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STATISTICAL OBSERVATIONS ON THE HEALTH OF THE LABOURING
POPULATION OF THE DISTRICT OF KELSO, IN TWO DECENNIAL
PERIODS, FROM 1777 TO 1787, AND FROM 1829 TO 1839.

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It is my intention, in the following observations, to enter into an examination, as detailed as my materials will permit, of what has been the state of health of the labouring population of the town of Kelso and its adjoining district; and for this purpose I have selected two distinct and somewhat distant periods as the limits of my inquiry. For the first period, I have chosen the ten years from the close of the month of November 1777 till near the termination of 1787; so that the end of this term is removed upwards of half a century from the time at which I write. For the second period, I have selected the ten years following the month of October 1829:—thus allowing, if I may so speak, a veil to rest over a space of upwards of forty years, and lifting it up to resume the inquiry at a time when a new generation has come upon the scene, occupying the same locality, but under circumstances which have, in many respects, undergone a material change. Briefly to note the nature of this change, to contrast the prevailing diseases of each period, to mark the varying causes and rates of mortality, and to estimate the comparative duration of life, will form the principal objects of my investigations.

2. What I shall term the district of Kelso may be described, with sufficient accuracy for my purpose, as included in a circle having a radius of about eight miles, of which the town of Kelso is to be considered as the centre. Its superficial extent will therefore amount to about 190 square miles. The parishes contained, either wholly or in part, within this limit,

are those of Kelso, Ednam, Eccles, Greenlaw, Gordon, Earlston, Smailholm, Stitchill, Nenthorn, Makerstoun, Mertoun, Maxton, Eckford, Roxburgh, Linton, Morbattle, Hownam, Yetholm, and Sprouston in Scotland; and that of Carham in England. The middle parts of the district are traversed by the Tweed, which intersects them in a direction tending from south-west to north-east. The Teviot flows through its south-western division, and pursues a course more directly north. The Eden, the Kail, and the Bowmont are smaller streams, tributaries, directly or indirectly, to the Tweed and Teviot, which also take their course through part of the district; the former, a comparatively sluggish current, serves, in part, to drain the high grounds on the north; and the two latter, rapid mountain-torrents, take their origin towards the south, in the range of the Cheviots.

3. The surface of the district is very irregular, and rises gradually in a series of undulations from the valley of the Tweed, to the high grounds skirting the base of the Lammermoors on the north side, and to the more adjacent range of the Cheviots in the opposite direction. Probably, the highest point where any considerable body of inhabitants is congregated together, is at the village of Home, which has an altitude of about 800 feet above the level of the sea. The bed of the river Tweed, where it passes Kelso, is 83 feet above the sea-line; and this may be considered as nearly the lowest point. The surface is abundantly clothed with wood, especially in its northern and middle divisions; part of it being in extensive plantations, and part scattered in the numerous hedges which serve as fences to the enclosures. Its geological character may be described briefly as consisting, for the most part, of a light sandy loam, resting upon extensive beds of gravel, or upon clayey and marly schists, beneath which layers of sandstone, of varying degrees of thickness, ordinarily occur. In the lower parts of the western division, and throughout the whole of the high grounds, appear rocks of igneous origin, chiefly amygdaloidal, porphyritic, and common greenstone, and in some parts these make distinct approaches to a columnar structure. In the eastern division occurs limestone, connected, doubtless, with the North Durham coal-field. The ordinary springs of the district are, for the most part, impreg-

nated with calcareous salts, in varying and often very considerable proportions; but no mineral sources, such as have any claim to be distinguished for their medicinal properties, exist within its limits.

4. Regarding the state of the climate during the first of our decennia, I possess no information whatever; or at least, none upon which I can place any dependence. In the second decennium, the mean annual temperature for the nine years preceding 1840 was $46^{\circ}.1$, and the mean quantity of rain which fell annually during the same period, as registered by a rain-gauge placed near the centre of the district, at a height of 171 feet above the level of the sea, and 6.5 feet above the surface of the ground, was 24.18 inches. The minimum and maximum quantities occurred in two consecutive years, 1835 and 1836. In the first it was 20.41, and in the second 29.82 inches.*

5. We believe we are not entitled to assert, that the more prominent features of the district, in as far as relates to the acknowledged beauty and richness of its landscape, or its general appearance of cultivation, have differed materially in the two decennial periods selected for our inquiry. Pennant, in describing his tour in 1772, speaks of it as "a fine country, full of gentle risings, covered with corn." The banks of the Tweed, he describes "as adorned with hanging woods;" and he alludes more particularly to "the great woods of Fleurs," near Kelso. The lands adjacent to this town are mentioned as consisting of "gentle risings, enclosed with hedges, and extremely fertile." "From Pinnacle-hill," he adds, "is seen a vast extent of country, highly cultivated, watered with long reaches of the Tweed, well wooded on each margin." Hutchinson, the eminent topographer and antiquary, writing in 1776, says,—"I never beheld a richer valley than we looked upon here; the crops of corn were surprisingly great; the whole being reaped, stood in sheafs; the meadows were luxuriant, and every object wore the happy aspect of opulence." The author of the reports published by authority of the Commis-

* For the preceding notices regarding the climate, and for other information as to the heights of various localities, I am indebted to Sir Thomas M. Brisbane, Bart. of Makerstoun, whose able and kind patronage, as extensive as it is liberal, in all matters connected with science or with public usefulness, ought ever to be gratefully acknowledged by the inhabitants of this district.

sioners of the annexed estates (1778), speaking of the same district, states, that "it is surprising with what spirit and industry improvements go on;" and, at a somewhat later date (1796), we perceive marked out in the map attached to the agricultural survey of the county, written by Dr Douglas of Galashiels, nearly the same proportion of cultivated and uncultivated ground as that which exists at the present day. Those who are acquainted with the district will at once acknowledge how closely the description of Permant applies to its aspect in our own times: but if its more general and prominent features have apparently undergone little alteration, there have yet been manifest changes effected, by which its more minute details have been modified in an important degree, and in such a way as to exert a material influence upon its salubrity as a residence for man.

6. I would here more particularly allude to the system of draining which has lately prevailed so extensively in the locality. During the first of the periods under examination, the whole district was studded with swamps and morasses, some of which were of considerable extent; the town of Kelso itself having been surrounded by a double chain of them, especially on the northern side of the river. Not only have nearly the whole of these now disappeared, but the general surface of the country has been carefully deprived of its superfluous moisture, by a system of draining as complete in its results as it has been extensive in its details. It has been no uncommon circumstance, that 60 miles and upwards, in linear measure, of the smaller drains have been cut upon a single farm; while large conduits have been excavated, where necessary, to carry off the water from the morasses; all which operations have been greatly favoured by the varying nature of the surface with regard to levels, and by the abundance, and generally rapid descent, of the water-courses.

7. The inhabitants of the district of Kelso are justly and strictly entitled to be considered an agricultural population. There are no mines in the neighbourhood, and no manufactories, in which large bodies of men are collected together, under peculiar circumstances, such as are likely to injure or affect their health. The various tradesmen and artisans in the towns and villages are merely shopkeepers and handicrafts

for mutual supply, such as must necessarily exist in every community; and so far from there being any surplus created to carry for sale to a distance, even shoes and other articles of clothing are now brought from England for the use of the inhabitants. We must therefore consider by far the greater part of the population as habitually engaged in occupations which necessarily expose them to all vicissitudes of the weather in the course of their duty as agricultural labourers; while it is only the minor part, acting, in a certain sense, subserviently to the others, who are enabled to carry on their vocations in situations better protected from the influence of the atmosphere.

8. The residences of the labouring population, during the first of our periods, were not such as to give us any high idea of the extent of their notions of those comforts and little amenities, by which even a life of perpetual toil may be softened and relieved. In the town they were confined, dark, and filthy, with the constant accompaniment of a dunghill, either in the narrow close attached to them, or encumbering and polluting the public streets. In the country, they were, for the most part, miserable hovels, built frequently of clay, seldom slated, and having, not rarely, the narrow space in their interior shared between the family of the occupier and the cow, or other less cleanly domestic animal, destined to assist in the sustenance of the inmates. A hole in the roof, surrounded at the top, and a little way down into the house, by a kind of wicker-frame, was often the only chimney; and the window scarcely deserved its name. The example and encouragement given by their superiors were not, at that time, fitted to lead to better things. Millar, in his observations on the prevailing diseases of Great Britain (1770), takes occasion to describe the dwelling of "a considerable farmer" in Berwickshire, at a period bordering closely upon that with which we are now occupied. "His family," he says, "consisted of thirty-six people. They were crowded together in a house which was only 16 feet wide, and about 40 feet long; it consisted of a ground-floor and garrets, and the roof of the largest apartments was only 7 feet high." The amount of space thus allowed to each individual of the household, was only 186.66 cubic feet. We are not surprised to be told, that a febrile dis-

ease, of a malignant nature, had broken out in this dwelling : which, after all, only resembled, in the inconvenience and insalubrity of its plan, the greater part of the farm-houses then existing in the country.

9. In the later of our two periods, we find that the cottage of the labourer has undergone many improvements. The walls are now universally of stone, and the roof is, in the great majority of instances, covered with slates. The chimney is regularly built, in such a way as to insure a more perfect ventilation of the apartments. These, in the country, are generally two in number ; and there is frequently a division above the joists, which is set apart for containing the more bulky and valueless portions of the family stores. In a few of the more modern, there are regular garrets. The window is of proper dimensions, and is ordinarily hinged, so as to admit of being opened for ventilation. At both periods, the floors were formed of a composition of clay ; but they, as well as the rest of the house, and the persons and apparel of the inmates, are now kept in a much more cleanly condition than formerly. The dunghill has disappeared from the public streets ; and nowhere is it permitted to accumulate into the same intolerable nuisance which disgraced the former period. The cow and the pig have retreated, in nearly every instance, to more fitting domiciles. In the town, the residence of the labourer consists usually of a single room and a closet ; and several families are frequently accommodated in this way under the same roof. The general aspect of these dwellings, and of their inmates, has also improved greatly in cleanliness ; but there is here less perfect ventilation, and, in this respect, much is still to be desired. Assuming an average rate of five individuals to a family, as that which prevails in the district, I find that the cottage of the agricultural labourer in the country, of the usual dimensions, allows a space of 704 cubic feet for each individual ; and this in situations generally exposed to the most free ventilation. But I estimate the average amount of space in a town residence, as only 280 cubic feet for each individual ; and I am aware of, at least, one instance, in which even this small proportion has been curtailed to one-half. A respectable journeyman joiner, with his family of eight persons, occupies a room 15 feet by 11, and $6\frac{1}{2}$ feet high, together with a closet

6 feet by 5, and of the same height. The space allowed for each of these persons is thus only 141 cubic feet. As it has been estimated, that between 600 and 700 cubic feet of air is, in the space of 24 hours, so far vitiated by every adult, as to be incapable of farther sustaining life, it is manifest, that it could have been only by a certain degree of ventilation kept up in the apartments, that the existence of the inmates was prolonged for a single day. As it is, I have never, at any time, known this family enjoying entirely good health; but, on the contrary, I have found them liable to many protracted and severe illnesses.

10. In other respects, it may be asserted that the habits of life of the labouring population present no remarkable contrasts in the two periods of our inquiry. Their food, at both times, has consisted chiefly of bread, porridge, potatoes (which Pennant speaks of as being cultivated "in vast fields," at the period of his tour), milk, cheese, herrings, and, more rarely, pork, and other varieties of butcher meat.* The bread is, in the country, usually made from a mixture of barley and pease-meal; in the town, wheaten bread is gradually becoming more extensively used. Neither of the periods selected can be distinguished as including any thing like those years of scarcity which have occasionally occurred amongst us, and which never fail to add so materially to the mass of disease, especially of an epidemic nature. The country part of the population is

* I have conversed with several persons of advanced age regarding the proportion of animal food consumed by labourers during the first of the periods selected; but the statements which I have received have been somewhat contradictory. The truth, I believe, lies somewhat near what I have stated in the text; because, though the price of this kind of provision was then lower, the wages of the labourer were also less in a nearly equal proportion, and he was, consequently, not better enabled to purchase it than now. We ought not to omit, however, the testimony of Dr Andrew Wilson, of Kelso, whose practice in the district extended through a period of half a century, following 1774. In his "Letters on Morbid Sympathy," published in 1818, he states, as the result of his own observation, that "the condition of the labouring class of people, with respect to their food, clothing, and habitations, is much mended; they are better paid, and live better." (p. 159.) The cotemporary writer (1778) of the reports published by the authority of the Commissioners of the annexed estates, already quoted, states the servants' wages at L.6 to L.8 Sterling a-year, with victuals; a day-labourer 15d. a man, and 10d. a woman." This is described as high, and the vicinity of England is assigned as the cause. Others report 4d. to 8d. a-day only, as the wages of a female.

distinguished for its remarkable temperance; instances of intoxication being of comparatively rare occurrence. In the town, and even in the larger villages, this commendation is, unfortunately, less generally deserved; but even here we have but little of that extreme of degradation and misery following on the abuse of spirituous liquors, which is found to occur so frequently in many other parts of the empire. Their clothing is generally warm and substantial, and, in their holiday attire, both sexes present an appearance of neatness and respectability, which, I suspect, will not be easily rivalled in any other district. The construction of their sleeping places is faulty in the extreme, and sets at defiance the most obvious rules of wholesomeness and convenience. Their supply of fuel cannot be considered as usually deficient, especially in the country.

11. The hours of labour have undergone no variation in the two periods. They may be stated as extending from six o'clock in the morning till six in the evening, while there is sufficient daylight; and in winter, from the dawn of the morning till sunset; with two hours intermission during the middle of the day.

12. I annex the following table, shewing the aggregate population of the district at five different periods:—

TABLE (A), *Shewing the Population of the District of Kelso, at five periods.*

| | 1755. | 1790-1798. | 1821. | 1831. | 1841. |
|---------------------|--------|------------|--------|--------|--------|
| Kelso, | 2781 | 4324 | 4860 | 4939 | 5320 |
| Ednam, | 387 | 600 | 601 | 637 | 614 |
| Eccles, | 1489 | 1780 | 1900 | 1885 | 1938 |
| Greenlaw, | 895 | 1210 | 1349 | 1442 | 1355 |
| Gordon, | 737 | 912 | 740 | 882 | 903 |
| Earlston, | 1197 | 1351 | 1705 | 1710 | 1756 |
| Smailholm, | 551 | 421 | 520 | 628 | 592 |
| Stitchill & Home, | 959 | 1000 | 852 | 834 | 842 |
| Nenthorn, | 497 | 400 | 393 | 380 | 446 |
| Makerstoun, | 165 | 255 | 345 | 326 | 355 |
| Mertoun, | 502 | 557 | 610 | 664 | 704 |
| Maxton, | 397 | 326 | 463 | 462 | 459 |
| Eckford, | 1083 | 952 | 1133 | 1148 | 1069 |
| Roxburgh, | 784 | 840 | 926 | 962 | 968 |
| Linton, | 413 | 383 | 458 | 462 | 526 |
| Morbattle, | 789 | 789 | 1070 | 1065 | 1045 |
| Hownam, | 632 | 365 | 327 | 260 | 290 |
| Yetholm, | 699 | 976 | 1220 | 1289 | 1295 |
| Sprouston, | 1089 | 1000 | 1371 | 1384 | 1438 |
| Carham, | | * | 1370 | 1174 | 1274 |
| Total, | 16,046 | 18,441 | 22,173 | 22,523 | 23,179 |

* The population of Carham has been necessarily omitted in the two first columns of the table, as I am not aware of the existence of any record to which I can refer for the requisite information.

13. These few preliminary observations on the physical aspect of the country, and on the past and present condition of its labouring population, will assist us to attach more precise ideas to the statements which are to follow regarding the prevailing diseases of that population, and the changes which these have undergone under the action of various modifying causes. These statements it is my intention to found, chiefly, upon an examination of the records of the Kelso Dispensary, during the two decennial periods referred to. The applicants for medical relief at this institution are drawn almost exclusively from the working class, and by no means always from its lowest orders. As to the paupers, who are, of course, frequently the objects of its active charity, they can be considered in no other light than as a part of the same body, disabled by disease, or by the infirmities of age. The records of the institution are contained in books of two different descriptions. The first series, kept by the individual medical officers, contains the date of application, the name, surname, place of residence, age, disease, and termination of disease, of each patient ; with a brief outline of the treatment, and such occasional remarks as may happen to suggest themselves to the practitioner. The second series has been kept by the clerk of the institution, and consists of an abstract of the contents of those first mentioned, exclusive of the details of treatment, and the incidental remarks.

14. The whole number of cases entered for the first decennium, from 1777 to 1787, is 4705 ; and the number for the second decennium, from 1829 to 1839, is 8034 ; making a total of 12,739 for both periods. The total number of deaths recorded is 423. These numbers I wish to be kept in view during the observations which are to follow, as forming the basis upon which every subsequent statement is to rest ; and this will be the more necessary, as I propose to reduce all my calculations to parts of a hundred, by which means the exact value of the different facts, and the proportions which they bear to each other, will be more easily recognised and understood. The amount of cases to be dealt with is certainly not large, when compared with the great masses of facts which have been the object of statistical research in other quarters.

But if extent of numbers be one important element of every statistical calculation, extent of time is another, the value of which cannot be overlooked; and, of two numbers, the smaller may acquire the greater degree of relative importance, if it be founded on a series of observations extending through a more considerable lapse of time. The period of twenty years, which forms the basis of the following calculations, will be admitted, therefore, as giving greater assurance of worth and stability to the facts which it may be in my power to elicit. I may be permitted to add, that I have myself, up to the period at which I now write (August 1841), entered nearly 3000 cases of disease upon the records of the Dispensary; so that, should I take occasion to appeal to my own individual experience, the reader will easily be enabled to estimate the degree of confidence to which that appeal may be entitled.

15. The cases for each decennium may be advantageously classed into six divisions; and this arrangement will be found sufficiently minute for our purpose, as any farther subdivision would reduce the numbers to be placed under the several sections to such an extent, as, according to the known doctrines of probabilities, would greatly affect the credit of the deductions which were to follow. Under these sections I propose to include, *1st*, The endemic diseases of the district, and those epidemic diseases which are capable of being propagated by either mediate or immediate contagion; but excluding all maladies, such as syphilis and hydrophobia, which can be propagated by immediate contagion only, and admitting erysipelas, as presenting many characters which naturally connect it with the other diseases of this class; *2d*, diseases of the nervous apparatus; *3d*, diseases of the respiratory apparatus; *4th*, diseases of the circulatory apparatus; under which head it is intended to include only those of the heart, and of the great vessels immediately connected with it; *5th*, diseases of the digestive apparatus; and, *6th*, all other diseases, accidents, or merely local affections, which cannot be properly arranged under any of the other sections.

16. The first of our sections, then, will include fevers, small-pox, scarlet fever, measles, chicken-pox, hooping-cough, and erysipelas; a class of diseases which gives, according to the

general rates of its prevalence, the surest indications by which to judge of the condition of a community with respect to its general health. The following table, by exhibiting to us the proportion per cent. of cases of this class to all other diseases, will shew us what has been their range during each of our decennial periods :—

TABLE (B), *Shewing the proportion per cent. of Epidemic and Endemic Diseases to all others, entered in each of two decennial periods.*

| Years. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | Whole Period. |
|----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|---------------|
| 1st Decennium, | 12.25 | 26.14 | 40.09 | 49.92 | 37.45 | 40.99 | 31.77 | 18.44 | 29.44 | 23.98 | 33.07 |
| 2d Decennium, | 23.97 | 10.65 | 12.04 | 17.29 | 17.96 | 22.56 | 14.67 | 9.71 | 15.11 | 11.53 | 15.35 |

17. In the first decennium, we observe, that, of 100 cases of all kinds of disease entered on the record in the first year, 12.25, or about an eighth, belonged to the class of epidemics ; and that, in the fourth year, this proportion had risen so high as 49.92, being nearly a half of all diseases brought under treatment ; these two numbers forming the two extremes for the whole period. In the second decennium, and in its first year, the proportion was 23.97, and in the eighth year it was 9.71 ; which two numbers also form the extremes for the second period. The mean proportion per cent. shewn by comparing the whole of the cases of this class, to those of all the other classes taken collectively, was, in the first period, 33.07 ; in the second period it was 15.35.

18. We thus perceive, that the proportion of cases of epidemic and endemic disease was, in the second decennium, somewhat less than half of that which had presented itself at the former period. It will be interesting to observe, in what particular species of disease this important diminution in point of prevalence has been most conspicuous ; and this will be shewn to us by the succeeding table, the materials for which are derived from the sums of the cases of each kind of disease, included in the class under consideration, taken for the whole of each of the decennia :—

TABLE (C), *Shewing the mean relative prevalence of various kinds of Epidemic and Endemic Diseases, and their proportion per cent. to all others.*

| Disease. | Ague. | Fever. | Small-Pox. | Chick-Pox. | Scar-Fever. | Measles. | Hoop-Cough. | Erysipelas. | Total. |
|----------------|-------|--------|------------|------------|-------------|----------|-------------|-------------|--------|
| 1st Decennium, | 14.05 | 12.71 | 3.31 | 0.13 | 0.02 | 1.02 | 1.10 | 0.73 | 33.07 |
| 2d Decennium, | 0.16 | 7.36 | 0.89 | 0.46 | 1.49 | 2.96 | 1.48 | 0.55 | 15.35 |

19. In comparing the two periods, our attention is here justly attracted by the extraordinary preponderance of cases of ague in the first decennium, where they present an average of nearly one-seventh of all cases of disease coming under treatment; and a closer examination of the separate years shews this proportion rising, more than once, to even as high as a fifth; while in the second decennium the average proportion is only a six-hundredth of the general mass of disease. Ague, then, as is well known to the older inhabitants of this district, was at one time regularly endemic amongst us; affecting every year a varying, but always a considerable, portion of the population, and occasionally, in seasons of unusual coldness and moisture, spreading itself extensively as an epidemic, and shewing its ordinary tendency, under such circumstances, of passing into a continued and more dangerous type. Ague was not usually in itself a disease of great fatality, the deaths recorded at the Dispensary having been only 1.81 per cent. of the cases treated; a sum which denotes its absolute mortality, while its relative mortality was 0.26, when viewed in connection with that from all other diseases. Still, if we keep in view how frequently it was known to degenerate into fevers of a worse form, and how often it terminated in jaundice, "obstructions of the viscera of the abdomen," and consequent dropsies; or, even if we take into consideration the frequency of its recurrence, and the lengthened periods during which it racked its victims, we shall see much reason to be thankful that a plague so universal and so pernicious has been almost wholly rooted out from amongst us. Those who recollect what has been stated of the former swampy nature of much of the soil in our vicinity, and of the extensive means which have been adopted for its drainage, will of course have no difficulty in

understanding why ague was once so prevalent, and under what agency it should now have disappeared ; and will gratefully acknowledge the two-fold value of those improvements, which have at once rendered our homes more salubrious, and our fields more fruitful.

20. The contrast between the rates of prevalence of ordinary fever, in the two periods, is also sufficiently striking to engage attention. From what we have previously stated, and especially from the brief description which we have given of the houses and of the habits of the people during the first decennium, it is apparent that the labouring population of that period were placed under circumstances which rendered them peculiarly liable to suffer from the various modifications of fever in its continued type ; inasmuch as they were continually surrounded by those conditions which are universally known to be favourable to the propagation of that disease. We are not surprised, therefore, to find, that, next to ague in numerical importance, and beyond it in direct mortality, fever occupies a place in the rank of epidemics. The cases of this disease bear, to those of all other diseases, the proportion of 12.71 per cent. for the first decennium. In the second decennium we find that its relative prevalence has declined to a very considerable extent ; but it continues to be regularly endemic amongst us, and still constitutes 7.36 per cent. of the general mass of disease. The relative mortality during the first period was 0.68 ; in the second it was 0.34. This degree of prevalence and of fatality admits, we are deeply convinced, of still farther reduction ; and we would look for one important means of amelioration to the further improvement of the houses of the labourers, especially in the town and in most of the villages. But as the fact, that ague and continued fever were mutually convertible ; that ague frequently lapsed into the continued form, while occasionally the continued form subsided into the intermittent ; with the additional fact, that both types of disease usually prevailed simultaneously in an epidemic character, proves that both may spring, in some sort, from a common origin ; so I am of opinion, that still enough of the original causes of the prevalence of ague remain amongst us, to keep up, at all times, a certain degree of prevalence of febrile

disorder, which even now, in rare instances, assumes the intermitting type, and more frequently, as in the prevailing form in 1838 and 1839, has a distinctly remittent character. When we consider the extent of forest by which we are surrounded, and the large masses of foliage which fall annually to perish by gradual decomposition, with the general profusion of vegetation which clothes our district, and the abundant streams frequently overflowing their banks by which it is traversed; having here some of the most fertile of all sources of miasmata, it can be no matter of wonder should the subtle poison occasionally enter the dwelling of the labourer, even in its most improved aspect, and subject the inmates to its noxious influences. With this view of the occasional origin of fever, it ought to follow, that the majority of our cases should occur either in autumn, when the decay of vegetable matter commences, or in spring, when the vegetable substances, which have been protected by the winter's cold and moisture, are exposed fully to the air, and to the action of decomposing causes, so that the miasmata may be generated and diffused through the atmosphere. And accordingly I find, in my memoranda regarding the prevalence of fever in eight different years, between 1829 and 1839, that in five of them it prevailed chiefly in spring; in one in autumn only; in one in autumn and in summer; and in one in summer only; which last, however, was rather to be viewed in connection with the influenza of that year (1836), than as one of the ordinary forms of the fever of the district. I may add, that, in the fever of the town of Kelso, I think I have observed that four-fifths of the severest cases occurred in situations adjacent to the river.

21. It will be recollected, that, long previous to the first of our periods, the practice of inoculation for smallpox had been extensively adopted throughout the country, and had received the unhesitating sanction of the most eminent practitioners. We are therefore not to expect to find this disease appearing, during our first decennium, with that unmitigated severity which pointed it out, at a still earlier period, as the most loathsome and deadly of human pestilences. Still it will be observed, that, in point of relative prevalence, it occupied the next place to fever, to which it also approached in point of re-

lative mortality; while in its absolute mortality it went far beyond it, and, indeed, beyond any other disease on the record. The first inoculation for smallpox noted at the Dispensary occurs on the 30th January 1780. There can be little doubt, however, that it was practised largely in the previous years, as it is known that this valuable improvement in the healing art began to be extensively adopted in Scotland about the year 1753; upwards of twenty years after it had been in general use in the sister country. Huxham (Essay on Fevers, London, 1750), a most competent authority, speaking of the practice, says, "that the danger in the natural way is at least ten to one of what it is in this." Of the inoculations at the Dispensary not one appears to have been attended by a fatal result. Of the natural disease, the relative mortality per cent., when taken into account with that from the mass of all kinds of disease treated, was 0.45 in the first decennium, and 0.07 in the second; but the absolute mortality, or the deaths in 100 cases of smallpox treated during each period, was as high as 13.46 in the first, and 8.44 in the second. In the first decennium cases occurred every year, and it might be said to be epidemic in five; in the second decennium there were three years which presented no cases, and it was epidemic in only one. In the later of our periods, then, this disease appears to present only one-fourth of the degree of prevalence, and one-fifth of the fatality, which characterised it in the previous one. For this comparative immunity from the invasions of so noisome and destructive an enemy, we are of course mainly indebted to the invaluable discovery of Jenner. But a still greater immunity would have been secured to us by the employment of vaccination, had it been possible to have procured an universal acceptance of the benefits which it proffers. Many parents, certainly chiefly of the lowest class, still either refuse or delay to place their children under its easily acquired protection; and thus the disease continues to prevail, if not so extensively as before, yet still stealing constantly from case to case, and shewing occasionally the certain traces of its existence in the death of a few stragglng victims. Of the deaths recorded at the Dispensary during the second decennium, every one, in as far as I have been able to discriminate, has

occurred in persons who have never enjoyed the protection of vaccination.*

22. That a few individuals, however, have died of smallpox of late years, in this as in other districts, who had previously been vaccinated, is most certain, while many others have been more or less seriously affected; the disease presenting, in different individuals, and especially at different ages, very various degrees of severity. Thus the public confidence in vaccination has been shaken, and many individuals have querulously challenged the value of the discovery, because it has not secured to us so large a measure of benefit as it at first promised. To enter here with any degree of fulness into the questions regarding the extent of the protection afforded by vaccination, and the period of its duration, which have been for several years past the leading topics of medical discussion, and have attracted the attention of the principal governments and scientific institutions of Europe, can of course be no part of the intention of this essay; but I may be permitted to offer a few facts which will at least serve to furnish some notion of what has occurred in this district.

23. It is necessary to admit, and appears now to be nearly universally admitted, that the degree of protection afforded by vaccination varies through the lapse of time, during which it appears to undergo a gradual diminution; but it seems to me equally manifest that it varies farther with reference to the individual, and that there are some in whom it is always more complete, and with whom it endures longer than in others, it being impossible, or at least difficult, to assign any precise limit. In as far as my experience teaches me, I have never seen smallpox after vaccination assume a severe form until fourteen years had elapsed from the period of its performance; but it is by no means my intention to assert, as has been asserted by others, that its protection does not occasionally extend beyond this period. To those who assume that the degree of effect produced by a second vaccination is a measure

* From the tables given in the Registrar-General's report for 1839 (p. 102), it appears plain, almost to a proof, that the great majority of deaths occasioned by the late epidemic of smallpox in England, had occurred in individuals who had never been protected by vaccination.

of the protective force still retained by the first, the following facts, derived from my own memoranda, may appear worthy of notice. Of 68 individuals vaccinated for the second time, of the results of whose cases I have preserved notes, 10 were under, and the remaining 58 above, fourteen years of age. None of them had, at any period of their lives, been affected by either the varioloid varicella or the true smallpox. In the 10 under fourteen the vaccinations took effect in 8 instances: in 1 the vesicles were regular; in 7 they were spurious; while in 2 the virus produced no effect whatever. The average number of operations was 1.20 to each individual, and the success was at the rate of 80 per cent. on the number exposed to the virus. The average of their ages was nine years. In the 58 individuals above fourteen, an effect was produced in 36 instances; in 8 the vesicle was regular, in 28 it was spurious, and in 22 the operation wholly failed. The number of operations was here greater, having been 1.29 to each individual; and in the unsuccessful cases they were repeated in some instances so often that the average amounted to 1.54 for each individual. Yet in this class it will be remarked the general success was smaller, being only at the rate of 62 per cent. on the whole number treated. The average of their ages was, in the cases shewing the regular vesicles, twenty-three, in those with the spurious vesicles, twenty-five, and in the wholly unsuccessful instances, twenty-six years.

24. All my vaccinations have been performed with lymph as fresh as I could possibly obtain it, and in no instance from the dried crust of the vesicle, or from the matter (variolo-vaccinous) of a second vaccination. The latter practice I consider as peculiarly reprehensible, though it has been resorted to frequently in this country, and in the vaccinations on a large scale performed on the Continent. Independent of the greater risk which it induces of complication with syphilitic, scrofulous, or other virus, as it is admitted that the vesicle from revaccination assumes a variety of forms, and shews various degrees of perfection, and as there must be one degree, or phasis, of modification, which, though truly a deviation from the normal condition of the vesicle, may not be easily perceptible to the best instructed eye, and may escape altogether the notice of an or-

dinary observer, and yet may be enough to vitiate the virus to a certain extent ; so this being used for vaccination, and repeated again and again for the myriads of cases in which the operation is required, our confidence may at length be justly shaken as to the security of a protection which we ourselves have heedlessly contributed to destroy. The same risk can never apply to a first vaccination where the vesicle is not subjected to the same modifying causes. I may mention here, that, as an additional precaution, I am always careful, in a first vaccination, to leave at least one of the vesicles wholly undisturbed.

25. It is a sad fault in science to attempt to reason upon any merely vague impressions taken from the memory ; and next to this, in the mischievousness of its effects, is the common offence of forming conclusions from too limited groups of facts. I shall not, therefore, presume to offer any positive deductions from my own scanty amount of experience ; but shall content myself with pointing out one result, which was to me an unexpected one, and by which it appears, that it was in those persons of the greatest average age, and upon whom the operation had been most frequently repeated, that the greatest number of failures, either partial or total, had occurred. Setting aside all consideration of what this may prove, one thing it appears to me most decidedly to disprove ; and that is, the assertion, which I have seen made, that there is *always* a direct correspondence between the degree of effect of a revaccination, and the length of the period which has elapsed from the first vaccination ; so that, of several individuals, their relative ages will be denoted by the relative degrees of perfection in the vesicles produced. Is it not probable, on the other hand, that the susceptibility of the constitution to receive the virus decreases, under certain limitations, with increasing years ? In so far as my observations have tended to indicate the greater susceptibility of earlier years, they have ample confirmation in the more extended experience of others. Neumann of Strasburg gives (V. Kleinert's Repert. der gesamt. Deutsch, Med. Chir. Journal, Augt. heft, 1837) a notice of the result of 685 revaccinations, from which it appears that a much greater proportion of children under fifteen, than of adults, was affected by the virus ; and that even the far greater pro-

portion of perfect vesicles was obtained in the younger class. It will be seen how facts of this kind may be made to bear on another question, for the answer of which science has not yet provided us with sufficient materials: viz. what is the duration of the protection farther conceded to us by a successful revaccination? If the susceptibility to the contagion decrease with increasing years, and if there be any truth in the Jennerian doctrine, lately so beautifully confirmed by the experiments of Ceely, of the identity, or, at least, closely congenerous nature, of smallpox and vaccinia, we may certainly expect that a revaccination, which has produced any distinct effect, will afford renewed protection for a period considerably longer than that conferred by the first operation. But it will be difficult in this, as in the former case, to fix any precise limit; and prudence would seem to point out, amid our present uncertainties, a period of from twelve to fourteen years as the utmost which is entitled to our confidence.

26. Of the remaining epidemic disorders, all, with the exception of erysipelas, have been more prevalent in the second than in the first of our periods. Chicken-pox, a trifling disorder, leading to no fatality, has been nearly four times as prevalent; but it is probable that some of the cases entered under this name, in the second period, should rather have been classed as slighter examples of modified smallpox. Scarlet fever has both been greatly more abundant and more fatal. In the first period its proportion per cent. to all other cases of disease was 0.02; in fact not more than a single case was entered. In the second the proportion was 1.49. In the first it occasioned no deaths: in the second it presented a relative mortality of 0.15, and an absolute mortality of 10. In six of the ten years of the second period, we find cases occurring sporadically throughout the district; and in two consecutive years, 1833 and 1834, it was epidemic. Measles, it will be observed, was nearly three times more prevalent in the second period than in the first; the proportion being for the one 2.96 per cent., and for the other 1.02. No deaths occurred during the first period: in the second the relative mortality was 0.08; and the absolute mortality was 2.52. In the first period this disease occurred during three different years, in two of which it

prevailed epidemically : in the second it occurred during seven different years, and was epidemic in three ; the severest and most extensive epidemic having been that of which I gave some notice in a former paper. The increased prevalence of hooping-cough was to a less marked extent ; the proportion having been 1.10 in the first, and 1.48 in the second period. The relative mortality in the first was 0.04, in the second it was 0.07. The absolute mortality in the first was 3.84, in the second the disease appears to have assumed a severer form, as the absolute mortality had now risen to 5.04. Hooping-cough occurred in five years of the first period, and was epidemic in three. In the second, cases presented themselves in eight different years, and it was epidemic in four. Though, from certain analogies, we have ranked erysipelas among the epidemics, it does not appear to have presented itself in either of the periods in what could be properly considered an epidemic form ; though in the last year of the second decennium it somewhat approached to it. Cases occurred in eight of the years of each decennium. In the first period the proportion was 0.73 ; in the second it was 0.55. The relative mortality in the first period was 0.02 ; in the second 0.01. The absolute mortality was in the first 2.94 ; in the second 2.27.

27. The following table will serve to give at one view what has been the relative mortality caused by this class of disease in each of our two periods :—

TABLE (D), *Shewing the mean proportion of Deaths from Epidemic and Endemic Diseases in one hundred cases of general disease brought under treatment.*

| Disease. | Ague. | Fever. | Small-Pox. | Chick-Pox. | Scarlet Fever. | Measles. | Hoop-Cough. | Erysipelas. | Total. |
|----------------|-------|--------|------------|------------|----------------|----------|-------------|-------------|--------|
| 1st Decennium. | 0.26 | 0.68 | 0.45 | 0.00 | 0.00 | 0.00 | 0.04 | 0.02 | 1.45 |
| 2d Decennium. | 0.00 | 0.34 | 0.07 | 0.00 | 0.15 | 0.08 | 0.07 | 0.01 | 0.72 |

The proportion of deaths per cent. from all classes of disease, taken collectively, was in the first period 4.60 ; and of these 1.45, or nearly a third, were owing to diseases of an epidemic or endemic character. In the second period the proportion of deaths per cent. was reduced to 2.59 ; and of these 0.72 were to be ascribed to the same particular class. The

relative proportion from each individual species, to the mortality from all, is shewn in the preceding table.

28. The information to be derived from this table, and from the tables shewing the relative prevalence, may be exemplified as follows. We learn from the first table (B), that, of 100 cases of general disease entered on the record during the first period, 33.07 belonged to the class of epidemics and endemics; the second (C) shews us that 14.05 of these were cases of ague; and from the third (D) we learn, that, of the whole deaths consequent upon the 100 cases of general disease, 0.26 were owing to this ailment. The whole deaths per cent. having been 4.60 for this period, we find, then, that the direct mortality from ague amounts to an eighteenth of that from all other diseases. The same kind of information is of course furnished with regard to the other species included in this class; and this information we are at once enabled to contrast with that which is furnished to us by a similar examination of the second decennium.

29. The term "absolute mortality" has been frequently employed in the course of the preceding observations, and perhaps without making it sufficiently clear what precise meaning it was intended to convey. By "absolute mortality" I wish to be understood the number which would die in 100 cases, not of all diseases taken collectively, but of any one individual disease examined by itself. This might be considered as representing the true mortality from that disease; but it certainly does not do so, if viewed with reference to any particular time or complication of circumstances. A disease might be fatal in nearly every instance; yet, if only one or two examples occurred in ten or a hundred thousand instances of other diseases, its importance in a statistical table would be very trifling. Or, again, a disease might be more extensively prevalent, and might be fatal in an equal proportion of cases in two different periods, but might present itself in one of them in only half the number of instances; during which, therefore, it would produce only half the effect upon the true or aggregate mortality, though in point of absolute mortality it was exactly equal. But if an inquiry into the rate of absolute mortality serves to throw little light upon the degree of prevalence and actual results of any individual disease, it certainly tends to furnish us with valuable information regarding

its particular character, and points out to us in how far it has been amenable to treatment. I subjoin a table presenting a connected view of the absolute mortality from the class with which we are now occupied in each of our two periods :—

TABLE (E), *Shewing the mean rate of mortality from Epidemic and Endemic Diseases per hundred of each kind of disease.*

| Disease. | Ague. | Fever. | Small-Pox. | Chick-Pox. | Scarlet Fever. | Measles. | Hoop-Cough. | Erysipelas. |
|----------------|-------|--------|------------|------------|----------------|----------|-------------|-------------|
| 1st Decennium, | 1.81 | 5.36 | 13.46 | 0.00 | 0.00 | 0.00 | 3.84 | 2.94 |
| 2d Decennium, | 0.00 | 4.56 | 8.44 | 0.00 | 10.00 | 2.52 | 5.04 | 2.27 |

Thus we learn that fever led to fatal results in 5.36 instances per cent. in the first, and in 4.56 in the second period; or that fever was nearly one-fifth less fatal in the second period than in the first. As we are constrained to confess that no very important improvement in the treatment of fever had occurred in the interval, we believe this diminished mortality must be attributed chiefly to the less virulent nature of the disease in the second period, owing to the advantages arising from a more universal attention to hygienic rules on the part of the population. But this gain of one-fifth on the mortality by no means represents the whole superiority possessed by the one period over the other. Not only was fever less fatal in the second period, but we learn, on turning to Table (C), that it presented also, at that time, little more than one-half of its former degree of relative prevalence; so that, in fact, its true mortality was also reduced to one-half, as it actually appears in Table (D). Scarlet fever is the most deadly disease of the second period, having led to fatal results at the rate of 10 per cent. of the cases treated. But, then, its relative prevalence was only 1.49 per cent. to that of all other maladies; by which its relative mortality becomes reduced to 0.16, when compared with that arising from the general mass of disease. In the first period we have seen it was never epidemic, and produced no mortality. From this table, then, we learn only what has been the degree of intensity of form in which any given disease has appeared in either of our periods, and in so far the information conveyed is of the most interesting description. But it is only by referring to the Table

(C) shewing the relative prevalence, and to that (D) pointing out the relative mortality, that we are enabled to estimate the true nature and extent of its influence at either period.

30. Our second section, or that of "diseases of the nervous apparatus," includes apoplexy and paralysis, inflammatory affections of the great nervous centres, mania, hysteria, chorea, and certain local neuralgiæ. The following table shews the relative degrees of prevalence of the diseases of this class, in each of our decennia :—

TABLE (F) *Shewing proportion per cent. of Diseases of Nervous Apparatus to all others.*

| Years. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | Whole Period. |
|----------------|-------|------|------|------|------|------|------|------|------|------|---------------|
| 1st Decennium, | 12.92 | 7.84 | 4.34 | 2.07 | 4.31 | 6.17 | 4.11 | 8.68 | 6.63 | 4.26 | 5.59 |
| 2d Decennium | 3.39 | 3.11 | 3.63 | 1.78 | 3.52 | 2.06 | 2.19 | 3.23 | 2.69 | 3.65 | 3.00 |

We thus observe, that, in the diseases of this class, the amount of relative prevalence in the first of our periods was nearly twice that of the second. Yet, on farther calculation, we find that the relative mortality of the second exceeded that of the first, in the proportion of 20 to 15; that is to say, of 100 cases of general disease brought under treatment in the second period, and producing death in 2.59 instances, the fatal termination in 0.20 is owing to disease of the nervous apparatus; or, in other words, out of 500 cases of general disease, one would prove fatal from disease of this class: while of the same number of cases in the first period, producing death in 4.60 instances, only 0.15, or one in nearly 700, could be ascribed to the same cause. The mortality cannot be accounted considerable in either of the periods. That it should be at all greater in the second must be attributed, in part, to a greater prevalence of inflammatory disorders, simple or complicated, of the brain and its membranes, which appear to have given origin to more than threefold the number of deaths occasioned by them in the first.

31. Scarcely a single case of apoplexy occurs, where the spectators, naturally aroused to attention by the sudden and appalling annihilation of mental and bodily vigour which they

have witnessed, do not inquire whether such attacks are not more common in our days than they were previously. It is usual to reply to this in the affirmative; but such inquiries can only be accurately answered from investigations similar to that in which we are now engaged. It appears from the materials before us, that the opinion ordinarily entertained is erroneous, and that palsy and apoplexy have not increased of late years. In the first of our periods cases of this kind have the proportion of 0.82 per cent. to the general mass of disease; in the second period this proportion is reduced to 0.29; so that, in fact, palsy and apoplexy have shewn, in the second decennium, little more than a third of the relative prevalence evinced by them in the first.

32. It cannot be necessary to specify the particular affections included in the sections of "diseases of the respiratory apparatus," farther than to state, that I have classed influenza here, rather than with the epidemics, because it is with this class that it has the greatest number of affinities; so that there are diseases here from which it is rarely accurately distinguished, and from some of which, indeed, it is frequently impossible to distinguish it, except by the circumstance, always an indefinite one, of its more or less extensive prevalence at a given time.* I shall, therefore, merely consider influenza as a form of catarrh; and shall content myself with noting, subsequently, those periods at which catarrh has been especially prevalent, so as to entitle it, in some sort, to the name of influenza. The following table will shew us what has been the range of this class of diseases during each of our periods:—

TABLE (G), *Shewing proportion per cent. of Diseases of Respiratory Apparatus to all others.*

| Years. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | Whole Period. |
|----------------|-------|------|------|-------|-------|-------|-------|-------|-------|-------|---------------|
| 1st Decennium, | 11.59 | 9.48 | 5.65 | 6.67 | 10.39 | 13.33 | 8.43 | 10.63 | 9.74 | 8.53 | 9.18 |
| 2d Decennium, | 8.11 | 7.31 | 7.90 | 16.40 | 9.42 | 12.97 | 13.15 | 15.87 | 11.92 | 12.75 | 11.30 |

* "Tusses, nemini fere parentes, cujuscumque is fuerit sive ætatis, sive temperamenti, integras vtro simul familias pervadentes."—SYDENHAM, *Opera Medica*, Cap. V.

33. We learn from this table, that diseases of the respiratory apparatus constituted, at an average, during the first decennium, nearly a tenth of the whole cases brought under treatment; and that, in the second decennium, their prevalence was slightly increased. Of (4.60) the average mortality per cent. during the first period, 1.09, or nearly a fourth, was owing to this class of ailments; while, in the second period, they produced fatal results in only 0.67 per cent.; thus still retaining, however, nearly the same proportion of one-fourth to (2.59) the average mortality per cent. from all diseases at this later period. We thus find, that, next to the class of epidemics, it is from this class that the largest amount of mortality takes its origin in this district. Pulmonary consumption, of course, shews itself here in its usual formidable aspect. In the first period, of one hundred cases of general disease, consumption produced fatal results in 0.61; thus giving rise to about an eighth of the aggregate mortality. In the second period, the proportion was only 0.24; being scarcely an eleventh of the whole mortality. Consumption, therefore, has been less fatal in the second than in the first of our decennial periods. Asthma appears as an exceedingly common disease in the first decennium; and its name, next to consumption, is the most frequently recorded as the precursor of a fatal termination, having been noted as producing death in the proportion of 0.23 per cent. of all diseases treated. Doubtless, many of the cases so entered were rather examples of chronic catarrh, or of some affection of the heart, than of true asthma, the real pathological character of which was not then distinctly recognised; while its diagnosis, with that of other affections of the chest, was very imperfectly determined, and received no aid from those valuable instruments, the stethoscope and plessimeter, which have been introduced by modern science. In the first of our periods asthma is recorded as constituting 2.95 of the general mass of disease; in the second period only 0.58.

34. In the first decennium, influenza appeared as an epidemic in June 1782; in the second, it prevailed in May and June 1833, in June 1836, and in January and February 1837. It is remarkable that the records of the Dispensary do not

present a single death attributed to this disease. But of pulmonary catarrh, or bronchitis, in the wider acceptation of the term, the record presents us with many fatal terminations. It will scarcely be anticipated, that this affection, which, in the first decennium, with a prevalence of 2.65 per cent., produced a mortality of only 0.06, should, in the second, have reached a prevalence of 8.46 per cent., and a fatality equal to that of consumption.* Seizing on the two extremes of life—on early childhood and on age—catarrh has selected its victims, for the most part, from among those whose physical weakness least fitted them to resist its attacks; and thus the lives which it has sacrificed have chiefly been those which, in the eye of the political economist, possess the smallest value. But there is one form of this affection, of which I have seen a few rare instances in the later of our periods, which appears rather to select for its usually fatal attacks the more vigorous periods of life. I allude to the pituitary catarrh of Laennec and other modern writers, and the phthisis pituitosa of some older authors. This disease, in as far as I have observed it, seems to be little influenced by any kind of treatment, and has nearly as uniform a fatal tendency as consumption itself. However, as it is of rare occurrence in the district, it has a proportionably small effect upon the general mortality.

35. Next to asthma in point of fatality, in the class of diseases under notice, in the first decennium, rank pneumonia and pleurisy; which have given rise to deaths in the proportion of a little more than 0.10 per cent. upon the general mass of disease. About a forty-fifth part, therefore, of (4.60) the aggregate mortality was owing to this cause. In the second period, I find no deaths ascribed to these affections. Indeed, pneumonia, unmixed with phthisis, is now a disease of comparatively rare occurrence; and, in my own practice at the Dispensary, I find that it has presented itself only once in 342 cases of all kinds of disease, or that it constituted 0.29 per cent. of the general mass.

* Such, however, appears to have been the fact; yet, in here noting it, it is proper to keep in view what has been formerly said when speaking of asthma.

36. "Diseases of the circulatory apparatus," or of the heart and great bloodvessels, remained nearly wholly unconsidered and unknown during the first of our periods. Previous to the second, they had been illustrated by a series of observations and discoveries, as brilliant as any that have ever thrown light on the science of semeiotics. In the first period, then, it can be no wonder that the Dispensary record scarcely presents us with a single distinctly noted example; but even in the second, I feel convinced that this class of affections does not appear with that degree of influence over human suffering and mortality which truly belongs to it. The following table will shew what has been its relative prevalence at each of our periods:—

TABLE (H), *Shewing proportion per cent. of Diseases of Circulatory Apparatus to all others.*

| Years. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | Whole Period. |
|----------------|------|------|------|------|------|------|------|------|------|------|---------------|
| 1st Decennium, | 0.33 | 0.33 | 0.22 | 0.15 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.09 |
| 2d Decennium, | 0.36 | 0.00 | 0.52 | 0.18 | 0.38 | 0.30 | 0.34 | 0.31 | 0.42 | 1.50 | 0.47 |

Thus the prevalence of this class of diseases has been five times greater in the second period than in the first, yet still amounts to a very insignificant proportion. The mortality in the second period is 0.09 per cent. of all diseases treated; in the first, no affection of this class has been assigned as a cause of death.

37. Those affections to be included under the section of "diseases of the digestive apparatus," appear to have been of very frequent occurrence within the district, especially during the later of our two periods. Their degree of relative prevalence will be illustrated by the following table:—

TABLE (I), *Shewing proportion per cent. of Diseases of Digestive Apparatus to all others.*

| Years. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | Whole Period. |
|----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|---------------|
| 1st Decennium, | 18.54 | 17.97 | 9.13 | 12.15 | 15.30 | 14.57 | 14.90 | 18.65 | 16.18 | 22.20 | 15.77 |
| 2d Decennium, | 22.76 | 30.97 | 33.55 | 27.09 | 29.65 | 25.98 | 30.02 | 26.81 | 28.38 | 27.83 | 28.34 |

We thus perceive that this class of diseases has been nearly twice as prevalent in the second period as in the first; the mean proportion in the one having been 28.34, and in the other 15.77 per cent. upon all kinds of diseases taken collectively. There would have been here deep cause of regret, had the mortality from this class of disease presented, in the second decennium, the same high rate which accompanied it in the first. During the earlier of our periods, of 100 cases of all kinds of disease brought under treatment, 1.06, or nearly a fourth of (4.60) the whole amount of deaths, perished from disease of the digestive organs. But in the second period, happily, this proportion appears reduced to 0.42, being now only a sixth of (2.59) the now also greatly diminished aggregate mortality. If we consider the absolute mortality, the contrast is placed in a still more striking point of view. In 100 cases of disease of the digestive apparatus treated during the first period, fatal results ensued in 6.73 instances; while of a like number in the second period only 1.44 terminated in death. A large proportion, nearly a fourth, of the deaths from this class, in the first period, is attributed to those "visceral obstructions," to which we have formerly alluded under the head of ague; and by which we are to understand the morbid deposits and other changes of structure which shew themselves in the liver, the mesentery, and especially the spleen, as consequences of that disease, usually more serious than the disease itself, and by which its fatality may be considered as doubled. Of course, in the second period, this cause of mortality is nearly wholly wanting. In fact, an examination into the nature of the prevailing complaints in this, and, I may add, in the following section, induces me to consider their proportionately greater prevalence in the later of our periods as an indirect, yet by no means insignificant, testimony of that improved condition of the general health of the community which had taken place in the interval between our two decennia, and of which we have gradually been accumulating proofs in the course of these inquiries. The greatly increased number of diseases of this class, recorded in the second decennium, with the equally remarkable diminished mortality, affords evidence of a readiness to apply for medical aid on comparatively trifling occa-

sions, which, I suspect, will always be found to be the sure concomitant of the more improved conditions of the social body, in comforts and civilization. It is indeed natural, as the general health of a population improves, that many trifling complaints should become noticed, which, in the deeper and more universal misery of a less happy period, would have been considered too trivial to claim attention. It is, therefore, to this cause, especially, that I would attribute the frequent entries, in the second period, bearing reference to that numerous train of symptoms usually classed under the head of dyspepsia, which have mainly contributed to swell the proportion of this class of diseases to nearly twice its amount in the prior decennium, without having exercised any observable influence on the rates of mortality.

38. It is to me a question, whether or not I ought to consider it as a matter of regret, that I am unable to offer, in this place, any precise details regarding the epidemic of malignant cholera, which, in 1832, prevailed to a slight extent in the district. Perhaps, as this disease is so little entitled, from its periods of recurrence, to rank with those by which our population is usually infested, it is better, in an examination of the diseases ordinarily occurring in the district, undertaken with a view to the illustration of their relative degrees of prevalence at distinct periods, to pass over with slight notice a malady, which, during all past time, has only presented itself once amongst us. But, whatever room there may be here for regret, it must, at least, be unavailing, from the circumstance that, for the two months during which cholera prevailed, the Dispensary was fitted up as a temporary hospital, its usual routine of duties was, in a great degree, interrupted, and its records for that particular period were, by some accident, mislaid, or wholly lost. It is probable that from about 25 to 30 persons belonging to the labouring class perished of this malady; but of these I have taken no note in my calculation, partly for the reasons already mentioned, and partly because I was unwilling to bring the results of a mere supposition within the range of an investigation, to which I wished to give as precise a character as it was in my power to bestow.

39. The affections included under our sixth and last section

are of a very miscellaneous description, and constitute, at both periods, a large proportion of the general mass of disease. This proportion, with its variations in different years, will be illustrated by the following table :—

TABLE (K), *Shewing proportion per cent. of Diseases of Miscellaneous Class to all others.*

| Years. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | Whole Period. |
|----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|---------------|
| 1st Decennium, | 44.37 | 38.24 | 34.57 | 29.04 | 32.55 | 24.94 | 40.79 | 43.60 | 38.01 | 41.03 | 36.30 |
| 2d Decennium, | 41.41 | 47.95 | 42.36 | 37.26 | 39.07 | 36.13 | 39.63 | 44.07 | 41.48 | 42.74 | 41.54 |

From this table, then, it appears that the proportion per cent. of cases of this class to all others, was, in the first period, 36.30 ; and in the second period 41.54. The principal affections here included are rheumatism, diseases of the skin, of the eye, ear, bladder, uterus, &c., scrofula, syphilitic complaints, abscesses, all affections strictly local, and all casualties of whatever description. The most prevalent of these, or at least next to the casualties, is rheumatism, which may be estimated as constituting 4.97 per cent. of the general mass of disease in the first period, and 5.40 per cent. in the second. In the first period, general rheumatism appears to have been the prevailing form entered upon the record ; in the second, local, and consequently less severe, affections, accompanied by less acute febrile disorder, are more frequently noted. Next in order, in point of prevalence, come the diseases of the skin ; and next, those of the eye. Scrofula appears to have been a much more common complaint in the first period than in the second ; and in the first also it appears to have assumed a more virulent character, as the notices of carious bones, &c. are comparatively frequent. This disorder constituting the most common source of those morbid changes of structure which lead to a necessity for the performance of amputations and other important surgical operations, it ought to follow, that, under its present milder form, operations of this description should be less frequently resorted to than formerly. And this is really what has happened in our district. Amputations are, undoubtedly, becoming of more and more rare occurrence ; and the modern surgeon, justly viewing an operation performed

without urgent necessity as the worst of triumphs, and bringing the better weapons of modern science to bear against a less dangerous antagonist, can now, in a great majority of instances, heal without mutilating, and thus happily admit his patient, more frequently, to the benefit of the important distinction between maiming and curing. Calculous disorders are of great rarity. In the first period, certainly, we find many notices of "gravel" (0.38 per cent.); but these, I suspect, were merely cases of dysuria, the causes of which had not been discriminated with sufficient accuracy. Such affections, at all events, occur in no such proportion in the later period. An inquiry into the relative prevalence of syphilis and other venereal affections will be interesting, as throwing light upon the moral condition of the population at the two periods. On ascertaining the result of this inquiry, it may perhaps be considered that both periods have passed through the ordeal of such a scrutiny with fair credit; though it must be confessed that the advantage is greatly on the side of the first decennium, during which the proportion was only 0.08 per cent., or 1 in about 1200 of all diseases treated; while in the second it had risen to 0.24, or 1 in about 400. Of hydrophobia, not a single instance is entered upon the record in either of the periods; and yet we have seen occasions when a kind of panic, owing to this affection, appears to have floated through the district, and imaginary fears have been entertained for a disease which has never been known actually to exist among us, while those more real dangers by which we are permanently beset, are looked upon with comparative indifference. But it is no rare matter for man, in things concerning his health as well as in others, to loose his hold of the substance that he may grasp with eagerness at the shadow. The mortality, owing to this section, was, in the first decennium, 0.85 per cent. of all kinds of disease taken collectively; or somewhat less than a fifth of (4.60) the aggregate mortality. In the second decennium it was reduced to 0.49; thus retaining nearly the same proportion of one-fifth to (2.59) the aggregate mortality for this period.

40. I now subjoin a table, shewing what has been the "ab-

solute mortality," under the several sections, during each of the two periods; requesting the reader to keep in view what has been formerly stated on this head, and to remember, that, inasmuch as no account is taken of the degrees of prevalence, such a table does not afford any true representation of the amount of death which has actually occurred; but merely instructs us, to a certain extent, regarding the degree of virulence or intensity of form, with which any given class of disease may have manifested itself at either period, and in how far it may have been under the control of medical treatment:—

TABLE (L), *Shewing the mean rate of Mortality from Six Classes of Disease, per hundred of each class.*

| Diseases of | Epidemic Class. | Nervous Apparatus. | Respiratory Apparatus. | Circulatory Apparatus | Digestive Apparatus. | Miscellan. Class. |
|----------------|-----------------|--------------------|------------------------|-----------------------|----------------------|-------------------|
| 1st Decennium. | 4.37 | 2.66 | 11.80 | 0.00 | 6.73 | 2.34 |
| 2d Decennium. | 4.74 | 6.63 | 5.94 | 18.41 | 1.44 | 1.16 |

Thus, of 100 cases of epidemic and endemic diseases brought under treatment, 4.37 have terminated fatally in the first period; and 4.74 in the second. These diseases, therefore, appear to occur in a somewhat more severe form now than formerly; but they are only half as frequent. Of 100 cases of disease of the nervous apparatus, 2.66 were fatal in the first period, and 6.63 in the second. The symptoms attending these affections have therefore manifested themselves with much greater intensity in the second than in the first period; but they have been little more than half as frequent. Diseases of the respiratory apparatus have been somewhat more prevalent in the second period; but they have shewn only half the-severity. The diseases of the circulatory apparatus present, for reasons formerly given, no fair objects for comparison; but in the two succeeding classes, constituting more than a half of the mass of disease in the first period, and nearly two-thirds of the aggregate in the second, the advantage is greatly in favour of the later period. Of 100 cases of diseases of the digestive apparatus treated in the first period, 6.73 proved fatal; in the second only 1.44. Of the class of

miscellaneous diseases, 2.34 per cent. were fatal in the first period; in the second 1.16.

41. But, lest any confusion should arise from the view of the absolute mortality just given, I shall now throw together into a tabular form, a view of the mortality considered in relation to the actual prevalence of disease; which gives, in fact, the true mortality for either period, and is that of which we have already presented separate notices under each of the sections. On this occasion, however, we shall take the larger number of 1000 as the basis of our calculations, by which the results will appear in a more tangible form, while the relative proportions will remain unaltered:—

TABLE (M), *Shewing the mean proportion of Deaths from each of Six Classes of Disease, per 1000 of all Diseases taken collectively.*

| Diseases of | Epidemic Class. | Nervous Apparatus. | Respiratory Apparatus. | Circulatory Apparatus. | Digestive Apparatus. | Miscellaneous Class. | Total. |
|----------------|-----------------|--------------------|------------------------|------------------------|----------------------|----------------------|--------|
| 1st Decennium, | 14.50 | 1.50 | 10.90 | 0.00 | 10.60 | 8.50 | 46.00 |
| 2d Decennium, | 7.20 | 2.00 | 6.70 | 0.90 | 4.20 | 4.90 | 25.90 |

From this table we learn that the amount of deaths per thousand, of all cases of disease taken collectively, was 46.00 in the first period; and, in the second, 25.90. In both periods, the largest proportion of this aggregate mortality was caused by the class of epidemics. Next to these ranked the diseases of the respiratory apparatus; next, those of the digestive apparatus in the first period, and the miscellaneous class in the second; and then follow these two classes in a reversed order for the two periods. Afterwards come the diseases of the nervous apparatus; and, lowest of all, in their influence upon the general mortality, appear the diseases of the heart, and the adjacent large bloodvessels. The precise proportion which the different classes bear to each other are sufficiently indicated by the table, and need not detain us for farther comment.

42. The tables presented under each of the sections point out to us only what has been the range, with regard to prevalence, of each particular class of disease, without indicating,

in any degree, the corresponding fluctuations which have taken place in all the other classes. But this forms also an interesting topic for investigation; and it is one for which ample data will be afforded by a new arrangement of the materials already presented in the tables referred to. These we shall now place in such order, as to furnish, at one glance, that information, which could only be otherwise obtained by many distinct references:—

TABLE (N), *Shewing the relative prevalence per cent. of each of Six Classes of Disease in the first Decennium.*

| Diseases of | Epidemic Class. | Nervous Apparatus | Respiratory Apparatus. | Circulatory Apparatus. | Digestive Apparatus. | Miscellaneous Class. |
|----------------------|-----------------|-------------------|------------------------|------------------------|----------------------|----------------------|
| Year 1 | 12.25 | 12.92 | 11.59 | 0.33 | 18.54 | 44.37 |
| 2 | 26.14 | 7.84 | 9.43 | 0.33 | 17.97 | 38.24 |
| 3 | 46.09 | 4.34 | 5.65 | 0.22 | 9.13 | 34.57 |
| 4 | 49.92 | 2.07 | 6.67 | 0.15 | 12.15 | 29.04 |
| 5 | 37.45 | 4.31 | 10.39 | 0.00 | 15.30 | 32.55 |
| 6 | 40.99 | 6.17 | 13.33 | 0.00 | 14.57 | 24.94 |
| 7 | 31.77 | 4.11 | 8.43 | 0.00 | 14.90 | 40.79 |
| 8 | 18.44 | 8.63 | 10.63 | 0.00 | 18.65 | 43.60 |
| 9 | 29.44 | 6.63 | 9.74 | 0.00 | 16.18 | 38.01 |
| 10 | 23.98 | 4.26 | 8.53 | 0.00 | 22.20 | 41.03 |
| Whole } Period, } | 33.07 | 5.59 | 9.18 | 0.09 | 15.77 | 36.30 |

We now offer the same arrangement for the second period :

TABLE (O), *Shewing the relative prevalence per cent. of each of Six Classes of Disease in the second Decennium.*

| Diseases of | Epidemic Class. | Nervous Apparatus. | Respiratory Apparatus. | Circulatory Apparatus. | Digestive Apparatus. | Miscellaneous Class. |
|----------------------|-----------------|--------------------|------------------------|------------------------|----------------------|----------------------|
| Year 1 | 23.97 | 3.39 | 8.11 | 0.36 | 22.76 | 41.41 |
| 2 | 10.65 | 3.11 | 7.31 | 0.00 | 30.97 | 47.95 |
| 3 | 12.04 | 3.63 | 7.90 | 0.52 | 33.55 | 42.36 |
| 4 | 17.29 | 1.78 | 16.40 | 0.18 | 27.09 | 37.26 |
| 5 | 17.96 | 3.52 | 9.42 | 0.38 | 29.65 | 39.07 |
| 6 | 22.56 | 2.06 | 12.97 | 0.30 | 25.98 | 36.13 |
| 7 | 14.67 | 2.19 | 13.15 | 0.34 | 30.02 | 39.63 |
| 8 | 9.71 | 3.23 | 15.87 | 0.31 | 26.81 | 44.07 |
| 9 | 15.11 | 2.69 | 11.92 | 0.42 | 28.38 | 41.48 |
| 10 | 11.53 | 3.65 | 12.75 | 1.50 | 27.83 | 42.74 |
| Whole } Period, } | 15.35 | 3.00 | 11.30 | 0.47 | 28.34 | 41.54 |

43. Of 100 cases of disease entered on the record, during the first period, 47.80 occurred in males, and 52.20 in females. The deaths per cent. were, in males, 4.93; in females 4.27. In the second period, the proportion of cases entered was, of males 46.0; of females 54. The deaths per cent. were, in males, 2.88; in females 2.30. The diseases of females, therefore, were, in both periods, more numerous, but less fatal, than those of males.

44. The facts which have been elicited in the course of the preceding inquiries appear to prove, that the diseases affecting the labouring population of this district have undergone a material change during the interval which has elapsed between the two periods selected for our investigation, and that this change has been manifestly to the advantage of the latter period, the prevailing maladies having, for the most part, assumed a less serious and fatal character. If we are justly entitled to draw these conclusions, it ought to follow, that, as the diseases are of a less severe description, the population will be better able to sustain their attacks, and will be, generally, later in succumbing to that fate which awaits all living. An inquiry, therefore, into the ages at which death has occurred in either of our periods, ought to present us with results in harmony with those at which we have already arrived, and of course greatly in favour of the second of our periods, otherwise the credit of our whole investigations will be inevitably shaken; while, on the other hand, if we discover that each new fact, as it is successively developed, is in correspondence with, and confirms, those by which it has been preceded, we shall have in this circumstance alone a testimony of the general truth and accuracy of our researches. The following table presents us with a classification of the ages at the period of death in each decennium:—

TABLE (P), *Shewing, in 100 Deaths, the number at each of twelve Periods of Life.*

| Ages. | Under 1. | 1 to 2. | 2 to 5. | 5 to 10. | 10 to 20. | 20 to 30. | 30 to 40. | 40 to 50. | 50 to 60. | 60 to 70. | 70 to 80. | 80 to 90. |
|---------------|----------|---------|---------|----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| 1st Decennium | 1.0 | 3.0 | 9.5 | 6.0 | 6.5 | 12.0 | 16.5 | 14.0 | 10.0 | 17.0 | 4.0 | 0.5 |
| 2d Decennium. | 5.0 | 5.0 | 10.0 | 6.5 | 14.0 | 11.5 | 5.5 | 9.0 | 7.5 | 12.5 | 10.0 | 3.5 |

Several circumstances deserving attention immediately present themselves on inspecting the preceding table. We find the deaths recorded as having occurred under the age of one year to be only at the rate of 1 per cent., and those from one to two years as only 3 per cent. of the whole number entered in the first period ; while in the second period, they are 5 per cent. for the first age, and a like number for the second. These numbers, especially in the first instance, are undoubtedly far from constituting a due representation of the mortality at the ages in question ; and, indeed, it was scarcely to be expected that the records of any dispensary, existing in a rural district, could convey information of the same value with reference to the mortality of early childhood as to that of more advanced periods. Many infants, especially in the first decennium, would doubtless perish without the benefits of the institution having ever been solicited in their behalf ; and in other instances where application had been made, the apathy of the parents would frequently interfere to prevent its being turned to proper advantage, and the results, especially in chronic cases, would probably never be duly reported. That this degree of apathy has in part subsided, and is still subsiding, is shewn by the record, in which the entries of the diseases of infants are gradually appearing in a larger proportion. During the years between 2 and 10, both decennia present a nearly equal proportion of deaths ; but in the period from 10 to 20, the advantage is greatly in favour of the first decennium. On examining into the causes of death at this age during the second decennium, I find that nearly one-third of the mortality is to be attributed to continued fever, one-fourth to consumption, and a like proportion to the febrile exanthemata, the greater part of which belongs to scarlatina.

But at the age of twenty all pretension to superiority on the part of the first decennium immediately ceases. Up to this period of life, the individual has been, comparatively speaking, a burden upon society. He has been indebted to others for those cares which have reared him through the weakness and perils of infancy, and which have sustained his after-existence and matured his intellect. But beyond the period of manhood, he appears in a new character, and is now able to

extend that aid to others upon which he was formerly dependent himself. His death, therefore, after this period, and in all time coming, till age has exhausted his faculties, is a direct loss to society, which has become, as it were, entitled to profit by the fruits of that usefulness to which it has painfully reared him. But during the first decennium, in the years between twenty and fifty, when man is in the fullest enjoyment of life, and in the most active exercise of his duties as a parent and a citizen, we find that for 26 individuals which fell in the second decennium, not less than 42.50 perished in the first. This superiority on the part of the second decennium is now maintained to the close. Between the ages of eighty and ninety, only 0.50, or 1 in 200, remained in the first decennium; while 3.50, or 7 in 200, were alive in the second. The age of the oldest person recorded was eighty-eight in the first, and eighty-seven in the second period.

45. After what has been said of the evidently deficient entries of the deaths in early infancy, especially in the first decennium, it may appear unnecessary to offer any statement of the average duration of life as shewn by the ages at the periods of death. But as I wish to take every advantage of the facts before me, and to allow them to speak for themselves in as far as possible, I shall here subjoin it; as giving, certainly, a true representation of what appears on the record, though, with equal certainty, no true representation of what has actually occurred in the district. In the first period, the average duration of life, as it appears from a calculation of the ages at the period of death, was thirty-five years and two months; in the second it was thirty-four years and four months.* Had

* The preceding statement has, of course, been computed from the whole practice at the Institution; but it is right to add, that, from another calculation, of which I gave some notice in a former paper read before the Border Medical Society, it appears that the average duration of life in the labouring classes, as computed from the results of my own practice exclusively, amounted, upon an average of ten years, to not less than 38 years and 210 days. In the better classes, the average has been as high as 49 years and 226 days. I have been able to extend the latter calculation over a period of three years only; but this will be sufficient to furnish something like an approximate proof of the advantages of a condition admitting of the enjoyment of greater comforts, and of a stricter attention to hygienic rules.

the deaths in infancy been entered in like proportions at both periods, and in similar proportions to those borne upon other records, this statement would have been something more than reversed.

46. Regarding the seasons in which the greatest mortality prevailed, the record enables me to offer little information in the first period, and none whatever in the second. Of 100 deaths recorded in the first six years of the first decennium, 26.72 occurred in spring, 30.18 in summer, 17.24 in autumn, and 25.86 in winter.

47. The evidence to be derived from such investigations as the preceding is not complete. There are many points upon which it leaves much to be desired in the way of more positive information, the nature and extent of which will readily suggest themselves to those who are versed in such inquiries. But, deficient as the evidence is, it is at least the best which I could obtain, and it would be ridiculous to attempt to discredit it upon any mere general impressions regarding such and such a particular fact. If impeached at all, it must be upon the faith of some record similar to that at the Dispensary, but still more extensive and more correct in its details; and I am not aware that there is any such in existence. The national prudence and sagacity of the Scotch have long been considered worthy of remark; but if the health of a people be an object deserving its earnest attention, they have shewn themselves less wise than their sister nation, in abstaining from demanding the institution of that system of registration which has lately been adopted in England, and which promises to throw many important lights directly upon the prevailing diseases and causes of death, and indirectly upon the means of obviating them. In the absence of these more valuable documents, I have endeavoured to turn the materials before me to such account as I was able, and I trust that no one will consider the results as wholly destitute of worth or interest. As a history of the past, as a record of facts regarding a matter so important as the health of our species, they cannot be without a certain degree of value; but, undoubtedly, the observations upon which they have been founded are not sufficiently numerous to entitle them to be offered as an unerring guide for the fu-

ture, neither have they been framed with any such ambitious views.

48. And yet, when we consider the manifest improvement in the condition of a large portion of the community, of which they afford, in as far as they go, a consistent series of proofs, and when we reflect that this improvement has taken place, as it were, almost by chance, and independent of any particular aids of science especially directed towards its furtherance, it is impossible to avoid the conclusion that much more might still be accomplished, could we be induced to profit by a gradually extending knowledge, so as to found upon it a more wisely directed practice. When man shall be brought to acknowledge, as truth must finally constrain him to acknowledge, that it is by his own hand, through his neglect of a few obvious rules, that the seeds of disease are most lavishly sown within his frame, and diffused over communities; when he shall have required of medical science to occupy itself rather with the prevention of maladies than with their cure; when governments shall be induced to consider the preservation of a nation's health an object as important as the promotion of its commerce or the maintenance of its conquests, we may hope then to see the approach of those times, when, after a life spent almost without sickness, we shall close the term of an unharassed existence by a peaceful euthanasia.

ON INSECTS MOST INJURIOUS TO VEGETABLES AND ANIMALS, AND
THE MEANS BEST CALCULATED TO COUNTERACT THEIR RAVAGES.

—NO. XI.

By JAMES DUNCAN, M.W.S.

We have already spoken of the relative numerical proportion of the insects which derive the whole of their nourishment directly from the vegetable kingdom; and that proportion being so great, it is obvious that a full account of every species from which plants suffer more or less, would come to be nearly tantamount to a *Fauna entomologica* of the country. But in every Order, the amount of those which, from their