take place from this situation. Severe or dangerous hæmorrhages from the alveolar processes have been most frequently caused by the extraction of teeth. FRANK has seen several pounds of blood lost from a varicose state of the veins of, and in the vicinity of the gums; and similar discharges have more frequently taken place from tumours in this situation, and from the excessive use of mercury. VOGEL met with an instance in which the discharge was produced by a combination of mercury and belladonna. HIRSCH, FRANK, and others have met with periodic hæmorrhage from this part vicarious of menstruation. Fatal effusions from the gums have been seen by HORSTIUS, FABRICIUS, HILDANUS, and several more recent writers. The occurrence of hæmorrhage in this situation in purpura hæmorrhagica, scurvy, and the diseases adverted to above (§ 86), is too well known to require farther notice.

88. c. Hæmorrhage from the tongue very rarely takes place to any very considerable amount, unless in cases of injury of the raninal veins or arteries, as in dividing the *frænum lingue*, when it may prove fatal. Slighter injuries from the teeth, especially during epileptic fits, seldom cause more than small discharges of blood. But the more serious diseases to which the tongue is liable (see art. TONGUE) may be followed by dangerous or even fatal hæmorrhage. Such instances are recorded by PLATER and others. MARI saw 24 lbs. of blood discharged from this part; and J. P. FRANK met with a case of *glossitis*, which, upon passing into gangrene, terminated fatally with profuse hæmorrhage.

89. d. Hæmorrhage from the palate and fauces to a very considerable amount has been ob-

served by BUNDEL, VOGEL, FRANK, and KLUIGE. J. P. FRANK believes it generally to proceed from a varicose state of the veins in this situation, and hence the appellation *Hæmorrhoides Oris*, applied to it by VOGEL and BUNDEL. He mentions an instance in a young man who, for many years, suffered repeated attacks of hæmorrhage from the state of the veins of the palate, and who was permanently cured, after a profuse discharge, by a strong solution of alum. PORTAL met with a case where the hæmorrhage took place from the *uvula*. A more or less copious effusion of blood may also proceed from the *velum palati* or *tonsils*, especially in the course of cachectic diseases, or as a consequence of a varicose state of the veins of the part, or of those in the vicinity.

90. e. Effusions of blood from the surface of the pharynx occur more frequently than is commonly supposed, and are overlooked in consequence of the fluid having passed into the stomach. When the hæmorrhage from this situation is very considerable, the quantity of blood which is swallowed is often so large as to cause vomiting, and to lead to the supposition that the stomach is the seat of the disease. The small veins in the pharynx are not infrequently varicose or obstructed, and when this is the case, hæmorrhage sometimes takes place from comparatively slight causes. The most dangerous discharges from this part occur in the advanced stage of putro-adynamic fevers, and of cyananche maligna, in which the pharynx is more or less affected. J. P. FRANK has noticed the occasional supervention of pharyngeal hæmorrhage independently of those diseases; but the subject has been overlooked by other writers. Some years ago I attended a lady, about 70 years of age, residing at St. John's Wood, who complained of dyspeptic disorder complicated with psoriasis and sore throat. The veins of the pharynx were reticulated and varicose. I was afterward called to her suddenly on account of a very severe hæmorrhage, attended by vomiting and cough. Much of the blood evidently was brought up from the stomach, but a great part passed directly from the throat. The cough arose from the irritation caused by the fluid on the epiglottis and pharynx. The effusion was arrested for a time by powerful astringents. Two days afterward, the hæmorrhage returned more violently than before, and terminated life before I reached her. On examination after death, the pharynx was found softened, black, and studded with soft aphthous ulcerations, between which dark blood was infiltrated. The veins of this part were numerous and dilated. The stomach contained a considerable quantity of blood. The upper part of the œsophagus was softened and congested in its internal surface. In this case the blood had passed into the stomach, the position in bed having favoured this occurrence, and had irritated this organ so as to produce vomiting.

91. i. The SYMPTOMS and DIAGNOSIS of hæmorrhage from the mouth or throat are not always as distinct as may be supposed, particularly as respects the source of the discharge. The symptoms preceding the effusion are very uncertain, and are those most commonly indicating congestion of the head or adjoining parts, or disease in one or other of the above situations. Headache, vertigo, noises in the ears;

soreness, irritation, titillation, tension, or a sense of fulness or heat in the throat; a bloated appearance of the countenance, and throbbings of the vessels in the vicinity sometimes usher in the hæmorrhage. If the patient be in bed when attacked, the irritation of the fluid on the glottis causes cough, and the passage of it into the stomach is followed by vomiting, when the quantity is considerable or the stomach irritable. If hæmorrhage take place from the pharynx while the patient is asleep, the blood will flow into the stomach; and the first intimation of the occurrence will often be the vomiting of blood. Hence the utmost care is required to distinguish this species of attack from hæmoptysis on the one hand, and from hæmatemesis on the other, as it may closely simulate either. In order to do this, the mouth ought to be well washed by a slightly astringent and colourless fluid, or the throat gargled, and afterward carefully examined. If the hæmorrhage be too copious to admit of inspection of the mouth and throat, the patient should lean forward so as to allow the blood a free passage from the mouth; and if it flow without coughing or retching, and is neither frothy or very florid, nor very dark or grumous, there can be no doubt as to the situation whence it proceeds. If the patient feel it collect in the throat, and create a disposition to deglutition, or if he require no effort to bring or hawk it up, it manifestly proceeds from the fauces or pharynx. In many instances, causing the patient to drink some fluid instantly before examining the throat will assist the diagnosis; and in others, the history of the case will be sufficient to settle the question. When the fauces or pharynx is the seat of the discharge, deglutition of food or drink, or the use of a gargle, either before or during the hæmorrhage, will cause more or less pain. (See *Diagnosis of Hæmoptysis and Hæmatemesis.*)

92. ii. The CAUSES of stomatorrhagia are those of hæmorrhages generally, but more especially previous diseases of a cachectic or malignant character; affections of the gums and teeth; repeated attacks of sore throat, particularly when connected with chronic disorder of the stomach and other digestive organs; the use of mercury; injury or previous lesion of the vessels, especially the veins; and obstructed discharges, as the catamenial or hæmorrhoidal, of either of which the hæmorrhage from the mouth may be vicarious. The acronarcotic poisons may even cause it. In a case of poisoning by aconitum, which I saw some years ago, remarkable swelling of the tongue and fauces took place, followed by moderate hæmorrhage from these parts.

93. iii. The PROGNOSIS entirely depends upon the circumstances in which stomatorrhagia occurs, upon the previous state of disease, and upon the quantity of blood lost, and the effect thereby produced upon the constitution. The general principles above stated will also guide the practitioner.

94. iv. The TREATMENT of hæmorrhage from the mouth or throat requires to be materially modified, according to the parts from which the blood is effused, and the causes producing the effusion. Cases rarely occur in which it is either necessary or proper to have recourse to blood-letting. Purgatives, however, especially

those of a stomachic or tonic kind, are often beneficial, more particularly when the disease is connected with disorder of the digestive organs, and with accumulations of morbid matters in the *prima via*. The chief dependance is to be placed in the local and internal use of the more energetic astringents noticed above, as the sulphates, the acetate acid with creasote, the acetate of lead or of zinc, spirits of turpentine, the chloride of lime, &c. These may be used in gargles, in more or less concentrated solutions, and in various states of combination, as with gums or mucilages. If the hæmorrhage take place from a single vessel, or from a limited extent of surface, the actual or potential cautery is quite appropriate. If it proceed from the alveolar process, powerful styptics, and various mechanical measures, may be resorted to.

95. When hæmorrhage from the mouth depends upon general cachexia, or supervenes in the latter stages of putro-dynamic fever, or of purpura or scurvy, the above means should be aided by the internal use of tonics, conjoined with vegetable or other astringents and antiseptics, as the chlorides, the chlorate of potash, the nitrate of potash, or the hydrochlorate of ammonia, &c., and by an appropriate regimen. If the effusion seems to proceed from the pharynx, the position of the patient should be such as will favour the flow of the blood from the mouth, and prevent it from irritating, or escaping into the larynx.

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V. HÆMORRHAGE FROM THE RESPIRATORY ORGANS.—SYN. *Hæmoptysis* (from *aima*, blood, and *πτύω*, I spit, or *πτύσις*, a spitting); *αιμοπτύσις*; *αιμοπτικος*, Galen, Dioscorides; *Sanguinis Sputum*, Celsus; *Emoptoë*, Gordon; *Sputum Cruentum*, Cruenta Exputio, *Sanguinis Fluor*, *Vomitus Pulmonis*, Auct. Lat.; *Æmoptoïca Passio*, Gilbert; *Passio hæmoptoïca*, Plater; *Hæmoptoë*, Boerhaave, Vogel, Darwin; *Hæmolismus*, Auct. var.; *Hæmoptysis*, Sauvages, Vogel, Cullen, &c.; *Hæmorrhagia Pulmonum*, *Hæm. bronchica*, *Hæmorrhæa pulmonalis*, Auct. var.; *Pneumonorrhagia*, J. P. et J. Frank; *Blutspeyen*, *Bluthusten*, *Lungenblütfluss*, Germ.; *Crachement de Sang*, *Expectoration de Sang*, Fr.; *Emotisi*, *Emotisca*, *Sputo di Sangue*, Ital.; *Blodspytting*, Dan.; *Pulmonary Hæmorrhage*, *Spitting of Blood*, *Coughing of Blood*.

96. DEFIN.—After a sense of heat, oppression,

or pain in the chest, and titillation in the throat, the rejection of florid, frothy, or pure blood from the bronchi or lungs, with a hawking or short cough.

97. *Hæmoptysis* is one of the most frequent varieties of hæmorrhage, owing to (a) the very extensive bronchial and vesicular surface to which the blood is circulated for the purpose of undergoing the requisite changes during respiration; (b) to the delicate conformation of the capillaries and mucous membrane of this part; (c) to the liability of the lungs to congestions, from impaired organic nervous power, from obstructions of the pulmonary veins and of the circulation through the left side of the heart, and from tubercular or other lesions of the substance of the lungs; (d) and to the liability of this organ to derangements of its circulation from hypertrophy and other lesions of the heart, and from alterations of the large vessels. Of all these morbid causes and connexions, tubercular formations in the lungs are the most common, either as a cause of the hæmoptysis, or as associated lesions consequent upon the same antecedent changes in the states of vital power and vascular action, or as both.

98. i. SYMPTOMS, &c. — A. The *premonitory signs* of hæmoptysis are, horripilations, passing redness and heat of the face, or flushings of the cheeks, headache, coldness of the extremities, with a collapsed or empty state of the veins of the surface; lassitude, and sense of weight of the limbs; occasionally cramps or spasms of the lower extremities; a feeling of internal warmth, particularly in the chest; pain or tension at the epigastrium or hypochondria; a burning sensation under the sternum, with more or less anxiety, inquietude, constriction, or oppression at the chest, or dyspnoea; a short, dry cough; dyspnoea, or shortness of breath on slight exertion; a dull pain or soreness under the sternum, between the shoulders, or beneath the clavicles; palpitations; a quick, hurried, or excited pulse, which is sometimes also hard, full, bounding, or oppressed, &c.; flatulence, or borborygmi, costiveness, and pale urine. A few only of these symptoms, or several variously modified, may be present in individual cases; they may exist for a longer or shorter time before the attack. In some instances, neither cough, nor difficulty of breathing, nor any symptom referrible to the chest, has been complained of; or it has existed in so slight a degree as to escape the observation of the friends of the patient; and yet the most extensive changes had taken place in the lungs, and caused the hæmorrhage. A case of this kind was attended by Mr. BUSHELL, Dr. CLARK, and myself while this article passed through the press. Such instances, however, are not uncommon, as shown by RHODIUS, MULLER, WEDEL, GRAMBERG, the FRANKS, LOUIS, CLARK, and others.

99. B. *Progress*.—As the blood rises to the larynx, a sense of titillation is felt in the trachea, or of irritation in the throat, with dyspnoea; and a gurgling or bubbling sensation in the chest or trachea; and the blood is either hawked or coughed up, exciting a sweetish-salt taste. As soon as this occurs, much alarm is sometimes caused, particularly in delicate or nervous persons; and several of the general

symptoms, particularly those connected with the action of the heart and pulse, are owing chiefly to this circumstance. When the blood is in considerable quantity, the discharge of it is attended with a feeling of suffocation; the chest is forcibly dilated, a convulsive reaction or cough follows, and this fluid is ejected from both the mouth and nostrils. In some instances the irritation at the top of the pharynx and in the fauces excites retchings; and in others the blood, as it collects in the pharynx, is instinctively swallowed; and, when it has accumulated in the stomach, causes vomiting, and gives rise to a suspicion, from this circumstance and from the presence of portions of ingesta, &c., as shown hereafter (§ 118), that the hæmorrhage is seated in the stomach. Occasionally the blood is brought up without any effort whatever, beyond a strong expiration, which it accompanies in a full stream; and when retching or full vomiting is occasioned in the manner just stated, another, and often a greater discharge of blood from the lungs attends it.

100. The quantity thus discharged varies from a few drops to many pounds. RHODIUS (*Obs.*, cent. ii., 31) saw 23 lbs. lost in three hours; PEZOLD (*Obs. Med. Chir.*, No. 49) and ZACCHIROLI (*WEIGEL'S Ital. Biblioth.*, b. iii., p. 154) observed larger quantities during a much longer period. J. FRANK (*Prax. Med.*, &c., ii., 2, 1, p. 417) had a patient who lost 192 ounces in twenty-four hours; and a friend of my own experienced nearly as great a discharge in the same time, and afterward recovered. [Dr. CHAPMAN states that he once saw two quarts come away in twenty or thirty minutes.* We have seen a still larger quantity, in one instance, discharged in the course of an hour. LAENNEC says that he has known 30 pounds lost in about 15 days, and, in a very extraordinary case, 10 pounds in 43 minutes. J. FRANK speaks of a case in which 25 pounds of blood were voided in three hours.] When the blood is not considerable as to quantity, it is frothy, or contains bubbles of air, and is of a florid hue; when it is very abundant, it is fluid, generally more or less florid, but not frothy; it is seldom mixed with muco-puriform matter, unless it be small in quantity, and it then is often semi-coagulated, and of a darker or brownish tint; but towards the termination of an attack this appearance is very common. If the hæmorrhage is very great, extreme faintness, or even full syncope, may come on; but a sense of depression, or sinking, with a quick, sibilous, and short respiration; a small, weak, interrupted voice and speech; and coldness of the extremities, are more commonly complained of. Occasionally, the least exertion of the voice, or of the body, or a fit of coughing, increases or brings back the discharge; but as often it returns without any such cause.

101. In some instances the attack is followed by great frequency of the pulse, and generally excited vascular action, with heat of skin, thirst, &c., although the pulse had been perfectly natural before or at the time of seizure. In these the congestion of the substance of the lungs connected with the production of the hæmoptysis has passed into inflammatory ac-

* Lectures on the more important Eruptive Fevers, Hæmorrhages, &c., p. 173. Phil., 1844.

tion, in one or several parts of the organ; or, rather, the infiltration of a portion of the effused blood through the smaller bronchi has excited inflammation of them, as demonstrated by the stethoscope and by dissection. In many cases, especially when the hæmorrhage occurs in weak or lax frames, and scrofulous or tubercular states of the lungs, not only the external discharge of the blood, but also its passage along the bronchi into the more depending parts of the organ, and even its infiltration into the substance of the lungs, or its effusion in the distinct form of pulmonary apoplexy, takes place, as I have several times recognised during life, and ascertained afterward by dissection.

102. An attack of hæmoptysis may be so severe and sudden as to suffocate the patient before a large quantity of blood is lost; or so continued as to destroy life by the loss of this fluid. Only one violent seizure may occur, the patient recovering perfectly, without suffering materially, after the immediate effects have passed off; but this is seldom the case, more or less disease of the lungs, although unapparent to the friends previous to the attack, following rapidly afterward. In some cases, particularly when tubercles have proceeded to softening, &c., without exciting much disorder, the hæmorrhagic congestion, infiltration, and atonic inflammation of the substance of the lungs, attendant and consequent upon the seizure, soon destroy life. In several instances to which I have been called, the patients had pursued their usual avocations, unconscious of ailment, been attacked by hæmoptysis, and died in three or four weeks afterward in consequence of these associated lesions of the lungs. In the case above alluded to (§ 98) death took place 26 days after the attack. More frequently the hæmoptysis is followed by pulmonary consumption in a much less rapid form. When the blood is ejected in small quantity, or of a brown colour, or is mixed with a rose-coloured lymph, or mucus, latent inflammation or active congestion most likely will be found to exist in the substance of the lungs; and this inference ought not be doubted, if febrile symptoms, with cough, be present, or if the blood taken from the arm be buffed. In a few instances, the lymph effused from the vessels towards the close of the attack is moulded into the form of several bronchi, and is expectorated in this state; in others, cretaceous or other earthy concretions, consequent on the degeneration, or the partial absorption of tubercles, or even ossific matters, are brought up with the blood, or soon afterward; but most frequently, and especially when the hæmorrhage is scanty, or towards its close, or after more than one attack, muco-puriform matter, with or without minute portions of softened tubercular substance, may be detected; and these become more manifest as the blood disappears.

103. Hæmoptysis may recur at irregular, or even at distant periods; the patient experiencing but little ailment in the intervals, or presenting merely a marked susceptibility to congestion or inflammatory affections of the lungs. When supplemental of suppressed or retained catamenia, or of the disappearance of hæmorrhoids or epistaxis, it sometimes returns periodically. In such cases, the evacuation depends more upon vascular plethora than upon

serious lesion of the substance of the lungs, although this may also exist. Some instances of a constitutional recurrence of hæmoptysis (§ 49) have been observed, and yet a far advanced age has been reached.

[Dr. CHAPMAN mentions the case of a lady who, for eleven successive days, had hæmoptysis at precisely nine o'clock in the morning, always preceded by a slight chill.—(*Loc. cit.*, p. 173.) Many similar cases are on record.]

104. *C.* The appearances after death comprise almost every lesion to which the lungs, heart, and large vessels are liable, but some of them are more immediately connected with hæmoptysis than others. *Tubercles* are the most common of all these, in one stage or other of their progress, and frequently they are found in every stage even in the same case—either disseminated through the lungs or clustered, in a crude, softened, and ulcerated state, in connexion with small or large excavations—in some instances the seats of the softened and partially absorbed tubercular matter containing earthy or cretaceous concretions; and, in rarer cases, the parenchyma of the lungs around them presenting a cicatrized or puckered appearance. When hæmoptysis has been very recent, the lungs are frequently more or less congested, and their substance infiltrated with dark blood, both throughout many of the minute bronchi and cells, and in the connecting cellular or parenchymatous tissue, large portions of the organ exhibiting a spleen-like appearance. In some cases, portions of the lungs are more or less obviously inflamed; the inflammatory appearances having been either antecedent to, or consequent upon the hæmorrhage, most frequently the latter. In rarer instances, blood is effused in the substance of the organ, forming a distinct cavity filled with coagulated blood.

105. Adhesions between the pulmonary and costal or diaphragmatic *pleura*, both old and recent, frequently exist. The bronchial membrane is generally injected, congested, and of a deep or dark red, or purplish, or nearly black, either throughout a large extent, or in parts or patches; but the state and colour of this surface vary with the period at which hæmoptysis took place, and the mode in which the disease of the lungs terminated the life of the patient. (See art. BRONCHI, § 3-14.) In rarer cases, gangrene of portions of the lungs, or erosion or ulceration of one or more vessels connected with softened tubercles or cavities, is observed. These cavities are generally lined with a more or less thick secreting membrane. In a few instances, osseous deposit has been found in the membrane of the cyst. (See art. LUNGS.)

106. Alterations of the large vessels in the chest, and of the heart itself, are occasionally found, especially in the cases of aged persons. The pulmonary veins have been seen diseased, inflamed, or partially obstructed by humours, or morbid depositions, either externally or internally. I found them inflamed, and a large branch partially obstructed by lymph, in one case. A dilated or varicose state of the pulmonary veins has been noticed in connexion with hæmoptysis, by MORGAGNI, GILLIBERT, PORTAL, and J. FRANK. Lesions of the pulmonary artery have also been met with, especially rupture (MATANI, *De Aneurism, Præcordior.*

Morbis, p. 120) and aneurismal dilatation (J. FRANK, &c.). Mr. SEMPLE has detailed a case which he considered hæmatemesis, but which was probably hæmoptysis attended with vomiting, owing to the circumstances above pointed out (§ 99), wherein the left pulmonary artery was obliterated, and the lung was extensively diseased. Aneurisms of some part of the aorta opening into the trachea, bronchi, or lungs, have been oftener observed than these. CRICKSHANKS found the lymphatics of the lungs turgid with blood, absorbed from the air cells, in patients who had died of hæmoptysis.

107. Diseases of the heart, particularly such as occasion obstructed circulation through the left cavities, as narrowing of the auriculo-ventricular opening, lesions of the valves, &c., are not infrequently found in connexion with hæmoptysis (WILSON, WATSON, &c.). Hypertrophy of the ventricles, especially of the right ventricle, has been remarked, in rare instances. BERTIN, BOUILLAUD, and other French writers, attach considerable importance to this lesion as a cause of the hæmorrhage; but I agree with Dr. WATSON in considering the alterations which obstruct the passage of blood from the lungs as more frequent causes than this.

108. ii. CAUSES.—A. The *Predisposing Causes* of hæmoptysis comprise most of those already enumerated in connexion with hæmorrhage generally (§ 21), and of those which favour the formation of *tubercular consumption*. (See that article.) Those which are more especially concerned in the production of hæmorrhage from the respiratory organs are: Hereditary constitution; the scrofulous and the hæmorrhagic diathesis; sanguineous, irritable, and sanguineo-irritable temperaments; a plethoric habit of body; the period of life between seventeen and thirty-five; tallness of stature; a narrow or deformed chest; curvatures of the spine, rickets, or severe hooping-cough in early life; sedentary occupations, especially at the writing-desk or drawing-table; a change of modes of life, as from active employments to inactivity; certain trades, as shoe-making and weaving; the spring and summer seasons; sudden or frequent vicissitudes of temperature and weather, especially rapid changes from cold to heat; suppression of accustomed excretions and discharges; and congestions or enlargements of the liver or spleen. M. LOUIS found hæmoptysis to occur among men nearly in the same proportion at all ages. GALEN, STRAMPIN, GOLTZ, and LOUIS consider it to be more frequent in females than in males. FRANK and CONRING entertain a different opinion; the latter remarks that men are more prone to the disease than females, unless when the catamenia of the latter are suppressed. LOUIS found it more frequent in females in the proportion of three to two, and that their age was most commonly from 40 to 65. I believe that the predisposition to hæmoptysis is less, or at least not greater, in females than in males, until the period at which menstruation usually ceases, but that, after this period, the frequent occurrence of vascular plethora favours the production of pulmonary hæmorrhage. There is no doubt of the influence of premature and excessive venereal indulgences, and more especially of solitary vices of this kind, in favouring the occurrence of this and its allied diseases.

109. B. The *Exciting Causes* are chiefly external injury; fracture of the bones of the thorax; wounds of the chest and lungs; falls or concussions on the chest; physical efforts, particularly in lifting or carrying great weights; compression of the thorax by straight lacing, &c.; running, especially against the wind, and hunting;* protracted exercise with the arms, great exertions of the voice, reading aloud, or speaking for a long time; playing on wind instruments; inhaling irritating fumes, as those of acids, &c., or particles of dust, as in various occupations (see art. ARTS and EMPLOYMENTS, § 40); foreign bodies fallen or drawn into the trachea and bronchi; [irritation from an elongated uvula; enlarged tonsils; the tying of large arteries in surgical operations;] cold in any form or mode of application; rarefaction, or great dryness of the atmosphere; the suppression of other sanguineous discharges; anger, and the more violent mental emotions; venereal excesses; terror, frightful dreams, or sudden surprise; severe fits of cough, of laughter, or of sneezing; straining at stool, and changes in the state of the blood. Besides these, many of the lesions just mentioned (§ 104, *et seq.*), act as exciting causes, especially tubercles and their consequences; alterations of the vessels either in the seat of hæmorrhage, or near the centre of circulation; and difficult or impeded passage of blood through the heart, pulmonary vein, or aorta, &c.

[Dr. RUSH informs us that those religious denominations who do not sing, and generally worship in silence, are very subject to hæmoptysis, from weakness of the lungs, induced by want of exercise. Dr. CHAPMAN, however, remarks that his experience does not confirm this observation. Clergymen, it is well known, are extremely liable to this affection, for which a variety of causes have been assigned, but which we have thought is generally attributable to exercising the organs of voice disproportionately to the rest of the body. High living and want of proper exercise predispose to attacks of local disease, and those organs which are debilitated from any cause are most liable to invasion. "As regards public singers," says Dr. CHAPMAN, "especially those of the opera, where the vocal powers are strained to the utmost, it is acknowledged that they are singularly liable to hæmoptysis, or, if they escape it, they soon begin to suffer from some pulmonary affection, and either prematurely die, or retire from their profession with a shattered voice and infirm health. Three or four years, I was informed by one of them, are, perhaps, the average of the full preservation of their powers."]

110. C. The *Seat of hæmorrhage*, in cases of hæmoptysis, has not always been recognised with precision. Previous to the writings of BICHAT, the effusion was very generally supposed to proceed from a ruptured or ulcerated vessel, arterial or venous. Subsequently it has been generally referred to exudation from the capillaries of the bronchial membrane. I believe that at present it is too exclusively imputed to this source; and that, although this is much the most common mode of its production, it not infrequently proceeds from an ulcerated

* A physician, in whose case I was consulted, experienced a severe attack of hæmoptysis on his way to London on one of the railroads.

or diseased vessel, particularly when the discharge is sudden, very copious, or rapidly fatal. It has been supposed by some that the blood is exuded from the general surface of an ulcerated cavity, when this lesion has preceded the discharge. This may possibly be the case in a very few instances; but, when the cavity is the seat of hæmorrhage, one vessel, or a few only, are most likely its source. In most of the cases of hæmorrhage, in connexion with cavities in the lungs, that I have seen, the internal surface of these cavities, or fistulous ulcers, appeared not in a state indicating that hæmorrhage either had, or could have taken place from them. The circumstance of the small bronchi being filled with blood, or their membrane being deeply tinged, or even injected or inflamed, is no proof of the discharge having taken place from them, as the blood when once effused, even as high up as the trachea, will frequently gravitate or pass downward into the minute air-vessels, especially when the lungs are in a state of disease or of debility, and will discolour, irritate, or even inflame them.*

111. J. P. FRANK has endeavoured to establish a variety of hæmoptysis under the denomination of tracheal, from its seat. Admitting the occasional occurrence of hæmorrhage from this situation, it rarely can be distinguished from other states of the disease, even with the aid of percussion and auscultation; for, as this very able and practical writer has shown with great truth and originality, a considerable portion of the blood effused in this situation passes down into the bronchi, and gives rise to the same phenomena as depend upon the more common forms of the malady. This, however, he concedes. In cases, also, of profuse hæmorrhage from the pharynx or parts adjoining, a portion of the blood may escape into the trachea, descend into the bronchi, and afterward be coughed up, thereby simulating hæmoptysis. The blood may thus pass into the lungs as well as into the stomach (§ 91, 99), and may either be coughed up, or both coughed and vomited up, thereby simulating true hæmoptysis; or, if the quantity be great, it may suffocate the patient. Dr. WATSON mentions a case which he saw, in which suffocation occurred from the passage of blood into the respiratory passages, from an ulcerated opening into one of the lingual arteries, the bronchi containing a considerable quantity of this fluid. From the foregoing,

* This, as well as other points connected with hæmoptysis, are very justly stated by the elder FRANK: "Si nullus, et ex vasis conspicuis, majore cum impetu cruor in bronchium ruit; ex hoc, in alia, vicina, altiora, assurgit; ex istius, per ramos bronchiorum laterales, declives, in subiectam pulmonis affecti, aut etiam in sani, substantiam descendit, ac novo reflexu, sub summæ anxietatis ad præcordia sensu, violentâ diaphragmatis actione, sed interdum sine tussis manifestâ, et per solam quasi expirationem fortiore, torrentis adinstar, per tracheam, laryngem, per oris, et narium per ostia, tam fluidus ac floridus, quam partim concretus, obscurus, horrendo spectaculo præcipitat. Sub tanto cruoris ad fauces impetu, pars ejus, in pharyngem regurgitans, vomitur, ut vidimus, violentum sæpe provocat, cibosque, forsitan ventriculo contentos, novæ sanguinis undæ, per tracheam simul expulsa; commistos, expellit, ac validum medico, tussis ipsum aliquando per vomitum eruentum excitatæ, non ignaro, quo demum ex cavo sanguinis scaturiat, dubitandi argumentum relinquunt. Hæc dubia non minus in casu, quo tussis violenta prævit, ac, istius ob impetum, sanguis non modo pulmonum, sed simul narium e vasis expellitur, urgeant; aut facile pulmo, ob nares cruentas, profuvit insons. cum magno judicii errore, declarabitur."—*De Curand. Hom. Morb.*, &c., class v., ord. iii., gen. 3, § 606.

therefore, it may be inferred that the blood in true hæmoptysis proceeds from one or other of the following sources: 1st. From the mucous membrane of the bronchi—*Bronchial Hæmorrhage*. 2d. From the substance of the lung, constituting the pulmonary apoplexy of LAENNEC, or, more correctly, *Pulmonary Hæmorrhage*. 3d. From an ulcerated or tuberculous cavity, one or more vessels having been eroded or ruptured. 4th. From aneurism of the aorta, or of some other artery.

112. D. *Certain Pathological Relations of Hæmoptysis* have been very generally overlooked by writers on this and other pulmonary diseases.—a. The intimate connexion, however, between it and *tubercles in the lungs* has been very diligently investigated by LOUIS, ANDRAL, and others. ANDRAL refers to cases of hæmoptysis in which there appeared to be no evidence of the previous existence of tubercles in the lungs. Such cases are rare, and are to be referred chiefly to extreme congestion of the lungs. Instances are certainly not infrequent of the hæmorrhage occurring in a state of apparent health; but, in many of these, tubercles in an early stage of their existence may have previously been formed, or even have been detected upon close examination. BAILLOU remarked that profuse hæmorrhage from the lungs is less dangerous than small, and there is much truth in the observation; but PORTAL went too far in saying that those who habitually spit blood are rarely phthisical. My own observation is more in accordance with that of LOUIS, who states that, with the exception of some cases in which hæmoptysis depends upon external injury, or is connected with suddenly-suppressed catamenia, it indicates with very great probability the presence of tubercles in the lungs. Dr. JAMES CLARK, in his able work, observes that hæmoptysis is occasionally idiopathic, or dependant upon a temporary plethora or congestion of the lungs, especially when it is a consequence of suppressed sanguineous discharges. In tubercular phthisis, congestion of portions of the lungs, or even of the whole of the organ, is not infrequent, and is, in many cases, followed by a more or less copious hæmoptysis. Such congestion may also develop tubercles, or hasten their progress, as well as occasion the effusion of blood. In some instances, the discharge will afford relief to all the pulmonary symptoms, especially when the effused blood is entirely thrown off; but, in others, it will accelerate a fatal issue, particularly when a portion of it remains in the bronchi and irritates them, as shown hereafter (§ 114).

113. It has been supposed by ANDRAL and others that hæmoptysis occasionally is a cause of phthisis, the blood effused into the lungs forming a matrix for tubercular deposits. But to produce this effect the effusion must take place in a scrofulous constitution. I agree, however, with Dr. JAMES CLARK in considering hæmoptysis rarely to be a cause of phthisis, unless by the debility it induces when very copious, or by the depletion employed to suppress it; or, still more probably, by the irritation produced by the effused blood in the minute bronchi. It is a frequent symptom during the whole course of phthisis, and may appear at any stage. LOUIS states that it was present in some degree or other in two thirds of his cases. It is rare

in the phthisis of children and old persons, and occurs in them chiefly towards the close of the disease.

114. *b.* The connexion between hæmoptysis and *inflammation of the lungs* has been very generally overlooked. The former occurs in very rare cases as a termination or crisis of the latter; but when the inflammation is associated with tubercles, the development of these is frequently promoted by the hæmoptysis. One of the most common consequences of hæmorrhage into the bronchi is inflammatory action. The effused blood irritates the mucous membrane of the bronchi, especially in the minuter ramifications, and the morbid action often extends to the air-cells and substance of the lungs. This is very frequently observed in weak and susceptible constitutions, and when the effused blood has been imperfectly excreted from the bronchi. The softening and discoloration of the bronchial surface, generally seen in fatal cases of hæmoptysis, arise from this consecutive inflammatory irritation; and the puriform matter sometimes poured into the bronchi, with or without fibrinous concretions, or a coloured lymph, proceeds from the same source. A part, doubtless, of the fibrinous matters arises from the effused fluid; but a part also consists of the lymph given out by the capillaries, which had shortly before discharged blood. In all cases, therefore, of hæmoptysis, it is not merely the development or accelerated progress of tubercles which is to be dreaded, but also the supervention of circumscribed or diffused *pneumonia*, which may assume any of the forms described in *Inflammation of the Lungs*.

115. *c.* The relation of hæmoptysis with *disease of the heart* has been already alluded to. The momentum caused by hypertrophy of the right ventricle is rarely sufficient to rupture any branch of the pulmonary artery, although it may probably overcome the resistance opposed by the tonicity of the extreme capillaries in the bronchial surface, or in the substance of the lungs. Dr. WATSON, who has taken a very sound view of this, as well as of some other subjects connected with hæmoptysis, states that every instance of pulmonary hæmorrhage dependant upon organic disease of the heart which he had observed coincided with disease on the left side of that organ, mechanically obstructing the return of blood from the lungs. The obstacle has sometimes been placed at the entrance of the aorta, but it has most commonly consisted of narrowing of the left auriculo-ventricular orifice, and a rigid condition of the mitral valve. Facts illustrative of this relation have also been adduced by Dr. WILSON (*Med. Gazette*, vol. vi., p. 25), and observed by myself. I believe, moreover, that those powerful mental emotions which affect suddenly the functions of the heart, which seriously disturb its action, and favour congestion of its cavities, as terror, fear, anger, grief, &c., sometimes produce hæmoptysis by impeding the return of blood to both the right and the left sides of this organ.

116. *B. Other complications* besides the above occasionally present themselves in practice; but in these, hæmoptysis is merely a symptom arising from some predisposition to pulmonary or hæmorrhagic affections.—*a.* It has been stated that bronchitis and pneumonia often follow

hæmoptysis, and the reason has been assigned (§ 114). But the *complication* of acute or sub-acute *pneumonia* with slighter forms of this disease has been very generally overlooked, especially by recent writers. STOLL and BROUSSELS, however, have remarked that hæmoptysis sometimes accompanies, or is an accidental symptom of pneumonia. The remark is just. Care, therefore, should be taken to recognise this state, as well as to distinguish between both diseases; as the use of astringents, on the supposition that the patient is suffering the former affection only, might lead to fatal results. Even with the aid of auscultation, the existence of the pneumonia may not be ascertained, as the auscultatory signs may be ascribed to the infiltration of the bronchi, or of the substance of the lungs, with the effused blood, or to the attendant congestion. The rational symptoms in this case should be carefully weighed; and where there are dyspnoea, cough, oppressed or quick breathing, heat of skin, a hard or full pulse, deep-seated pain in the chest, crepitant rhonchus, and bronchial respiration present, the disease should be viewed as inflammatory, the hæmorrhage being merely a contingent symptom or complication. Even when the hæmoptysis has originated in tubercles, inflammation of one or more lobes of the lungs may also exist, and may implicate not only the substance of the organ, but also its pleura, giving rise to albuminous exudation, and adhesions to the costal pleura. I have not infrequently found, upon dissection of cases of hæmoptysis, not only tubercles in every stage of their progress and results, but also inflammations of the substance of the lungs and of the pleura,* with all the structural consequences, and yet, in some cases, no pain had been felt so severe as would have directed attention to an affection of the pleura.

117. *b.* It is not unusual to see hæmoptysis in the course of severe *hooping-cough*, especially when this latter disease affects persons near, or after the period of puberty. In children the hæmoptysis is generally slight; but in grown-up persons it is often a dangerous or fatal complication of hooping-cough.—*c.* It is occasionally observed as a consequence of *enlargement or congestions of the liver and spleen*; these affections in some measure causing the pulmonary hæmorrhage, by deranging the circulation through the lungs or heart, or both. In most

* As the article was going through the press, a boy, aged 15, of a scrofulous diathesis, who had been long under my care with tubercular phthisis, died with profuse hæmorrhage from the lungs. Excavations in this organ, with accretion of the pleura, had been recognised some months before his death. He had not complained of pain in any part of the thorax. The body was examined in my presence by Mr. HERBERT BARKER twelve hours after death. Numerous cavities with thick linings were found dispersed through both lungs, the small intervening spaces being studded by crude tubercles. Each lung contained between thirty and forty ulcerated cavities, varying from the size of a bean to that of a large orange; those on the right side being the largest, and from this side the hæmorrhage had taken place. The cavities on the left side were filled by pus of various colour and consistence. Those on the right were filled chiefly by coagulated and fluid blood, the latter mixed with pus in some places. The right pulmonary pleura was so firmly adherent to the costal and diaphragmatic pleura, that this lung could not be removed from the chest until all the costal pleura was removed from the parietes to which it was attached. In this case the heart participated, in its unusual atrophy, in the extreme emaciation of the body. The stomach, as in many cases of profuse or fatal hæmorrhage from the lungs, contained a large quantity of blood, thus illustrating the statements made above.

of such cases the functions of the heart are intermediately disturbed. Where the hæmoptysis is consequent upon hæmorrhoids, obstructions of the liver may be anticipated. This connexion has been noticed by BAILLOU, MORGAGNI, STOLL, LANDRE, BEAUVAIS, and others. SAUVAGES makes very particular mention of the occasional dependance of hæmoptysis upon enlargements of the spleen. The connexion between hæmoptysis and hæmorrhoidal affections is generally one of sequence rather than of association; the former following the latter, or sometimes occurring after operations for these, and for *fistula in ano*. The connexion with *amenorrhœa* is generally that of cause and effect; but the pulmonary disease and the attendant hæmorrhage more frequently give rise to the suppression of the catamenia than this latter occasions the hæmoptysis.—*d.* Pulmonary hæmorrhage has also, in rare cases, appeared in gouty persons, or in connexion with irregular or misplaced *gout*. In these, calcareous concretions have sometimes been expectorated with the blood, or have been found in the lungs on dissection.—*e.* The symptomatic occurrence of hæmoptysis in the course of *measles*, of *putro-dynamic fevers*, of *scurvy*, *purpura*, and pestilential diseases, requires no remark.

118. iii. DIAGNOSIS.—It will often be difficult to determine whether or not the blood discharged proceeds from the bronchi, or from the nares, throat, pharynx, or stomach, owing to the circumstances insisted upon in other parts of this article (§ 91, 99). The remarks there made, in illustration of this, render it unnecessary to enter much farther into the subject.—*a.* When the blood is florid, frothy, or contains bubbles of air, or is mixed with mucopuriform matters, then all doubt will be removed. The history of the case, and the premonitory and attendant phenomena, are generally such as to remove all difficulty, unless when the patient has been previously in good health, or when the blood is of a dark hue, or when a large portion of it has been swallowed, and is thrown up by vomiting. In these cases, it will very commonly be found upon auscultation that blood is present, either in the large bronchi, causing a bubbling rattle, or in the small ramifications, with loss of the respiratory sounds, and with dulness on percussion. Phthisical indications, also, referrible to the constitution, have generally preceded the attack; and symptoms of disorder of the respiratory organs have ushered it in, and accompanied it.

119. *b.* When the accumulation in the *pharynx* of blood effused from the fauces or adjoining parts excites cough, or when blood escapes into the trachea or bronchi, the difficulty of determining with precision the source of the discharge is generally great. In these the practitioner will be guided chiefly by the state of the patient just before the attack, and by the premonitory symptoms. The absence of disease within the chest, as indicated by auscultation and percussion, an attentive examination of the mouth and throat, and a close observation of the phenomena attending the discharge of blood, will greatly assist the diagnosis (§ 91, 99).*

120. iv. PROGNOSIS.—Hæmoptysis is always a serious disease, and attended by danger in most circumstances. This character, however, does not so much depend upon the hæmorrhage as upon the pathological state or lesion of which it is the consequence. The opinion as to the result will, therefore, be chiefly formed from the inference as to its source. Whenever there is any obvious sign of tubercular disease, and when dyspnoea or pulmonary symptoms have preceded the attack, a most unfavourable prognosis should be given. The question merely relates to the period which may elapse from the occurrence of hæmorrhage to a fatal termination; and this will depend much upon the season, upon the progress of the pulmonary lesions, and various other circumstances. The cause of the disease should also be taken into consideration, and the pathological states which complicate the hæmorrhage. When there is reason to infer that venereal excesses, and more especially solitary venereal vices, have induced the malady, as they very frequently do, we may infer that tubercles have preceded the attack; and should, consequently, form a most unfavourable prognosis, especially when the diathesis is obviously scrofulous or hæmorrhagic. The circumstance of the patient not being alarmed by the attack, but flattering himself with the hopes of recovery, should be taken into account, as recommended as early as ARETÆUS. The dependance of the effusion upon disease of the heart, especially upon narrowing of the left auriculo-ventricular opening, is perhaps not a much more favourable circumstance than the connexion with tubercles.

121. A more favourable, but still a guarded opinion may be given, when the attack seems dependant upon inflammatory determination to the lungs, or on active congestion, or upon general plethora; or when the indications of pulmonary disease, or of constitutional fault are not present; and when the attack has been produced by external violence, or by mechanical injury. If it have arisen from suppressed catamenia or hæmorrhoids, or in connexion with congestion or enlargement of the liver or spleen, a similar opinion may be formed, unless the indications of pulmonary disease are manifest; but when the disappearance of these or of other evacuations are evidently the consequence of the disease in the lungs, and of which the hæmoptysis is merely a part, the prognosis should be as unfavourable as in the circumstance above noticed. When hæmoptysis appears after the operation for fistula, particularly when the fistula has been connected with pulmonary symptoms, as it often is, the result may be surely predicted.

122. In every case of hæmoptysis the opinion should partly depend upon the symptoms immediately preceding the seizure, and upon the frequency and state of the pulse both during and after the discharge, due allowance being made for the alarm caused by the occurrence. If the pulse becomes quick and sharp, the breathing short or oppressed; if symptoms or

fax. If it is brought up by hawking, it is from the palate or parts about the pharynx. If it flow from the head, it is evacuated with tickling and cough, for it runs down into the windpipe, and is again brought up; such discharges being generally preceded by an acrid defluxion, and by headache or heaviness (l. iii., ch. 31).

* PAULUS ÆGINETA remarks that, if the blood be frothy and light, it comes from the trachea; but if it be black or gumous and if there is pain in the part, it is from the tho-

signs of inflammatory action in the lungs or pleura exist or supervene; if a large portion of the lung cease to be traversed by the air; if the expectoration be puriform, or rusty, or offensive; and especially if a cavity be detected in the lungs, and particles of softened tubercular matter appear in the expectoration, a fatal result should be expected.

[It is very rare for hæmoptysis to terminate fatally as an immediate effect; we have known but one such instance in our practice. Dr. HEBERDEN states that, in a practice of sixty years, he never lost a patient by it; and Dr. CHAPMAN states that his experience of forty years supplies him with very few instances, and in none of these did the hæmorrhage proceed from the mucous membrane.]

123. TREATMENT.—A. ARETEUS and PAULUS ÆGINETA recommend that the patient be laid upon a couch in a cool place, with the head elevated, and all physical and mental excitement, and talking, or strong respiration, should always be carefully avoided. As to the means of cure, CELSUS, GALEN, AETIUS, and ALEXANDER are tolerably agreed. ARETEUS, ORIBASIUS, ACTUARIUS, and NONNUS advise blood-letting in most cases, ligatures on the extremities, and astringents internally and externally. A similar practice is advocated by CELSUS, with the addition of cold drinks. SCRIBONIUS LARGUS and OCTAVIUS HORATIANSUS direct the chest to be sponged with vinegar. GALEN remarks that cooling astringents often have a different effect from that which they are intended to produce; that they occasion determination of blood internally, and congestion of the deep-seated veins; and that he has seen persons with hæmoptysis injured by the application of cold to the chest. He, therefore, does not approve of the indiscriminate recourse to astringents and to cold. CÆLIUS AURELIANUS recommends the application of cold water and vinegar or other astringents to the thorax, and bleeding, general or local, or both, if pain, dyspnoea, or a dry cough be present. He gives, internally, gum with alum, and decoction of poppies, vinegar, and electuaries with opium, frankincense, &c. He decides in favour of the disputed practice of applying ligatures to the extremities. Similar remedies are advised by PAULUS, with the addition of austere wine and fruits. Among the latter, the pomegranate is particularly mentioned. MARCELLUS directs nearly the same means, with the exception of ligatures. DIOSCORIDES, PLINY, GALEN, ALEXANDER, PAULUS, and most of the ancients, prescribe the hæmatite, or blood stone, which contains oxide of iron.

124. The Arabian writers supply very little information respecting the treatment of hæmoptysis beyond what is contained in the works of the Greeks. AVICENNA, who is very full upon the subject, approves of the internal exhibition of vinegar, and of anodynes, as mandragora, henbane, and poppy, for the relief of cough. AVERRHOES condemns the use of vinegar, but RHASES and SERAPION advise the chest to be sponged with it. MESUE prescribes chalybeate waters for drink, and astringents. HALY-ABBAS endeavours to adapt the treatment to the forms of the disease. In the hot (the active) variety, he directs bleeding from a vein, and the repetition of it, if required, purging

with mild medicines, and the combination of demulcents with poppy. When the disease arises from a cold cause (passive), he prohibits venæsection, and prescribes stimulants, as frankincense and myrrh, and, in some cases, tonic astringents, as galls, sumach, alum, &c., with astringents applied to the chest. ALSAHARAVIUS approves of bleeding, cold applications to the thorax, opiates and astringents, with a milk diet. RHASES agrees with this practice, but guards against the indiscriminate application of cold to the breast. Mr. ADAMS, in his interesting remarks (*Trans. of PAULUS ÆGINETA*, p. 412), states that cold applications to this part are not now generally resorted to; yet a practitioner lately acquired great celebrity for curing hæmoptysis by sponging the chest with vinegar. I have been called to two or three cases for which cold epithems had been most assiduously employed; but they were injurious, and evidently increased the pulmonary congestion and all the pectoral symptoms. VAN SWIETEN is favourable to the internal and external use of cold water in this disease; but I am confident that sponging with vinegar will be found more serviceable and more generally appropriate than a prolonged application of cold.

125. B. From the brief view now exhibited, it will be seen that but little progress has been made in modern times in the treatment of hæmoptysis, and that this progress has reference chiefly to the more appropriate use of the means which were known to the ancients as well as to the moderns. Much, however, will depend upon the decision with which they are prescribed and carried into effect. Upon seeing a patient attacked by hæmoptysis, the physician will frequently find him alarmed; and the consequences of such alarm may be mistaken for the state of the constitution, or the effects produced by the disease. This, and various other circumstances, must be taken into consideration, and a determination as to the measures to be adopted, in order to arrest the hæmorrhage, promptly formed.

126. a. The clothes should be removed or loosened from the upper part of the body, and the patient ought to be seated upright in a chair, in order to facilitate the discharge of the blood from the lungs. In a recumbent, or even reclining posture, the blood will more readily pass along the bronchi and fill the smaller ramifications than when the chest is erect, and its movements during respiration unimpeded. If the patient be robust or young, if he have not suffered long from pulmonary disease, and if the hæmorrhage has not been very great, *blood-letting* ought to be immediately performed in the arm from a large orifice, until an impression is made upon the pulse, or faintness ensue. While the blood is flowing, the bared chest may be sprinkled with cold water, or sponged with vinegar; and any astringent the earliest procured, as vinegar slightly diluted, may be taken internally. The quantity of blood to be abstracted, and the repetition of the operation, must entirely depend upon the effects produced by it, and the judgment of the practitioner; but he will be guided in this by the constitution and state of the patient, by the indications of active congestion or inflammatory determination, by the continuance and violence

of the hæmorrhage, by the antecedent symptoms, and by the information he may obtain as to the causes and pathological relations of the seizure. If the patient be delicate, or enfeebled by previous disease, or if the hæmorrhage has continued so long as to render venæsection a hazardous measure, or if blood-letting has been already resorted to, or repeated, *cupping* should be substituted. Where farther abstraction of blood, even by cupping, cannot be ventured on, *dry-cupping*, as advised by HIPPOCRATES and most of the ancients, and in modern times by HORNE and WIEDEMANN, ought to be adopted. When the least delay may increase the danger, it may be very efficiently and promptly performed with some common beer glasses, or other similar means, several being applied, either between the shoulders or upon the breast. I have often used *dry-cupping*, in addition to venæsection, with marked advantage, sometimes covering the back and shoulders by the substitutes just mentioned. If the hæmorrhage be connected with suppression of the catamenia or hæmorrhoids, the feet should be plunged in warm water, and a vein opened in each foot. If the hæmoptysis is moderate, a number of leeches may be applied to the tops of the thighs or around the anus. The derivation produced by these means, and the effects of the latter in restoring the suppressed discharge, should not be neglected. CELSUS advises cupping to be performed in these situations, especially when the disease is thus associated.

127. *b.* It often happens, when hæmoptysis ceases after a small or single blood-letting, or when the pulse rises in strength and frequency, that the hæmorrhage returns in one, two, or three days, or after a longer interval. This mostly occurs in young or plethoric persons, where the discharge is connected with congestion of the lungs, or when the first attack has been slight, and the venæsection sufficient merely to give a greater freedom of vascular action, without removing the pulmonary congestion or determination. In these cases blood-letting should be repeated, in order to prevent a renewed attack, especially if the pulse rise after the first depletion, and if signs of inflammatory action in the lungs or bronchi appear. The patient should be carefully watched after the first discharge, and daily examined by the stethoscope and by percussion; and, upon the first indication of returning hæmorrhage, or of supervening inflammation, blood ought to be taken away in one or other of the modes just stated, according to the peculiarities of the case.

128. Where the antecedent disease, the quantity of blood discharged or removed by venæsection, and the manifest asthenia from these or other causes, forbid farther depletion, recourse must be had to *derivatives, astringents, and sedatives*, generally simultaneously or in combination. Indeed, even in those cases which evince increased action, and require decided or repeated depletion, these, as well as refrigerants, ought to be brought as early as possible into simultaneous or successive action. The feet and hands ought to be plunged in warm water, and, if venæsection be not performed in the former situation, mustard or salt, or both, should be added to the water. An enema, with an ounce or an ounce and a half of

spirits of turpentine, should be administered forthwith, and other means appropriate to the case prescribed. But as to these means, much difference of opinion will necessarily exist. The internal use of astringents is generally adopted; but those usually employed can have little effect, excepting in slight or protracted cases; and even powerful astringents taken into the stomach will have little or no influence upon the bleeding part before a number of hours have elapsed. From observing the rapidity with which oil of turpentine is absorbed, and passes off by the kidneys and lungs, I have been induced to employ this medicine in preference to others as an astringent in hæmoptysis; prescribing it in small or large doses, according to circumstances, and as it seemed desirable to act at the same time more or less decidedly upon the bowels or kidneys.

129. In advising sponging with vinegar and rose-water, or sprinkling cold water on the breast, I had especial reference to the sympathetic influence these may have upon the bleeding surface, and the reaction in the skin which they subsequently occasion, especially when they are also applied to the face. When these means have not succeeded, I have, on several occasions, prescribed rubefacients, instead of cold applications, to the chest; as these last are more frequently injurious than beneficial in such cases. An epithem with oil of turpentine, either tepid or warm, allowed to remain on the breast, or between the shoulders, until it occasions a burning sensation and redness, is the rubefacient I have preferred, as the quickest in its operation, and the most conducive to the removal of congestion or of inflammatory action. The vapour, also, of the turpentine is diffused around the patient, and, being inhaled during inspiration, assists in constricting the vessels of the bleeding surface. Where there appears any objection to this application, a *sinapism*, or a piece of flannel soaked with either of the *liniments* (F. 296, 311), may be placed upon the chest. *Blisters* may also be resorted to. I agree with LENTIN, RANOE, and PERCIVAL in the propriety of applying them to the back or between the shoulders.

130. *c.* Besides the above means, others may be employed, the practitioner being guided in his selection by the peculiarities of the case, and especially by the previous treatment, by the state of vital power and vascular action, and by the presence of cough and febrile symptoms. It should be kept in mind, that the sooner the hæmorrhage is arrested, the least likely is infiltration of the bronchi and its consequent evils to take place; and that, while this—the *first indication of treatment*—is receiving attention, the accumulation of the effused blood, and the consecutive effects upon the bronchi and lungs, and, through them, upon the system, ought to be prevented as far as possible. The treatment already described with reference to hæmorrhage in general, is, in great measure, appropriate to hæmoptysis, according to the principles of its application already advocated. Most of the information that will be here conveyed may be viewed chiefly as suggestions, which the practitioner will receive or reject as he may deem proper, or which he may apply to practice as the features of the disease may warrant. He ought, however, to be impressed

by the fact that, however high vascular excitement may appear, vital tone is more or less impaired; that in proportion as tone becomes diminished, so will the tendency to infiltration of the bronchi or lungs with the effused blood, and to capillary congestion of them, be increased; and, consequently, that vascular depletions and other vital deprivements, although often required with promptitude and decision, should be employed with discrimination and caution.

131. *d.* Of the various *astringents* recommended in hæmoptysis, the *acetate of lead*, commended with opiates or other sedatives, as advised by REYNOLDS, LATHAM, DAVIES, VALENTIN, AMELUNG, and others, is one of the most deserving of adoption. It may be given more freely than has generally been done, as shown by Dr. A. T. THOMSON, if it be conjoined with acetic acid, this acid being itself one of the best remedies when taken in sufficiently large quantity. Of this the ancients were fully aware, as it was employed most liberally by them. The *mineral acids* appear to be preferred by HENNING, DOEMLING, HALLER, JOERDENS, LOEFFLER, SCHULZE, and others, and by most of the moderns. I have, however, seen the liberal use of common vinegar more efficacious than these; and it is more generally congruous with the other remedies usually employed. Indeed, where the acetate of lead is given, the mineral acids will either neutralize its effects or prove injurious. The *gallic acid*, dissolved in water, or in æther, or in alcohol, and the powder or tincture of galls, may be mentioned. RUSPINI's styptic is supposed to be a solution of this acid in æther or in spirit, and may also be tried on account of its reputed efficacy.* Of other astringents little additional mention need be made. They are sometimes useful in the more adynamic states of the disease, or after large losses of blood or copious depletions. When debility is urgent, those which are most tonic may be selected, as the tincture of the sesquichloride of iron, the sulphates of iron or of alumina, or of zinc or of quinine—the two latter in the infusion of roses with sulphuric acid; and the vegetable astringents, as catechu, kino, uva-ursi, extract of logwood, rhatany, pomegranate bark, &c. The mineral acids, as well as the other astringents, may be conjoined with opium, or other anodynes. A strong solution of alum, and alum whey, for common drink, have been very generally employed by both ancients and moderns.

132. *e.* *Refrigerants* are required in the more febrile and active states of the disease, as adjuvants, chiefly of depletions and other antiphlogistic remedies. They are farther beneficial by acting upon the kidneys. *Nitre*, in considerable or frequently-repeated doses, is recommended by GIBBON, DICKSON, HARTMANN, HUFELAND, and many others. It is much used by the Italian physicians, in large doses, conjoined with demulcents. They give from three to six drachms in twenty hours. It is also beneficially associated with camphor, the acetate of ammonia, and sweet spirits of nitre (F. 95, 294, 747), or with the *boracic acid* (F. 644), and with conserve of roses. The *hydrochlorate*

of ammonia is equally serviceable, especially in the more passive states of hæmoptysis, when it is advantageously conjoined with muriatic acid (F. 864). LENTIN advises it to be taken in half a drachm every two hours, with an equal part of extract of liquorice. The internal use of ices or of iced fluids has been advocated by many writers; but, like all other active means, they require discrimination. In the passive states of the disease, where asthenia is apparent, the circulation languid, and the temperature not much above the natural standard, they are injurious.

133. *f.* Alvine evacuations are serviceable by removing morbid matters and obstructions to the portal circulation, and by deriving from the seat of hæmorrhage. *Purgatives* ought, therefore, never to be neglected; and, unless when the hæmoptysis is so abundant as to be alarming, they should precede, or be alternated with astringents; or such of these latter as will not confine the bowels ought to be selected. The exhibition of an *emetic* previous to the purgative has been advised, especially by STOLL, DARWIN, PLENCIZ, RANOE, DOEMLING, PAULINI, and SCHMIDTMANN; while FRANK and some others think them hazardous. When the hæmorrhage has been already copious, or after blood-letting has been resorted to, an emetic of ipecacuanha, or of sulphate of zinc, or of a combination of both, is serviceable, not only in aiding the arrest of the effusion, but also in evacuating the blood accumulated in the bronchi, and thereby preventing the ill effects which this fluid would produce if it were allowed to remain. It is not merely the vomiting caused by an emetic which is beneficial, but the effect which is produced upon the heart's action. It is with reference chiefly to this latter operation—to its contra-stimulant action—that emetics and *nauseants* have been recently employed on the Continent, especially in Italy, and by LAENNEC and others in France. In the passive or asthenic forms of the disease, *nauseants*, especially the tartar emetic, may be injurious, even in the same case wherein an emetic of sulphate of zinc might prove of service. As to *purgatives*, the neutral salts, with an excess of acids, as the sulphates, with sulphuric acid in infusion of roses, or the bi-tartrate of potash in the form of electuary, are the most generally appropriate, with the exception, perhaps, of oil of turpentine, conjoined with castor oil. These oils are the most beneficial; they may be taken on the surface of an aromatic water or of milk, and be administered in enemata.

134. *g.* In exhibiting *anodynes* or *sedatives*, the probability of their being injurious in the asthenic states of hæmoptysis should be recollected. When the powers of the system are inadequate to procure the excretion of the fluid effused into the bronchi, they ought to be given with caution, or in conjunction with tonic astringents, or with expectorants. *Colchicum* has been recently recommended; but it is only in the active states of the disease that it ought to be exhibited (F. 545). *Digitalis*, however, is more generally prescribed. It is recommended by WITHERING, JONES, FERRIAR, HEUSINGER, VALENTIN, CARSON, HENRY, HORN, and others. It may be conjoined with astringents (F. 544), narcotics, or other appropriate remedies (F. 514, 515). In the case of a physician

* Dr. A. T. THOMSON states that this styptic consists of gallic acid, a small proportion of the sulphate of zinc, and of opium, dissolved in a mixture of alcohol and rose-water. This combination is judicious in most hæmorrhages.

recently under my care, the *secale cornutum* proved of great service. It was given in doses of five or ten grains every three or four hours, or every hour until an effect was produced. It has been much praised by SPAZANI, NEGRI, and RYAN. *Narcotics* are most servicable when cough is urgent, by allaying the irritation, and diminishing the risk of the perpetuation or recurrence of the effusion from this cause; but when the hæmorrhage has ceased, and when breathing is difficult, the lungs congested, or the bronchi obstructed by the effused blood, narcotics, especially in large doses, will only retard the discharge of the effused blood and increase the mischief, unless they be conjoined with expectorants, as the senega or benzoin, benzoic acid, myrrh, asafoetida, the balsams of Peru or of Tolu, the terebinthines, or camphor. In the passive states of the disease, or after large losses of blood, the balsams, both natural and artificial, especially those prescribed in the *Appendix* (F. 18-22), are often beneficial. The balsam of LOCATELLI is very much employed on the Continent in hæmoptysis, and from its composition it seems very appropriate to most circumstances of the disease. The turpentine is the active ingredient, not only of it, but of the other artificial balsams prescribed in hæmorrhagic affections. The following is the usual mode of preparing it:

No. 241. R Olei Olivæ ꝑviij.; Terebinthinæ, Ceræ flavæ, ʒss ßiv.; Pulv. subtiliss. Ligni Santali rubri ꝑss. Ceram in Olei pauxillo solve, dein reliquam. Terebinthinam, Lignumque Santali adde, et assidue move donec refrigerant.

135. *h.* There have been various other means recommended for the arrest of hæmoptysis, but many of them are not deserving of notice, and are therefore not here adverted to. The application of *ligatures* on the extremities was a disputed practice with the ancients, although most of them recommended them. J. P. FRANK and J. FRANK approve of them, and direct them to be placed high above the knees and elbows in such cases as admit not of blood-letting, owing either to the profuse hæmorrhage or to constitutional adynamia. *Ipecacuanha*, in small doses, frequently repeated, is praised by LOEFLEER, HENNINGS, AASKOW, KECK, and NIEMANN; and by DE MEZA and HORN, conjoined with opium; a strong solution of *common salt*, by PERCIVAL, DOEMLING, MICHAELIS, and RUSH; the *turpentine*s by YOUNG, BOYLE, ADAIR, and the author; and the *comfrey*, with aromatic sulphuric acid, by WENDT. With MARRVAT and numerous practitioners, mixtures, containing nitre or alum, gums, and some one of the balsams, constituted the principal anti-hæmorrhagic remedies; and vascular depletions were prescribed. It cannot be doubted that blood-letting is often unnecessarily directed in hæmoptysis, or carried too far; but in the active or inflammatory states of the disease, and when the discharge is scanty or small, it should not be neglected.

136. *i.* A few authors have questioned the propriety of arresting the effusion in certain circumstances. Dr. A. T. THOMSON remarks that when the hæmoptysis "is not of an alarming character, and there is no obvious predisposition to tubercular consumption, especially if it be the consequence of a suppression of the menstrual discharge, it should only be moderated, not checked suddenly, which might in-

duce a congestion in some organ less capable of supporting it with impunity." This is most dangerous doctrine; for if the hæmorrhage be judiciously treated, the sooner it ceases in consequence the better. Hæmoptysis, in the circumstances stated by this writer, ought to be treated by depletions, derivatives, and other measures calculated to restore any suppressed discharge. The cases are very few in which there is no "obvious predisposition to tubercular consumption," and they are still fewer in which the suppressed discharge is the cause of the pulmonary disease; this latter, in either its more concealed or obvious states, almost always preceding, and even being the chief cause of the suppression. It should be kept in view that, however moderate the hæmorrhage may appear to be, it is difficult to determine how far it may be attended by infiltration of the bronchi; and that the continuance of it, by filling these vessels, will risk the supervention of inflammatory irritation or action in them, and often also in the substance of the lungs and pleura, as well as hasten the development and progress of the tubercular productions.

[We deem it of the first importance, when called to a patient with hæmoptysis, to calm his mind, and, if possible, allay his apprehension, which is generally much excited. The flow of blood is usually alarming, and is too often, perhaps, regarded as a highly dangerous symptom. While the blood is flowing, our practice, in all cases, is to immerse the feet and legs in a hot mustard bath, as the revulsion thus produced is extremely beneficial. In addition to these means (and bleeding is rarely if ever admissible) if the hæmoptysis be tubercular, we apply a large sinapism between the shoulders, or over the front of the chest, and administer a stimulating enema of salt and water, and a saline cathartic. Small quantities of ice or ice-water should be frequently swallowed; and, in addition to this, tea-spoonful doses of the chloride of sodium may be administered every fifteen or twenty minutes.* Many of our practitioners place great confidence in the nitrate of potash in this disease; but we have never seen any very decidedly beneficial effects from its use. The application of cold water to the chest seems to us of very doubtful propriety. To prevent the recurrence of the hæmorrhage, the *pill. plumb. opiat.* will be found as useful as any other preparation, although we have seen prompt relief from the use of the *turpentine*, in doses of ten drops every fifteen minutes during the spitting of blood, as recommended by Mr. COPLAND. This exercises a

* (Our experience relative to the use of this article differs from that of Dr. DUNGLISON, who states ("Pract. of Med.," 2d. ed., Phil., 1844) that he has never had the slightest reason for believing that it has been productive of any advantage. Dr. CHAPMAN, however, speaks favourably of it, and intimates that it operates efficaciously by creating a stronger impression on the parts with which the vessels of the lungs have the most intimate sympathy. ("Lect. on the more important Eruptive Fevers, Hæmorrhages, and Dropsies, and on Gout and Rheumatism." Phil., 1844.) There can be no doubt, we think, that it also acts by stimulating the capillary vessels by its speedy introduction into the blood. This article was first introduced to the notice of the profession, as a prompt and efficient remedy in hæmoptysis, by Dr. RUSH. It would seem, however, from SCHOPF's account of his Travels in the United States (Ed., i., p. 116), that the knowledge of its powers in this way was first brought to this country by SCHIEL from Ireland.]

speedy influence over the capillaries, being rapidly taken into the circulation, and manifesting its presence in the urine and breath in a very sensible manner. *Tannic acid* is depended on by some practitioners, and doubtless deserves a trial if the means above recommended should fail. It may be given as follows: R. *Acid Tannic*, gr. iv.; *Pulv. Acac.*, gr. xvi.; *Syr.* q. s. M. ft. pil. viii.: one every three hours for two or three days. *Monesia* is highly esteemed by some as a remedy for hæmoptysis: R. *Monesia*, *Con. Rosar.* aa. gr. xv. M. Div. in pil. x.: two every two hours during the day. Where there are inflammatory symptoms and much excitement present, tartarized antimony, combined with nitre, as in the following formula, will be found, according to Dr. CHEYNE, superior to all other remedies. R. *Ant. et Potassa Tart.*, gr. j.-ij.; *Potass. Nitrat.*, ℥ ij.-iv. M. Div. in pulv. iv.-viij., sig.: one every hour. *Ipecacuanha* is highly praised by Dr. GRAVES, in doses of two grains every fifteen minutes, or half hour, till the bleeding stops; and several physicians, in extensive practice in this city, place more reliance on it, either in nauseating or emetic doses, than on any other remedy.* Dr. CHAPMAN thinks that *ipecacuanha*, given in emetic doses, "will do more than anything else" in arresting hæmoptysis, and states that he has employed it with increasing confidence for more than thirty years. He attributes its efficacy, not only to the influence which nausea itself has in repressing the force of the circulation, but to its general controlling effect over the capillary vessels, modifying their condition, and thus checking the escape of their contents. For cases illustrating the great success of this remedy, see "*Lectures on Eruptive Fevers*," &c., Phil., 1844, p. 190, 91, 92. Combined with the acetate of lead and opium, it often proves more efficient than either article separately given.

We have no confidence in *leeches* applied to the hollow of the throat, as recommended by Dr. GRAVES, unless as a prophylactic measure; but *purgatives* are of essential benefit. Most cases of hæmoptysis, we believe, are preceded by a suppression of the biliary discharge, which must be restored before we can expect a permanent suppression of the hæmorrhage.

In cases of active hæmorrhage, attended with a plethoric state of the system, blood-letting, of course, is indispensable; but it should be prompt, and carried sufficiently far as to make a decided impression upon the circulation. Its repetition is to be regulated by the exigencies of each particular case. Dr. CHAPMAN thinks that the use of the lancet is not to be restricted to cases only that are marked by fulness and activity of the circulation with vigour of constitution, but that it is an important remedy in removing the topical accumulation, as well as restoring an equilibrium in the circulation. Besides, he remarks that in active hæmoptysis the lungs are either inflamed or highly disposed to take on inflammation. Cups to the chest, or between the shoulders, are an important part of the treatment, and may often be substituted with advantage for general bleeding.]

137. *k.* The practitioner is not to rest satisfied with having fulfilled the first intention—the

arrest of the hæmoptysis; his attention should immediately afterward be directed to the removal of any blood that may have collected in the bronchi, and of whatever inflammatory irritation connected with it, either coætaneously or consecutively, that may exist. Where a crepitation is present, and is much diffused through the lung of one or both sides, more generally of one, fluid is present, and it is either a mucous lymph, or blood, or both, with more or less serum; the state of the expectoration indicating the proportions of either. But the blood may not be expectorated, or may undergo changes previous to expectoration, and clog up the bronchi and air-cells, and either perpetuate inflammatory action, or excite it anew. In the slight forms of hæmoptysis attendant upon tubercles, the effusion of blood is frequently one of the consequences of the inflammatory irritation existing in various parts of the bronchi connected with impaired tone and congestion of parts of the substance of the lungs. Now, by what means is the above consecutive condition to be removed? When the attack has been treated actively, the more antiphlogistic means having been employed, and the lungs still remain embarrassed, manifestly from a portion of the effused blood, or from the fluid subsequently exuded, the exhibition of an emetic, and the repetition of it, as circumstances may indicate, will prove most serviceable. If febrile action, heat of skin, &c., be still present, then tartar emetic, *ipecacuanha*, or both, may be thus employed; but when the vital powers are sunk, and asthenia is very prominent, the sulphate of zinc should be preferred. In cases characterized by relaxed, thin, or weak fibres, and general flabbiness of the soft solids, where bleeding would be injurious, *emetics* are frequently most beneficial. They have been often advised in hæmoptysis; but the indiscriminate or inappropriate use of them, and the somewhat empirical recommendation of them by Dr. MARRYAT, have led to their disuse. I have, however, often prescribed them with great benefit. This writer directs two grains of the potassio-tartrate of antimony to be first given, and, as soon as nausea commences, two grains of sulphate of copper, dissolved in a little water. He deprecates blood-letting, and, after the sickness has gone off, gives twenty drops of the balsam of copaiba, night and morning, for several weeks, to prevent a return of the attack, and the size of a nutmeg, of the following electuary, twice or thrice a day:

No. 242. R. *Pulv. Cinchonæ* ʒvi.; *Sulphuris Sublimatis* ʒij.; *Potassæ Nitratis* ʒj.; *Oxy-sulphureti Antimonij* ℥j.; *Mucilaginis Acacis*, q. s. ut fiat Electuarium.

138. I have no doubt of this treatment being quite appropriate to many circumstances of the disease; and, even in those cases where inflammatory action may supervene after the hæmorrhage has ceased, it may prove beneficial, especially if local depletion by cupping; external derivation by blisters, sinapisms, terebinthinated epithems or liniments, or by issues or setons, and suitable regimen be employed. In order to fulfil the intention stated above, as well as to prevent the return of the hæmorrhage, the assiduous adoption of these external irritants, the internal use of the balsams or terebinthines (F. 18-22), and an emetic occa-

* [For cases illustrating the utility of *ipecacuanha* for the suppression of hæmorrhage, see "*Braithwaite's Retrospect*," Am. Ed., p. 36, 37.]

sionally, to unload the bronchi of accumulated fluids or mucosities, will prove most serviceable. At the same time, the digestive and excreting functions ought to receive due attention, and cough or irritation should be allayed by the combination of narcotics and sedatives, as conium, hyoscyamus, opium, &c.; and of emollients or demulcents, with the above, or other suitable medicines. When the hæmoptysis assumes a periodic form, which rarely is observed, the combination of the sulphate of quinine, with alum or with sulphate of zinc (F. 597, 667), or the electuary just prescribed, according to MARRYAT, will generally prove successful.

139. *l.* The inhalation of watery or medicated vapours has been recommended in hæmoptysis, and lately employed by both rational and empirical practitioners. I have tried several substances, and in various combinations, through this medium. The practice requires much caution; but I think it will be found often of service, if discrimination as well as perseverance be observed in respect to it. Towards the decline, or in the slighter forms of hæmoptysis, the more astringent substances may be used in this way, care being taken that they neither occasion irritation or tightness in the thorax, nor excite cough. Those which I have tried in this state are, common vinegar, sometimes with a little camphor, or with a small quantity of turpentine; the pyroligneous acetic acid, creasote, and common tar. These were put in an inhaler with hot water, and the vapour inspired in the usual way; or in a large basin, and hot water poured upon them, and the vapour allowed to diffuse itself around the patient. When a terebinthinated epithem or liniment (F. 300, 311) is used, the vapour from it will generally be sufficient. Some time after the hæmorrhage has ceased, the cautious adoption of this practice will be serviceable; and either these or other substances, as benzoin, asafetida, galbanum, myrrh, and other odoriferous resins, or oil of aniseed, may be employed in this way, as directed in the article BRONCHI (§ 100). In the more *asthenic forms* of the disease, when the expectoration is copious, or is tinged with very dark blood, the diffusion of the vapour of the above substances in the air of the patient's apartment, and the taking of frequent deep inspirations, will frequently prove beneficial. If the patient evince indications of coexistent or consecutive *inflammatory action*, *emollient vapours* (see art. BRONCHI, § 76) with the addition of the extract of conium, or of hyoscyamus, or of stramonium, to the warm fluids employed for inhalation, will be extremely useful, especially if cough be severe.

140. *C.* The *regimen*, during and after hæmoptysis, is a most important part of the treatment.—*a.* The ancients advised cooling beverages and diet. They allowed acid wine, and acerb or acid fruits. The *pomegranate* was much and deservedly praised by them, on account of its cooling and astringent operation. Glutinous and mucilaginous articles of diet were also recommended. All these deserve adoption. The principal question is as to the diet which should be adopted. Dr. STEWART, some years ago, advised nourishing diet, cold sponging the surface, cold bathing, and exercise in the open air, and frequently with advan-

tage. To persons of a relaxed habit, with a slow or natural pulse, and to those not suffering from febrile action, this plan is generally appropriate; very dilute acids, or lemonade, or common vinegar and water, being the usual beverage. He directed the whole surface of the body to be sponged in the morning, and the neck, breast, and shoulders at night, with tepid vinegar and water, gradually reducing the temperature to that of the surrounding air. After the sponging, frictions with flannel or the flesh-brush for half an hour were enjoined. Cold bathing and salt-water bathing were afterward employed, and continued until recovery took place. Dr. STEWART advised this method in both febrile and non-febrile, in acute and chronic cases. In the non-febrile and chronic it is often serviceable, and early in the febrile it may also be occasionally useful. Sponging the surface, and assiduous friction immediately afterward, are applicable to most cases; but the diet requires greater discrimination. Where fever is present, animal food increases the patient's ailments. In those, farinaceous, glutinous, or mucilaginous substances only should be allowed, with goat's whey, stale butter-milk, grapes, raisins, the fruit of the carob or St. John's bean, asses' milk, with Seltzer-water, &c.

141. *b.* The propriety of having recourse to repeated small depletions, or to a moderate blood-letting, about each equinox, in order to prevent the recurrence of hæmoptysis, has been insisted on by some writers, and when the effusion depends chiefly upon plethora or active determination to the lungs, the practice may be of service; but when it occurs in the progress of tubercular phthisis, it may be injurious, if indiscriminately adopted, although it may be of use in those cases in which subacute inflammatory action, or congestion of portions of the lungs often complicate the tubercular formations, and occasion the sanguineous discharge. In the more asthenic states, depletions favour the progress of the tubercles, and are more or less injurious. The regulation of the excretions; the restoration of suppressed evacuations or accustomed secretions; occasional change of air; residence in a mild, humid, and equable climate; sea-voyaging; gentle exercise in the open air; flannel clothing next the skin; cold sponging the surface; acidulated drinks; light and nourishing food; mental quietude, and the avoidance of whatever depresses the vital powers, are severally productive of benefit; some of them ought not to be dispensed with. Exertions of the voice, playing on wind instruments, venereal indulgences, warm baths, and exposure to vicissitudes of the weather and season, ought always to be shunned. (See art. TUBERCULAR CONSUMPTION.)

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VI. HEMORRHAGE FROM THE STOMACH.

SYN.—*Hæmatemesis* (from *aîma*, gen. *σρος*, blood; and *εμεσις*, vomiting), *Linnæus*, *Sagar*, *Vogel*, *Sauvages*, *Pinel*, *Good*. *Vomitus cruentus, ve vom. sanguis. vomitio sanguinis*, Auct. Lat. var. *Hamorrhæa ventriculi*, *Swediaur*. *Gastrorrhagia*; *Œsophagorrhagia*; *Morbis niger*; *Fluxus splenicus*, Auct. *Vomissement de Sang, Hématémise*, Fr. *Blutbrechen*, Germ. *Vomito di Sangue, Ematemesi*, Ital. *Vomiting of Blood*.

142. DEFIN.—A vomiting of a dark red, black fluid, or semi-coagulated blood, sometimes pure, at other times mixed with aropy or watery fluid, or other matters contained in the stomach; preceded by nausea, oppression, tension or heat of the epig-

gastrium, sometimes by faintness; unattended by cough; and frequently accompanied with very dark-coloured, grumous, or pitchy stools.

143. i. PATHOLOGY.—Like dropsy—of which it may be either an antecedent or epi-phenomenon—vomiting of blood is seldom an idiopathic or primary disease, but generally the consequence of certain pre-existing changes, sometimes chiefly seated in the stomach, at other times in the collatitious viscera, as the spleen, liver, or pancreas, and occasionally in some two or more of these organs. The blood may proceed from the mucous surface of the stomach, which is most commonly the case; and from the surface of the duodenum, or of the œsophagus. It is generally poured out from the congested, dilated, and weakened capillaries and exhaling pores of this surface; but it may be effused either from a limited part, or from a few small vessels chiefly, as when it depends on a congested or otherwise morbid state of the spleen, or on ulceration, or from one or more diseased or ulcerated vessels, which latter is but rarely the case. It may proceed, also, from the rupture of an aneurismal tumour which has poured its blood either directly or mediately into the stomach; or, as supposed by some to happen in a very few instances, it may even flow along the ducts from the liver into the duodenum, from whence it may be partly regurgitated into the stomach; but this is extremely doubtful. The blood may, however, as shown above, pass from the posterior nares or throat, or from the respiratory organs, into the stomach, and be afterward vomited, and thus hæmatemesis may be closely simulated.

144. Besides these sources of the hæmorrhage, it is of importance to recognise the general condition of vital energy of the system accompanying it, as well as the state of action which the heart and arteries may evince. Hæmatemesis is attended with almost every grade of vascular action, from the lowest state of sub-action to the most acute action; but more frequently the vascular system is deficient of vital tone, and this condition is extended more or less to all the soft solids of the frame. In a very great number of cases of this disease, also, we observe a state either of general cachexia, or of congestion, and morbid function, or morbid structure, of more than one of the abdominal viscera.

145. Hæmatemesis is, more commonly than is generally stated by authors, a mode of termination, or a consequence of inflammation, or of inflammatory irritation and congestion of the internal tunics of the stomach and duodenum, particularly when it presents signs of sthenic action, or is preceded by cardialgia, acute pain, tenderness, distention, and a sense of heat in the region of this organ, or when it occurs in young, plethoric subjects, and is caused by ingurgitation, by acrid matters received into the stomach, by the use of inebriating fluids, and by the suppression of accustomed discharges. In this *inflammatory form* of the disease, the blood thrown from the stomach is seldom in large quantity at one time, although frequently ejected, and is of less deep colour than in some other varieties; and that taken by venæsection is usually cupped and buffed. I agree, however, with QUARIN, RICHTER, FRANK, and SCHMIDTMANN, that this disease is more frequently ac-

companied with an sthenic than a sthenic state of the vital powers.

146. It is of the utmost importance to appreciate justly the foregoing states, as upon them are chiefly based our opinions respecting the exact nature of the disease, and the most successful mode of removing it. In the following observations I shall notice, *first*, the primary and less complicated state of hæmatemesis; *secondly*, the supplemental, succedaneous, or vicarious forms of this disease; *thirdly*, hæmatemesis from disease of the viscera connected with the stomach; *fourthly*, hæmorrhage from certain organic lesions of the stomach, or of its vessels, and from complications with other diseases; and, *lastly*, that rarer form of hæmatemesis, which, from the colour of the ejected fluid, has been called the *morbus niger*.

147. A. Primary or Simple Hæmatemesis.—This form of the disease is entirely dependant upon the state of the mucous surface of the stomach, or upper portion of the duodenum. It may arise from a constitutional tendency to hæmorrhage, heightened in this particular part of the digestive mucous surface by some of the exciting causes of the disease, especially by an excessive use of vinous or spirituous liquors, or by both, and by general vascular plethora. It seems to be preceded by, and even to consist in a more or less congested, weakened, or atonic state of the extreme venous capillaries arising in this surface, connected with similar states of this surface itself (see art. DIGESTIVE CANAL). But, conjoined with these states, there may exist increased action of the vessels supplying the bleeding surface. When it proceeds chiefly from the former of the conditions now referred to, there are generally appearances of deficient tone throughout the soft solids of the body. The blood ejected is dark-coloured or grumous; and although there may be pain or tenderness of the epigastrium, there is no sense of heat, or sign of increased or sthenic vascular action.

148. When it depends more upon local determination or increased action, arising from an irregular distribution of the vital energies with which the vascular system, or particular viscera, is endowed; or when it is consequent upon the state of inflammatory congestion referred to above (§ 145), the vomiting of blood is either preceded by, or accompanied with a frequent, soft, open, and sometimes small pulse, by a sense of pain or tenderness, and of heat at the epigastrium, with other symptoms of gastritis; and the blood thrown up is redder and more fluid than in the foregoing case, and seldom in very large quantity; but is sometimes mixed with portions of lymph, or with substances of a fleshy or fibrinous appearance. This particular state of the disease is often connected with a plethoric state of the vascular system, particularly of that part forming the portal system. When this obtains, the history of the case, the preceding causes, and circumstances connected with it will assist us in forming a diagnosis. The patient generally is of a full habit of body, or he presents appearances of vascular plethora. The pulse is full, broad, and strong, and there is often fullness of the abdomen, particularly towards the epigastrium and hypochondria, but without that degree of fulness, tumefaction, pain, or tenderness in the

hypochondria, which attends upon serious disease of the spleen or liver, and which accompanies the third variety (§ 151). This form of hæmatemesis in delicate constitutions, or in those predisposed to hæmorrhagic disease, occasionally follows upon acrid or irritating substances taken into the stomach. Thus it has been produced by the irritation of an emetic, and by acrid poisons. WARTON, GLISSON, and HOFFMANN have observed it occasioned by the use of irritating emmenagogues. It may assume a chronic, remittent, or periodic character. In two instances, in which it was occasioned by the daily excessive use of intoxicating liquors, it recurred every morning for several weeks; and, in one of them, was followed by a most violent attack of gout.

149. *B. Succedaneous or Vicarious Hæmatemesis.*—This form of the disease is not of infrequent occurrence. It is noticed by several authors, and particularly by BALLONIUS, HOFFMANN, FORESTUS, WHYTT, RIEDLIN, THOMANN, PINEL, and others, and has come before every experienced practitioner oftener than once. It generally arises from those causes which suppress suddenly, or prevent the return of the *menstrual discharge* or the *hæmorrhoidal flux*. It may even replace an habitual *epistaxis*, or occur in females in the form of misplaced catamenia, this part of the uterine functions not having appeared. In the majority, however, of such cases, the hæmatemesis has been occasioned by some evident cause, and in its subsequent occurrence it has assumed a periodic or vicarious form. This form may even manifest itself from the commencement, as where it has occurred instead of the catamenial evacuation, which has either not appeared or been but imperfectly established.

150. From whatever cause this state of the disease may proceed, it evidently arrests or prevents the discharge the place of which it supplies; and, although it cannot be generally shown to depend upon previously existing disease of the stomach, or of the viscera intimately connected with this organ, yet we may suppose that the mucous surface and vessels of the stomach have been disposed to experience congestion, local determination, or the morbid conditions on which hæmorrhage has been shown above to depend. Possibly, also, the morbid states of the surrounding viscera may have been such as to assist in producing the hæmorrhage, although these states cannot be generally recognised, owing either to their slight extent, and the obscure or imperfectly developed phenomena attending them, or to our imperfect powers of observation. When hæmatemesis is consequent upon or vicarious of hæmorrhoids, particularly in aged or intemperate persons, a morbid state of the liver, as respects either its functions or its structure, as well as of the stomach, may reasonably be inferred, so far, at least, as to lead to an intimate examination of the state of this organ. Admitting the frequency of this morbid relation, we cannot, however, infer its constant existence, seeing that we often fail in detecting it, and of observing it after the hæmatemesis has ceased. It seems, therefore, more correct to infer that, in cases of this description, the sanguineous effusion is often a consequence of inflammatory congestion of the villous coat of

the stomach and duodenum, which has taken place more suddenly, and induced more rapidly the effusion than in some other forms of the disease.

151. *C. Hæmatemesis from Disease of the Viscera connected with the Stomach.*—The vomiting of blood in this form of the disease is *symptomatic* of congestion or structural change of the spleen, liver, or pancreas, or even of some other abdominal viscus. This is the most frequent form of hæmatemesis. A congested state of the stomach, and even also of the duodenum, being caused by obstructed circulation through, or other disease of one or more of these viscera, any accidental irritation, or whatever increases the congestion on the internal surface of the stomach, may occasion the effusion of blood from it. Most frequently, perhaps, the hæmorrhage is produced by obstruction, enlargement, or some other lesion of the spleen, the anastomoses of the vessels of this organ with those of the stomach favouring its occurrence. When hæmatemesis arises from disease of the liver or spleen, the history of the case, the presence of fulness or tumefaction, tenderness or pain, in the hypochondria and epigastrium; symptomatic pains about the shoulders or shoulder-blades; an unhealthy or sallow state of the countenance; and chronic functional disorder of the stomach and bowels, will generally be observed. The discharge of blood in this form of hæmatemesis has sometimes acted as a critical evacuation, the symptoms of congestion of the liver or spleen, or of both, which had existed, having been removed by it, and health restored. Instances of this kind have been recorded by DE HAEN, FRANK, PORTAL, PINEL, SCHMIDTMANN, and others, and have occurred to myself, particularly in persons who had suffered long from ague. More frequently, however, the hæmorrhage has furnished only a temporary advantage, the disease of the liver or spleen, which it had relieved, again returning, followed by an attack of hæmatemesis and another period of relief; or terminating fatally, dissection disclosing the extent of the disease, of which the hæmorrhage was merely a symptom. In this variety the blood thrown up is generally of a dark colour, and either fluid or grumous, and consisting of small coagula. The stools are also morbid; frequently black, pitchy, or grumous, loose, and very offensive. The hæmorrhage is often preceded by, complicated with, or followed by dropsy of the abdomen, or of the lower extremities, or both; but rarely with hydrothorax, unless it have followed the effusion into the peritoneal cavity. In some instances, obstinate diarrhœa or dysentery has supervened, especially in warm or miasmatic climates.

152. I agree with TRALLES (*De Usu Opii*, vol. ii., p. 29), who has strongly insisted on the frequently active or sthenic state of the vessels in hæmatemesis, that, in the preceding forms, the impeded or obstructed return of blood through the veins frequently occasions an augmented action of the arteries; and, as the blood cannot pass in sufficient quantity, or with requisite celerity, by the veins, that it is determined with greater impetus into the extreme arterial capillaries, thereby dilating their exhaling pores, and being effused into the cavity of the organ. Some degree of vascular reaction

may also take place on the villous surface of the stomach from this circumstance, giving rise to the membranous pieces of lymph which are sometimes ejected along with the blood, or subsequently.

153. *D. Hæmatemesis from Disease of the Coats or Vessels of the Stomach, and from other Maladies.*—The discharge of blood from the stomach may arise from ulceration having extended into one or more vessels, or from disease of the coats of an artery or vein, or from atheromatous or other deposits in the coats favouring their perforation or rupture. Such occurrences are, however, very rare. In a case of extensive and fatal hæmatemesis consequent upon scirrus of the pylorus, in an aged man, attended by Mr. ВУАН and myself, the arteries of the stomach were found studded by atheromatous deposits, and the coats of a considerable arterial branch were at one part destroyed by them; an opening from the interior of the vessel into the stomach having been detected after a minute examination. The effusion may even proceed from perforation and adhesion of the stomach to the liver or spleen, ulceration having extended to these viscera. It may also occur in an advanced stage of scirrus ulceration of the pylorus or cardia; or from tumours, particularly those of a malignant character, in the parietes of the stomach; but in these cases the hæmorrhage seldom proceeds from the ulcerated part or from the tumour, unless they be of a fungoid kind, the blood being exuded chiefly from the villous surface of the organ. Hæmatemesis may be also occasioned by any lesion causing hæmorrhage from the internal surface of the œsophagus, or from the bursting of an aneurismal tumour or varix in this situation, as well as in the stomach itself. When the effusion takes place from the œsophagus, the blood generally passes, in the first instance, into the stomach, whence it is ejected with the contents of this viscus by vomiting; but it is sometimes eructated or gulped up without nausea or retching.

154. Blood is occasionally thrown off the stomach in the progress of continued fevers, particularly of those of an adynamic or putrodynamic form, and of those complicated with predominant disease of the stomach, liver, or spleen. It is also sometimes vomited in long-continued remittent and intermittent fevers, and more rarely in the exanthemata. Hæmatemesis has even ushered in severe attacks of smallpox and scarlet fever, and has sometimes supervened in the course of hooping-cough, particularly in plethoric and cachectic persons, and in those affected with visceral disease. It is not infrequently symptomatic of scurvy or purpura hæmorrhagica, the blood being exuded from the extreme vessels in consequence of deficient tone and weakened vital cohesion of the villous coat of the stomach, and of the whole digestive canal. In these latter complications, the quantity of blood evacuated by stool is often greater than that thrown off the stomach. Lastly, hæmatemesis sometimes occurs in persons affected by intestinal worms, especially tænia and lumbrici. It is, moreover, occasionally complicated with hysteria and disorder of the uterine functions. It not infrequently alternates with, or is supplemental of some other hæmorrhage.

155. In the first and second of the foregoing states, constituting the more *idiopathic* varieties of hæmatemesis, as well as in the third and fourth, forming the *symptomatic* and *complicated* conditions, the appearance of the stools is the next deserving of attention to the quantity and state of the blood thrown off the stomach. In many cases, the quantity of blood passed from the bowels is greater than that vomited. This happens most frequently when the blood is slowly effused without irritating the stomach. It then passes the pylorus, and undergoes a partial digestion, or mixes with the secretions poured into the alimentary canal; imparting a very dark colour, or pitchy or black grumous appearance to the stools.

156. *E. Vomiting of Black Matter.*—The *morbus niger* of the ancients.—When the blood continues long congested in the capillaries of the stomach previous to its effusion, it gradually acquires a dark colour, and loses the property of coagulating. When, also, the congestion of the venous capillaries has continued long, the arterial ramifications passing into them necessarily participate in this state, the blood in them assuming venous characters. This condition of the circulation of the organ sometimes occurs, especially in persons of a spare habit of body, of a morose, irascible, and melancholic temper, and of a pale, sallow, or jaundiced countenance; and is attended with, or followed by pain and distention in the epigastrium and left hypochondrium, flatulence of the stomach, debility or sinking, borborygmi or tormina, and several other symptoms usually indicating the approach of hæmatemesis. At length, during great prostration of strength, or deliquium, followed by nausea, and sometimes colicky pains of the abdomen, vomiting of a black, tar-like matter takes place, often with similar discharges from the bowels. This matter is occasionally extremely offensive, and is evidently the result of serious changes in the vital action of the vessels of the stomach, liver, and spleen; the tone of the capillaries, and the healthy cohesion of the digestive mucous surface, being lost, and thereby allowing the exudation of the altered blood into the cavity of the organ, this fluid becoming still farther changed by admixture with the acrid gastric juice and exhalations poured out by the villous surface. It will be seen from this that I consider the discharge of a black matter from the stomach as a modification or variety of hæmatemesis, occurring in an extremely asthenic state of the frame, and most probably from some degree of perverted function, not only of the stomach, but also of the liver and spleen. It may be also inferred that a morbid state of the secretions from the mucous follicles and liver may coexist with these changes, and that the admixture of those secretions with the effused blood may deepen the already dark colour of this fluid; but this effect is chiefly produced by the free acid shown by Dr. PROUT to exist in the gastric juices.

157. ii. CAUSES.—A. *The predisposing causes* of hæmorrhage from the stomach are, hereditary conformation and disposition to hæmorrhagic affections; the female sex; the sanguine and irritable temperaments, and the melancholic and the hypochondriacal, especially in persons of a pale, sallow, or earthy appearance.

of countenance; the full and plethoric habit of body, and irascible disposition; indolent and luxurious modes of life, particularly when adopted soon after puberty; addiction to the use of spirituous liquors, or of inebriating fluids of any description; indulgence in too much food; the continued influence of moist and miasmatic states of the air; chronic affections and congestions of the abdominal viscera, particularly of the spleen, liver, and pancreas; the advanced months of pregnancy; and irregularity or suppression of the menstrual discharge. J. P. FRANK states that he has met with hæmatemesis most frequently between the thirtieth and fiftieth years of age.

158. *B.* The *exciting* and *determining* causes are, blows and injuries on the abdomen, particularly on the hypochondria and epigastrium; violent concussions or succussions of the trunk; external or internal pressure on the stomach; the ingestion of irritating or hurtful matters into this viscus; the intemperate indulgence in food or stimulating liquors; the presence of worms, larvæ, leeches, &c., in the stomach or upper part of the intestines; the irritation occasioned by morbid or excoiating bile on the surface of the duodenum or stomach; powerful or irritating emetics, especially when given in the advanced stages of fevers, or in cachectic or visceral diseases; the suppression of accustomed discharges, particularly the menstrual or hæmorrhoidal; the application of cold, or of cold and moisture, to the lower extremities or surface of the body, during perspiration or the catamenial period; unusual distention of the colon, owing to habitual or continued costiveness; neglect of the bowels, and consequent accumulation of fecal matters; violent fits of passion; disease of the vessels of the stomach, or collatitious viscera; the gravid uterus, and large tumours developed in any part of the abdomen. Whatever, in short, irritates the mucous surface of the stomach, or interrupts the return of blood from the organ, will occasionally produce the disease.

159. *iii.* SYMPTOMS.—*A. Premonitory Symptoms.*—The patient generally complains, previous to the accession of the hæmatemesis, of many of the symptoms of hæmorrhagy, as well as of others peculiar to this species. These are, commonly, cardialgia; tension or pain at the epigastrium, with either loss or increase of appetite; sometimes faintness, or a sense of sinking or of anxiety at this region; flatulent or acrid cructations; lassitude, with irregular chills and flushes of heat; an open, sharp, and soft pulse; a sense of pain, or heat and uneasiness, with distention and tenderness at the epigastrium and left hypochondrium. Sometimes the pains in these situations are severe and pulsative, or extend to the left shoulder and scapula; and there is generally more or less of nausea, expression of anxiety, and pallor of the countenance. In rarer instances the attack commences without any premonitory symptoms sufficient to attract attention; and cases even of death from hæmorrhage into the stomach have been observed by FRANK (*De Cur. Hom. Morb.*, t. vi., p. 198) and others to have occurred suddenly, without any external discharge or symptom indicating the cause of sudden dissolution. In some instances I have ascertained that, for a long time previously, evi-

dent symptoms of chronic gastritis had been present, of which the hæmatemesis was a consequence.

160. *B.* The *pathognomonic* phenomena of the disease soon succeed to the above; the nausea is followed by increased pain, uneasiness, and tenderness at the epigastrium, and with vomiting of blood, either fluid or coagulated, pure, or mixed with the contents of the stomach. The blood and other matters thrown up come away with more or less effort; frequently with comparative ease, even when the hæmorrhage is the greatest, and seldom with much previous retching; it is sometimes gulped or eructated upward. When the quantity of blood thrown up is great, the effort at ejecting it may sometimes occasion irritation in the pharynx, and excite coughing, and, from this circumstance, cause some doubt as to the seat of effusion; but the history of the case, and an attentive examination of the phenomena (§ 159, 160), will show the nature of the disease.

161. The appearance of the blood varies with the quantity effused and the time it has been retained in the stomach, but especially with the state of the vital energies and of vascular action previous to, and at the time of the hæmorrhage. Where the discharge is attended by increased action, and the quantity is large, or when it has been poured from a considerable vessel or vessels, the blood is generally pure, and unmixed with the ingesta. Where it has been effused from an artery or ruptured aneurism, it is florid and fluid; but if it have slowly oozed from the congested mucous surface, or depended upon congestion or other disease of the spleen or liver, it is of a dark venous colour, sometimes grumous, at other times fluid, and either pure or mixed with the secretions or other matters contained in the stomach. In some cases (the *morbis niger* of old authors) the blood is nearly black, of a tar-like hue, or grumous, particularly in the hæmatemesis occurring during the progress of old remittent and malignant fevers, where there has evidently existed for some time impaired tone of the mucous surface of the stomach and of its capillaries, and of the vessels of the spleen, with congestion of these viscera, and obstruction of the liver.

162. In some instances, particularly when the disease has been preceded by inflammatory symptoms referrible to the stomach, membraniform, polypous, or fleshy substances are found among the coagula ejected from this viscus. These substances evidently proceed from inflammatory action in a part of the villous surface, with effusion of coagulable lymph, this action being followed by, or accompanied with, or even consequent upon a more or less active hæmorrhage.

163. After hæmatemesis, the patient often experiences much relief from the more severe symptoms ushering it in; and this continues until shortly before a return of the attack, which may be repeated oftener than once, with intervals of relief of irregular duration. When the effusion of blood into the stomach is continued for a prolonged period, the vomiting of this fluid is repeated at short intervals. And occasionally the hæmorrhage occurs, particularly in those addicted to ingurgitation and the immoderate use of spirituous liquors, in short and

slight fits, at short and regular intervals. I have remarked it, particularly in persons of a full habit of body who have been addicted to those indulgences, recur every morning, even for several weeks or months, with temporary relief to all the symptoms, and disappear only occasionally for longer periods than 24 hours. Sometimes a single attack of considerable severity is followed by many months of comparative health; and when it is critical of engorgement of the spleen or liver, it may not again return, under proper treatment. When hæmatemesis is succedaneous or vicarious of some other accustomed sanguineous evacuation, it often recurs at regular intervals, as in the second variety of the affection. After an attack, the bowels are generally relaxed, and the dejections dark-coloured, from the presence of blood in them, and extremely fetid. Sometimes the stools are quite black, and of the consistence and appearance of tar. This state of the evacuations (*the malena* of old authors) often continues for some time after the vomiting has ceased; and they are often preceded by colicky pains through the abdomen, distention, flatulence, tormina, and even slight meteorismus.

164. There is seldom much fever or heat of surface; but the pulse is quickened, sometimes full and developed, or even strong, in the more active or sthenic states of the disease, particularly at the commencement of the attack. But in the asthenic states of the system, or as the disease advances, and the attacks are repeated, it is commonly small, soft, and accelerated, and occasionally very compressible and open. The tongue presents various appearances, which depend more upon the concomitant and primary lesions producing the effusion of blood than upon this occurrence alone. It is sometimes furred, but more commonly loaded at its base, or coated with mucus merely, or it is red, particularly its point and edges, and lobulated or fissured: sometimes it is apparently raw and livid, particularly in the worst cases.

165. *C. Appearances on Dissection.*—There are few lesions to which the stomach and other abdominal viscera are liable, and have not been found in fatal cases of hæmatemesis. The chief of these, particularly in the primary forms of the disease, are, dark red, purplish, brown, or black patches, streaks, or spots, of the internal surface of the stomach; an enlarged, dilated, or injected state of the capillaries in this surface, permitting, according to the observations of PORTAL, injections thrown into the gastric arteries to pass into the cavity of the viscus; very rarely rupture of any of the vessels, excepting in connexion with ulceration or atheromatous deposits in their coats; generally a relaxed state of the vessels, with diminished cohesion, or a softened, dark-coloured, blackened, tumid, infiltrated, ecchymosed, and flabby condition of the villous and sub-villous tissues; occasionally a flaccid, dilated, and pale state of the whole organ, the vessels having been emptied by the hæmorrhage; sometimes similar alterations to the above of the internal surface of the duodenum, or of the œsophagus, either independent of (GAUBE, in *Rev. Méd.*, t. i., p. 394, 1825), or associated with the foregoing lesions of the stomach; collections, varying much as to quantity, of coagulated,

semi-coagulated, or grumous, dark-coloured blood in this viscus, and in the duodenum, and of a still darker, pitchy, and fetid blood, mixed with morbid secretions and fæcal matters, in the intestinal tube; and a nearly empty state of the veins. In some cases, especially of the symptomatic forms, the mucous surface of parts of the small or large intestines presents similar appearances to those seen in the stomach. In a few instances, there is but little change from the healthy state of this viscus, the principal morbid changes existing in the liver or spleen, or in the pylorus or œsophagus; and, in a few others, the mucous membrane is red, injected, and covered in parts by a layer of coagulated lymph or of jelly-like fluid. In addition to one or several of the above lesions, there have been observed, in rare cases, erosion of one or more arterial vessels (RICARD, LATHAM, CLARK, and myself) of the stomach; a dilated or varicosed state of the veins (RULLIER), and even rupture of the varicosed veins (STOLL, ROZIERE); great dilatation of the vasa brevia, the meseraic, mesocolic, and splenic veins, and ulcerations and perforations of the œsophagus and duodenum, as well as of the stomach.

166. In the more decidedly symptomatic and complicated states, the various alterations to which the abdominal viscera are liable are severally observed, but those which are more directly connected with hæmorrhage into the stomach are, congestion, enlargement, and softening of the spleen, its vessels containing a black, semi-coagulated, or grumous blood; unusual hardness and diminished size of this viscus, portions of it being converted into cartilage, and deposits of bone on its surface; congestion, tubercular formations, interstitial deposits, tumours, scirrus, atrophy, and other changes in the liver, causing obstruction of the portal circulation; tumours pressing upon the vena portæ, and lesions of its coats, or of parts connected with it, diminishing its caliber; enlargement or scirrous tumours of the pancreas (VAN DOEVEREN, myself, and others); alterations of the coats of the large vessels, and aneurisms, particularly of the aorta, opening either directly or mediately into the stomach or œsophagus; adhesions of the spleen to the stomach, with perforating ulcers of the latter penetrating into the former; fungous or other tumours of the stomach or pylorus (WHYTT, NIEMANN, PORTAL, &c.); scirrus of the cardiac or pyloric orifices, tumours developed at the root of the mesentery, and organic changes of the kidneys. The most common of these are, the alterations of the spleen and liver, especially enlargement of the former, and lesions of the whole structure of the latter; changes affecting merely a part of the organ, or not materially obstructing the portal circulation, having but little influence in the production of hæmatemesis.

167. *D. Pathological Inferences.*—From the phenomena observed in connexion with this disease, both during life and after death, it may be inferred, 1st. That the effusion of blood into the stomach is sometimes a termination or consequence of active congestion, or of inflammatory irritation of the villous surface of this viscus, and sometimes also of the parts of the digestive tube adjoining it—*inflammatory hæ-*

atemesis; 2d. That the hæmorrhagic discharge frequently arises from interrupted circulation in the spleen or vena porta, or both, and consequent congestion of the veins and venous capillaries of the stomach, causing increased action of the arteries, with dilatation of, and consequent effusion from the exhalant pores of the congested surface—*congestive symptomatic hæmatemesis*; 3d. That the effusion occasionally proceeds from diminished or lost vital cohesion of the villous surface, and impaired tone of the capillaries of the stomach, with general adynamia—*asthenic symptomatic hæmatemesis*; 4th. That, in rare instances, the hæmorrhage arises from an aneurism, from ulceration or perforation of an artery or vein; and more frequently from malignant, fungoid, or ulcerated tumours in the stomach, or near either of its orifices, &c.—*complicated hæmatemesis*.

168. iv. DIAGNOSIS.—The vomiting of blood is no proof that this fluid is effused primarily from the stomach, or even from the œsophagus or duodenum; for, as I have shown above (§ 91, 99), very dangerous hæmorrhages often proceed from the posterior nares, fauces, or pharynx, and even from the respiratory organs, yet but little blood escapes externally from these situations, the greatest quantity passing into the stomach, whence, if it be considerable, it is afterward thrown off by vomiting. Where the hæmorrhage takes place slowly, hæmatemesis does not occur, the blood having nevertheless flowed into the stomach, and thence into the intestinal canal, admixing with the secretions and alimentary matters, and colouring the dejections. Hence the presence of this fluid, even in the stools, is no proof that it has been effused either in the stomach or duodenum, as it may have been, as now stated, poured out from the œsophagus, or from the throat, &c., and have passed downward instead of upward. In cases, however, of hæmorrhage from the superior portions of the digestive tube, the blood is more or less changed, or intimately mixed with the intestinal secretions and fecal matters; and the stools present, in their black colour, or their grumous, sanious, or tar-like appearance, indications of considerable remora, or of partial digestion of the effused blood in the alimentary canal. These appearances may be thus modified, not only by this circumstance, but by the action of the acid in the gastric juice, or by acidity in the bowels, and by admixture with the biliary and pancreatic fluids. They will necessarily also vary with the quantity of blood effused, with the particular seat of effusion, with the state of the system, and with various concomitant circumstances, in respect of the causes and states of the digestive viscera.

169. The diagnosis, therefore, of true hæmatemesis from the vomiting of blood consequent upon the passage of this fluid into the stomach from the pharynx and adjoining parts, requires more attention than has been directed to it; and it is chiefly from a careful inquiry into the history and phenomena of the case, and from the premonitory symptoms referrible to the stomach, spleen, or liver, that a correct opinion can be formed. Where these symptoms have ushered in hæmatemesis, there need hardly be a doubt as to the stomach being the seat

of effusion; and in this case the blood is very often dark-coloured, grumous, or coagulated, mixed with portions of ingesta, or with a pale or colourless rosy fluid, or with bile. In some cases the passage of the blood over the glottis occasions more or less cough, and causes some doubt as to the source of hæmorrhage. In these, however, as well as in others, the absence of the symptoms ushering in and characterizing *hæmoptysis* (§ 98, 99) will distinguish *hæmatemesis* from that form of hæmorrhage. The dyspnoea, the bubbling sensation in the trachea and about the top of the sternum, the florid and frothy appearance of the blood, or the presence of bubbles of air in it, are all present in the former, but are absent in the latter. Dr. WATSON very justly remarks that the symptoms usually succeeding the hæmorrhage, in either variety, afford much assistance in forming a judgment in some doubtful cases. Generally copious *hæmoptysis* proceeds for some time in a succession of mouthfuls, whereas there is mostly only one access of full vomiting; and, at the close of the former, the patient manifestly coughs up and expectorates smaller quantities of blood, while, a few hours after the latter, slight griping pains are felt in the abdomen, and stools such as I have above described are passed.

170. Other circumstances, also, connected with the diagnosis of hæmatemesis, ought not to be overlooked, especially the visceral diseases of which it is frequently a consequence, and the affections upon which it may be contingent, or of which it may be supplemental or vicarious. When blood is vomited in the course of *cancer* or *scirrus* of the stomach or of its orifices, besides the symptoms indicating these maladies, this fluid is generally changed to a dark or black, grumous, or even inky appearance. When hæmatemesis occurs in the course of *scurvy* or of *purpura*, the circumstances are generally such as to leave us in doubt as to its source. If it take place after a fit of *hooping-cough*, it is often difficult to determine whether the blood be discharged from the stomach or from the respiratory passages; but attention to the phenomena just pointed out (§ 168, 169) will obviate any error. When hæmatemesis proceeds from a ruptured *aneurism*, or from an ulcerated or ruptured vessel, the quantity of blood thrown up is generally great, and unmixed with other matters, and sometimes more or less florid and fluid. The exhaustion, fainting, pallor, and sinking attending it are extreme, and a fatal result occasionally soon supervenes; but more frequently the exhaustion and sinking or syncope arrests the hæmorrhage, and the patient apparently makes a short or slight progress in recovery; but after some mental or physical excitement, or after slight exertion, the hæmorrhage recurs, and death either takes place, or another respite is obtained. In many of these extreme cases a great part of the effused blood is retained, and found in the stomach and intestines on dissection.

171. v. PROGNOSIS.—In proportion to the severity of the symptoms referrible to the stomach, liver, and spleen, particularly the pain, tenderness, anxiety, and fullness in these situations, the danger may be considered great. When these are very distressing, the quantity,

of blood ejected considerable or excessive, dark-coloured, pitchy, fetid, or grumous; when the vomiting is attended with sinking, with a very quick, weak, small, or an open and compressible pulse, or with signs of cachexia, and of organic disease of any of the abdominal viscera; if it be preceded by symptoms of inflammation of the stomach and adjoining viscera; if it have proceeded from acrid poisons, or from severe injury; if it be attended or preceded by dropsy, jaundice, hypochondriasis, or a sallow, sunk, earthy, or waxy state of the countenance or general surface; if fainting or syncope come on and be protracted, or recovery from them imperfect; if the eyes be sunk, the features pallid and sharp; if there be great distention and tenderness at the epigastrium and left hypochondrium; and, lastly, if the patient have cold extremities and cold sweats, the danger is generally great, and, with the latter symptoms, extreme. If the symptoms ushering in the attack, or preceding it for some time, be either imperfectly mitigated, and still more, if they be increased by the discharge of blood, an unfavourable inference as to the issue may be formed. If hæmatemesis occur in the last stage of fevers or of the exanthemata, in the old and cachectic, in persons who have gone through a long course of intemperance, or who have laboured under chronic abdominal disease; particularly if the hæmorrhage be great, or impart not relief if moderate, danger may be inferred, although it may not be immediate in the latter circumstances.

172. When, on the other hand, the disease has been caused by a fit of anger, by the suppression of an accustomed evacuation, as the catamenia, hæmorrhoids, epistaxis; or if it be vicarious of these, or when it has occurred on the disappearance or suppression of an external discharge, eruption, &c., the patient being otherwise healthy, or not far advanced in life; if the hæmorrhage is not excessive or very frequently repeated; if the premonitory and attendant symptoms be not severe; and if the attack be soon followed by relief, and a return of the appetite and digestive functions; if the abdomen and hypochondria be without tenderness, unnatural fullness, or tumour upon an accurate examination, the prognosis may be favourable. Yet an attack of hæmatemesis should be always considered deserving the utmost attention and skill of the physician.

173. It has been generally stated that periodic hæmatemesis, vicarious of menstruation, is unattended by danger; but there are many exceptions to this, arising from circumstances alluded to above (§ 171). Mr. NORTH met with two cases of this form of the disease which terminated fatally. Upon the whole, therefore, the prognosis ought entirely to depend on the nature of the case, the age of the patient, the state of vital power and vascular action, and especially upon the complication, and the visceral lesions from which the attack proceeds. Dr. SCHMIDTMANN states that in plethoric patients, and in cases not characterized by much visceral disease, hæmatemesis seldom proved fatal in his practise; and my experience confirms this result. In one case, where it recurred almost daily, a violent attack of gout and the subsequent regimen have prevented its recurrence for years. HOPPMANN found five ca-

ses fatal out of eight, in those depending upon visceral disease and broken-down powers of the frame. When hæmatemesis assumes or even approaches to the characters constituting the *morbus niger* of the older writers, or indicating structural or malignant disease of the stomach or its orifices, the prognosis must be extremely unfavourable.

174. vi. TREATMENT.—The indications are, 1st, to prevent or to arrest the attack; 2d, subsequently to remove the pathological conditions on which the hæmorrhage depends.—A. The physician has seldom an opportunity of prescribing for the premonitory symptoms of hæmatemesis; but cases sometimes present themselves in which it is necessary to have recourse to means, when these symptoms recur, in order to prevent the seizure. In these circumstances, a moderate venæsection or cupping over the hypochondria, warm mustard pediluvia, a full dose of calomel, followed by cooling purgatives, cathartic enemata, cooling diaphoretics conjoined with demulcents, and spare farinaceous diet, will generally be efficacious, especially if excited or sthenic action be present. If the powers of life be depressed, instead of the blood-letting, a sinapism, or the warm turpentine epithem, may be applied over the region of the stomach. If the attack is apparently supplemental of hæmorrhoids, or of the catamenia, leeches may be applied around the anus or near the groins, and aloetic purgatives should follow a full dose of calomel. A blister, or stimulating plaster, may also be applied to the sacrum. In cases of obstructed catamenia, cathartic enemata, with a full dose of spirits of turpentine, may be administered.

175. B. During the attack, the treatment must be directed conformably with the principles inculcated above. The question as to the propriety of arresting the hæmorrhage should hardly be entertained in this disease more than in hæmoptysis (§ 136); for, although the hæmorrhage may sometimes proceed with less risk in the former than in the latter, or even occasionally with advantage; yet, as the quantity of blood thrown up from the stomach is no sure indication of the amount effused, and as the ends likely to be fulfilled by the internal discharge may be more safely attained by treatment, even when circumstances seem most favourable to the allowing of the hæmorrhage to proceed, it will be safer, as a general rule, to employ appropriate means to arrest the attack, and at the same time to accomplish all that the unrestrained effusion could have produced. Even in cases of supplemental or vicarious hæmatemesis, when it is supposed by some advantageous to allow a free discharge, danger may result; for the hæmorrhage may be fatal, although little blood is vomited, the stomach and intestines being filled with the effused fluid.

176. a. For hæmatemesis the means of cure are to be selected according to existing pathological conditions. In plethoric and robust persons; in cases depending upon congestion of the liver or spleen, or upon suppressed discharges; and where indications of increased or sthenic action are present—in those circumstances that might indicate the propriety of allowing a copious effusion to take place, it would certainly be improper to arrest the disease at its commencement by the internal use

of powerful astringents; but it would be judicious to do so by removing the pathological states of which the hæmorrhage is the effect by *venesection*, copious or repeated, according to circumstances; by *cupping* over the hypochondria; by *purgatives* and cathartic enemata, and by *external derivations*. In these, the more active states of hæmatemesis, *refrigerants*, cooling *diaphoretics*, and the other means advised in similar states of hæmorrhage (§ 35, *et seq.*) may be also employed. Whenever the disease continues, notwithstanding free vascular depletion and external derivation, there can be no doubt of the propriety of having recourse to the more powerful astringents. In the more active forms, however, a full dose of *calomel*, followed in a few hours by a purgative draught, and this by a cathartic enema, so as to procure copious alvine evacuations, should precede astringents. When the hæmorrhagic discharge is so copious as to forbid the delay which this practice would occasion, the calomel should be followed, in a very short time, by a full dose of oil of *turpentine*, given on the surface of milk, or of some aromatic water, or of this medicine conjoined with castor oil. If this draught be thrown off the stomach, it should be repeated; and it may be even again preceded by the calomel. Notwithstanding its usual nauseating effect, turpentine is generally retained in hæmatemesis; and it allays the vomiting by arresting the hæmorrhage. It may be given in any dose, from twenty to thirty drops, every half hour, to half an ounce or more at considerable intervals; it may also be administered in *enemata*, or applied externally in the form of *liniment* (F. 311) or *epithem*. I have resorted to this practice upward of twenty years, and am convinced that it is safer and more generally appropriate than any other yet recommended.

177. *b. Cold*, in various modes of application—as an enema, applied over the epigastrium, iced fluids or lemon, and other water ices taken into the stomach—has been directed in active hæmatemesis, and is often efficacious. But this treatment often merely suspends the hæmorrhage, which returns as soon as it is relinquished, sometimes with greater violence. It occasionally, also, merely checks the vomiting, while the sanguineous effusion still continues. It requires caution and discrimination, and ought not to be confided in alone, when the discharge is very profuse, or the case urgent. Where enlargement or passive congestion of the liver or spleen exists, the propriety of this practice is very doubtful. In passive hæmatemesis it is injurious. *Nitre* (F. 95, 294, 644), or *hydro-chlorate of ammonia* (F. 864), may also be tried in the active states of the disease, as being appropriate to them.

178. *c. Of the astringents*, the acetate of lead in large doses, with opium, or with pyroligneous acid, acetate of morphia, and creasote, is the most efficacious. In the latter combination I have lately seen it successful. The combination mentioned above (§ 131), as constituting *Russini's styptic*, or the *styptic solutions* prescribed in the appendix (F. 9-12), or the *astringent balsams* (F. 8-22), the trisnitrate of bismuth or sulphate of zinc, with narcotics, and most of the substances already noticed under this head (§ 40, 41), will often be of service. In the *passive*, or profuse states of the disease,

the more tonic astringents, as the tincture of the sesquichloride of iron, the oil of turpentine with aromatics, the sulphates and sulphuric acid with opium (VOGEL, RULAND, VICAT), and infusion of roses; alum in milk-whey (STRÖM, WILlich, LINDT, &c.), are generally useful.

179. *d. Emetics*, especially the sulphate of copper or of zinc, are efficacious in some cases. They have been employed by RICHTER and KECK. Dr. SHERIDAN states that both he and his father have resorted to ipecacuanha emetics in hæmatemesis with general success. Very recently the secale cornutum has been recommended; and I have lately employed the *creasote* in two cases with benefit, and have conjoined it with pyroligneous acid, acetate of lead, and acetate of morphia. Camphor is mentioned by MARCARD, but it is useful chiefly as an adjunct to other means. The acid formed by the fermentation of butter-milk or whey is noticed by VAN DER HAAR. I have seen it employed in some northern parts of Europe with benefit. Blistering the epigastrium is directed by VOGEL and TOGENBURGER, and should not be neglected if the other modes of counter-irritation already noticed (§ 36, 47) be not adopted. Of the various anodynes, opium has been justly preferred by YOUNG, JONES, ROESCHLAUB, DORFFMULLER, and NARCUS; the salts of morphia are now frequently employed, the one most congruous with the other substances prescribed being selected.

180. *C. The treatment after the attack* is often of greater importance than that of the attack itself. It is chiefly then that the pathological states producing it can be removed. The means of cure should have strict reference to these states (§ 146), and especially to those of the liver and spleen. There are few cases in which a judicious, regular, and persevering use of mild *purgatives* will not prove serviceable. When there is enlargement or engorgement of the liver, deobstruent and chologogue aperients, occasional cupping below the right shoulder-blade, and a mild, farinaceous diet are required; calomel, blue pill, PLUMMER'S pill, taraxacum, the bitartrate of potash, and the neutral salts being the most appropriate aperients. When the spleen is enlarged, purgatives are also necessary; but they should either be conjoined or alternated with tonics, and calomel be either laid aside or be given with caution. In either state, purgative draughts (*Form.* 99), deobstruent liniments (F. 296, 311) applied over the hypochondria, the nitro-hydrochloric solution taken internally and used externally, blisters and other external derivatives will be useful. Cathartic enemata are also serviceable, especially when the bowels are very sluggish, or when the catamenia are interrupted. Most continental writers reprobate the more active purgatives, and venture only upon mild aperients, as rhubarb, manna, tamarinds, &c. When the disease depends chiefly upon relaxation, or irritation of the digestive mucous surface, this caution is very proper; but when the collatitious viscera are chiefly in fault, or when the catamenia are suppressed, the opinion of Dr. BATEMAN, given strongly in favour of the practice recommended by Dr. HAMILTON, is perfectly just.

181. In hæmatemesis vicarious of menstruation, or of hæmorrhoids, purgatives are re-

quired; but they should be suited to the peculiarities of the case. When the amenorrhœa is connected with plethora, local depletions, from the groins or tops of the thighs, should be prescribed, and repeated just before the return of the menstrual period or of the internal hæmorrhage; but when it is connected with adynamia, and a chlorotic or anæmic state of system, the preparations of iron, with myrrh, aloes, or other substances, which circumstances will suggest, should be employed. In the aged, debilitated, cachectic, and in those addicted to fermented or spirituous liquors, purgatives should be given with caution, those of the mildest kind, in connexion with tonics and restoratives, being selected.

182. When the stools continue black some time after hæmatemesis has ceased, this colour *not* having arisen from the use of chalybeates, the exudation of blood from the upper parts of the digestive tube—either from the stomach, in so small a quantity as not to excite vomiting, or from the duodenum, or parts in the vicinity—may be inferred. In this case, purgatives, unless those of an astringent or tonic kind, as *Form.* 99, tamarinds, rhubarb, &c., would be injurious. In some prolonged cases of this kind in which I have been consulted, the spirit of turpentine, either in small and repeated doses, or in a full dose, has been most successful; but the external applications just noticed, and means appropriate to the complications which these cases usually present, should not be neglected.

[The treatment of hæmatemesis, like that of all other diseases, must be regulated by its true pathology in the case before us. We have been accustomed, in this affection, to resort promptly to blood-letting, where there is much activity of pulse or warmth of surface, to be followed immediately by cups to the epigastrium, and these to be succeeded by an epispastic. Rest and low diet, with the use of ice-water internally, are adjuncts which, under the above circumstances, ought never to be neglected. We have seen no particular benefit from the use of *astringents*, unless it be the *sulphate of zinc* or *turpentine*;* but where *ice* is accessible, the ingestion of cold fluids is preferable to the whole of this class of agents. Dr. CHAPMAN has recommended *emetics*, unless marks of phlogosis are present, for the relief of hæmatemesis, and remarks that vomiting, especially with *ipeca-cu-anha*, tends more than any other process to change that condition of the exhalants which favours sanguineous effusions, though doubtless a part of its efficacy is to be ascribed to the removal of large clots of blood by which the stomach is oppressed. A feeble state of the pulse, or of the general system, constitutes no valid objection to their use, as they tend to rouse the recuperative energies, especially when a large amount of blood is discharged. The contractile efforts of the stomach, moreover, tend to close the orifice of the exhalants,

* [In some instances the turpentine occasions nausea, when it will be useful to combine with it a small quantity of *hydrocyanic acid*; or, the latter may be given a short time previous to the turpentine. Dr. ELLIOTSON states that he has never failed in arresting hæmorrhage of the stomach with turpentine, given in dose of twenty to twenty-five drops, every four or six hours. It comes directly in contact with the bleeding vessels, and checks the flow of blood by a direct impression.]

and thus arrest the hæmorrhage. For some striking cases illustrating the benefits of this mode of treatment, see "*Lectures on Eruptive Fevers, Hamorrhages,*" &c., by N. CHAPMAN, M.D., Phil., 1844. We have never employed *ice* to the epigastrium in this complaint, as recommended by some late writers, although we have heard of cases in which much advantage was derived from such an application. We can readily imagine that leeches would prove beneficial in arresting the flow of blood to the internal organs, as would also the warm bath, stimulating frictions, sinapisms, &c. Where, however, there is evidence of great torpor of the system generally, with a sluggish state of the circulation, and especially of the portal system, the employment of cold applications, both internally and externally, must be prohibited, as tending to increase that state of congestion on which the hæmorrhage itself depends. Emetics might, under such circumstances, also be hazardous; but mustard may be used freely to the external surface, and the spirits of turpentine, administered internally in doses of from twenty to sixty drops, frequently repeated, with a very fair prospect of success. In these cases many of the more prominent symptoms, as cold skin, nausea, feeble circulation, &c., are often owing to the fact that the intestinal canal is loaded with grumous blood, which its ordinary peristaltic action is unable to discharge; hence the necessity of resorting to the use of such agents as will most promptly discharge the offending contents without tending to aggravate the disease. A mixture of castor oil and spirits of turpentine has been recommended for this purpose, and we have found it admirably adapted to meet this indication. Purging has been recommended by HAMILTON as almost a specific in the treatment of hæmatemesis, especially for that species of it that occurs among females in early life, and which, most probably, is unattended with structural disease of the stomach, and is a discharge vicarious to the menses. That internal hæmorrhage of some kind is very apt to accrue from a sudden suppression of the menstrual flux is a fact very well known to the practitioner of medicine. That hæmatemesis sometimes results in consequence of obstinate constipation, is a fact no less generally known and recognised; hence the importance of the cathartic class of agents. Where the disease is vicarious to the menstrual suppression, our chief efforts, of course, should be directed towards a restoration of the uterine function. The directions of our author, as to general regimen, should be strictly heeded, and but a small part of our duty will be performed if we neglect attention to that condition of the system, or the particular pathological cause which gave rise to the hæmorrhage. Much diagnostic acumen will be required to detect visceral lesions, or pronounce with certainty upon the precise conditions which led to the hæmorrhagic affection. To guard effectually against the recurrence of the accident will often require the clinical skill of the most experienced observer.]

183. *D. The regimen* in hæmatemesis does not differ materially from that already recommended. During the continuance of the discharge, total abstinence should be enjoined; but afterward mild, mucilaginous liquids, and

farinaceous food in small quantity may be allowed, and the transition to solid and more nutritious diet carefully and gradually conducted. The drink should be cooling and astringent, and appropriate to the states of the digestive organs, especially the liver and spleen. Those prescribed in the *appendix* (F. 591-595, 915, 916) will be found very generally appropriate. Subsequently, change of air, regular exercise on horseback, and the use of the deobstruent mineral waters, as those of the Beulah Spa or of Cheltenham, and the factitious Ems or Carlsbad waters at Brighton, ought to be recommended.

[The Ballston and Saratoga waters, as well as the White and Red Sulphur Springs of Virginia, will prove extremely beneficial in this affection, especially after all acute symptoms have subsided. The mineral springs at Sharon and Avon, in this state, are also recommended as highly useful in these cases. The cold and shower bath, and especially sponging the body with cold water every morning, should not be neglected, while attending, at the same time, to the other hygienic measures recommended by our author.]

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[AM. BIBLIOG. AND REFER.—See Bib. of "Hæmorrhage" and "Hæmorrhage from the Lungs."]

VII. HEMORRHAGE FROM THE INTESTINES AND MELÆNA.—**SYN.** *Intestinal Hæmorrhage*, *Melæna*, *Melaina*, *Melaina Nōstos* *ἡλαός*, *αιματίτης*, *Hippocrates*; *Morbus Niger*, *Hippoc.*, *Auct. Lat. var.*; *Fluxus Splenicus*, *Gordon*; *Dysenteria Splenica*, *Balloonius*; *Nigra Dejectiones*, *Schenck*; *Secessus Niger*, *Hoffmann*; *Melæna Sauvages*, *Sagar*, *Good*; *Melanorrhagia*, *Swediaur*; *Schwartzæ Krankheit*, *Schwartzæ Bluffuss*, *German*; *Malaïde Noir*, *French*; *Melena*, *Italian*.

DEFIN.—*The evacuations from the bowels, containing fluid, grumous, or coagulated blood, or presenting a black or pitchy appearance, with or without vomiting of blood.*

184. I have considered melæna in connexion with intestinal hæmorrhage, although the blood colouring the evacuations proceeds, perhaps, as frequently from parts above as from those below the pylorus: it may even come from the mouth, nares, or fauces, or from the respiratory passages, as I have already shown. The melæna of HIPPOCRATES was the *morbus niger* noted above, or a variety of hæmatemesis (§ 156); the application of the term melæna chiefly to black-coloured dejections being of modern date, and I believe justly ascribed to SAUVAGES. I have viewed it according to this acceptance, and connected it with intestinal hæmorrhage, as it always arises either from this source or from blood which has passed into the intestines from parts above the pylorus. At the same time, the frequent association of melanoid stools with vomiting of blood, in any of the states above described, has been kept in recollection, and considered as a result of the pathological conditions, causing the sanguineous effusion either in the stomach, or in the small intestines, or even in parts above the former viscus. Indeed, melæna may occur not only in any of the circumstances in which hæmatemesis has been shown to supervene, but also in some of those connected with the

other hæmorrhages already noticed. This fact is fully demonstrated by observation, and by the writings specified above, as well as by those referred to at the end of this article. *Melæna* may also appear in the course of cachectic maladies, especially scurvy, purpura, jaundice, &c.; or of adynamic or malignant fevers; or of malignant adventitious productions. In order to arrange the various conditions in which blood is voided from the bowels, unconnected with hæmorrhoids, I shall notice, 1st. *Intestinal hæmorrhage*, the stools not exhibiting the melænoid appearance; 2d. *Melæna*, in relation to the sources of hæmorrhage, and to its complications.

185. i. *Intestinal Hæmorrhage, the stools containing fluid or coagulated Blood, or Simple Intestinal Hæmorrhage—Hæmor. Intestinorum—H. Intestinalis*—occurs, 1st. From interrupted or impeded circulation through the liver; 2d. From congestion and loss of the vital tone of the capillaries of the mucous coat of the intestines; 3d. From ulceration of the intestinal tunics; and, 4th. From inflammatory irritation, or its consequences in these tissues. *A. Intestinal hæmorrhage*, perhaps, most frequently arises from impeded circulation through the *vena porta*. Even when other pathological states seem to produce it, this may be a concurrent cause: hence, all those lesions of the liver that occasion some impediment to the portal circulation may be connected with it. It has also been seen complicated with enlargement and induration of the pancreas, with engorgement of the spleen, with tumours about the root of the mesentery, and with enlargement of the mesenteric glands. These latter lesions are, however, rather contingently associated with the hæmorrhage than concerned in the production of it; whereas, those alterations—as induration, atrophy, scirrus, enlargement, and tubercular or other changes of the liver, which impede or obstruct the circulation of the *vena porta*, are the efficient causes of the sanguineous effusion: hence the occurrence of intestinal hæmorrhage, not only in the course of these lesions, but occasionally also in connexion with ascites or anasarca; or even with hæmatemesis, or after protracted intermittent or remittent fevers. In these cases, the blood is exuded from the intestinal mucous surface, as first inferred by GLISSON; and it is either fluid, grumous, or coagulated, and of a venous or very dark hue, as it is changed by the intestinal gases and secretions, or by its remora in the bowels. The appearance of the blood also varies according to the situation in which it is exuded.

186. *B. Impaired vital tone of the intestinal mucous surface*, and of the capillaries supplying it, with congestion or engorgement of those vessels, is also a frequent cause of intestinal hæmorrhage. It is owing to this pathological condition that blood is discharged from the bowels in purpura, in the early course of fevers, in scurvy, and in other cachectic maladies. In fevers, however, there is probably more or less active determination to this part of the economy, especially in those cases in which the hæmorrhage occurs early, or in which it proves critical. When it takes place in the course of petechial, putrid, or malignant fevers, it is generally passive, or entirely de-

pendant upon the pathological conditions under consideration. In these cases, the blood discharged is generally fluid and grumous, and is of a venous or dark hue. When it is evacuated in an early stage of continued fever, or is critical, it is sometimes partially coagulated, or coagulates loosely after it is passed.

187. *C. Ulceration of the intestines frequently occasions hæmorrhage*.—The discharges of blood from the bowels in the advanced or latter stages of dysentery or chronic diarrhœa, and of continued fever, are often owing to this cause, although they may also proceed, in these stages of fever, from the pathological states just mentioned (§ 186). Intestinal ulceration unattended by fever may also give rise, although rarely, to hæmorrhage. Instances have even occurred in which ulceration had gone on to perforation of the intestine, and adhesion of it to an adjoining viscus, the consequent hæmorrhage proceeding from the ulceration in that viscus. M. RAYER met with a case in which the duodenum and transverse colon were perforated and adherent to the liver, the ulceration in this latter organ having divided two branches of the *vena porta*, and occasioned fatal hæmorrhage.

188. *D. Inflammation of the bowels* is rarely attended by hæmorrhage to a great amount, unless it terminate in ulceration. It sometimes, however, gives rise to discharges of blood, especially when the cæcum or colon is affected, or when portions of the intestines are introssuscepted. It has been supposed by some writers that *blood may be discharged from the liver along the ducts*; but of this we have no satisfactory proof, and it is certainly by no means probable that this fluid will be passed from the secreting structure of this organ.

189. *The appearance of the blood effused from ulcerated vessels depends upon their seat and size, and upon the nature and stage of the antecedent disease*. In far advanced cases of fever or dysentery, the blood is generally fluid, or grumous, and dark. When a large venous branch has been ulcerated, and the hæmorrhage has been very copious, large soft coagula, with much sanguineous serum, are generally passed by stool. In the inflammatory states of intestinal hæmorrhage, as in the early stages of acute dysentery, the blood is fluid, mixed with lymph and mucus, and not in very large quantity, unless ulceration has occurred. The blood discharged furnishes no sure indication as to the seat of the effusion. When, however, it is fluid and unmixed with faecal matters, the lower bowels are probably the seat. The ancients supposed that if the blood passed before the faecal matters, it proceeded from the lower parts of the bowels; and that if it was voided after the fæces, it was effused by the upper parts; but this is no sure criterion. When the hæmorrhage is profuse, the blood acts as a cathartic, occasions severe colicky pains, and is often the only substance evacuated. When it is very dark and grumous, or consists of small coagula, and of a sanious fluid, it has generally either been long retained, or been poured out in the upper portions of the canal. The appearance, however, very much depends upon the states of the vascular system, and of the blood itself at the time when the hæmorrhage occurred; for, if it take place in the latter stages of adynamic or malignant fevers,

the blood evacuated will be fluid or grumous, as well as of a dark hue, or otherwise altered.

190. ii. *Melæna in relation to its sources and complications.*—When blood either flows into the stomach from any of the situations noticed above, or exudes from the internal surface of this viscus in so gradual a manner, or so slight a degree as not to excite vomiting, but passes into the pylorus, and when it is exhaled from the internal surface of the duodenum or small intestines, the evacuations often assume a *perfectly black colour, and tar-like consistence.* In hæmatemesis the stools frequently have this appearance (§ 163), owing to the passage of a portion of the extravasated blood into the bowels. This colour is manifestly owing to the admixture of the blood with the biliary and intestinal secretions, and to the action of the acid and gaseous matters contained in the digestive canal, although other explanations have been advanced (§ 192, 193). Indeed, the evacuations often present, in nearly the same states of constitutional or visceral disease, every variety of colour and appearance, from those just described as constituting melæna to those resulting from the manifest and abundant presence of pure or venous blood. Evacuations, more or less obviously sanguineous, must be referred either to some one of the sources just noticed, or to the passage of blood from the stomach into the intestines. When the blood comes from parts above the pylorus, the stools generally have more or less of the melanoid character, and there frequently is, or has been, hæmatemesis; but when it proceeds from the parts below, the stools vary with the quantity of blood effused, and other circumstances, and are generally as described above.

191. HOFFMANN first, and MORGAGNI afterward, attributed melæna to the discharge of blood from the over-distended and ruptured venous capillaries of the intestines, caused by obstruction of the portal circulation and of the spleen. Dr. CULLEN considered this to be the usual origin of the disease; but admitted that a true *atrabilis* might be formed, and occasion all the phenomena attending sanguineous melæna. Dr. GOOD comprised, as a species of this malady, that morbid state which has been called green or black jaundice, and which is very different from melæna, and not necessarily connected with it, although the stools often have a dark green or blackish hue, owing to alteration of the bile, probably from torpor of the liver and prolonged retention of this secretion in the biliary passages. (See art. JAUNDICE.)

192. While HOFFMANN and CULLEN attributed the colour of the dejections to the remora and alteration of the blood previous to effusion from the venous capillaries, PORTAL, BICHAT, and others supposed that, in consequence of the impeded or obstructed circulation through the mesenteric and portal veins, the blood was more strongly determined to the extreme arterial capillaries or exhalants of the intestines causing distention of, and effusion from these capillaries; and that the change in the blood from an arterial to a black hue was produced subsequently to the extravasation by the acids and gases in the digestive canal. In opposition to these opinions, Dr. AYRE has contended that both melæna and the black variety of hæmate-

mesis (§ 156) arise from the passage of blood from the minute ramifications of the *vena porta* in the secreting structure of the liver consequent upon extreme congestion of these vessels; a very dark blood, instead of bile, passing by the biliary pores into the hepatic ducts, and thence into the duodenum. This hypothesis is, however, not supported by pathological research, and is almost as difficult to refute as to establish. If all cases of melæna were preceded by manifest congestion and its consequence, more or less fulness or enlargement of the liver, the probability of this being the source of melæna would be much stronger than it is; but indications of congestion or of enlargement of this viscus are not uniformly observed.

193. Cases sometimes occur in which a very dark, black, or greenish-black bile is passed, the stools being fluid, or of the consistence of treacle, owing to the circumstance just alluded to, and more fully explained in the article on the GALL-BLADDER, &c. I have met with such instances connected with chronic disorder of the respiratory and digestive functions. Cases, also, are rarely seen in which melanotic matter is voided by stool, owing to the breaking down of tumours or adventitious encysted formations containing this matter, as admitted by Dr. MARCARD and Dr. GOLDIE, or to the exudation of this matter from the follicles where it may have been secreted, if, indeed, such an occurrence ever takes place. In order to distinguish between melæna arising from the *effusion of blood*, or from *black bile*, or from *melanosis*, the stools should be diluted with water, or with a weak solution of soda, when blood will become apparent if the black colour of the evacuations have depended upon this cause.

194. SAUVAGES and PORTAL have distinguished as many *varieties of melæna* as there are circumstances in which it presents itself. The latter of these pathologists has illustrated an interesting memoir on the subject by numerous cases; but the varieties adduced by him are deserving of notice, chiefly as indicating the pathological states on which this morbid condition is contingent, and not any modification of this condition itself; for, as he admits, the matters voided are nearly the same in all. The excretion of black or melanoid stools are, according to M. PORTAL, met with as follows: *a.* In the advanced course of continued fever; *b.* In connexion with periodic fevers; *c.* After strong mental emotions; *d.* After the suppression or cessation of hæmorrhoids, of the menses, or of any accustomed discharge; *e.* From irregular, suppressed, or misplaced gout; *f.* In the course of scurvy, whether depending upon engorgement of the liver and spleen, or upon alteration of the blood; *g.* In dropsy, owing to the associated visceral disease, or to the abdominal effusion, or to both. This enumeration is, however, defective, inasmuch as the frequent dependance of melæna, *h.* Upon disease of the liver, spleen, or pancreas, unconnected with scurvy or with dropsy; *i.* Upon carcinomatous, encephaloid, or fungoid productions in some part of the digestive canal; and, *k.* Upon tumours developed in the mesentery, has been overlooked in it.

195. iii. CAUSES.—*a.* The *remote causes* of hæmorrhage from the intestines and of melæna are not materially different from those that

occasion *hæmatemesis* (§ 157, 158). Sedentary occupations; intense or prolonged anxiety, and close application to study or business; full diet and neglect of exercise in the open air; frequent contrarities; an irritable temper, especially in the melancholic, or sanguineo-melancholic temperament; the intemperate and daily use of spirits or other intoxicating liquors; general debility and cachexia; and the period of life between forty and sixty, are the most common *predisposing* occasions of the disease.—*b.* Violent mental emotions, particularly fits of anger; great excess in eating or drinking; irritating or drastic purgatives, and acrid poisons; the suppression of sanguineous evacuations or accustomed discharges; the visceral and constitutional maladies just mentioned; and the causes generally productive of hæmorrhage, are the common *exciting* causes of intestinal hæmorrhage.

196. iv. The SYMPTOMS connected with melæna and discharges of blood from the bowels have been partially adverted to (§ 189). There have commonly been disorder of the digestive canal, as loss of appetite, nausea, or occasional vomiting, and indications of visceral disease, for a considerable time before the attack. A sallow, dusky, waxy, or leaden hue of the countenance; a foul, loaded, dark, or otherwise morbid state of tongue, and tainted breath; a soft or spongy state of gums; fulness, tension, or griping pains of the abdomen, or fulness or enlargement in the hypochondria; oppression or anxiety referred to the præcordia or epigastrium; great debility, faintness, sense of sinking, or syncope; flatulence or nausea; and a tensive or dull pain in one or other of the upper abdominal regions; sometimes vomiting of blood; vertigo and coldness of the extremities; tormina, or colicky pains in the abdomen; and a weak, soft, or open, sharp, or bounding pulse usually precede and usher in the discharges of blood by stool, or tar-like evacuations. In some instances, the motions are fœtid or extremely offensive; and in all the exhaustion is great. In a few cases, the quantity of blood passed from the bowels has been small; yet a fatal termination has occurred, preceded by tormina, and by fulness or tension of the abdomen. In these the hæmorrhage has been concealed, the bowels being found, upon dissection, filled by semifluid or coagulated dark blood.

197. v. The DIAGNOSIS of intestinal hæmorrhage and melæna is often difficult; *first*, as respects the seat of effusion; and, *secondly*, as regards the resemblance to other affections, particularly biliary disease and hæmorrhoids.—*a.* As to the source of hæmorrhage, the practitioner will be guided in forming his opinion by the circumstances already stated. He will take into consideration the probability of the blood having been poured out from parts above the diaphragm or pylorus, and the existing indications of such visceral disease as usually give rise to sanguineous effusion from the digestive canal.—*b.* If the colour of the stools be caused by black or morbid bile, dilution with water will impart to them a yellowish, greenish, or greenish-yellow hue. If it proceed from the matter of melanosis, dilution will give them neither a bilious nor a sanguineous tint. When the melanoid appearance depends upon blood, the stools are generally offensive, and the san-

guineous hue becomes very apparent upon dilution.—*c.* Intestinal hæmorrhage is often mistaken for internal hæmorrhoids; but it is readily distinguished from the latter by the history of the case; by the tormina and spasmodic pains ushering in the attack; by the action of the bowels being unusual as to the time, and by the attendant sensations and symptoms; by the faintness and exhaustion attending it; by the existing evidence of visceral or constitutional disease; and by the imminent danger in which the patient is manifestly placed. Whereas *hæmorrhoids* are accompanied by the usual tumours, or by prolapsus of the inner coats of the rectum at stool, along with the tumours; and are generally followed by relief of most of the uneasy symptoms, the hæmorrhage occurring chiefly when the patient is passing his usual evacuation, which is commonly more or less fœcal, or unmixed with the blood which is discharged.

198. The *appearances on dissection* are nearly the same as are seen in fatal cases of *hæmatemesis* (§ 165). The liver and spleen usually present structural change, and occasionally also the mesenteric glands, the pylorus, and pancreas. Congestion, dark-red, brownish, or purplish patches, ulcerations, excoriations, &c., of the digestive mucous membrane, are often observed, especially when the hæmorrhage occurs in an advanced stage of FEVER (§ 51), in scurvy, or in purpura. In these, the mesenteric and portal veins are very generally loaded with dark fluid or thick blood. In some instances, however, the digestive canal is not materially altered; and in others it is unusually pale and bloodless. The blood itself is often manifestly changed, the hæmorrhage, as well as the melanoid state of the stools, depending partly upon this circumstance, and partly upon the lost tone of the digestive mucous surface and capillaries. This change obviously obtains in the diseases just mentioned, and in *scorbutic dysentery*, in which discharges of dark blood frequently take place from both the small and large intestines.

199. vi. PROGNOSIS.—Intestinal hæmorrhage and melæna are generally attended by danger; but much depends upon the pathological states of which they are consequences, upon the amount of the discharge, and the consequent exhaustion. When the effusion takes place early in fever or dysentery, is moderate, or is likely to prove critical, a more favourable opinion may be given; but with some reservation, nevertheless. When sanguineous or black stools are consequent upon hæmatemesis, or upon hæmorrhage from parts above the diaphragm or pylorus, the prognosis will have strict reference to the related circumstances, and especially to the parts from which the blood appears to have directly proceeded, and will be either favourable or unfavourable accordingly; but, unless when the blood has come from the lungs, in the manner noticed above (§ 99), or in some alarming states of hæmatemesis, or when there are very obvious visceral disease, and great exhaustion, the danger is much less than in true intestinal hæmorrhage and melæna.

200. vii. TREATMENT.—The stools ought to be attentively examined, in those diseases especially in which intestinal hæmorrhage and melæna are most likely to occur, and still more particularly whenever faintness or exhaustion

after a motion is complained of. For want of this precaution, hæmorrhage from the bowels has been often overlooked, and even fatal syncope has supervened soon after the patient has been allowed to get upon the night-chair. In most circumstances of disease in which this form of hæmorrhage is apt to occur, a bed-pan ought to be used, and the sitting or erect posture should not be assumed until it is allowed by the physician.

201. A. The ancients supposed that blood effused in the intestines soon becomes putrescent; and they, therefore, prescribed purgatives to carry it off, and to prevent its injurious effects upon the system. This view of the matter is not without truth; but purgatives ought to be employed with caution, as they are apt to increase the hæmorrhagic state of the bowels if they be of an irritating or relaxing kind. *Rhubarb*, with *ipecacuanha* and the *hydrargyrum cum creta*, and spirits of *turpentine* with *castor oil*, are the most safe, appropriate, and efficient purgatives in this disease; but they will often require to be assisted by mucilaginous enemata, or by injections containing these oils. When the liver is much affected, occasional doses of *calomel* may be given with *rhubarb*, or with opium or some other narcotic, as circumstances may suggest. The spirit of *turpentine* was prescribed first by Dr. ADAIR for this form of hæmorrhage, and afterward by Dr. BROOKE, in the same year that it was employed by myself, in a different quarter of the globe. I have since always resorted to it, and in some very hopeless cases. In a very severe case of *melæna*, which I saw in 1823, with Mr. CHURCHILL, this medicine was successfully administered after the most powerful astringents had failed. It has likewise been recommended by Dr. W. NICHOLL and Dr. ELLIOTSON. It exerts either an astringent or a purgative effect chiefly, or both, according to the dose and the mode of exhibiting it (§ 176). It is also very beneficially applied over the abdomen in the form of liniment, or of warm epithem or fomentation.

202. The other means of cure should entirely depend upon the related pathological states, and upon the nature of the malady on which this is contingent. If it occur in the course of *putro-adyamic fever* (§ 570), the means there advised should be employed; if in the progress of *scurvy* or *purpura*, the remedies directed for these diseases, in addition to those now suggested, ought to be prescribed. If intestinal hæmorrhage depend upon structural change of the liver or spleen, the treatment is not materially different from that advised for *hæmatemesis* in similar circumstances; but when the discharge is profuse, astringents must, in the first instance, be decidedly employed. Of these, the oleum terebinthinæ; the acetate of lead with opium, or with acetic acid and morphia; the gallic, citric, or other vegetable acids; the mineral acids and the metallic salts; the chlorides, especially the chloride of lime; creasote, and the most powerful vegetable astringents should be preferred. When nervous symptoms are present, camphor may be conjoined with either of these, or with opium; and when the crases of the blood, as well as the vital cohesion of the tissues, are manifestly impaired, the chlorides, or the muriate of ammonia, or the nitrate or

the chlorate of potash, &c., may be given with such of the astringents as are congruous with them.

203. B. The diet and regimen should be even more rigidly attended to than in hæmatemesis. The former ought to consist chiefly of farinaceous and mucilaginous substances. Fruits and slops are generally prejudicial. Vermicelli, or rice boiled to a pulp, and moistened with beef tea or veal broth, is generally suitable. Perfect quiet of body and mind, and the recumbent position, ought to be maintained. Wine is sometimes necessary, especially in circumstances requiring the use of opium. Lime-water, alone or with milk, alum-whey, lemonade, imperial, or any of the beverages prescribed in the APPENDIX (F. 588, *et seq.*), may be employed as the patient's drink. When blood has entirely disappeared from the stools, attention ought to be carefully directed to the excretions and the digestive functions, and the strength restored by mild and light nourishment, the quantity of which should be gradually increased to a very moderate amount. The causes and pathological states on which this affection depends ought to receive attention, as the removal or mitigation of these is the most sure means of preventing a recurrence of the attack. When convalescence is not retarded by disease of the liver, then wine, with seltzer-water, the preparations of bark, and various tonic astringents may be allowed; but the bowels ought at the same time to be duly regulated. See, also, the *Treatment of Hæmatemesis* (§ 174).

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VIII. HÆMORRHAGE FROM THE URINARY ORGANS.—SVN. *Hæmaturia* (from *aiua*, blood, and *ovpew*, to urinate), Auct. var.; *Sanguis in Urinâ*, Celsus; *Mictus Cruentus*, Sydenham, Hoffman, and Juncker; *Mictus Sanguineus*, *Hæmorrhagia ex Viis Urinariis*, *Hæmorrhœa Viarum Urinariarum*, Swædiah; *Blutharnen*, Germ.; *Pissacret de Sang*, *Hæmaturie*, Fr.; *Orina de Sanguie*, *Ematuria*, Ital.; *Bloody Urine*, *Hæmorrhage from the urinary passages*.

DEFIN.—The urine, containing or consisting of a fluid, grumous, or partially coagulated blood, the

colour varying from red to brown or black, sometimes with small fibrinous coagula, the patient generally complaining of uneasy sensations in the region of the kidneys or bladder.

204. i. The CAUSES of hæmaturia are, *external injuries* on the loins, hypogastrium, or perinaeum; falls, or concussions of the trunk; prolonged or severe exercises on horseback; riding in carriages over a rough or broken pavement; violent muscular exertions; *internal irritants*, as calculi formed in the kidneys or bladder, and acrid substances taken into the stomach, absorbed into the blood, and carried to the kidneys, as turpentine, cantharides, savine, and various other medicines; and whatever inflames, or causes congestion of the urinary organs, as the application of cold, the suppression of accustomed discharges, &c. Hæmaturia may also be produced by the concurrent influence of plethora, venereal excesses, violent fits of passion, &c.; but the most common causes are organic changes implicating the kidneys or bladder; general cachexia, as scurvy and purpura; malignant and exanthematous fevers; and even still more common are calculous formations and the other internal irritants specified above. This disease is most frequent in males, in persons advanced in life, and in the aged; in plethoric habits and sanguineous or irritable temperaments; in the scrofulous and calculous diathesis; in those who pass an indolent and luxurious life, and who are addicted to venereal indulgences, and to the intemperate use of intoxicating liquors.

205. a. *Idiopathic hæmaturia* is extremely rare. CULLEN states that he never met with it. J. P. FRANK rarely saw it. Unless when caused by cantharides or turpentine, it is certainly very seldom observed; and even when thus induced, the hæmorrhage is generally scanty, and the consequence of inflammatory irritation. Indeed, hæmaturia is often merely a symptom of inflammation of either the kidneys or urinary bladder, the quantity of blood effused being small.—*b. Supplemental hæmaturia*, or that which is vicarious of the catamenia or of hæmorrhoids, is equally rare, although its occurrence has been much insisted upon by foreign writers; and it is extremely probable that organic lesion is more or less concerned in the production even of this variety. CHOPPART, however, mentions an instance of hæmaturia consequent upon irregular menstruation, in which the urinary organs presented no change after death.—*c. Critical hæmaturia* is seldom observed, although FORESTUS, ETTMULLER, AMATUS LUSITANUS, MARCELLUS DONATUS, ZACUTUS LUSITANUS, HOFFMANN, JUNCKER, CHOPPARD, LATOUR, &c., insist on its importance during inflammatory fevers, and in plethoric persons. They also consider that, of all critical hæmorrhages, it should be the least interfered with. When hæmaturia is actually critical, it seems to depend upon a similar state of local action and of vascular fulness, general or local, to that which obtains in the more idiopathic and vicarious states of the disease. It is chiefly, therefore, as a *symptom* of previous disease, local or constitutional, or even of both, but especially of urinary calculi, that hæmaturia is met with in practice.

206. ii. The DESCRIPTION of hæmaturia comprises, 1st. The appearances of the urine and

of the blood contained in it; 2d. The symptoms attending this morbid state of urinary excretion, and their relation to the seat of hæmorrhage; and, 3d. The pathological states of which hæmaturia is the consequence.—A. The *urine* may contain much or little blood; or the fluid evacuated from the bladder may be almost entirely blood. Its colour may be either red or brownish red, or nearly black or inky. Sometimes the urine is passed *guttatim* with pain and scalding; and with a constant or frequent recurrence of the desire to empty the bladder, although but little or even no urine is contained in it. At others, the blood and urine are retained in large quantity, efforts at evacuation being ineffectual, owing to coagula obstructing the outlet from the bladder or being lodged in the urethra. Even when the obstacle is removed by a sound or catheter, the urine often presents a bloody, sanguineous, or chocolate appearance for several days, although the hæmorrhage may have ceased, and is sometimes extremely offensive from the decomposition of the clots retained in the bladder, or from the action of the urine upon them. Occasionally this fluid is grumous, very dark, or even black, or contains a number of small brown coagula. In some cases, fibrinous substances of various forms and sizes are evacuated, consisting of the fibrin of the effused blood, moulded or changed by the parts through which they have passed. In others, a stringy or gelatinous substance, with dark coagula, or black, grumous matter, is observed in the urine; and occasionally mucous, muco-puriform, or gravelly matters are also found.

207. B. The *symptoms* of hæmaturia vary with the seat of hæmorrhage.—(a) When the *kidneys* are the parts chiefly affected, the attack is usually preceded or attended by chills or rigours; by coldness of the extremities, and particularly of the hands; by deep-seated pain, or a sense of weight, or of tension, or of heat in the loins; by general lassitude; and often by anxiety, or colicky pains in the abdomen; by frequent desire to pass the urine; sometimes by numbness in one or both thighs, and pain in the course of the ureters, or by nausea or retchings. If cantharides or savine have been taken, a burning heat is felt in the urinary passages, with priapism, scalding, and pain on discharging the urine, &c.—(b) When the *bladder* is the seat of hæmorrhage, a frequent desire, or great difficulty to excrete the urine; tenesmus, or pain or heat about the anus; a sense of tension or of warmth, with itching above or behind the pubes, or of dragging in this situation; pain or acting in the perineum, frequently with febrile symptoms, or nausea, and constipation of the bowels, are complained of. The severity of the local symptoms, as well as the state of constitutional disorder, vary extremely, according to the grades of vital power and of sthenic or asthenic vascular action, and to the organic changes or nature of the local irritation of which the hæmorrhage is a consequence.

208. The above symptoms, especially when they precede the attack, indicate inflammatory irritation or active congestion of the urinary organs. But sometimes the hæmorrhage takes place suddenly, and in great abundance, without any precursory sign. In some cases, also,

the symptoms are very obscure. In most of these, however, it will be found that the blood comes from the kidneys, and that its effusion is caused by calculi in these organs. Even when the blood is discharged from the kidneys, the symptoms may be most severe in the region of the bladder, owing to the irritation and interrupted excretion of the effused blood, or even independently of these circumstances. Indeed, the symptoms have not infrequently been referred to the sound or least affected organ, whether the kidneys or bladder. More commonly, however, they indicate the seat of hæmorrhage with much precision, when duly investigated. Dr. PROUT very justly remarks that, when the blood is equally diffused through the urine, it generally proceeds from the *kidneys*; and that when it mostly comes away in greater or less quantity at the termination only of the urinary discharge, the urine having previously flowed off nearly pure, it is effused from the *bladder*. In the former case, also, coagulated fibrin in the shape of worms, moulded in the ureter, and subsequently washed out by the urine, are not infrequently met with. When these appear, the diagnosis is unequivocal, especially when they are consequent upon the symptoms above referred to the kidneys, or upon other evidence of the existence of calculi in these organs. On the contrary, when there are symptoms of stone in the bladder, or of other disease of this viscus or of the prostate gland, indications of renal disorder not being present, the bladder may be considered the source of hæmorrhage; and this inference may be likewise drawn, if severe pain above or behind the pubes be complained of; if the bladder become suddenly distended; if the passage of urine be interrupted or entirely obstructed; and if other signs of coagula in the bladder be present, although the external discharge may be small. When the blood passes *guttatim*, without urine, it manifestly comes from the *urethra*. It may, however, proceed from the upper parts of the urethra, and flow back into the bladder, and be voided with the urine. Rigours or horripilations not infrequently attend hæmorrhage from this, as well as from other parts of the urinary passages.

209. *Hæmorrhage into the bladder*, from either the kidneys or ureters, or the upper part of the urethra, but more especially from the *parietes of the bladder itself*, may be followed by *coagulation of the blood* in this viscus. This is not unlikely to take place if the effusion be sudden and copious; and whenever it does, the patient experiences great suffering. When the coagulum is large, it often causes retention of urine; and when it is small, it sometimes becomes the nucleus of calculous formations. The principal *indications of the existence of coagula* in the bladder are pain, distention, and weight, with tenderness or tension above and behind the pubes, with a sense of dragging in this situation, and of aching in the perineum, preceded or attended by the excretion of a small quantity of pure or recently effused blood by the urethra, and frequent desire to pass the urine. When this secretion is retained, distention of the bladder, so as to occasion a tumour above the pubes, with tenderness and tension of the hypogastrium, and other distressing symptoms, are also present. If the

urine present, after a scanty discharge of recently effused blood, and more or less of the above symptoms, a brown or chocolate appearance, or deposits a heavy dark sediment, and if frequent efforts to urinate continue, the evidence of coagula in the bladder is still stronger (§ 208).

210. *C. Duration, &c.*—Hæmaturia may continue a few minutes only, or many hours, or even days. It may *renit* or *intermit*, or recur at short or very distant intervals. It may be even *periodic*, the attack returning more or less frequently. Periodic hæmaturia is not uncommon in miasmatic climates, and it is, although rarely, even seen in this country among those who have been exposed to malaria, or have resided long in warm climates, or suffered from periodic fevers. In a case of this kind detailed by Dr. ELLIOTSON, hæmaturia accompanied the cold fit of ague, and was cured, along with the ague, by the sulphate of quinine. Hæmaturia may be also periodic when it is vicarious of the catamenia or of hæmorrhoids. When it depends upon calculi in the urinary organs, its recurrence may be expected until the cause is removed; when it proceeds from malignant or other organic disease of these parts, it is most commonly persistent, recurring, or severe, or even fatal in its consequences.

211. *D. The Pathological states of which hæmaturia is generally a consequenc* have been already noticed, but some of them require more particular mention.—*a.* When the hæmorrhage is consequent upon *inflammatory irritation*, the symptoms referable to either the kidneys or bladder are well marked, and more or less symptomatic, or irritative fever is often present. Fibrinous substances are also generally found in the urine, and the discharge of blood is seldom considerable, and never excessive. Hæmaturia from inflammatory action of the inner coats of the bladder, is stated by M. RENOULT to have been very prevalent among the French troops in Egypt. It was characterized by pain in the region of this viscus, extending to the glans penis, with frequent and urgent desire to pass urine, the last drops often consisting of pure blood, and their discharge being attended by very acute pain.—*b.* Very nearly the same phenomena are observed when the complaint depends upon the irritation of *calculi in the kidneys or bladder*. When these exist in the latter viscus, mucous or mucopuriform matter, or a gelatinous lymph is sometimes found, along with more or less blood, in the urine.—*c.* The irritation of a *calculus in the ureter* may occasion hæmaturia; but the symptoms, as respects either the appearances of the urine, or the seat of uneasiness, may not be different from those already mentioned. In some cases, the pain felt in the situation or course of the ureter; the sense of weight, uneasiness, or pain in the lumbar region of the same side, and the numbness or cramps of the thigh or leg of that side, will indicate the source of disorder.—*d.* The hæmaturia which occurs in the course of typhoid or putro-ady-namic fevers, of scurvy, and of purpura, generally arises from *relaxation of the extreme vessels* of the kidneys, and of the urinary mucous surfaces, in connexion with *alteration of the blood itself*. In these the blood is sometimes effused in considerable quantity; but it is nev-

er coagulated, although it is occasionally grumous. It is more intimately mixed with the urine than in other circumstances, the excreted fluid being generally dark, and either offensive or soon becoming so.—*c.* Hæmaturia may also arise from *malignant disease of the kidneys, bladder, or prostate gland, especially fungoid or encephaloid productions* in these organs. In some cases arising from this cause, the hæmorrhage has been excessive, the urinary bladder being distended by fluid and coagulated blood, especially when the effusion has taken place from this viscus or from the prostate gland. An interesting instance of hæmorrhage into the bladder from fungoid tumours connected with the prostate, where it was necessary to perform the high operation in order to remove large and firm coagula that had formed, is recorded by Mr. COPLAND HUTCHISON (*Lond. Med. Repos.*, vol. xxii., p. 128). In some cases of malignant disease of the urinary organs, the colouring parts of the blood appear as a reddish sediment in the urine.—*f.* *Softening of the kidneys, or the internal tunics of the bladder, may be followed by hæmaturia, without being suspected during the life of the patient; but these lesions are very rare.*—*g.* *Ulceration of the inner coats of the bladder very rarely occurs, unless as a consequence of simple cystitis, or of cystitis associated with calculi in this viscus; or without very manifest symptoms of these diseases. In these cases, the hæmaturia is preceded by such symptoms for a longer or shorter period, and the urine has been loaded by a mucous or muco-puriform matter.*—*h.* *A varicose state of the veins, particularly about the neck of the bladder, has been noticed by several writers as a cause of hæmaturia (*Hæmorrhoides vesicæ*, auct. var.), and by some in connexion with the gouty diathesis; but this change is very seldom observed.*—*i.* *Other organic lesions of the kidneys have been mentioned as causes of hæmaturia; but they can be merely suspected during life, unless they be attended by, or consist of tumours of the organ, and give rise to pain in the loins and numbness of the thigh of the same side, with the appearances of the urine already noticed (§ 208); and even then their nature will seldom be fully ascertained.*

212. iii. DIAGNOSIS.—The urine may present appearances very closely resembling hæmaturia, and yet be perfectly free from blood. The internal use of various vegetable substances, especially the prickly pear (*Cactus opuntia*), beet-root, madder, sorrel, logwood, &c., will give a red colour to the urine that will be distinguished with great difficulty from that produced by blood. The reddish pink hue of the urine in some inflammatory diseases will hardly be confounded with hæmaturia. The dark, black, or inky state of the urine, noticed by several writers, may arise either from the presence of blood, or from the principal elements of bile being excreted by the kidneys with the urine, while the liver is obstructed or incapable of performing its functions, as in jaundice. Cases in which black urine has been voided are recorded by RHODIUS, SCHENCK, SAILLENS, BONET, COWPER, RIEDLIN, BARTHOLIN, LOMMIUS, STOLL, NICOLAI, MARCET, E. THOMPSON, and myself. GALEAZZI met with it complicated with hæmatemesis. BONET, after record-

ing a case in which the urine had the appearance of ink, states that he has observed this in hypochondriasis, where it has occasionally proved critical. In a case treated by me fifteen years ago, a perfectly black sediment was deposited after the urine had stood some time. This condition of the urine may be produced either in the way just stated, or in the manner I have explained when detailing the case just alluded to (*Lond. Med. Repos.*, vol. xviii., p. 161), by supposing the arterial capillaries and secerning apparatus of the kidneys to be relaxed to a degree sufficient to allow red globules of the blood to escape with the excreted urine, the black colour arising from the action of an acid, or of the saline ingredients of the urine on these globules.

213. When blood is present in the urine in any considerable quantity, a portion of it sinks to the bottom of the vessel, and the transparency of the secretion is disturbed. The reddish pink urine without blood is generally clear. A mixture of urine and blood tinges a piece of white rag dipped into it of a red colour. Dr. WATSON observes that, upon boiling urine containing blood, a brown coagulum will be formed, and that the fluid part will retain the natural colour of urine. When the black hue depends upon the presence of bile, it passes to a yellowish or greenish tint upon dilution with water; if it proceeds from blood, a reddish colour becomes apparent, especially if a little sub-carbonate of soda be added.

214. iv. PROGNOSIS.—The prognosis must depend chiefly upon the pathological states producing the hæmaturia. If these consist principally of inflammatory action or irritation, or of active congestion, a severe, although not necessarily a dangerous disease, is indicated. If there be evidence of calculi in the kidneys or bladder, a nearly similar opinion may be formed, but much will depend upon the circumstances of the case and the states of associated disorder, particularly of these organs. If hæmaturia occur in aged persons and broken-down constitutions, or if there be reason to infer the existence of malignant or serious organic change in any part of the urinary passages, the prognosis must be very unfavourable. The amount of hæmorrhage is in itself rarely fatal, although the retention of coagula in the bladder is always dangerous, and often fatal, from the consequences which result, particularly as respects the excretion of urine. When hæmaturia appears in the course of adynamic, continued, or exanthematic fevers, or in purpura, &c., an unfavourable opinion of the result should be entertained.

215. v. TREATMENT.—*a.* When bloody urine proceeds from inflammatory irritation or active congestion, or is supplemental of some other sanguineous discharge, and especially when it is attended by severe pain or symptomatic fever, or increased vascular action, *blood-letting*, and particularly cupping on the loins, or perineum, according to the seat of the chief affection, should be practised. In these, as well as in other circumstances, demulcent diluents, and oleaginous or mild aperients, are more or less beneficial. When acrid substances have caused the complaint, these are especially required; and the almond emulsion, the gums, the decoction of althæa, the infusion of linseed, &c.,

may be abundantly exhibited, either alone or with small doses of camphor, or with paregoric elixir. When the hæmorrhage is induced by calculi, local depletions and demulcents, conjoined with the opiates or other anodynes, or these latter, either with the alkaline carbonates, or with diluted hydrochloric acid, according to the state of the urine, the warm bath, and emollient enemata, will generally be of service.

216. *b.* When hæmaturia presents a passive character—when it is attended by great debility or vascular asthenia, or supervenes in the course of the maladies already mentioned, camphor should be given in considerable doses, with small quantities of opium or acetate of morphia. In such cases, also, the tincture of the sesquichloride of iron, or the balsams or terebinthines, particularly the balsam of Peru, copaiba, the Canadian balsam; or the spirits of turpentine in small doses; or the infusion of *uva ursi*, or of the *diosma crenata* (F. 231), may be employed, and conjoined with opiates or other anodynes, according to circumstances. FRANK advises cold clysters with vinegar, and tonic astringents internally. Dr. PROUT found an obstinate case of profuse hæmaturia yield at last to a combination of colchicum with *uva ursi*. Where sabulous or calculous formations are concerned in the production of the hæmorrhage, or when the hæmaturia occurs in the gouty diathesis, this combination, either alone or with the alkaline carbonates, seems very appropriate. If the urine be alkaline, the decoction of *parcira brava*, with *nitric* or *hydrochloric acid*, will be of service. When the hæmorrhage is so very profuse as to require to be immediately arrested, dry cupping on the loins, the warm bath, or warm pediluvia, spirits of turpentine, given internally and administered in enemata, the acetate of lead with opium, creasote, and the other active astringents already mentioned (§ 40, 178), are the most to be depended upon. Mr. COULSON advises alum, with powdered galls and sulphuric acid, to be taken in the compound infusion of roses.

[As the pathology of hæmaturia differs in different cases, so also must its treatment. In itself, it rarely proves fatal, as the register of the Vienna Hospital shows only a solitary instance out of 13,647 cases of the affection. Often indicative as it is of organic derangement, it excites apprehension rather from its complication than from anything formidable in the discharge itself. When of a vital character, it either spontaneously ceases or is readily checked, and seldom proves seriously detrimental. Where it is symptomatic of an organic cause, our aim is chiefly to be directed to the removal of the original affection. Where there is evidence of local congestion, general bleeding will be indicated, with cups and leeches over the lumbar region; slight purging, and demulcents. Dr. CHAPMAN recommends, in addition to these, an infusion of peach leaves, or of the petals of the red rose, as being more efficacious than any other articles with which he is acquainted. (*Lec. on Hæmorrhages*, &c., Phil., 1845.) Dr. DEWEES also speaks highly of the infusion of the leaves of the red rose (ʒss. to oʒ. water) prepared with boiling water, of which a wine-glassful is to be given every two or three hours. Next to this in point of efficiency, Dr. D. thinks is the *extract of rhatany*, in 2 grain

doses, every two or three hours. Dr. EBERLE extols the muriated tincture of iron, and a combination of ipecacuanha and alum (℞ *Pulv. Alum* ʒj.; *Ipecac.* ʒj. M. Div. in x. pulv.: one every morning, noon, and evening).

Where the hæmorrhage proceeds from the kidneys, diuretics, as the nitrates of potash, and other salines, squills, &c., which are so frequently administered, are highly improper. Instead of exciting the kidneys to increased secretory efforts, our object should rather be to allay any increase of action, which may be done by opiates, bleeding, cool demulcent drinks, &c. Occasionally we find hæmaturia vicarious to hæmorrhoidal or catamenial discharges, and attended with symptoms of inflammatory excitement. Here, after the employment of antiphlogistic measures, our efforts should be directed to bring back the original discharge; as a general rule, however, so far as we have observed, the affection is usually accompanied by some cachexia, or disease of which debility is a leading feature, as typhus fever, chronic gout, and affections of the liver and spleen, produced by malaria. In such cases, the mineral acids, with quinine, galls, tannin, the *tinct. ferri muriati*, alum, and other remedies of this class, will prove the most efficient. If these should not succeed, we may then resort to those of a more powerful character, as arsenic, zinc, or lead. Dr. PROUT recommends the acetate of lead, as more efficacious than any other articles of this class. Dr. CHAPMAN recommends the turpentine, and blistering over the lumbar region, the blister, however, being allowed to remain on only long enough to produce simple rubescence of the skin, as strangury would not fail to aggravate the disease. In the southern parts of our country, where the affection so often occurs in connexion with derangements of the liver and spleen, it will often be found useful to apply leeches over these organs, which will enable us to administer tonic and astringent remedies with greater confidence and freedom. Where renal hæmaturia is connected with the gouty diathesis, colchicum will prove useful in conjunction with the appropriate styptic remedies. The carbonate of soda is recommended by Dr. PROUT, after meals, in these cases, and the mineral acids at other times of the day. The balsamic and terebinthinate remedies, he states, have hitherto disappointed his expectations. As prophylactic measures, we have found pure air, moderate exercise, a mild vegetable diet, with the infusion of *parcira brava*, accomplish everything that could be expected in such cases.]

217. *c.* If *coagula* form in the bladder, the serious consequences they usually induce should be prevented as much as possible, by breaking them down by means of a catheter; and by injections of tepid water, or other emollient fluids, containing a small quantity of the carbonate of soda, or of potash. This practice has been advised by DESAULT, J. P. FRANK, HOME, LARREY, HOWSHIP, and others; and should not be delayed, or partially or negligently adopted.

[In these cases, a large-eyed catheter and an exhausting syringe should be employed, by the aid of which and the occasional injection of water, either cold or tepid, the coagula may be broken down, and removed. If the hæmor-

rhage be so profuse that the bladder becomes again distended with blood in a very short time, the injection of cold water into the rectum or bladder will be useful; and should this not succeed, from 20 to 40 grains of *alum* may be dissolved in each pint of water injected, a remedy recommended by Dr. Prout as seldom failing to check the bleeding, even where the cause is malignant disease. "I have never known," says this able writer, "any unpleasant consequences follow the use of this expedient, and have seen it immediately arrest the most formidable hæmorrhage when all other means had failed, and when the bladder had repeatedly become again distended with blood, and almost immediately after its removal."—(*On Stomach and Renal Diseases, &c.*, Amer. edit., Phil., 1843, p. 320.)]

218. d. There have been *some other means* recommended by writers on the disease, but few of them are deserving of notice. CÆLIUS AURELIANUS advised blood-letting, the injection of astringent fluids into the bladder, and the application of cold epithems to the pubes; but considered diuretics to be injurious. SYDENHAM recommended depletion, and astringents with narcotics; BUCHARE and LOEFFLER, frequent doses of ipecacuanha; GOOCH, large doses of opium; MOYLE, SCHOENFELD, and others, the terebinthines; BISHOP, the decoction of the leaves of the Persian almond; and J. P. FABER, the application of lead or of its preparations over the region of the kidneys.

219. e. The *regimen* during and after hæmaturia should be directed in conformity with the seat of the disease, and with the principles already developed. The *diet* should be chiefly farinaceous and mucilaginous, and the beverages emollient and slightly astringent. The waters of Bath, or those of Ems and Carlsbad, or of Selters and Geilnan, or the factitious waters prepared at Brighton may be tried. When the bowels require assistance, oleaginous purgatives, especially castor and olive oil, are, upon the whole, the most appropriate, and may be freely administered in enemata. The patient should avoid riding on horseback or in a carriage; but, if the latter cannot be dispensed with, an air cushion should be used.

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[AM. BIBLIOG. AND REFER.—See Bib. of "Ars. Hæmorrhage" and "Hæmorrhage from the Lungs."]

IX. HÆMORRHAGE FROM THE UTERUS.—SYN.

Sanguinis Stillicidium ab Utero, *Ballonius*. *Hæmorrhagia Uterina*, *Juncker*, *Good*. *Hæm. Uteri*, *Hoffmann*. *Menorrhagia*, *Sauvages*, *Vogel*, *Cullen*, &c. *Fluor Uterini Sanguinis*, *Boerhaave*. *Hysterorrhagia sanguinea*, *Swedidaur*. *Metrorrhagia*, *Sagar*, *Ploucquet*, *J. P. Frank*. *Metro-hæmorrhagia*, *Auctor*. *Blutgang*, *Mutterblutfluss*, *Gebärmutterblutfluss*, *Gerin*. *Perte de Sang des Femmes*, *Perte Rouge*, *Perte Uterine*, *Fr.* *Perdita di Sangue*, *Ital.* *Uterine Hæmorrhage*, *Flooding*.

220. DEFIN.—Discharge of blood from the vessels of the Uterus, independent of the menstrual evacuation.

221. From this definition it will appear that *Menorrhagia*, or excessive menstruation, should not be confounded with *Metro-hæmorrhagia*, or uterine hæmorrhage. But it should not be overlooked that the former often passes into the latter. *Menorrhagia* is treated in the article MENSTRUATION: hæmorrhage from the uterus only legitimately falls under consideration at this place. *Metrorrhagia* (from *μήτρα*, the womb, and *ῥήγνυμαι*, I break forth) has been very generally employed to denote this disease; but it is evident that *αἷμα* should be interposed, in order to convey the idea attached to this term, and that the name *Metro-hæmorrhagia* should be preferred.* The division of this subject, adopted by M. DUCES and some others, although considered unnecessary by M. DESORMEAUX, may be here followed with advantage. I shall, therefore, consider uterine hæmorrhage as it occurs, 1st. Before puberty; 2d. During nubility, or before the cessation of the menses; 3d. At the critical period of life, and during old age; and, 4th. In connexion with the puerperal states, or during pregnancy, and after delivery.

222. i. Hæmorrhage may take place from the uterus, or in a slight degree from the vulva,

* [It were well if the term *hypermenorrhœa* were employed to express the excessive discharge of blood at the menstrual period, and *metrorrhagia* to designate that which appears at any other epoch than that of menstruation.]

at any period *previously to puberty*; but this very rarely occurs, unless as a consequence of masturbation, or of premature sexual connexion, or of genital excitement. The destructive vice, masturbation, exists much more frequently among young females, and is acquired at an earlier age, than is generally supposed even by medical men, children of the age even of two or three years sometimes acquiring it from nurse-maids or from older children. Two or three instances of this have accidentally come to my knowledge. Both at the infirmary for children and in private practice cases of hæmorrhage from the female genitals occurring at irregular periods previously to puberty have come before me, as well as instances of premature menstruation, the discharge recurring after monthly intervals; and, in every case, a strict investigation has led to the inference as to the cause already stated. Precocious menstruation is much more rare than uterine hæmorrhage before puberty; the latter may be distinguished from the former by the attendant injury to the general health, and loss of the healthy look and complexion: whereas, the former is accompanied by a more rapid growth of the frame, and by other signs of puberty, as the development of the mamæ, &c.

[Juridical medicine contains in its records occasional instances of hæmorrhages from the vulva long before the period of puberty. Dr. FRANCIS has seen three cases, in one of which this sanguineous discharge occurred prior to the completion of the fifth year, and two before the tenth year of age. In one of these the signs of puberty were preternaturally conspicuous.]

223. ii. From the 12th to the 16th year, in our climate, the female sexual organs are developed so far as to give rise to the menstrual discharge. But the occurrence of this discharge at or for some time after the earlier of these years is not an indication of these organs being capable of performing all their functions, inasmuch as impregnation is rarely effected before fourteen years of age. *Metro-hæmorrhagia occurring after puberty*, independently of the puerperal states, or menorrhagia proceeding so far as to amount to a true hæmorrhage, is liable to recurrence, at irregular or regular periods. When the hæmorrhage is slight, and returns at the monthly periods, the observations offered when treating of *excessive MENSTRUATION* are altogether applicable. But when it is very large, or of frequent or of habitual recurrence, it is most exhausting and injurious to the system, although it may be entirely independent of any structural lesion. A female may experience only one attack, arising from excessive determination of blood to the uterus, caused by various exciting causes; and, even when the attacks recur, they will be much influenced by diet and regimen. Whenever they return, whether at monthly, at irregular, or at short intervals, or whether the discharge be continued or remittent, especially if the female have been or is married, or has had children, some morbid structure in the uterus should be dreaded, and a careful examination made *per vaginam*. Uterine hæmorrhage at this epoch, unconnected with impregnation and the puerperal states, is either, 1st. *Sthenic* or *active*—depending upon determination of blood to, or

upon inflammatory irritation of the uterus; or, 2d. *Asthenic* or *passive*, arising from impaired tone of the uterine vessels and parietes; or, 3d. *Symptomatic* of organic lesion. But before the phenomena ushering in or attending these states of the disease are described, the causes which induce them may be detailed.*

224. A. *Causes*.—The *predisposing causes* which are more especially concerned in the production of this form of uterine hæmorrhage are the epochs at which the menses first appear, and at which they altogether cease; the menstrual periods themselves; general or local plethora; excessive sensibility of the uterus, arising either from original conformation, or from inordinate sexual excitement, or masturbation; frequent or difficult child-bearing, or abortions, especially if they have succeeded each other rapidly; constriction of the abdomen by tight corsets (MAURICEAU, RANOE); too much warmth applied to the lower parts of the trunk and thighs; very hot seasons; the habitual use of exciting liquors, of rich and high-seasoned dishes; and a frequent recourse to warm baths. These predispose chiefly to the more *active* states of uterine hæmorrhage, but the following favour the occurrence of the more *passive* forms; especially weakness of constitution, general debility, and cachexia; the lymphatic temperament; imperfect or unwholesome nourishment; chronic or excessive discharges, particularly prolonged lactation; the depressing passions, as grief, sadness, anxiety, &c.; the abuse of relaxing beverages; [an indolent mode of life; the use of foot-stoves; the abuse of emmenagogues, of acrid purgatives, and the warm bath, &c.]

225. b. The *exciting causes* are, stimulation of the vascular system generally, or of the uterine organs in particular, by the use of hot baths, of intoxicating liquors, of acrid purgatives, or of emmenagogues, and by excessive sexual indulgence; riding on horseback, or in an uneasy carriage; prolonged dancing; running, or walking too far; lifting heavy weights and physical exertions of any kind; shocks or concussions of the trunk; falls on the thighs or hips; excitation or irritation of the sexual organs, by injections, pessaries, or suppositories; the more violent mental emotions, as anger, fright, &c. SENNERT refers to a case in which it was induced by a stimulating pessary; and obstruction or retardation of the menses may be the cause of hæmorrhage, independently of any means being used to remove this obstruction, as shown by DESORMEAUX and LOCK. It is, also, not unusual for metro-hæmorrhagia to occur within the first fortnight after marriage, especially when this rite has been performed shortly before the period of female indisposition. It has been supposed that sexual congress during this period is apt to induce an attack of this disease. Certain causes, also, may occasion it, by affecting related organs, and thereby acting sympathetically upon the uterus. VAN-DEN-BOSCH adduces

* [M. COLONBAT makes three divisions, 1. *Essential*, 2. *Sympathetic*, 3. *Symptomatic Hemorrhages*; the first two classes including all discharges of blood that take place without wound, erosion, or appreciable rupture of tissue, and the latter those which constitute secondary phenomena or accidental complications of some more serious disease.—(A Treatise on the Diseases and Special Hygiene of Females, translated by C. D. MEIGS, M.D., Phil., 1845, p. 466.)]

instances of it having been produced by worms in the intestines. I have seen it favoured, if not excited, by ascarides. STOLL and FINCKE observed uterine hæmorrhages unusually prevalent during the bilious inflammatory fever of 1778. GENDRON, CONRAD, STRACK, and HOPFNER remarked it occasionally to attend gastric and bilious diseases; and ZIEGERT conceived that it is not infrequently induced by irritating matters lodged in the bowels. The irritation of the mammae during suckling causes it in some females. A passive and severe form of the disease has been observed to attend upon epidemics of an adynamic or malignant character; and upon scurvy, and some other cachectic maladies.

226. But however influential and numerous may be the occasional causes of metro-hæmorrhagia, they do not so frequently produce it as *morbid formations in the uterus*, particularly fibrous and other tumours seated in the parietes of the organ, or under the internal lining, polypous productions, hydatids, moles, ulcerations, carcinoma, &c. It may also attend inversion, prolapsus, or other displacements of the womb, or may accompany inflammatory congestion of this viscus, or chronic metritis; and it may even prove a critical evacuation in these affections. [It may also be the result of scorbutic, eruptive, typhoid, and pestilential diseases, and of malignant intermittents.]

227. *B. Symptoms and Progress.*—These vary with the causes of the hæmorrhage. If the occasional cause be violent, it sometimes follows instantly upon the action of such cause; but more commonly a certain interval elapses, during which indications of congestion of the uterine vessels may be observed. In some such cases the attack is so severe as to place the patient's life in jeopardy, particularly if it have occurred during the menstrual period. This form, which may be called accidental uterine hæmorrhage, does not ordinarily occur; but that, on the contrary, which follows the operation of the predisposing causes is slowly established, and often by a successive increase or duration, or by the more frequent return of the menstrual discharge.

228. The precursory symptoms of an attack sometimes consist only of uneasiness, or colicky pains, as on the accession of the menses; but more frequently the discharge is preceded by some of the following signs: by enlargement, tenderness, or pain of the breasts; tension at the hypochondria; a sense of fulness, weight, heat, throbbing, or pain in the hypogastric and inguinal regions; constipation, or tenesmus, with occasional abdominal pains; general lassitude, and a frequent, soft, or open pulse. To these succeed pallor of the face, coldness of the extremities, horripilations, the *cutis asserina*, and heat or pruritus of the genitals, followed by the sanguineous discharge, which removes most of the foregoing ailments; but, when the loss of blood has become great for her strength, the patient complains of a sense of sinking or weakness at the epigastrium; and when it is excessive, the lips and face are pallid, the pulse fails, and the eyes grow dim; noises are heard in the ears, and deafness supervenes; respiration becomes quick, laborious, or irregular, and faintness, full syncope, convulsions, or even death may take

place. But the symptoms do not always follow this course. In some cases the discharge is less rapid or excessive; coagula form in the vagina, and these restrain the hæmorrhage, and are afterward expelled by voluntary efforts before the severer symptoms occur. In delicate or nervous females convulsions or other nervous symptoms may appear early or before much blood is lost. Violent headache, especially towards the occiput, is a very common attendant, and generally continues long after the hæmorrhage has ceased. If the discharge, without being excessive and rapid, recurs frequently, or is moderate but continued, or merely remits, the patient complains of pain and sinking at the stomach, of extreme languor and exhaustion; the pallor is extreme, the eyes are surrounded by a livid circle; the ankles become œdematous, especially towards night; various nervous symptoms appear, and serous effusions into the shut cavities occasionally occur. Metro-hæmorrhagia may appear at first in a sthenic or acute form, and become passive or asthenic from its continuance or recurrence, the effused blood being frequently thin, pale, or dark. It may continue long, or return often without giving rise to any severe ailment, or merely to some of the foregoing symptoms in a slight degree. When it occurs at the menstrual period, it is often replaced by a leucorrhœal discharge.

229. *C. Diagnosis.*—The disease is so manifest as to the extent of the sanguineous discharge, and the effects thereby produced upon the system, that its diagnosis is a matter of no difficulty. But it is not so easy to distinguish between the causes which produce it and the states of the economy which are induced by it. Yet this distinction, as M. DESORMEAUX contends, should be made, as it directs to a judicious method of cure, and it will generally be made without great difficulty if the attention of the practitioner be directed to the subject, and if the various circumstances causing the attack, and the several phenomena attending it be passed in review. As to uterine hæmorrhages dependant upon organic lesions of the uterus, it may be remarked that most frequently they are not passive, even when they proceed from ulceration; but that they are generally preceded by circumstances indicating sanguineous congestion, active determination, or an hæmorrhagic effort.

230. iii. *Uterine hæmorrhage, about the period of the cessation of the catamenia or subsequently to this period,* is not infrequent. Menstruation then often assumes an irregular form, disappearing for months, and returning in a profuse or truly hæmorrhagic form. Generally this circumstance is unattended by material risk. But if the discharge be very great, or occurs often, or if it appears after the age of fifty or after the catamenia have ceased for many months, or for two or three years or more, there is sufficient cause for alarm, and serious disease of the uterus should be suspected. Such returns of youth, with which aged females sometimes console themselves, are rarely unattended by some one of the structural changes already enumerated (§ 226). I was consulted, however, long ago in a case of a female above sixty, and otherwise in good health, who had returns of uterine hæmorrhage-

at nearly monthly intervals. No disease was detected upon examination, and she is now alive and well, and in her 74th year. I was very recently called to a lady 47 years of age who had been subject to frequent returns of uterine hæmorrhage during two years, and who was labouring under a dysenteric attack when I saw her. This latter was soon subdued, when the hæmorrhage and the cause of it became objects of attention. An examination was made, and a hard fibrous tumour was found in the os uteri. It was soon afterward thrown off; but the hæmorrhage returned and symptomatic irritative fever continued. An examination was made some days afterward, and another tumour was found passing into the vagina. This, which was distinct from the former in structure and form, came away soon afterward, and the recovery was progressive and complete. In this case the tumours were most probably developed beneath the internal lining of the uterus, and thrown off in the course of the treatment which was adopted for the arrest of the hæmorrhage.

231. The *symptoms* of uterine hæmorrhage at this advanced epoch of life are not different from those already described (§ 227); but they are more generally caused by organic lesions of the womb than uterine hæmorrhage at the preceding epoch, and complicated with the symptoms which more particularly appertain to the associated lesion. Indeed, this constitutes the chief malady, the hæmorrhage being only the contingent, but often the more immediately dangerous or most alarming occurrence. The consideration, however, of these associated lesions cannot be entered upon at this place. It is fully entertained in the article upon *diseases of the UTERUS*.

232. IV. OF PUERPERAL UTERINE HÆMORRHAGE.—Under this head is comprised hæmorrhage during pregnancy or parturition, and after delivery. The changes that then take place in the uterus, and particularly soon after parturition, sufficiently account for the frequency of metro-hæmorrhagia at these periods. During pregnancy there is an actual increase of the vitality as well as of the bulk of the uterus: a state of orgasm of which vital activity and vascular determination are the chief elements. Hence the active nature of the hæmorrhages that take place from it at this epoch. Besides, this viscus contains an organized and living body, presenting intimate relations with it, and opposing certain of the circumstances which favour sanguineous effusions from it. The vascular connexion between the uterus and placenta becoming more developed as pregnancy advances, it follows that the detachment of a portion or the whole of the placenta or ovum will give rise to a more profuse hæmorrhage in the advanced than in the earlier months of this period; but as soon as the uterus has thrown off its contents, and in proportion as the uterus contracts, the disposition to effusion will become less, until it altogether ceases. Hæmorrhage during pregnancy or after delivery may proceed either from the numerous minute decidual vessels which connect the ovum to the internal surface of the uterus, and are necessarily torn when the ovum is either partially or altogether separated, or from the semilunar openings seen in the inner surface

of the uterus when the placenta is removed, or from both sources. The opinions of pathologists are divided on this subject; but as long as the exact offices of these openings are undetermined, no precise inference can be arrived at as to this question.* However it may be settled, the treatment to be adopted is unaffected by it, inasmuch as the fact is unquestioned that it is to the partial or entire detachment of the placenta from the uterus that uterine hæmorrhage, at an advanced period of pregnancy, is generally to be attributed.

233. Previously to the consideration of true puerperal uterine hæmorrhage, the disputed topic as to the *source of the loss of blood*, occasionally observed in the earlier months of pregnancy, may be briefly referred to. This species of discharge has been considered as a true menstrual evacuation from that part of the uterus to which the ovum has not become particularly attached by means of the placenta, and that it escapes through the imperfectly closed *os uteri*, owing to the softness of the mucous or albuminous secretion which fills it. But if this were the case, we may reasonably infer that it would also occur in many instances in which the os uteri presents a complete obstacle to its exit, and in which it would accumulate and assume the form of internal hæmorrhage. Having met with two or three instances in which I was enabled to inquire into the phenomena attending this kind of discharge, I am of opinion that it proceeds from the cervix and os uteri, external to the limits to which the deciduous membrane extends; and that it depends upon the active vascular determination of which the uterus is the seat during the early months of pregnancy. In some cases this discharge takes place only once, about the usual monthly period; in others, oftener; it is generally slight, and of short duration; seldom considerable. It often passes into a somewhat profuse leucorrhœa; and this circumstance indicates that it proceeds from the same seat, and depends upon a nearly similar state of vascular action as that secretion.

234. *Puerperal uterine hæmorrhage* is somewhat different as to its causes, prognosis, and indications of cure in the different periods in which it occurs: 1st. It may appear *before the sixth month of pregnancy*, and it is then generally active, or dependant upon vascular determination, or a *molimen hæmorrhagicum*; it is sometimes mechanical, or owing to a local injury or violence, which has occasioned the partial or general separation of the attachments of the fœtus, and connected with *abortion*, the risk of which it announces. 2d *During the three or four last months of pregnancy* it may, in some cases, be connected with the same causes or changes; but it more frequent-

* [DR. ROBERT LEE maintains that, although the partial detachment of the membranes from the vicinity of the cervix may occasion a slight oozing of blood from the rupture of some small deciduous arteries and veins, yet the quantity proceeding from this source can never be great, or amount to what is usually called a flooding; that it is from the great semilunar, valvular-like, venous openings in the lining membrane of the uterus, and of the arteries laid open by the separation of the placenta, that the blood alone flows in uterine hæmorrhage; that all the different causes of flooding, as blows, falls, shocks of various kinds, mental and physical, produce their effect by separating and exposing the arteries and veins by which the circulation of the maternal blood is carried on in the placenta.—(*Lectures on the Theory and Practice of Midwifery*, Phil., 1844.)]

ly depends upon the attachment of the placenta upon, or very near to the mouth of the womb. 3d. It is chiefly to this cause, and to some others about to be noticed, that hæmorrhage takes place *during parturition*; and, 4th. It is generally to imperfect contraction of the uterus that its occurrence *after delivery* is to be attributed.

235. Besides these divisions, there is another to which some attention should be directed: this is into *internal* and *external* uterine hæmorrhage. The former often takes place after delivery at the full time, and after abortions; but its occurrence during pregnancy, and while the fœtus and its envelopes fill the uterus, has been disputed. M. DESORMEAUX observes that, in internal hæmorrhage during pregnancy, the blood is effused either between the uterus and membranes, or within the membranes. When seated between the ovum and uterus it depends upon the same causes as external hæmorrhage, but certain circumstances have opposed the discharge of the blood. ALBINUS found the placenta detached, and a large quantity of coagulated blood interposed between it and the uterus, its circumference being firmly adherent, and preventing the escape of the blood. BAUDELLOCQUE and DESORMEAUX believe that, in rare instances, the external discharge may be prevented by the head of the fœtus pressing upon the neck of the uterus, or by a clot of blood plugging up the os uteri. Hæmorrhage occurring within the membranes is, strictly speaking, *fœtal*; as the blood in such cases comes from the vessels of the fœtus, and generally from a rupture of the umbilical vessels. These forms of internal hæmorrhage (during pregnancy) have been denied by M. DUCES and some others. But the facts adduced by ALBINUS, DE LA MOTTE, LEVERT, and BAUDELLOCQUE indicate that it actually occurs but in rare instances. M. DESORMEAUX even enumerates the symptoms by which its existence may be recognised. He states that it may be inferred from the presence of the usual symptoms of hæmorrhage, without the external discharge; by a sense of weight and of painful tension in the region of the uterus; and by the sensible augmentation of the volume of this organ, generally in an unequal or lobulated form, owing to the effusion occurring exteriorly to the membranes, and being confined to one part. It is obvious, however, that these indications cannot be fully depended upon.

236. *A. Uterine hæmorrhage previous to the sixth month of pregnancy* arises in the manner already stated, from the causes enumerated above (§ 224), or from means resorted to in order to procure abortion, or from some of the other causes adduced in the article ABORTION. At this period a certain interval elapses between the action of the cause and the commencement of the discharge, during which symptoms indicating sanguineous congestion of, or determination to the uterus are manifested; and when a suitable treatment is then adopted, these symptoms disappear, and hæmorrhage is prevented. The causes of hæmorrhage, during this part of pregnancy, are never more influential than at the usual periods at which the catamenia would have returned if the patient had not been pregnant; and it is

during these months that general or local plethora and mental emotions, causes so frequently concerned in the production of uterine hæmorrhage, seem to be most injurious.

237. *B.—a. Hæmorrhage at, or subsequently to the sixth month* is generally owing to the attachment of the placenta on the neck of the uterus, and commonly appears without any obvious remote or exciting cause. It is generally moderate at first, and either subsides spontaneously or after treatment. But it soon returns as before, is more abundant, continues longer, and does not yield so soon to treatment. Hæmorrhage from this attachment of the placenta generally goes on increasing until the child is destroyed, or delivery is effected. Yet it occasionally commences with great violence, and instantly threatens the life of the female. Sometimes it does not occur until near the natural period of delivery; or it appears much earlier, and returns not until then. M. DUCES considers that, when the placenta is attached only partially over the neck of the uterus, or laterally, the dilatation of the neck will occasion only a slight or very partial detachment of it, and a moderate hæmorrhage, admitting of being permanently arrested; but that, when it passes over a great portion of the *cervix* and *os uteri*, the discharge, although moderate at first, will return with greater violence and frequency, and will at last continue until the uterus is emptied, or until the mother and child perish. And, where the life of the female is preserved, the great loss of blood leaves her in a state of anæmia and exhaustion, attended with severe headaches, sleeplessness, or palpitations, and other sympathetic affections.

238. The period of utero-gestation at which this variety of hæmorrhage takes place coincides with that at which the relation of the placenta with the cervix and os uteri, to which it is attached, is disturbed, and which is usually from the sixth to the eighth month. But it may occur early in the fifth, or in the course of the ninth. The discharge appears without any obvious cause; but it sometimes is hastened by some effort or physical shock, and is even occasionally attended by a sensation leading the patient to infer that something had given way in the uterine region. During labour-pains the discharge of blood is always increased, while it is diminished by the contraction of the uterus in other cases; and, as parturition proceeds, the placenta occasionally passes before the fœtus, which generally dies if this process is not speedily completed. Upon examining the os uteri in this form of hæmorrhage, it is found thicker and softer than usual, and its orifice is occupied, either partially or altogether, by a soft, spongy body, which must not be mistaken for a coagulum of blood. If a coagulum be detected in this situation, it ought not to be disturbed, lest the hæmorrhage be renewed.

239. *b.* But hæmorrhage from the uterus may occur in the latter months of pregnancy, although the *placenta is implanted on the upper part of the uterus*. This, however, is comparatively rare. The blood may be effused in small quantity, and may be chiefly internal. When it is in considerable quantity, and the placenta is separated to some extent, uterine contractions are exerted, terminating in delivery, or in a renewal of the hæmorrhage, from which

the patient may expire. This form of hæmorrhage may occur without any premonitory sign; but it is more frequently preceded by a sense of uneasiness or weight, or of pain in the region of the uterus, and other signs of congestion or of active determination. It is most frequently caused by external injury, fright, and concussions of the trunk.

240. *C. During delivery*, a small or moderate quantity of blood is lost, but is rarely pure, being always accompanied with water and mucus. When true hæmorrhage occurs, it is generally owing to the detachment of the placenta by the unequal contractions of the uterus, or to the situation of the placenta near or upon the *os uteri*. In rarer cases, it proceeds from rupture of the parietes of the womb, or from rupture of the umbilical cord. In cases of plurality of children, hæmorrhage may supervene in the intervals between the delivery of each. It is then chiefly owing to effusion from the part of the uterus where the placenta of the first child is inserted, owing to a partial or complete detachment of it. When flooding occurs in the first stage of labour, the discharge always ceases when the uterus contracts, and returns during the intervals between the pains.

241. *D. Hæmorrhage after Delivery*.—This may occur previously to the expulsion of the placenta or subsequently.—*a*. When it takes place *before the placenta is thrown off*, it is usually owing to one or other of the following circumstances, or, at least, it is met with in connexion with them: 1st. To torpor of the organ; 2d. To a partial detachment of one part of the placenta and undue adhesion of another; 3d. To irregular or spasmodic contraction of the womb. It scarcely ever proceeds from the cord, unless in cases of twins, when it may possibly take place. But it may arise from laceration of the uterus or vagina.—*b*. *After the expulsion of the placenta*, flooding generally proceeds from imperfect contraction or torpor of the womb. It may, however, be connected with inversion, or with retention of a portion of the placenta or of the membranes, in the cavity or mouth of the organ; and in a few cases it appears to depend upon active determination of blood to the uterine vessels, as insisted upon by Gooch, after some Continental writers. These states of the uterus, especially flaccidity, may be readily inferred from a careful examination and observation of the symptoms. Whether the hæmorrhage takes place before or after the expulsion of the placenta, it may be either *internal* or *external*.

242. *c. Internal uterine hæmorrhage*, after delivery, may thus take place before the expulsion of the placenta or afterward, or it may be favoured by the retention of the placenta or of the membranes, or of both, partly in the neck and mouth of the womb, and partly in the vagina. That this form of hæmorrhage should be early detected and remedied, is of the utmost importance. The uterus upon external examination will be found soft, roundish, and increasing in bulk, so as often to approach, or even to pass the umbilicus. It may even ultimately attain the dimensions it had just possessed, and be followed by the death of the female or by a prolonged and difficult recovery. Whenever pallor of the countenance and lips, vertigo or swimings, noises in the ears, a

sense of sinking, nausea, or retching; a very rapid and irregular pulse, a quick, anxious, or gasping respiration; restlessness, jactitation, &c., supervene, while the lochia are not more than usually abundant or are diminished, internal hæmorrhage to a most dangerous extent may be inferred, and a careful examination of the abdomen ought to be made. In order to ascertain the cause of the retention of the effused blood, the expulsion of all the placenta and membranes should be proved, as well as the presence or absence of a portion of these, or of coagula, in the *os uteri* and vagina. At the same time, distention of the uterus by effused blood must not be confounded with the existence of another child in the womb, or with meteorismus, or with a distended urinary bladder, either of which cannot be mistaken if attention be directed to it, and to the existence of the symptoms just enumerated.

243. *d. External flooding* after delivery of both the fetus and placenta is not to be mistaken, if due attention be paid the patient; for the blood may collect and coagulate in the centre of the bed in the depression produced by her weight, and be overlooked, if she be exhausted and carelessly attended. This variety of hæmorrhage occurs in every degree of severity, and is either gradual, draining, and continued, or rapid, violent, alarming, and even speedily fatal; or remittent, intermittent, &c. It is accompanied with all the symptoms already noticed in connexion with this (§ 228), and other severe forms of hæmorrhage, and is followed by most of the phenomena caused by extreme losses of blood, as described in that article (§ 53, *et seq.*). While *internal* or *concealed* hæmorrhage is almost uniformly dependant upon a total want of uterine action, the *external* form arises either from that state, or from imperfect, irregular, or transient contractions, and from either of these states in connexion with vascular determination to the womb. When slight, continued, or draining, it may be kept up by the retention of a portion of the placenta or membranes, or of fibrinous coagula, in the uterus. It is important to keep in recollection these pathological states, as upon them the appropriate use of remedies entirely depends.

244. *ii. Prognosis*.—The circumstances which indicate a favourable or unfavourable result in other hæmorrhages also apply to the different forms of uterine hæmorrhage. But the condition of the uterus, in both the unimpregnated and puerperal states, and the period of gestation, with various other related circumstances, must be considered in reference to particular cases. *A. In uterine hæmorrhage occurring independently of the puerperal states*, the prognosis should entirely depend upon the nature of the causes, the states of the uterus, the severity of the symptoms, the duration of the disease, and the strength of the patient. When it is induced by occasional causes of a passing or accidental nature, danger will arise only from the quantity of the discharge. If it proceed from causes which have modified the constitution, and endowed it with a tendency to hæmorrhage, or occasioned an habitual discharge, the treatment will generally prove difficult or unsatisfactory. That variety which occurs in girls at the periods of puberty ceases

spontaneously as the menses become regular ; and that which takes place at the critical age of woman also disappears with the monthly indispositions, if the womb be free from organic changes. When it proceeds from these changes, the prognosis should be guarded, even when circumstances admit of it not being unfavourable. In these cases, danger may arise from the hæmorrhage, as well as from the nature of the lesion of the uterus ; but more frequently this latter is the chief source of risk, unless where the morbid formation admits of removal, as in the case of *polypus uteri*. (See art. UTERUS.)

245. *B. Uterine hæmorrhage during the puerperal states* is often one of the most alarming and speedily fatal of the maladies peculiar to females. According to Puzos, it is rarely fatal before the fifth month of gestation. Experience has shown the justice of the remark ; yet I have seen life in imminent peril at this early period. Flooding is the more dangerous the nearer it occurs to the natural period of delivery, whether previously or subsequently to this process. As respects the fetus, however, the chances of its preservation diminish with the length of the time to the period of birth. Hæmorrhage from insertion of the placenta on the neck or mouth of the womb is always attended by danger, varying with the violence of the discharge, and requires the speedy acceleration of parturition to save either the mother or child. *Internal* is much more unfavourable than *external* hæmorrhage. The latter, when slight, is often its own cure, by removing plethora or vascular determination. But the former has frequently proceeded to a dangerous or even fatal extent before the medical attendant is made aware of its accession. Moreover, in order to arrest it, the uterus must be emptied of its contents ; and this often increases the exhaustion, or causes a farther loss of blood. In either internal or external hæmorrhage, when the pulse becomes very frequent (above 120), small, thready, or irregular ; the breathing suspirious or gasping ; the motions convulsive, with shudderings, or jactitation ; or the sinking and anxiety distressing ; and if full syncope supervene, notwithstanding the supine posture and low position of the head, great danger exists, and the patient may either suddenly expire, or recover slowly and with great difficulty.

246. *iii. TREATMENT.*—*A. Hæmorrhage from the uterus previously to puberty* seldom requires more than moral treatment.—*B. When it occurs at or after puberty, independently of the puerperal states*, 1st. The occasional causes should be avoided ; 2d. Means appropriate to the pathological states producing it ought to be used for its arrest chiefly when it is excessive ; and, 3d. Measures should be directed to prevent its return when the nature of the case indicates that a return is probable. The fulfilment of the first intention will often accomplish the third, and will generally promote more or less the success of the second.—*a.* In a great majority of instances, the hæmorrhage is the result of active determination or of congestion ; and it is often connected with a chronic or slight grade of inflammatory action. In these circumstances, the discharge ought not to be arrested by astringents or tonics ; for I have

seen this kind of interference convert a slight and salutary hæmorrhage into a severe or chronic inflammation. Yet it is not always judicious to allow the discharge to continue, inasmuch as the uterus might thereby contract a disposition to hæmorrhage, or to some other disease. It will be better to attack at once the pathological conditions—general or local plethora, or local vascular excitement—upon which the disease depends, by general or local depletions, by internal refrigerants, by a strictly antiphlogistic diet and regimen, and by repose of mind and body. The patient should be placed in a cool and airy apartment, and preserve the horizontal posture on a bed or couch, which is neither too soft nor too warm. The nitrate of potash, vegetable acids, and acidulous fruits should be given from time to time ; and the circulation may be equalized by cooling diaphoretics, as ipecacuanha, hyoscyamus, and nitre, with small doses of camphor. Ipecacuanha, in free or frequent doses, is one of the best remedies that can be prescribed ; and when bilious colluvies require to be removed, it may be given so as to procure full vomiting, as advised by STOLL, FINKE, and others. Constipation ought always to be prevented ; but heating and irritating cathartics ought to be withheld. The tartrate of potash, or of potash and soda ; tamarinds, or the superhydrate of potash with the confectio of senna, the inspissated juice of the sambucus, &c., or any of the aperient electuaries in the *Appendix* (F. 82, 96, 98), and mild laxative enemata, are the most appropriate. *Derivatives*, as warm mandulvia, are occasionally of use, and are advised by HOFFMANN and LORDAT. DUGES and some French practitioners direct the application of cupping glasses on the mamma. When blood-letting has been employed, or is not indicated, *dry cupping* over the loins or sacrum may be resorted to. *Opium* and other narcotics are most beneficial in the form of DOVER'S powder. It is only in the more urgent cases that cold, either externally or in lavements, and other means about to be recommended, need be prescribed.

247. *b.* If the hæmorrhage has passed into a *chronic* or into a *passive* state, the foregoing treatment is no longer appropriate. Tonics and astringents are then required, especially the preparations of catechu, or those conjoined with opium, as directed by WENDELSTATT ; the tincture of the sesquichloride of iron ; the terebinthiates and balsams ; the acetate of lead and opium ; the sulphate of alumina or the metallic sulphates ; and the other astringents already recommended for other asthenic or profuse hæmorrhages (§ 40–45). It is in the passive form of the disease that the *secale cornutum* seems to be most serviceable. It may be given in decoction or powder. DE WEDEKIND and SAUTER advise the exhibition of the *Juniperus Sabina*, in doses of from ten to twenty grains of the powder, thrice daily, but it should be exhibited with caution, and its effects attentively watched.

[Dr. C. D. MEIGS recommends in these cases a decoction of the roots of the common black currant and the dew-berry : a handful of each to be boiled in two quarts of water, and after straining the liquor, to give a wine-glassful every hour or two.]

248. *c.* In delicate or nervous females, in whom

metro-hæmorrhage soon assumes a passive character, and gives rise to various nervous affections, an early recourse to restoratives, astringents, and sedatives is often necessary. *Camphor*, with nitrate of potash and opium, or hyoscyamus, in conserve of roses; *Dover's* powder with catechu; the infusion of roses with sulphuric acid and anodynes; the balsam of Peru or of Tolu, in the form of pills, with magnesia or powdered rhubarb, or with oxyde of zinc, and small doses of opium, according to the peculiarities of the case, may be severally employed.

249. *d.* If the hæmorrhage continue, or become excessive, or occasion exhaustion, or any alarming symptom, the use of cold externally and internally has been very generally recommended. *HOFFMANN* and *LEAKE* advise cold fluids to be taken in large quantity; *PEZOLD*, very cold clysters, and the external application of pounded ice to the hypogastrium; numerous writers, various cold epithems, on the loins, tops of the thighs, vulva, &c.; and many recent authors, the cold affusion on these situations. But these require much discrimination. They are not always appropriate in the passive states of the disease, and they are serviceable chiefly when the active form has become excessive or dangerous. Yet I have seen recourse to them fail in some instances, and productive of injury in others. If resorted to prematurely, they may be followed by inflammatory action in the uterus, peritoneum, &c., or by severe rheumatic attacks. I have, therefore, had recourse, in extreme or prolonged cases, to the spirits of turpentine, either in a draught, or in an enema, or in the form of epithem or fomentation applied over the hypogastrium, and always with success. This practice was first adopted by me in 1819, in metro-hæmorrhagia occurring after delivery, and has been pursued by me in other hæmorrhages, whenever it was considered advisable speedily to arrest them. In 1820, I publicly recommended this treatment; and I know that it has succeeded with those who were thus led to employ it.

[*Dr. CHAPMAN* relates cases in his practice where emetics have not only promptly arrested hæmorrhage from the uterus, but relieved that condition of the system which predisposes to it. These were chronic cases of an inactive kind, which had resisted the ordinary modes of treatment.]

250. *e.* When the hæmorrhage is *symptomatic of organic disease of the uterus*, it is generally prolonged, or returns frequently, and is injurious more from this circumstance than from its violence at any particular time. It is also often remittent or periodic, the intervals varying in different cases; but the discharge generally subsides spontaneously after local plethora or determination is removed, and returns again as soon as the organic change has established vascular fluxion, or congestion in the uterine organs. Although merely a symptom of the existing organic lesion, yet its frequent recurrence, and the consequent anæmia, sinking, and serious nervous symptoms require that it should receive the chief attention in the treatment; and that tonics, astringents, restoratives, and anodynes should be liberally, but appropriately exhibited. When the hæmorrhage is symptomatic of ulceration, or of ma-

lignant disease, injections, *per vaginam*, with the solutions of the *chlorides*, particularly of the chloride of lime, or with pyroligneous vinegar, or with the solutions of *creasote*, should be resorted to in addition to the means just mentioned. When it is occasioned by a polypus, or by a tumour on which a ligature may be placed, then this ought to be applied.

251. The *third intention*, viz., to prevent the return of metro-hæmorrhagia, need hardly be enforced in the accidental form of the disease; but it is of the first importance in the constitutional, habitual, or periodic states. In order to fulfil it, the remote causes ought to be removed or avoided, and the patient be placed upon a strict diet or regimen. Every source of local and of general and mental irritation should be shunned. The horizontal posture ought to be retained as long as possible for some time previously to and during the discharge; and, in the intervals only, gentle exercise should be taken in the open air. The food ought to consist chiefly of mucilaginous and farinaceous articles of easy digestion; and asses' milk, with Seltzer water, as advised by *HOFFMANN*, may be used both as a beverage and as an article of diet. The patient should be kept cool; she ought to sleep on a mattress, rise early, or remove to a couch; and, if she be married, lie apart from her husband. If the hæmorrhage be active, and dependant chiefly upon general or local plethora, a small blood-letting from the arm may be resorted to just before the expected accession of the hæmorrhage; or small and frequent doses of ipecacuanha, so as to occasion either nausea or vomiting, may be tried, as directed by *HOFFMANN*, *RANDE*, *HOLST*, *DALBERG*, and others. In cases depending chiefly upon debility, the preparations of cinchona, of iron, or of other tonics; the cold plunge or shower bath and salt-water bath; the mineral waters of Tunbridge or of Bath; the factitious waters of Pyrmont, Spa, or of Seltzer, and a light diet, will be of great service. When the recurrence of the discharge is owing to organic lesion, cold bathing is inappropriate, and the mineral waters just mentioned require to be tried with circumspection. Those of Ems, of Carlsbad, or of Marienbad, however, will often be employed with benefit.

252. *C. Treatment of puerperal metro-hæmorrhagia.*—*a.* *Previously to the sixth month*, uterine hæmorrhage should be treated altogether as described in the article *ABORTION*. If the fœtus and membranes have entirely come away, and the discharge continue from a passive state of the uterus, the exhibition of spirits of turpentine in an enema will rarely fail of arresting it; but the practitioner should ascertain that no part of the placenta or membranes remain in the uterus or vagina, causing irritation and prolonging the discharge. When the uterus is thus inactive after abortions, the *secale cornutum* or *biborate of soda*, or the spirits of turpentine, may likewise be exhibited to procure its contraction.

253. *DESORMEAUX* considers that hæmorrhage may take place in the early months of pregnancy, so as partially to detach the placenta, but that the clot that is formed between it and the uterus will often arrest the hæmorrhage, and adhesion of the detached portion subsequently occur; and he refers to a case

by Noorthuyk in support of his opinion. On this ground, he advises having recourse, at the earlier periods of gestation, to *plugging* the vagina, as recommended by Leroux, after bleeding and the usual means of arresting the hæmorrhage have failed. (See ABORTION, § 26, *et seq.*) At these periods, the uterus is still more or less unyielding, and the resistance to farther effusion is considerable. But in slight attacks, or at the commencement, the obstacle afforded by the plug may hasten the complete detachment of the ovum, by favouring the accumulation of blood between it and the uterus; and either a copious internal hæmorrhage may thereby be produced, or the ovum, being detached, may be prevented by it from being thrown off, and be retained for a long period, keeping up irritation and hæmorrhage, or a continued draining, with occasional exacerbations or a putrid discharge. Indeed, this occurrence is not rare in the early months, independently of the plug, although the use of it before the expulsion of the ovum, and when the os uteri is soft or yielding, is more likely to occasion than to prevent it. When, however, the os uteri is firm, and the discharge copious, it is often of service; but it is chiefly after the ovum is expelled, in cases of flooding before the fifth month, that plugging is most efficacious if efficiently employed. Care should be taken that the plug do not press injuriously upon the urethra. Mr. Ingleby directs that it should remain undisturbed for twenty-four hours or longer; but the supervention of internal hæmorrhage should be kept in view, and the case carefully watched.

254. When the blood escapes in small quantity only, and there are no pains present, and no disposition in the os uteri to dilate, the constitutional powers being unimpaired, an attempt should be made to prevent a return of the discharge, by the means already described both in this article and in that on ABORTION. But, as Dr. R. Lee justly remarks, where the flooding is profuse at first, or is renewed with violence, in spite of efforts to check it, the continuance of pregnancy to the full period cannot be expected, and it will be of no avail to take blood from the arm, and to administer internal remedies with any other view than with that of arresting the discharge, and thereby averting danger. In these circumstances the speedy evacuation of the uterus is the chief indication, as the slightest cause may reproduce the hæmorrhage in an alarming manner, while the partially-detached ovum remains. But, in the early months of pregnancy, this intention is not so easily accomplished as at later periods. *Puncturing* the membranes, in order to excite the uterus, is advised by Rigby, R. Lee, and Merriman: but before the fifth or sixth month this may not be easily performed; and, until the sixth or seventh, the hand, however small it may be, will not readily be admitted into the uterus. The *ergot of rye* has been recommended by Neale, Negri, Ryan, and numerous American as well as European practitioners, in order to procure the contraction of the womb in such cases. It may be given in powder, or in decoction, with three or four drops of the oleum Pulegii, as advised by Dr. Ryan.*

I have prescribed it successfully both alone and with from ten to twenty grains of the borate of soda. An enema, containing an ounce or an ounce and a half of spirit of turpentine may be thrown up, if these fail. A judicious recourse to these means will generally supersede the use of the plug or puncturing the membranes, the propriety of which latter, before the sixth month, is denied by Mr. Ingleby and some others. Wherever, in such cases, the end can be obtained by the use of medicine, recourse to any operation, however trifling, should be avoided. Instances, however, may occur about the fifth or sixth month in which perforating the membranes is required, in addition to the other means just advised. The cold affusion, or the dashing of a wet napkin against the external parts, or the application of the turpentine epithem on the hypogastrium, may be also resorted to when the case becomes urgent.

255. *b.* When in the *third or fourth month* the hæmorrhage is continued, draining, or remittent, a merely partial evacuation of the uterus should be suspected, especially if the discharge become offensive; or if the fœtus, with the whole of the appendages, have been ascertained to have come away, a flaccid or relaxed state of the uterus may be inferred. In such cases, a careful examination will discover one or other of these states, which will generally be removed by the medical means just advised, and especially by the exhibition of the spirit of turpentine by the mouth, or in enemata. The recommendation of Drs. Haighton and Blundell to inject the uterus with astringent fluids, if at all advisable, is most likely to be serviceable in cases where a portion of the ovum has been retained in the uterus, and is passing into decomposition.

[The blood-vessels of the uterus do not attain a sufficient size until the seventh month of pregnancy to pour out blood in so great a quantity as suddenly to destroy life, though the discharge may be very profuse, and produce alarming symptoms. The remedies on which we rely to check hæmorrhage in the early months are, venesection, where the patient is plethoric and the circulation excited; rest in the horizontal position; cool air; ice in a bladder, or cold vinegar and water over the hypogastrium; cold, acidulated drinks; pills of the acetate of lead and opium; the introduction of a sponge into the upper part of the vagina; and where these all fail, puncturing the ovum, and bringing on uterine contraction by the use of the ergot. Where the bleeding is kept up by the presence of the ovum in the uterus, and it cannot be reached by the finger, a curved wire, or a polypus or lithotomy forceps may be introduced, provided the os be sufficiently dilated, and thus the ovum may be extracted.]

256. *c.* *Hæmorrhage after the sixth month*, although occurring most frequently from attachment of the placenta upon the *cervix uteri*, may also take place when this does not exist. In

* [Dr. Chapman observes that "ergot is shown, by the well-conducted experiments of Dr. Charles Byrd, to have

no remedial effect except on the gravid uterus. Given under other circumstances, it appeared to be utterly inert, even in relation to the system of the female, the womb included. Were it, too, endowed with the power ascribed to it, should it not be displayed in regard to hæmorrhages generally? But in epistaxis, hæmoptisy, and hæmætemesia it has none. I am persuaded from all my observations."—(Lectures on Hæmorrhages," &c., Phil., 1845.)]

this stage of pregnancy, as well as at earlier periods, if the discharge be in small quantity or moderate; if it have not proceeded with much rapidity; if it stop soon; if no large clots be formed in the vagina; if the cervix have its usual feel, showing that the placenta is not attached there, and that no large coagula are retained in the os uteri; if the child be still alive; if there be no indication of the accession of labour; and if the discharge become pale and watery, we may conclude, with Dr. BURNS, that the full period of gestation may be reached. In this case the treatment already directed in active hæmorrhage ought to be adopted. But where the effusion is profuse, or continues, and the strength of the patient is impaired by it, the fœtal membranes should be punctured, the liquor amnii evacuated, and the uterus roused to action by the means just advised (§ 254), aided by frictions over the hypogastrium, and by dilatation of the os and cervix uteri.

257. *d. When the placenta is attached over the cervix uteri, as evinced, on a careful examination, by its fibrous vascular structure, by its adhering to one part of the uterus and being separated at another; by the renewal of the hæmorrhage during labour pains; and by its occurrence without any obvious exciting cause, the utmost decision and dexterity on the part of the practitioner are required. If flooding occur to an alarming extent in the seventh or eighth month, an examination should be instantly made, and while the blood is actually flowing. In some cases, where a small portion of the placenta lies over the os uteri, coagula may close the orifices of the bleeding vessels, and the patient may go on to the full time.* In these, the hæmorrhage is seldom very profuse; and this result cannot be expected. The general recurrence and increased violence of the effusion, until the patient either expires, or is delivered by art, demand that a rule of practice should be laid down; and the rule first devised by LEVRET, and now generally received, is the speedy performance of artificial delivery. Dr. R. LEE states that he has seen only one case of flooding from the position of the placenta, followed by recovery, without artificial delivery; and, in order to accomplish this, he recommends the hand to be passed into the vagina, as in turning, without waiting for the pains of labour, or the dilatation of the os uteri, and carried steadily forward through the os, in a conical form, between the uterus and placenta, at the part where their separation has taken place. The membranes are then to be ruptured, and an inferior extremity of the child brought down, and the infant and placenta*

* [The fact was first established by Dr. JONES, that when an artery is divided, nature employs certain means adapted to arrest the flow of blood; the artery contracts and retracts, and a conglumum is formed within its orifice. The same means are employed by nature to prevent fatal hæmorrhage from the uterus when the placenta is detached; and if this were not the case, death from hæmorrhage would probably take place in all cases immediately after the expulsion of the child and separation of the placenta. The same muscular contractions which expel the contents of the gravid uterus close the mouths of the exposed vessels in the lining membrane until coagula of the fibrin of the blood are formed within them, which effectually prevents the farther effusion of blood; a result which is facilitated by the oblique valvular manner in which the veins open into the cavity of the uterus. All the different means which prove efficient in checking the discharge in uterine hæmorrhage either excite the contractions of the uterus or promote the coagulation of the blood within the vessels.]

slowly extracted. The hand, however, should not be forcibly introduced while the os uteri is rigid and undilatable. Until it becomes soft, the flow of blood should be checked by the recumbent posture, by cold applications, and the plug. But this latter ought not to be inserted when the os uteri is soft and dilatable. In the rigid state of this part, in hæmorrhage from this cause, it will command the effusion, until the operation of turning can be safely performed; but, as soon as this may be attempted, it becomes inadmissible.

[According to the statistics of the Maternité at Paris, from 1797 to 1811, out of 20,357 women delivered, there were eight cases of placental presentation, or 1 in 2554. During six years and nine months, in the Dublin Lying-in Hospital, during Dr. CLARKE'S attendance there, four cases of placental presentation, or 1 in 2596; and Dr. COLLINS met, in the same institution, with 11 cases of placental presentation in 16,654 labours, being in the proportion of 1 to 1492. Out of 174 cases of placental presentation recorded by different authors, Dr. CHURCHILL states that 48 proved fatal, or nearly 1 in 3; and about the same proportion where the placenta was attached at the fundus. Dr. ROBERT LEE states that he had seen 38 cases of uterine hæmorrhage in the latter months of pregnancy from partial or complete attachment of the placenta to the neck of the uterus, of which 14 proved fatal.]

258. *e. If flooding occur during the first stage of labour, at the full time, the membranes should be immediately ruptured, as recommended by CLEMENT, PUZOS, KOK, RIGBY, BAUDELOQUE, DENMAN, MERRINAN, D. DAVIS, BLUNDELL, LEE, RAMSBOTHAM, SWEATMAN, and others; but if the discharge should still continue, and the pains become more and more feeble, and the patient exhausted, delivery must be accomplished by turning, by the forceps, or even by embryotomy, according to the circumstances of the case. In less imminent cases, the ergot of rye and other means already mentioned (§ 254) may be tried before recourse be had to these operations. Mr. INGLEBY, however, considers that many of this description of cases are occasioned by the injudicious use of the ergot; but, when it is employed for the arrest of the discharge, and for the purpose of procuring uterine action, this objection does not apply either to it, or to other means intended to exert a similar operation. After the liquor amnii has escaped, the os uteri still remaining rigid, there are objections to the exhibition of the ergot; and in such a case, plugging the vagina, as advised by BURNS, DEWEES, CAPURON, GARDIEN, DAVIS, &c., may be resorted to, with the aid of friction and moderate pressure on the abdomen, in order to increase uterine action. The possible occurrence, however, of internal hæmorrhage should not be overlooked; and if this take place, the still more active interference just mentioned must not be delayed. But the plug should not supersede rupturing the membranes when flooding occurs at the commencement of labour at the full term.*

259. *f. Hæmorrhage after the birth of the fœtus, and before the expulsion of the placenta, is frequent, and often sudden and profuse. In this case, strong pressure should be made over the hypogastrium, in order to excite uterine ac-*

tion. A binder ought to be firmly applied over the abdomen, several folded napkins being placed under it, so that the fundus uteri be compressed. Dr. R. LEE advises the hand afterward to be introduced to remove the placenta, but the removal of it should not be attempted until contraction of the uterus commences. After contraction, and the expulsion or withdrawal of the placenta, he directs a cloth, wet with cold vinegar and water, to be applied to the external parts, cold acidulated drinks to be given from time to time, and the patient to be preserved for two or three hours in a state of perfect repose. This plan will generally succeed when the hæmorrhage and retention of the placenta are caused by inactivity of the uterus. But when irregular action of the organ, or spasmodic contraction of the *os internum* or *externum uteri*, retains the placenta either altogether or partially, and thus causes *internal hæmorrhage*, additional means, especially the exhibition of opium by the mouth, are required. The passage of the hand, in order to remove the placenta, then demands caution and perseverance. If it cannot be accomplished, the turpentine enema or embrocation will generally aid in removing the difficulty. If the flooding arise from morbid adhesion of a portion of the placenta, the adhesion must be separated by the hand in a manner that will readily suggest itself. Dr. T. RAMSBOTHAM attributes these adhesions to partial separation of the placenta during pregnancy, from some accidental cause, followed by a slight discharge, the extravasated blood exciting inflammation of the separated surfaces with effusion of lymph, and the consequent agglutination of them. This opinion is probably correct.

260. *g. Flooding after the expulsion of the placenta* requires a modified practice, according as it arises, 1st. From atony of the uterus; 2d. From imperfect or remitting contractions; 3d. From a portion of the placenta left in the uterus; and, 4th. From inversion of the organ. As in hæmorrhage previously to the complete expulsion of the placenta, so in this the blood may be retained in the cavity of the viscus, by coagula, or by a portion of the secundines lodged in the *os uteri* or vagina. In every case, therefore, the state of the uterus and the integrity of the placenta should be ascertained. Where simple atony of the uterus is the chief cause, constant and well-directed pressure on the fundus uteri, especially by the hand; the sudden application of cold, or effusion of cold water; the turpentine enema, or draught; the ergot, &c., are the most efficacious means. If the hæmorrhage be internal from any of the causes just stated, the same measures will generally procure their removal, by contracting the uterus; but if these fail, they should be removed by the hand. The draining or recurring hæmorrhage, the expulsion of clots, the offensive nature of the discharge, and the constitutional effects consequent upon the presence of a portion of the placenta in the uterus, demand at first the same means as other states of the disease; but afterward, and particularly when serious constitutional symptoms supervene, indicating a remarkable diminution, and marked vitiation of the vital current, additional or other remedies should be employed. Weak solutions of the chloride of lime, or of soda,

should then be injected *per vaginam*, or even into the uterus; and the decoction of cinchona with the chlorate of potash, or with hydrochloric acid; camphor in frequent doses; an occasional enema with spirits of turpentine, or draught with the same and castor oil; the biborate of soda, and other means calculated to support the vital energies, to increase the excreting functions, and to enable the uterus to retract and discharge the matters retained in it, should be prescribed.

[Dr. THOMAS RADFORD, of England, has employed galvanism with great success in the treatment of cases of uterine hæmorrhage, accidental or unavoidable, accompanied by exhaustion, and occurring before, during, or after labour. "I am satisfied," he says, "from positive trial of the remedy, that it will be found a most important agent in tedious labour, depending upon want of power in the uterus, and where no mechanical obstacle exists. I would also suggest the probability of its proving valuable in originating uterine action *de novo*, in cases where it may be considered necessary to induce premature labour. It seems to me, also, to be worthy of trial in certain cases of menorrhagia in the ungravid state, where, on vaginal examination, the uterus is found to be atonic, as evidenced by its large, flaccid condition, and the patulous state of the *os uteri*."]'

His mode of applying galvanism is the following: The brass ball of the vaginal conductor is to be passed up to the *os uteri* and moved about, at intervals, on to various parts of this organ; at the same time, the other conductor must be applied to the abdominal parietes over the fundus uteri. Shocks may also be passed transversely through the uterus, by simultaneously applying the conductor on each side of the belly.

The application should be used at intervals, so as to approximate, in its effects, as nearly as possible to the natural pains. It may be continued until it meets the exigencies of the case.

Dr. RADFORD has also been led by his experience to conclude that on a complete separation of the placenta the hæmorrhage is immediately and completely suppressed, provided the uterus is in a condition to so far contract as to force down the head with the placenta upon the uterine openings. By this practice it may be said that the life of the child is sacrificed; but this will not always happen. We find from hospital and individual reports, that the child is usually dead, when the case has been treated by the present recognised means.

"In nearly all the cases which I have collected and referred to in my paper," he remarks, "of expulsion of the placenta by the natural efforts, we find that the mother recovered; and when this fortunate event did not happen, it depended upon the serious impression made upon the vital powers before the placenta was completely detached.

"It may also be stated that uterine phlebitis takes place more frequently in cases of placenta prævia, when the ordinary practice is adopted, than we observe in the same number of cases of accidental hæmorrhage. This result, in the opinion of the writer, arises from the contusions and slight lacerations which are consequent upon a forced delivery."

Dr. RADFORD has, from these circumstances, been led to recommend the following practice :

"1st. Then, as neither delivery, nor detaching the placenta, ought ever to be attempted until the cervix and os uteri will safely allow the introduction of the hand; rest, the application of cold, but, above all, the use of the plug must never be omitted in cases where they are respectively required.

"2d. If there are unequivocal signs of the child's death, the placenta is to be completely detached, and the membranes are to be ruptured. The case is then to be left to the natural efforts, provided there be sufficient uterine energy; if otherwise, the ordinary means are to be used, and, in addition, galvanism.

"3d. When a narrow pelvis exists in connexion with placenta prævia, the practice is to detach the placenta and to remove it, then to perforate the head as soon as the condition of the parts allow, and to extract it by means of the crotchet.

"4th. When the os uteri is partly dilated, and dilatable so as to allow the easy introduction of the hand, when the membranes are ruptured and strong uterine contraction exists, the practice is to detach the placenta completely.

"5th. In all cases of exhaustion, as already referred to in my paper, the practice is to draw off the liquor amnii by perforating the placenta, as then recommended, then to detach completely this organ, and apply galvanism.

"6th. In all cases of partial presentation of the placenta, the artificial rupture of the membranes will generally be found sufficient to arrest the hæmorrhage; but if that should prove ineffectual, then we must apply galvanism.

"The practice of detaching and removing the placenta was adopted by some of the older writers; and as I have mentioned in my paper 'On Galvanism applied to the Treatment of Uterine Hæmorrhage,' I detached this organ in the year 1819, although it was not my custom to do so."—*Prov. Med. and Surg. Journ.*, 1844.

Dr. SIMPSON, of Edinburgh, has proposed, in these cases of hæmorrhage from placental presentation, that the placenta should be *first extracted*, leaving the fetus to be expelled by the natural efforts of the uterus or otherwise. Dr. S., as well as Dr. RADFORD and Dr. KINDER WOOD, relate instances where this procedure has proved successful; in one case the placenta was extracted two hours before the birth of the child. This method is particularly recommended in those cases in which turning or rupture of the membranes is inexpedient or impracticable; as in cases where hæmorrhage occurs to an alarming extent while the os uteri is still small and rigid; in unavoidable hæmorrhage in first labours; in placental presentations where the patient's strength is already so sunk, from the flooding, as not to allow, without danger, of immediate turning or forcing delivery; in cases where the child is known to be dead, &c.—(*Lond. and Ed. Month. Jour. Med.*, Feb., 1845.)]

261. The occurrence of hæmorrhage after delivery, while the uterus appears to be contracted, upon which Dr. GOOCH has so unnecessarily insisted, is nothing more than its connexion with an imperfect, remitting, or irreg-

ular contraction in some cases, and with determination of blood in others; states previously known to the profession, and requiring, at most, but a modification only of the means insisted upon in the course of this article. In these, as well as in other cases, the application of pounded ice has been much praised; but the continued application of great cold is less beneficial than the shock produced by the affusion of moderately cold water, or by dashing a wet napkin upon the hypogastrium and external parts. Indeed, the former may cause an imperfect or irregular contraction to pass into a state of relaxation, and thereby perpetuate the hæmorrhage. With respect to the hour-glass contraction of the uterus, insisted upon by Dr. BURNS and others, in connexion with flooding, the perspicacious remarks of Dr. MALINS should be borne in mind. This acute physician observes that, as the contraction of the uterus in the unimpregnated state, dividing it into two portions, disappears under gestation, the whole uterus then forming but one spheroidal cavity, so the removal of the distending causes allows the organ to recover, in a great degree, its original shape during contraction, and that thus two cavities again exist, in some measure divided by that contraction usually denominated the os internum uteri, perfectly natural, indeed, in character, but to which the name of hour-glass contraction, as denoting a preternatural state, has been in error so constantly applied. The contraction of the circular fibres, which thus takes place, dividing the upper part of the genital canal into two chambers, when excessive, the other portions of the organs being relaxed, is not infrequently associated with hæmorrhage, either while the placenta is still retained in the upper chamber or after it has been thrown off, coagula filling the lower cavity formed by the cervix uteri. The introduction of the hand into the uterus in order to excite it to action, or to press upon the part to which the placenta was attached, as advised by Dr. GOOCH and others, can seldom, under judicious management, be necessary; and it is very doubtful if it will ever prove serviceable. Plugging the vagina, after delivery at the full time, requires the utmost caution and constant watching, even when the uterus is firmly contracting, as it may favour dangerous internal effusion.

262. *D. The management of a patient after dangerous uterine hæmorrhage* constitutes an important part of the treatment. Although the uterus is firmly contracted, and the patient seems comfortable, yet she ought not to be considered as altogether safe, as the uterus may again relax and the hæmorrhage return. This contingency ought to be guarded against by applying a proper binder, by perfect repose, and by a full dose of opium, if irritability or restlessness exist. Her position ought not to be changed for several hours, and the horizontal posture must not be departed from on any occasion. The room should be darkened and well ventilated, and nutrient but light fluids, in moderate quantity, should be given at stated intervals.

263. *IV. THE PARTICULAR REMEDIAL MEASURES ADVISED BY AUTHORS FOR UTERINE HÆMORRHAGES* require but little notice after the full exposition of the treatment given above.—*a. Vas-*

cular depletions, either general or local are directed by several writers, and particularly by SCHENCK, LEFEVRE, and PELARGUS; but they are admissible only in the more active states, and as means of prevention, especially in these. When practised so as to derive from the seat of hæmorrhage, some advantage may accrue from *local depletions*, more especially from cupping over the sacrum or under the mammæ, as advised by HIPPOCRATES and ACTUARIUS. Several of the ancients resorted to cupping on the breasts; GALEN directed this operation to be performed over the hypochondria; and GONDRET prescribed *dry cupping*, with large glasses, between the shoulders. *Emetics* have been prescribed, in order to derive the circulation from the uterus, after blood-letting has been resorted to, by STOLL, GENDRON, REIDLIN, and KORTOM. CONRADI employed them to procure contraction of the uterus, and the expulsion of coagula in uterine hæmorrhage after delivery. They are certainly serviceable in some cases, but they require discrimination, and their effects ought to be carefully observed.

264. *b. Internal refrigerants*, particularly nitre and cold drinks, have been praised by several of the older writers. MM. MARTINET and DESLANDES have recently given the *nitrate of potash* in remarkably large doses—as much as six drachms in the twenty-four hours. It is not appropriate in cases of puerperal hæmorrhage, although it is sometimes of service in the active forms of the disease unconnected with pregnancy. I have given it in hæmorrhage after abortion, but with little or no benefit. The *hydrochlorate of ammonia* is more likely to be serviceable, especially in cases of debility, and when the discharge is draining or remittent. It may then be given with cinchona, or small doses of opium.

265. *c.* Of the application of *cold* little farther need be stated. It has been generally prescribed by writers from HIPPOCRATES to the present time. COLLOMB, DOEMLING, GAUTHIER, HIENSIS, CHAUSSIER, and most modern authors, recommend it, both internally and externally, in the forms of epithem and injection. RANOE, LOEFFLER, JOSEPHI, D. D. DAVIS, and OLIVIER direct cold drinks; while FIELIZ and THOMANN consider cold in any form inappropriate in uterine hæmorrhage after delivery, and in the passive states of the disease. There is much justice in this. The recourse to cold requires great discrimination; for, if too long applied, or if the cold be too great, much mischief may be produced by it. The sudden and temporary application of cold, so as to produce more or less shock to the frame, is certainly more beneficial, and more generally appropriate than a prolonged recourse to it.

266. *d. Astringents* have been very generally administered, both by the mouth and *per vaginam*, in metro-hæmorrhagia. *Aluminated whey* has been prescribed by LENTIN, PASTA, MULLER, LINDT, STROEM, and HUFELAND. THILENIUS has directed it to be employed topically, by means of a sponge. WENDT and AASKOW have recommended the *sulphuric acid* with laudanum; GEBEL, the tincture of the *sesquichloride of iron*; and FOTHERGILL, CARRON, and WENDELSTATT, the preparations of *kino* or of *catechu*. These medicines are even now in general use, but are most beneficial in the more passive

states of the disease, unconnected with pregnancy or childbirth, and when the discharge is moderate and prolonged. Of the numerous astringents mentioned by writers, the *acetate of lead*, in doses of two grains to six or seven, repeated according to the urgency of the case, has been most praised by modern authors, and especially by REYNOLDS, HEBERDEN, MITCHELL, YOUNG, WILLIAMSON, AMELUNG, THOMSON, &c. When the flooding is profuse, or occurs in connexion with childbirth or abortion, only the most energetic astringents and the most rapid in their effects ought then to be given internally; and of these, the *spirits of turpentine*; the *ergot of rye* (SFAJRANI, CABINI, &c., in *Ann. Univers. di Med.*, 1830); and the *acetate of lead*, in large doses, with opium in *acetic or pyrolignous acid*, are most deserving of notice.

267. *e.* The more energetic tonics, in large doses, have likewise been directed. They are appropriate in cases of debility, when the discharge is prolonged without being excessive; and when it is unconnected with pregnancy or active determination to the uterus. In these circumstances, and when the disease is periodic, the preparations of *cinchona* have been prescribed by STROEM, STARKE, DUNCAN, BANG, PICQUE, &c.; the tincture of *cinnamon* by PLENCK, VOGEL, and SCHNEIDER; and the *sulphate of iron*, and other chalybeates, by RATH, THILENIUS, and DOEMLING. The *sulphate of quinine*, with sulphuric acid and tincture of cinnamon, or with sulphate of iron in the form of pill, will be given with advantage in many cases of this description.

268. *f. Ipecacuanha* in small doses has been much used by PAULISKY, DE MEZA, BRUCK, HOLST, LOEFFLER, STOLL, DALBERG, DENMAN, and others; and small quantities of *tartar emetic* have been recommended by CHALMERS. The former of these may be useful when the uterus contracts irregularly, and when the placenta is retained from this cause. But it is chiefly in combination with opium, or in frequently repeated doses, that any advantage can be expected from it. In hæmorrhage after delivery but little benefit will be derived from opium, especially if given in large quantity, or depended upon chiefly. When thus exhibited, it will rather impair than promote the contractions of the uterus. Yet circumstances will sometimes arise to justify the praises of opium expressed by HORSTIUS, HEISTER, YOUNG, SMELLIE, RANOE, CHESNEAU, and GARTISHORE, especially in uterine hæmorrhage unconnected with pregnancy, or in that occurring in the earlier months of gestation. In these cases it may be given with dilute sulphuric acid (AASKOW); or in *clysters*, as directed by Mr. COLPLAND. HARCKE advised it to be used in injections thrown into the vagina—a method by no means to be advocated; and every practitioner of experience will be aware of the danger of administering opium, unless in very small quantity, in the form of enema.

["The more I prescribe opium," says Dr. CHAPMAN, "the stronger is my conviction that it exercises a very general power over hæmorrhage, provided adequate depletion has been practised, and which I think it does by its operation on the nervous system. Commonly it, or some of its preparations, is given alone, but the DOVER's powder often answers better; and

in some instances a union of opium, ipecacuanha, and camphor is still more to be preferred." Our experience coincides with that of Dr. C. in relation to the use of this article. A full dose of DOVER'S powder, after proper and suitable venæsection, will generally check hæmorrhage, whether it be from the uterus or any other organ.]

269. *g.* In *passive metro-hæmorrhagia*, particularly when the powers of life are depressed or exhausted, *brandy* or other spirits have been resorted to by many practitioners, often in large quantity. Stimulants of this description are apt to give rise to a very serious affection of the head, and to protract convalescence. *Ammonia*, or *camphor* (ERTMULLER), is less objectionable in such circumstances; and a judicious recourse to spirits of *turpentine*, as advised above, is much more efficacious and less hazardous. Of other internal medicines recommended by writers, no farther notice than the simple enumeration of them need be taken. The *fungus militensis* has been mentioned by LINNÆUS; the *bursa pastoris*, by DE MEZA; the *gemm urbanum*, by STROEM; and the decoction of the fruit of the *hippocastanus*, by HUFELAND; *tannin*, by CAVALIER; *savine*, by RAVE, FIEST, and WEDEKIND; *purgatives*, by LENTIN, STRACK, and CONRADI; and the *pimpinella*, by RIEDLIN. Whatever effects these may produce in the hæmorrhage occurring independently of pregnancy, but little benefit can be expected from them in those supervening during the puerperal states.

[We believe that a current of galvanism, passed directly through the uterus, as directed above by Mr. RADFORD, will speedily induce uterine contractions, and thus check hæmorrhage from this organ. Farther trials with it are, however, needed, before its efficacy can be considered as fully established.

Monesia has been recommended by various writers, in different forms of hæmorrhage from the uterus; and Prof. SIMPSON, of Edinburgh, recommends *gallic acid*, in doses of from ten to twenty grains in the twenty-four hours, made into pills. He states that it possesses the advantage of not confining the bowels; and it forms the active ingredient in RUSPIN'S *styptic*. The *infusion of matico* has also been given with decided benefit, where an internal styptic was needed (BRAITHWAITE'S *Retrospect*, part vi., art. 79, and part viii., art. 7). Dr. DEWEES is a strong advocate for the sugar of lead.]

270. *h.* Various *external means* of arresting flooding after delivery have been adopted, and frequently with success. *Friction of the abdomen*, particularly when the uterus contracts either imperfectly or irregularly, and *compression* over the fundus of the organ by the hand, or by *compresses*, *bandages*, &c., have been very properly insisted upon by LEVRET, TALLONY, ZELLER, VOGEL, SMELLIE, OSIANDER, INGLEBY, RAMSBOTHAM, R. LEE, and by most modern writers. LOEFFER directed that pressure should be made by means of a sand-bag. Dr. D. DAVIS and Dr. BEATTY have recommended *bandages* constructed on purpose. Pressure on the descending aorta, through the abdominal parietes, has been favourably mentioned by LATOUR and INGLEBY. PLOUQUET advised the pressure to be made by the hand introduced into the relaxed uterus; and EICHELBERGER

has adduced an instance of the success of this method. *Injections* of various kinds into the uterus have been employed. PROSPER ALPINUS, THILENIUS, and PASTA prescribed the mineral acids much diluted; GALEN, the juice of the plantago; ASTRUC, diluted vinegar; and KOK, astringent infusions, in this way. FIELZ directs the hand wet with vinegar; WENDELSTATT, lint moistened with much-diluted sulphuric acid; and M. GORAT, a decorticated or divided lemon, to be passed into the uterus.

271. *i.* *Plugs or tampons*, moistened with various astringent fluids, have been very generally resorted to since the praises bestowed on them by A. PAREY, HOFFMANN, LEROUX, THILENIUS, TRIOEN, HELD, LOEFFLER, HUMBERG, and SMELLIE. Some modern British authors have, however, supposed that the addition of astringents is unnecessary, although they approve of the plug in nearly the same circumstances in which I have recommended it above (§ 253), namely, when the os uteri is rigid. Soft lint or sponge may be used; but in such a manner as to fill completely the upper part of the vagina.

272. *k.* When all other means have failed—when the face is blanched; respiration is scarcely audible, or gasping or hurried; the pulse almost imperceptible or gone; the extremities cold or clammy; the power of deglutition lost—*transfusion* should be resorted to, although the chances of success from it are few. Dr. HAMILTON has, however, seen recovery take place from this state by the ordinary means; but so fortunate an issue is rare. The question only is, whether the practitioner should still persist in the use of some of the more appropriate means, or have recourse to transfusion. The contingencies of resorting to it ought not to be kept out of view; for if air pass into the vein, immediate death will follow. Phlebitis may even supervene, although the operation has succeeded, and carry off the patient. The propriety and success of this measure have, however, been so far established by Dr. BLUNDELL, Dr. INGLEBY, and by some others, who have attempted it in circumstances of more doubtful propriety, as to justify the having recourse to it as an *ultimum sed anceps remedium*.

273. *l.* *The prevention of uterine hæmorrhage*, particularly in the puerperal states, is a subject of great importance. In the early months, the precautions recommended in the *article on ABORTION* (§ 26, *et seq.*) should be adopted. In order to prevent hæmorrhage after delivery, Dr. BEATTY and others advise an appropriate binder to be passed loosely round the abdomen, and drawn tight, as circumstances may require. I am convinced that a moderate degree of pressure on the parietes of the abdomen after delivery is of service in preventing, not only uterine hæmorrhage, but also some other diseases, especially the different forms of puerperal fevers, &c.

[As hæmorrhage from the lungs indicates, for the most part, something wrong in the condition of that organ, so hæmorrhage from the uterus should lead us to suspect a morbid state of this viscus. We should particularly inquire whether there is a sense of pain or heat in the organ, extending to the lumbar region and lower extremities, and whether the flow of blood may not alternate with other depraved and non-

sanguineous discharges of an offensive nature. If we cannot ascertain satisfactorily by the touch the precise pathological state of the uterus, we shall be warranted in having recourse to the *speculum*—an expedient which we never wish to see resorted to on ordinary occasions, and never, indeed, except as a last resource. In many of these cases, the suppression of the discharge is a subordinate consideration; it may even prove a salutary evacuation, designed for the relief of a phlogosed condition of this important organ, as it often prevents the occurrence of organic disease. Our chief object should be to arrest the progress, or relieve that condition from which the hæmorrhage emanates. To this end, general and local bleeding; the latter, by the occasional application of leeches to the os itself; an alternative use of iron and conium, iodine, or mercury; a mild diet; frequent sponging the body; pure country air; moderate but regular exercise; and especially a cheerful and placid state of mind. When, in a later stage, we detect the presence of scirrhus and other serious organic derangements, we are obliged to resort to the use of narcotics and anodynes, especially the iodides, with conium, opium, sarsaparilla, &c. LISFRANC has recommended and practised the removal, by the knife, of diseased portions of the uterus; but, in our judgment, such operations, like those for diseased ovaria, are entirely unjustifiable, and should be abandoned.]

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[AM. BIB. AND REF.—(See Bib. of art. "Hæmorrhage," &c.)

274. X. OF HÆMORRHAGE INTO SEROUS OR SHUT CAVITIES.—Owing to the organization of serous membranes, hæmorrhage very seldom takes place from them, the vessels with which they are supplied rarely experiencing that degree of relaxation admitting of the exudation of blood, or even of a portion of its colouring particles. When blood is effused into cavities formed by serous membranes, it proceeds from one or other of the following sources: 1st. From the rupture of an aneurism. 2d. From the erosion, ulceration, or rupture of an artery or vein. 3d. From rupture or ulceration of an organ or part. 4th. From relaxation of the vital cohesion with which the serous tissues and extreme vessels are endowed. 5th. From deficient crasis, or other changes in the blood; and, 6th. From the co-existence of the last two conditions. Hæmorrhage may occur from the first, second, or third of these causes, without any manifest indisposition or disorder sufficient to induce the patient to resort to medical advice; but it never appears as the consequence of the other pathological states, unless in the advanced stage of the most dangerous, depressing, or malignant maladies. When the hæmorrhage occurs from the former of these, it is often to a very great amount; but it very rarely is excessive when it proceeds from the latter states. In all, the existence of the extravasation is to be inferred from the presence of the *constitutional symptoms* (§ 25) usually produced by profuse hæmorrhages. When the states of vital power and of the blood cause sanguineous exudation into the shut cavities, ecchymoses or petechiæ in other parts of the body, and hæmorrhage from mucous canals are very generally also observed.

275. i HÆMORRHAGE FROM THE SEROUS MEMBRANES OF THE BRAIN OR SPINAL CHORD very rarely occurs, unless as a consequence of concussions or injuries of the head or spine, or from violent exertion, particularly in warm weather, or under a hot sun. Sanguineous effusion between the membranes may, however, follow the rupture of small superficial aneurisms or varices, and the growth of malignant or other tumours, or the occurrence of ulceration, implicating the membranes. Hæmorrhage in these situations causes apoplexy and paraplegia, or other comatose and paralytic states. I have seen very slight effusion in the spinal canal in a case of tetanus; and Dr. Thomson observed it in a case of rabies. BONET, MORGAGNI, and OLLIVIER have seen effusion simultaneously between the membranes of the brain and spinal chord. (See arts. APOPLEXY, BRAIN (§ 26), PALSY, and SPINAL CHORD.)

276. ii HÆMORRHAGE INTO THE PERICARDIUM may take place without rupture of the heart or large vessels within the pericardium, although more or less manifest rupture is the most frequent cause. Rupture of the parietes of one

or other of the cavities of the heart has been observed by SALZMANN, MORGAGNI, MORAND, PORTAL, CORVISART, LAENNEC, and several others enumerated in the subjoined references. In the larger proportion of these cases, the pre-existent lesions which occasionally give rise to rupture have existed. (See art. HEART.) But rupture of the coronary artery (VIRIDET), of the vena cava (WRIGHT), or of one of the pulmonary veins, or of an aortal aneurism, or perforation of the aorta (FIORATI) within the pericardium, may be the source of hæmorrhage. Several instances of these are referred to below. Blood may also be effused, or, rather, exuded into the pericardium in greater or less quantity, or mixed with more or less water, without laceration or rupture of any vessel. Cases of this kind have been observed by VATER, BAADER, SANDIFORT, DE HAEN, THOMSON, HOOPER, myself, and others (see references), and occur chiefly in the advanced stages of adynamic, scorbutic, putro-dynamic, or malignant diseases. Sometimes the blood is poured out between the layers of the pericardium, forming sanguineous vesicles or ecchymoses. (MORGAGNI, DE LA FAYE, STOLL.) When hæmorrhage into the pericardium arises from any of the kinds of rupture just enumerated, death generally takes place suddenly; but when it is exuded, in the manner just stated, the already depressed vital power is still farther depressed, and the oppressed action of the heart is more slowly abolished by the effusion.

277. iii. HÆMORRHAGE INTO THE PLEURAL CAVITIES has been observed by MORGAGNI, PLENCIZ, CALDANI, STOLL, FRANK, JOHNSON, myself, and others. It most frequently arises from rupture of an aortal aneurism within the thorax. In this case the blood is effused, in the first instance, into the posterior mediastinum, death seldom occurring until the accumulated blood lacerates this part, and opens the way to suddenly fatal effusion into one of the pleural cavities. The aneurism may be so large as to occasion symptoms which will lead to its recognition; or it may be so small, and attended by so little disorder, as to escape detection, as in the case of Sir DAVID BARRY, an eminent member of the profession. In him, the symptoms before, and the appearances after death, illustrated this procession of the morbid phenomena. Hæmorrhage into the pleural sac may proceed, also, from erosion or ulceration of the aorta (MORGAGNI, PORTAL); from rupture of the pulmonary vein (EICKEN); from rupture of the vena cava (PORTAL); or from rupture, or a varicose state of some of the veins near the pleural surface (CALDANI, PORTAL, &c.). Hæmorrhage into the thorax is frequently consequent upon fractures of the ribs and wounds; and many of the instances where it seems to have arisen spontaneously, have been induced or hastened by external injury or muscular exertion. More or less blood may be exuded from the surface of the pleura, in states of very intense inflammation, attended by diminished vital resistance, or during the advanced stages of putro-dynamic fevers, and of other malignant diseases. But these are comparatively rare occurrences; and the blood effused is seldom pure, but mixed with much serum or watery exhalation; or, rather,

the effused serum is more or less deeply coloured by an admixture of red particles.

278 iv. HÆMORRHAGE INTO THE PERITONEAL CAVITY, like hæmorrhages into other serous cavities, seldom occurs, unless as a consequence of external injuries or wounds. It sometimes depends upon rupture of a large vessel, or the laceration of some viscus, especially the spleen, liver, or stomach; but it may proceed from other lesions. BALLONIUS, PORTAL, DANIEL, and others have recorded instances of its occurrence from rupture of the spleen, a case of which has come under my own observation. AVRAULT mentions an instance in which it arose from ulceration of some of the vessels of this viscus. BLANE found it to proceed from the surface of the liver. When the spleen or liver is engorged or enlarged, after repeated attacks of ague, particularly in warm or miasmatic countries, a comparatively slight external injury, or a concussion of the trunk may occasion laceration or rupture of either, with extravasation of blood in the abdomen. Hæmorrhage in this situation may arise also from operations for strangulated hernia, especially when a portion of omentum has been removed; or from paracentesis in cases of ascites (BELLOCQ), or of encysted dropsy. Rupture of an aortal aneurism, or of the aorta without any pre-existent aneurism (FERRO, J. P. FRANK, JAMES, ARNOTT, ROSE, HUME, &c.), of the vena cava (BONET, LANCISI), of the vasa brevia (SANDIFORT), of the mesenteric artery (FERRO), and of the splenic artery (NENI), with hæmorrhage into this cavity, have been severally noticed. JENTY mentions a case in which rupture of the vena cava seemed to have been favoured by curvature of the spine. HEIM traced the hæmorrhage to the ovarian vessels; PALFYN, to the vessels of the omentum; GODELLE, to rupture of a Fallopian tube; and PORTAL to the mesenteric vessels, in a female who had experienced sudden suppression of the catamenia in one instance, and to the ovarian vessels in another. In cases of tubal or ovarian fœtation, extravasation of blood into the abdominal cavity is a necessary consequence of the growth of the ovum; and it has been observed in such circumstances by BUTNER, HEIM, CLARKE, PAINTER, myself, and many others. OSIANDER met with hæmorrhage into the peritoneal cavity after delivery, that had arisen, in his opinion, from dilatation of the Fallopian tubes. The exudation of blood, or of a bloody serum from the peritoneal surface occurs only during morbid states of the system, similar to those in which it has been observed to take place into the pericardium or pleura. (See art. PERITONEUM).

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279. XI. HÆMORRHAGE INTO THE AREOLAR TISSUE, OR INTO THE SUBSTANCE OF AN ORGAN, occurs in two forms: 1st. Confined to a single part or organ; 2d. Extended to several organs, and more or less diffused. The pathological states of which either of these forms may be the result are chiefly the following: a. Increased determination of blood or vascular action; b. Active congestion, or engorgement from in-

creased flow of blood to the part; *c.* Passive congestion from interruption to the return of blood from the seat of hæmorrhage; *d.* Softening, or diminished vital cohesion of the organ in which extravasation takes place; *e.* Disease of the vessels of the part favouring rupture, &c.; *f.* Laceration or rupture of an organ from concussions or external injuries; *g.* Loss of vital tone, expressed chiefly in the extreme capillaries; *h.* A morbid state of blood; and, *i.* These last two conditions conjoined. The more limited forms of hæmorrhage into cellular or parenchymatous parts may arise from either, or from more than one of these pathological states; but the more diffused or extended depends chiefly upon the last three of them. The former may occur primarily, or without any very manifest sign of pre-existent disorder, although such disorder actually exists; the latter is generally the result of very serious and evident disease, especially of scurvy, purpura, putro-adyamic or malignant fevers, &c. The organs in the structure of which hæmorrhage most frequently occurs are the brain and cerebellum, the spinal chord, and the lungs; and those in which it is more rarely observed are the spleen, liver, pancreas, and kidneys. It still more rarely takes place in two or more of these parts at once, unless in the course of the dangerous constitutional maladies just mentioned. M. ROBERT (*Nouv. Biblioth. Méd.*, t. ii., p. 74, 1826) records a case in which he found blood effused in the substance of the brain, lungs, liver, pancreas, and kidneys; but the pre-existent constitutional disorder was characterized by extreme adynamia, manifested especially in the vascular system and circulating fluids.

280. Hæmorrhage into the *areolar tissue*, particularly in those parts of it that possess the membranous form, giving rise to ecchymoses, petechiæ, &c., occur chiefly in *purpura, scurvy*, and the last stages of malignant exanthematous and other fevers; and in these diseases hæmorrhage generally takes place, also, from mucous surfaces, and sometimes, likewise, into the substance of one or more organs. In these cases, the blood is dark, dissolved, or deficient in crasis, and incapable of coagulating. The instances of "*Universal Hæmorrhage*" (*Hæm. Universalis*) recorded by several writers of the sixteenth and seventeenth centuries are entirely to be referred to the above maladies, or to a scorbutic conjoined with a hæmorrhagic diathesis, generated, most probably, by the nature of the food and modes of living, and to the putro-adyamic state which exanthematous and typhoid fevers then frequently assumed. (See arts. *APoplexy, Brain, Lungs, Palsy, Purpura, Scurvy, &c.*)

HÆMORRHOIDS. — SYN. *Αιμορροΐς* (from *αἷμα*, blood, and *ροοσ*, a flux), Hippocrates, Galen, Celsus. *Hæmorrhoids*, Pliny, Linnaeus, Sagar, Sauvages, Cullen. *Hæmorrhoides*, Juncker. *Fluxus Hæmorrhoidalıs*, Hoffmann. *Proctorrhœa*, Auct. var. *Proctalgia Hæmorrhoidalıs*, Macbride. *Marisca*, Good. *Hæmorrhischesis*, Plouquet. *Hæmorrhœa Vasorum Hæmorrhoidalium*, Swediaur. *Hæmorrhoides*, *Flux Hæmorrhoidal Fr. Goldaderfluss*, *Hæmorrhoiden*, Germ. *Morice*, Ital. *Piles*.

CLASSIF.—1. *Class*, Febrile Diseases; 4. *Order*, Hæmorrhages (Cullen). 1. *Class*, Diseases of Digestive Organs; 1. *Order*,

Affecting the alimentary Canal (Good).

II. CLASS, II. ORDER (Author).

1. DEFIN.—*Pain, tension, weight, heat, or other uneasy sensation, referred to the rectum and anus, accompanied or followed by tumours in these parts, or by a flow of blood from them when the patient is at stool; recurring after intervals, and sometimes periodically.*

2. *Preliminary Remarks.*—There are few diseases upon which so much has been written—ignorantly and dogmatically written—as upon hæmorrhoids. In modern times, the pathology and treatment of this disease have been too generally viewed in a limited point of view, and usurped by persons who have endeavoured to convince the public that they have made it the subject of especial investigation, or even of exclusive study. Judging, however, from their writings, more mischief than benefit has thus arisen from the mechanical division of labour they have adopted; and not only have they failed in advancing our knowledge as to the nature and treatment of the malady, with which they profess so intimate an acquaintance, but they have actually overlooked, or been ignorant of the part it occupies in the circle of morbid action, and they have frequently, even when affording temporary benefit by empirical means, or by local or surgical aid, caused most serious consequent mischief. Those affected by this complaint are unable to foresee the consequences that may result from injudicious interference, especially if appropriate medical treatment be not afterward pursued; and, while immediate relief, when procured, is made a matter of high commendation, both by those who receive and by those who administer it, the remote or contingent bad effects are rarely traced by them to their origin, and are often of such a nature as to terminate all inquiry.

3. Of those who have professed an infallible cure for hæmorrhoids, there have been few who appear, from their writings, to have been acquainted with the nature of the complaint; with the relation in which it often stands to other morbid conditions; with its frequent existence as the more manifest part of a more important and concealed state of disease, and with the most safe and appropriate means of removing it. They have viewed it as a local disorder which is to be cured by local or surgical treatment, and not as a visceral disease often depending upon latent or extensive morbid conditions, to which surgical measures may prove injurious, and for which such measures are, at most, only occasionally required, and then as adjuncts merely of a strictly medical, and often constitutional treatment. Owing to an imperfect knowledge of the varieties of hæmorrhoidal tumours, and of their pathological relations, *a.* Fatal hæmorrhage has not infrequently resulted from excising or puncturing them; *b.* Enteritis, peritonitis, and even internal phlebitis, have followed the extirpation of them by ligature; and, *c.* Fatal diseases of the brain, or of the lungs, or even of the liver, have arisen from the permanent stoppage of a discharge by these means, to which the system had become habituated, and which had warded off these and other serious maladies. This evacuation being arrested by these or other local measures, the safety-valve to an overloaded state of the vascular system is permanently closed,

and a source of local derivation and of discharge that had preserved a vital organ from impending disorganization is cut off, without either preparing the system for the changes thereby produced, or substituting some other evacuation in its place. Persons who thus extend the division of labour principle to a science which admits not of it with advantage either to the branch which is thus attempted to be cultivated, or to those upon whom it is practised, may reply that *they* have seen no mischief result from the means they employ; but the mischief in such cases is strictly of a medical nature, is often remote, and falls not within the sphere of those who thus unscientifically and empirically limit the practice of their profession. Division of labour may improve manual dexterity, or may extend mechanical contrivance; but it cannot improve pathological knowledge, nor illustrate the relations or associations of morbid actions, nor lead to truly scientific, and safe, and appropriate, and permanently beneficial modes of cure.

4. I. PATHOLOGICAL HISTORY OF THE DISEASE.

—The term *hæmorrhoids*, signifying literally a flow of blood, was made use of by HIPPOCRATES; and, down even to the present time, has been applied to a dilatation of the veins at the extremity of the rectum, accompanied with a flow of blood, and the vessels of this part have been consequently called the hæmorrhoidal vessels. Many of the ancient and of the older writers have extended the term, not only to every complication of this complaint, but also to hæmorrhages from natural outlets; and thus hæmorrhoids of the uterus, of the bladder, and of the mouth have been frequently used to denote hæmorrhage from these parts. Since the time of MORCAGNI, the term has been applied indifferently to that morbid condition which was generally attributed to dilatation of the hæmorrhoidal veins, and to hæmorrhage from the rectum, although some authors have endeavoured to restrict it to one or other of them. But as the tumours and the flow of blood, whether appearing separately or in conjunction, arise from the same source, I shall consider them as varieties of the same disease. It will, however, be shown that the hæmorrhoidal tumours consist of different kinds or modifications of structural lesion, and that either of them may take place independently of, as well as in connexion with a discharge of blood from the anus.

5. i. *General Character and Symptoms of Hæmorrhoids*.—The first attack is usually slight, and often attended by little constitutional disorder. Slight pain, heat, weight, or fulness are felt at the extremity of the rectum, or about the sacrum, sometimes extending to the perineum, with obscure tenesmus or pain at stool, often with costiveness, and occasionally with an irregular or irritated state of the bowels. The sensibility of the bladder or urethra is frequently, also, increased. After a short time, or in two or three days at most, a slight flow of blood, generally of a bright colour, is observed with the fæces, or smearing their surface. In some persons this flow does not take place, particularly in early attacks; but when it does, it is usually critical, and all the symptoms subside. When this discharge does not occur, as well as very frequently when it does, one or

more tumours, of varied size, begin to appear within or at the verge of the anus. These tumours are preceded by a stinging or pricking pain, which increases as they enlarge; or are compressed by the sphincter ani. Sometimes blood oozes from their surface, or is squirted out through small apertures when at stool. Occasionally they remain dry, or are moistened by a colourless serum; but in either case they collapse after a short time, and entirely or partially disappear.

6. After a longer or shorter interval the same train of symptoms returns, generally in a greater degree, and acquires increased severity by the repetition. The pains are more acute, especially when sitting, standing, or walking; and often extend down the insides of the hips and thighs; the blood is discharged in greater quantity; and the tumours, if they have previously been developed, become larger or more numerous. Subsequently, when they collapse, and particularly when they have been often distended, they present so many flaps of skin, and, when external, form a serrated margin to the anus.

7. In irritable or weak persons, especially when the complaint is simple or primary, is severe, or returns often, the local alteration affects more or less the general health. Frequent chills or coldness, alternating with flushes, dryness of the mouth, hardness or frequency of pulse, costiveness, pallor of the countenance, and other febrile symptoms are complained of. The functions of digestion are also more or less deranged, and the bowels are either costive or irregular, especially when the complaint is dependant upon disorder of the hepatic organs. When it is associated with disease of the lungs, the symptoms referrible to the chest are generally materially alleviated by it, especially if it be attended by sanguineous discharge; and a similar result follows its occurrence in plethoric persons liable to headaches, or to congestion of the brain or liver. In all cases, however, care should be taken not to mistake the constitutional disorder, or the affection of remote organs, often occasioning the disease, for sympathetic disturbance preceding the hæmorrhoidal attack. A minute examination of the relation of the complaint with other ailments should always be instituted before the indications of cure are determined upon.

8. Such is the usual course of hæmorrhoidal attacks; but the sense or weight, heat, fulness, or constriction, with more or less pain about the anus, and slight constitutional disturbance occasionally occur without either effusion of blood or the formation of tumours, even in old cases; and the hæmorrhage sometimes takes place without the tumours, but seldom without being ushered in by the other symptoms. Indeed, in all cases, indications of congestion, or of increased action of the vessels of the part are present in some degree, these states of the vessels constituting a principal feature of the complaint. Both the local and constitutional symptoms, and the structural lesions, show that increased determination of blood to the extreme vessels of the part in most cases, and impeded return of it from them in others, are the chief pathological conditions of the disease.

9. ii. *Of the Hæmorrhoidal Tumours*—The nature of these tumours was not understood

until lately. They were usually distinguished into *internal* and *external*, and into *bleeding* and *blind* piles, according to their situation in respect of the verge of the anus, and to their connexion with a sanguineous discharge. But most of the older writers and many of the moderns, and among the latter the BELLS, HOME, BAILLIE, COOPER, &c., imputed them to dilatation of the veins. More correct views as to their structure were entertained first by LE DRAN and RICHTER, perhaps also by CULLEN and ABERNETHY; and more certainly by CHAUSIER, DE LARROQUE, DE MONTEGRE, CALVERT, and COLLES. From my own observations, as well as from the researches of these and other pathologists, hereafter referred to, there are *three* kinds of hæmorrhoidal tumours, differing essentially both in their structure and appearance.—*a.* The *first*, or most common kind, is first seen in the form of fleshy tubercles of a brownish or pale-red colour, situate within the anus, or descending from the rectum. They have a somewhat solid or spongy feel; and, when divided, they present a compact or porous and bloody surface. As the blood oozes from the cut surfaces, they become pale and flaccid. When the tumours are *external*, they are paler and more elastic; are infiltrated by serum; and are sooner produced, and disappear more readily than when they are *internal*. In either case, they often contain a central cavity filled with fluid or coagulated blood, of a dark colour. This cavity is either smooth or granulated, and minute vessels may be traced into it; Mr. CALVERT states that it has no direct connexion with any larger vessels. It is usually small; generally about the size of a pea, but sometimes that of a bean or walnut, or even larger. More frequently, however, there is no regular cavity or cyst; the substance of the tumour being as if infiltrated with blood, which becomes coagulated and dark; but this appearance is not owing to extravasation, but rather to dilatation of a number of small vessels which traverse the tissue in the direction of the axis of the rectum, as, upon dividing the part longitudinally, numerous dark streaks are seen in its substance, while a section made transversely shows only small, roundish specks.

10. The patient is usually made sensible of the development of these tumours by a peculiar pricking or stinging sensation, within or at the margin of the anus; and one or more are found slightly elevated, or pressed downward by the sphincter. The increase of these tumours takes place more by elongation than by expansion, and they assume a conical form, and are larger than their necks. Sometimes blood is exhaled from their surface; in other cases, or on other occasions, a serous fluid is exuded; and occasionally they are entirely dry, especially when they are external. In either case they generally disappear in two, three, or four days, but return again at an uncertain or at a regular period, and increase in size, becoming firmer in texture. After some blood is evacuated from them, or after the determination of blood to the parts has ceased, they collapse, leaving small pendulous flaps of skin, which ultimately disappear if the tumours have been small; but if they have been large, these flaps continue conspicuous, and give a projecting and irregular margin to the anus. Having

been strangulated by the sphincter, or repeatedly engorged with blood or lymph, or chronically inflamed, these tumours become more solid and almost permanent, are a source of constant discomfort, and give rise to several of the consequences and complications about to be noticed (§ 20).

11. The permanent state of the tumours is owing partly to the development of capillary vessels, and partly to the effused blood and lymph becoming organized; this latter circumstance, especially, giving rise to the excrescences or irregular mass of tumours found around the anus in those subject to hæmorrhoids. Occasionally the tumours acquire a very great size, arising from the effusion of much blood in the central cavity, and of blood and lymph in the cuticular envelopes. Instances of the enormous size of these tumours have been recorded by SCHMUCKER, CALVERT, and other writers about to be referred to.

12. *b.* Hæmorrhoidal tumours formed by a *varicose state of the veins* of the rectum are not so common as those just described. They seldom attract attention until they have made some progress, for the distention takes place very gradually, without causing much sympathetic disturbance, or materially increasing previous disorder. They are not so disposed to enlarge at particular periods, and are more permanent and less painful than the form already noticed. They are commonly of a dark or bluish colour, and soft and elastic to the touch. When compressed by the finger they become sensibly less, but return to their former state when the pressure is removed. They are round and broad at the base, and often distributed in irregular or ill-defined clusters. They evince little disposition to bleed, unless when ruptured or injured. They appear crowded together, extend up the rectum, are more or less internal, or become external chiefly during costiveness, or when the patient is straining at stool, or after a fæcal evacuation; while the former kind is limited, and generally external, or within the reach of the finger. VALSALVA, LUDWIG, PETIT, RICHERAND, BEGIN, CALVERT, and others have seen hæmorrhoidal varices extend upward along the rectum to the colon, especially in persons who had experienced obstruction of the portal circulation. M. BEGIN observes that, in most cases, the dilated, superficial, submucous, or subcutaneous veins are only the smaller part of those surrounding the rectum. Sometimes the lower part of this intestine appears as if plunged in the middle of a network of dilated and engorged veins, forming a thick vascular ring, the incision or puncture of which may give rise to dangerous hæmorrhages. M. RICHERAND found, upon dissection, those varicose tumours filled with clotted blood, and their interiors continuous with those portions of the veins which retained their usual size. These dilated vessels presented alternately a state of distention and their natural caliber, and were continued in every direction, forming a plexus around the outlet of the bowel, the dilated portions being covered only by the thinned mucous membrane.

13. As the varicose tumours arise from many of the causes that produce the preceding form (§ 9), and as both varieties occupy nearly the same situation, it may be reasonably inferred

that they may exist together, or that the latter may often give rise to the former in connexion with it. Now this is sometimes the case; inflammatory irritation supervening in the course of the varicose form of the disease, superinducing the *marisca*, or the first variety of tumour, and thereby obscuring the varicose character of the former. Or a different procedure, as Mr. CALVERT supposes, may take place; the veins becoming dilated in consequence of the previous formation of the cellular tumours. These complications of the tumours can be ascertained only by a careful examination, and by attention to the history, progress, and symptomatic relations of the case.

14. c. A third form of hæmorrhoidal tumours, of an *erectile* character, was first noticed by Sir JAMES EARLE, and more particularly described by Mr. COLLES. These tumours are of different sizes; are soft and spongy to the touch, of a purplish colour, with a number of minute but distinct vessels on the surface of each. One, two, or more of these tumours protrude through the anus when the patient is at stool. Early in the disease the protruded parts retire spontaneously; but, in advanced stages, they require to be replaced by the hand. Alvine evacuation is followed by pain, which, especially when the disease is prolonged, does not cease for two or three hours, and is attended by losses of blood, which sometimes occasion exsanguine exhaustion, the *sphincter ani* becoming wide and relaxed, and the tumours protruding. Dr. COLLES states that, on examination after death, he found blood-vessels as large as crow-quills, running for some way down the intestine, and then dividing into a number of branches; each of these vessels ramifying profusely, and each forming, by the interlacing of its numerous branches, one of these erectile or vascular tumours. The trunks and branches of these vessels were covered only by the lining membrane of the intestine.

[The late Dr. GEORGE BUSHE, of New-York, thus speaks of hæmorrhoidal tumours: "I have repeatedly injected these tumours with coloured water, both from the arteries and the veins, and when cut into while the fluid was injected, small jets were observed to issue from many points. I have frequently dissected them with the greatest ease, and found that they were spongy, reddish, and contained both arteries and veins, the latter being most copious, but always perfectly healthy."*

Dr. JOHN WATSON, of New-York (*New-York Journ. of Med.* for July, 1844), states that, so far from finding the veins in hæmorrhoidal tumours "healthy," he has often observed them not merely distended enormously beyond their natural size, but tortuous, convoluted, and thrown into irregular pouches, with their coats thickened, the blood within them coagulated, and the cellular tissue surrounding them hypertrophied and consolidated, precisely as we see in some of the worst forms of varices in the veins of the limbs.

Dr. W. also remarks, "On one occasion, in which I assisted Dr. STEVENS in an operation for the removal of an immense protrusion of the anus, depending on a vast number of hæm-

orrhoidal tumours that lay beneath the surface, and in which the parts were removed by excision, I took occasion to examine the diseased structure carefully. After the excision, the exposed surface bled profusely. The hæmorrhage was checked with difficulty, and only after repeated and protracted efforts with the tampon, in which the patient appeared to suffer infinitely more than if ligatures had been applied. On inspecting the well-exposed bleeding surfaces in this case, I could readily distinguish the minute capillary arteries pouring out their delicate jets of red blood from the numberless dilated veins, each of the size of a crow-quill, or larger, which gave the whole surface the perforated appearance of the top of a watering-spout, and from which issued a torrent of venous blood. I took occasion afterward to examine the mass that had been removed. After it had lain a day or two in diluted alcohol, the dilated veins on its surface had contracted nearly to their primitive size; but, on tracing them inward, I found them communicating with pouches at least the sixth of an inch in diameter, which, when dissected from the surrounding parts, might, in size and form, be compared to small leeches. Many of these pouches communicated with a capillary vessel at either extremity. Their coats were rather thick; they were filled with coagulated blood; they were very numerous, pressed upon one another in all sorts of ways, and were held together by thickened and indurated cellular tissue. They were, in short, varicose pouches, formed in the course of the hæmorrhoidal vessels, just as such pouches are seen to form in the branches of a varicose saphena vein, only more numerous, and in closer apposition than is usual in the latter case."—(*Loc. cit.*)]

15. iii. *Of the Hæmorrhoidal Discharges.*—A: The ancients believed the blood to be discharged from the tumid extremities of the hæmorrhoidal veins. MORGAGNI found these veins more or less dilated in several cases, and it was very generally considered that the blood oozed through, or proceeded from rupture of these vessels. The investigations of modern pathologists have satisfactorily shown that the hæmorrhage may arise from various sources: 1st. From congestion of the vessels of the part, followed by exhalation or exudation from the internal surface of the rectum; 2d. From irritation of this bowel, followed by vascular determination and sanguineous exhalation; 3d. From the surface of the hæmorrhoidal tumours, especially those belonging to the first and third varieties; and, 4th. From the rupture of varicose or enlarged vessels. When the blood proceeds from the *first* or *second* of these sources, it may be seen to exude from the surface of the protruded portion of bowel; and the discharge generally removes all the symptoms characteristic of the complaint. It is also frequently preceded and followed by an exhalation of a serous nature from the same source. Hæmorrhage, in connexion with the common form of tumour, may arise from exhalation from its surface; or from the contraction of the sphincter forcing blood, in a fine stream, from one or more points of it; or from exhalation from the adjoining mucous surface, in consequence of congestion of, or of sanguineous determination to the affected bowel. Where

* [*A Treatise on the Malformations, Injuries, and Diseases of the Rectum and Anus*," by GEORGE BUSHE, M. D. New-York, 1837, p. 182.]

the vascular or *erectile* tumours exist, blood is always discharged, and uniformly from their surface. The *varicose* form of tumour is less frequently attended by hæmorrhage than any of the others. When the blood proceeds from the rupture of enlarged or varicose vessels, it generally flows in a stream while the patient is straining at stool, the flow increasing or returning when this effort is repeated. The passage, also, of hardened fæces over the congested or inflamed mucous surface of the rectum, or over the tumours developed beneath this surface, or over the enlarged or distended vessels, may lacerate or injure them in such a manner as to be followed by hæmorrhage, but in such cases the discharge is usually slight.

16. In many cases the blood flows for a short time only, and is not again seen until the next attack; but in others it is observed repeatedly when the bowels are acted upon, or the discharge is renewed, when the fæces are expelled, for several days. It is generally of a red colour, and either covers or follows the fæcal evacuation; but when it is consequent upon venous affection or dilatation, it is of a dark hue, and follows, or is partially mixed with the fæces.

17. *B.* The *returns and amount of the hæmorrhoidal discharge* are extremely various, but in many instances a periodical return is observed in both males and females. In females the hæmorrhoidal not infrequently takes the place of the catamenial discharge, especially at the age when the latter usually ceases, and assumes a periodic form. In some instances these evacuations alternate. When the morbid action has once commenced in this part of the body, it being favoured by peculiarity of structure and by several pathological relations (§ 30), there is always a predisposition thereby formed to the recurrence of it; and the same causes still operating, it at length becomes habitual, and even necessary to the prevention of more serious maladies. It has been satisfactorily shown by observation that, as long as the causes of hæmorrhoids continue, the evacuation attending them is a wholesome occurrence, inasmuch as an overloaded state of the vascular system, that would otherwise induce dangerous visceral disease, is thereby removed. In all cases, therefore, when hæmorrhoidal affections depend upon constitutional causes, or are connected with any indications of visceral disease, or have existed for a considerable time, their return should not be prevented, unless other sources of discharge, or other sanguineous evacuations are substituted for them; but when they proceed from causes which are chiefly or entirely local, neither the vascular system nor constitution, nor any important internal organ manifesting disorder, a more active interference may be attempted, although even then with caution, especially if there be any tendency to vascular plethora, and if the principal causes of the disease are still in operation.

18. The *quantity of blood lost* in each attack may be very trifling, may not exceed a drachm or two; or it may amount, at one time, to several pounds. Instances are adduced by RUODIUS, FERNELIUS, LANZONI, HARRIS, SPINDLER, MOEHRING, HOFFMANN, EARLE, CALVERT, and others, in which the quantity discharged seem-

ed enormous. Mr. CALVERT supposes that the vessels in such cases are in a state of extreme excitement; but this is by no means a correct inference, as in most cases of excessive discharge the hæmorrhage is passive or venous, or is consequent upon congestion, or upon interrupted circulation through the hæmorrhoidal vessels. The evacuation more commonly is excessive from its frequent return than from its quantity at any one time; and it not infrequently induces a state of exsanguine exhaustion, requiring the most decided interference.

19. *C. A colourless Hæmorrhoidal Discharge—Mucous or Serous Hæmorrhoids (H. mucosa vel serosa)* of authors; *Hæmorrhoides blanches*, BEGIN; *Medorrhæa Ani*, J. P. FRANK—sometimes takes place, and either follows the discharge of blood, or attends the hæmorrhoidal tumours, especially those belonging to the first variety. It varies much as to quantity and appearance. It is either watery or mucous, or resembles a weak solution of gum, or it is albuminous and like the white of egg. When watery, serous, or mucous, it usually exudes slightly from the anus; when more abundant or albuminous, it is commonly passed at stool. In cases attended by much heat and irritation about the anus, a colourless exudation, consisting chiefly of an increased secretion from the follicular glands of the part, takes place. These varieties of colourless discharge are most frequent when there is little or no hæmorrhage, and when the disease is associated with *ascarides*, or with *leucorrhæa*, or with *pregnancy*.

20. *iv. Of the Consequences and Complications of Hæmorrhoids, local and constitutional.*—*A. Inflammation* is one of the most frequent morbid associations of hæmorrhoids. It is attended by more or less swelling and redness of the lower part of the rectum and anus; by throbbing, and by increased sensibility and heat, aggravated by the passage of fæces. The sanguineous discharge is slight or absent, but if it become abundant the symptoms subside. A mucous discharge is, however, not uncommon. Sometimes the inflammation is severe, and implicates not merely the mucous membrane and subjacent cellular tissue, but also, in a slighter degree, the prostate gland and neck of the bladder, occasioning much pain in the perineum, sacrum, &c., with dysuria, or even strangury. The irritation may even extend to the womb in females. The tumefied state of the lower part of the intestine in these cases, together with the inflamed tumours, and the spasmodic constriction of the sphincter, produces obstinate constipation and straining or tenesmus. Not infrequently the protrusion of the tumours, when internal, with a portion of the mucous membrane, follows the action of the bowels, and the inflamed tumours, being strangulated by the sphincter, become remarkably painful, or even ultimately slough. With the severity of the local symptoms, the constitution generally sympathizes; and febrile symptoms are developed, particularly in irritable or nervous temperaments.

21. *B. Fissures or rhagades of the anus* are not uncommon in cases of hæmorrhoidal tumours. They may commence in small longitudinal ulcerations; but they more frequently seem to take place as follows: When the tumours are large and numerous, hardened fæcal

26. II. DIAGNOSIS.—*a.* Hæmorrhoids may be confounded with *Intestinal Hæmorrhage* (§ 185), but in that disease the local symptoms and lesions characteristic of hæmorrhoids are not present in a prominent or primary manner; nor can a varicose state of the vessels, nor any other form of tumour, be detected, upon examining the rectum with the finger. Besides, intestinal hæmorrhage is more generally a symptom of an acute or dangerous visceral disease, and more frequently appears in the advanced stages of adynamic or other fevers, or as a symptom of non-febrile cachexia, than the hæmorrhoidal discharge, while this latter is more commonly the principal and most manifest, if not the primary affection. It may, however, sometimes happen that a patient subject to hæmorrhoidal affections is seized with low fever, or with remittent or simple fever, complicated with congestion or obstruction of the liver, with or without jaundice, and hæmorrhage from the bowels supervenes. The question is, whether, in either of these cases, the blood is discharged from the intestinal mucous surface (see arts. *FEVERS*, § 474, and *HÆMORRHAGE*, § 185, 196), or from the hæmorrhoidal vessels or tumours (§ 15). These are not uncommon cases: I have seen several. A fatal instance of this kind occurred in my practice while writing this article. The diagnosis is of importance, as the prognosis and treatment are both affected by it. If pain, tumours, or other symptoms referrible to the rectum or anus are present; if they be increased by the action of the bowels, and the blood discharged at that time appear fluid and recently extravasated; and if an examination of these parts, as far as it can be accomplished, show the presence or increase of hæmorrhoidal disease, then the hæmorrhage proceeds from it; but if the blood be clotted, very dark, mixed with the secretions or fæces, or consist of small coagula, the calls to stool not being attended by any distress, the source of the discharge is above that which is the seat of hæmorrhoids, and the examination post-mortem will show the accuracy of the inference.

27. *b.* Hæmorrhoidal tumours may be confounded with *fungous* or *polypous* tumours or excrescences of the rectum or anus; but these latter enlarge progressively, their surfaces are indolent, and they rarely give rise to hæmorrhage, or to paroxysmal attacks resembling hæmorrhoids, or to inflammation of the adjoining parts. *Veneræal excrescences* about the anus may be ascertained by the history of the case, by their development exteriorly to the rectum only, and by the morbid appearance of their surface. The slightest observation and the least experi-

ence are sufficient for the diagnosis in these cases.

[These tumours may also be confounded with prolapsus of the mucous membrane of the rectum, especially that chronic affection in which a flap of the mucous membrane, on either side, is forced down, and becomes thick and rugous. The semilunar form of these flaps, the extent of their base, our ability to glide the folded membrane between the finger and thumb, as well as their freedom from hæmorrhage and erection, are characters very different from those which belong to hæmorrhoidal tumours.]

28. III. CAUSES.—*a.* The antecedent or predisponent causes of hæmorrhoids are tempera-ment, and constitution, age, sex, climate, and modes of living. Persons of a melancholic, bilious, or sanguineo-bilious temperament, of a plethoric habit of body, and with a venous system prominently developed, are most liable to this disease. The remark of STAHL, that “subjectis accidere solet facilius hic fluxus sanguineo-cholericis, et sanguineo-melancholicis plethora affectis,” is very near the truth. Owing to this predisposition, the complaint is often hereditary, as fully shown by HALLER, ALBERTI, LARROQUE, MONTEGRE, and others. It is most common in mature age, when the abdominal viscera are in a state of greatest activity, and the vascular system most plethoric, and, consequently, when these viscera are most liable to disorder and to vascular determination. When it occurs in early puberty or soon afterward, it is chiefly owing to the determination of blood to the vicinity of the rectum, often favoured or induced by excessive venereal indulgences. Hæmorrhoids seldom appear before puberty; and yet I have seen several instances of it in children. I very recently prescribed for the disease in a boy of five years. TRNKA, ALBERTI, and many of the authors referred to adduce similar cases, most of which they impute to hereditary disposition. Authors differ as to its greater prevalence in males or in females. Much depends upon the circumstances in which the latter are placed; but it is more frequent in females about the period of the cessation of the catamenia, and afterward, and during pregnancy, than at any other time; and these and other circumstances may render it almost, if not quite, as frequent in them as in males. M. MONTEGRE supposes that it is more common in females in an accidental or occasional form, and in males in a regular or constant manner.

[We believe that this disease is far more prevalent in males than in females, previous to the cessation of the menstrual flux in the latter; but after that period females are more liable to it than males.]

29. Climate has some influence in disposing to the complaint. Warm, moist, and miasmatic climates are much more favourable to it than those which are dry, cold, or temperate. The former develop the bilious, melancholic, and choleric constitutions, relax the venous system, and favour obstructions of the abdominal viscera, changes most conducive to hæmorrhoids. Much, however, will depend upon the modes of life, the manners, and the morals of the inhabitants. [We agree with Dr. BUSHNÉ in opinion that changeable weather, such as we experience in this country especially, is a

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| 4. Painful Hæm. (Dolentes) - - - | { Inflammatory. Nervous. Fissured. |
| 5. Hæmorrh. with Constriction of the Anus (cum Contractione Ani) - - - | { Indolent. From Induration of the Tissues. Painful - - - - { Spasmodic. Scirrous. |
| 6. Hæmorrh. with Ulceration (Ulcerata) - - - | { Superficial. Fistulous. |
| 7. Hæmorrh. with Prolapsus (cum Procidente Ani) - - - | { From elongation of the internal Membrane. From Invagination of the Intestine. |
| 8. Hæmorrh. with Irritation of the Bladder (cum Irritatione Vesicæ Urinariæ) - - - | { With Dysuria. Strangury. Hæmaturia. |

frequent source of hæmorrhoidal affections. There is no more frequent disease, perhaps, in the United States than the one under consideration; and there can be no doubt that it is frequently induced by the frequent and sudden accumulation of blood in the internal organs, when the surface of the body, which has been hot, becomes rapidly cooled by the sudden reduction of temperature. "The spring," says Dr. B., "is the period most favourable to the development of hæmorrhoids; first, because the mass of the blood is increased in consequence of the secretions having been diminished during the winter; secondly, because the absorption of caloric expands the blood; and, thirdly, because the phenomena of life are more active at this season."] *Habits of life* exert the greatest influence in causing the disease. Sedentary occupations, and indolence with luxurious nourishment, must, as Dr. J. JOHNSON remarks, either find some outlet to the superabundant fluids, or bring on a train of diseases. Hæmorrhoids and gout are the common consequences of this state of things. Many people who have led an active life for many years, on leaving off business and indulging in repose, become, for the first time, affected with piles. The sitting posture, retained for many hours in succession, or habitually, particularly on warm or soft cushions; full or rich food; heating or stimulating diet, and intoxicating beverages; inordinate excitement of the sexual organs; habitual constipation, and the use of warm or irritating lavements, and strait corsets, not only predispose to, but often also directly produce this complaint. It is owing to the association of several of these causes that piles are so common among persons occupied at the desk, and among tailors and shoemakers, as well as among the inhabitants of Turkey and of other Eastern countries. It has been very often remarked that hæmorrhoids are more prevalent in spring and summer than in winter; and this appears to be the case. A disordered state of the alimentary canal and of the liver, and the suppression of other discharges, have a great influence in favouring an attack.

30. *b. The occasional exciting causes* are, 1st. Whatever inordinately excites the rectum and lower part of the colon, particularly too large or too often-repeated doses of calomel, aloes, colocynth, black hellebore, camboge, or scammony; occasionally, also, of rhubarb, the neutral sulphates, and of any other purgatives injudiciously prescribed or exerting a drastic action; the passage of acrid bile; the irritation caused by worms; many of the substances said to be emmenagogue; all the preparations of mercury in large or frequent doses; the liquor arsenicalis, when thus employed; and the inappropriate use of chalybeates; 2d. Whatever prevents the return of blood through the hæmorrhoidal veins, as constipation, the lodgment of hardened feces in the rectum or lower parts of the colon, and repeated efforts at evacuation; torpor, congestion, or structural lesions of the liver, and obstructed circulation through the portal system; the pressure of a pregnant, enlarged, or displaced uterus, or of a diseased ovarium; and disease of the prostate or sphincter ani; 3d. Whatever excites and determines an increased flow of blood to the sexual and urinary organs, as venereal excesses, spirituous

liquors, the irritation of calculi, of cantharides, &c.; 4th. External irritation of adjoining parts; prolonged walks in hot weather; riding in coaches, or on horses or mules without a saddle: "Nam solet a nudo surgere fœcus equo" (MARTIAL, l. xiv., epig., 85), and the frequent application of leeches to the anus; and, 5th. The local influence of cold or warmth, as sitting on the ground, or on stone seats or on damp cushions, and the habit of standing with the back to the fire. Besides the foregoing, various other circumstances occasionally cause this complaint, as the more violent mental emotions, both exciting and depressing; errors of diet and of regimen; inordinate excesses of any kind; and diseases of other organs, particularly those of the lungs or liver. Hæmorrhoids are, moreover, sometimes *critical* in other maladies, especially in fevers and in inflammations of the brain, or of any of the viscera lodged in the thoracic and abdominal cavities. Owing generally to the association of several of the above causes, this complaint is very common in the upper classes of society, in both its simple and more complicated states; and hence the number of treatises which have appeared on it and its consequences.

[There is one cause peculiar to females about the period of the change of life, and that is the cessation of the natural menstrual discharge, in consequence of which, especially in plethoric women, the system becomes surecharged with blood. If, under such circumstances, the vessels of the rectum exhale the superfluous blood, it may be looked upon as a fortunate occurrence, for in this way fatal attacks of apoplexy and other diseases are warded off.]

31. IV. PROGNOSIS.—A favourable opinion of the result may generally be entertained in all the simple states of this affection, particularly when the patient is not far advanced in life, when the constitution is not in fault, and when the lungs, the liver, and brain present no tendency to disease. In other circumstances, and when the complaint is periodic, the removal of it, however cautiously effected, may be followed by serious effects, and especially by diseases of the lungs. (See § 3, 30). In all cases the prognosis should be founded upon a knowledge of the causes, of the form, and of the complication of the disorder. If the causes be not obviated, either the disease will return after a time, or it will be followed by a more serious malady. The extent and frequency of the discharge must always be taken into account, as well as the form of hæmorrhoidal tumour. The more common variety of tumour is seldom attended by any risk, unless in the circumstances just alluded to, or when otherwise complicated, locally or constitutionally. But the varicose tumours require a more cautious or reserved opinion; for, under the most judicious management, the more prominent or distended parts of the vessels may burst by a thinning process, and occasion profuse hæmorrhage. They are also generally connected with more or less visceral disease or constitutional disorder. The prognosis should not be materially different from that just stated, when the complaint is complicated with *inflammation*, for some one of its terminations, as abscess, ulcerations, or fissures between the tumours, fistula, spasm of the sphincter, prolapsus or invagina-

tion of a portion of the bowel, and even permanent stricture of the rectum, may take place, however judicious the treatment may be, and occasion very great or prolonged suffering, if not imminent danger. When the complaint is connected with visceral disease, and especially with pulmonary disease, the opinion should be formed chiefly with reference to this association, and the hæmorrhoidal affection should be so managed as to prove a derivation from the internal malady, and to prevent its increase.

32. V. TREATMENT.—A. *The propriety of suppressing the hæmorrhoidal discharge* ought always to be considered when entering upon the treatment of it. CULLEN erred egregiously in considering the complaint as generally local, and in recommending a local treatment; and in this he has been too closely followed by surgical writers. This practice, as Dr. J. JOHNSON observes, of removing the disease as speedily as possible, is very well in sound constitutions; but where there is any defect in the system or organ predisposed to disease, we should be careful in avoiding the sudden stoppage of the hæmorrhoidal movement or discharge. HIPPOCRATES observed that this complaint often protected the system from other maladies; and a similar opinion has been offered by STAHL, HOFFMANN, ALBERTI, ROSEN, RICHTER, and others. This is especially applicable to persons who are liable, hereditarily or otherwise, to gout, consumption, apoplexy, palsy, or other kinds of hæmorrhage. Mr. HOWSHIP states that a gentleman, subject to periodic hæmorrhoids, was induced by a quack, and in opposition to the regular opinion, to have recourse to a strong vitriolic wash. This cured the discharge, but the patient died soon afterward of gout in the stomach. M. MONTEGRE adduces proofs of a number of diseases having been produced by the suppression of piles; the most common of these being fevers,* hæmorrhages, inflammations of the lungs or pleura, phthisis, apoplexy, and various other internal and organic maladies. Mr. CALVERT saw gastric fever follow the application of cold water to the anus for hæmorrhoids. I was lately consulted in a case of apoplexy consequent on the stoppage of the discharge, and, some years since, in a case of fever, and in another of melancholy from this cause.

33. B. *Constitutional Treatment.*—The often-er the hæmorrhoidal attack is renewed the more liable will it be to recur, and the greater will be the risk of effecting a sudden cure. On this account, it is most desirable to ascertain the causes of the complaint, and to remove

* A gentleman, between fifty and sixty, who had suffered long from hæmorrhoids and prolapsus of the mucous membrane of the rectum, had remained free from the complaint for a considerable time, in consequence of using cooling astringents, &c., locally, as advised by a person who had derived benefit from them. I was called to him, and found him labouring under a most dangerous form of fever, complicated with deep jaundice, and attended by a conviction of approaching dissolution. His pulse was upward of 120, soft, small, and weak. His bowels were relaxed, the stomach irritable, and the evacuations white. He had been attacked only the day before, and was restless and desponding. Calomel with camphor; effervescing draughts with the carbonate of soda in excess; Seltzer water with old wine; laxative enemata, and various other means, both internal and external, were prescribed according to the rapid progress of the malady. On the third night he became delirious; soon afterward comatose; and, although the hæmorrhoidal discharge returned, from the use of the calomel, he died on the eighth day of the disease. Inspection of the body was not permitted.

them, as being most necessary, not only to the efficacy, but also to the safety of the treatment. Piles being among those diseases which it is sometimes dangerous to cure, care should be taken to distinguish those which ought from those which ought not to be removed. M. MONTEGRE justly remarks that those which are of a constitutional nature, or which the constitution, as it were, requires, are generally of long standing—sometimes from youth; or they replace some serious or habitual affection; they are hereditary, attended by well-marked indications of plethora; take place from various and opposite exciting causes, or without any obvious cause; are preceded by constitutional symptoms; are succeeded by an improved state of health, whether there be discharge or not; and, finally, are accompanied or followed by inconvenience when interrupted or suppressed: all these circumstances indicating a constitutional disorder which it is dangerous to meddle with too rashly. When hæmorrhoids are more strictly accidental, the symptoms and occasions of their appearance are different from the above, and they may be subjected to more active treatment. But even these become, after frequent repetition or long continuance, habitual to the system—often a safety-valve to the circulation, and require a constitutional and cautious treatment. In most circumstances, however, of the disease, strict attention to diet, and to the state of the excretions, with stomachic or deobstruent laxatives, when there is any tendency to constipation; and with cooling diaphoretics when there is any febrile movement present, will be productive of benefit. When the secretions and excretions from the bowels are deficient, a few grains of blue pill, or of hydrargyrum cum creta, with one of ipecacuanha, and five or six of extract of taraxacum or of soap, should be taken at bedtime, and a draught, with equal parts of the compound infusions of gentian and of senna the next morning, or a tea-spoonful of either of the electuaries in the *Appendix* (F. 82, 89, 98, 790) at night. When constitutional irritation exists, the camphor mixture, and solution of the acetate of ammonia, may be given with sweet spirits of nitre, and the inspissated juice of the sambucus, or the infusion of the tilea Europea with the carbonate of soda or of potash, with the extract of taraxacum. The nitrate of potash may also be given with the electuary, or in a diaphoretic or diuretic mixture. When the complaint is connected with vascular plethora, the treatment should be based upon this circumstance; and a spare farinaceous diet, an open state of all the emunctories, and regular exercise ought to be enforced. If these be neglected, the suppression of the discharge may be followed by some one of the maladies alluded to above. In other respects, the treatment should be directed according to the peculiarities and complications of the case, as shown in the sequel; and organs evincing a tendency to disorder ought to be protected either by allowing the hæmorrhoidal complaint to proceed, or by increasing it (§ 47) when it is insufficient for this purpose, or by establishing other sources of irritation or of evacuation.

34. B. *Treatment of the Hæmorrhoidal Discharges.*—a. While the sanguineous discharge is

moderate, returns after considerable intervals, and leaves no unpleasant effects, it is only a salutary adjustment of the constitution, attended, it is true, with inconvenience, but with more than counterbalancing advantages. When, however, it becomes excessive, it ought immediately to be restrained. Its excess should be inferred rather from the effects than from the quantity; for some persons will lose large quantities of blood, almost daily, for some time, and yet be otherwise in good health. But whenever the discharge is followed by pallor, debility, syncope, or convulsions or spasms, it ought to be arrested. Like other *hemorrhages* (see the art., § 35, 45, *et seq.*), it may be either *active* or *passive*; and the treatment should be directed accordingly.

35. *a.* In the *active form* vascular determination should be diverted from the rectum by quietude and the horizontal position; by bleeding from the arm when the pulse admits of it, and by cooling drinks and diaphoretics. If these do not succeed, cupping-glasses, with or without scarificators, according to the state of the system, may be applied over the hypochondria, as advised by the ancients, or upon the loins or sacrum. Derivatives, especially sinapisms, the terebinthinate epithem, or blisters, may be placed on these or other parts of the surface, and astringent or cold lotions, or injections may be employed.—*β.* In the *passive form*, the acetate of lead with opium; the preparations of cinchona with the mineral acids, or the sulphate of quinine in the compound infusion of roses; the tincture of the sesquichloride of iron, and other chalybeates; the balsams of Peru or of copaiba, in large or repeated doses, or the terebinthines, and the oil of turpentine, or lime-water, administered either by the mouth or in enemata, are the most efficacious means of arresting the discharge. (See art. HÆMORRHAGE, § 45, *et seq.*)—*γ.* *Plugging the rectum*, and the *actual cautery*, have been recommended in extreme circumstances. If the source of hæmorrhage is above the sphincter, a fatal internal discharge may follow from having recourse to the former of these. It is not practicable to resort to the latter, unless the spot whence the blood issues can be brought into view.

36. *b.* *The colourless mucous discharge* (§ 19) from the anus, although a frequent attendant upon piles, is not necessarily so, as it may be occasioned by ascarides, &c. If it accompany internal or external tumours, and be independent of inflammation, slightly astringent and detergent injections; the internal use of the balsams, or of the spirits of turpentine, or of the balsams or terebinthines combined with magnesia; and an occasional recourse to the stonachic aperient mentioned above (§ 33), will generally remove it. When it is connected with inflammatory irritation, the means about to be stated (§ 42) are most appropriate.

37. *D. Treatment of the Hemorrhoidal Tumours.*—*a.* In all cases the parts should be carefully examined by the practitioner, since the accounts given by patients themselves are very fallacious. Besides, the particular kind of tumour must be ascertained before the means of cure can be appropriately directed. Whether the piles be internal or external, or both, the anus should be washed with cold water after

each evacuation; or with yellow soap and water, as suggested, in the course of some excellent remarks on the treatment of the disease, by Mr. MAYO. If the piles be internal, this should be done before they are returned. If they cannot be returned, or are permanently protruded, or altogether external, whatever may be their form, *pressure* is one of the best remedies that can be applied to them. After each evacuation, and having thoroughly cleansed the parts, a conical pad, or piece of ivory, made to slide along a bandage or handkerchief, should be passed between the nates, and fastened above to a cincture, or belt, worn around the loins, in the form of the T bandage. The pad may be provided with a concentric wire spring, the more internal coils of which rise in a conical form. This is the best external mode of employing pressure. When the tumours are internal, and protrude at stool, dragging the mucous coat with them, or when they consist chiefly of varicose veins, a short metallic bougie, of an oval form, with a short, slender neck, and a conical base to press upon the anus externally, may be attached to the bandage, carefully introduced into the rectum, and worn occasionally. Pressure will thus be made both above and within the sphincter, as well as without it. When introduced, the part of the *bougie* which rises above the sphincter being oval, varying in diameter with the peculiarities of the case, and being many times as thick as its slender neck grasped by this muscle, necessarily, from its shape, retains itself within the rectum, draws up with it the external tumours and prolapsed portion of the bowel, and presses its conical base externally against the anus, and upon the tumours or enlarged veins external to the sphincter. This combination of the *internal* with the *external method* of making pressure on the anus was introduced by Mr. MACKENZIE into practice, and is often extremely efficacious in the treatment of hæmorrhoids, and of the prolapsus attending them.

38. Before having recourse to either of these, it will often be of service to wash out the rectum immediately after each evacuation, by injecting some cold or tepid water, with or without a few grains of sulphate of zinc dissolved in it; and, if the parts be painful or irritable, a little cold cream, or of a slightly anodyne or astringent ointment, or of any other most appropriate to the circumstances of the case, should be applied to the surface of the bougie, when about to introduce it. At the same time, the bowels ought to be kept gently open by any mild or cooling purgative that will not irritate the rectum. I have found equal parts of the compound infusions of gentian and of senna, with the soluble tartar, &c., taken at bedtime, the most beneficial, when the digestive organs were weak; and one or two tea-spoonfuls of either of the following electuaries, or of one of those in the *Appendix* (F. 82, 98), the most serviceable when plethora or hepatic disorder was present, or even when there was a manifest tendency to them.

No. 242. R Potassæ Bitart. in Pulv. ʒj.; Sulphuris precipitat. ʒij-iv.; Confect. Sennæ ʒij.; Sirupi Aurantii vel Zingib. q. s. ut fiat Electuarium melle.

No. 243. R Potassæ Nitratis ʒij.; Confect. Sennæ, et Sirupi Zingiberis, aa ʒjss.; Succu Spiss. Sambuci ʒj. M. Fiat Electuarium.

39. These electuaries may be variously modified, according to circumstances; and the confectio pipēris nigri may be substituted for the sirup, or the inspissated juice of the sambucus, or a small quantity of it may be taken twice or thrice daily, when there is much relaxation of parts, or in cold, languid, or leucoplegmatic habits. Aperient medicines, in hæmorrhoidal cases, should always be taken at bedtime, in such doses as to operate only once, or, at most, twice in the morning. Subsequent irritation of the bowels during the day will thus be prevented, especially if the rectum be washed out by a lavement after passing a motion. When it is necessary to have recourse to the short bougie described above (§ 37), it should then be introduced, its passage being facilitated by an anodyne or slightly astringent ointment or pomade.

40. *b.* When the tumours are internal and protrude only at stool, and when they continue, notwithstanding the use of the constitutional treatment advised above, aided by the modes of employing pressure just described, the removal of them by an operation may be entertained; but it certainly ought not to be practised, unless it be clearly ascertained that they belong to the *first variety* (§ 9), and never, if they present the *varicose* character (§ 12). Most surgical writers make no distinction between these tumours, and resort either to the *ligature* or to *excision* to remove them. Mr. COPELAND refers to several instances of dangerous, and even fatal results from having recourse to the ligature; and yet Dr. J. JOHNSON, in an able review of the subject, states that he knows “that Mr. COPELAND’s practice is, and long has been, almost invariably to employ the ligature;” his success, by means of it, entirely depending upon his drawing the thread as tight as possible, so as completely to destroy the vitality of the tumour. This is certainly the only mode in which the ligature ought to be employed, and the one in which it has been generally recommended and practised since the days of GALEN; but Mr. COPELAND only states the danger of this method in his work, and neither advises it nor points out the mode of performing it! LE DRAN considers that, in addition to the pain, the ligature may cause inflammation extending along the rectum to the intestines; and M. MONTEGRE objects to it for the following reasons: 1st. The operation is often difficult, and always very painful. 2d. The tumours sometimes resist the ligature, and, instead of falling off, ulcerate. 3d. As they can only be tied in succession, the irritation produced by the first operation increases the swelling and inflammation of those remaining. 4th. The ligature may produce all the effects of strangulation of the gut. Dr. J. JOHNSON thinks that these objections are founded on the inefficient mode of applying the ligature, and that few or none of them are valid, provided the thread is drawn to a proper degree of tightness at the beginning. I believe that even this more efficient mode is not secure from danger; that, in addition to the evils enumerated by MONTEGRE (*a*), inflammation of the hæmorrhoidal veins, extending even to the liver (*b*), locked jaw (*c*), retention of urine, and (*d*) contraction of the rectum have in some instances resulted. It were to be wished that

those who have been most in the habit of resorting to it would state more fully than they have done the results, and the circumstances in which they confide chiefly in it. In the varicose form of the complaint, it is a most dangerous mode of treatment.

41. *c.* *Excision* of the tumours is preferred by LE DRAN, ABERNETHY, MONTEGRE, COLLES, and CALVERT; while Sir ASTLEY COOPER and Mr. HOWSHIP are favourable to the *ligature*. Mr. MAYO advises this latter method for all internal piles, his mode of operating being the most judicious that can be followed. Sir E. HOME and Sir C. BELL recommend a combination of both methods—the excision of the tumour immediately after the application of the ligature. There can be no doubt of the danger of excision, and that it is very liable to be followed by great hæmorrhage, and by peritoneal inflammation, particularly when the tumours are formed by varicose veins. Numerous cases illustrative of the fatal or dangerous results of this practice are adduced by several of the authors referred to. When the piles are external, are covered by skin, and are formed as described when considering the first form of tumour (§ 9), excision is preferable. But I believe, from considerable experience, that either operation will be very seldom required if the medical treatment be judiciously conducted. Neither the one nor the other should be resorted to without a careful examination of the pathological relations of the case, and of the form, state, and complications of the local affections; nor without a preliminary treatment, consisting of one or two small cuppings over the sacrum, of a regulated state of the bowels, moderate diet, and of abstinence from fermented or spirituous liquors. In nervous and irritable persons either operation is hazardous, and should not be performed unless in urgent circumstances. Dr. BURNE states that he has seen “a person die of sympathetic adynamic fever in four days after the removal of piles by a most accomplished surgeon. The nervous system of this patient was disturbed prior to the operation, the shock of which excited high febrile movement and delirium, soon terminating in dissolution.”

[The removal of hæmorrhoidal tumours is not to be thought of, unless they become seriously injurious to the health, and threaten to undermine the constitution. We find them, when neglected, as has been seen, sometimes resulting in prolapsus, ulceration of the rectum, fistula in ano; and in females, fistula between the rectum and vagina; to swelled testicle; diseases of the bladder; constant tenesmus and uneasy sensations in the limbs; frequent and copious loss of blood, and its attendant states of anæmia and sinking; palpitations, lowness of spirits, &c. But notwithstanding these evils, great as they are, the surgeon, in view of the past results of surgical operations for the removal of these tumours, will hesitate much before undertaking their cure, either by excision or ligature. We do not allude to those temporary evils, such as tenesmus, strangury, gastralgia, and nervous symptoms, which so frequently follow the operation, but phlebitis, tetanus, excessive hæmorrhage, and fatal collapse from the shock of the operation itself. There are others, also, of a more permanent charac-

ter, such as contraction or stricture of the anus, extensive abscesses, obstinate fistula, and, finally, a state of general plethora, from suddenly checking the frequent loss of blood in a system long habituated to it, and, consequently, to an accelerated process of sanguification.

Dr. JOHN WATSON, of New-York, has very forcibly called the attention of the profession to the dangers attending the operations,* both of excision and the application of the ligature for the removal of hæmorrhoidal tumours, and states that within eight years he had known of four fatal cases; one after excision, and three after the application of ligature, but none by hæmorrhage. One fatal case has also recently occurred in this city, after the operation by ligature. One fatal case occurred in the practice of the late Dr. PHYSICK, of Philadelphia, from phlebitis, on application of the ligature. Two serious cases occurred in the practice of J. L. PÉRISS, where, after the operation of tying, symptoms occurred similar to those of strangulated hernia—nausea, vomiting, hiccough, and abdominal pains: one of these proved fatal. The late Dr. BUSHE was of opinion that phlebitis was not one of the accidents likely to occur after these operations. "Hæmorrhoidal tumours," says Dr. WATSON (*loc. cit.*), "are either external or internal. The first are readily managed, either by incision, excision, ligature, or caustic applications. The internal, however, are worthy of much more serious consideration. They rarely extend above the pouch of the rectum, and are, therefore, generally within reach. Hence the great success of operations upon them when properly performed, and where the patient escapes the first effects of the operation itself. But, in some cases, I have known them situated so high up within the rectum as to be beyond the reach of either knife or ligature. Tumours of this sort may, in the end, give rise to prolapsus of the mucous membrane, descend with the descending prolapsus, and finally come within the surgeon's reach. So long, however, as they remain high up, beyond the verge of the anus, although they may frequently bleed, or harass the patient and undermine his health, they are not to be interfered with, except by enemata, suppositories, and the administration of internal remedies.

"For these bleeding internal hæmorrhoids, I have found more benefit in the use of injections of acetate of lead than in any other form of local application. I commonly employ this of the strength of a drachm to eight ounces of rain water, and never administer over two ounces of this solution at a time. I repeat the injection after each return of hæmorrhage; and, as this most commonly occurs during the effort to evacuate the bowels, I commonly advise the patient to resort to the injection immediately after every stool, until the hæmorrhage has ceased for a few days. The usual internal medicines are, the occasional administration of a blue pill, especially where there is reason to suspect any disturbance in the functions of the liver; a dose of oil, or the extract of taraxacum, or some other mild laxative. But, for the mere evacuation of the bowels, and with the view of correcting an obstinately-constipated habit, I

know of no article better than one or the other of the following confections: *First*. Common Rosin, well pulverized, ℥i.; Clarified Honey, ℥v. M. *Second*. Common Rosin, as before, ℥i.; Balsam of Copaiva, ℥ss.; Clarified Honey, ℥ivss. M.

"The last of these, when it can be borne, is the most efficacious. But to many persons, and particularly delicate females, the balsam is so nauseous that they are unable to use it. The ordinary dose is from two to three drachms at bedtime. This dose is generally sufficient to produce one soft and consistent stool early on the following morning, without griping, uneasiness, or any of the usually disagreeable attendants of cathartic medicine. These measures are to be assisted by the occasional use of the hip bath; by cooling, anodyne, and emollient clysters; by a course of regimen most suitable to keep the bowels regular, without, however, stimulating them; and, above all, by carefully and gently reducing the prolapsus after every evacuation of the bowels, and guarding against all movements likely to produce it in the intervals."*

The late Dr. PHYSICK, who was very successful in the treatment of piles, resorted to their excision by scissors, when external and covered by skin; and to the *wire* ligature, when internal and enveloped with mucous membrane, in order to avoid danger from hæmorrhage, which he believed was considerable. Dr. HARRIS, however, of Philadelphia, who has also had much experience in the treatment of the disease, always practises excision, and states that, in his numerous operations, he has never encountered any of the accidents alleged to have followed this plan. Dr. CHAPMAN strenuously opposes the ligature as a most dangerous and painful mode of treatment, and recommends excision, excepting in the varicose tumour. (*Lecture on Hæmorrhages, &c.*, Phil., 1844.)

Dr. HOUSTON, of Dublin, has lately called the attention of the profession to the use of *nitric acid* in hæmorrhoidal affections. (See BRAITHWAITE'S *Retrospect*, part vii., art. 62; part x., art. 64.) He confines its use to the *internal* bleeding piles—that soft, red, strawberry-like elevation of the mucous membrane, called by some *vascular tumour*, which it removes by producing a slough on its surface. The part to be touched must be free from cuticle, and wiped dry, or freed from all mucous or other adherent fluids. The acid is to be applied freely, and rubbed in with force enough to be pressed into the pores of the surface. A slough follows; but often a second, or even a third application may be required before the disease is cured, especially where the tumours are old or firm in texture. Dr. WATSON remarks that this remedy may prove useful when the disease lies near the surface of the mucous membrane, or is entirely confined to it; but that he should expect little benefit from it where the hæmorrhoidal tumours lie deep, and are enveloped in thickened and indurated mucous membrane and cellular tissue; where the mucous coat of

* [The reader may profitably consult, in relation to the surgical part of the treatment of these tumours, Dr. WATSON'S paper in the *New-York Jour.* for July, 1844, and Dr. BUSHE'S *Treatise on the Malformations, Injuries, and Diseases of the Rectum and Anus*, New-York, 1837, 8vo.]

* [The *New-York Journal of Medicine and Surgery* and the *Collateral Sciences*, vol. iii., N. Y., 1844.]

the rectum is varicose and tumefied, the solid nitrate of silver may be often used with advantage; but it must be employed very freely, and every day or two, for weeks together, in order to effect a permanent cure.

Where we conclude to apply the *nitric acid*, it may be done in the following manner: the patient is directed to strain, so as to bring the tumours fully into view; and while they are so down, let him either lean over the back of a chair or lie on the edge of a bed, on the side on which the disease exists. A piece of wood made into the shape of a spatula should then be dipped in the acid, and as much of it applied as will adhere to it, rubbing it on as above directed. When the membrane is changed to a grayish white colour, smear it with oil, and gently replace the prolapsed parts within the sphincter; put the patient to bed, and administer an opiate. The pain, which is often sharp and burning at first, soon subsides, and does not again return in the same form.]

42. *E. Treatment of Inflamed Piles.*—The application of leeches to inflamed hæmorrhoids is very often advised. MONTÈGRE disapproves of the practice, as it frequently draws the blood to the parts. I believe that cupping on the loins or on the perinæum is more beneficial. As more or less strangulation produces or accompanies the inflammation, the tumours should be pushed within the sphincter, if this can be done without aggravating the affection; and poultices or fomentations applied. When the inflammation is abated, MONTÈGRE advises injections of cold water; but care should be taken not to lacerate the tumours by the pipe of the syringe, as serious consequences may accrue, as in the cases recorded by ZACUTUS LUSITANUS, GASSENDI, and others. The external application of lint, moistened with a cooling and anodyne lotion, or frequently sponging the parts with it, will often afford relief. Equal parts of the solution of the acetate of lead, and of laudanum, diluted with rose water, will generally answer the purpose. If this lotion is not of service, it may be relinquished for poultices or poppy fomentations. *Incisions* or punctures of the inflamed and protruded piles are advised by some surgeons. MONTÈGRE condemns the practice; and Mr. CALVERT states that he saw an instance of fatal hæmorrhage from having had recourse to it. Much more dependance should be, therefore, placed upon local blood-lettings in the situations just mentioned, on low diet or abstinence, and on the refrigerants and cooling diaphoretics already recommended. If the inflammation terminate in suppuration or abscess, poultices or fomentations, and as early an external outlet to the matter as can be given it, are requisite. When tenesmus is present, cupping over the sacrum, ipecacuanha, with nitrate of potash and opium, in frequent doses, anodyne fomentations, and the treatment about to be prescribed for this symptom (§ 46), are most serviceable. The bowels should be kept gently open by means of castor oil, the aperient electuaries, and other laxatives mentioned hereafter (§ 46, c.).

43. *F. Treatment of Ulcerations, Fissures, or Cracks.*—a. When ulcerations form between the tumours, or on their surfaces, the parts should be carefully cleansed after each evacuation, and an ointment, with a small proportion of Peru-

vian balsam, may be applied to it by a pledget of lint, or any other ointment of an astringent and anodyne kind may be tried. The balsams or terebinthines should be given internally, in the form of pill, with magnesia, in quantity sufficient to keep the bowels gently open.

44. *b. Fissures or cracks* between the tumours are attended either by exquisite pain, or by spasmodic constriction of the sphincter. More frequently both these latter morbid states are present, and occasionally the patient is tolerably free from both. When the lesion is thus simple, the treatment recommended for ulceration will often be sufficient; the local application of bichlorate of soda, dissolved in honey, will also be of service as a substitute for an ointment; but when either pain or spasm of the sphincter is complained of, other means are required. In these cases, I have found the addition of the extract of *belladonna* to any of the ointments usually prescribed, give almost immediate relief. If a large proportion of the extract be employed, the effects ought to be carefully watched. Due attention to the functions of digestion and of excretion, and to existing constitutional symptoms, is always necessary. In less severe cases of this description, the extract of hyoscyamus may be tried before having recourse to the belladonna. M. BOVER and most surgeons in this country have advised a complete division of the sphincter ani muscle for the removal of this complaint. I have treated five cases of fissured anus since 1822, when the first came under my care. In all these the operation had been recommended; and yet they perfectly recovered in a short time, and, without a single exception, by means of a purely medical treatment. Strict injunctions as to diet and regimen; the daily evacuation of the bowels, and afterward washing out the rectum by emollient injections; careful ablation of the external parts, and the application of an appropriate ointment or cerate with belladonna; attention to the functions of the digestive and assimilating organs, and to constitutional symptoms, and the removal of general or local plethora, constituted the treatment. The belladonna was added to various kinds of ointment, according to the peculiarities of the case. In all it affected the pupils, and in two it produced its characteristic eruption on the skin. Several years after I first employed this medicine for fissure, with painful spasm of the sphincter, the account of M. DUPUYTREN's treatment of this affection by the same means appeared in the medical journals of Paris.

[In the treatment of this extremely painful affection, the patient should maintain the recumbent position, and confined to a low diet. Cathartics are to be carefully avoided, and irritation allayed by simple enemata of flax-seed tea. When the disease is mild, we have found the application of the *unguentum acetatis plumbi* prove sufficient for its healing; and if there be much spasm of the sphincter, the extract of belladonna will prove a powerful auxiliary: a drachm of this substance, with the same quantity of the acetate of lead, mixed with six drachms of lard, is the preparation of DUPUYTREN, which has been so extensively used in these cases. A very good practice is, to apply the nitrate of silver to these fissures when

superficial, and then introduce meshes of lint, besmeared with a mass consisting of one part of the extract of belladonna, and seven of spermaceti ointment—a course of practice which has succeeded in cases where DUPUYTREN'S ointment has failed.

The late Dr. BUSHE, of this city, was in the habit, where other means failed, of dividing the stricture with the knife, a procedure, he states, "which never fails to give immediate relief, and to effect a rapid cure."*—(*Loc. cit.*).

This practice, however, originated with BOYER, who regarded the fissures as the consequence of a spasmodic contraction of the sphincter ani. This, however, as M. JOBERT has pointed out (*Gaz. Med. de Paris*), is more than questionable. The spasmodic contraction of the sphincter seems to be rather the effect than the cause of the ulcerated fissure of its mucous covering and of its surface. It is the irritation to which its superficial fibres are exposed that induces the spasmodic contraction of the muscles. It is of importance to attend to this circumstance, viz., whether the ulceration is limited to the mucous lining of the gut, or whether it has extended to the fibres of the sphincter ani, in the management of the disease. In the former case, it is rarely necessary to have recourse to the scalpel; the ulcerated fissure will generally heal under the use of caustics, &c. But when once the fibres of the sphincter are involved, and the consequent spasmodic contractions of the muscles is induced, the application of any irritating substance tends only to aggravate the suffering; and some suppose the only successful mode of treatment is probably to divide the muscels across. M. JOBERT has, however, found that simple excision of the diseased part, with the knife or scissors, will relieve the spasmodic contraction of the sphincter, by bringing the fissure to the state of a simple wound, and thus cure the disease.—(*Loc. cit.*)

45. *G. Hemorrhoidal Pains and Spasmodic Stricture of the Rectum*, generally connected with fissure or ulceration at the bases of the tumours, must be treated in the manner just stated (§ 44). The pains are often intermittent, but very acute during their continuance. Sometimes they extend down to the feet and ankles, and even occasionally assume a neu-

ralgic character in these or other parts of the lower extremities, or give rise to spasm in various parts, especially in nervous or hysterical females. Some interesting instances of such affections have been recorded by Sir B. C. BRODIE, and have been observed by myself. In such cases, much benefit will generally accrue from taking the confectio piperis nigri twice or thrice daily, and from adopting the constitutional and local treatment just recommended. This medicine may also be conjoined with an anodyne, and the bowels regulated by the medicines already suggested. M. MONTEGORE strongly advises having recourse to the "douche ascendante;" or the forcible dashing of cold water against the anus, and to cold injections. In order to render the evacuation more easy, he directs the lavement to be thrown up when the inclination to stool takes place. Emollient injections may also be tried, either to facilitate the discharge, or to cleanse the rectum afterward; and *suppositories* with the ceratum plumbi compositum, and opium, or stramonium or belladonna, or any other narcotic, may be occasionally introduced into the rectum, and they will seldom fail of giving relief. Great care ought to be taken in the administration of narcotics in lavements, in the treatment of this or any other state of the complaint, as they are often rapidly absorbed into the circulation from the rectum and colon, and without having undergone any change. I have known half a grain of the belladonna in one case, and thirty drops of laudanum in another, produce the most serious effects. When, however, either of these, or any other narcotic, is prescribed in an ointment, pomade, or suppository, no unpleasant results will follow.

46. *H. Tenesmus, Strangury, and Constipation*, often depend upon the same pathological states.—*a.* The tenesmus is generally owing to inflammatory irritation and congestion of the inner coats of the rectum, conjoined with spasmodic action of the muscular tunic. It will, with few exceptions, be removed by the means just directed (§ 42, 45). In less acute, or more obstinate cases, the belladonna plaster may be applied to the perinæum or sacrum. Five or six grains of the extract of poppies, or one or two drachms of the sirup, may also be occasionally thrown into the rectum, with any tepid emollient enema; or a suppository of the kind just stated may sometimes be introduced.—*b.* If *strangury* or *dysuria* supervene, it is to be imputed to the extension of the affection of the rectum to the neck of the bladder, or to the prostate and urethra; and it will generally be found that it will be removed or relieved by the treatment recommended for tenesmus.—*c.* *Constipation* also frequently proceeds from the same local changes as occasion tenesmus and strangury, and from tumours or enlarged and congested vessels obstructing the canal of the intestine. In either case, there is more or less obstacle to the passage of a consistent motion, and much pain attending it. If these symptoms be allowed to continue, the complaint will be aggravated; or they will give rise to still more serious changes. In removing them, the milder laxatives will be found more serviceable than active purgatives; but those which act also upon the liver should be selected. Mercurials aggravate, and even bring on tenesmus,

* [In performing the operation, Dr. B. recommended that the patient should be placed opposite a window, on his side, an assistant being employed to separate the buttocks, and retain them so during the operation. The surgeon is then to insert the forefinger of the left hand, well oiled, into the anus, as far as the second joint, which is to serve as a conductor for the knife, which should have a blade two inches long and one eighth broad, with a blunt extremity. Having passed the blade fatwise as high as the superior border of the internal sphincter, he then turns its edge towards the fissure, provided it be on the side of the bowel, and divides both sphincters by cutting outward, gradually increasing the pressure so as to ensure the complete section of the external muscle. If a fissure exists on the opposite side, Dr. B. recommends to treat it in the same manner. If the seat of disease be the anterior or posterior portions of the intestine, the incision is to be made on the side, as the division of the sphincter, and not the fissure, is the object in view. After the hæmorrhage ceases, dossils of lint should be placed in each wound, and secured by a compress and T bandage. A full dose of morphia is to be given, and nothing but toast-water, broths, and gruel allowed for two or three days. The dossils of lint, compress, and bandage are then to be removed with great care, the bowels evacuated with an emollient lavement, and fresh dressings applied. This course is to be pursued daily, gradually diminishing the size of the dossils of lint, until the wounds heal, which will be in about three weeks.—(*Loc. cit.*)

and therefore cannot be employed, with the exception of hydrargyrum cum creta. This may be taken in small doses at bedtime, with ipecacuanha and hyoscyamus, or with extract of taraxacum. Some one of the electuaries already prescribed (§ 38), or the decoction of taraxacum with the carbonate of soda, or the tartrate of potash with tincture of senna and sirup of roses, or of senna, may be given and continued for some time. A Seidlitz powder, taken about an hour before breakfast, is also one of the best aperients in hæmorrhoidal cases. A frequent recourse to warm lavements is injurious in this complaint, as they relax the parts and solicit the circulation to them. M. MONTÈGRE, whose authority in this matter is very high, advises the injection of cold water in preference, as it strengthens the bowel; but he directs no more than will fill the rectum (about half a pint) to be thrown up. In the more severe states of the disease, especially in cases of fissure, of spasm of the sphincter, and of painful evacuation, he considers the cold injection, every time that a motion is about to be passed, most beneficial.

47. *I. Re-establishment of Suppressed Hæmorrhoids.*—When the suppression or interruption of piles is followed by aggravation of some related complaint, or injures the general health, or threatens some important organ, as the lungs, brain, liver, &c., there ought to be no hesitation as to having recourse to means calculated to reproduce them. A gentleman of about fifty, residing near Russell Square, subject to returns of humoral asthma often passing into bronchitis, as well as to frequent attacks of hæmorrhoids, experienced great aggravation of the former in 1835, after the latter had disappeared for some time. I directed him to be cupped, but he neglected to adopt my advice; I therefore prescribed a full dose of calomel and aloes, and repeated it in a few hours, with the view of restoring the suppressed piles. This had the desired effect; but severe inflammation of the tumours and strangury supervened, followed by an abscess between the prostate and anus. This broke externally, and soon healed, and the patient has not been confined a day since. Another gentleman, between fifty and sixty, had experienced severe headaches from the non-appearance of the hæmorrhoidal discharge. He was advised in 1829, when I saw him, to lose blood, to live abstemiously, and to relinquish malt liquors. The first only of these injunctions was complied with, and his complaints returned. The same advice was again given, and the purgatives formerly prescribed were changed to those which act most energetically on the rectum. The hæmorrhoids were reproduced, and the headaches disappeared. Such instances are, however, not at all uncommon. Unless in urgent cases, it will be preferable to attempt the restoration of piles by the more gentle means at first, as the exhibition of those which are most irritating, before the action of milder remedies is ascertained, may excite inflammatory action of a very severe kind, and great distress, as in the case first adduced. A reference to the causes which commonly occasion the complaint will show the means most likely to reproduce it. The most appropriate, however, are, pediluvia or semicupia; the hip-bath; the applica-

tion of leeches to the anus; the use of purgatives which act especially on the rectum, as calomel and other mercurials in full doses; aloes, colocynth, rhubarb, sulphate of soda, &c.; warm injections; aloetic enemata, &c.

48. *K. Of Regimen and Prophylaxis.*—An abstemious regimen is required during the attack, and is even more necessary in the intervals; for it is chiefly by diet and prudent conduct at these times that this complaint and its contingent ills are to be warded off. A temperate climate is best suited to persons liable to hæmorrhoids; but sudden vicissitudes of weather are unfavourable, and should be guarded against by wearing flannel next the skin, and by warm clothing. Malt and spirituous liquors ought to be avoided, and temperance in food and drink should be observed. Too warm and soft beds are improper; and sitting on soft, warm cushions is still more so. Regularity in the hours of eating, sleeping, waking, and taking exercise is generally of service; and when medicine is requisite, it should be such as will correct morbid action, increase scanty secretion and excretion, particularly of the biliary and mucous surfaces, and preserve the bowels regularly and gently open. Cold ablu-tion of the anus after each motion, and, if hæmorrhoidal tumours protrude, the careful sponging of them before they are returned, will not only remove disorder, but prevent its return, if continued without interruption in winter as well as in summer. Venereal excesses, the more violent mental emotions, and all the depressing passions, are injurious. Exercise in the open air, especially on horseback, is always of service if taken regularly, although rough riding, especially by those who are not accustomed to it, is often a cause of the complaint. (See, also, RECTUM—Diseases of.)

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Boston Med. and Surgical Journal, vol. vi., p. 253 (The editor remarks that he has seldom failed in removing piles by the internal administration of tincture of digitalis, and the external use of stramonium ointment).—*E. R. Smith*, in *Bost. Med. and Surg. Jour.*, vol. xxxi., p. 40 (Dr. S. recommends the employment of nitric acid in internal piles in the following manner: After preparing a bougie of cloth filled with cotton, it is to be adapted to the size of the rectum by a covering composed of one part of olive oil to eight of bees' wax, to be applied by a brush, and when completed it is to be introduced into a jar-acid, to remain until its action changes the colour of the composition to a dingy white, when it is to be introduced into the rectum, to remain until its action upon the rectum is, in a measure, suspended. When withdrawn, it is to be smeared with belladonna ointment, and again introduced into the rectum, to be removed as the pain subsides).—*Somuel Jackson*, in *Am. Jour. Med. Sciences*, vol. vi., p. 315. On Rhubarb in Hæmorrhoids (Dr. J. states that rhubarb, administered internally in small, but regular doses, will often cure the most aggravated cases of hæmorrhoids).—*Wm. M. Fahnestock*, in *Am. Jour. Med. Sci.*, vol. viii., p. 359. On the Treatment of Hæmorrhoids (Dr. F. recommends the rye or oatmeal mush, with molasses, as food, and barley-water for drink, and cold water, and a liniment made of burned cork finely powdered, and mixed with oil, as local applications. The relief from the latter he describes as prompt and wonderful).—*A. H. Stevens*, in *New-York Lancet*.—*V. Mott*, *Ibid.*—*W. E. Homer*, in *Am. Jour. Med. Sciences*, Oct., 1842.—*W. Gibson*, *Practice of Surgery*, and various articles in Periodicals.]

HAIR—ALTERATIONS OF.

CLASSIF.—GENERAL PATHOLOGY—*Symptomatology*; *Ætiology*: SPECIAL PATHOLOGY AND THERAPEUTICS.

1. The hair being an appendage of the skin, and the natural covering of one of the most important parts of the body, material changes in its state or appearance are interesting to the medical practitioner, as furnishing indications of several pathological conditions. Nor is the growth or removal of the hair devoid of importance, especially in certain diseases, and in convalescence from dangerous maladies. The various alterations presented by the hair are rarely primary or idiopathic, and seldom even depend upon local changes merely, but are usually the more remote consequences of debility and chronic disorder of the digestive organs, frequently associated with superinduced affections of the skin and of the pilous follicles, and occasionally also with general cachexia. In many instances where the hair undergoes a marked change, the nails likewise present more or less alteration.

2. I. EFFECTS OF REMOVING THE HAIR.—The consequences of removing the hair depend, 1st, upon the quantity of hair removed from, and left upon, the scalp; 2dly, upon the states of the system and of the circulation in the head at the time of removal. When a person is in good health at the time, little farther results from cutting off the hair than headache, cold in the head, or earache, or sore throat. M. Jourdan states that, when the long hair worn by the soldiers in the Revolutionary War was cut off in all the regiments, many complained of headache of several weeks' continuance; but he was not aware of any fatal effect being produced. The removal of the hair in cases of inflammatory excitement of the brain, or in that sthenic state of vascular action which requires having recourse to cold applications or the cold affusion, can seldom be productive of injury, although it seems very doubtful if it be so beneficial as is very commonly supposed; but it is very different in other circumstances. In adynamic, nervous, low, or typhoid fevers, or in exanthematous fevers presenting these characters—and still more especially during

early convalescence from these—the removal of a large quantity of the hair very close to the scalp sometimes aggravates the symptoms. During the advanced stages of these diseases, the circulation in the scalp and the perspiration from it are checked, and congestion, or even serous effusion, is either thereby favoured, or induced, or increased. Therefore, in these low states of action and of vital power, the hair should not be shaved or closely cut from the scalp, unless when a blister is about to be applied in this situation. During convalescence from these or other dangerous maladies, the early removal of the hair, particularly when long or thick, is not without risk. SEGER, VASSAL, LANOIX, ALIBERT, JOURDAN, and others have met with dangerous, and even with rapidly fatal effects from this measure. The risk from it is great in proportion to the quantity of hair removed, and of the perspiration proceeding from the scalp. I have seen, in several instances, ill effects follow the removal of long, thick hair from the heads of delicate children and females. In children thus constituted, the hair should always be kept short; and, if it be allowed to become abundant, it ought not to be closely cut at once. Whenever much hair is removed, a warm covering to the scalp should be immediately substituted, and worn for some time afterward. Persons strongly constituted, and taking regular exercise in the open air, may not experience any disorder from the neglect of this precaution; but the weak, or the exhausted, or convalescents, will generally suffer if they act contrary to this advice.

3. Persons in the habit of wearing long beards have often been affected with rheumatic pains in the face, or with sore throat, upon shaving them off. In several cases of frequently recurring or of chronic sore throat, wearing the beard under the chin and upon the throat has prevented a return of this complaint.

4. On the other hand, the removal of the hair, or keeping it closely cut, is often productive of good effects: I have seen it of service in headaches. Frequent cutting promotes the growth of the hair, and admits of the usual operations of brushing and combing acting more efficiently on the scalp. In cases requiring cold sponging, the shower-bath, &c., shortness of the hair is an advantage. MORGAGNI (*Epist. viii.*, art. 7), GRIMAUD, RICHERAND, and others have adduced instances of recovery from mania, headaches, and various nervous affections, by keeping the head closely shaved. Whether the hair has any influence or not in retarding the passage of positive electricity from the body, or in otherwise affecting the electro-motive or galvanic actions taking place in the system, it is difficult to determine; but it seems very probable that it has.

5. II. OF EXCESS OF HAIR. — *A. General excess of hair* is not often seen. I knew two persons whose bodies were so thickly covered with hair, excepting the parts of the face, hands, and feet that are usually devoid of it, as nearly to prevent the skin from appearing through it. Both were remarkable for strength and endurance, and in both the hair was dark brown. Their joints were small, the muscles uncommonly developed, and the adipose and cellular tissues scanty.—*B. Partial excess of*

*hair, or the growth of hair in unusual parts—Extraneous hair—the Trichosis hirsuties of GOOD—*is very common. The most frequent examples of it are in sterile women, who often have more or less of a beard after they pass the age of thirty. Since HIPPOCRATES, growth of the beard in females has been imputed to deficient menstruation, but there are very numerous exceptions to this. Dr. GOOD states that one of the most striking cases he ever observed was in a woman who was subject to excessive menstruation, and who died at forty. The growth of hair on the upper lip is sometimes seen in young as well as in aged women; and, either on the chin chiefly, or on both the chin and upper lip, is often met with in females about or after the change of life, and occasionally even in those who have had several children.—*a.* Tufts or patches of hair, in situations where none is generally seen, have been frequently met with. When the patches are small, they have been usually denominated *nævi pilares*, or hairy *nævi*. In rare instances, however, they have been remarkably large. Cases are adduced by RAYER, GRIVET, BICHAT, DUFOUR, and others, in which these patches covered a large portion of the surface of the body, were of a brownish hue, somewhat elevated above, and quite different from the colour of the surrounding skin.

6. *b.* The hair also, in its natural situations, may acquire a remarkable length. This is not a rare occurrence as respects the hair of the head, but it is very seldom met with in other places. BRUCKMANN saw the hair of the head reach the ground; and OTTO refers to an instance of the pubic hair of a female being an ell and a half long. The premature growth of hair in natural situations, as on the pubis, chest, &c., has been sometimes seen, especially in connexion with the too early development of the genital organs. Several instances of this kind are on record.

7. *c.* The growth of hair on mucous membranes has been met with, in rare instances, in different parts of the digestive mucous surface (WALTHER, OTTO, VILLERME, &c.), of which various cases are referred to in the *Dictionary of Medical Sciences* (vol. ii., p. 37, *et seq.*), in the gall-bladder (BICHAT), in the uterus and vagina (MECKEL, &c.), and in the urinary bladder (CRUVEILHIER, &c.); but it is extremely doubtful that the hair was developed in some of the situations where it has been found, as no information, in most of the cases, is given as to its roots. It is more probable, therefore, that it was introduced from without, or had accidentally passed into these situations.

8. *d.* The development of hair in the interior of cysts is more common, and has been more accurately observed. These cysts have been most frequently found in the ovary, in the substance of the uterus, below the skin, and in various other parts. They seldom contain hair only, but more frequently, also, fatty matter, bones, teeth, &c. The hair is sometimes attached to the interior of the cysts, but it is more frequently entirely detached. It would appear, from the observations of WARREN, ZUZIATI, BOSCH, SCHACHER, MECKEL, and others, that it is formed from roots or bulbs, as in the skin; and that, in consequence of an alteration in these, it often becomes entirely unconnected

with the surface from which it was formed. The researches, however, of TYSON, MORAND, BICHAT, and CRUVEILLIER, do not confirm this view, as, in the cases they met with, the hair was not attached at one of its extremities, either to the cyst, or to the other matters which the cyst contained. From the circumstances of these cysts being found most commonly in the ovaries, their formation has been imputed to an imperfect or unaccomplished coition. The fact that they have sometimes been met with in the ovaria of females who had not reached puberty, or in whom the hymen was unruptured, has been considered to militate against this mode of accounting for their formation. But this objection to the doctrine is not valid, as it merely shows the impossibility of complete coition having taken place, and is no proof that the act has not been attempted.

III. MORBID STATES OF THE HAIR.—CLASSIF.—
6. Class, 3. Order (Good). IV. CLASS, IV.
ORDER (Author).

9. i. The hair of the head may become weak and slender, and may split at the extremities—the *Trichosis distrix* of GOOD, or *forked Hair*. This is a very common affection, and depends upon a deficient action of the bulb of the hair, in consequence of debility, or impaired vital power, frequently connected with weakened digestion and assimilating function.

10. ii. The hair is sometimes *rigid, crisped, and hard*. It is then usually very short and rough, and harsh to the touch. This state seems to depend upon a deficient secretion of oily matter, by which the hair is covered and protected. It is more rarely *bristled*—*Trichosis sclosa* of GOOD. This alteration is noticed also by PLENCK, but in a loose and unsatisfactory manner. Of the *crisped* and dry state of the hair, I have seen some instances; of the *bristled*, I have not known even of a single case.

11. iii. The *Treatment* of these states of the hair consists in frequent cutting, and in the use of the local applications advised for loss of hair (§ 32), more particularly the ointment prescribed at that place. Attention should also be paid to the digestive, assimilating, and excreting functions; as I have never seen either of those affections of the hair unconnected with disorder of these functions.

12. III. FELTING OR MATTING OF THE HAIR—*False Plica*.—The long hair of persons who have neglected it frequently becomes felted, or inextricably interlaced. Females after long illnesses are subject to it, particularly in Poland, and other countries where cleanliness in respect to the head is so much neglected. It is somewhat favoured by a morbid secretion from the scalp, and is occasionally met with in connexion with *porrigo favosa* and other chronic affections of this part. It has been particularly noticed by DAVIDSON, KREUZER, BOYER, GASC, and other writers on *Plica*, and been confounded by many authors with that disease. JOURDAN and RAYER have, however, pointed out the great differences between them. Felting of the hair occurs independently of any alteration of the hair itself or of its bulbs, and without the constitutional and local disorder ushering in or attending *plica*. (See § 34.) The remedy for it is obvious.

IV. LOSS OF COLOUR OF THE HAIR.—SYN. *Canities*; Πολιότης, Πολίωσις (from πολος, white,

hoary); *Trichosis poliosis*, GOOD; *Canitia*, Auct.

13. DEFIN.—*Hairs prematurely gray, hoary, or white*.

14. i. HISTORY.—Loss of colour of the hair may be accidental, premature, or senile; and it may be partial or general. The hair begins to be gray first at its free extremities, but it often changes in that portion which is nearest the skin. This latter circumstance shows that the hair has been first secreted of its natural colour, and afterward secreted gray or white, in consequence of an affection of its bulbs, and is frequently observed when the loss of colour has been preceded by *eczema*, or any other chronic affection of the scalp. Men usually begin to get gray about forty, many between thirty and forty, and some not until a more advanced age. The occurrence of gray hairs in persons under thirty is not rare; and I know two individuals, one a male, the other a female, considerably upward of seventy, who have thick dark hair, without any being gray. The hair of the head is that which first loses its colour from age, the change usually commencing on the temples. The white hairs are at first few, but they soon multiply. When they fall out, they are seldom reproduced, so that baldness often follows canities. Females generally retain the colour of their hair longer than males, and the hair longer than the dark; but fair hair often falls out at an early age.

15. Canities, either partial or general, is very rarely congenital, or observed in childhood. The very fair, or almost white hair, with which fair children are sometimes born, is not the change under consideration. Grayness of parts only—in tufts—has been often noticed, and is owing to some affection of the scalp in those parts. This partial loss of colour may occur on the head, in the beard, or in other situations. Instances of this kind, and of the change taking place on one side only, have been recorded by LORRY, LUDWIG, HAGEDORN, RAYER, and others, and are by no means rare. Loss of colour of the hair commonly is gradual and slow; but in some cases the change has taken place in a few hours, or in the course of a single night. The case of Mary, queen of Scotland, has been often adduced, and others are mentioned by VOIGTEL, BICHAT, CASSAN, and RAYER. When hair grows from cicatrices without pigment, it is colourless; and in general or partial leucopathia, the hair is white or gray in most instances. In senile canities, however, the scalp seldom participates in the loss of colour.

16. ii. CAUSES.—A. The *remote causes* of premature canities are, disappointments, anxiety of mind, extreme or protracted grief; unexpected and unpleasant intelligence; fear, fright, or terror; great mental exertion; paroxysms of rage or anger; severe, repeated, or continued headaches; rheumatism of the head, and toothache; the salts from the evaporation of salt-water from the hair; *eczema* and other chronic eruptions of the scalp; over indulgence of the sexual appetite; excessive hæmorrhage or other discharges, mercurial courses, and an hereditary predisposition.

17. B. Blanching of the hair appears to arise from a diminished secretion of the colouring matter by the bulbs or follicles. Dr. MACARTNEY thinks, very justly, that an organic action

must be admitted to exist in the substance of the hair, in order to account for the changes to which it is subject, and which sometimes take place so rapidly as otherwise not to admit of explanation. M. RAYER states "that gray hairs have been said to be without marrow or matter in their interiors, in place of which there is an empty canal." VITHOF says that the bulbs of those hairs which have become white are somewhat atrophied, and Dr. MACARTNEY thinks that the change is owing to the absorption of the colouring matter when it takes place rapidly.

18. iii. TREATMENT.—When canities is the result of age and of partial or general leucopathia, it cannot be made the subject of medical treatment; but when it is partial, or depends upon chronic inflammation of the scalp having extended to the bulbs of the hair, the removal of this state, and of the white hairs, is sometimes followed by the production of hairs of the natural colour. Various means of dying the hair have been resorted to, but these are unworthy of notice. Applications to the hair, with the view of preventing it from becoming gray or falling off, have been frequently employed. Among these, the prepared marrow of the ox or deer, bears' grease, honey-water, and substances mentioned hereafter (§ 32), are most deserving notice.

V. PRETERNATURAL COLOUR OF THE HAIR.—
SYN. *Miscoloured Hair*; *Trichosis Dcolor*, Good.

19. The hair may be changed from a very light to a very dark colour. Instances of this have been adduced by ALBERT and others, and are not infrequent. It may be also changed to a reddish yellow, and even to green or blue. It has likewise been observed of a spotted or variegated hue; this, however, is not common. Hair that has become gray has, in very rare cases, been changed to black. The instances in which the hair has been said to have been green or blue have most probably arisen from the action of metallic fumes on hair of a light colour. The subject is more fully discussed by M. RAYER, but it is not deserving of farther notice.

VI. THE WANT OR LOSS OF HAIR.—SYN. *Alopecia*; 'Αλώπεκία (from ἀλωπηξ, a fox), Galen; *Area*, Celsus; *Gangrena Alopecia*, Young; *Alopekia*, Swediaur; *Defluvium Capillorum*, Sennert; *Fluxus Capillorum*, Auct. var.; *Der Kahlkopf*, *Kahlheit*, Germ.; *Chauveté*, *Calvitie*, *Alopécie*, Fr.; *Calvezza*, Ital.; *Baldness*.

20. DEFIN.—*The defect or loss of hair, either limited to one or more parts only, or diffused and more or less general.*

21. Alopecia may be congenital, and is then owing to the tardy development of the hair, which often does not appear until the end of the first or second year. This form of baldness is, however, very rarely permanent. If it is, the circumstance is to be imputed to the absence of the follicles.

22. Decay of the hair may take place in various states of the scalp and of the constitution. It may occur either prematurely, or as a consequence of age. In the former case it is the result of disease, and is either limited—partial, but complete, as far as it extends—or diffused, and more or less general; in the latter it is always diffused, and depends upon the change

which the integuments of the body undergo at that period of life. I shall consider, first, Limited or partial Alopecia; and, secondly, Diffused Alopecia; this latter comprising (a), Premature loss of hair, and (b) Decay of the hair from age.

i. LIMITED OR PARTIAL BALDNESS.—SYN. Ὀφιασίς (from ὄφις, a serpent); *Ophiasis*, Celsus; *Area*, Auct. var.; *Alopecia Areata*, Sauvages; *Porrigo decalvans*, Willan, Bateman; *Trichosis Area*, Good; *Alopecia partialis*, *Alopecia circumscripta*.

23. CHARACT.—*Bald patches, often without decay or change of colour of the surrounding hair, the bared spots being often shining and white, frequently spreading or coalescing.*

24. Partial alopecia is the consequence of various alterations of the secreting follicles of the hair, induced by impetigo, fevers, chronic eczema, scyosis, &c. The variety described by WILLAN, under the name of *Porrigo decalvans*, is the most remarkable which comes under the present head. The scalp, or skin of the chin or cheeks of persons affected with it, presents one or more patches, frequently of a circular form, entirely devoid of hair, although surrounded by that of the natural growth. The skin of these patches is smooth, without redness, and often unusually white; and their areas extend gradually. When several exist near each other, they ultimately unite. A large portion of the scalp may be thus denuded of hair. Neither vesicles nor pustules, nor any other kind of eruption, can be detected in the surface of these patches. This affection occurs commonly in the hairy scalp, and in children; but it is not infrequent in adults, and in the beard. In children it often assumes an irregular serpentine or winding form. I have seen it in them associated with various disorders of the digestive organs, and occasionally with those of the brain; but it has also been apparently independent of any internal affection. Dr. ELLIOTSON has seen it in a child with disease of the brain (*Lond. Med. Gaz.*, vol. vii., p. 639, and vol. viii., p. 30). The cases which I have met with in adults were not connected with any other disorder. I agree with GOOD, RAYER, and TODD in viewing it as a variety of alopecia, and entirely unconnected with porrigo.

25. A variety of partial alopecia has been noticed by MM. MAHON, RAYER, and myself, that differs from the preceding chiefly in the appearance of the affected surface, and in the presence of a few altered and brittle hairs. In this latter respect it nearly approaches the morbid state of the hair already mentioned (§ 10). On one or more circular patches, the hair seems broken off to within a line or two of the skin. The surface of the patches is dry, appears rough to the eye, and feels more so to the touch. It is slightly bluish, and a fine, white powder can be detached from it. The affection begins at a point, and spreads, similar spots forming in the vicinity of the one which first appeared. These may extend until nearly all the scalp becomes affected.

ii. DIFFUSED ALOPECIA.—SYN. *Calvitie*, *Depilatio*, *Defluvium Pilorum*, Auct. var.; *Trichosis Atheriz*, Good.

26. CHARACT.—*The decay or fall of the hair occurring in a diffused or general manner; the hair*

becoming gradually thinner, commonly, at first, on the crown, or on the forehead and temples.

27. Decay of the hair in a gradual and diffused manner may take place prematurely, and as a consequence of disorder of the digestive organs, or of the constitution, or of a local affection of the scalp extending to the pilous follicles. It is often an indication of premature exhaustion of organic nervous energy. *Congenital absence*, or defective development of the hair of a permanent kind (§ 21), has been rarely observed. Instances of it have been recorded by HEISTER, DANS, WELLS, and RAYER. Premature loss of hair is not confined to the scalp, but often extends to the eyebrows, beard, and other parts of the body. It may be even general. Mr. SOUTH (*Translation of Otto's Pathology*, p. 120) mentions a case most probably of this kind. A total loss of hair, however, is more common than general defective development of a permanent kind, and is met with chiefly in mature or far advanced age. J. P. FRANK saw it in a young man; and instances of its sudden occurrence are recorded by PAULINI and HEISTER, and in the *Journal de Physique* (t. xiv.), and in the *Berlin Medical Transactions* (t. iii., p. 372). Most commonly, the hair of the head, of the axillæ, and pubes gradually and successively fall off. In rare instances, the hair has been renewed of a finer quality, as in the cases recorded by LEMERY and BONINA (*Journ. des Progrès, &c.*, t. xiv., p. 244). A singular case of baldness, confined to one side of the body, is related by RAYATON.

28. CAUSES.—A. The *remote causes* of baldness are whatever debilitates and exhausts the system, as profuse or prolonged discharges; dangerous hæmorrhages; masturbation, or immoderate indulgence of the venereal appetite; low, typhoid, or adynamic fevers; care and disappointments; the depressing passions and anxiety of mind; excessive application to study; the contact of rancid, septic, or putrid animal matters with the scalp; more rarely the syphilitic poison, and the frequent or prolonged use of mercury. It may also be caused by exposure to the sun's rays; by the fumes of quicksilver, by the friction of a military cap or helmet; by eczema or other chronic eruptions of the scalp, and by the use of tobacco. It has been said to be endemic in some places. LEO AFRICANUS has stated that baldness is common in Barbary; TOURNEFORT, that it is almost universal in Mycone, one of the Cyclades; and Sir R. SIBBALD, that it was frequent in Shetland in his time, owing to the fish diet of the inhabitants. That living chiefly on fish, and on poor, unwholesome food may aid in its production, is not improbable. The salts of sea-water left in the hair will sometimes cause it indirectly. Extreme distress of mind has produced a general loss of hair within twenty-four hours; but such instances are extremely rare. Since HIPPOCRATES, it has been said that eunuchs do not become bald; and SCHENCK remarks that baldness does not commence until after the generative functions are exercised. It is certainly much less frequent in females than in males.

29. HISTORY AND PATHOLOGY.—A. The fall of the hair may take place in a few days, or even in a shorter period; or so slowly as to escape observation. The skin of the denuded

part usually presents the ordinary appearance, especially in senile alopecia. In some cases it is pale, or of a dead, whitish colour, and furfureous; and occasionally it is covered by scurf, or scales, and is distinctly inflamed. In the former case, its sensibility is not materially altered; in the latter, there is heat, itching, or pricking. The hair is often more or less altered before it falls out, being thin, harsh, dry, weak, and stunted, or deprived of colour. This is most frequently the case when it proceeds from causes acting directly on the scalp, and from chronic eruptions of this part.

30. B. Loss of the hair proceeds from changes in the bulbs, 1st. From atrophy or wasting of the follicles, as in senile alopecia, and in that state of the affection which is produced by excessive venereal indulgences; 2d. From an impaired or suspended vital action of the pilous follicles, as in the alopecia that takes place suddenly or rapidly from mental emotions, &c.; in that which follows malignant adynamic or putrid fevers; and in that variety which has generally been known by the name of *porrigo decalvans*; and 3d. From chronic inflammation, extending to the bulbs. Equally important with a knowledge of the particular condition of the follicles of bulbs to which the loss of hair is to be imputed is the investigation of the affections with which it is related, or upon which it is dependant. Although alopecia is often a strictly *local* and *primary* affection, proceeding directly from local causes; yet it as frequently depends upon disorder of the digestive and assimilating organs, and upon the general state of the system. As Dr. T. J. TODD justly remarks, it may arise not only from a change primarily induced in the follicles, but also from the extension of disease to them from the tissues in which they are situate. In this latter case, the alopecia may be also *local*, but it is *consecutive*, the follicles being altered by becoming involved in the inflammation constituting an adjacent cutaneous disease. The baldness following eczema, porrigo, impetigo, &c., is an illustration of this.

31. C. Alopecia is most frequently *symptomatic* of debility or cachexia, produced by the exhausting causes enumerated above (§ 28). After fevers, the hair is generally exfoliated with the cuticle, and sometimes even with the nails; but as the follicles have their vital actions restored, the hair is reproduced. When, however, the hair falls out in phthisis, diabetes, and other cachectic maladies, no attempt at restoration takes place. Alopecia may also be symptomatic of chronic inflammation of the digestive mucous surface; indeed, this is a frequent cause of it. The connexion of this state of the digestive organs with chronic cutaneous eruptions is fully established and well known; and the pilous follicles are sometimes the parts of the integuments affected thus sympathetically; the affection implicating them either principally or solely, or in conjunction with other parts of the skin. This dependance upon, or connexion with derangement of the digestive, and even of the biliary functions, should never be overlooked in practice; for, although I cannot agree with BROUSSAIS and his followers that the external change is produced by the internal inflammatory irritation, or that the internal complaint is so generally inflammatory

in its nature as they would make it appear, yet I am convinced that there is a very close connexion often existing between the internal and external affection, both affections generally proceeding from, and being associated by the same pre-existent disorder; which disorder may generally be referred to the state of organic nervous function or power.

32. TREATMENT.—A. In limited or partial alopecia, more particularly that variety usually called porrigo decalvans, and in all those cases that appear independently of inflammatory action, that depend upon the first and second pathological states enumerated above (§ 30), stimulation of the parts, by the decoction of walnut-tree leaves, or of the leaves of the solanum; by the infusion of rosemary, or of the lesser centaury, or of mustard-seed; by various spirituous and aromatic washes; by ointments containing the tincture of cantharides, or some essential oils; or by embrocations of thyme, lavender, the juice of onions, of garlic, &c., has been very generally recommended. M. RAYER, however, does not consider this practice very successful. Dr. WILLIS has seen the common mercurial ointment prove of service. An ointment, with the iodide of sulphur (ʒj. of iodide to ʒvj. or ʒj. of ointment), may be rubbed on the part night and morning. This ointment has been much employed by me in affections of the skin and scalp since 1824. The balsam of sulphur, applied to the scalp, is praised by RULAND; a solution of the sulphate of copper in spirits, by some recent writers; and blisters, by ARNDT. I have seen a strong solution of the nitrate of silver, in some instances, and either an infusion of capsicum, or ointments with the tincture, in others, applied to the affected surface, and persisted in for some time, restore the hair. DUPUYTREN generally prescribed an ointment with a strong tincture of cantharides. I have, in several cases of baldness, of the kind under consideration, employed an ointment containing the balsam of Peru with complete success. It has the effect of rendering the hair thick and persistent, and of promoting the growth of it in parts from which it had fallen out from impaired action of the follicles. The following is the formula that I have usually employed:

No. 244. R Adipis Præparate ʒj.; Cere Albu ʒss.; lento igne simul liquefac, tum ab igne remove, et, ubi primum lentescat, Balsami Peruviani veri ʒij.; Olei Lavandulæ ʒiij., adice, et assiduè move donec refrigererit.

33. When alopecia proceeds from eczema, impetigo, fevers, &c., the treatment should be entirely directed to the removal of these eruptions. When this is accomplished, and the skin remains dry, tense, or furfuraceous, the part should be shaved, and the surface anointed with the above ointment, or with some substance of a similar nature, as an ointment with the oil of mace, &c. The tincture or infusion of tobacco, as recommended by ZACUTUS LUSITANUS, and often empirically resorted to, will also be of service in this and in some other states of the disorder. In every form of the affection, the digestive, assimilating, and excreting functions should be regulated or assisted; and associated internal congestions, or inflammatory irritations, removed by appropriate means. Alopecia, as well as premature grayness of the hair, is often caused by disorder

of these functions, and associated with these internal diseases; and neither the one nor the other can even be retarded in their progress, unless the treatment be directed with a strict reference to these pathological connexions.

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VII. TRICHOMATOSE HAIR.—*Syn.* *Τρίχωμα*, *Plica Polonica*, *Plica Polonica Judaica*, *Auct. var.*; *Plica Saxonica*, *Linnæus*, *Vogel*; *Plica Belgarum*, *Schenck*; *Trichoma*, *Manget*, *Sauvages*, *Cullen*; *Lues Sarmatica*, *L. Polonica*, *L. Trichomatosa*, *Auct.*; *Trica*, *Trica Incuborum*, *T. Scroforum*; *Cirragra*, *C. Polloworum*; *Affectio Sarmatica*; *Helotis*, *Agricola*; *Ephyma Trichoma*, *Young*; *Trichosis Plica*, *Good*; *Plica*, *Rayer*; *Plica Cachectica*, *Author*; *Weichselzopf*, *Indenzopf*, *Germ.*; *Gwozdziec*, *Pol.*; *Plique*, *P. Polonais*, *Fr.*; *Plica Polonica*, *Ital.*; *Plicose Hair*, *Felted Hair*, *Cachectic Plica*.

CLASSIF.—3. Class, 3. Order (Cullen). 6. Class, 3. Order (Good). IV. CLASS, IV. ORDER (Author).

34. DEFIN.—*The hair thickened, softened, felted, and agglutinated by a morbid secretion from their bulbs and from the scalp.*

35. The anomalous development and agglutination of the hair, occasionally observed in Poland, and more rarely in some adjoining countries, and peculiar to them, has attracted much attention during the last two centuries. It frequently appears in the course of some acute or febrile disease, or of some chronic internal complaint; but it also occurs, although more rarely, as the primary or principal malady. Hence it has been considered by some writers as an idiopathic disorder; but by others, and very recently by Dr. MARCINKOWSKI and BRIÈRE DE BOISMONT, who had frequently seen it in Poland, chiefly as a contingent critical affection.

36. i. DESCRIPTION.—After an attack of acute fever, characterized by languor, pains in the limbs and head, vertigo, an invincible disposition to sleep, rushing noises in the ears, pains in the orbits, injection of the conjunctiva, coryza, and sometimes clammy sweats, indications of plica are sometimes observed. Occasionally the febrile disorder is attended by redness of, or by an eruption on the skin, and an offensive perspiration. M. LEBRUN and the writers just named state that it may occur in the course of any acute or chronic affection of the brain, or of the viscera of the chest or abdomen; and that, although it often is observed in the young and robust, it always is preceded and attended by more or less febrile or internal disease. Hence the remarkable differences in the descriptions of the constitutional symptoms attending it, as furnished by most authors; and hence the reason for viewing it as proceeding from a cachectic state of the constitution developed by these complaints, and by the peculiar habits and circumstances of those attacked by it. According to this, the opinion of Drs. MARCINKOWSKI and BRIÈRE DE BOISMONT, that it is generally *critical*, and should be treated by means directed to the primary disorder, will appear perfectly rational. M. JOURDAN and others contend that it is both primary or *idiopathic* and *critical*; and that in the first form it appears suddenly or in a short time, attended by severe pains, resembling those of rheumatism or gout; in the second, it supervenes slowly, in the advanced course of various affections different in nature and character, but generally accompanied with viscous perspirations of the head. The scalp is most commonly or chiefly affected, but the hair in other situations and the nails are frequently also implicated.

37. The scalp is sore to the touch, excessively sensible and itchy; a clammy, offensive sweat exudes from it, and agglutinates the hair, which loses its lustre, and appears thickened, softened, or distended by a glutinous fluid of a reddish or brownish colour. This fluid is produced at the extremities of the bulbs, and is transmitted to the ends of the hair. A peculiar offensive smell attends this exudation from the hair and scalp. The hair is matted or agglutinated in different ways; sometimes in single locks of various thickness and length, re-

sembling ropes—*Male Plica*—*Plica multiformis*. Occasionally the hair is stuck together in one mass or cue—*Plica caudiformis*; and in other instances it is felted into a mass or cake of various sizes—*Female Plica*. The hair of the beard, pubis, and axillæ may also present similar appearances. When thus diseased, the hair often acquires a great length. Instances of its reaching the length of some yards are adduced by the writers referred to at the end of this article. Professor KALTSCHMIDT possesses the pubes of a female, the hair of which may have readily reached round the body. The surface of the scalp is often covered with superficial ulcerations, or with incrustations formed by the morbid exudation; and numbers of *pediculi* are frequently seen in this and in other parts of the body. The nails of the hands and feet commonly become long, hooked, yellowish, livid, or black.

38. MECKEL injected the scalps of two persons who died with plica, but none of the injection reached the bulbs of the hair. J. FRANK and LA FONTAINE found the hair-bulbs much enlarged, and full of a yellowish glutinous fluid; GILBERT also observed them distended by a dark fœtid matter. SCHLEGEL states that the hairs are enlarged, and filled with a yellowish-brown fluid; and ROLFINCH and VICAT say that they are so frequently distended with this fluid as to burst, and to discharge it externally. Similar changes have been observed by GASC and others. M. BLANDIN remarked the bulbs to rise above the level of the skin, within the infundibuliform cavity of the root of the hair, as the papilla or bulb of the feather elongates and produces the quill in the young bird (RAYNER). M. SEDILLOT found, on examining trichomatous hair with a microscope, the internal canals much larger than in healthy hair, and the cellular cavities near the canal much more distinct than usual. That the hair neither bleeds when divided, nor is sensible, has been shown by BOYER and others. The morbid sensibility attending the complaint is seated in the scalp and hair-bulbs.

39. ii. CAUSES.—Plica is said to have first appeared in Poland near the end of the thirteenth century. The earliest writers on the disease speak of it as well known. It is now wearing out. It has always been more frequent on the banks of the Vistula and Borysthènes, and in damp and marshy places, than in other parts of Poland. Very rare instances of it have been met with in Holland, Saxony, and some other places in Germany. Its endemic origin seems well established. LA FONTAINE states that, in the provinces of Cracow and Sandomir, plica affects the peasantry, beggars, and Jews in the proportion of two thirds in ten; the upper classes in that of two in thirty or forty. In Warsaw and the vicinity it attacks four out of forty or forty-five of the former class; and three out of ninety or a hundred of the latter. He assigns the same proportions to Lithuania as to Warsaw, and the same to Volhynia and the Ukraine as to Cracow. SCHLEGEL, GASC, HARTMANN, and other recent writers consider that the disease is not nearly so frequent as here stated. This malady appears in the human species primarily, and it is said also to affect the lower animals; but there has been no proof adduced of its

transmission from the former to the latter. It has been supposed to be contagious, but this opinion has been shown to have been unfounded.

40. *a.* Among the *remote causes* of plica, wearing the hair long and applying to it oils and ointments, often rancid (GILBERT); neglect of personal cleanliness; keeping the head warm or covered with thick woollen or fur caps; using heating aromatic substances to the head, and covering it with warm applications and dresses with the view of procuring a critical discharge from it, especially in rheumatic or other diseases of this part, are the most influential. SCHLEGEL imputes plica chiefly to the use of semi-putrid fish and damp residences; and doubtless these often concur with the foregoing in predisposing to or in exciting the affection.

41. *b.* M. JOURDAN considers this complaint, in respect of *its nature*, to consist of an increase of the vital functions of the bulbs of the hair and of their secretions, with augmented sensibility. BALDINGER imputes it to rheumatic acrimony, attended by an increased secretion from the bulbs. FRANCK, WOLFRAMM, and LARREY view it as a consequence of, or as connected with secondary syphilis; and many of the writers referred to, as a critical discharge, determined to the hairy scalp by the concurrence of several of the causes just enumerated. By most of the authors, however, who have closely watched this affection, it has been considered as *sui generis*, and as seated essentially in the bulbs of the hair. SCHLEGEL, LA FONTAINE, ROBIN, CHAUMETON, MOUTON, and numerous others have shown that it is not a product of neglect or dirt, otherwise it would have been seen in other countries as well as in Poland; that the bulbs of the hair exude a peculiar viscid secretion, which may be seen issuing from them when the morbid hair is removed; that they are found swollen and acutely sensible; that it is often attended by a similar change in the nails; that it is frequently a marked crisis of other maladies; and that it cannot be quickly removed without danger. Much of the difference of opinion as to the origin and nature of plica, and as to the consequence of removing it, has arisen from confounding the false (§ 12) with the true disease.

42. *iii.* DIAGNOSIS.—The precursory and characteristic symptoms are such as readily distinguish true plica from the false, or the felting of the hair caused by neglect of cleanliness, &c., and from every other affection. The agglutination of the hair by a nauseous exudation from its roots, the enlargement of the bulbs, the swelling and softening of the hair itself, and the attendant alteration of the nails, are peculiar to this complaint.

43. *iv.* TREATMENT.—The occurrence of plica in persons affected with various serious diseases has sometimes proved beneficial. In such cases it should not be interfered with until the agglutinated mass is pushed at some distance from the skin by the growth of healthy hair. When plica is left to itself, the febrile and other symptoms very frequently disappear of themselves. After several months, or a year, or even longer, the morbid exudation decreases or entirely ceases; and as an effect of the growth of the hair, the diseased portion is

removed to a distance from the surface. It is only then that the Polish physicians recommend the hair to be cut. SCHLEGEL, LA FONTAINE, HARTMANN, MOUTON, and other experienced writers contend that the removal of the diseased hair before this time has been followed by amaurosis, palsy, convulsions, epilepsy, apoplexy, and even by death. Warned by these consequences, and considering the exudation from the scalp and pilous bulbs as a poison—"virus trichomaticus"—the expulsion of which from the system is essential to recovery, the Polish physicians frequently carry the principle of non-interference to an injurious length. At the same time, it must be admitted that a premature removal of the diseased hair and suppression of the morbid exudation is very likely to prove injurious upon the principles stated above, and insisted upon in various parts of this work; especially if such interference be not attended, and its consequences not prevented by the exhibition of means which will eliminate effete or morbid matters from the circulation, by increasing the functions of other emunctories, particularly of the intestinal canal, kidneys, and skin. If, therefore, the hair become dry and sound at its roots, the best informed observers agree in removing it, the head being kept moderately warm afterward; but, as long as the bulbs continue inflamed, morbidly sensible, and exude a viscid fluid, other means of cure should be prescribed. What these means, however, are, is a matter that has not yet been fully shown; and certainly the internal remedies recommended by most of the writers on plica are but little calculated to remove the morbid conditions on which it depends.

44. The marked disorder of the digestive and excretory organs, acknowledged to attend or precede the appearance of plica, although never viewed in sufficiently close connexion with its causation, indicates the propriety of directing at least a part of the means of cure to these organs. The antecedent *plica*, and the morbid states of all the secretions and excretions, show the propriety of having recourse to purgatives—cholagogue, deobstruent, stomatic, and others, according to circumstances—in the treatment. It is to the general neglect, in Poland especially, of these and of other evacuations, in the early stages of acute and chronic maladies, that the occurrence of this affection is, in my opinion, chiefly to be attributed. That purgatives are of service in plica, is shown by the admission of the good effects resulting from them, by HUFELAND, DE LA FONTAINE, and KUSTER. From the manner in which the means of cure have been recommended in works on plica, it is very obvious that most of them are employed altogether empirically. The *Lycopodium clavatum* is much used, both externally and internally, but some writers consider it inert. Various preparations of mercury, antimony, sulphur, zinc, &c., have been employed; and emetics, diaphoretics, anodynes, and narcotics have severally been insisted upon. It is obvious that these may be either serviceable or injurious, according to the circumstances of the case, and the manner of prescribing them. DE LA FONTAINE and KUSTER prefer sulphur and antimony, and their combinations, especially the oxy-sulphuret of

antimony. J. FRANK praises sulphur and opium. For the debilitated and aged, it is obvious that tonics, or a combination of tonics and aperients, are necessary. Personal cleanliness, warm baths, and suitable diet, are also requisite.

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HEADACHE.—*SYN.* Κεφαλαλγία (from κεφαλή, the head, and ἀλγέω, I suffer pain); Κεφαλαία, Ημικρανία (from ἡμι, half, and κρανιον, the skull). *Cephalalgia*, *Cephalaa*, *Hemicrania*, *Auct. Lat. var. Dolor Capitis*, *Sennert*, &c. *Dolor Cephalicus*, *Hoffmann*. *Capiple-nia*, *Baglivi*. *Gravedo Capitis*, *Carebaria*, *Karpharia* (from καρφ, the head, and βαρυς, heavy), *Podagra Capitis*, *Clarus*, *Clarus Hystericus*. *Mal de Tête*, *Céphalalgie*, *Migraine*, *Fr. Kopfschmerz*, *Hauptwehe*, *Germ. Mal di Capo*, *Cefalca*, *Ital. Pain in the Head*, *Megrin*.

CLASSIFICA.—4. *Class*, 4. *Order* (*Good*).

IV. CLASS, III. ORDER (*Author*.)

1. DEFIN.—Pain in the head, with intolerance of sound, sometimes also of light, and incapability of mental exertion.

2. Headache has too generally been referred to disorders of those viscera of the abdomen

with which the head sympathizes, even when manifestly proceeding from morbid states of parts enclosed by the cranial bones. It should, however, be recollected that the primary affections, of which headache has been viewed as a symptom merely, much more frequently exist without than with this attendant; and that, when thus accompanied, some pre-existent or contemporaneous affection of the head is often actually present, either independently or as an intimately related complication of these reputed primary disorders, and is only aggravated or rendered more manifest by them. Besides—and the circumstance cannot be too strongly impressed upon the young practitioner—those very disorders so generally considered the source of headache are not infrequently produced by an affection of the brain; for pain of the head, although a common symptom of it, is neither universally nor constantly present, but is very frequently altogether wanting at an early or an advanced period; so that disease of the brain itself may, in the first place, disorder the digestive or other functions, this disorder reacting upon the brain, or on the nerves more immediately related to it, and exciting or otherwise altering their sensibility, so as to give rise to headache and other symptoms actually depending upon the brain, although developed and rendered manifest by the sympathetic disturbance of the digestive organs. When this takes place, the means of cure directed to the supposed primary disorder, but really to the symptomatic affection, by removing it, and by modifying the current of the circulation, frequently relieves the disease of the brain, as far as morbid sensibility is concerned; and the relief is more or less complete or permanent, according as the prescribed means affect both the symptomatic and the primary disorder. That secondary or sympathetic affections are often thus mistaken for the primary, will be manifest to every experienced and acute practitioner upon reading Dr. WARREN'S paper on headaches; for many of the symptoms he has enumerated as indicative of primary disorder of the stomach and intestines are often either dependent upon the state of the circulation within the head, or associated with an affection of this part, and are resulting phenomena of previous disorder of the organic nervous system.

3. The dependance of disorder of the digestive organs and of the altered sensibility of the head upon the state of organic nervous influence has been overlooked by pathologists, owing to the brain having been generally, but erroneously viewed as the source of nervous and vital energy, and to the dominion which the stomach has been supposed to exercise over the functions of other organs through the medium of the brain. But it has been shown in another place (see art. DEBILITY, DISEASE, &c.), that the brain performs other offices than that of generating organic, nervous, or vital power; that it is enabled to perform its appropriate offices by the vital influence it derives from the organic nervous system; and that the stomach is dependant upon the same source as the brain for the discharge of its functions. Instead, therefore, of considering headache to proceed so frequently from disorder of the digestive organs, as some recent writers sup-

pose, I view both the one affection and the other as often associated phenomena resulting from other morbid conditions; and while I grant that it sometimes arises from that source, I contend that it then appears as a contingent phenomenon only, for when one part of the circle of organic nervous influence is disturbed, other parts frequently become also disordered. as hereditary constitution, previous disease, latent vice, or habits of life may have predisposed particular organs or structures. Moreover, it seems extremely probable that various morbid states of parts contained within the cranium are indicated by pain before they have proceeded so far as to induce change of structure, or even without occasioning this result. The existence of altered sensibility of the ganglial nerves, distributed to the head, may be admitted without any very evident alteration of the parts they supply being thereby induced. Observation has proved that the degree of pain is no index to the danger or extent of disease, as the most severe headaches are often unattended by any other evidence of organic lesion; while the most extensive disorganization is frequently accompanied by little or no headache.

4. From this it will appear that headache should be viewed as a symptom of disorder within the cranium, although not of altered structure, more frequently than it usually is; that it should be oftener assigned to a change in the organic nervous energy and sensibility in this situation; and, consequently, that it is oftener a primary disorder than it has been generally considered. In treating, therefore, of headaches, I shall view them with strict reference to pathological states. Some of these states are such as do not admit of the headaches they produce being viewed otherwise than as symptoms; but others allow a nearer approach to a primary or idiopathic form, especially where local or general causes of exhaustion or depression occasion the complaint.

5. When called to a person suffering, or liable to severe headache, the rational practitioner is led to inquire as to the *causes* and *seat* of pain, and as to its *nature*. But these are among the most difficult points to determine in practical medicine. The *causes* are most numerous and diversified, and yet they have a more or less intimate relation to the kind or form of the pain that results. The *seat* of pain is determined with great difficulty even when it admits of recognition, and in many cases it is impossible to ascertain it with any degree of precision. In order to arrive at a just conclusion, a number of circumstances—the history of the case, with its causes and progress, the existing symptoms, and more especially those which more directly relate to the functions of digestion and excretion, and to perception, sensation, and locomotion—must be carefully observed and cautiously estimated. When the external or superficial parts of the head are chiefly affected, the exact *seat* and *nature* of the disorder are sometimes manifest. But, even in this case, the external affection may be only the consequence of previous disease of internal parts, the exact nature or seat of which can be only surmised in many instances. Disease of the membranes is generally attended

by pain; but when it is chronic, and even when acute, if pressure of the brain is caused by it, no headache may be felt. When the more internal parts, especially the fibrous or medullary structure, are altered, pain is only an occasional symptom. Indeed, whenever the substance of the brain is chiefly affected, the pain should be ascribed rather to those parts of the membranes, or of the ganglial nerves supplying the brain that had become implicated in the disease, than to the brain itself. Although it is the brain that feels alteration of sensibility induced in morbid parts, yet its own sensibility is so obscure, or so deficient, as seldom to be either excited or perverted when itself is the seat of lesion. Besides this, when the disease of the brain is attended by pain, the pain is rarely referred to the internal parts of the head, but either to some superficial situation, or to the head generally, in a confused or indistinct manner; or to some more or less distant part having an intimate nervous connexion with the seat of disease.

6. The difficulty of ascertaining the *nature* of headache cannot be considered so great as that of determining the seat of it. Indeed, it is often from inferences as to the nature of headache that we are enabled to form any notion of its seat. A careful inquiry into the causes of the pain in every case, and a due estimate of the constitution, habits of life, previous ailments, and existing state of the patient will generally enable the physician to determine as to which of the different forms of the complaint into which I have divided it individual cases belong. The *kind* of pain, especially, should be inquired into with the utmost precision. Its severity, its character, the state of the senses and of the general sensibility, the temperature of the scalp, &c., ought to be ascertained. The *pain* may be either slight or intense, or characterized as heavy, dull, indistinct, diffused, numbing, compressive, constrictive, tensive, acute, burning, rending or bursting, or splitting, darting, lancinating, plunging, cutting, tearing, gnawing, boring, pulsating, or throbbing, &c.; but whichever of these may exist, the mode of its accession and subsidence; its duration, remissions, and exacerbations; the circumstances alleviating or aggravating it; the extent and situation of it; and its connexion with affections of sight, with noises in the ears—the character of these noises—and with derangements of sensation, touch, and muscular action in any part of the body, ought to be carefully remarked. The state of the mental operations, of the articulation, and of sleep in respect both to its manner and duration, should also receive attention. It is only from a careful estimate of these circumstances—of all the functions depending upon the cerebro-spinal system in connexion with the state of the digestive, excreting, and circulating functions—that a correct opinion as to the nature of headache can be formed. There is no disorder which tries the science, experience, powers of observation, and acumen of the physician more than this does; and there is none that requires a more precise estimate of the pathological conditions on which it depends, as a basis for safe and successful indications of cure. From this it will appear that a comprehensive division of the varieties of headache,

without being either complicated or unnecessarily minute, is requisite to the due consideration of so important a subject as this.

7. SAUVAGES divides headache into three species: *Cephalalgia*, or acute headache; *Cephalæa*, or chronic headache; and *Hemicrania*, or partial or local headache. Under the first he enumerates the following varieties: the *plethoric*, *catamenial*, *hæmorrhoidal*, *dyspeptic*, *febrile*, *throbbing*, *intermittent*, *puerperal*, *inflammatory*, *catarrhal*, *nervous*, *hysterical*, and the *metallic*. Under the second species he adds the *syphilitic*, *scorbatic*, *arthritic*, *remittent*, *melancholic*, the *Polish* or *plicose*, and the *serous*. Under the third, pains of the eyes and sockets, in the frontal sinuses, and the *catarrhal* and *hysterical*, *hæmorrhoidal*, *purulent*, *nephralgic*, and the *lunatic hemicrania*. It is obvious that this enumeration is deserving of attention only in as far as it shows the symptomatic states of the disease. SAGAR adopts the division of SAUVAGES without any material alteration. J. FRANK, also, follows it partially, and enumerates four species, viz., *Cephalalgia*, *Cephalæa*, *Hemicrania*, and *Clavus*. He considers that headaches, in respect of their nature, may be farther divided into *inflammatory*, *rheumatic*, *gastric*, *arthritic*, *scorbatic*, *periodic*, *scrofulous*, *carcinomatous*, *syphilitic*, and *nervous*.

8. Dr. GOOD has taken a very superficial view of the pathology of headache, and the surgical editor of his work has added nothing to the text. He divides headaches into the *stupid*, *chronic*, *throbbing*, and the *sick*, and *megrim*. Every practitioner of experience must have met with, if he have not actually experienced in his own person, headaches which at one and the same time possessed all the characters Dr. GOOD has enumerated as marking distinct species. Dr. BURDER has given a more correct division of the complaint, but it is deficient in some important particulars. The varieties, according to him, are, *muscular*, *periosteal*, *congestive*, *organic*, *dyspeptic*, and *periodic headache*. Dr. WEATHERHEAD divides headaches into *dyspeptic*, *nervous*, *plethoric*, *rheumatic*, *arthritic*, and *organic*. The division adopted by SAUVAGES is complicated, and, notwithstanding its apparent minuteness, deficient. The arrangements of recent writers are even still more defective.

9. The several varieties of headache will be more advantageously considered according to the following arrangement: 1st. The *nervous*, from depression or exhaustion; 2d. The *congestive*, from impeded circulation in the brain or its membranes; 3d. The *plethoric* and *inflammatory*, from general plethora, active determination of blood to the head, or inflammatory action; 4th. The *dyspeptic* and *bilious*, from disorder of the stomach, liver, or bowels; 5th. The *cerebral*, from organic change within the cranium; 6th. The *pericranial*, from disease of the pericranium, or bones of the cranium; 7th. The *hemicranial* or *limited*, confined to a spot, or neuralgic; 8th. The *rheumatic* and *arthritic*; 9th. The *periodic*; 10th. The *hypochondriacal*; and, 11th. The *sympathetic*, from disorder of the uterine and urinary organs.

10. i. NERVOUS HEADACHE.—A. Causes.—a. This variety is most frequent in females, in persons of the nervous temperament, and in those possessing high susceptibility and delicate constitutions. Venereal excesses, masturbation, intestinal worms, the abuse of calo-

mel or other mercurials, and whatever depresses or exhausts nervous or vital energy, predispose to it.—b. It is often excited by exposure to cold, or to cold and humidity conjoined; by northerly or easterly winds; by the more extreme electrical states of the air, or by sudden vicissitudes of these states; by prolonged or excessive lactation; by losses of blood, menorrhagia, leucorrhœa, or other discharges; by low diet and prolonged fasting; by the depressing passions, alarm, fear, grief, and anxiety of mind; by want of sleep, or inordinate mental or physical exertion; by the improper use of mercury or other depressants, as tobacco, digitalis, &c.; by various odours or mephitic vapours or gases; and by the impure air of crowded or insufficiently ventilated rooms. Sleeping in apartments containing plants in flower, the fumes of burning charcoal, or of turpentine, and recently painted rooms, not infrequently cause it. The irritation of adjoining parts, as caries of the teeth and disease of their fangs, sometimes also occasion it, especially on the same side of the head as the seat of irritation. I have seen the most intense state of this affection produced by the injudicious application of cold to the head, by too copious depletion, by floodings, and by a residence in low, cold, and humid localities. Nervous headache is common to females during the catamenia, especially when excessive or too frequent. It is often, also, indirectly caused by intoxicating liquors. HEINIMANN very justly notices it as a not infrequent attendant upon general *anæmia* resulting from disease or improper treatment. I believe that some degree of *cerebral anæmia* very often attends, if it does not produce this variety of headache.

11. B. Nervous headache is often sudden in its attack and termination; is frequently acute, excruciating, lancinating, or darting; sometimes constrictive, or attended by a sensation of the temples being pressed together; occasionally accompanied with vertigo, a feeling of sinking and dread of falling, or with great nervous agitation or restlessness, and sometimes confined or limited to a narrow space. The patient is incapable of thought and of physical and mental exertion. The sight is often dim or impaired, dark spots or meshes moving before the eyes. In some instances, the eyes become sunk, and the countenance depressed or collapsed. The pulse is small, occasionally frequent, but generally languid, and always compressible. The pulsation of the carotids is small or weak. The head is cool, and the face more pallid than natural. The stomach is liable to disorder, especially to acidity and flatulence, and the bowels are often costive. This headache is frequently worse in the morning and through the day, and abates in the evening. During severe attacks, wakefulness, dizziness, loss of memory, general susceptibility of the nervous system, &c., are usually complained of.

12. ii. CONGESTIVE HEADACHE.—The state of the circulation within the head, the manner in which the blood is returned from the brain, the partial protection of the parts contained in the cranium from the physical influences exerted upon the rest of the general surface, and the periodical changes in the position of the head and in the exercise of the functions of the

brain, would seem, on a superficial view, to favour the occurrence of congestion in this part. Yet, if these circumstances be more closely contemplated, there is at least equal evidence that they essentially tend to preserve the brain from passive congestion on the one hand, and inflammatory determination on the other, as well as from the more serious contingencies consequent upon that minute division of the extreme vessels required for the exercise of the various cerebral functions. The congestion occasioning this form of headache is seldom general, but commonly limited to, or seated chiefly in one hemisphere or lobe of the brain, or one or more lobes, either in their vertical or basilar aspect.

13. *A. Causes.*—Congestive headache is produced by pre-existent disorder, especially by repeated attacks of nervous or dyspeptic headache, and of active determination of blood to the brain. It often follows adynamic fevers, phrenitis, congestions of the lungs, and impeded circulation through the heart; and it is not infrequently caused by the circumstances that sometimes give rise to nervous headache, particularly the depressing passions, cold and humidity, miasmata, noxious gases, mephitic vapours, and crowded rooms. The use of opium, belladonna, aconitum, and other narcotics, occasionally also produces it, especially in certain idiosyncrasies, or in large doses. Tight neckcloths, stooping, and a too low position of the head during sleep, also occasion it. The headaches following the inordinate use of intoxicating liquors are to be referred to this and the preceding variety, rather than to disorder of the digestive organs or any other pathological state. Prolonged or intense mental occupation often gives rise to congestive headache; the repeated or continued determination of blood to the brain, thereby produced, passing into congestion, owing to exhaustion of nervous power; and this state, if allowed to continue, or frequently produced, often terminates in apoplexy or palsy. This variety is most frequently observed in persons advanced in life, and in those who have exhausted their vital energies and injured their constitutions by dissipation or intemperance.

14. *B. The most characteristic symptoms* of this variety are, the dull, gravative pain, and sense of weight in the head; frequently stupor, heaviness, or giddiness; dimness of sight; buzzing, ringing, or humming noises in the ears; and heaviness or pallor of the countenance. The pain is often referred to one part of the head chiefly, probably owing to the congestion being greater in one part than in another (§ 12). The patient experiences great increase of vertigo when looking up, or when stooping or looking down from an eminence; he sometimes complains of a sense of coldness in the head, of fatigue or prostration of strength, coldness of the extremities, and of susceptibility of the nervous system. Sleep is often sound, heavy, or snoring; occasionally it is disturbed or restless, and attended by dreams, or by convulsive movements. The spirits are depressed, or almost hypochondriacal. The pulse is languid, weak, or small, occasionally accelerated. The bowels are torpid, and the biliary secretion deficient or morbid. The urine is loaded, and deposits a copious sediment.

15. iii. HEADACHE FROM PLETHORA AND INCREASED VASCULAR DETERMINATION OR ACTION.

—*A. The predisposing causes* of this variety are, the earlier and middle periods of life, the male sex, plethoric habits of body, sanguineous and irritable temperaments, full living, indolence, indulgence in bed, neglect of regular exercise in the open air, and mental exertion.—*B. The exciting causes* are, all the circumstances which either increase the vascular plethora resulting from the predisposing causes, or determine an increased flow of blood towards the head, especially neglect of accustomed depletions; the suppression of discharges and eruptions, particularly of epistaxis, the catamenia, and hæmorrhoids; exposure to the sun; intemperance in eating or drinking; premature or inordinate mental culture, and exercise of the intellectual powers; every kind of mental excitement; fits of passion; the supine posture, with the head low; wearing strait corsets; too long hair, or the removal of it; overheated or overcrowded rooms or assemblies; prolonged or unaccustomed continence, and the causes usually occasioning inflammation of the brain or of its membranes, or determination of blood to these parts. (See art. BRAIN, § 182.)

16. *C. The Symptoms* in this variety sufficiently indicate the cause of the headache; but they differ very much in different habits, temperaments, and ages.—*a.* In young persons the pulse is strong, or full, somewhat accelerated; the head is hot, the countenance flushed, the eyes more or less suffused and heavy; and the pain is rending, severe, sometimes pulsative or throbbing, occasionally with a beating noise in the ears, and felt chiefly in the forehead and temples. The bowels are costive; and the patient is depressed, heavy, and indisposed to exertion.—*b.* In delicate or young persons, whose mental faculties have been prematurely exercised, or exerted to the neglect of the physical powers, the slightest excitement and the most trifling causes will produce headache, with coldness of the extremities, and great susceptibility of the nervous system, especially of females. The principal flux of the circulation takes place to the head, and the functions of other parts are performed imperfectly.—*c.* In persons of the middle age, or beyond it, and especially in those who have lived fully or intemperately, the headache is heavy, rending, or throbbing; often general, or referred chiefly to the occiput; attended with increased heat of the scalp, with distention of the veins about the temples, with fulness or redness of the eyes, and sometimes also of the whole countenance. The face is occasionally bloated, and its expression heavy; the pulse is full, strong, and oppressed, or slower than the usual standard; the bowels are torpid, the liver inactive, and the urine high-coloured or loaded. Sleep is heavy, but often disturbed. In some cases, however, with all, or nearly all these symptoms, the patient is excited or restless, is watchful, or sleeps but little, or is irritable, and the pulse is slightly accelerated, the excretions being scanty. In the first and second classes of persons, this form of headache not infrequently precedes the inflammation of the brain and membranes, or effusion from the latter: in the third class, it more frequently ushers in apoplexy or palsy.

17. iv. DYSPEPTIC AND BILIOUS HEADACHES.

—A. This variety of headache is very nearly allied to the nervous and congestive, and it has been confounded with these in the description of it given by Dr. WARREN. From the circumstance of sickness or vomiting being a frequent symptom, the term *sick headache* has been commonly applied to it. But I am convinced that this symptom often depends upon the brain, and that many cases which have been viewed as merely instances of sick headache have actually been cases in which the affection of the brain has been attended both by sickness and by headache (§ 2, *et seq.*). This form of disorder frequently affects dyspeptic persons who have been longer than usual without food, or who have committed even slight errors of diet, and whose bowels are habitually sluggish. It may occur, as Dr. BURDER remarks, without any obvious susceptibility of the brain; or in persons who can bear close application to study without inconvenience as respects the head, and yet who are liable to headache after taking certain articles of food, or mingling them in too great variety.

18. a. Dyspeptic headache, particularly when attended by nausea or vomiting, is observed chiefly in persons subject to mental or cerebral excitement, and in whom the gastric disorder, as well as the pain of the head, are only effects of that excitement. In these, the stomach is either irritable or weak, or even both, and unfit to perform its functions, as well as very liable to become farther disordered by slight causes. Stomach headache generally affects the forehead or one temple, particularly the left; but it often extends over most of the head. When the left temple is chiefly affected, tenderness of the left eye is frequently, also, felt. The pain is dull, heavy, or oppressive, or acute, sharp, or darting. The mental faculties are somewhat weakened, and exertion of the mind is irksome. Tenderness of the scalp is seldom present, unless in a slight degree, or in connexion with rheumatism. This variety of headache usually commences when the patient first wakes. It is then oppressive, heavy, or diffused. Nausea often supervenes, and sometimes vomiting. When the pain is slight, it generally subsides after breakfast; but if retching occurs, it continues longer, or until offending matters are thrown off, and then becomes more limited or concentrated. The remains of an undigested meal, or merely an insipid fluid, mixed with frothy mucus, is at first ejected. But if the vomiting continue, bile is frequently discharged. In some instances, an acid or acrid fluid, or greenish bile, is vomited, when pain and all the symptoms disappear. If the attack be not arrested by suitable means, or by the spontaneous vomiting, the pain often increases as the day advances, until stimulating food or beverages taken into the stomach, or sleep, allay it; but it may return the following day. Dyspeptic headache, however, may take place much more slightly and transiently, or it may assume a more chronic or continued form. It may follow a principal meal, and cease in two or three hours; or it may not occur until several hours after a meal. The pulse is languid or feeble, seldom accelerated. The tongue is white, loaded, particularly towards the root; and its edges are slightly red, and often indent-

ed by the teeth. The bowels are usually constive. Vision is frequently indistinct; and coldness or slight numbness of the fingers is sometimes complained of.

19. b. It has been supposed by Dr. WARREN and Dr. PARIS that, when the headache does not occur until several hours after a meal, and particularly when uneasiness or a sense of distention is felt in the situation of the duodenum, it depends upon irritation of this viscus. The circumstance of an emetic often failing to afford relief in such cases, or to evacuate anything material from the stomach, while a dose of rhubarb and magnesia, or of any other purgative, generally removes both the headache and the uneasiness in the course of the duodenum, has been considered as proof of the dependance of the affection of the head upon disorder of this bowel. Without questioning the existence of functional disorder of the duodenum in these cases, the origin of the headache in that disorder does not necessarily follow. Both affections, most probably, depend upon the same pathological states; and it is, moreover, extremely likely that the derangement of the duodenum extends more or less to both the stomach and liver. The symptoms which the writers just referred to consider characteristic of headache proceeding from disorder of the upper portion of the intestines—particularly chilliness of the body; coldness and dampness of the hands and feet; severe pain of the head, with a sense of coldness and tightness of the scalp; slight giddiness, with weight, distention, and stiffness of the eyeballs, and the appearance of brilliant ocular spectra; and sometimes tingling and numbness of the fingers and hands—arise as much from disorder of the stomach or liver, or both, as from derangement of the duodenum and upper parts of the intestines. More dependance may, perhaps, be placed upon flatulency and the sensation of dryness and inactivity of the bowels noticed by Dr. PARIS, and upon the presence of nausea without vomiting; but it is most probable that the altered sensibility referred to the head, equally with the symptoms just mentioned, depends primarily upon the state of organic nervous influence.

20. B. Biliary derangement is generally connected with more or less disorder of the stomach and bowels; the affection of the one may have extended to the other, or all may have been simultaneously disturbed by causes affecting the nervous or the vascular systems. In either case, the disturbance is not infrequently, also, extended to the head, and partly manifested by pain in this situation, particularly in the forehead, eyebrows, and orbits.—a. The headache may proceed from an interrupted discharge of bile into the duodenum, and a consequent accumulation of it in the gall-bladder or hepatic ducts; the morbid impression thereby made upon the organic nervous system affecting the head, and often, also, other remote parts. When the headache arises from this state of disorder, vascular action is generally weak, languid, or depressed, the tongue loaded or white, the skin harsh or unhealthy in its hue, and the functions of digestion and fæcation impaired. In these cases, flatulency, coldness of the extremities, and a sense of smarting in the eyes and eyelids, or pain in the eyeballs, are often, also, complained of.

21. *b.* In some instances, headache proceeds from an exuberant secretion of bile, or from the irruption of morbid bile into the duodenum; but, in most of these, there are increased vascular action and heat of skin, with nausea and bilious vomitings. The face is flushed, the eyes suffused, and the pain is throbbing or rending. The evacuation of bile often gives relief, but the retchings sometimes keep up the secretion, or promote the discharge of it; and the digestive mucous surface, and the nerves supplying it, being thereby irritated, vascular action becomes excited, and the sensibility even of remote parts more or less altered: pains of the head, loins, and limbs are thus induced.

22. *C.* The *Causes* of dyspeptic and bilious headache have a very intimate relation to the predisposition or susceptibility of the nervous systems and digestive organs to excitation or irritation.—*a.* Such susceptibility very often exists in a high degree in persons of sedentary and studious habits. Intense application of the mind, the anxieties of parents, the eager pursuit of business or of gain, the speculations of merchants, the gambling transactions of the stock-markets and of club-rooms, &c., keep the mind in an almost constant state of excitement, determine an augmented flow of blood to the brain, and thereby increase the irritability of the stomach, and predispose both organs to be disordered by the slighter causes to which the latter is so much exposed. As vital power becomes weakened, the susceptibility of the cerebro-spinal nervous system is increased, and the sensibility of it more readily disturbed. The digestive and assimilative functions are also weakened, and more prone to disorder, which not infrequently affects the brain, especially when its circulation has been excited, or kept in an almost constant state of erethism, by the circumstances just adverted to. Dyspeptic headache is most common in the young or middle-aged. The bilious variety is most prevalent during summer and autumn.

23. *b.* The *exciting causes* are, errors in diet, especially too great a variety or quantity of food; indigestible, acrid, cloying, rich, or heavy articles; too long fasting; the excessive use of diluents or of stimulating or intoxicating beverages, particularly of spirituous liquors; costiveness or constipation, and the irritation of morbid secretions and faecal matters retained in the bowels. In young persons, especially, headache and increased determination of blood to the head are frequent consequences of costiveness, of collections of sordes or of faecal matters in the digestive canal, and of intestinal worms.

24. *V.* HEADACHE FROM ORGANIC CHANGES.—In the early stages, this form of headache can hardly be distinguished from the other varieties; indeed, organic change not infrequently originates in some one of the pathological states of which headache is an occasional attendant. But, while in all these varieties the pain is only sometimes present, or is, at least, entirely absent for considerable periods, that produced by organic lesion is nearly constant or continued, or merely remits, without altogether disappearing. The alterations which are attended by headache are numerous; indeed, all those enumerated in the articles BRAIN (§ 3-133) and CRANIUM may give rise to

it; but the most common are tumours of various kinds, hydatids, exostosis from the inner surface of the cranium, ossific formations, softening of the substance of the brain, suppuration, adhesions of the membranes; tubercular, cancerous, fungous, and malignant productions, &c. Besides these, aneurismal or ossified arteries, varicose or inflamed veins, obstructions in the sinuses and veins; concretions, albuminous exudations, or purulent matters in these vessels (LIEUTAUD, BORSIERI); enlargement of the pineal or pituitary glands, serous effusion, &c., have been observed.

25. The pain caused by any of these lesions is generally fixed, often referred to the same spot, continued, and deep-seated. It is independent of the other causes of headache, although aggravated by them, by mental application, by stooping, and by stimulants. Dr. BURDER justly remarks that cheerful conversation that would chase away, or at least suspend the feeling of ordinary headache, often becomes insupportable in this variety. When the disease is farther advanced, even a slight motion of the head, or rotating it, often gives rise to extreme suffering, and sometimes to vomiting. The affection of the stomach, dependant upon the cephalic lesion, frequently occurs without any obvious cause, or independently of apparent disorder of the stomach itself, or of any error in diet; and the pain of the head remains when the sickness ceases. Although the pain is generally constant, yet remissions are sometimes felt, or even short intermissions, especially early in the disease. This is even the case when the lesion is malignant or carcinomatous, or consists of fungous tumours; and the pain is usually then lancinating, stounding, or darting, and referred to a particular spot. In the advanced stage of organic headache, spasmodic contractions of the limbs, vertigo, convulsions, paralysis, or idiotism frequently supervene. When the lesion is of a malignant or contaminating nature, the surface generally assumes a pale straw-coloured hue, or is obviously cachectic. Neuralgic pains in the face, or in more remote parts, darting pains in the limbs, are also occasionally present in this variety. (See arts. BRAIN—*Softening of, &c.*, and PALSY.)

26. *VI.* HEADACHE FROM DISEASE OF THE PERIOSTEUM AND CRANIAL BONES.—This variety is not often met with. Cases of it have been recorded by Mr. CRAMPTON, Sir E. HOME, Dr. ABERCROMBIE, and others; but the best description of it is given by Dr. BURDER.—*a.* Affection of the *periosteum* is usually caused by exposure to cold, to currents of air, to humidity, and vicissitudes of temperature and weather. The pain is tensive, remitting, and increased by pressure, and by the action of the temporal or occipito-frontalis muscles. There are sometimes fever, and excited action of the vessels of the head, with increase of the heat of the scalp. A constrictive pain is caused or aggravated by going into a cold room, or by removing the usual covering from the head. Dr. BURDER observes that this variety of headache occurs only in those who have suffered from continued cerebral excitement; and that it is commonly dependant upon a highly susceptible, or preternaturally vascular condition of the brain or its membranes, such as is often

induced by long-continued study, by mental irritation, or by gastric or hepatic disorder connected with debility or exhaustion. If a person whose nervous or vital powers are thus impaired, and whose brain and membranes are rendered susceptible and vascular, is exposed to the exciting causes just mentioned, periosteal cephalalgia of great severity or obstinacy is often produced, the external affection, with the consequent irritation and want of sleep, aggravating the morbid condition of the brain and membranes. The cases which I have seen have been chiefly in persons of the scrofulous diathesis.

27. *b.* Cases of fixed pain of the head, and tenderness of a portion of the scalp, with thickening or swelling of the integuments, have been observed by the writers just mentioned, and by Mr. PEARSON and Sir C. B. BRODIE. I have seen instances of this affection originate in *otitis*: one of these was in a medical friend, who consulted also Dr. J. JOHNSON and Sir C. B. BRODIE. The external disorder followed the use of the cold douche or shower-bath, recommended for the removal of increased vascular action and heat of the scalp indicative of cerebral excitement. Division of the pericranium in these cases has generally shown thickening of the periosteum, and even disease of the bone in a few instances.

28. *c.* When headache is owing to a diseased state of the bones (see art. CRANIUM), there are constant pain and tenderness of a particular spot. Some of these cases originate in syphilitic or mercurial cachexia. Others proceed from inflammation of the ear, and are connected with chronic discharges from this organ, or consist of caries of a portion of the petrous bone, or of the mastoid process. In the cases of this kind which I have seen, there was partial paralysis of the face, with excessive swelling around the ear, especially below it, and extending even to the eye. I attended one of these cases with Mr. BARNWELL, and another was seen by Sir C. BELL and myself, and is noticed in his work on the nervous system. Similar instances are recorded, also, by J. FRANK and others.

29. vii. RHEUMATIC AND ARTHRITIC HEADACHE.—*A. Rheumatic Headache* is usually caused by exposure to cold, or to cold and humidity, or to currents of air; by uncovering the head when perspiring; by sleeping on a damp pillow; by the passage of air through a carriage window; by sudden vicissitudes of temperature or of weather, especially by easterly or northerly winds. But a *predisposition* arising out of the rheumatic diathesis, or of disorder of the digestive organs—particularly torpor of the liver, accumulations of bile in the bile passages, and collections of sordes in the intestinal canal—is often necessary to the production of this affection of the head.

30. Rheumatic headache is often preceded by a sense of coldness over the head and face, especially on one side. It is seated chiefly in the aponeurosis of the occipito-frontalis and temporal muscles; but it is not always confined to this structure, it being sometimes associated with increased vascular determination to the membranes of the brain. The pain is severe, heavy, distracting, or aching, and in its uncomplicated state is attended by a sense of

coldness, by great tenderness of the scalp, by rheumatic pains extending down the neck, or in one side of the neck, or in one shoulder, or in the face; sometimes by copious perspirations, and more rarely by rheumatic inflammation of one or both eyes. It is generally aggravated in the evening, and alleviated in the morning, and by warmth. There is no increase of the temperature of the scalp, or augmented action of the arteries of the head, unless the affection be complicated with excited vascular action in the internal membranes. If it be thus complicated, these symptoms are also present; and, as Dr. ELLIOTSON justly observes, there are likewise giddiness, drowsiness, and internal throbbings. This associated disorder is seldom ameliorated by warmth, and the face is often flushed, the eyes injected, and the vessels loaded.

31. *B. Arthritic Headache* is met with in persons who are subject to the irregular forms of gout; and, in those who have an hereditary or an acquired predisposition to this malady, it may be the first manifestation of the gouty affection. Of this I have seen more than one instance, both in males and in females about the change of life. It is not an unusual form of misplaced or of retrocedent gout, in persons who have had the disease in its more regular forms, but who neglect the air, exercise, and regimen necessary to the development of a regular paroxysm; and it is often a dangerous affection. The pain is severe, and attended by a sense of fullness and of heat or burning in the head; by remarkable tenderness, and by increased heat of the scalp; by giddiness, dimness of sight, and fear of approaching insensibility, especially upon stooping; by sounds in the ears, great acuteness of hearing, and intolerance of noises; by flushes of heat in the face; by irritability of temper and restlessness; and by confusion of thought and loss of memory. There are also flatulence and disordered digestion; costiveness; a morbid state of the stools, and of the biliary secretion; and scanty, high-coloured urine, which deposits a copious reddish sediment. The tongue is generally loaded, and its papillæ excited; and the pulse is either natural, as to frequency, and full, or accelerated and hard, or oppressed. If this affection is not removed, it may pass into effusion, with comatose or apoplectic symptoms. (See GOUT—Irregular Forms of, § 16.)

32. viii. INTERMITTENT HEADACHE.—*Cephalalgia Periodica*, Auctorum—*Febris Intermittens Cephalica larvata*, J. FRANK—usually presents the same characters as the functional varieties already described, especially the nervous and dyspeptic, and differs from them only in respect of periodicity. But it may be not merely functional; for the pain caused by chronic inflammation of the membranes, or even by organic lesion within the cranium, may assume, at their early stages, an intermittent type. A strict investigation of the causes, and of the states of the various functions, is therefore requisite to a knowledge of the nature of the affection. When the headache proceeds from terrestrial exhalations, or from cold, raw, easterly or northerly winds, and attacks persons who have been affected with agues or remittent fevers, it generally returns daily, either in the morning or about noon; but it may observe

a tertian or quartan form. It is often limited to a particular part of the head—frequently to the forehead, or to one brow, or to the brow and orbit—*brow-ague*. It is sometimes seated in one half of the head. The pain is occasionally so severe and so limited in extent as closely to resemble neuralgia. Indeed, intermittent headache and neuralgic affections almost insensibly pass into each other, the paroxysms of the latter being, however, much more intense and of shorter duration than those of the latter; and they both frequently proceed from the same predisposing and exciting causes, namely, disorder of the stomach, bowels, and biliary organs, and exposure to malaria, or to cold damp winds, &c.

33. ix. HYSTERICAL AND SYMPATHETIC HEADACHE.—The pain in the head is one of the numerous forms in which hysteria manifests itself. It is generally limited to a small space, or to a single spot; and is often described as resembling a wedge or nail driven into the cranium or pressing upon the brain—*Clavus*, &c. It is commonly sympathetic of irritation of the uterine organs, and associated with irregularity of the uterine discharge; with painful, scanty, or excessive menstruation, or with leucorrhœa; and with flatulent borborygmi, or with the globus hystericus. I have seen it also connected with worms in the intestines, with the irritation of calculi in the kidneys, and with tenderness and other indications of inflammatory irritation of parts of the spinal chord and membranes. Indeed, affections of the spine seldom exist without pain in the head, in some one of its forms, being occasionally felt.

34. x. HYPOCHONDRICAL HEADACHE.—Pain of the head is often one of the most distressing symptoms of which hypochondriacal and melancholic persons complain, and is exaggerated by them into the most intense suffering that can be imagined; and yet, when their attention is directed to other objects of interest, or when they are otherwise excited, this part of their miseries seems altogether forgotten, or for the time removed. Their minds brood upon the cause and consequences of the pains referred to this situation, until they firmly believe the very worst results. A patient, some time since, called upon me to know whether or not I considered the pain to depend upon organic change; and although my opinion was that this was not the source of the affection, yet several visits were afterward made to me with the same object. Another more recently came under my care, with the firm belief that the headache would terminate in insanity or idiotism. Such cases are, however, not rare; and although the fears, which subsequently become the firm convictions of the patient, are fulfilled in some instances, or even impel them to suicide in others, yet recovery is not infrequently effected by judicious treatment and management. The source and character of the pain in such cases are ascertained with difficulty, as the patients' accounts are often exaggerated, but are most frequently dependent, as far as I have observed, upon the state of the nervous system, in connexion with chronic disorder of the digestive canal and biliary organs. The organic nervous energy is manifestly impaired, and all the functions which chiefly depend upon it. But I have seen

cases furnishing evidence of congestion, or of chronic inflammatory action of the brain or of its membranes, and have found a treatment based on this view more or less beneficial.

35. xi. OF HEMICRANIA, AND PARTIAL AND NEURALGIC HEADACHES.—These can scarcely be considered as distinct varieties of headache, inasmuch as the pains proceeding from the pathological states which have been passed in review are very frequently limited in extent, or confined to one side of the head, or affect it chiefly. This is especially the case with the dyspeptic, the bilious, the organic, the nervous, the rheumatic, the intermittent, and the hysterical varieties; and it is still more so in respect of that, upon which a few observations remain to be made—the *neuralgic*.—A. This variety is characterized principally by the intensity of the pain, which is confined to a single spot, or extends in the course of a single nerve. The pain comes on in violent paroxysms, is of short duration, and is followed by distinct, and often by considerable intermissions. There is generally increased sensibility or tenderness of the scalp around the seat of suffering, and the digestive organs often betray disorder. The nervous system is susceptible and weakened. The pulse is seldom materially disturbed. This is only one of the numerous situations in which NEURALGIC AFFECTIONS (see the article) manifest themselves.

36. B. *Partial or limited Headache* is often excited by local causes of irritation. Very severe pain in the situation of the frontal sinuses has been experienced, owing to the ova of insects having passed by the nostrils to this part. PLOUQUET gives numerous references to cases where the larvæ of insects had occasioned intense pain. A servant in my own family suffered from this cause, the larva being discharged upon a violent fit of sneezing. Caries, or disease of the fangs of the teeth, is often the cause of partial headache, the pain being sometimes confined to a single spot on the same side of the head as that in which the cause of irritation is seated.

37. xii. DIAGNOSIS.—There is no class of affections which requires greater discrimination than this; and there is, perhaps, none which is esteemed more lightly by practitioners, or more empirically treated, the digestive organs being considered much too generally as the source of disorder. I believe that a careful investigation of the cases, and close observation of the juvenia and lœdientia, will show that a greater number of them depend upon chronic inflammation of the brain, or of its membranes, than is commonly supposed. The diagnostic symptoms of each variety have been enumerated in the description of it, but the following summary may be given at this place: (a) *Nervous headache* is distinguished by absence of constitutional disorder, by susceptibility of the nervous system, by the feeling of constriction, and the limited extent of the pain, by the natural temperature of the head, &c. (¶ 11).—(b) The *congestive* is characterized by the numb, dull, or heavy, oppressive, and deep-seated pain; by languor of the circulation; by pallour or heaviness of the countenance; by dizziness, drowsiness, and want of animation; by the coolness of the scalp, and sometimes by fullness of the eyes and a bloated state of the face

(§ 14).—(c) *Plethoric and inflammatory headache* is manifested by the general, severe, rearing, and throbbing pain; by nausea or vomiting; by fulness of the vessels, or flushing of the face and eyes; by the full, hard, or oppressed pulse; and by the increased temperature of the head (§ 16).—(d) The *dyspeptic and bilious* is evinced by dull, aching, or racking, or shooting pains, which move from one part to another, and are often attended by soreness of the scalp, by disorder of the digestive organs, and flatulence; by a loaded tongue, foul breath, and a morbid state of the secretions, especially the biliary (§ 18–21).—(e) The *organic* is distinguished by internal acute pain, which becomes more and more constant or prolonged; by sudden retchings; by a quick, irritable, or irregular pulse; by the pain darting or shooting from one situation; by tenderness or soreness on pressure being felt, particularly when the bones are affected; by alterations in the sensibility and motions of a limb or limbs; and by symptomatic pains, spasmodic contractions, &c. (§ 25).—(f) *Rheumatic and arthritic headaches* are readily recognised from the diathesis of the patient, and from the causes and characters of these affections. The rheumatic is generally connected with rheumatism of an adjoining part (§ 30). The arthritic presents symptoms that cannot be mistaken, especially when viewed in connexion with the history of the case (§ 31). The description of these, and of the other forms of headache, has been so fully given, that nothing farther respecting their diagnosis is requisite.

38. iii. *PROGNOSIS*.—A favourable result may be anticipated of cases of the nervous, the dyspeptic, the bilious, the rheumatic, the aguish, and the hysterical headache. A guarded opinion should be given respecting the inflammatory, the arthritic, and the rheumatic when associated with increased vascular action in the internal membranes (§ 30). When headache is accompanied with vomiting, without obvious disorder of the stomach having preceded the attack, an inflammatory affection of the brain should be suspected, and a prognosis conformable with this view ought to be given. A still more unfavourable opinion should be entertained if the locomotive powers, if the memory, if the senses, or if utterance or articulation become impaired. If there be sufficient evidence of disease of the brain, or of its membranes, great danger exists, although a fatal termination may be long delayed, or even deferred for some years, as in cases of palsy. If the pericranium be affected, and especially if the bones of the cranium be diseased, a very guarded, if not a very unfavourable, prognosis is necessary.

39. xiv. *TREATMENT*.—It is evident that the indications for the cure of headaches should be inferred from the nature of each; that remedies ought to be directed to their pathological conditions and relations, ascertained by a close examination of the states of the organic and locomotive functions, of the senses, and of the mental manifestations. And, although what has been advanced above may aid the inexperienced, or furnish useful suggestions to many, yet the successful administration of remedies in these affections will entirely depend upon accuracy of observation, and upon pathological

and therapeutical knowledge previously acquired.—*A. Nervous Headache*, proceeding from depression or exhaustion, obviously requires the nervous energies to be restored by tonics and stimulants. These medicines, however, should be administered with due caution at first; as the more active of them, or too large doses, may excite fever, or even occasion vascular determination to the head. They ought not to be given, or continued long, until fecal accumulations have been removed by mild or stomachic purgatives, which should afterward be prescribed occasionally, in conjunction with deobstruents, in order to preserve the excreting functions in a state of healthy activity. While the head ought not to be kept too warm, the impression of cold must be prevented, at least until the organic functions have acquired their usual tone. In most instances, the milder tonics may be given, with the alkaline carbonates, or the aromatic spirit of ammonia, and with carminatives. The diet should be light and nourishing, the occasional causes avoided, and gentle exercise in the open air daily taken. In slight cases, these means, and a due regulation of the digestive functions, will remove the disorder; but, if they fail, those about to be noticed should be resorted to.

40. Nervous headache may prove obstinate, or it may be unusually violent from the commencement, or gradually become so. If, in these cases, the symptoms, especially those connected with the organic functions, and with the senses and cerebral manifestations, evince neither vascular action nor organic lesion within the cranium tonics conjoined with anodynes, antispasmodics, or carminatives, according to the peculiarities of the case, should be resorted to. The preparations of cinchona, of valerian, of arnica, of asafetida, and of ammonia; camphor in full doses; the æthers; the carbonate of iron, the nitrate of silver, &c., are then severally indicated, and may be given with opium, or with the acetate or hydrochlorate of morphia, or with hyoseyamus, or with belladonna, according to circumstances. If there be prolonged watchfulness, a suitable narcotic should be exhibited at, or shortly before bedtime. I have found the following medicines of great benefit in some very severe cases of this kind, the pills (No. 245) having been taken, in addition to the mixture (No. 246), during the violence of the attack. An increased dose of the pills, or the anodyne draught, may also be given at night. *Formula* 24, 25, 36, 269, 367, 423, 539, 555, prescribed in the *Appendix*, also, may prove useful in this variety of headache.

No. 245. R Camphoræ rasæ gr. xij.—xviiij.; Extracti Hyoscyami ʒss.; Conserv. Rosarum q. s. ut fiant Pilulæ xij., quarum capiat duas, quartâ vel quintâ quaque horâ.

No. 246. R Infusi Valerianæ ʒx.; Sodæ Carbonatis gr. xij.; Spiritus Ammoniaë fortid. ʒj.; Tinctura Lavand. Comp. ℥xx.; Tinct. Aurantii Co. ʒj. M. Fiat Haustus, quartis, quintis, vel sextis horis somnendus.

No. 247. R Quinina Sulphatis, Camphoræ rasæ, ʒâ gr. x.; Extr. Aloës purif. gr. xij.; Extr. Hyoscyami ʒss.; Mucilag. Acaciæ q. s. M. Fiant Pilulæ xxiv., quarum capiat unam, vel duas, vel tres, bis terve in die.

41. *B. Congestive Headache* should be treated according to the age, habit of body, and constitutional power of the patient, and to the local as well as general state of the circulation. It should not be overlooked that vascular action in the brain, owing either to impaired vital

power of the capillaries, and of the organ generally, or to impeded return of blood by the veins and sinuses, is insufficient for the due performance of the several functions of this part of the frame.—*a.* In delicate or irritable persons, stomachic or mild purgatives; tepid or cold sponging the head with fluids containing aromatic and fragrant substances, as lavender or Cologne water; derivatives, especially warm or stimulating pediluvia; the internal exhibition of camphor, ammonia, valerian, gentile tonics, &c.; light diet, and moderate exercise in the open air, will prove most serviceable. Local blood-letting will seldom be required, even in small quantity; blisters behind the ears will be productive of benefit in some cases; and the effusion of tepid water on the head in others. As the patient's strength improves, cold sponging the head, or the shower bath, and friction of the scalp, will be useful in preventing a return of the affection. Where there is much irritability, the combination of hyoscyamus, or of small doses of the powder or extract of belladonna, with the medicines just named, and strict attention to diet, air, and exercise, will generally be found of advantage.

42. *b.* When this form of headache affects persons whose vital powers have been exhausted by dissipation and unrestrained indulgences, or those of a leucophlegmatic habit of body, the treatment should be still more restorative, tonic, or stimulant than the foregoing (§ 41). Even local depletions will be injurious, and the cold affusion on the head will be of little service unless the affection has followed the use of narcotics, or when the head is hot. Cordial stomachic aperients, warm spiced wine, or coffee; the preparations of ammonia, or of camphor, or of valerian, or of arnica, &c.; stimulating pediluvia; and blisters behind the ears, or on the temples, or even on the head, in extreme cases, are among the most appropriate remedies in cases of this kind. After these have relieved the more distressing symptoms, the complete removal of the disorder, and the prevention of a return of it, may be attempted by promoting the digestive, the assimilating, and the excreting functions; by the use of tonics, of the preparations of bark or of iron; and by mild chalybeate and aerated mineral waters. But, before these are prescribed, the secretions and excretions should be freely evacuated, and their morbid states corrected, by alteratives and mild purgatives (F. 205, 266, 430); and, during the course of restorative medicines, these should be frequently resorted to. The factitious mineral waters of Carlsbad, Marienbad, or Pyrmont or Spa, subsequently, may be cautiously tried; but those of Seidschutz or Pullna should, in many cases, precede the use of these.

43. *c.* When congestive headache occurs in the plethoric, the indolent, and well fed; in persons about or past middle age, or who have experienced obstructions of the liver, or of any accustomed evacuation, the treatment should be very different from the above. General or local blood-letting, the affusion of cold water on the head, brisk cathartics, and derivation to the extremities by warm and stimulating pediluvia or manuluvia, are chiefly to be depended upon. But these will fail of being permanent-

ly useful, unless the diet of the patient be restricted, and regular exercise be taken in the open air. The secretions and excretions ought, also, to be freely and regularly promoted. A daily recourse to the shower bath will prove of great service.

44. *d.* When this form of headache proceeds from prolonged or intense mental application or exertion, not only should the above means be adopted, according to the age, strength, habit of body, and modes of living of the patient, but entire relaxation of the mind, change of air, travelling, the amusements of watering places, sea voyaging, early hours, light reading, and horse exercise should be enjoyed, as circumstances may permit. At the same time, the mineral waters most suited to the peculiarities of the case may be taken, especially those that are deobstruent, aperient, and gently tonic; and, while the functions of digestion and assimilation are promoted by restoratives, and by breathing an open, dry air, the secreting and excreting actions of the abdominal viscera should receive strict attention.

45. *C. Plethoric and Inflammatory Headache* requires the adoption of the means just enumerated (§ 43), but in a much more active manner. The regimen ought to be strictly antiphlogistic, and permanent derivation or counter-irritation established by means of issues or setons in the nape of the neck, or of the tartar emetic ointment, or of croton oil, applied in this situation and in its vicinity. The bowels ought, also, to be copiously and frequently acted upon. When this form of headache follows the disappearance of accustomed discharges or eruptions, or of hæmorrhages, this treatment should be most strictly enforced, and the use of external as well as internal derivatives strenuously persisted in. (See BRAIN—*Congestion of*, § 139, and *Inflammation of*, § 191.)

46. *D. Dyspeptic and Bilious Headaches.*—*a.* The former will be remedied by the means advised in the article on INDIGESTION. I may, however, state in this place, that when this headache is attended by nausea, and when it is clearly ascertained that the sickness does not proceed from inflammatory action within the cranium, an ipecacuanha emetic, vomiting being promoted by drinking chamomile tea or warm water, will generally give relief. After the stomach is evacuated, and the nausea is gone, a mild purgative, as the compound rhubarb pill; or the sulphate of magnesia, with carbonate of magnesia and a carminative spirit or tincture in an aromatic water; or rhubarb, with magnesia or an alkaline carbonate, and any aromatic or carminative medicine, will give farther relief by changing the state of the secretions in the stomach and upper part of the intestines, and by promoting the excreting functions of the latter and of the large bowels. If nausea be not present, these purgatives should be given forthwith, and repeated until the bowels are freely evacuated. Suitable light diet, exercise in the open air, and an occasional recourse to these or similar aperients will prevent a return of the affection. I have found the following most serviceable, when given with this intention, in moderate doses. In larger doses, they will also remove the complaint.

No. 248. R Pulveris Rhei ʒss; Extr. Fellis Bovini, Extr. Aloës purificati, ʒā ʒj; Saponis Duri gr. xv.; Pulv. Ipe-

caenanha, Pulveris Capsici, ʒā gr. xij.; Balsami Peruvian, Olei Carui, ʒā gott. viij. Contunde bene simul, et massam divide in Pilulas xxxvj., quarum capiat unam vel duas, cum pʒandin, vel horā somni.

No. 249. R Infusi Gentianæ Comp., Infusi Sennæ Comp., ʒā ʒij.; Sodæ Carbon. ʒij. (vel Magnesiæ Sulphatis ʒvj.); Tinct. Jalap. ʒjss.; Tinct. Sennæ, et Tinct. Cardamom. Comp., ʒā ʒijss. M. Fiat Mist., eujus capiat Coch. iij. amplā horā somni, vel Coch. iv. primo mane.

47. *b.* When *bilious headache* seems to depend upon the congestion or accumulation of bile in the biliary passages, then chologogues, particularly calomel or blue pill, should be given, and followed, after a few hours, by a stomachic purgative, which should be repeated until a full effect is produced. In these cases, it will often be necessary to repeat the mercurial, as well as the purgative, oftener than once; the infusion of senna, or equal parts of it and of a tonic infusion, being given with an alkaline carbonate, or with a neutral salt and the extract of taraxacum, or the bitartrate of potash in large doses, with the confection of senna and this extract. When the headache seems to proceed from an exuberance of acrid bile, then demulcents, with cooling aperients, or with alkaline carbonates, saline medicines in a state of effervescence, and warm mucilaginous diluents, are generally useful. In cases of this kind, it is necessary to dilute the acrid secretions, to evacuate them from the bowels, and to protect the digestive mucous surface from their irritating operation. When the acidity of the bile is the consequence merely of its retention and accumulation in the biliary apparatus, then these means will be sufficient to remove disorder; but when it depends upon the exuberance in the blood of the elements whence bile is formed, or upon a morbid action in the liver, a vegetable or farinaceous diet, bland fluids, the alkaline carbonates and refrigerants in camphor mixture, regular exercise, especially of the muscles of the upper extremities and of the trunk, are then required. If the action of the liver is not improved by these means, recourse should be had to mercurial alteratives or aperients; and if it be connected with vascular excitement of, or determination to the organ, local depletions, antimonial preparations, diaphoretics and diuretics, external derivatives, and the antiphlogistic regimen, should be prescribed. In every case, fecal accumulations and morbid secretions should be regularly evacuated by the means already advised.

48. *E. Organic or Cerebral Headache.*—When the patient complains of increased pain in the head on moving it, of spasms or pains in the limbs, or of impaired sensibility of motion of them, of sickness, and of any of the characteristic symptoms of this variety (§ 25), depletions, general or local, according to the peculiarities of the case; deobstruent purgatives, internal and external derivatives, blisters applied on the nape or behind the ears, and kept long discharging, setons or issues, low diet, mental and bodily repose, and local or general refrigerants, or diaphoretics, as circumstances indicate, then constitute the principal means of affording relief. After these have removed vascular excitement, small doses of the bichloride of mercury, or of the iodide of mercury, or of the iodide of potassium, or of the ioduretted solution of the iodide of potassium, or of the arsenical solution, may be prescribed, and continued until the effects are ascertained; but

external derivation should be also persisted in. (See, also, articles BRAIN, § 211, 222, and PALSY.)

49. *F. Pericranial Headache.*—When the affection proceeds from disease of the pericranium or of the cranial bones (§ 26), the treatment is essentially the same as that just advised (§ 48); but it may be modified to meet various peculiarities and changes. If the affection is syphilitic, the bichloride of mercury, or the iodide of mercury, or the other preparations of iodine above mentioned, may be employed. If the periosteum or the bone be diseased, an incision should be made down to the affected part, and a free discharge afterward maintained, as successfully practised by Mr. PEARSON and Sir B. C. BRODIE. If this affection have proceeded from inflammation of the ear, the discharge from the external meatus of the organ should be allowed a free egress. (See EAR—Inflammation of, § 26–29.)

50. *G. Rheumatic and Arthritic Headaches* should be treated with strict reference to the diathesis or constitutional disorder.—*a.* If *rheumatic headache* is not associated with inflammatory action of the membranes, the head should be kept warm, and the secretions and excretions freely promoted and evacuated. After biliary and fecal accumulations have been carried off, camphor, ammonia, and colchicum may be given in conjunction; or one or more of these may be taken, with bark or any other tonic, or with magnesia, or with the subcarbonate of soda or potash, especially when the urine deposits a copious sediment or is acid. If severe symptomatic fever or signs of inflammatory action in the cerebral membranes accompany the rheumatic affection of the head, local depletions, antimonials, active cathartics, and derivatives should be prescribed, and colchicum freely exhibited. But when these symptoms are absent, either of the following medicines will generally give relief, a full dose of calomel, or of blue pill with JAMES'S powder, or some antimonial, having been taken at bedtime, and a stomachic purgative the following morning, and repeated according to circumstances:

No. 250. R Camphoræ rasæ, Quinæ Sulphatis, Pulveris Radicis Colchici, ʒā gr. xvij.; Extracti Hyocyami ʒss.; Conserv. Rosar. q. s. M. Fiat Pilulæ xxiv., quarum capiat duas, bis terve in die.—Vel.

No. 251. R Sodæ Carbon. ʒj.; Tinct. Colchici Comp. ʒss.; Tinct. Cardamom. Co. ʒj.; Decocti Cinchonæ (vel Infusi Cascarille) ʒx.; Tinct. Lavandul. Comp. ℥iij. M. Fiat Haustus, ter in die sumendus.

51. *b. Arthritic headache* sometimes requires local depletions from the nape of the neck and from behind the ears, especially in plethoric or robust persons; but a great quantity of blood should not be taken away. The lower extremities ought to be put in warm water containing flour of mustard and salt; and if the headache is not very much relieved by these means, mustard poultices may be applied to the feet. Colchicum should also be prescribed, with aperient or purgative medicines, and with magnesia, or the alkaline carbonates, as recommended in the article GOUT (§ 55, 82, et seq.). In these cases, the colchicum, when given in small or suitable doses, and continued for some time, in order to ensure its action on the liver and on the kidneys, seems to favour the elimination of the superabundant urea from the blood; a

great excess of this substance in the circulation being generally connected with the production of the gouty affection, in all its modes of manifestation. As urea is the sum or ultimate product of assimilation, or results from a combination of the effete elements of human organization, and as it is liable to accumulate in the blood when the functions of excretion are impaired, owing to weakened organic nervous power (see art. Gout, § 40-42), so it is not improbable that, when it is thus superabundant, it becomes an excitant not only of morbid or altered sensibility, but also of increased vascular action, and of local determination—that, in short, it is the *materies morbi* of the ancients, and one of the forms which effete and excrementitious elements in the blood assume; and that it constitutes a part of the morbid condition of which I have shown gout to be the chief manifestation. This view is supported by the experiments of PROUT, CHELIUS, and others, showing the superabundance of urea, and its combinations in the urine, when the actions of the kidneys are freely exerted, towards the decline of the gouty attack.

52. *H.* It is unnecessary to enter into the treatment of the other *symptomatic varieties of headache*, inasmuch as the means of cure for them are essentially the same as are fully stated in the articles on those diseases of which headache is a frequent symptom.—*a.* When the pain is *intermittent*, independent of organic lesion, and one of the forms which *masked ague* assumes, then a full dose of calomel with JAMES'S powder, or of any other mercurial alterative, at bedtime, a brisk cathartic draught early the following morning, and, after the operation of these, the sulphate of quinine with camphor, or the preparations of bark and serpentaria, will remove the affection.—*b.* If the headache be *hysterical*, the means already advised for *nervous headache* (§ 40) will generally remedy it. If, however, the pain be symptomatic of disorder of the uterine or of the urinary functions, the means of cure must be directed to the restoration of these functions to the healthy state, as shown in the articles on MENSTRUATION, URINE, and UTERUS; and to the removal of vascular plethora by evacuations and derivatives, especially when the affection depends upon this state of the circulation, or arises from suppressed or diminished secretion or excretion. (See *Treatment of Plethoric HEADACHE*, § 45.)—*c.* The headache attending *hypochondriacal affections* is frequently relieved by the means advised for dyspeptic and bilious headaches (§ 46); but the treatment may be conducted in all respects as directed in the article on HYPOCHONDRIASIS.—*d.* *Local or neuralgic headaches* (§ 35) require the removal of the cause of irritation, when it can be accomplished, and generally the means already advised for the nervous and congestive varieties (§ 40-44); sometimes a constant and energetic action to be exerted upon the intestinal canal; frequently the exhibition of tonics, stimulants, and narcotics, or anodynes; occasionally external irritants or vesicatories, as moxas, croton oil applied to the surface, the tartar emetic ointment, issues, blisters, &c.; in some instances the application of narcotics, as veratria, &c., to the part affected, or of the acetate of morphia to the skin denuded of its cuticle, and

the other means mentioned in the article on NEURALGIC AFFECTIONS.

53. XV. BRIEF ACCOUNT OF REMEDIES RECOMMENDED BY AUTHORS.—*A. Evacuants.*—*a. Emetics* have been advised for headaches by CÆLIUS AURELIANUS, HORSTIUS, RULAND, RIEDLIN, and FRANK, and are often of great benefit when the pain proceeds from injurious ingesta, from the accumulation of bile in the biliary passages, or from impeded circulation in the vena porta.—*b. Purgatives* are not less useful, and have been very generally, but often empirically, prescribed for headaches. SELIG trusted chiefly to them for the removal of the intermittent form of the affection. Considerable judgment is, however, requisite in the selection of medicines of this class, and in the combination of them with other substances, so as to secure all the advantages they are calculated to afford. ARETEUS, and many others of the ancients, employed *hellebore*. When the pain arises from accumulations of bile, or from obstructions to the excretion of this fluid, then *calomel*, conjoined with some other purgative, and occasionally, also, with antimony, or with ipecacuanha, is most appropriate. In the nervous, the congestive, the dyspeptic, the periodic, and in the hypochondriacal forms of headache, the stomachic purgatives prescribed above (§ 46), or the combination of a purgative with a tonic, carminative, or aromatic, &c. (F. 215, 266, 379), will be found most serviceable.—*c. Vascular depletions* are requisite in plethoric and inflammatory headaches. *Bleeding* from the arm, sometimes from a vein in the foot, or *cupping* on the nape, are the most eligible modes. ARETEUS, CÆLIUS AURELIANUS, and VELSCHIUS preferred cupping on the head itself. I have repeatedly directed it to be performed on the occiput, behind the ears, or on the temples; and, when a small quantity of blood is to be taken away, these are often preferable situations. *Leeches* may be applied in circumstances similar to those requiring cupping. *Arteriotomy* has received the sanction of ARETEUS, SCHENCK, WEPFER, WILLIS, ZACUTUS, LUSITANUS, and of many recent writers; but I believe that it possesses no advantages above the other modes of vascular depletion, even in the most inflammatory form of the complaint.—*d. Sudorifics* are most beneficial in the febrile, inflammatory, rheumatic, and periodic states of the affection. In the last of these, they have been prescribed by MORGAGNI. The selection of sudorifics or diaphoretics should be guided by the state of the general circulation and of vascular action in the head. When either the former or the latter is excited, the *polassio-tartrate of antimony*, in frequent doses, or JAMES'S powder, and the more refrigerant diaphoretics, are most appropriate; but when the head is cool, and the pain is connected with rheumatism, depression of vital power, and suppressed cutaneous function, the *warm or vapour bath*, *camphor*, the *mistura guaiaci*, or weak infusions of *serpentaria*, or of *arnica*, or of *briony*, will be more beneficial than antimonials, unless these latter be conjoined with opiates and restoratives.

54. *B. Stimulants and Antispasmodics.*—These are serviceable chiefly in the nervous, the rheumatic, the hypochondriacal, and the neuralgic forms of headache, and sometimes in the intermittent, the congestive, the dyspeptic, and hys-

terical. The medicines of this kind most commonly prescribed are, the preparations of *camphor* and *ammonia*, the *compound tincture* and *fœtid spirit* of *ammonia*, the *æthers*, *castor*, *musk*, *serpentaria*, *tincture of lavender*, &c. Besides these, preparations of *arnica* have been recommended by SELIO, DUMANGIN, and J. FRANK; *cajuput oil*,* by THUNBERG; a strong infusion of *coffee*, by BAGLIVI and PERCIVAL; an infusion of *verbena*, *betonica officinalis*, and *semina coriandri*, by J. FRANK; and the *ledum palustre* by LINNÆUS. *Valerian* has been praised by STRANDBERG and FORDYCE. I have found the infusion, with the ammoniated tincture of *valerian*, or the fœtid spirit of *ammonia*, of great benefit in the headaches just mentioned. *Black pepper* has been recommended by LANGE in the dyspeptic variety; and its active principle, *piperine*, has been employed in the intermittent form of the affection. *Guaiacum* has been prescribed by J. FRANK in rheumatic and arthritic headaches. It is of service in combination with *colchicum* and *magnesia*, or with an alkali. *Green tea* and *coffee* are very commonly resorted to in the above forms of headache as domestic remedies.

55. *C. Tonics*.—*a.* The preparations of *bark* are generally beneficial in the periodic and non-inflammatory kinds of this complaint. The *sulphate of quinine* is now generally preferred; but, in many cases, the decoction of *cinchona*, with the compound tincture, and an alkaline subcarbonate, will be more efficacious.—*b.* *Absinthium* was most frequently employed by the older writers. RIVERIUS conjoined it, or other bitters, with purgatives; a practice deserving of more general adoption.—*c.* The *cascarilla bark* was used for nervous and dyspeptic headaches by RIEDLIN, and is excelled only by *cinchona*.—*d.* The *hydrochlorate of ammonia* is also of service in the nervous and intermittent varieties.—*e.* The *arsenical solution* was praised by DARWIN. I have prescribed it, and taken it myself, for headache, with marked benefit.—*f.* The *chloride of barium* was recommended by HUFFELAND, for the pains proceeding from, or connected with scrofulous disease.—*g.* The preparations of *iodine* are, however, more deserving of adoption, when the complaint is thus associated, and when it depends upon organic lesion. They may be given with any of the narcotics about to be mentioned. I have lately proved their efficacy in the rheumatic variety of headache arising from the gonorrhœal infection. The *iodide of potassium* is preferable in this latter form, and, indeed, in several others.—*h.* The extract of *nux vomica* is mentioned by HORN, and may be given in small doses, as a tonic, in the nervous, the rheumatic, and the hypochondriacal varieties; but its effects must be carefully watched. It is preferable to the active principle, *strychnine*, which should be prescribed only in very minute doses.

[The *carbonate of iron*, in large doses, will often cure these periodic and non-inflammatory kinds of headache. The *valerianate of quinine*, a remedy lately introduced, promises more benefit in this and other intermittent forms of disease than any other with which we have been hitherto acquainted.]

* THUNBERG prescribed the cajuput oil externally; but I have ordered it to be taken internally, and with great benefit.

56. *D. Narcotics and Anodynes* have been employed in several of the varieties of headache, both externally and internally.—*a.* *Opium*, in various forms, has been directed by WHYTT, MURSINNA, J. FRANK, W. STOKES, and many others; especially in the nervous, the rheumatic, and intermittent kinds of the complaint. The *acetate* and *hydrochlorate of morphia* are now generally used; but they, as well as other preparations of opium, should be conjoined with camphor, or with an aromatic, in order to ensure their good effects.—*b.* *Aconitum*, in the form principally of extract, was praised by STÖERCK and VOGEL, and was once much employed in rheumatic and chronic headaches. It is certainly often beneficial in these as well as in the nervous varieties; but it should be given in small doses, and its effects carefully observed. *Aconitine*, the active principle, is to be preferred as an external application, in the neuralgic or rheumatic states of the complaint; but even in these it requires the utmost caution. The powder of the root or of the leaves may sometimes be ordered with advantage. I was lately consulted in a case where the incautious employment of aconitine caused an apoplectic seizure and hemiplegia.—*c.* *Belladonna* has been used in somewhat similar cases to those for which the aconitum has been exhibited. The extract, or the powder of the root or of the leaves, may be given, either alone or with camphor, or an aromatic. I prescribed it in a case of hypochondriacal headache with much benefit.—*d.* *Hyoscyamus* has likewise been recommended by STÖERCK, RENARD, and others. I have found it of great use when combined as just stated, or when conjoined with ipecacuanha and some stimulating antispasmodic, and given in a decided dose.—*e.* *Cornium* was directed by LETSOM; the distilled *laurel-water*, by J. FRANK; and the *hydrocyanic acid*, by GOOD. *Digitalis* is considered by FRANK as very beneficial in the headache proceeding from scrofulous disease.—*f.* *Stramonium* has been prescribed by several writers. I have seen it given with benefit.

57. *E. Alteratives* are required whenever the affection of the head appears to depend upon a morbid state of the secretions, upon impaired action of the chief excreting viscera, or upon an impure state of the circulating fluids.—*a.* Of these, *mercurials* are the most active, and most generally used, both internally and externally, for this complaint. *Calomel* was prescribed largely by WEPFER, VELSCHIUS, BANG, &c. It is most serviceable when the headache depends upon accumulations or obstructions of the bile, and a torpid state of the bowels, and when conjoined with, or followed by other purgatives. In the rheumatic form it is advantageously conjoined with antimony and opium. The *blue pill* may be prescribed on similar occasions, and in the same manner. The *bichloride of mercury* was preferred by LENTIN, DE MONETA, VAN SWIETEN, and GMELIN, especially in the headaches depending upon organic lesions within the cranium, or upon disease of the bones. In these, as well as in some other cases, it may be prescribed in a tonic tincture or decoction. The *iodide of mercury* may be used in similar circumstances. Mercurials were pushed to salivation by WILLIS, LENTIN, NUCK, BANG, DARWIN, and BLANE; but this effect is rarely re-

quired unless when the pain resists all other means, or proceeds from a syphilitic taint.—*b.* *Alkalies*, particularly the subcarbonates of soda or of potash (THILENIUS), the solution of potash, or BRANDISH's alkaline solution, are often of service, when given in tonic or aperient infusions or mixtures, and aided by the decoction or extract of *taraxacum*.—*c.* An infusion of two or three drachms of the *clermatis vitalba*, in a pint of boiling water, was recommended by STORCK and MULLER, to be taken in the twenty-four hours.—*d.* The decoctions of *sarsaparilla* are more deserving of adoption, and may be made the vehicles for the exhibition of other medicines which produce an alterative effect, as the bichloride of mercury, the iodide of potassium, the alkalies, the extract of *taraxacum*, &c.—*e.* The *alkaline chlorides* may be also tried.—*f.* The precipitated sulphur will be found beneficial in the rheumatic form of the complaint, if taken daily in sufficient quantity to exert a gentle action on the bowels.—*g.* The preparations of *colchicum*, when given in small doses, and conjoined with magnesia, or with *sarsaparilla* and the alkalies, also exert an alterative operation, as explained above (§ 52), and are of great use in the arthritic and rheumatic forms of the affection.—*h.* Various *mineral springs* are extremely serviceable; but they require to be appropriately prescribed. Those containing iron, fixed air, lime, or the alkaline carbonates, are most suited to the nervous, neuralgic, rheumatic, and dyspeptic varieties; those holding sulphur, &c., in the rheumatic, arthritic, bilious, hypochondriacal, &c.; and those containing the purgative salts, in the bilious, arthritic, hypochondriacal, &c.

58. *F. Derivatives*—whether those which exert an immediate and brief effect, or those which act more slowly but permanently—are of great benefit in several forms of headache.—*a.* To the former class *purgatives* may be said to belong; as they not only increase secretion and excretion, but also determine the fluids to the digestive canal.—*b.* *Masticatories* were employed for headaches by CELSUS, ARTEIUS, FORESTUS, MURALT, and many others; but they have now fallen into disuse. Nevertheless, they are frequently of service.—*c.* The same remark applies to *sternutatories*, which have been recommended by the same writers, and have experienced the same fate. The benefit derived from various *cephalic snuffs* is undoubted, even in cases that have resisted other means, and has led to their adoption as empirical remedies, in irregular and domestic practice. They are beneficial in exciting the olfactory nerves, and thereby the cerebral functions, and in procuring a defluxion from the Schneiderian membrane.—*d.* *Warm pediluvia* and *manuluvia* are often resorted to, especially when the extremities are cold, or when the pain depends upon determination of blood to the head. In these circumstances, the addition of mustard and of salt to the water will be of service.—*e.* *Sinapisms* and *stinging* with nettles, or *urtications*, were employed by the ancients in the treatment of headache. CELSUS, ARTEIUS, and others directed sinapisms to the head, over the seat of pain; but TIEMISON contended for their application to the lower extremities.—*f.* *Blisters* on the nape, sometimes on the extremities, are now more generally prescribed.—*g.*

Setons and *issues* in these situations, or in the arm, are commonly recommended in the more obstinate cases of this complaint, and when the pain is suspected to arise from organic lesion. They are praised by RIVERIUS, ZACUTUS, LUSITANUS, HOLLER, FABRICIUS HILDANUS, HEISTER, PURMANN, and DE HAEN. I have prescribed them in several cases with benefit.—*h.* The *tartarized antimonial ointment* has also been of advantage when applied on the scalp or nape of the neck, and its effects on the integuments fully procured.

59. *G. Topical Means*.—*a.* The application of *cold* to the head or temples, in various modes, has been advised by most writers, when the pain proceeds from determination of blood to, or inflammatory action of the brain or membranes. A recourse to the *affusion* of cold or tepid water on the head, and the repetition of either, according to the grade of vascular action in it, are often preferable to the continued application of great cold, which is sometimes productive of mischief. Cold sponging, cold lotions, or epithems, wetting the forehead and temples with ather, or with aromatic waters, &c., and the shower bath, are severally of benefit, especially in the plethoric or inflammatory states of the affection; but the *douche*, or affusion, should be preferred in the congestive form, especially when caused by narcotics.—*b.* *Warm applications* and *warm coverings* on the head have been sanctioned by CELSUS, LANGE, and many others. In nervous and rheumatic headaches especially, they are frequently of great service. ALEXANDER TRALLIANUS prescribed them in the form of emollient fomentations. DIEMERBROECK and MARCUS directed fomentations with aromatic herbs; and J. FRANK warm epithems, moistened with a decoction of *verbena* and *betonica officinalis*. Hot *sinapisms* applied over the affected part have been resorted to by some of the ancients (§ 58).—*c.* *Blisters* on the head are occasionally of service, especially in the congestive and rheumatic varieties of headache; but they require much discrimination. They have been applied to the scalp by RIVERIUS, SCHRADER, BANG, POUTEAU, AUBERT, MONRO, and others; but, unless in some cases of the varieties just stated, they are more useful behind the ears, where they may be kept open for some time, or often repeated.—*d.* *Stimulating liniments* (F. 299, 311), rubbed assiduously on the scalp, are sometimes of service when cautiously prescribed, in nervous, rheumatic, and neuralgic headaches, or hemicrania. Liniments, also, containing *acetate of morphia*, or the extract of *belladonna*, or of *aconitum*, or of *hyoscyamus*, or of *stramonium*, or of *opium*, have been advised by several writers to be rubbed upon the scalp, in obstinate cases of this kind. I have found them of service in several instances, although it was doubtful whether they or a full dose of acetate of morphia, given with aromatic spirits, that was also prescribed in some of the cases, had produced the effect. Very recently, ointments, containing *veratria*, *aconitine*, or other acro-narcotic substances, have been directed to be similarly applied in these affections. I have seen benefit derived from them in two or three instances; but I have known others where they either failed in giving relief, or seemed to be injurious. The propriety of having recourse

to them is often doubtful.—*c.* The tartarized antimonial ointment may be used in the varieties of headache just mentioned, or even where organic lesion within the cranium is suspected; but the effects of it, as well as of liniments, ought to be carefully watched.—*f.* Frictions of the scalp have been advised by GILBERT and others, and have been of advantage when regularly and assiduously practised.—*g.* Compression of the carotids, although suggested by STRAPION and PARRY, is undeserving of farther notice. The same remark is applicable to strait cinctures of the head, advised by some writers.

—*h.* The actual cautery, applied to the seat of pain, has been recommended by HIPPOCRATES, CELSUS, ARTEIUS, VELSCHIUS, AULAGNIER, VALENTIN, and by other ancient and modern writers. It is, however, reprobated by CÆLIUS AURELIANUS, and is now rarely had recourse to.—*i.* The application of *moxas*—a modification of this practice—has been long adopted in Eastern countries, and has been advised by PASCAL, SAISSY, LARREY, J. FRANK, and others. WEPFER advises the *moxas* to be placed in the course of the coronal suture; POUTEAU, on the vertex; and VELSCHIUS, on the temples.—*k.* Incisions of the scalp, in the seat of pain, have been directed by LE BRUY, SEVERINUS, GRATELOUP, TISSOT, and SUMEIRE. They are more serviceable in disease of the pericranium, or of the bones of the cranium. Issues in the scalp have been sanctioned by PURMANN and many others. I have seen benefit accrue from them in two instances.—*l.* Electricity and galvanism have been recommended by many in headaches; but they produce merely a temporary benefit, and are not always safe.—*m.* Trephining the cranium has been favourably noticed by BAGLIVI, MORGAGNI, MEEKREN, MARCHETTI, VOGEL, SCHMUCKER, and GOOD, and actually practised by some of them. It is only when the pain is very violent, confined to a single spot, has followed an external injury, and resists all other means, that the practice can be entertained. Mr. S. COOPER states that he has seen two cases in which the patients lost their lives by this treatment.—*n.* The extraction of carious teeth should not be neglected in hemicrania, or local pain of the head from this cause. In a case where this object could not be accomplished, and in another where it was objected to, I directed a strong solution of the acetate of morphia, to which aromatic spirits were largely added, to be rubbed upon the seat of pain, and complete relief was obtained. The application of *ereasote* to the tooth, or of camphor, acetate of morphia, and capsicum conjoined, has also been of service.

[GRANVILLE'S lotion, applied to the temples, or the scalp itself, is one of the best applications we have ever employed for the relief of headache, especially of the nervous kind, or that connected with an anæmic state of the system, as in chlorotic females. In nervous headache from exhaustion, as well as general anæmia, the extract of *aconite*, in doses of from a half to a grain, every two or three hours, will often prove very useful. See MEASE On Sick Headache, and BURGESS On Nervous Headache from Exhaustion.]

60. In the sketch here given, I have mentioned only such means as seem deserving of a trial, or are calculated to be of service in

some one or other of the numerous forms and circumstances in which headache is presented to the practitioner. I have furnished suggestions merely, but these will be useful even to the most experienced. The advantage to be derived from them will entirely depend upon the pathological acumen by which their application to particular cases may be guided.

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HEARING—IMPAIRED OR LOST.

CLASSIF.—4. *Class*, 1. *Order* (*Cullen*). 4. *Class*, 2. *Order* (*Good*). IV. CLASS, III. ORDER (*Author*).

1. Those diseases of the organ of hearing which are not necessarily attended by impaired function were considered under the article EAR. At this place, therefore, diminution or loss of hearing—*Deafness*—will be considered with reference to the lesions which usually occasion it, and to appropriate treatment. The disorders of hearing may be divided into, 1st. *Exaltation of this sense*; 2d. *Depravation of hearing*; 3d. *Impaired or lost hearing*. The first of these is merely symptomatic, and is observed chiefly in affection of the brain, and in fevers (see art. SYMPTOMATOLOGY); the second is fully considered at another place (see art. EAR, § 2); the third only remains for discussion.

2. Before entering upon the consideration of the various lesions causing deafness, directions as to the best mode of inspecting the ear are required, as, unless the auditory passage be carefully examined, the diagnosis of affections of the ear must necessarily be very defective. In consequence of the curvature of this passage, the bottom of it and the membrana tympani cannot be distinctly seen, unless the patient's head be very much inclined to the opposite side, the ear directed to the sun, or a strong light reflected into it, and the auricle drawn well upward and downward, while the tragus is pressed outward. The rays of light may thus be made to fall upon the bottom of the meatus, provided that the external ear be sound. But when it is the seat of morbid changes, a *speculum* is requisite in order to convert the curvature of the passage into a straight line. This instrument should be nearly round, and funnel-shaped, the inside of the arms being blackened or rendered dim. When the ear is examined with the aid of the speculum, the light of the sun, as recommended by Dr. KRAMER, should be preferred; but the light reflected from a small mirror may be employed.*

[A common triangular reflecting prism of flint glass will be found very useful, as the light can be sent to the bottom of the ear with the greatest facility, and without obstruction from the presence of the observer. (See *New-York Journ. of Med.*, July, 1845.) It can be used with or without the speculum.]

3. I. DEAFNESS FROM AFFECTIONS OF THE EXTERNAL EAR.—i. *Diseases of the Auricle*, especially erysipelalous inflammation extending to it, and boils, may impair the function of hearing, but never in a remarkable manner or permanently, unless the inflammation has extended to more internal parts, a circumstance which occasionally takes place. Dr. KRAMER notices the occurrence of scirrus of the auricle as a cause of deafness, but it is very rarely seen.

4. ii. *Diseases of the Auditory Passage and Membrane of the Tympanum*.—All affections of these parts are either inflammatory, or the consequence of inflammation in some one grade or other, affecting one or more of the tissues in this situation. The fact is ably supported by Dr. KRAMER, who remarks that the different forms of disease seated in the auditory passage depend upon inflammation of the constituent structures, and they are characteristically defined, as one or other structure is affected. The effects, therefore, of these inflammations can hardly be considered separate states of disease, unless they continue after the inflammation which caused them has disappeared.

5. A. *Erythematic inflammation of the auditory passage* generally causes accumulations of brownish hard wax, obstructing, more or less, the function of the organ. It sometimes occurs in persons of a cachectic habit of body, or in conjunction with chronic affections of the skin, and in connexion with disorder of the digestive and excreting organs. It is often excited by substances that have passed into the ear, or by neglect of cleanliness, which, however, is not so frequent a cause as is generally supposed; the accumulation of hardened or morbid wax, with increased sensibility, pain, or soreness in the meatus, being the chief indications of the affection. In its slighter states, itching or formication in the passage is only felt.

[But in addition to this, we generally have a pricking or burning sensation, with tearing, dragging pain about the ear and in the head; with confusion of the head; with various kinds of noises in the ear; and various degrees of impaired hearing. The lining membrane becomes preternaturally red, but not sufficiently swollen as to diminish the caliber of the passage. In a few days broad, dry scales of the cuticle are thrown off, and, as a result of the sympathetic irritation of the glandular structure, a secretion of tenacious wax takes place, mixed with the cuticular scales, which adheres closely to the walls of the meatus, and blocks up the passage. Cold is the chief cause of this

proposed by others; each lauding his own practice, and each detracting from the merits (such as they are) of his contemporaries. In this, however, the despised aurists do not stand alone; for all those who take a single organ under their especial protection—and what organ has not been thus distinguished?—belong to the same category, as they are most anxious entirely to appropriate the object of their adoption, and evince the utmost rancour to those who attempt to encroach on their province. Verily, of all empirics, the regularly qualified empiric is the most degrading to medical science and to the character of the profession.

* Writers on the diseases of the ear, with few exceptions, advise various instruments, each finding fault with those

affection; the *prognosis*, under proper treatment, is always highly favourable.]

6. The *Treatment* of deafness from this cause consists chiefly of syringing the meatus with tepid water, and of attending to the digestive and excreting functions, and to the general health. Mr. BUCHANAN recommends a small syringe with a slender point to be employed, fearing that the *membrana tympani* may be ruptured by the quantity of fluid injected, and by obstruction to the counter-current by the point of the instrument being too thick. Dr. KRAMER, however, considers that this precaution is unnecessary, as the membrane cannot be injured by the stream of water, and as the loosened wax will readily flow out with the water. He therefore uses a syringe that will contain an ounce and a half of water, the pipe being three quarters of an inch long, and the opening wide enough for a strong stream.

[We sometimes find it necessary to persevere for half an hour or more, in injecting lukewarm water into the ear, before the indurated wax will be washed out; the patient, in the mean time, sitting with a wash-hand basin before him, holding his head over it, so that the water thrown into the ear may fall into the vessel. The symptoms, such as tinnitus, deafness, &c., immediately disappear as soon as the wax is removed; but it is necessary to examine the ear with the speculum or prism, and if we find the walls of the meatus much reddened, it will be useful to drop into the ear a solution containing one grain of acetate of lead to an ounce of water; and if the disease prove obstinate, pustulation, with tartar emetic, may be practised behind the affected ear. Should ulceration exist, it only requires to be smeared with tincture of myrrh, or tincture of opium.]

7. *B. Deafness from inflammation of the follicles of the auditory passage* seldom is considerable, until the inflammatory action has given rise to some lesion of structure. *Mucous or catarrhal otorrhœa* (see art. EAR, § 18) is caused by the affection of these glands. From this inflammation, and from that of the *membrana tympani*, various excrescences* or morbid growths in the meatus ultimately proceed. On inspection, redness and partial swelling of the walls of the passage are first observed; and, if the affection continues long, or becomes chronic, excrescences, or polypi, of a soft, spongy, or vesicular appearance, are gradually formed. These are red, sensitive, roundish, pedunculated, and readily bleed when irritated. In some cases, they have a broad, hard base, are insensible, and not disposed to bleed. These obstruct more or less the meatus, and impede the functions of the organ. Hardened mucus and wax may also accumulate in the passage, as a consequence of the chronic states of this affection, and of the obstruction caused by these excrescences.

[KRAMER is very positive that this affection, even in its worst form, rarely, if ever, extends beyond the limits of the glandular structure; and never inducing ulceration, destroying the *membrana tympani*, or extending to the bone.

* [The terms *polypus*, *fungus*, and *vegetation* are applied indiscriminately to these morbid growths. (See *A Treatise on the Structure, Economy, and Diseases of the Ear*; being the Essay for which the Fothergillian Gold Medal was awarded by the Medical Society of London, by GEORGE PILCHER, 1st Am. Ed., Philadelphia, 1843.)]

He admits, however, that it is possible, when the secretion from the glandular structure becomes suppressed, the inflammatory action may be increased, and extend not only to the internal ear, but to the brain, endangering the life of the patient.*]

8. The *Treatment* of this disease should be directed according to the method just advised (§ 6). The extirpation of the fungous growth should be performed; but, as M. ITARD has stated, the deafness may continue nevertheless; for the membrane of the drum may be thickened, or ulcerated, or covered by inspissated secretions; and otorrhœa will often long remain. In these cases, injections of tepid water, or of emollient and diluent fluids; blisters on the nape, and kept open, or setons or issues, and the means advised for the removal of *mucous otorrhœa* (see art. EAR, § 29), should be prescribed.

[Polypi of the ear, especially if pedunculated, can readily be reached, either with the ligature, or with a pair of finely made scissors with curved blades, or with a double-edged knife, similarly curved, having a blunt and rounded extremity, or with a pair of delicate forceps, furnished at their extremities with several sharp points, in order to lay hold of the polypus, and either twist it off, or tear it out. After it has been removed, it will be useful to touch the root, or place of attachment, with the solid nitrate of silver, which should be in the form of a very thin stick, scarcely a quarter of a line in diameter, and placed in a holder bent in a zigzag form, and provided with a ferule of platina at its extremity. For this operation, a full, bright light will be necessary. KRAMER recommends an injection of a solution of the acetate of lead into the affected ear (gr. x. to ʒj. water), where the polypus sprouts up, notwithstanding the use of the caustic.—(Loc. cit.)

In the removal of these polypi, especially by the forceps, great care is necessary lest the *membrana tympani* be implicated, and violence be done to this part by the operation; by which severe inflammation may be excited, productive of dangerous consequences. Excision is to be used where the polypus projects so far outward as to allow the forceps or the scissors to be passed to its pedicle; if not, we must resort to the careful use of escharotics.]

9. *C. Deafness caused by phlegmonous inflammation of the cellular tissue* of the passage rarely occurs; but this affection may be mistaken for the preceding; from which, however, it is readily distinguished by its rapid course, and termination in abscess—results never observed in inflammation of the follicles. Owing to the severity of the pain, and other symptoms, it may be confounded with inflammation of the internal ear; but in this case, the external passage never presents any lesion on inspection, at least at the commencement. This disease is usually caused by cold or currents of air. The treatment is altogether the same as recommended for external acute Otitis (see EAR, § 27).

10. *D. Inflammation of the periosteum of the passage* is most common in children of a scrofulous diathesis, and generally occasions caries of the bony structure, which is readily detected

* [“Nature and Treatment of Diseases of the Ear, by Dr. WILLIAM KRAMER.” Translated from the German by JAMES RISDON BENNETT, M.D. Philadelphia, 1838.]

with the probe. If exfoliation of the diseased bone occur, and the ulcerated part begins to heal, narrowing or obliteration of the meatus may take place. In these cases, the deafness often depends as much upon congestion of the adjoining parts as upon swelling and disease of the passage. Dr. KRAMER advises, in the *treatment*, that, when the parts show a tendency to close, they should be opened up by art, and maintained open by touching them with lunar caustic throughout their extent. Hearing, however, usually continues very dull, owing to the natural form of the meatus having been lost, and to the membrane of the drum having become thickened.

11. *E. Deafness from Disease of the Membrane of the Drum.*—It has been supposed that relaxation of this membrane, that too great tension of it, that rupture of it, and that rupture of the tendon of the *tensor tympani*, may severally occasion impaired hearing. CLELAND, SAISSY, BECK, and others think that these lesions may be produced by violent sneezing, by claps of thunder, by noises of artillery, &c. ; but, as KRAMER contends, these suppositions are unfounded, rupture of these parts never occurring unless from inflammation and its consequences. He remarks that perforation of the membrane is in rare cases met with, little or no mucous or purulent discharge having been observed; but, even in these, upon examination, in a bright sunshine, with the speculum, a viscid, mucous, or puriform matter is always found at the bottom, and the remaining portion of the membrane is seen reddened, thickened, and opaque.

12. *a. Inflammation of the membrane of the tympanum* most frequently occurs in connexion with inflammation of one or other of the structures of the meatus, especially of the follicles. It may, however, take place primarily, and constitute the chief affection. Acute inflammation of this part is not so common as the sub-acute and chronic states; and either, when neglected, gives rise to opacity, thickening, perforation, purulent discharge, fungous or polypous excrescences, &c. ; but the chronic states most frequently induce these lesions. In acute inflammation, the membrane is seen, on careful examination, more or less red, rough, swollen, and opaque. It often seems as if covered with small projecting glands or follicles. Sometimes bundles of vessels are seen in it, and the point of insertion of the handle of the malleus cannot be distinguished. Dr. KRAMER states that inflammations of this part are distinguished from internal inflammations of the ear, not only by the greater mildness of the former, but especially by the changes of the membrane presented by them from the commencement; whereas, in the latter, such changes cannot be detected early in the disease, however violent the symptoms and attendant fever may be; and occur only in the farther course of the malady, when the membrane is about to burst, from the pressure of accumulated matter, or has become involved in the inflammatory process. The different grades of this disease have been imputed to *nervous otalgia*, or confounded with it. Dr. KRAMER, however, denies the existence of such an affection. In this he is evidently mistaken (see EAR, § 6); although it must be admitted that both this, and other inflammatory

diseases of the ear, are often improperly viewed as nervous merely. The hardened secretion in the meatus, to which the more chronic states of inflammation of the membrane have been imputed, is more commonly the result of inflammatory action than its cause. The disease, in both its primary and its consecutive states, generally impairs hearing more or less.

[It is important that the practitioner should be fully acquainted with the symptoms of this affection, so often mistaken for pure nervous otalgia, or earache, as its successful treatment will depend on such discrimination. When inflammation occurs in the tympanic membrane, the patient suddenly feels an acute pain at the bottom of the meatus, following the application of some irritant, as cold wind striking sharply against the membrane; the introduction of some foreign body, as insects, &c. ; or mechanical injury resulting from the removal of hard wax or a foreign substance; or too violent and sudden noise. The pain is accompanied by buzzings, as if something were fluttering in the ear, and by a lessened capability of hearing; and it is increased by loud sounds, by variations of temperature, and by pressure upon the ear. If we examine the tympanum by means of the speculum, or aural prism, we shall find it slightly reddened in mild cases, but intensely so in severe ones, the blood-vessels being distinctly visible.]

13. *The Treatment* is the same in this as in the other inflammatory diseases of the meatus, and as directed for *inflammations of the external Ear* (§ 27, 29). Dr. KRAMER, however, prefers injections containing the acetate of lead, and pours a solution, varying in strength, from one grain to ten of the salt to an ounce of water, into the diseased ear twice or thrice a day. Injections of a solution of the nitrate of silver, or of the sulphate of zinc, or of alum, have been also recommended; but unless they be weak, they often occasion pain and irritation in the meatus. A few drops of pyroligneous acid to an ounce of water have likewise been used as an injection. Both it and the acetate of lead will effectually remove the offensive odour of the discharge.

[Our own experience in the treatment of this affection leads us to the belief that stimulating applications, as advised above by KRAMER, are extremely hazardous, and not to be compared with those of a soothing and emollient kind. The warmth and moisture of a poultice, applied between two pieces of muslin over the affected ear, or the pulp of a roasted onion, bound over the same part, aided by a purgative, to be followed by a DOVER'S powder in the evening, will generally prove successful in removing the malady. If the symptoms persist, and are of a severe character, general or local bleeding, or both, will be advisable, with a strict antiphlogistic regimen; and if the disease threatens to become chronic, a blister behind the ear, and kept discharging by means of the Savine ointment, will prove useful. Under such circumstances, PILCHER recommends salivation, but if the foregoing means are faithfully used, it will rarely be found necessary.]

14. *b. Deafness from Perforation of the Membrane of the Drum.*—KRAMER states "that many authors, and among them even ITARD, are of opinion that perforation of this membrane does

