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THE
COMPLETE DISTILLER;
COMBINING
THEORY AND PRACTICE;

AND EXPLAINING
The MYSTERIES and most recent IMPROVEMENTS
of DISTILLING and BREWING, in a most
simple, easy, and familiar manner.

AND CONTAINING
All the Instructions necessary for a complete Ac-
quirement of these useful ARTS.

IN FOUR PARTS.

- PART I. Containing the Distilling of SPIRITS from various Substances,
with the best Methods of rectifying and colouring SPIRITS, &c.
PART II. Of the Method of making Compound, Cordial, and Medicinal
WATERS.
PART III. Of brewing, preserving, and recovering of MALT LIQUORS in
general.
PART IV. Of making, refining, preserving, and recovering British and
other WINES.

*Adapted for the Use of Private Families, Apothecaries,
Distillers, and Dealers in Spirits or Wines.*

BY A GENTLEMAN OF EXTENSIVE PRACTICE, AND LONG
EXPERIENCE.

EDINBURGH:

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TO THE PUBLIC.

It is not the intention of the Editor of this little performance, to usher it into notice, in the usual manner, by a pompous, and he might add, often fallacious, Prefatory Discourse. Leaving the facts, which it contains, to speak for themselves, and that the Reader, without a rude anticipation, may be at full liberty to form his own judgment, the Editor will only add, that it has been his intention to render it an useful performance, and if it is found such, his chief aim will be accomplished.

EDINBURGH,
February, 15th, 1793.

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[1]

COMPLETE SYSTEM

OF
DISTILLING.

PART I.
OF THE METHOD OF DISTILLING SPIRITS FROM
VARIOUS SUBSTANCES.

Definitions.

DISTILLATION is the art of separating, or drawing off the spirituous, aqueous, and oleaginous parts of a mixt body from the grosser, and more terrestrial parts, by means of fire, and condensing them again by cold.

By the Distillation of SPIRITS is to be understood the art by which all inflammable Spirits, Brandies, Rums, Arracks, and the like, are procured from vegetable substances, by means of a previous Fermentation, and a subsequent treatment of the fermented liquor by the Alembick, or hot Still, with its proper Worm and Refrigeratory.

BUT as it is impossible to extract vinous spirits from

any vegetable subject without Fermentation, and previous to this Brewing is often necessary, it will be requisite first to consider these operations.

CHAP. I.

Of Brewing, in order to the Production of inflammable Spirits.

BY Brewing, we mean the extracting a tincture from some vegetable substance, or dissolving it in hot water, by which means it becomes proper for a vinous fermentation.

A solution or fermentable tincture of this kind, may be procured, with proper management, from any vegetable substance, but the more readily and totally it dissolves in the fluid, the better it is fitted for fermentation, and the larger its produce of spirits. All inspissated juices therefore, as sugar, honey, treacle, manna, &c. are very proper for this use, as they totally dissolve in water, forming a clear and uniform solution; but, malt, for its cheapness, is generally preferred, tho' it but imperfectly dissolves in hot water. The worst sort is commonly chosen for this purpose, and the tincture, without the addition of hops, or trouble of boiling it, is directly cooled and fermented.

But in order to brew with malt to the greatest advantage, the three following particulars should be carefully attended to: first, The subject should be well prepared; that is, it should be justly malted, and well ground: for if it be too little malted, it will prove hard and flinty; and consequently only a small part of it dissolve in the water: and, on the other hand, if too much malted, a great part of the finer particles, or fermentable matter, will be lost in the operation. With regard to grinding, the malt should be reduced to a kind



kind of coarse meal ; for experience has shewn, that by these means, the whole substance of the malt may, thro' the whole process, continue mixed with the tincture, and be distilled with it ; whereby a larger quantity of spirit will be obtained, and also great part of the trouble, time, and expence in brewing saved. This secret depends upon thoroughly mixing, or briskly agitating the meal, first in cold water, and then in hot ; and repeating this agitation after the fermentation is finished : when the thick turbid wash must be immediately committed to the still. And thus two operations of brewing and fermenting may very commodiously be reduced to one, to the no small profit and advantage of the Distiller.

The second particular to be attended to, is, that the water be good, and properly applied. Rain water is the best adapted for brewing ; for it not only extracts the tincture of the malt better than any other ; but also abounds in fermentable parts, whereby the operation is quickened, and the yield of the spirit increased. The next to that of rain, is the water of rivers and lakes, particularly such as wash any large tract of a fertile country, or receive the fullage of populous towns. But whatever water is used, it must stand in a hot state upon the prepared malt, especially if a clear tincture be desired ; but the greatest care must be taken to prevent the malt from running into lumps or clods ; and indeed, the best way to prevent this, is to put a small quantity of cold water to the malt first, and mix them well together, after which the remaining quantity of water may be added in a state of boiling, without the least danger of coagulating the malt, or what the distillers call, making a pudding.

It has been found by experience, that a certain degree of heat is necessary to extract the whole virtue of the malt : this degree may, by the above method, be

determined to the greatest exactness, as the heat of boiling water may at once be lessened to any assigned degree of warmth, by a proper addition of cold water; due regard being had to the season of the year, and the temperature of the air. This improvement, with that mentioned above, of reducing the two operations of brewing and fermentation to one, will be attended with considerable advantage.

With regard to the proper quantity of water, it must be observed, that if too little be used, a viscid clammy mixture will be produced, little disposed to ferment, nor capable of extracting all the soluble parts of the malt. On the other hand, too much water renders the tincture thin and aqueous, and by that means increases the trouble and expence in all parts of the operation. A due medium, therefore, should be chosen; and experience has shewn, that a wash about the goodness of that designed by the London brewers for ten shilling beer, will best answer the distiller's purpose. When a proper quantity of water is mixed with the malt, the whole mass must be well agitated, that all the soluble parts of the malt may often come in contact with the aqueous fluid, which being well saturated, after standing a proper time, must be drawn off, fresh water poured on, and the agitations repeated, till at last the whole virtue or saccharine sweetness of the malt is extracted, and only a fixed husky matter remains, incapable of being dissolved by either hot or cold water.

The third requisite particular is, that some certain additions be used, or alterations made, according to the season of the year, or the intention of the operator.—The season of the year is very necessary to be considered. In summer, the water applied to the malt must be colder than in winter; and in hot sultry weather the tincture must be suddenly cooled, otherwise it will turn

turn eager; and in order to check the too great tendency it has to fermentation, when the air is hot, it will be necessary to add a proper quantity of unmalted meal, which being much less disposed to fermentation than malt, will greatly moderate its impetuosity, and render the operation suitable to the production of spirits, which by a too violent fermentation would, in a great measure, be dissipated and lost.

C H A P. II.

Of Fermentation.

THE tincture, or, as the distillers call it, the wash, being prepared, as in the foregoing chapter, it is next to be fermented; for, without this operation, no vinous spirit can be produced.

Definition.] By fermentation is meant the intestine motion performed by the instrumental efficacy of water, whereby the salt, oil, and earth of a fermentable subject, are separated, attenuated, transposed, and again collected, and recomposed in a particular manner.

The doctrine of fermentation is of the greatest use, and should be well understood by every distiller, as it is the very basis of the art; and perhaps, if more attended to, a much purer spirit, as well as a greater quantity of it, might be procured from the same materials than at present. We shall therefore lay down a concise theory of fermentation, before we proceed to deliver the practice.

Every fermentable subject is composed of salt, oil, and a subtile earth; but these particles are so small, that, when asunder, they are imperceptible to the senses; and therefore, when mixed with an aqueous fluid, they

they leave it transparent ; neither have fermentable bodies any taste, except that of sweetness.

These particles are each composed of salt, oil, and earth, intimately mixed in an actual cohesion, connection, and union ; and, therefore, when any one of those principles too much abounds in any subject, so that an intimate union is prevented, the whole efficacy of the fermentation is either stopped or impaired, or at least limited to one certain species.

This equal connection of salt, oil, and earth into a single compound particle, forms a corpuscle soluble in water ; or, to speak more philosophically, this compound corpuscle is, by means of its saline particles, connected with the aqueous corpuscles, and moved up and down with them. But where these corpuscles are not thus connected with the water, a number of them join together, and form either a gross, or a loose, chaffy, and spungy matter.

When these compound particles are diluted with a small quantity of an aqueous fluid, they feel clammy, slippery, and unctuous to the touch, and affect the taste with a kind of ropy sweetness. And when a proper quantity of the fluid is added, a commotion is presently excited, and afterwards a subtile separation.

This commotion and separation, first begins in the whole substance ; for before the addition of water, the substance may remain in dry, solid, and large pieces, as in malt, sugar, &c. which being reduced to powder, each grain thereof is an aggregate of many smaller compound corpuscles ; these being put into water, dissolve, and separately float therein, till at length they become so small as to be invisible, and only thicken the consistence of the liquor.

These corpuscles being thus separated from one another, there next ensues a separation of their component par-

particles ; that is, the salt, the oil, and the earth are divided by the interposition of the aqueous particles.

The first commotion is no more than a bare solution ; for the saline particles being easily dissolvable in water, they are immediately laid hold of by the aqueous particles, and carried about with them. But the succeeding separation, or fermentative motion, is a very different thing ; for by this the saline particles are divided from those of oil and earth, partly by the impulse of the others in their motion, and partly by the force of the aqueous particles, which are now continually meeting and dashing against them.

This motion is performed by the water, as a fluid, or aggregate of an infinite number of particles, in actual and perpetual motion ; their smallness being proportionable to that of the fermenting corpuscles, and their motion, or constant susceptibility of motion, by warmth, and the motion of the air, disposing them to move other subtile moveable corpuscles also. The certain agreement of figure, or size, between the aqueous particles, and those of the salt in the fermentable subject, tends greatly to increase the commotion ; for, by these means, they are readily and very closely connected together ; and therefore move almost like one and the same compound corpuscle ; whilst the water is not at all disposed to cohere immediately with either the oil or earth. And thus an unequal concussion is excited in the compound corpuscles of the fermentable subject ; which concussion at length strikes out the saline particles, loosens the others, and finally produces a separation of the original connection of the subject.

An aqueous fluid, therefore, is the true, and indeed, the only instrument for procuring a fermentable motion in these compound corpuscles of the subject ; for were an oily fluid poured upon any fermentable subject, no vinous fermentation would ensue ; as the oil
could

could neither give a sufficient impulse to the compound corpuscles, which are grosser than its own constituent particles, nor divide the oily or saline particles of the subject from their connection with the others, which detain, and, as it were, envelope or defend them from its action.

The compound corpuscles of the fermentable subject being affected by the perpetual motion of the particles of the aqueous fluid, a proper degree of motion is necessary, or that the particles move with a proper degree of velocity, which principally depends on external heat. A considerable degree of cold, indeed, will not absolutely prevent fermentation, though it will greatly retard it; and a boiling heat will prevent it still more. A tepid or meddelling degree of heat between freezing and boiling, is therefore the most proper for promoting and quickening the operation.

The admission of air, also, though not of absolute necessity, yet greatly promotes and quickens the action, as being a capital instrument in putting in a proper degree of motion the oily particles of the subject. But while the air thus contributes to hasten the effect, it causes at the same time, by its activity, some remarkable alterations in the oily particles; for it not only moves, but absolutely dissolves and displaces them from their original connections; and thus carries them off with itself from the whole mass. And, therefore, though the consideration of the air does not so properly belong to fermentation in general, yet it does in particular; as having an accidental power to alter every species of this operation; consequently its agency ought to be well understood, either to procure alterations at pleasure in fermenting the mass, or to prevent and correct impending dangers.

The oily particles, thus separated and dissolved by the air, are also elastic, though they probably derive that

that property from their intercourse with the air itself, and their being rendered extremely minute.

When, therefore, an aqueous fluid is added to a fermentable subject exposed to a temperate heat, a fermentative struggle immediately arises, the saline part of the compound particles being dissolved by the continual intestine motion of the water, and carried up and down with it in all directions, amidst an infinite number of other particles, as well fermentable as aqueous ones; whence, by this collision and attrition, the saline particles are dissolved, and separated from their connection with the oily and earthy. And as the oily particles are the most subtle and elastic, they would, by these means, be thrown up to the surface of the liquor, and carried off by the air, were they not closely connected with the earthy ones, whose gravity prevents their evaporation, and by coming in contact with others of the same kind, form aggregations, and sink down, with the oily particles, to the bottom. But before these can form a bulk too large to be supported by the water, many of the oily particles are, by their frequent collisions with the aqueous fluid, separated from the earthy ones; and, by degrees, more strongly connected again with the saline ones; whilst, on the other hand, the same saline particles imbibe some of the earthy ones, which being left single, upon their separation from the oily particles, float about separately in the fluid.

And hence proceed the several different consequences of fermentation; viz. first, From the separation of the saline particles of the fermentable subject proceeds the tart, saline, or acid taste of the liquor; which is more sensible at first, before the liquor is duly composed and settled, or the due arrangement and connection of the saline particles with those of the oily and earthy kinds, completed; after which the liquor proves milder, softer, or less pungent. Secondly, From the oily particles

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being

being set at liberty, proceeds the strong smell of the liquor, and the head or shining skin upon the surface. Thirdly, The earthy particles collecting together in clusters, cause the fluid to appear turbid, and afterwards a visible earthy, or clay-like matter to be precipitated : and some of the earthy parts, in their motion, arriving at the head, or oily skin on the surface, cause it to thicken ; and afterwards taking it down along with it, thus constitute the lees, which abound in oil. Fourthly, From this new struggle or collision, which is productive both of solution, and a new connection in the saline and earthy corpuscles, proceeds the ebullition in fermentation. And, lastly, by the same repeated coalition of the oily, with the aqueous and saline, particles, the inflammable spirit is produced.

Having thus laid down a concise *theory* of fermentation, we shall now proceed to the *practice*.

THE wash being brought to a tepid, or lukewarm state in the backs, a proper quantity of a good-conditioned ferment is added ; but if the ferment be solid, it should be previously broke into small pieces, and gently thinned, either with the hand, whisp, &c. in a little of the tepid liquor. A complete and uniform solution, however, should not be attempted, because that would greatly weaken the power of the ferment, or destroy its future efficacy. The whole intended quantity, therefore, being thus loosely mixed with a moderate quantity of the liquor, and kept in a tepid state, either by setting it near the fire, or otherwise, and free from the too rude commerce of the external air ; more of the insensibly warm liquor ought to be added, at proper intervals, till the whole quantity is set to working together. And thus, by dividing the business into parts, it may much more speedily and effectually be performed, than by attempting it all at once.

The

/ The whole quantity of liquor being thus set to work, secured in a proper degree of warmth, and defended from a too free intercourse with the external air, Nature itself, as it were, finishes the process, and renders the liquor fit for the still.

By ferments we mean any substance, which, being added to any rightly disposed fermentable liquor, will cause it to ferment much sooner and faster than it would of itself, and, consequently, render the operation shorter; in contradiction to those abusively so called, which only correct some fault in the liquor, or give it some flavour. Hence we see, that the principal use of ferments is to save time, and make dispatch in business; whilst they only occasionally, and, as it were, by accident, give a flavour, and increase the quantity of spirit. And, accordingly any fermentable liquor may, without the addition of any ferment, by a proper management of heat alone, be brought to ferment, and even more perfectly, though much slower, than with their assistance.

These ferments are, in general, the flowers and faces of all fermentable liquors, generated and thrown to the surface, or deposited at the bottom, either during the act of fermentation, or after the operation is finished.

Two of these are procurable in large quantities, and at a small expence; we mean, beer-yeast and wine-lees; a prudent or artificial management, or use, of which, might render the business of distillation much more facile, certain, and advantageous.

It has been esteemed very difficult, and a great discouragement, in the business of distilling, to procure a sufficient stock of these materials, and preserve them at all times ready for use. The whole secret consists in dextrously freeing the matter from its superfluous moisture; because in its fluid state it is subject to a farther fermentation, which is productive of corruption; in which state it becomes intolerably foetid and cadaverous.

The method of exposing it to the air till it has acquired a proper consistence, is subject to great inconveniences; and so peculiar and careful a management necessary, that it rarely succeeds.

The best way, therefore, is to press it very slowly and gradually, in a thick, close, and strong canvass bag, after the manner of wine-lees, by the tail-press, till it becomes a kind of cake; which, though soft, will easily snap, or break dry and brittle between the fingers. Being reduced to that consistence, and closely packed up in a tight cask, it will remain a long time uncorrupted, preserve its fragrantcy, and consequently fit to be used for fermenting the finest liquor.

The same method is also practicable, and to the same advantage, in the flowers or yeast of wine; which may be thus commodiously imported from abroad; or, if these cannot be procured, others of equal efficacy may be procured from fresh wine lees, by barely mixing and stirring them into a proper warm liquor; whence the lighter, or more volatile and active parts of the lees, will be thrown to the surface, and easily taken off, and preserved, by the above-mentioned method, in any desired quantity. And hence, by a very easy process, an inexhaustible supply of the most useful ferments may be readily and successively procured, so as to prevent for the future all occasion of complaint for the want of them, in the distiller's business.

Experience has demonstrated, that all ferments abound much more in essential oil, than the liquor which produced them; and consequently they retain, in a very high degree, the smell and flavour of the subject. It is therefore requisite, before the ferment is applied, to consider what flavour is intended to be introduced, or what species of ferment is most proper for the liquor.

The alteration thus caused by ferments is so considerable, as to render any neutral fermentable liquor, of
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the same flavour with that which yielded the ferment. This observation is of much greater moment than will presently be conceived; for a new scene is hereby opened, both in the business of distillation, and others depending upon fermentation. It must, however, be observed, that its benefit does not extend to malt, treated in the common method; nor to any other subject but what affords a spirit tolerably pure and tasteless: for, otherwise, instead of producing a simple, pure, and uniform flavour, it causes a compound, mixed, and unnatural one. How far the fine Stillier may profit by it, well deserves his attention; and whether our native cyder spirit, crab spirit, &c. which have very little flavour of their own, may not, by this artifice, be brought nearly, if not entirely, into the state of some foreign brandies, so highly esteemed, is recommended to experience.

It is common with distillers, in order to increase the quantity of spirit, give it a particular flavour, or improve its vinosity, to add several things to the liquor, during the time it is in a state of fermentation; and these additions may properly be reduced to salts, acids, aromatics, and oils.

All rich vegetable juices, as treacle, honey, &c. which either want a natural acid, have been deprived of it, or contain it in too small a quantity, will be greatly improved by adding, at the beginning of the operation, a small quantity of the vegetable, or fine mineral, acids; as oil of sulphur, Glauber's spirit of salt, juice of lemons, or an aqueous solution of tartar. These additions will either give, or greatly improve, the vinous acidity of the subject, but not increase the quantity of the spirit, that intention being performed by aromatics and oils.

All pungent aromatics have a surprising quality of increasing the quantity of the spirit, as well as in altering,

ing, or improving, the flavour; but their use requires, that the fermentation should be performed in close vessels. And if a large quantity be intended to be added, care must be taken not to do it all at once, lest the oiliness of the ingredients should check the operation.— But if the flavour be the principal intention, they should not be added, till the operation is nearly finished. After the same manner a very considerable quantity of any essential vegetable oil may be converted into a surprisingly large quantity of inflammable spirit; but great caution is here also necessary not to drop it too fast, or add too large a quantity at a time, which would damp the fermentation; it being the surest method of checking, or totally stopping this operation, at any point of time required. The best method, therefore, of adding the oil, so as to avoid all inconveniencies, is to rub the oil in a mortar with sugar, which the chemists call making an *olæosaccharum*, by which means the tenacity of the oil will be destroyed, and the whole will readily mix with the liquor, and immediately ferment with it. The distiller would do well to consider these observations attentively, as he may thence form an advantageous method of increasing the quantity of spirits, and at the same time greatly improve their quality and flavour.

But in order to put these observations in practice, particular regard must be had to the containing vessel in which the fermentation is performed, the exclusion of the air, and the degree of the external heat or cold.

With regard to the containing vessel—its purity, and the provision for rendering it occasionally close, are chiefly to be considered. In cleansing it, no soap, nor other unctuous body ought to be used, for fear of checking the fermentation; and, for the same reason, all strong alkaline lixiviums should be avoided. Lime-water, or a turbid solution of quick-lime, may be employed for this purpose, without producing any ill effect;

fect; it will also be of great service in destroying a prevailing acetous salt, which is apt to generate in the vessels when the warm air has free access to them; and tends to pervert the order of fermentation, and, instead of a wine or wash, produce a vinegar. Special care must also be had, that no remains of yeast, or cadaverous remains of former fermented matters, hang about the vessels, which would infect whatever should afterwards be put into them; and cannot, without the utmost difficulty, be perfectly cured and sweetened.

The occasional closeness of the vessels may, in the large way, be provided for by covers properly adapted; and, in the small way, by valves, placed in light casks. These valves will occasionally give the necessary vent to preserve the vessel, during the height of the fermentation; the vessel otherwise remaining perfectly close, and impervious to the air.

It is a mistake of a very prejudicial nature, in the business of fermentation, to suppose that there is an absolute necessity for a free admission of the external air. The express contrary is the truth, and very great advantages will be found by practising according to this supposition. A constant influx of the external air, if it does not carry off some part of the spirit already generated, yet certainly catches up and dissipates the fine, subtle, or oleaginous and saline particles, whereof the spirit is made, and thus considerably lessens the quantity. By a close fermentation this inconveniency is avoided; all air, except that included in the vessel, being excluded. The whole secret consists in leaving a moderate space for the air at the top of the vessel, unpossessed by the liquor. When the liquor is once fairly at work, to bung it down close, and thus suffer it to finish the fermentation, without opening, or giving it any more vent than that afforded it by a proper valve placed in the cask; which, however, is not of absolute necessity, when

when the empty space, or rather that possessed by the air, is about one tenth of the gage; the artificial air, generated in the operation, being then seldom sufficient to open a strong valve, or at most to endanger the cask.

This method may be practised to good advantage by those whose business is not very large; but it requires too much time to be used by large dealers, who are in a manner forced to admit the free air, and thus sustain a considerable loss in their quantity of spirit, that the fermentation may be finished in the small time allowed for that purpose. It may, however, be said, that the silent, slow, and almost imperceptible vinous fermentation, is universally the most perfect and advantageous.

During the whole course of this operation, the vessel should be kept from all external cold, or considerable heat, in an equal, uniform, and moderate temperature. In the winter, a stove-room, such as is common in Germany, would be very convenient for this purpose; the vessel being placed at a proper distance from the stove: but at other seasons no particular apparatus is necessary with us, if the place allotted for the business be but well defended from the summer's heat, and the bad effects of cold bleak northern winds.

The operation is known to be perfected, when the hissing or bubbling noise, can be no longer heard, upon applying the ear to the vessel; and also by the liquor appearing clear to the eye, and having a pungent sharpness on the tongue. And that it may fully obtain these properties, and be well fitted to yield a pure, and perfectly vinous spirit by distillation, it should be suffered to stand at rest in a somewhat cooler place, if possible, than that in which it was fermented; till it has thoroughly deposited and cleansed itself of the gross lee, and become perfectly transparent, vinous and fragrant;

grant; in which state it should be committed to the still, and the spirit thus obtained will not only exceed that obtained in the common way, in quantity, but also in fragrance, pungency, and vinosity.

C H A P. III.

Of Distillation in general.

HAVING, in the two preceding chapters, laid down the best methods of brewing and fermentation, we shall now proceed to the method of distillation.

And in order to lead our readers methodically thro' the path which lyes before them, we shall begin by explaining the principles of distillation; or the method of extracting the spirituous parts of bodies.

To extract the spirits is to cause such an action by heat, as to cause them to ascend in vapour, from the bodies which detain them.

If this heat be natural to bodies, so that the separation be made without any adventitious means, it is called Fermentation, which we have already explained.

If it be produced by fire, or any other heating power, in which the alembic is placed, it is called Digestion, or Distillation: Digestion, if the heat only prepares the materials for the distillation of their spirits; and Distillation, where the action is of sufficient efficacy to cause them to ascend in vapour, and distil.

This heat is that which puts the insensible parts of a body, whatever it be, into motion, divides them, and causes a passage for the spirits enclosed therein, by disengaging them from the phlegm and the earthy particles by which they are enclosed.

Distillation, considered in this light, is not unworthy the attention and countenance of the learned. This art is of infinite extent; whatever the earth produces, flow-

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ers, fruits, seeds, spices, aromatic and vulnerary plants, odoriferous drugs, &c. are its objects, and come under its cognisance; but we generally confine it to liquids of taste and smell; and to the simple and spirituous waters of aromatic and vulnerary plants. With regard to its utility, we shall omit saying any thing here, as we shall give sufficient proofs of it in the sequel.

C H A P. IV.

Of particular Distillation.

DISTILLATION is generally divided into three kinds; the first is called distillation *per ascensum*, which is when the fire, or other heat, applied to the alembic, containing the materials, causes the spirits to ascend. This is the most common, and indeed almost the only kind used by distillers.

The second is called distillation *per descensum*; which is, when the fire being placed upon the vessel precipitates, or causes the spirit to descend. This kind is hardly ever used by distillers, but to obtain the essence, or oil, of cloves.

The third is termed distillation *per latus*, or oblique distillation; but this, being used only by chemists, we shall say nothing farther of here.

With regard to the different methods of distillation, occasioned by the different vessels or materials made use of to excite heat, improperly called distillation, they are of various kinds, and shall be explained as they occur in the work.

There are various kinds of distillation, some of which arise from the different constructions of alembics; such
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are the distillation by the common Alembic, with a Refrigeratory, the Glass Alembic, the serpentine Alembic, and the Retort: others are produced from the heat surrounding the Alembic; such as the distillation in *Balneum Mariæ*, the Vapour, the Sand, the Dung, and the Lime Baths.

These different methods of distillation we shall explain, in enumerating the operations in which they are most proper.

C H A P. V.

Of the Accidents that too often happen in performing the Processes of Distillation.

AMONG the accidents which frequently happen in distilling, the least of all is for the operation to miscarry, and the ingredients to be lost.

And this being a subject of the greatest importance, we shall treat it with all possible accuracy.

All accidents are occasioned by fire, their primary cause; by want of attention they get too much head, and fear often suffers them to become irremediable.

The first accident which may happen by the fire, is when a distiller, by too great heat, causes the ingredients to be burnt at the bottom of the still; by these means his liquor is spoiled by an emperumatic taste, and the tin is melted off from the alembic. An emperuma resembles the smell of burnt tobacco, and is produced in liquors by too great a degree of heat. To illustrate this, distil any fruit, flowers, or any aromatic whatever; but especially something whose smell is very volatile, draw off only the best, unlute the alembic, and what remains in the still, will be found to have a very disagreeable smell; whence it follows, that if a little more had been drawn off, it would have spoiled what was before obtained.

If the fire be too violent, the extraordinary ebullition of the contents causes them to ascend into the head; and if a glass alembic, they fall ignited into the recipient; the heat breaks it, the spirits are dissipated, and often take fire from the heat of the furnace.

If the fire be too strong, the bottom of the still becomes red hot, the materials inflamed, and consequently the fire reaches the recipient.

When an earthen alembic is used, the closest attention is requisite to keep the fire from burning the materials at the bottom. The head, which is always of glass, bursts, and the spirits are spilt, and often catch fire. And the remedy becomes the more difficult, as earth retains the fire much longer than a common alembic.

If the alembic be not firmly fixed, it is soon put out of order, falls down, and unlutes itself; thus the liquor is spilt, and the vapour sets the spirits on fire.

If all the joints be not carefully luted, the spirits, at their first effort, issue through the least aperture, run into the fire, which is propagated into the alembic by the vapour.

In distillations where the phlegm ascends first, its humidity penetrates the lute, and loosens it, so that when the spirituous vapours ascend, they are exposed to the same accident.

Lastly, when the recipient is unluted, especially if near full, without the greatest circumspection, the spirits will be spilt, and so catch fire.

Hitherto I have given only a simple account of what daily happens to distillers; but the consequences of these accidents are infinitely more terrible than the accidents themselves: for an artist to lose his time, his labour, and goods, is no small matter; but it follows, from what we have premised, that both his life and fortune

tune are in danger from these conflagrations. Instances of the former are too common, as well as those of the latter, relating to the danger to which the operator is exposed. The spirits catch, the alembic and recipient fly, and the inflamed vapour becomes present death to all who breathe it.

The rectifiers, who perform the most dangerous operations of distillery, are particularly exposed to these terrible accidents; the fineness of the spirit at the same time that it renders it more inflammable, also causes the fire to spread with greater rapidity. And when their store-houses are once on fire, they are seldom or never saved.

Possibly I may be censured for my conciseness upon this head; indeed the importance of it requires the most particular discussion; but intending to speak of the methods proper to prevent these accidents, I shall close this chapter with recommending the subject of it to the serious reflection of all concerned in distillation.

And it being hitherto omitted, though of all others it requires the attention of the distiller, I shall further observe, that these operations should never be left to servants. What can be expected from ignorant persons? Fear will seize them, when the greatest presence of mind is requisite.—Let us now proceed to the method of preventing, or at least lessening, their effects.

C H A P. VI.

Of the Methods of preventing Accidents.

TO have informed the reader of the accidents which happen in distilling, would have been of little consequence, without shewing, at the same time, the methods of preventing them. In order, therefore, to fortify him against the terror which the foregoing

going chapter may have excited, we shall here point out the remedies for all the cases before specified.

To prevent accidents, two things especially must be known and adverted to.

First, The knowledge of the fire, which depends on the fuel, whether wood or coal.

Secondly, The manner of luting so as to prevent the vapours from escaping through it, and, by those means, setting the whole on fire.

The hardest wood generally makes the quickest fire, such as beech, oak, holm, elm, &c. The white woods, as the ash, the poplar, the willow, and the birch, make a milder fire. This holds good also of the coal made of these two kinds of wood; and, consequently, the nature of the wood or coals must determine the fire, and the action of this must be proportioned to the effect intended to be produced by it. That is, the capacity of the alembic, the matters to be distilled, and their quantity. The same may be said of pit-coal, which is generally used in this country.

It is evident, that the larger the alembic, the more fire is necessary. What has not been digested, also, requires more fire than that which has been prepared by that operation. Spices require a stronger fire than flowers; a distillation of simple waters more than that of spirituous liquors.

The surest way of ascertaining the necessary degree of fire, is to regulate it by the materials, as they are more or less disposed to yield them spirits, &c.; and this is done as follows. The operator must not leave the alembic, but attentively listen to what passes within, when the fire begins to heat it. When the ebullition becomes too vehement, the fire must be lessened, either by taking out some of the fuel, or covering it with ashes or sand.

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It requires a long experience in the several cases, before a distiller can acquire a competent knowledge in this important point. Nor is it possible to determine the degree of fire from the quantity of fuel; judgment, assisted by experience, must supply this defect.

Every thing being determined with regard to the degree of fire, we shall now proceed to explain the method of luting alembics.

By the term luting an alembic, we mean, the closing the joints through which the spirits might transpire.

Lute is a composition of common ashes, well sifted, and soaked in water; clay, and a kind of paste made of meal or starch, are also used for this purpose; which, as I before observed, is to close all the joints, &c. in order to confine the spirits from transpiring.

Good luting is one of the surest methods of preventing accidents. An alembic, where all transpiration is prevented, having nothing to fear but the too great fierceness of the fire; and that may be regulated by the rules already laid down.

The refrigerating alembic is mostly used. The body and the head are joined to each other; but notwithstanding the greatest care be taken in luting the juncture, there will still be some imperceptible interstice for transpiration; and the least being of the greatest consequence, a piece of strong paper should be pasted over the joint, and the alembic never left till the spirits begin to flow into the receiver, in order to apply fresh paper, if the former should contract any moisture. The master himself should carefully attend to this, and whatever precaution may have been previously used, the eye must be constantly upon it.

The alembic, when vinous spirits are distilled, should be luted with clay, carefully spread round the joinings, in order to prevent all transpiration; because the consequences here are terrible; for when the fire catches a
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large quantity, it is often irremediable. Besides, as this earth cracks in drying, it must be often moistened, and fresh applied, on the first appearance of any occasion for it.

The retort is also luted with clay; but as glass retorts are also used, they are often coated with the same clay, to prevent their melting by the intenseness of the fire.

Lastly, the earthen and glass alembics are luted with paper and paste as above.—Having thus explained the great consequence of circumspection with regard to luting, and the degree of fire, we shall now proceed to the third method of preventing them, and close this chapter with a short observation on portable furnaces; which is, that alembics being never thoroughly secure on this kind of furnaces, a hook should be fastened to the refrigerant for fixing it to the wall.

C H A P. VII.

Of the Remedies for Accidents when they happen.

NOTWITHSTANDING the best rules, and the strictest observation, it is impossible entirely to prevent accidents, and therefore it is of no less importance to point out the remedies on those occasions.

The most essential are, courage, and presence of mind; fear only increasing the misfortune.

First, If the fire be too violent, it must be covered, but not so as totally to prevent its action, as by those means the process of the distillation would be interrupted, and rendered more difficult, and less perfect.

Secondly, When the ingredients burn, which you will soon discover by the smell, the fire must be immediately put out, in order to prevent the whole charge of the

the still being entirely spoiled, which would otherwise inevitably be the consequence.

Thirdly, If the spirits should catch fire, the first care is to unlute immediately the receiver, and stop both the end of the beak, and the mouth of the receiver with wet clothes.

The fire must then be put out, and if the flame issued through the luting the joints must be closed with a wet cloth, which, together with water, ought never to be wanting in a distil-house.

Fourthly, If the alembic be of earth, and the contents burn at the bottom, the fire must immediately be put out, the alembic removed, and water thrown upon it, till the danger is over; and, for farther security, covered with a wet cloth.

Fifthly, If, after all your care in closing the junctures to prevent transpiration, you perceive any thing amiss, while the spirits are ascending, apply clay, or any other composition, in order to stop the aperture, and have always a wet cloth ready to stifle the flame if the spirits should take fire.

Sixthly, If the heat detaches the lute, or it becomes moist, immediately apply another, having always ready what is necessary for performing it. Should the transpiration be so violent, that you cannot immediately apply a fresh lute, clap a wet cloth round the joint, and keep it on firm and tight, till the spirits have taken their course. But if, notwithstanding all your efforts, the transpiration should increase, so that you fear a conflagration, remove the receiver as soon as possible from the fire, and afterwards your alembic, if portable; but if otherwise, put out the fire immediately.

Seventhly, The charge being worked off, be cautious in luting the receiver, that nothing be spilt on the furnace, and carry it to some distance from it, that the spirits exhaling may not take fire.

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Lastly, Observe, that wherever a remedy is required, there must be no candle used ; for the spirituous vapours easily take fire, and propagate the flame to the vessels from whence they issue.

All that has hitherto been said concerns only the management of the alembic ; but what remains is still more interesting, and relates to those who work it, that they may not, by conquering the accident, destroy themselves.

On discovering any of the above accidents, when the flame has not reached the spirits, let the remedies already mentioned be applied, either with regard to the lute, or the violence of the fire.

But if the flame has reached the alembic, the following precautions are to be used.

The operator must not approach the alembic without a wet cloth over his mouth and nostrils, it being immediate death to inhale the inflamed vapour.

In hastening to stop any accident, be careful to approach the side opposite to that whither the air impels the flame ; for, without this precaution, you would be involved in it, and could not, without the utmost difficulty, extricate yourself from it.

If, notwithstanding this precaution, the eddy of the air should force the flame to your side, quit the place immediately, and do not return till its direction be changed, always taking care to have a wet linen cloth before your nose and mouth, and keep yourself on the side opposite to the direction of the flame ; and also to have another such cloth, in order to smother the flame, and close the crevice through which the spirits issue.

Should it be your misfortune to be covered with inflamed spirits, wrap yourself in a wet sheet, which should be always ready for the purpose. Self-preservation is of too great importance that any of these precautions

cautions should be omitted, in such a variety of dangers.

If the fire has acquired such a head that it cannot be stopt, the receiver must be broke, and the alembic, if portable thrown down; but no person must be suffered to go near them, especially those who are strangers to the business.

In a desperate case, like that of a large quantity of rectified spirit taking fire, if time permit, the communication of the beak of the alembic with the recipient, which is usually a cask, must be cut off by closely stopping the bung; and be sure no candle come near the receiver; leaving the rest, as the danger would be too great to expose one's self to the flames of a large charge, and the distiller's safety should be principally considered.

I thought it my duty to give my reader these informations, and hope that, in the practice of distillation, he will find them of great advantage.

C H A P. VIII.

On the Necessity of often cooling the Alembic, as another Mean of preventing Accidents.

THE refrigerant is so essential a part of the alembic, that for want of it several other expedients are made use of to perform its office, for cooling those whose capacity, brittleness, or whose construction will not admit of their having any.

The refrigerant is usually in proportion to the capacity of the alembic, for which the following may serve for a rule, that the capacity of the refrigerant should be to that of the alembic, as 14 to 8.

The necessity of cooling the head of the alembic is self-evident to all who have the least knowledge of di-

stillation, as it condenses the spirits, cools them, and causes them to flow into the receiver, which, if of glass, would otherwise be broken by the heat; and consequently serves to prevent conflagrations.

The alembics of the *Balneum Mariæ*, and the vapour bath, ought also to have refrigerants, like the common alembic, unless they are of glass.

Those of earth and glass are cooled, as we have already observed, with a wet cloth, which is also used to cool the head of other kinds of alembics. But it is not difficult to contrive one which may be placed in a refrigerant; such as the following.

To a common small still apply and lute a worm, or long tin or pewter tube, forming several circumvolutions, of the same circumference with the body, in order to give it some elevation, place this worm in a refrigerant, proportioned to the alembic. If the capacity of the alembic should make it bear too much on the neck of the matrafs, it may be supported by a trevit of the same circumference as the body itself; the extremity of the worm may have a beak projecting beyond the side of the refrigerant, for conveying the spirits into the receiver.

This apparatus will be attended with little expence, will save the distiller the trouble of being perpetually cooling the head of the alembic, and is such a safe-guard against accidents, that if the worm be well luted, nothing need be apprehended, but from the violence of the fire.

This method of practice, therefore, is productive of three valuable particulars. The first is, that, by cooling the spirits, it preserves the receiver, and obviates the accidents arising from their heat. The second is, that the spirits being kept in a moderate heat, the transpiration is less, and consequently the spirits procured by the
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operation have more taste, smell, and fragrancy than they would otherwise have had.

Experience demonstrates, that when the spirits flow hot into the receiver, however attentive the distiller may be to lute the junctures of the alembic, there will be a very sensible evaporation, which, even in simple waters, greatly depreciates the goodness of the liquor.

Lastly, the third is, that the cooling of alembics is what principally contributes to the perfection of the operation; because the coolness of the head precipitates the phlegm, and in the case of too great a degree of fire, and where the ebullition is too vehement, if after taking away part of the fire, or covering it, the ebullition should continue, the head may be cooled with a wet cloth, till the ebullition is reduced.

As there is a necessity of cooling the alembic, so what we have said, cannot be too carefully observed. In fine, the contrast of cold and heat, equally concurring, but by methods directly opposite, to the same process, and the perfection of the distillation, is a phenomenon which deserves the attention of all who study the operations of nature.

C H A P. IX.

Of the Necessity of putting Water into the Alembic for several Distillations.

TWO principal advantages attend putting water into the alembic. The *first* is, to prevent the loss the distiller would incur without that precaution, and so prevent any alteration in the liquor procured by distillation. This we shall illustrate by an example.—Suppose a distiller should attempt to rectify spirits of wine, without putting water into the alembic. It is evident that the fire will consume part of it, which is entirely

tirely lost, because the same quantity of spirit cannot be procured from it, which might, had there been any thing to moderate the action of the fire, which now preyed upon it.

Secondly, If liquors are impregnated with strong ingredients, especially feeds, and the quantity be sufficient to absorb all the phlegm, a great quantity of spirit must be left in the still, or the ingredients will burn, and the spirits contract an empyreumatic taste, which is the more detrimental to the spirit, as it is increased by age.

Thirdly, If no water be put into the alembic with the ingredients, the spirit will be rendered finer by them, and the fire, if ever so little too strong, will cause the ingredients to burn, and the spirits to contract an empyreuma; a misfortune easily prevented by this precaution.

Thus it is a safe-guard against accidents: but besides, water being mixed with the ingredients, they are at once prevented from burning, and the spirit not weakened: for no sooner are the ingredients put in motion by the fire, than the spirits immediately ascend, and the liquor loses nothing of its quality, provided the receiver be removed as soon as the phlegm begins to ascend.

The water, therefore, prevents the waste of the spirits, and thus the distiller loses nothing of his goods; whereas, without water, the spirits, by impregnating the materials, their quantity must be less. With regard to the phlegm, there is no difficulty in finding when it begins to ascend, the first drop being cloudy, and when it has continued dropping for some time, it is perceived by a milky cast at the bottom of the receiver.

Lastly, The distiller is no loser with regard to the quality of his liquor, which is not at all weakened thereby. Thus it is attended with two capital advantages, the

the profit of the distiller, and the perfection of the liquor. Let us now proceed to the different manners of distillation.

C H A P. X.

Of the particular Advantages attending every kind of Distillation.

IN the third chapter we mentioned the several kinds of distillation; we shall here enlarge on the particular advantages of each, and in what circumstances each is to be used.

In order for distillation, the alembic must be charged with materials, and placed on a fire, or substances capable of producing the same effect.

The Method of Distilling with the common Refrigerant Alembic.

THIS method of distilling is the most generally used, being one of the most speedy and profitable, as it requires fewer preparatives, and less time.

To distil with the common alembic, the body of it must be thoroughly cleansed, that no taste or smell of any preceding materials may remain. The materials are then to be put into the alembic; but care must be taken that the alembic be not above half full, in order that the materials may have sufficient room to move, without choaking the neck of the alembic. The same care must be taken with regard to the head; it must be thoroughly cleansed and dried; for it often happens, that some small quantity of water is left in the rim, which renders the first spirits foul, and, by endeavouring to separate it from the other, some, and that the most volatile part of the spirit, will be lost.

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After this, the two parts of the alembic are to be carefully luted with strong brown paper, well pasted on, and the nose of the alembic luted to the worm; after which the fire should be immediately made under the still, lest too long an infusion should prejudice the liquor.

This alembic being worked on an open fire, the operation is quicker than any other; but the degree of fire requires a very close attention; as a different management is necessary to different materials. The water of the refrigeratory must be changed from time to time, and if the case requires it, the whole head, but especially the beak, must be kept cold.

Of Distillation in Sand, and in what Cases it should be used.

THIS species of distillation is performed in two different manners. First, by covering the fire with sand or ashes, and placing the alembic upon it. This method is very necessary in digestion, and for the perfect rectification of spirits. Sand is absolutely necessary for moderating the action of the fire, when there is reason to fear the matter contained in the bottom of the alembic will burn.

The second method of sand distillation, is to take the finest river sand, and after thoroughly washing it, put into the alembic a quantity sufficient to cover it three fingers deep; after which the still is to be charged with the ingredients to be distilled. This serves instead of water, in certain cases, where the use of it would prejudice the ingredients; as in the fine spirituous waters impregnated with the aromatic parts of flowers; the sand preventing the ingredients from burning. It is also necessary in distilling rectified spirits from seeds.

This operation being finished, the alembic must be
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thoroughly cleansed from the sand, that the taste or smell contained therein, be not communicated to any other charge of different ingredients.

Of Distilling in Balneum Mariæ, and its Advantages.

THIS method of distillation is of great use in several cases. Its operation is more perfect, and is subject to few, if any, of those accidents attending distillations on an open fire.

In distilling sweet-scented waters from flowers, aromatic plants, and others of that kind, where neither water nor spirit ought to be mixed with them, there is an absolute necessity of using the *Balneum Mariæ*; as, by every other distillation, on an open fire, the ingredients would infallibly burn.

If sand should be made use of, the fire would melt the tin from the alembic, and the contents be in the utmost danger of being burnt.

In distilling in *Balneum Mariæ*, a glass alembic is generally used. The alembic is to be placed in a copper vessel filled with water. This vessel ought at least to be of half the height of the alembic; at the bottom of the copper vessel must be a trivet, on which the alembic is to be placed, that it may not touch the bottom of the copper, because when the water begins to boil, it disperses itself towards the sides, and leaving the bottom dry, the ingredients would be in danger of burning.

The use of the *Balneum Mariæ* is excellent for those ingredients which require little spirit; but if a copper alembic be used, be sure to place sand at the bottom, that the distilled liquor may not contract any ill taste or smell. This method is also advisable in the rectification of spirits, on account of the danger attending the operation when performed on a naked fire.

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Were this method of distillation as expeditious as that performed on a naked fire, no other ought to be used, because it is subject to no accidents, and at the same time the spirit, &c. distilled is much more fragrant and grateful.

In what Cases glass, or earthen, Alembics are to be used; their Advantages and Disadvantages.

IN the chapter relating to accidents, we have mentioned the earthen alembic; we must now add, that it ought never to be used, except the matter to be distilled have a strong and bad smell, and then seldom above once, unless it be for ingredients of the same, or similar, qualities.

This alembic being very difficult to be managed, we can only recommend it in the case above-mentioned.

As a naked fire is generally applied to this alembic, it requires a furnace where the fire may be gradually increased, on account of the accidents to which it is liable.

The glass alembic is more easily managed, as it is generally placed in a *Balneum Mariæ*. Its principal use is for distilling waters from flowers, and making quintessences; and, were it not for the length of the operation, it would be preferable to any other method.

This alembic, hardly admitting of a refrigerant, a wet linen cloth must be placed on the head, and often changed.

The receiver of this alembic must not be very large, because of the fragility of the beak; but if it were ever so little bent into a curve, the largeness of the receiver would be of no prejudice; because then its whole weight would be supported by its stand.

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Advantages of Distillation performed by the Vapour Bath.

THIS method differs very little from the *Balneum Mariæ*, and is used nearly in the same circumstances: but has greatly the advantage of it in the quickness of the operation. And LEMERY, in the first part of his course of chemistry, affirms its operation to be more perfect.

However that be, its use is equal to that of the *Balneum Mariæ*; but in distilling sweet-scented waters, or flowers, sand must be placed at the bottom, that the liquor may not contract a taste from the copper.

Cases where Dung, Husks of Grapes, and Lime are to be used.

THESE substances are rarely used, except in digestions; and therefore of no great use to distillers, they using only hot ashes, or a fire well covered for that purpose.

If dung be used it must be of the hottest kind, viz. that of horse or sheep, and the quantity proportioned to the heat intended. The lime must be quick, and if the heat required be moderate, lime which has lain some time in the air must be used.

The same is to be observed with regard to the husks of grapes. But in whatever manner they are used, the digestion must be performed in a close covered vessel.

C H A P. XI.

Of Bodies proper for Distillation.

THIS chapter alone might make a volume, were we to make a particular enumeration of all its parts ; but, as we have already observed, we shall confine ourselves to the distillation of simple and compound waters, &c.

The bodies proper for distillation, are flowers, fruits, seeds, spices, and aromatic plants.

By distillation and digestion, we extract the colour and smell of flowers in simple waters and essences.

We extract from fruits, at least from some, colour, taste, &c.

From aromatic plants, the distiller draws spirits, essences, simple and compound waters.

From spices are procured essences, or, in the language of the chemists, oils, and perfumes, and also pure spirits.

From seeds or berries are drawn simple waters, pure spirits ; and from some, as those of anise, fennel, and juniper, oil.

The colour of flowers is extracted by infusion, and likewise by digestion in brandy or spirit of wine : the smell is extracted by distillation ; the simple water with brandy or spirit of wine.

What is extracted of the colour of flowers, by infusion in water by a gentle heat, or by digestion in brandy or spirits of wine, is called, in the distiller's phrase, the tincture of flowers.

The colour of fruits is extracted in the same manner, either by infusion or digestion : their taste is also procured by the same processes. But let it be observed, that the time of these operations must be limited ; for
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otherwise the fruit, after fermentation, would render it acid. The taste is also extracted by distillation in spirit of wine.

From aromatic plants are extracted, by the alembic, pure spirits, odours, and simple waters. But these require different methods of distillation. The first by water or brandy only, the second by rectified spirit, which will give them the greatest excellency they are capable of.

The plants themselves, with their flowers, may also be distilled, which is still better.

From spices are drawn spirits, and oily or spirituous quintessences. The spirits are drawn by brandy, or spirit of wine, with very little water: the oils are distilled *per descensum*; and the spirituous quintessences by pounding the spices, and after infusing them in spirit of wine, decanting it gently by inclination.

From seeds are extracted simple waters, spirits and oils. Very few of the first and last, spirits being what is generally extracted from seeds and berries.

Some distillers, through a notion of frugality, distil seeds with water; but their liquors are not to be compared with those which are distilled with spirits. When oils are drawn from seeds, the operation is performed either by the *Balneum Mariæ*, or the vapour bath.

We only deliver in this place, the first elements of each of these operations, which will be farther illustrated in the sequel, when we treat more particularly of these subjects.

C H A P. XII.

Of what is procured by Distillation.

BY distillation are procured spirit, essence, simple waters, and phlegm,

Spirits

Spirits are very difficult to be defined. I consider them as the most subtile and volatile parts of a body.

All bodies, without exception, have spirits, more or less.

These parts are an ignited substance, and, consequently, by their own nature, disposed to a violent motion.

These volatile particles are more or less disposed to separate themselves, as the bodies are more or less porous, or abound with a greater or less quantity of oil.

By the term *Essence*, we understand the oleaginous parts of a body. An essential oil is found in all bodies, being one of their constituent principles. I have observed, in all my distillations, spirit of wine excepted, a soft unctuous substance floating on the phlegm; and this substance is oil, which we call essence; and this is what we endeavour to extract.

Simple Waters are those distilled from plants, flowers, &c, without the help of water, brandy, or spirit of wine. These waters are commonly odoriferous, containing the odour of the body from whence they are extracted, and even exceed in smell, the body itself.

Phlegm is the aqueous particles of bodies; but whether an active or passive principle, we shall leave to the decision of chemists.

It is of the last importance to a distiller to be well acquainted with its nature; many mistaking for phlegm several whit and clouded drops, which first fall into the receiver, when the still begins to work. These, however, are often the most spirituous particles of the matter in the alembic, and ought to be preserved. What has given occasion to this mistake, is some humidity remaining in the head, &c. of the alembic. And had it been thoroughly wiped, the first drops would have been equally bright with any during the whole operation.

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The following remark deserves attention. In bodies that have been digested the spirits ascend first; whereas, in charges not digested, the phlegm ascends before the spirits. The reason of this is very plain and natural.

In substances previously digested, the action of the fire no sooner causes the matter in the alembic to boil, than the spirits being the most volatile parts detach themselves, and ascend into the head of the alembic. But when the matter to be distilled has not undergone a proper digestion, the spirits, being entangled in the phlegm, are less disposed to ascend, till the phlegm itself separates, and gives them room to fly upward. The phlegm, being aqueous, rises first: this is more particularly observable in spices. I am, however, inclined to believe, that, were the operation performed in an alembic, whose head was at a great distance from the surface of the charge, they would not ascend high enough to come over the helm, but fall back again by their own gravity, and by those means leave the spirits at liberty to ascend. But in the common refrigeratory alembic this always happens.

If this observation be not readily admitted, I appeal to experience, which I desire may be the test of every thing I shall advance.

Another observation, which has verified the above assertion in innumerable instances, is, that in an extraordinary run of business, when I had not time sufficient to digest the substances, I used to bruise them in a mortar; but, notwithstanding the trituration, the phlegm first came over, and afterwards the spirits. But I desire to be understood, that I speak here only of the volatile parts of plants not drawn with vinous spirits, but contained in a simple water.

Another remark I must add, and which I hope will be acceptable to the curious, as it has not yet been made

made public, though, doubtless, the observation has often occurred to others; it is this: That in mixed charges, consisting of flowers, fruits, and aromatic plants, put into the alembic, without a previous digestion, the spirits of the flowers ascend first; and, notwithstanding the mixture, they contracted nothing of the smell or taste of the flowers and plants. Next after the spirits of the flowers, those of the fruits ascend, not in the least impregnated with the smell or taste either of the flowers or plants. And, in the last place, the spirits of the plants distil no less neat than the former. Should this appear strange to any one, experience will convince him of the truth of it.

Another observation I have made on aromatic herbs, is, whether they are, or are not, digested; whether the spirits or phlegm ascend first; the spirits contain very little of the taste and smell of the plants whence they were extracted; and I have always been obliged to put to these spirits a greater or lesser quantity of the phlegm, in order to give the spirits I had drawn the taste of an aromatic odour of the plants; the phlegm containing the greatest quantity of both.

This observation I insert, as of great use to those who practise distillation.

As the term *digestion* often occurs in this essay, I cannot avoid pointing out its advantages, and even shew the necessity of using it in several circumstances.

Substances are said to be *in digestion*, when they are infused in a menstruum, over a very slow fire. This preparation is often necessary in distillation; for it tends to open the bodies, and thereby free the spirits from their confinements, whereby they are the better enabled to ascend.

Cold digestions are the best; those made by fire, or hot materials, diminish the quality of the goods, as some part, and that the most volatile, will be lost.

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In order to procure essences, the bodies must be prepared by digestion. It is even of absolute necessity for extracting the spirits and essences of spices.

C H A P. XIII.

Of the proper Season for Distilling.

FLOWERS of all kinds must be distilled in their proper seasons. To begin with the violet. Its colour and smell can only be extracted when it is in its greatest vigour, which is not at its first appearance, nor when it begins to decay. April is the month in which it is in its greatest perfection; the season being never so forward in March, as to give the violet its whole fragrantcy.

The same must be observed of all other flowers.— And let them be gathered at the hottest time of the day; the odour and fragrantcy of flowers being then in their greatest perfection.

The same observation holds good, with regard to fruits, to which must be added, that they are the finest, and of the most beautiful colour, especially those from which tinctures are drawn; they must be free from all defects, as the goods would, by those means, be greatly detrimented.

Berries and Aromatics may be distilled at any season, all that is necessary being a good choice.

C H A P. XIV.

Of the Filtration of Liquors.

FILTRATION consists in passing liquors through some porous substance in order to free them from those particles which obscure their brightness.

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Nothing is finer than a liquor newly distilled ; but the syrup and colouring particles render it thick and opaque ; in order, therefore, to restore their brightness, they are filtrated ; which is done by passing them thro' sand, paper, cloth, &c.

All the attention of the distiller cannot, in ordinary operations, always prevent some aqueous particles from rising with the spirits, either in the beginning of the process, in those compositions where they ascend first, or at the conclusion when they arise last. As this is almost unavoidable, so it is also sometimes necessary.

In distilling flowers or aromatic plants, fresh gathered, the phlegm rises first ; and this part cannot be taken out of the receiver without depriving the spirits of a considerable part of their fragrancy.

In distilling spices, their odour being more entangled, will remain in the alembic till part of the phlegm is drawn off. But when, instead of these substances, their quintessences are used, the necessity ceases. But the phlegm commonly causing a cloudiness in the liquor, it may be rendered tolerably fine, by pouring it gently off by inclination, without the trouble of filtration ; the aqueous particles by their gravity, falling to the bottom. But, to render it entirely bright and fine, put some cotton in a funnel, and pour the liquor thro' it, by which means the aqueous particles will be retained in the cotton. You must, however, remember to cover the top of the funnel, to prevent the most volatile parts of the spirit from evaporating.

C H A P. XV.

Of the Distillation of Malt Spirits.

THE wash, or liquor, being prepared by brewing and fermentation, as directed in the first and second chapters of this treatise, the still is to be charged with it, and worked off with a pretty brisk fire. But it should be observed, that the only apparatus used in this process, is the alembic with a refrigeratory.

The wash being of a mucilaginous nature, a particular management is necessary to prevent its burning, and cause it to work kindly in the still: if it should happen to be burnt in the operation, the spirit will have a most disagreeable flavour, which can hardly ever be removed; and therefore, to prevent this ill effect, the wash should be diluted or made thin, the fire well regulated, and the whole kept in continual agitation during the process. The most judicious distillers always take care to have their wash sufficiently diluted, and constantly find their spirit the purer for it. With regard to the fire, it may easily be kept regular by a constant attendance, and observing never to stir it hastily, or throw on fresh fuel; and the stirring of the liquor in the still is to be effected by means of a paddle, or bar kept in the liquor till it just begins to boil, which is the time for luting on the head; and after which there is no great danger, but from the improper management of the fire: this is the common way; but it is no easy matter to hit the exact time, and the doing it either too late, or too soon, is attended with great inconvenience, so that several have discovered other methods; some put more solid bodies into the still with the wash, others place some proper matter at the bottom and sides of the still, which are the places where the fire acts with the greatest force.

The use of the paddle would however, answer better than either of these methods, could it be continued during the whole time the still is working ; and this may be done by the following method : Let a short tube of iron or copper be soldered in the centre of the still-head, and let a cross bar be placed below in the same head, with a hole in the middle corresponding to that at the top ; through both these let an iron pipe be carried, down in the still, and let an iron rod be passed through this with wooden sweeps at its end ; this rod may be continually worked by a winch at the still-head, and the sweeps will continually keep the bottom and sides scraped clean, the interstices of the tube being all the time well crammed with tow, to prevent any evaporation of the spirit.

The same effect may, in a great measure, be produced by a less laborious method, namely, by placing a parcel of cylindrical sticks lengthways, so as to cover the whole bottom of the still, or by throwing in a loose parcel of faggot sticks at a venture ; for the action of the fire below moving the liquor, at the same time gives motion to the sticks, making them act continually like a parcel of stirrers upon the bottom and sides of the still, which might, if necessary, be furnished with buttons and loops, to prevent them from starting. Some also use a parcel of fine hay laid upon the loose sticks, and secured down by two cross poles, laid from side to side, and in the same manner fastened down with loops. Care is to be taken in this case not to press the hay against the sides of the still ; for that would scorch nearly as soon as the wash itself ; but the sticks never will. These are simple but effectual contrivances, and in point of elegance, they may be improved at pleasure.

There is another inconvenience attending the distilling of malt spirit, which is, when all the bottoms, or gross mealy feculence is put into the still along with the
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the liquor, the thinner part of the wash going off in form of spirit ; the mealy mass grows, by degrees, more and more stiff, so as to scorch towards the latter part of the operation. * The best method of remedying this is, to have a pipe with a stop-cock, leading from the upper part of the worm-tub into the still, so that upon a-half, or a quarter, turn, it may continually supply a little stream of hot water, in the same proportion as the spirits run off, by which means the danger of scorching is avoided, and the operation, at the same time, not in the least retarded.

In Holland, the malt-distillers work all their wash thick, with the whole body of meal among it ; yet they are so careful in keeping their stills clean, and so regular and nice in the management of their fires, that tho' they use no artifice at all on this head, only to charge the still while it is hot and moist, they very rarely have the misfortune to scorch, except now and then in the depth of winter. When such an accident has once happened in a still, they are extremely careful to scrape, scrub, and scour off the remains of the burnt matter, otherwise they find the same accident very liable to happen again in the same place. But beyond all the other methods in use on this occasion, would be the working the stills not by a dry heat, but in a *Balneum Mariæ*, which might possibly be so contrived by the basin being large, and capable of working a great many stills at once, as to be extremely worthy the proprietor's while in all respects.

Another requisite to be observed is, that the water in the worm-tub be kept cool ; this may be effected by placing in the middle of the tub a wooden pipe or gutter, about three inches square within, reaching from the top almost to the bottom ; by this contrivance cold water may, as often as necessary, be conveyed to the bottom of the worm-tub, and the hot water at the top forced

ced either over the sides of the tub, or, which is better, through a leaden pipe of moderate size, called a waste-pipe, soldered into the top of the tub, and extended to the gutter formed to carry away the water.

C H A P. XVI.

Of the Distillation of Molosses Spirit.

THE spirit distilled from molosses, or treacle, is very clean or pure. It is made from common treacle dissolved in water, and fermented in the same manner as the wash for the common malt spirit.

But if some particular art is not used in distilling this spirit, it will not prove so vinous as malt spirit, but more flat, and less pungent and acid, though otherwise much cleaner tasted, as its essential oil is of a less offensive flavour. Therefore, if good fresh wine-lees, abounding in tartar, be added, and duly fermented with the molosses, the spirit will acquire a much greater vinosity and briskness, and approach much nearer to the nature of foreign spirits.

Where the molosses spirit is brought to the common proof strength, if it be found not to have a sufficient vinosity, it will be very proper to add some good dulcified spirit of nitre; and if the spirit be clean worked, it may, by this addition only, be made to pass on ordinary judges for French Brandy.

Great quantities of this spirit are used in adulterating foreign brandy, rum and arrack. Much of it is also used alone in making cherry-brandy, and other drams, by infusion; in all which many, perhaps with justice, prefer it to foreign brandies.

Molosses, like other spirits, is entirely colourless when first extracted; but distillers always give it, as nearly as possible, the colour of foreign spirits; the methods of per-

performing which we shall explain in a subsequent chapter.

C H A P. XVII.

Of the Nature of Brandies, and Method of distilling them in France.

THE general method of distilling brandies in France need not be formally described, as it differs in nothing from that commonly practised here in working from wash or molasses; nor are they in the least more cleanly or exact in the operation.

They only observe more particularly to throw a little of the natural lee into the still, along with the wine, as finding this gives their spirit the flavour for which it is generally admired abroad.

But though brandy is extracted from wine, experience tells us there is a great difference in grapes from which the wine is made. Every soil, every climate, every kind of grapes varies with regard to the quantity and quality of spirits extracted from them. There are some grapes which are only fit for eating; others for drying; as those of Damascus, Corinth, Provence, and Avignon; but not fit to make wine.

Some wines are very proper for distillation, others much less so. The wines of Languedoc and Provence afford a great deal of brandy by distillation, when the operation is made in their full strength. The Orleans wines, and those of Blois, afford yet more; but the best are those of the territories of Cogniac and Andaye, which are however, in the number of those the least drank in France. Whereas those of Burgundy and of Champaign, though of a very fine flavour, are improper, because they yield but very little in distillation.

It must also be farther observed, that all the wines for distillation, as those of Spain, the Canaries, of Alicante,

cant, of Cyprus, of St. Perés, of Toquet, of Grave, of Hungary, and others of the same kind, yield very little brandy by distillation; and consequently would cost the distiller considerably more than he could sell it for.—What is drawn from them is indeed very good, always retaining the saccharine quality, and rich flavour of the wine whence it is drawn; but as it grows old, this flavour often grows aromatic, and is not agreeable to all palates.

Hence we see, that brandies always differ, according as they are extracted from different species of grapes: Nor would there be so great a similarity as there is between the different kinds of French brandies, were the strongest wines used for this purpose. But this is rarely the case: the weakest, and lowest flavoured, wines only are distilled for their spirit, or such as prove absolutely unfit for any other use.

A large quantity of brandies is distilled in France during the time of the vintage; for all those poor grapes that prove unfit for wine, are usually first gathered, pressed, their juice fermented, and directly distilled. This rids their hands of their poor wines at once, and leaves their casks empty for the reception of better. It is a general rule with them not to distil any wine, that will fetch any price as wine; for, in this state the profits upon them are vastly greater than when reduced to brandies. This large stock of small wines with which they are almost over-run in France, sufficiently accounts for their making such vast quantities of brandy in France, more than other countries, which in warmer climates, and are much better adapted to the production of grapes.

Nor is this the only fund of their brandies; for all the wine that turns eager, is also condemned to the still; and, in short, all that they can neither export, nor consume at home, which amounts to a large quantity; since

since much of the wine laid in for their family provision, is so poor, as not to keep during the time in spending.

Hence many of our British spirits, with proper management, are convertible into brandies that shall hardly be distinguished from the foreign in many respects, provided this operation be neatly performed. And, in particular, how far a cyder spirit, and a crab spirit, may, even from the first extraction, be made to resemble the fine and thin brandies of France, we would recommend to those distillers, whose skill and curiosity prompt them to undertakings condemned by those who only work mechanically, and scorn to deviate from the beaten tract, though they have the fairest prospect of acquiring profit to themselves, and a lasting emolument to their country.

C H A P. XVIII.

Of the Distillation of Rum.

RUM differs from what we simply call sugar spirit, as it contains more of the natural flavour, or essential oil of the sugar cane: a great deal of raw juice, and even parts of the cane itself being often fermented in the liquor, or solution, of which the rum is prepared.

Hence we see whence rum derives its flavour; namely, from the cane itself. Some, indeed, are of opinion, that the unctuous and oily flavour of the rum proceeds from the large quantity of fat used in boiling the sugar. This fat, indeed, if coarse, will give a stinking flavour to the spirit in our distillations of the sugar liquor, or wash, from our refining sugar-houses; but this is nothing like the flavour of the rum; which, as we

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have already observed, is the effect of the natural flavour of the cane.

Great quantities of rum are made at Jamaica, Barbadoes, Antigua, and other sugar-islands; the method of making it is as follows:

When a sufficient stock of the materials is got together, they add water to them, and ferment them in the common method, though the fermentation is always carried on very slowly at first; because at the beginning of the season for making rum in the islands, they want yeast, or some other ferment to make it work; but after this they, by degrees, procure a sufficient quantity of the ferment, which rises up as a head to the liquor in the operation; and thus they are able afterwards to ferment, and make their rum with a great deal of expedition, and in very large quantities.

When the wash is fully fermented, or to a due degree of acidity, the distillation is carried on in the common way, and the spirit is made up proof; though sometimes it is reduced to a much greater degree of strength, nearly approaching to that of alcohol, or spirit of wine; and it is then called double distilled rum.

It would be easy to rectify the spirit, and bring it to a much greater degree of purity than we usually find it to be of; for it brings over in the distillation a great quantity of the oil; and this is often so disagreeable, that the rum must be suffered to ly by a long time to mellow before it can be used; whereas, if well rectified, its flavour would be much less, and consequently much more agreeable to the palate.

The best state to keep rum, both for exportation, and other uses, is doubtless that of alcohol, or rectified spirits. In this manner it would be contained in half the bulk it usually is, and might be let down to the common proof strength with water when necessary: for the common use of making punch, it would likewise
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serve much better in the state of alcohol; as the taste would be cleaner, and the strength might always be regulated to a much greater degree of exactness than in the ordinary way.

If the business of rectifying rum was more nicely managed, it seems a very practicable scheme to throw out so much of the oil, as to reduce it to the fine light state of a clear spirit, but lightly impregnated with the oil; in this state it would nearly resemble arrac, as is easily proved by mixing a very small quantity of it with a tasteless spirit; for it then bears a very near resemblance to arrac in flavour.

C H A P. XIX.

Of Sugar-Spirit.

WE mean, by a sugar-spirit, that extracted from the washings, scummings, dross, and waste, of a sugar-baker's refining-house.

These recrementitious, or drossy parts of the sugar are to be diluted with water, fermented in the same manner as molasses or wash, and then distilled in the common method. And if the operation be carefully performed, and the spirit well rectified, it may be mixed with foreign brandies, and even arrac in a large proportion, to great advantage; for the spirit will be found superior to that extracted from treacle, and consequently more proper for these uses.

C H A P. XX.

Of Raisin-Spirits.

BY raisin-spirits, we understand that extracted from raisins, after a proper fermentation.

In order to extract this spirit, the raisins must be infused in a proper quantity of water, and fermented in the manner described in the chapter on fermentation. When the fermentation is completed, the whole is to be thrown into the still, and the spirit extracted by a strong fire.

The reason why we direct a strong fire is, because that by those means a greater quantity of the essential oil will come over the helm with the spirit, which will render it much fitter for the distiller's purpose; for this spirit is generally used to mix with common malt goods; and it is surprising how far it will go in this respect, ten gallons of it being often sufficient to give a determined flavour, and agreeable vinosity to a whole mass of malt spirits.

It is therefore well worth the distiller's while to endeavour at improving the common method of extracting spirits from raisins; and perhaps the following hint may merit attention.

When the fermentation is completed, and the still charged with fermented liquor, as above directed, let the whole be drawn off with as brisk a fire as possible; but, instead of the cask or can generally used by our distillers for a receiver, let a large glass, called by chemists, a separating-glass, be placed under the nose of the worm, and a common receiver applied to the spout of the separating-glass; by these means the essential oil will swim upon the top of the spirit, or rather low wine in the separating-glass, and may be easily preserved at the end of the operation.

The use of this limpid essential oil is well known to distillers; for in this resides the whole flavour, and consequently may be used to the greatest advantage in giving that distinguishing taste, and true vinosity, to the common malt spirits.

After the oil is separated from the low wine, the liquor

quor may be rectified in *Balneum Mariæ* into a pure, and almost tasteless spirit, and therefore well adapted to make the finest compound cordials, or to imitate, or mix with the finest French brandies, arracs, &c.

In the same manner a spirit may be obtained from cyder. But as its particular flavour is not so desirable as that obtained from raisins, it should be distilled in a more gentle manner, and carefully rectified in the manner we shall shew in the chapter on rectification; by which means a very pure and almost insipid spirit will be obtained, which may be used to very great advantage in imitating the best brandies of France, or in making the finest compound waters or cordials.

C H A P. XXI.

Of Arracs.

WHAT is properly meant by the term arracs, are spirits extracted from the fermented juice of certain trees common in the East Indies, particularly those of the cocoa or palm-tree. The whole process of making arrac is performed in the following manner.

In order to procure the vegetable juice for this operation, the person provides himself with a sufficient number of small earthen pots, with bellies and necks, resembling our common glass bottles; a number of these he fastens to his girdle, or to a belt across his shoulders; and climbs up the tall trunk of the cocoa-tree: having reached the boughs of the tree, he cuts off with a knife certain small buds, or buttons, applying immediately to the wound one of his bottles, and fastens it, with a string to the bough. In this manner he proceeds till he has fixed his whole number of bottles, which serve as receivers to the juice distilling from the

the wounds. This operation is generally performed in the evening, a greater quantity of juice flowing from the tree in the night than in the day. The bottles are next morning taken off, and the liquor emptied into a proper vessel, where it spontaneously ferments. As soon as the fermentation is completed, the liquor is thrown into the still, and drawn down to a low wine; but so very poor and dilute, that they are obliged to rectify it in another still, to that weak kind of proof spirit we generally see it; for though it appears bubble-proof, it rarely contains more than a sixth, and sometimes only an eighth of alcohol, all the rest being no more than an acidulated water, which might be supplied from any common spring. Why arrac appears bubble-proof, when in reality so far below what we mean by proof, is not so great a mystery as at first sight it appears to be; for this kind of proof is entirely owing to a certain tenacity of the parts of the liquor, or to the particular property of the oil incorporated in the spirit.

From this account of arrac, it should seem no very difficult matter to imitate it here. And, perhaps, the whole difficulty lies in procuring a pure and insipid spirit; for it is ridiculous to attempt it with our common malt spirit. With regard to the flavour of the arrac, it may be effectually imitated by some essential oils easily procurable.

Hence we see of what prodigious advantage a pure and insipid spirit would be to distillers, and consequently the great encouragement there is to attempt the discovery. Perhaps a spirit of this kind may be extracted from sugar properly refined. The hint is worth prosecuting; and the writer of this essay, from repeated experiments, is abundantly convinced the thing is practicable. Had he entirely succeeded, he would readily have communicated the whole for the benefit of
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his country ; but is now obliged to defer, till some future opportunity, the result of his enquiries. In the mean time, he would recommend the prosecution of this hint to those distillers, who endeavour to improve their art, and advance it nearer to perfection.

Since arrac is a spirit extracted from the juice of the cocoa-tree, it might perhaps be worth enquiring how nearly it might be imitated by fermenting and distilling the juices of the birch and sycamore-trees. We should, by these means, obtain a British arrac ; and, perhaps a spirit equal in flavour, to that imported from Batavia.

When the cask, in which the arrac is imported, happens to be decayed ; or the liquor touches any nails, or other iron, it dissolves part of it, and, at the same time, extracts the resinous parts of the oak, by which means the whole liquor in the cask acquires an inky colour. In order to whiten and clarify arrac, which has contracted this colour, a large quantity of new or skimmed milk must be put into the cask, and the whole beat together, as vintners do to whiten their brown wines ; by these means the inky colour will be absorbed by the milk, and fall with it to the bottom, so that the greatest part of the arrac may be drawn off fine ; and the remainder procured in the same condition by being filtrated through a conical flannel bag.

C H A P. XXII.

Of Rectification.

THERE are several methods of performing this operation ; though some, and indeed those in general practised by our distillers, hardly deserves the name ; because, instead of rectifying, that is freeing the spirit from its essential oil and phlegm, they alter the natural flavour of the spirit that comes over in the operation.

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The principal business of rectification is to separate the spirit from the essential oil of the ingredient, which is very apt to adhere strongly to the spirit. And in order to avoid this, care should be taken in the first distillation ; that is the spirit, especially that from malt, should be drawn by a gentle fire, by which means great part of the essential oil will be kept from mixing with the spirit ; for experience has abundantly proved that it is much easier to keep asunder, than to separate them when mixed.

But as it is almost impossible to draw low wines without the spirit being in some measure impregnated with the essential oil, it is absolutely necessary to be acquainted with some methods of separating the spirit from the oil, and also freeing it from its phlegm.—The best methods of doing this to perfection, are re-distillation and percolation.

In order to rectify low wines, they should be put into a tall body or alembic, and gently distilled in *Balneum Mariæ* ; by these means a large proportion, both of the oil and phlegm, will remain in the body. But if the spirit should be found, after this operation, to contain some of the essential oil, it must be let down with fair water, and re-distilled in the same gentle manner. And thus it may be brought to any degree of purity ; especially if in the working, the spirit be suffered to fall into a proper quantity of clear water, and the spirit afterwards rectified to the height proposed. The same method should be used in freeing proof spirit, or even alcohol, from this oil ; namely, by letting it down with clean water to the strength of low wines, and re-distilling it in *Balneum Mariæ*. But it must be remembered, that it is much more difficult to cleanse alcohol, or proof spirit, than low wines, because the oil is
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more intimately mixed with the two former than with the latter. This oil may however be separated from proof-spirit, &c. by the method already proposed, especially if it be previously filtrated through paper, thick flannel, sand, stone, &c.

But this method, though it effectually answers the intention, is generally rejected by our distillers, because of the slowness of the operation; and others substituted in its stead, though instead of freeing the spirit from the oil, they only abolish the natural flavour of the spirit, and make a more intimate mixture between the particles of the spirit, and those of the essential oil.

It is impossible to enumerate all the methods practised by distillers, as almost every one pretends to have a secret nostrum for this purpose. The principal methods in use for rectifying malt-spirits, are however reducible to these three, namely, by fixed alkaline salts,—by acid spirits mixed with alkaline salts,—and by saline bodies, and flavouring additions.

The method of rectifying by alkaline salts is thus performed.

To every piece of proof spirit, add fourteen pounds of dry salt of tartar, fixed nitre, or calcined tartar; lute on the head, and distil, by a gentle heat, but be very careful to leave out the faints. By this method a large proportion of the foetid oil will be left in the still; and what comes over with the spirit will be greatly attenuated. But this operation is generally performed in a very different manner; for, instead of distilling the spirit in a gentle and equable manner, the still is worked in its full force; by which means the oil, which should have remained in the still, is driven over, and intimately mixed with the spirit; and, consequently,

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the whole operation frustrated, and the spirit rendered much harder to cleanse than it was before.

But even when the operation is performed according to the rules of art, it is far from being perfect; for it is well known, that part of the fixed salts become volatile in the operation, pass over the helm, and intimately mix with the essential oil still contained in the spirits; by these means the oil becomes more perfectly united with the spirits, and consequently much harder to be separated by repeated distillations. Nor is this all, for the still being worked in its full force, the bitter oil of malt, formed into a kind of liquid soap in the still, by means of the alkaline salt, is brought over the helm with the fumes, and suffered to mix with the spirit, whereby it is rendered as nauseous and ill-tasted as before the operation. Besides, if this operation were performed in its utmost perfection, it would never answer the intention; for the alkaline salt destroys the vinosity of the spirit; and, consequently, deprives it of one of its most valuable properties. Our distillers are well acquainted with this defect in the operation, and endeavour to supply it by an addition of acids. This is what we call the second method by alkalies and acids.

The operation of rectifying by the method of fixed alkalies and acids is the same as that above described; the spirit is drawn over from fixed alkalies as before; but in order to mortify the alkali in the spirit, and restore its vinosity, a proper quantity of some acid spirit is added. Various kinds of acids are used on this occasion; but principally those of the mineral kind, because of their cheapness; as oil of vitriol, spirit of nitre, oil of sulphur, and the like. We would, however, caution a young distiller from being too busy with these corrosive acids; the sulphureous spirit of vitriol, dulcified spirit of nitre, or Mr BOYLE's acid spirit of wine,

wine well rectified, will answer his purpose much better.

The third method of rectification is that by saline bodies, and flavouring ingredients. There is no difference in the operation between this and the two foregoing methods; fixed alkaline salts, common salt decrepitated or dried, calcinated vitriol, sandiver, alum, &c. are put into the still with the low wines, and the spirit drawn over as before. When the quantity is drawn off, the flavouring ingredients are added to give the spirits the flavour intended. But as the spirit is not by these means rendered sufficiently pure, the disagreeable flavour of the spirit generally overpowers that of the ingredients, whereby the whole intention is either destroyed, or a compound flavour produced, very different from that intended.

Some distillers, instead of alkaline salts, use quick lime in rectifying their malt spirit; this ingredient cleanses and deslegimates the spirit considerably; but, like that rectified from alkaline salts, it acquires an alkaline disposition, and also a nidorous flavour. Acids, therefore, are as necessary to be mixed with those spirits rectified with quick lime, as with those rectified with an alkaline salt. If chalk, calcined and well purified animal bones, &c. were used instead of quick lime, the spirit would have a much less alkaline or nidorous flavour; and, consequently, the flavouring ingredients might be added to it with more success than can be expected from a spirit rectified from alkaline salts.

But, perhaps, if neutral salts were used instead of the alkaline ones, the spirit might be rendered pure, without contracting an alkaline flavour; soluble tartar might be used for this purpose, though the spirit acquires from hence a little saponaceous flavour. Dr. Cox has

mentioned another method for this purpose, namely, to deprive the volatile salts of their oil, by rendering them neutral with spirit of salt, and afterwards subliming them with salt of tartar. The acid may be varied if the spirit of salt be found not so well adapted to the purpose as could be wished: but *fine dry sugar* seems the best adapted to the purpose of rectifying these spirits; as it readily unites with the essential oil, detains and fixes it, without imparting any urinous, alkaline, or other nauseous flavour to the spirits rectified upon it.

Thus have I considered the principal methods used by our distillers in rectifying their spirits; and shall conclude this chapter with remarking, that there is no other way of rectifying to perfection besides what we first laid down, namely by gentle distillation. But then it must be remembered, that the whole process must be of a piece: we mean, that the first distillation from the wash must be performed in a gentle manner; for otherwise the essential oil will be so intimately blended with the spirit, as not to be easily separated by re-distillation. Another good property attending this method is its universality; all kinds of spirits, from whatever ingredients extracted, require rectification; and this is adapted to all kinds.

C H A P. XXIII.

Of the Flavouring of Spirits.

WE have observed in the preceding chapter, that the common method of rectifying spirits from alkaline salts destroys their vinosity, and, in its stead, introduces an urinous or lixivious taste. But as it is absolutely necessary to restore, or at least to substitute in
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its room some degree of vinosity, several methods have been proposed, and a multitude of experiments performed, in order to discover this great *desideratum*: But none has succeeded equal to the spirit of nitre; and accordingly this spirit, either strong or dulcified, has been used by most distillers to give an agreeable vinosity to their spirits.

Several difficulties, however, occur in the method of using it; the principal of which is, its being apt to quit the liquor in a short time, and, consequently depriving it of that vinosity it was intended to give. In order to remove this difficulty, and prevent the vinosity from quitting the goods, the dulcified spirit of nitre, which is much better than the strong spirit, should be prepared by a previous digestion continued for some time with alcohol; the longer the digestion is continued, the more intimately will they be blended, and the compound rendered the milder and softer.

After a proper digestion, the dulcified spirit should be mixed with the Brandy, by which means the vinosity will be intimately blended with the goods, and disposed not to fly off for a very considerable time.

No general rule can be given for the quantity of this mineral acid requisite to be employed, because different proportions of it are necessary in different spirits. It should, however, be carefully adverted to, that though a small quantity of it will undoubtedly give an agreeable vinosity resembling that naturally found in the fine subtile spirits drawn from wines, yet an over large dose of it will not only cause a disagreeable flavour, but also render the whole design abortive, by discovering the imposition. Those, therefore, who endeavour to
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cover a foul taste in goods by large doses of dulcified spirit of nitre, will find themselves deceived.

But the best, and indeed the only method of imitating *French* brandies to perfection, is by an essential oil of wine; this being the very thing that gives the French brandies their flavour. It must, however, be remembered, that in order to use even this ingredient to advantage, a pure, tasteless spirit must be first procured; for it is ridiculous to expect that this essential oil should be able to give the agreeable flavour of French brandies to our fullsome malt spirit, already loaded with its own nauseous oil, or strongly impregnated with a lixivious taste from the alkaline salts used in rectification. How a pure insipid spirit may be obtained has been already considered in some of the preceding chapters; it only therefore remains to shew the method of procuring this essential oil of wine, which is this:

Take some cakes of dry wine lees, such as are used by our hatters, dissolve them in six or eight times their weight of water, distil the liquor with a slow fire, and separate the oil by the separating-glass; reserving for the nicest uses that only which comes over first, the succeeding oil being coarser and more resinous.

Having procured this fine oil of wine, it may be mixed into a quintessence with pure alcohol; by which means it may be preserved a long time fully possessed of all its flavour and virtues; but without such management, it will soon grow resinous and rancid.

When a fine essential oil of wine is thus procured, and also a pure and insipid spirit, French brandies may be imitated to perfection with regard to the flavour.

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It must however be remembered, and carefully adverted to, that the essential oil be drawn from the same sort of lees, as the brandy to be imitated was procured from ; we mean, in order to imitate Coniac brandy, it will be necessary to distil the essential oil from Coniac lees ; and the same for any other kind of brandy. For as different brandies have different flavours ; and as these flavours are owing entirely to the essential oil of the grape, it would be preposterous to endeavour to imitate the flavour of *Coniac* brandy, with an essential oil procured from the lees of Bourdeaux wine.

When the flavour of the brandy is well imitated by a proper dose of the essential oil, and the whole reduced into one simple and homogeneous fluid, other difficulties are still behind : the flavour, though the essential part, is not however the only one ; the colour, the proof, and the softness must be also regarded, before a spirit, that perfectly resembles brandy, can be procured. With regard to the proof, it may be easily hit, by using a spirit rectified above proof ; which, after being intimately mixed with the essential oil of wine, may be let down to a proper standard by fair water. And the softness may, in a great measure, be obtained by distilling and rectifying the spirit with a gentle fire ; and what is wanting of this criterion in the liquor, when first made, will be supplied by time ; for it must be remembered, that it is time alone that gives this property to French brandies ; they being at first, like our spirits, acrid, foul, and fiery. But with regard to the colour a particular method is necessary to imitate it to perfection : and how this may be done shall be considered in the next chapter.

C H A P. XXIV.

Of the Methods of colouring Spirits.

THE art of colouring spirits owes its rise to observations on foreign brandies. A piece of French brandy that has acquired by age a great degree of softness and ripeness is observed, at the same time, to have acquired a yellowish brown colour; and hence our distillers have endeavoured to imitate this colour in such spirits as are intended to pass for French brandy.—And in order to this a great variety of experiments has been made on various substances, in order to discover a direct and sure method of imitating this colour to perfection. But in order to do this, it is necessary to know whence the French Brandies themselves acquire their colour; for, till we have made this discovery, it will be in vain to attempt an imitation; because, if we should be able to imitate exactly the colour, which indeed is no difficult task, the spirit will not stand the test of different experiments, unless the colour in both be produced from the same ingredient.

This being undeniably the case, let us try if we cannot discover this mighty secret; the ingredient from whence the French brandy acquires its colour.

We have already observed, that this colour is only found in such brandies as have acquired a mellow ripeness by age; it is therefore not given it by the distiller, but has acquired it by lying long in the cask. Consequently the ingredient whence the colour is extracted, is no other than the wood of the cask, and the brandy is actually become a dilute tincture of oak.

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The common experiment used to prove the genuineness of French Brandy shews, that this opinion is well founded. The experiment is this : They pour into a glass of brandy a few drops of solution of calcined vitriol of iron in a diluted spirit of sulphur, or any other mineral acid, and the whole turns of a blue colour ; in the same manner, as we make ink of a tincture of galls and vitriol.

Since therefore the colour of French brandies is acquired from the oak of the cask, it is not difficult to imitate it to perfection. A small quantity of the extract of oak, or the shavings of that wood properly digested, will furnish us with a tincture capable of giving the spirit any degree of colour required. But it must be remembered, that as the tincture is extracted from the cask by brandy, that is alcohol and water, it is necessary to use both in extracting the tincture ; for each of these menstrooms dissolves different parts of the wood. Let therefore, a sufficient quantity of oak shavings be digested in strong spirit of wine ; and also at the same time other oak shavings be digested in water : and when the liquors have acquired a strong tincture from the oak, let both be poured off from the shavings, into different vessels, and both placed over a gentle fire till reduced to the consistence of treacle. In this condition let the two extracts be intimately mixed together ; which may be done effectually by adding a small quantity of loaf sugar, in fine powder, and well rubbing the whole together. By these means a liquid essential extract of oak will be procured, and always ready to be used as occasion shall require.

There are other methods in use for colouring brandies ; but the best, besides the extract of oak above-mentioned, are common treacle and burnt sugar.

The treacle gives the spirits a fine colour, nearly resembling that of French brandy; but as its colour is but dilute, a large quantity must be used; this is not however attended with any bad consequences; for notwithstanding the spirit is really weakened by this addition, the bubble proof, the general criterion of spirits, is greatly mended by the tenacity imparted to the liquor by the treacle. The spirit also acquires from this mixture a sweetish or luscious taste, and a fulness in the mouth; both which properties render it very agreeable to the palates of the common people, who are, in fact, the principal consumers of these spirits.

A much smaller quantity of burnt sugar than of treacle will be sufficient for colouring the same quantity of spirits; the taste is also very different; for, instead of the sweetness imparted by the treacle, the spirit acquires from the burnt sugar an agreeable bitterness, and by those means recommends itself to nicer palates, which are offended with a luscious spirit. The burnt sugar is prepared by dissolving a proper quantity of sugar in a little water, and scorching it over the fire till it acquires a black colour.

Either of the above ingredients, treacle or burnt sugar, will nearly imitate the genuine colour of old French brandy; but neither of them will succeed, when put to the test of the vitriolic solution.

Thus have I traced the subject of Distillation from its origin; shewn the methods commonly made use of by distillers, and pointed out various improvements, that might be introduced into this art with great advantage; and shall conclude this part with recommending the several hints to those distillers who are desirous of improving their art, and proceeding on a rational foundation, it being from such only, that improvements are
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to be expected ; for where the operations are constantly carried on in the same beaten tract, it is in vain to expect improvements, unless chance should be kind enough to throw that in their way, which a rational theory would have easily led them to discover.

to be expected, for where the operation is confined to a small area, the improvement is not so great as when it is extended over a large area. The same is true of the improvement in the rate of interest, which is not so great when it is confined to a small area as when it is extended over a large area.

A **COMPLETE SYSTEM** OF **DISTILLING,**

PART II.

**OF THE METHOD OF MAKING COMPOUND COR-
 DIAL WATERS ; WITH AN ACCOUNT
 OF THEIR VIRTUES.**

IT may not here be improper to insert some certain Rules observed by distillers, in drawing off, and making up their distilled goods.

Some General Rules in Distilling.

WHEN you perceive about two third parts of the first quantity you put into the still is come off, then be often trying the goods ; and when you see the bell or proof immediately falls down, and does not continue a good while on the surface, then take away the cann of goods, and substitute another vessel to receive the faints ; which, if suffered to run among the goods, would cause a disagreeable relish, and be longer in fineing down : whereas, the faints being kept separate, the goods will be clean, and well tasted, when made up with liquor to their due quantity.

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It will much improve your goods, and is used by most distillers, to throw into your still along with the goods, when first charged, about six ounces of bay salt to every three gallons of spirits; and so proportionably more or less, to a greater or less quantity of spirits: by these means the goods will better cleanse themselves, and separate from their phlegmatic parts; and the spirits so dephlegmated will ascend and come over much cleaner and finer in distillation.

Some also are wont to cast in a handful of grains, to make the goods feel hot upon the palate, as if they bore a better body; yet this conduces nothing towards the advancement of the proof, when the goods come to be tried.

When your goods are come off, and you design them for double goods, you must make them up to their first quantity with liquor: As if, for instance, you charged your still with three gallons of proof spirits; they will yield in distillation about two gallons without faints; which deficiency of one gallon must be made up with liquor (and sugar used in dulcifying) to their determined quantity: and if you are to make up common or single goods, you must add, over and above the prescribed quantity in compounding double goods, one and a half part more of liquor, viz. one gallon and a half, to dilute it for single or common goods. Thus by this specimen may you learn to make goods proof, and how to reduce them lower, to what strength or body you please; according as the use, or the custom of the place has rendered them more or less vendible.

You must also observe, when you dulcify your goods, that you never put your dissolved sugar amongst your new distilled goods, till the said dulcifying be perfectly cold; for if mixed hot with the goods, it would cause some of the spirits to exhale, and render the whole more foul and phlegmatic, than otherwise they would be.

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When you want to fine any goods speedily for present use or sale, especially white or pale goods, add about two drachms of crude alum, finely powdered, to three gallons of goods: romage it well therein, and it will immediately depurate or throw down the faeces, whereby the relidue will become clear and transparent for sale or use.

These observations, so useful and necessary in distilling, I could not omit; but thought proper to insert them under one general head; as designing, in the following sheets, to touch upon this subject no further.

ANISE SEED WATER.

RECIPE. Take anise seeds six ounces, caraway seeds three ounces, proof spirit three gallons, river or spring water, one gallon and a half: infuse all night in the still, and draw off the goods with a gentle fire, no longer than proof; dulcify with brown sugar two pounds, and make up your goods with liquor to their due quantity.

By this addition of water put into your still along with the goods, which ought never to be omitted in distillation, the goods will come off cleaner, and in larger quantity from the still without faints; and will require less liquor to make them up, than otherwise they would do.

VIRTUES OF ANISE SEED WATER.

ANISE seed water ought never to be reduced below proof, upon account of the oleaginous particles wherewith this water is highly saturated: which, whilst the goods bear a good body or spirit, they intimately commix with, so that they swim, and are dissolved therein, though imperceptible to the eye (for all oils

oils do readily commix, and unite with sulphur, which is the more spirituous part of the menstruum, or goods, as they are called by distillers); but when the goods are reduced, and the body of them weakened with liquor, the oil separating from the spirit, its proper vehicle, renders the whole of a milky colour, unpleasant both to the eye and taste. And this is the cause that makes anise seed water so little in esteem as it now is, and has, for some years past, been daily falling in its reputation, purely on account of its disagreeable gust, which is so offensive to most palates; but if it be made with carraway seeds, as before directed, it will be much more pleasant in taste, and no less efficacious in virtue.

It is a good carminative, and is commonly used as such, especially among the populace, to expel wind, and attenuates viscidities lodged in the first passages, causing pricking pains and tortions there: but as it is an unpleasant and disagreeable water (a cordial I can't call it) when simply taken, it might most properly be used as a common menstruum for drawing carminative and anticholic tinctures with, and would serve much better than common spirits for making *Elixir Salutis*; whereby the medicine would be rendered more carminative, and less subject to cause griping; and also some of the correctives might very well be omitted, which only serve to clog up the menstruum, and thereby hinder the due extraction of the cathartic virtue of the fenna.

ANGELICA WATER.

RECIPE. Take *Angelica roots sliced half a pound; Angelica seeds, and carraway seeds bruised, each one ounce; proof spirits three gallons, water, as much as is sufficient: macerate them all night in the still, and draw off your clear goods without faults; which dulcify with sugar*

sugar one pound and a half, and make up with liquor as before directed.

VIRTUES OF ANGELICA WATER.

ANGELICA water is a cardiac, cephalic, and carminative, and is accounted a good specific against windy and flatulent colics; it comforts the heart, cheers and resuscitates the spirits, and gives a grateful sensation to the whole nervous system, as all aromatic, spirituous, and volatile bodies do; which, by the volatility of their substance, are as auxiliaries immediately dispensed to, and by their tenuity and subtilty as easily admitted into those sensible organs, with a new supply of spirits, to repair that waste, which their continual motion renders them liable to; whereas all languor or faintness, is removed, and their tonic structure is invigorated more forcibly, to vibrate and shake off any pendulous or viscous matter adhering to the fibrous or membranous expansions (as in the stomach and guts), which lentor may, not improperly, be called the common matrix of indigestion, fevers, cacochymias, flatulencies, vapours, &c. causing various pains and tortions in those parts wherein included or detained, till by some natural or artificial means it is removed. And this seems most efficaciously to be performed by those mendicaments that are endued with an attenuating and discussive faculty, whose subtil parts have power to penetrate and open the glandular pores, and thereby make way for the exclusion of excrementitious or heterogeneous humours: and that Angelica is endowed with such qualities, is evident by that pungency or smart impression wherewith, in tasting, it affects the nervous papillæ of the tongue; and farther, by the use and esteem the ancient doctors had of it; who ordered it in their orvietans, antipestilential antidotes, and alexipharmic mixtures;

tures ; for they observed its diaphoretic and rarifying quality, and therefore very worthily ranked it amongst their alexipharmics ; whose virtue and efficacy chiefly consisted in promoting a gentle diaphoresis, thereby expelling the malignity or venenate matter from the centre to the circumference, which was thence carried off by the glandular pores of the cutis, &c. by a visible perspiration, or gentle dew.

WHITE CLOVE WATER.

RECIPE. *Take cortex Winterana six drachms, pimento one ounce, cloves two drachms, bruise them, and infuse all night in proof spirits three gallons ; water a due quantity, draw off the proof goods, and sweeten with fine sugar one pound and a half for use.*

BEST RED CLOVE WATER.

RECIPE. *Take cloves bruised six drachms, Jamaica pepper an ounce and a half, proof spirits three gallons, water as much as is needful : macerate, and distil, no longer than proof ; dulcify with brown sugar, or rather treacle two pounds and a half, and colour it with elder juice five or six pints, to the due colour of claret wine.*

There is yet another prescription for making red clove water, it is this :

Put an ounce of cloves, and half an ounce of carraway seeds to the three gallons of spirits, draw off, and dulcify, ut supra, and colour it with red sanders or poppy flowers : of these you may take your choice.

VIRTUES OF CLOVE WATER.

CLOVE waters are not much in use or esteem, except among the populace, who use them sometimes to warm their stomachs; or perhaps to expel or drive off a fit of the cholic; the elder juice in the one, and Winter's bark in the other, make the said compositions to partake of an antiscorbutic and diuretic quality: and if the white clove water was sweetened or coloured with juice or syrup of elder berries, it would be much improved in the said virtues; and might sometimes be used in that case; and perhaps too with as much success as a more pompous medicine. For by the heat and subtilty of the said cortex communicated to the spirituous menstruum, it has the power and efficacy forcibly to attenuate and incite any viscous or saline concretions which might adhere, or cause obstructions in the capillary vessels or their glandules, thereby hindering perspiration; which being detained becomes sharp and acrid, eroding the capillary glandules, and surface of the cuticle; whereupon ensue the cutaneous defædations, which usually attend the scurvy.

BEST CINNAMON WATER.

RECIPE. *Take choice cinnamon bruised twelve ounces, proof molasses-spirits rectified three gallons, water one gallon and a half: macerate them twenty-four hours, and then distil and draw off your proof spirits, and dulcify with loaf sugar two pounds and a half, and make up your goods full proof.*

There is another Recipe for making best cinnamon water, which is by an addition of nutmegs to the composition, and with a much larger quantity of cinnamon,

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Take best cinnamon bruised a pound, nutmegs bruised an ounce, bay-salt four ounces, strong rectified proof spirits three gallons, river water a gallon and a half: macerate and draw off as above directed; and dulcify the same with best loaf sugar two pounds twelve ounces, and make them up for sale or use.

VIRTUES OF CINNAMON WATER.

THE best cinnamon water is sometimes by persons of nice distinguishing palates and judgment, drunk undulcified, or only *pro re nata* dulcified with double refined loaf sugar put into the glass; therefore it will be your advantage to keep a stock of both sorts always by you: for as it is an excellent commodity that bears a good price, and yields an encouraging profit, of quick demand, and no loss to be feared by age, but rather an improvement (for all high proof goods meliorate, and become better by long keeping), a greater stock is therefore required of it than of most other distilled cordial liquors.

This compound water is much used both in dram and medicine; and is frequently prescribed by physicians in all astringent and corroborating juleps and draughts, wherever astringent of the viscera is required: it comforts and strengthens all the noble parts, as head, heart, stomach, nerves, liver, spleen, matrix, &c. it opens obstructions, attenuates and dissolves gross humours; and upon that account is ranked among the alexipharmics; it takes off fainting, palpitations, and tremor of the heart; sickness at stomach, hiccough, vomiting, continual bearing down of the intestines, &c. and is a very efficacious remedy against all or most disorders, arising from weakness, and laxity of the nerves; especially from a humid and cold distemperature: for it powerfully stops defluxions, and dries up and dissolves

ses superfluous moisture: and these effects may principally be ascribed to the saline and oleaginous particles that arise from the cinnamon in distillation: the said salts I take to be of two kinds, viz. volatile and fixed; and that not from conjecture only, but from actual experiment; the analysis of the bark does partly manifest the same unto us: the subtil and pungent atoms that arise from it in simple trituration, and which so sensibly affect or stimulate the olfactory fibres, as thereby sometimes to provoke sternutation, shew us the volatility of some of its constituent particles; for which reason cinnamon should only be slightly bruised for distillation; which, when put into the still, and the potential heat of the more spirituous part of the menstruum, assisted and actuated by the additional heat of the subjacent fire, comes to act upon the bruised and half-separated particles of that drug, the finer and more diffusible or volatile parts thereof are compelled wholly to disjoin from the more heavy and fixed salt, which being now set at liberty, and poised up, or, as it were, borne upon the wings of the high rectified alcohol, or aerial spirit, which is then rising, unites, and comes over with the same in the very first beginning of distillation: for then we perceive this new-drawn spirit to have a remarkable pungency and volatility, if held to the nose, which certainly must be attributed to those saline particles we have now been speaking of; which lying dissolved in the menstruum, till admitted in the body, is there by the heat of the blood and spirits subtilized anew, and thereby rendered capable of entering the minutest pores or passages of the capillary glandules; where, if meeting with any viscosity or gross matter that may cause obstruction therein, it attenuates the same by its subtilty, and rarifys it by heat to such a degree of fluidity, as to make it capable of passing thro' the cutaneous pores, in order for its ejection out of
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the body along with the recrements of the blood : the stimulus which it gives the nervous fibres *in transitu*, not a little contributing towards the expulsion or squeezing out of the stagnating humour, otherwise (if too gross for that excretion) to be reassumed by the reductory vessels, and thereby conveyed to some proper emunctory, to be secerned as an excrementitious matter ; thus are vapours disscussed from the brain, and other parts of the body by opening the pores, and making free perspiration, whereby the load of heterogeneous matter, which weakened and oppressed nature, is removed, and in lieu thereof a calm tranquillity is induced upon the whole animal œconomy ; which being duly considered, we may easily account for that briskness and agility we immediately perceive in ourselves after a moderate dram of these cordial liquors, which they effect by the aforesaid causes, viz. by opening the pores, and giving due vent for perspiration ; an evacuation so useful and beneficial to nature, that SANCTORIUS has in his accurate book *De Medicina Statica* told us, that more excrementitious humours are in one day secerned, or carried off by insensible perspiration, than by stool in fifteen days : and further he affirms, that more than one half of our daily aliment which we receive into our bodies is thrown off by insensible vapours. And to this opinion does that great and learned physician Dr. GLISSON assent, where discoursing on the same subject, he has in his *Anatom. Hepatis*, page 370. these words : *Ingens est, procul dubio hujusmodi (insensibilium nempe habituum) evacuatio, &c.* Now from the aforesaid observations may we see the danger of obstructed perspiration ; for what a load of humours must we necessarily expect therefrom, and what a train of diseases thence ensuing, if not timely removed by proper remedies, such as we are now treating of, &c. which are endued with such volatile salts, or particles,

as are capable of entering the capillary or cutaneous glandulæ, and forcing open their minute pores when obstructed : but a more immediate way it has of comforting the principal organs or viscera, viz. by the grateful sensation which it imparts to the nervous genus, by communicating a fresh influx of animal spirits thereto, and consequently new strength and vigour to their languid motion, which being recruited, and the waste of nature repaired anew, their fibres being contracted, or braced up to their due natural tone, by the aforesaid repletion of spirits, are now invigorated to shake off, and dislodge any heterogeneous or viscid matter, which may adhere to, load, or disturb them : but since the nervous fibres are sometimes so greatly relaxed, especially by superfluous humours, or too much moisture, that this auxiliary or new supply of the nervous fluid cannot sufficiently wind or brace them up to their due pitch of tensity, necessary to disburthen and free themselves of that oppression ; another powerful assistance they have to this so necessary a work, and that is from the fixed salt or oil which arises together by a more vehement heat of fire towards the middle and latter end of distillation ; for as they are a more ponderous body than the phlegm, as is seen by their subsiding in water, they require a more forcible heat to raise them, so as they may ascend and come over in distillation ; which being effected, they readily commix with, and ly dissolved in the sulphureous or spirituous part of the menstruum ; and these are what gives that acute pungency to the nervous *fibrillæ* of the tongue, leaving a sort of roughness thereon, upon tasting this cordial water : and the same may we lawfully suppose they do impart (especially the pointed particles of the fixed salt) to the nervous fibres, or their expansions in other parts, which striking or darting against those sensible organs, cause them forcibly to contract, or shrink up themselves into

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a more compacted tone ; which state of contraction I take to be only a return to their natural site, or place of rest, which they had been stretched from, by that superfluous moisture wherewith they were annoyed in that preternatural state of relaxation, which being freed from by the deterfive quality of the fixed salt (assisted by the vibrations of the said capillary fibres) ; and partly also by the attenuating and discussing quality of the extraordinary hot, and I had almost said acrid, oil ; the superfluous humidities falling upon, or lodged in any part, are thereby attenuated or absorbed ; whereby the natural tone of the parts being restored, they are enabled to perform their due functions,* and also invigorated to throw off by the secretory canals such excrementitious humours as nature has appointed to be secreted, which being detained, are the source of innumerable maladies, as I observed before. Thus the stomach, having first received their saniferous impression or influence (by discussing vapours, and deterging viscidities or crude phlegm, the cause of indigestion, flatus &c.), it immediately recovers its digestive faculty, whereby good chyle is sent into the blood, replenished with mild balsamic spirits, fit for the generation of the nervous fluid, which being crowded with no lentor or heterogeneous obstructing matter, is easily dispensed by its canals to all parts of the body, to communicate life and motion thereto : and in this state no fuliginous vapours are sent up into the head ; and those that were before lodged there, causing pains, giddiness, swimings in the head, catarrhus and other ferous defluxions, &c. are removed and thrown off by the opened *perspiracula*, being partly beforehand attenuated by the very warming and aromatic effluvia of this cordial.

Thus may we account for the cure of all the enumerated maladies ; and after this manner may it be said to comfort and strengthen all the noble parts, or principal viscera,

viscera, and take away their disorders; as sickness at stomach, vomiting, hiccough, &c. and from the heart palpitations and faintings, which only arise from a convulsive motion of its nervous fibres: and upon account of its subtil ætherial or volatile salt, whereby it attenuates gross humours, and opens the perspirable pores of the cutis; thereby making way for the transit of morbus humours or vapours; it is ranked in the alexipharmic class; and, upon account of its fixed salt, it has a place among the deobstruents; and is frequently, in many feminine cases, given, where opening of the uterine passages is desired: and this it effects by the specific gravity of the said salt (and partly also by its deterfive quality), which being driven by the impetus of the arterial fluid against those obstructed glands, abrades, or wears away the obstructing humour or matter, and enables thereby the blood to force open, and break through those capillaries, whereby a way is opened for those natural and critical discharges, which nature has that way appointed.

CINNAMON WATER.

RECIPE. *Take small cinnamon and cassia lignea, each four ounces, proof malt spirits three gallons, water as much as is necessary: bruise the barks, and infuse them all night in the spirits; then distil and dulcify with fine sugar three pounds, and make it up as in double cinnamon water directed.*

When you make second cinnamon water, it is best done when you have newly drawn off your double cinnamon water, and having poured off the wash from the still, put the bruised cinnamon and cassia along with the spirits, &c. as above described, upon the magma of the double cinnamon water left in the still: which draw

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off and dulcify *ut supra*, whereby your water will taste stronger of the cinnamon, than otherwise it would have done. You must be careful in drawing it off; for the cassia, if drawn low, is very subject to an empyreuma.

The Virtues are much the same with, though far inferior to, the former.

CARRAWAY WATER.

RECIPE. *Take carraway seeds bruised twelve ounces, proof spirits three gallons, water one gallon and a half: draw off and dulcify with sugar one pound and a half, and make it up as the former.*

Another.

Take carraway seeds bruised half a pound, lemon, or orange peel dried six drachms, spirits three gallons, water q. s. : distil and dulcify with two pounds sugar, and make up as usual.

VIRTUES OF CARRAWAY WATER.

THIS water partakes of the same virtues with double anise seed water; but is much superior in pleasantness of taste, if not in virtues; it is an excellent carminative and anticholic water, discussing wind and vapours pent up, either in the stomach or bowels, or included between their membranes.

It abounds with a very warming, discussive, and subtil oil; which powerfully penetrates and rarifys included vapours, which being agitated partly by the motion of the fibres, and rarified by the force of additional heat, communicated by the said oleaginous particles of the seed, forces the obstructed wind or vapours to dislodge, and expand itself in order for its discharge out of the

the body. And of this we have a familiar example (aluding to the included vapours in our bodies) of boys blowing up soap water with a reed or quill into bubbles : which, by the continual succession of heat and warm air, blown through the said tube, the included vapours rarified expand the vesicle or bubble more and more, according to the degree of viscosity of the liquor, till it be stretched to such a degree of tenuity that the rarified vapour therein contained is capable of forcing its way through the same : and that such a collection of vapours may be detained in our bodies is indisputable ; we too frequently experience it by those tortions or griping pains which we feel in the colic ; and the ease that ensues when this pent-up wind, &c. has forced its way, either upwards or downwards ; and the strepitus, or rumbling noise, it makes either before or at the discharge, proclaims to us the cause of our malady, and the nature of the enemy that offends us.

GOLD CORDIAL.

RECIPE. Take angelica roots one pound, raisins, half a pound, coriander seeds four ounces, carraway seeds and cinnamon, of each two ounces, cloves, half an ounce, melilot-flowers two ounces, figs four ounces, liquorice four ounces ; having sliced and bruised the ingredients, infuse them all night in proof spirits three gallons, water one gallon and a half ; draw off your proof goods without fains ; which dulcify with fine sugar two pounds, dissolved in rose water a pint, adding thereto the liquor with which you make up your goods proof ; and colour it with burnt sugar to a fine golden colour, or, if you please, with saffron tied in a rag three drachms, and pressed into the goods ; adding twelve leaves of gold when you put it by for use.

Another,

Take best brandy three pints, confecti^on of alchermes half an ounce, oil of cloves ten drops, loaf sugar six ounces, musk and ambergrease tied in a rag, each three grains, Infuse them all together in a large glass bottle close corked and shaken up every day, then filter or decant off the clear liquor, adding six leaves of gold thereto.

VIRTUES OF GOLD CORDIAL,

GOLDEN cordial, as you may see by the prescription, does wholly consist of carminative and emollient ingredients joined with those of a lubricating mucilaginous quality; for which, I think, it is much better: for they induce a softness and smoothness on the parts, and thereby hinder the renitency and adhesion of both viscous and sharp juices; which may either by collection of vapours cause gripings in the stomach or bowels, or by their asperity so vellicate the nervous fibres, as to draw them into spasms: and as Hippocrates has well observed, spasms and convulsive twitchings, yea and sometimes a paralysis, often succeed inveterate colics; and both ancient and modern practice confirm the same. Dr. CHARLETON, in his lectures, recommended to his learned auditors the use of emollient and lubricating medicines, even in continual fevers, to make the passages for the transit of the humour soft and yielding, by smoothing their roughness, and inducing a slipperiness; so that the humours may slide along through them, without renitency and attrition, which always cause griping pains in the stomach and belly when retained: and in rheumatisms and pleurifies, lubricating oleaginous mendicaments are now frequently prescribed, for the said reasons, and with

with laudable success: for we may easily conceive that when the points of any saline or sharp humours are wrapped up, or as it were sheathed, in the mucilaginous body, or rather vehicle of any such like mendicament, so as they cannot *in transitu* vellicate the sensible fibres, and the parts being also rendered by the said lubricating quality smooth and yielding to the same, they must consequently thus pass on imperceptible and inoffensive, till by the due course of circulation, they be brought to their proper emunctory or secretory organs, in order for their discharge, without offending the parts through which they pass.

The latter Recipe of gold cordial, made with confection of alchermes, is a great cordial; it takes off faintings, swooning, sickness at stomach, palpitations of the heart, &c. It is also a good neuretic or nervous cordial, warming and comforting the nerves; and thereby takes off cramps, numbness, tremblings, and weakness of the joints, occasioned either through languor, or obstruction of the nervous fluid: which effects may in a great measure be attributed to the fragrancy and volatility of the perfumes; upon which account it is also good in some feminine cases, where the women can well bear the odour of perfumes; but in others they are as pernicious, as sometimes immediately inducing violent hysteric fits, faintings, &c.; and therefore cannot safely be given in all constitutions.

This cordial may be made cheaper, and fully as good, with the succ. chermes, instead of the confection; for no virtue can be extracted (by a mercurious or spirituous menstruum) from the pearls prescribed in the confection; and the perfumes ordered in the cordial are sufficient to aromatize it high enough for any constitution,

CITRON WATER.

RECIPE. *Take fresh lemon peels number thirty, figs fourteen pounds, proof spirits three gallons, water q. l. : infuse and distil, make it up high proof, and dulcify with double refined loaf sugar two pounds and a half for use.*

Another.

Take best lemon peel bruised eighteen ounces, orange peel nine ounces, nutmegs bruised one quarter of a pound, strong proof spirits three gallons, water two gallons ; macerate, distil and dulcify with double refined loaf sugar two pounds, for use, &c.

The former is what is usually sold for citron water, and it must be a nice palate that distinguishes it from the genuine ; you ought to keep some of this water undulcified ; for most persons of the best judgment desire it so ; and for others it may be dulcified *pro re nata*, with a lump of double refined sugar put into the glafs.

VIRTUES OF CITRON WATER.

THE true citron water (which I have drawn from the citron peel in the West Indies) I found had a more aromatic flavour than any that could be drawn from the lemon peel alone : and the figs only contribute to make it softer and smoother upon the palate. This put me upon an enquiry, whether a succedaneum might not be found nearer, and more improved to the nature and flavour of the genuine, than what was commonly sold : and this form or recipe with nutmegs, which I have here given, I found, after many experiments, to come nearest to the true West Indian citron ;
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the nuts must be bruised, and the peels cut in pieces, and infused all night in the rectified spirits and liquor, and then drawn off with a gentle fire, which reserve in bottles either plain or dulcified.

This water is a very pleasant cordial dram, of a very aromatic and grateful flavour: it strengthens the stomach, and gives a suitable tenacity to the nervous tunics of it, thereby rendering it the more able to digest the aliment. And by the addition of the nutmegs it becomes a good cephalic, and comforts the brain as well as stomach; and that partly by the grateful sensation it imparts to the nervous system, invigorating their tonic structure, and partly also by its warming discussive quality; it dries and clears the brain of superfluous humidities, attenuating them, and making them fit for glandular secretion, or perspiration.

PLAGUE WATER.

RECIPE. *Take rue, rosemary, balm, carduus, scordium, marigold-flowers, dragons, goats' rue, mint, each three handfuls, roots of master wort, angelica, butter bur, piony, each six ounces, scorzonera three ounces, proof spirits three gallons; macerate distil, and make it up high proof.*

Another.

Take roots of master wort, gentian, snake root, each two ounces; green walnuts bruised twenty-four, Venice-treacle and Mitbridate, each one ounce; camphire two drachms, rue, elecampane root, each an ounce; horebound two ounces, saffron a drachm, proof spirits three gallons, water q. s.: distil, and sweeten with white sugar one pound and a half, for use.

Note, that the saffron is best added after distillation.

EPIDEMIC, OR PLAGUE, WATER.

RECIPE. *Take dragons, rosemary, wormwood, sage, scordium, mugwort, scabious, balm, carduus, tormentil with roots, angelica with roots, marigold-flowers, centaury, betony, pimpernel, celadine, rue, agrimony, each half a pound; gentian, zedoary, liquorice, elecampane, each four ounces; bruise and slice the ingredients, and infuse them in three gallons of molossus-spirits; then add spring water two gallons: distil and dulcify with fine sugar one pound, for sale.*

VIRTUES OF PLAGUE WATER.

I HAVE given here three prescriptions for compounding plague water, of which you may take your choice. They are compounded of noble and generous alexipharmics; and are each profitable to be taken as a preservative against all pestilential, malign, or other contagious disorders: and also as an antidote to expel the malignity from the heart, and force it towards the circumference, there to be discharged by a gentle diaphoresis: and this they effect by the subtilty and tenuity of their substance, whereby they divide and attenuate the humours, so as to render them fine enough to pass through the cutaneous glands, by a sensible perspiration, which appears upon the cuticle in form of dew, or gentle sweat: And to this necessary work we may well suppose the nerves lend their helping hand; for they being now invigorated by a fresh influx of animal spirits communicated to them by these generous cordials or alexipharmics, and their waste repaired by this timely auxiliary, are enabled more forcibly to contract their fibres, and so to squeeze out of the capillaries those humours which obstructed the perspiration; or
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so to divide them by such shocks or impulses, of the contracting fibres, that becoming thereby more fluxile, they may readily pass out that way which nature endeavours for their excretion; which commonly terminates the distemper by this critical evacuation.

That plague water which I approve best of for this purpose, is the second recipe made with the snake root, camphire, saffron, &c. Among all the alexipharmics no greater antidotes can be found; for they are allowed to be the principal ingredients for this use. The walnuts and rue formed the basis, or rather made up the most part, of that famed antidote, or counter-poison, of Mithridates king of Pontus, which so effectually preserved, and rendered proof, his body against all manner of poisons. The camphire, croci, and radex serpentaria Virg. are of no less efficacy; for they are generally taken to be the greatest alexipharmics in the whole *Materia Medica*; for being of wonderful subtil parts, they exceedingly attenuate gross or viscid humours obstructing the capillaries, and forcing them out by sweat; and, by the same attenuating qualities, have the efficacy or power to keep the rest of the humours or circulating fluids in a due state of fluxility.

AQUA MIRABILIS.

RECIPE. Take sage, berony, balm, cowslip-flowers, mint, each a handful and half; cubebs, galingal, ginger, calamus aromaticus, each one ounce and half; nutmegs, cloves, cardamoms, each half an ounce; proof spirits three gallons, water q. s.: macerte, distil and dulcify with fine sugar a pound and half, for use.

Another.

Take celadine half a pound, nuts, ginger, each one
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ounce ; cowslip flowers half a pound, cloves one ounce ; penny-royal, marjoram, each four ounces ; spirits rectified three gallons ; infuse all night, and distil, which make up high proof and dulcify with fine loaf sugar two pounds, for sale or use.

The COLLEGE has it thus :

Take cloves, galingal, cubebs, mace, cardamoms, nuts, ginger, each half an ounce ; juice of celadine two pounds, rectified spirits two gallons water one gallon ; distil and dulcify with loaf sugar q. s. pro usu.

Another.

Take cardamoms, cubebs, nuts, galingal, each two drachms ; cloves a drachm ; white ginger and grains, each half an ounce : carraway seeds one ounce, proof spirits two gallons and a half ; water one gallon and a half : infuse, draw off, and dulcify with fine sugar two pounds, for sale or use.

VIRTUES OF AQUA MIRABILIS,

THESE are the various recipes that are now used, and there is little difference in their virtues, except what the penny-royal makes in the one, and the celadine in another ; for the virtues of the spices are not much different, being all of the warming and aromatic species, and, upon that account, are good stomatic and cephalic ingredients.

This water warms the stomach, corrects crudities, and flatulencies in the *primæ viæ* and thereby helps digestion ; cheers the heart, helps languor and faintings, and performs the office of a generous cordial to the whole œconomy : it is frequently prescribed in most
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stomachic and cephalic juleps; and, on account of its aromatic flavour, is usually the sole menstruum in pearl cordials: for by its warmth it helps digestion, stops vomiting, hiccough, gripes in the stomach and bowels, and, by the addition of the celadine, is useful in all indispositions of the eyes, proceeding from weakness, or obstruction of the optic nerves; for it attenuates and discusses gross humours; and by its pungency vellicates the fibres to shake off any pendulous or gross matter which may occasion their obstruction.

[But here I would be understood, that when I reckon up the several virtues contained in each cordial water arising from, and communicated to them by their proper ingredients, extracted by the spirituous menstruum, I don't mean, that a liberal use of any of these waters used simply, or by themselves, will really effect a cure in the aforesaid diseases; neither do I believe any one so gross as to expect it; for it is certain that all spirituous liquors produce a coagulum in the blood, if immoderately taken, suffocate the natural heat, thereby bringing on dropsies, weakness of the nerves, and other cold and humid distempers, as is daily experienced by those who have indulged themselves in a too frequent use of them; and evidenced by their swelled legs and trembling hands: therefore they are to be taken as a cordial, either simply, or diluted with some proper vehicle; when, and at such seasons as the recited diseases call for the use of them; and then the rehearsed benefits and virtues may be expected from them: for a daily use of any thing, whether medicinal or not, becomes in time so customary to nature, that in case of a distemper, wherein that medicine, cordial, &c. might be serviceable, and from which a cure might happily be expected, it will then fail at the greatest need, and no more benefit may be expected

from it, than from our daily food in a continual fever, which rather augments, than abates, the fury of the distemper: and of this we see divers examples, as in those who, to allay some inveterate pain, or induce sleep when long absent, have begun with a moderate dose of laudanum, &c. which answering their expectation, and they fearing the sad returns of their hostile guest, when the salutary and pleasing dose had spent its virtue, have been prevailed with to repeat the same dose again; but not finding the same benefit as from the former, have, to mend the matter, augmented the dose some few drops or grains, and thus by degrees increasing it, have at last arrived at such an uncommon pitch of taking opiats, custom having now made it habitual to them, that one ordinary dose of such persons would be sufficient to kill half a dozen persons unaccustomed to this medicine. I knew a gentlewoman, who, to palliate an occult cancer in her breast, took a large silver spoonful of liquid laudanum every night, without any visible harm, or stupor arising from it: and this dose would have been sufficient at thirty drops or grains per dose (which is too much for the strongest persons, madness or delirium excepted) for eight persons! for a large silver spoon will contain half an ounce. And I knew another who would daily take a scruple of London laudanum at a dose, and even as much of crude opium, to abate the excruciating nocturnal pains of the venereal disease; and especially of nodes, and gummatas, wherewith he was much afflicted. And we daily experience the same in tobacco and snuff-takers, which has little effect upon them, in comparison with other people. And therefore I must here advise all persons, who at any time would expect benefit from any medicinal composition, not to be too liberal in its use, but to take it moderately, as occasion requires; and then they may expect to reap the benefit of it at a time when most required.]

HUNGARY WATER.

RECIPE. *Take proof spirits three gallons, rosemary and lavender-tops, each three handfuls : macerate, and distil according to art.*

Another.

Take flowers and tops of rosemary nine handfuls, lavender three handfuls, root of florentine-orrice three ounces, salt two handfuls, proof spirits three gallons, water q. s. ; distil in Balneum Mariæ.

VIRTUES OF HUNGARY WATER.

THIS water was formerly made with only the flor. anth. ; but by the addition of the lavender, the medicine is much better ; and the orr. flor. gives a more delicious flavour to it. This spirituous mendment is seldom or never used inwardly, but always topically, as in embrocations, epithems, lotions, &c. ; its chief use is in nervous and cephalic diseases, especially those proceeding from a cold cause, as epilepsies, apoplexies, atrophies, spasms, and all paralytic affections ; it dries up superfluous humidities (falling upon, or lodged in, any part) by its heat ; and is a good discutient in cold gross tumours, for it is highly impregnated with a subtil detergent oil which incites and attenuates the viscidities, and by its warmth rarifies the same, so as to become fit to be carried off by transpiration, or to be absorbed or reassumed by the reflux blood, thence to be conveyed to some convenient emunctory, in order for its secretion. We apply it to the origin of the nerves in convulsive spasms, and twitchings of the arms, and paralysis of those parts ; and it is rubbed along the spondils of the neck and back for the same end.—

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It makes a noble cephalic snuff, if mixed with spirit of lavender; and is of singular use against megrims, vertigo, lethargy, head-ach, apoplexy, &c. The said cephalic mixture may be rubbed from the second vertebra of the neck to the first of the thorax, and also on the fore part of the gula, and above the clavicles, for loss of speech; for at the said second vertebra issue out the nerves from the cervical marrow there, which send forth several twigs to the muscles of the larynx, gula, neck, and parts adjacent; which having formed two plexus, from the inferior of which immediately under the clavicles, spring the recurrent nerves, the main organ or instrument that serves for the formation and modulation of the voice; both which nerves run up along the sides of the trachæa, to which they impart some twigs, and end in the muscles of the larynx. I have deviated thus far to shew you the origin, course, and insertion of those nerves, which are the chief instruments of voice and speech; which being obstructed, or otherwise preternaturally affected, a defect or loss of speech must necessarily follow: and no better external medicine do I know than this composition to rub the described parts with, whereby the said nerves will be invigorated to shake off the viscidty which causes their obstruction; or if occasioned by too much superfluous humidity, or laxity of the said nerves: this mendicament, by its warmth, subtilty, and pungency, will both attenuate the lentor, discuss and dry up the humidities (which it effects by its saline particles therewith impregnated), and by its pungency, arising from its hot detergent oil, vellicate and contract their fibres, so as to recover their natural elasticity, whereby their vibrations being oftener repeated, the nervous fluid will be thereby so attenuated (being also assisted by the subtil parts of the medicine immediately penetrating the same) as to pass freely without obstruction, to those parts

parts they are designed to give sense and motion to, and this in the interim may be assisted by internal cephalics, as spirit of lavender comp. given in juleps, or any convenient vehicle. The cleosacchar. anth. and lavendul. are specifics in this case. The use and virtue of Hungary water may be much augmented and improved by an addition of camphire to it, which, by its great heat, subtilty, and volatility, dries up superfluous moisture, contracts the weakened fibrillæ, attenuates, incides, and dissolves viscidities, and disposes the fluids to a brisk motion, whence comes natural heat, and consequently nourishment to those parts, which before laboured under a contrary quality.

LEMON, OR ORANGE, WATER.

RECIPE. Take proof spirits, three gallons, lemon or orange peel one pound, water one gallon and a half; distil and dulcify with sugar one pound and a half, for use, or sale.

The Virtues of this water are the same with that which goes under the denomination of citron water, and which I have enumerated under that head,

MINT WATER.

RECIPE. Take mint two handfuls, proof spirits two gallons and a half; water one gallon; distil, and dulcify with sugar one pound a half, for use.

VIRTUES OF MINT WATER.

THIS water wholly partakes of the nature of mint, and is used against vomiting, hiccough, wind in the stomach or bowels, griping of the guts, megrim, head-

headach, &c. ; against all which disorders it has been found to be very effectual.

RATAFIA.

RECIPE. *Take three gallons of molossus brandy, nuts two ounces and a half, bitter almonds one pound and a half ; bruise them, and infuse them in the brandy, adding ambergrease three grains mixed with fine Lisbon sugar three pounds ; infuse all about seven or eight days, and then strain off for use.*

Another.

Take of the black heart cherries twenty-four pounds, black cherries four pounds, raspberries and strawberries, of each three pounds ; pick these fruits from their stalks, and bruise them, in which condition let them continue twelve hours ; press out the juice, and to every pint of it add a quarter of a pound of sugar. When the sugar is dissolved run the whole through the filtrating bag, and add to it three quarts of clean proof spirits. Then take of cinnamon four ounces, of mace one ounce, and of cloves two drachms. Bruise these spices, put them into an alembic with a gallon of clean proof spirits, and two quarts of water, and draw off a gallon with a brisk fire. Add as much of this spicy spirit to your ratafia as will render it agreeable to your palate ; about one fourth is the usual proportion.

VIRTUES OF RATAFIA.

THIS water is seldom or never prescribed in physic ; it is of a carminative and deterfivè quality, which it receives from the nuts and almonds ; and by the said opening and cleansing quality, may prove a good

good diuretic ; for the bitter almonds abound with an absterfivè oil ; which, as it fuffers or undergoes no torture by fire, retains its unctuous and softening quality too. And in this view we have a most noble diuretic of it, answering all the intention that can be required of a medicament, coming under that appellation : for by its oleaginous quality, the fibres that compose the urinary glandules and canals are lubricated, softened, and relaxed ; and by their penetrating and deterfivè virtue, which certainly they receive from some saline particles wrapped up, or as it were lying diffolved in the oil, they scour off fuch viscous humors or calculous concretions, as may obstruct the said glandules, and hinder the free emission of the urine, till opened and cleansed by medicaments of this nature. The nuts in this composition look as if defignedly added for this use ; for by their attenuating quality they rarify and dilute gross viscid humours, and thereby render them thinner, and consequently easier for the opening and deterging particles of the almonds to incide, and dislodge, and so pass off by urine. By the same qualities this water may be useful to open obstructions in several other viscera, as the liver, spleen, mesenteriy, womb, &c. and may answer the same intentions there, as well as in the former : and in the pulmonic cases too, it may have the same effects, and we may suppose much stronger too, for it immediately arrives at that *viscus* after its commixtion with the blood, and having as yet suffered little or no depuration, or secretion, of its saline deterfivè particles, must therefore, in a special manner exert its virtue there, in forcing open all obstructions that may impede the blood's course or motion, thereby cleansing the lungs of those infractions, which might occasion coughs, wheezings, difficult breathing, &c.

SURFEIT WATER.

RECIPE. *Take centaury, marigold-flowers, mint, rosemary, mugwort, scordium, rue, carduus, balm, dragons, St. John's wort, each two handfuls; roots of angelica, butter-bur, piony, scorzonera, each seven ounces; calamus aromaticus, galingal, angelica seeds, caraways, each ten drachms, ginger six drachms, red poppy flowers three handfuls; proof spirits three gallons; water one gallon and a half; macerate, distil, and dulcify with fine sugar, one pound and a half for use.*

VIRTUES OF WHITE SURFEIT WATER.

THIS water is compounded of cephalic, neurotic, hysteric, alexipharmic, carminative and stomachic ingredients, whose virtues being conjoined and designed to strengthen the principal organs and viscera, must needs be very effectual against crapulas, indigestion, crudities and rawness at stomach, vomiting, and other symptoms thence arising. It is used successfully against colics, gripings in the stomach and bowels, flatulencies and vapours, all which it dissolves by its carminative virtue; it attenuates the humours, and helps perspiration, and is therefore good in all epidemical and contagious distempers. It resists putrefaction, and expels the malignity from the center to the circumference, which it discharges by a gentle dew upon the surface of the cuticle; and this it effects by the efficacy of the alexipharmic ingredients, wherewith this compound water is well stored. I have put into the prescription flo. papav. erratic. in lieu of the red poppy seed, which is both cheaper, and easier to procure (especially at the season of the year in which this water should be made); and, in my opinion, without any detriment to the composition;

position ; the Virtues of which I shall give you as soon as I have inserted the following Recipe of Surfeit Water made by infusion.

Take best brandy a gallon, red poppies two pecks, let them stand in the sun, in a wide-mouthed jar, close covered for two or three days, till the tincture of the flowers be wholly extracted : then strain out the liquor from the flowers, by a strong expression ; adding to the tincture caraway and coriander seeds, liquorice sliced, of each an ounce ; cardamums, cubebs, of each three drachms ; raisins stoned half a pound ; cinnamon half an ounce ; nutmegs, mace, each two drachms, cloves ten, ginger two races, juniper berries two drachms, two lemons sliced ; infuse three or four days, adding eight figs sliced, white sugar one pound and a half, rose water a quart : let them stand for a day or two longer in infusion, being often shaken in the mean while, then strain, and let it stand to subside for use.

This water is not a whit inferior to the former, but rather superior ; for it retains the whole carminative and alexipharmic virtues of the other, and is no less powerful to expel the intestine enemy, than that which is loaded with alexipharmics. Its cordial virtues render it serviceable in all tremblings of the nerves, and depressions of the spirits.

DR. STEPHEN'S WATER.

RECIPE. *Take thyme, mother of thyme, sage pennyroyal, pellitory of the wall, rosemary, red roses, camomile flowers, origanum, lavender, mint, each a handful and a half ; ginger, galingal, cinnamon, nuts, anise seeds, caraways, each six drachms ; proof spirits three gallons ; water q. s. : macerate, distil, and dulcify with white sugar*

one pound three quarters for use ; adding of leaf-gold six leaves, mix them well in the goods f. a.

This water has its name from its inventor, a physician of great learning and practice. It is a noble cephalic cordial and carminative ; of the same nature and use with *Aqua Mirabilis* ; it is also in some degree an hysterick ; good in all colic pains in the stomach and bowels, and discaes of the nerves,

ROYAL USQUEBAUGH.

RECIPE. Take mace, cloves, cubebs, of each three drachms and a half ; nuts ten drachms ; cinnamon, coriander seeds, ginger, of each six drachms ; proof spirits three gallons : infuse all night, and distil ; hanging at the end of your worm English saffron, dissevered and tied in a rag, ten drachms : then make ready the following ingredients, viz. raisins stoned one pound two ounces, dates sliced twelve ounces, liquorice nine ounces, spring water six pints ; let them macerate in a warm oven, or upon hot ashes, till their whole virtue be extracted ; then strain them, and add fine Lisbon sugar two pounds and a half, which, when dissolved therein, and perfectly cold, put to your distilled goods, and set them by in an open-headed vessel, with a cock in it, to become fine, and fit for sale or use.

USQUEBAUGH.

Take nutmegs, cloves, cinnamon, of each half an ounce ; anise seeds, carraways, coriander, of each an ounce ; liquorice sliced two ounces, proof spirits three gallons, water q. s. : macerate and distil, hanging at the end of the worm saffron teezed half an ounce ; which frequently squeeze out, till all its tincture be emitted into the distilled goods, which

which make up and dulcify with fine sugar two pounds, for use.

ROYAL USQUEBAUGH, BY DIGESTION.

Take raisins stoned two pounds, figs sliced half a pound, cinnamon two ounces and a half, nuts one ounce, cloves half an ounce, mace half an ounce, liquorice three ounces, saffron half an ounce; bruise the spices, slice the liquorice, &c. and pull the saffron in pieces, and infuse them all in a gallon of the best brandy for seven or eight days, till their whole virtue be extracted; then filter them, putting thereto a quart of canary wine, and half a drachm of essence of ambergrease, and twelve leaves of gold broken in pieces, which reserve for use.

VIRTUES OF USQUEBAUGH

THESE waters bear an Irish name, and are excellent stomachic cordial liquors, and, on account of the balsamic and healing quality communicated to the menstruum by the raisins, dates, figs, liquorice, &c. become a good pectoral and restorative cordial: yet, as they are of a very mucilaginous and adhesive substance, if not attenuated and kept fluid by the volatile parts of the warm spices, might perhaps be subject to impress too great a lentor upon the chyle, and adhere in some part of the galaxia, and so dam up and obstruct the small passages, or glandulous pores of the mesentery; or, if admitted into the blood in that clammy substance, might occasion the same damage there, in some of the arterial capillaries, or their glandules. But this inconvenience is well guarded against, as I observed above, for they undergoing a twofold digestion together, first in the composition of the cordial liquor, and then afterwards when received into the ventricle,

and

and there so comminuted or mixed as to become one homogeneous substance, neither too gross and languid, nor too aerial and volatil, the one serving as a spur, the other as a bridle to the another. And in this state they pass along the milky path, till brought into the sanguineous mass, where, upon their arrival at the heart, they suffer another comminution or subdivision of their particles; for there, and perhaps partly in the lungs, by the admixtion of the sulphureous particles of the air, they may be said to undergo their last concoction for the service of the whole fabric. For in the heart and arterial canals, the blood is subtilized, and here the spirituous parts begin to separate and take leave of the grosser and more ponderous, as designing to make their exit as soon as they arrive at their proper port. But this being done by a sort of violence or colluctuation, cannot be performed all at once: for the grosser bodies endeavouring to restrain or hinder the evolution of the more volatile particles, their old associates, repress their immediate flight, till after repeated vibrations of the arteries, they become more and more divided by the rapid motion of the blood, and consequently more attenuated by the intense heat thereof, are at last forced to disjoin, though gradually, as before observed: and now the grosser particles reassuming their former adhesive and tenacious nature, do readily come into contact, unite and stick in any interstice or cavity made by the attrition or abrasion of the circulating fluid; and thus do they repair the wastes and decays of nature, and may successfully be given in all colliquations and wastings of the solid parts, (where a fever, as hectic, &c. is absent) especially if proceeding from a defect or decay of natural heat; and is of great service to old people, where no fever is to be feared, and the lamp of life, or *ingenitus ignis*, called by some of the ancients the *Vestal Flame* (as it is elegantly described by Dr.

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CHARLTON in his *Oeconomica Animalis*) has almost consumed its *pabulum*, and begins to wax faint and low : there nature requires more generous cordials, which may more safely be used than in younger persons, whose blood is more subject to be inflamed upon very slight occasion. This water, on account of the saffron, wherewith it is pretty highly impregnated, as containing near five grains in three ounces of the liquid menstruum, must needs be a pretty good alexipharmic too ; and may if cautiously and wisely used, assist and promote the expulsion of the small pox, measles, and other cutaneous eruptions, where a spur to nature is required. And in malignant and pestilential fevers too, its use is of good service in expelling and driving out the morbid matter by the cutaneous pores, for it effectually promotes a diaphoresis : and though the saffron may be looked upon proportionably to add to, and augment the heat of this cordial medicine ; yet it is not to be feared on that account, but may rather be used in a larger quantity : for, as it powerfully opens the pores, (whereby we may judge of a deterfivè quality lodged in it, and thereby removes obstructions, and causes a plentiful perspiration of both kinds, viz. sensible and insensible) it leaves free egress for the hot spirituous particles of the menstruum to exhale, and thereby rather cools and extinguishes, than incites or induces any preternatural or febrile heat upon the body, as having by the aforesaid critical discharge spent the *fomes* or *pabulum* there of. And this is no fictitious hypothesis, but grounded upon true reason, confirmed by daily experience ; for do we not see that camphire (which tho' taken, by some persons, to be cold in quality, yet the inflammability and volatility of its substance or constituent particles demonstrates it to be hot, and that in a high degree) effectually abates and takes off all inflammations, and that only by the subtilty of its parts, which

which opens its pores, and having by the said quality attenuated the humours that obstructed the passages, makes them thereby fit to go off by perspiration. And by the said quality and causes, we find spirit of wine to be the most effectual remedy against ambustion. And if the said qualities be allowed, we may suppose it also available to cleanse any of the *viscera*, wherever obstructed, and by cleansing and opening the biliary pores and canal, may be useful in the jaundice, cachexy's, &c. and in some uterine cases too it may not perhaps be unsuccessfully made use of.

WORMWOOD WATER.

RECIPE. *Take dried wormwood one pound, caraway seeds bruised four ounces, proof spirits three gallons, infuse, distil and dulcify with sugar one pound and a half, for use.*

VIRTUES OF WORMWOOD-WATER.

WORMWOOD water is deservedly in great use, and esteem; for it is a noble stomachic, and the best of all distilled waters (gentian excepted) of that class: It is frequently prescribed in stomachic and chalybeate tinctures and infusions. An excellent stomachic and anticolic tincture might be drawn from spirit. absinth. rad. zedoar. cort. aurantior. gent. centaur. fem. Cardamom. &c. and is much more proper for drawing those tinctures and elixirs with, than spirit of wine, provided it were no lower drawn than that spirit. Dr. BATES has in his pharmacopœia, given us the recipe of a compound wormwood water, which, for the excellency thereof, I have here transcribed from him.

AQ. ABSINTH. COMP. BATEANA.

R. Cort. extern. limon. recent lbjs aurant. lbj sumat. alf. secat. cort. winteran. ana lbjs flo. cham. ℥iv sem. cardamom. cariophyl. cubeb. junc. odorat. ana ℥j cinnam. N. M. sem. carui ana ℥ii sp. rectif. lbxij aq. absinth. simpl. cong. 4 fs diger. per trium dierum spatium, postea distil. s. a.

The composition of this water shews its virtues and use to which it was designed ; for the basis of it wholly consists of stomachic, carminative, and anticholic ingredients : and, in my opinion, nothing can be more suitably adapted to this purpose ; only I think the quantity of wormwood (as this water takes its appellation from it) is too little, and the orange-peel might have been substituted instead of the lemon, if its quantity had been increased, without any detriment to the medicine ; and if zedoary and ginger had been added, it would have been yet more powerful to all the designed intentions, which is particularly to warm the stomach, incide, attenuate, and discuss crude viscid phlegm, and vapours the product of it. It brings over in distillation a great quantity of its salt, which with its oil lys enveloped in the spirit ; its pungency upon the tongue does plainly discover it, which acting upon the membranous coats of the stomach, by vellicating the fibres thereof, gives a suitable tensity thereto ; and if any visciduity be therein lodged, or adherent thereto, it abrades and scours off the same, which, if wholly excrementitious is extracted into the intestinal duct, there to be secreted with the fæces. The cavity of the ventricle being thus purged or cleansed, and its fibres being invigorated and strengthened by the grateful sensation of the warm stomachic spices, and partly also by that slight vellication or pleasing pungency which the fibres thereof might receive from the said salts, thereby giving them a suitable

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able tenfity, whereby its concave or inner part becoming more corrugated, renders this membranous bowel more able to retain and accommodate itself to the indigested aliment, in order for laudable digestion. And this it effects by purfing up itself, and more ftreightly closing its two orifices, whereby it becomes thicker and ftronger, and confequently more able to break, digest, and tranfmute the aliment into good and perfect chyle, fit for its entrance into the lacteal veffels ranked along the fides of the firt or fmall inteflines: thus by inciding and removing phlegm out of the firt paffages, and by cleaning the ftomach, and giving a due elasticity to its fibres, are aromatic bitters accounted true ftomachics, and are a fuccedaneum to natural bile or choler; which, like thefe, deterges and fcours off crude phlegm, and always caufes a fenfe of hunger whenever this ufe-ful humour is contained, and has the predominance in the ventricle. All bitters refift putrefaction, the nidus or common matrix of worms, gripes, putrid fevers, cacochymias, &c:

JUNIPER WATER.

RECIPE. *Take beft juniper berries twelve ounces, proof fpirits three gallons, water q. f. : diftil and dulcify with fugar one pound for fale or ufe.*

VIRTUES OF JUNIPER WATER.

THIS water is more in efteem efpecially among the populace, than all the whole tribe of diftilled waters put together. It is a good carminative water, and preferable to anife feeds upon account of its tafte, as being much more grateful and pleafant to the palate; (efpecially if it be not reduced below proof, for then it becomes foul, phlegmatic, and ill tafted, as indeed moft di-

distilled goods lowered below proof frequently are) and in virtues it equals, if not exceeds, it; for it partakes of all the carminative quality of the other, and is as effectual to discuss wind and vapours, either in the stomach or bowels. It is the common anticholic water amongst country people, and is very effectual for that purpose, as is frequently experienced; for the berries abound with a very detergent salt, which rises in distillation with the oil and spirits, which powerfully incides and scours off phlegm, &c. adhering to the inner tunic of the intestines; and by its warming carminative virtue attenuates the same, and discusses any collection of vapours therein, or elsewhere inclosed: and by the said qualities this water becomes an excellent diuretic, detergent and cleansing the reins and urinary passages, whereby it powerfully provokes urine, and causes a free discharge of that excrementitious fluid. The Dutch have this water in great esteem for the said diuretic quality, which they frequently experience as often as they drink their impure, feculent, and grooty malt liquor, they presently fall into an ischuria, or total suppression of urine, which I conceive may be occasioned by the grossness of that liquor. And as those people are commonly great drinkers, and as great drinkers commonly are, or at least should be, great pissers; and it is frequently observed, that a great portion of our drink goes immediately off by urine, we may not improperly conjecture, that the feculencies or grosser parts of that liquor is conveyed along with the blood to the kidneys, where falling in with the serum into the secretory glands of that part, does so obstruct and fill up the same, that no more serum can there be put off from the blood; and consequently then no urine can descend through the ureters into the bladder: and this I take to be the occasion of their suppression; which as soon as those people labour under, and are sensible of, they

fly. (*tanquam ad asylum*) to the use of this distilled water; which they have so often experienced to give them ease and benefit: for being taken in a pretty moderate dose, it soon removes the obstruction by its detergent quality, opening and cleansing the urinary pores and glandules, whereby they receive that common benefit of nature (viz. a free discharge and open passage for the urinary fluid) which their gross malt liquor had stopped up.

And by the said quality Geneva may be of service in the jaundice, by opening the obstructions in the biliary pores and canals, and with it a very good icteric tincture might be made with proper anti-icteric ingredients, as croci, curcum. rubi tinctor. &c. Dr. BATE commends the spirit of juniper, to be a very powerful medicine in curing and removing barrenness; which I conceive must be by discussing and drying up the superfluous humidities of the matrix: and further he tells us, that it provokes the menses, which is effected by the efficacy of its detergent salts; which, striking against, and forcing open the mouths or extremities of the uterine vessels, absterges or wears away the obstructing viscidities, whereby a free passage is granted for those periodic evacuations.

CARDAMUM.

RECIPE. *Take pimento, caraway and coriander seeds, lemon peels, each four ounces; proof spirits three gallons, water q. s.: distil and dulcify with sugar one pound and a half, for sale or use.*

This water has its name from the four ingredients in its composition; and in some countries is greatly used by the poorer sort of people, who are induced to use it from its cheapness. It is a good stomachic, carminative,

tive, and anticholic liquor: and were it drawn as high proof as the cordial waters of the shops, it would not be much inferior in flavour and virtue to *Aqua Mirabilis*: it may very well be substituted in lieu of anise seed water, whose abominable empyreuma and disagreeable gust renders it unfit for dram or medicine.

NUTMEG WATER.

RECIPE. *Take nutmegs bruised twelve ounces, proof spirits three gallons, water one gallon and a half; infuse, distil, and dulcify with fine sugar two pounds for use.*

Another.

Take nuts bruised half a pound, caraway seeds or orange peel an ounce, proof spirits three gallons, water q. s.: distil and sweeten with loaf sugar two pounds.

VIRTUES OF NUTMEG WATER.

THIS water is seldom made, yet for its virtues deserves to stand in the first class of all stomachic and cephalic cordial waters, both upon account of its agreeable flavour, and its medicinal virtues; for in the whole *Materia Medica* there is not one compound water found, that is more agreeable to the palate, more comfortable to the stomach, and more grateful to the nerves than this cordial is; and may profitably be used in all cephalic and nervous cases, especially those proceeding from a cold cause, for as it abounds with a very warm and subtil oil, it powerfully discusses wind and vapours, from the stomach, bowels and head, thereby curing pains and tortions in those parts. It dries up and discusses superfluous humidities of the brain, and is therefore serviceable in catarrhs, and other ferous de-
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fluxions; it helps and strengthens the memory and eye-sight by the said qualities, especially if affected with too much moisture: it strengthens the stomach and other membranous parts, by repairing the relaxed tone of their fibres, giving a suitable tenfity thereto; and therefore may be found serviceable in most of their disorders.

ROS SOLIS.

RECIPE. *Take ros solis picked clean one pound and a quarter; cinnamon, cloves, nutmegs, each an ounce; marigold flowers a quarter of a pound, carraway seeds three ounces, proof spirits three gallons, water two gallons; draw off your proof spirits from the still, and infuse in a quart of liquor, liquorice sliced four ounces, raisins stoned one pound, red sanders four ounces; infuse upon hot ashes to a due extraction of their virtue; strain, and dissolve therein white sugar one pound and a half, which, when cold, mix with the proof goods for use.*

ROS SOLIS, BY DIGESTION.

Take ros solis clean picked four handfuls, nutmegs, carraway and coriander seeds, mace, cloves, cinnamon, each half an ounce; ginger, cardamum, zedoary, calamus aromaticus, each a drachm and a half; cubebs, yellow sanders, each half a drachm; red sanders an ounce, liquorice two ounces, red rose leaves dried a handful, best brandy a gallon; infuse for some days, and then strain off the clear liquor; in which dissolve white sugar twelve ounces.

Another.

Take ros solis cleansed four handfuls; cinnamon, nutmegs, carraway and coriander seed, each one ounce; cloves, mace,

mace, ginger, each three drachms; cardamum, cubebs, zedoary, calamus aromaticus, each a drachm, red roses dried an ounce, liquorice two ounces, raisins stoned half a pound, cochineal, saffron, each one drachm, best brandy one gallon; infuse for eight days, and strain, to which add loaf sugar twelve ounces.

These waters made by infusion of the herb are hotter in quality than that which comes off by distillation, where most of its hot, fiery, and caustic fixed salt does not ascend in distillation, but remains with the magma in the still; yet they are both without danger. It is good against phthisics, or consumptions of the lungs, a tabes, or pining, &c. It comforts the heart, liver, and ventricle, eases the pain of the head, and is a preservative from the plague.

SPIRIT OF ALKERMES.

RECIPE, Take orange peel, cinnamon, each four ounces, lemon peel, nuts, rosemary flowers, bitter almonds, each two ounces, proof spirits one gallon and a half, water one gallon; macerate and distil, to which add juice of kermes one pound, double refined sugar, one pound, ambergrease, rubbed and mixed in the said sugar, a scruple; digest for some days, and filter, adding leaf gold half an ounce.

BY INFUSION.

Take cinnamon and citron water, each one pound, juice of kermes three ounces, double refined loaf sugar a quarter of a pound: digest and filter, adding leaf gold number eight, essence of ambergrease half a drachm; mix.

As this water is a great cordial, so it bears a great price, which is much augmented by the gold and amber-

bergrease which enters the composition ; it is good in nervous cases ; and by its grateful effluvia takes off fainting, swooning, palpitation and tremor of the heart, weakness and numbness of the extreme parts, spasms, paralyzes, and other nervous disorders.

ANTISCORBUTIC WATER.

RECIPE. Take garden scurvy grass twelve handfuls, water cresses, brook lime, each two handfuls, lemons sliced six, horse radish roots two pounds, fresh briony root, four pounds, Aaron root two pounds, mustard seed six ounces, nutmegs one ounce : digest in two gallons of proof spirits, adding water q. s. : and draw off gently the proof spirit f. a.

VIRTUES OF ANTISCORBUTIC WATER.

THIS water is much the same with that excellent antiscorbutic water of the shops, called *Aqua Raphani comp.* save only that here we have *Sem. Sinapi* in lieu of the *Cortex Winterana*, with other small variations not material. It is composed of exceeding subtil and volatil ingredients, whose particles, when actuated by the heat and impulse of the arterial fluid, are rendered capable of inciding all viscidities, which may obstruct their capillaries, whereby perspiration being impeded, the perspirable matter becomes sharp and acrimonious, eroding the capillaries and their glandules, whence proceed those cutaneous eruptions and erratic pains which form those anxious symptoms we call scorbutic. The *Sem. Sinapi* in the composition makes it also serviceable in paralytic and hydropic cases.

A P P E N D I X

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P A R T F I R S T.

ADDITIONAL RECIPES.

Walnut Water.

TAKE green walnuts in the beginning of June ; beat them in a mortar, and distil them in a cold still, and keep the water by itself : then about midsummer gather some more, and use them as you did the first, and keep that also by itself : gather your walnuts a third time, a fortnight after midsummer, and use them in the same manner. Then take a quart of each, mix them together, and distil them in a glass still, and keep it for use.

VIRTUES.—*It is deemed good in paralytical and dropical disorders.*

Baum Water.

TAKE two gallons of strong ale, and a quart of sack, four pounds of young baum leaves, shred them ;
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anise seeds and liquorice, of each a pound, beaten to powder ; put them all into the ale and sack ; let them steep twelve hours, and then put them into an alembic and distil it.

Cherry Water.

TAKE a pottle of claret wine, four pounds of common cherries, a handful of rosemary, a handful of baum, two ounces of cinnamon broken in sticks, one dram of nutmegs, quarter'd ; steep them all in an earthen pot all night ; the next morning distil them in an ordinary still, and keep a pretty quick fire under them ; after it is distilled, put to every quart of water four ounces of white sugar candy, and hang a bag with a little musk and ambergrease ; stop it close, and set it in the sun, as you do other waters.

VIRTUES.—*It is good in any weakness or fevers, where other hot waters cannot be given, to comfort the stomach and spirits.*

A good Water to be drank in a Fever.

TAKE a quart of red wine, and a quart of milk ; and distil them together.

VIRTUES.—*The patient may drink plentifully of it, and it will allay the heat, and bring the body into a good temper.*

Rosemary Water.

TAKE three quarts of rosemary flowers, one quart of cowslip flowers, half a pound of dates, two drams of nutmegs, half a pound of clove July flowers, and
half

half a pound of cinnamon, two ounces of sun-raifins stoned; bruise the cinnamon, and slice the nutmegs and dates; steep them with the flowers all night in six quarts of sack; next day distil them in an alembic, and draw away three quarts of water with a flow fire; put into your receiver one pound of white sugar candy. You may put the first and last runnings together, and keep the middle by itself.

Dr. Butler's Treacle Water.

TAKE harts-horn shaved one ounce; boil in three pints of spring water to a quart; then take roots of elicampane, gentian, cypress, tormentile, of each one ounce; carduus benedictus, angelica, of each one ounce; borage, bugloss, rose mary flowers and marigold flowers, of each two ounces; citron-peels one ounce; cowslip-flowers two ounces; clove July flowers, lavender tops, sweet marjoram tops, of each two ounces; Venice treacle one pound dissolv'd in six pints of rich sack or white wine, and three quarts of red rose water; infuse all the ingredients twenty-four hours in a clean earthen vessel stop'd close; then distil it in a common still well luted (there will be enough for two stills, unless your still be very large). It will take near twenty-eight hours in the operation: the first running is best, and you may draw a quart off, and of the next draw as long as you find taste or smell. The dose of the first is two spoonfuls; the other three spoonfuls at time: the weakest is for young children.

A Water for weak Stomachs, Small Pox, Measles, and Surfeits.

TAKE sage, celadine, rosemary, wormwood, dragon, mugwort, pimpernel, scabious, agrimony, balm,

scordium, centory, carduus, betony, ros solis, of each one handful ; angelica roots, gentian, tormentile roots, zedoary roots, and liquorice, of each an ounce ; slice the roots, and shred the herbs, and put them all together into a gallon of white wine ; cover them close, and let them infuse for forty-eight hours : then distil them in an ordinary still, and keep the top of the still cold with wet cloths ; draw off three quarts, keep each quart by itself. When you take it, sweeten it with sugar give a child two spoonfuls of the first or second drawing, or four of the last drawing ; to grown persons give double the quantity.

Compound Piony Water.

TAKE of the roots of piony fresh gathered, eighteen ounces ; of bitter almonds six ounces ; of the leaves of rosemary, rue, wild thyme, and flowers of lavender dried, each three ounces ; of cinnamon, cubeb, seeds of angelica, coriander, carraway, anise, each half an ounce ; rectified spirit of wine one gallon ; water five gallons. Draw off by distillation three gallons.

This water is good in all nervous cases.

An excellent Cordial Water.

TAKE peels of dried citrons and oranges, nutmegs, cloves, cinnamon, of each two ounces ; roots of cypress, Florentine orrice, *calamus aromaticus*, of each one ounce ; zedoary, galingales, ginger, of each half an ounce ; tops of lavender and rosemary, of each two handfuls ; leaves of bays, marjoram, mint, sage, thyme, of each one handful ; fresh flowers of white and damask roses, of each one handful and a half ;
infuse

infuse them in two quarts of damask rose-water, and one gallon of brandy ; distil them, and draw off five quarts.

VIRTUES.—*It is a very good cephalic, and a convenient julep in all nervous cases. It is also a pleasant dram, and very good upon any sudden sickness of the stomach.*

Compound Horse-radish Water.

TAKE the leaves of both the scurvy-grasses, fresh gathered in the spring, of each six ounces ; bruise them and press out the juice, and add the juices of brook-lime and water-cresses, of each a pint and a half ; of horse-radish root two pounds, arum root fresh six ounces ; Winter's bark and nutmegs, of each four ounces ; lemon peels dried two ounces, French brandy two quarts ; draw off by distillation one gallon.

VIRTUES.—*It is good against all obstructions in the kidneys and viscera, and prevails against the jaundice, weakness of constitution, and dropsies, and is of great service in all scorbutic cases. The dose is from half an ounce to three or four ounces, unless at first distilling, and then it must be diluted by some proper vehicle. You must fix the worm close to the receiver by a bladder, to prevent spirits flying away.*

Aqua Mariæ.

TAKE sugar candy one pound, canary half a pint, rose water four ounces ; boil them to a syrup, and mix it with *aqua cælestis* two pints, ambergrease and musk of each eighteen grains ; saffron fifteen grains, yellow

yellow Sanders, infused in *aqua cælestis*, two drams, let it settle and decant the liquor off fine by inclination.

VIRTUES.—*It is a good cordial, and raises the spirits, and is good in all sinkings and nervous decays. Take from two drams to one ounce.*

Alexiterial Milk Water.

TAKE the leaves of meadow-sweet, *carduus benedictus*, and goats, of each six handfuls; mint and wormwood of each five handfuls; rue three handfuls; angelica two handfuls; bruise them all, and pour three gallons of new milk upon them; distil in a sand heat.

Milk Water.

TAKE wormwood, spearmint, balm, of each one pound, *carduus* two pounds, cut small; two gallons of milk; distil them gently.

This water is good to quench thirst in fevers.

Compound Scordium Water.

TAKE the juices of goats rue, sorrel, scordium and citrons, of each one pint; London treacle two ounces; digest three days, and then distil off the water: or take the herbs before mentioned, and put them into an alembic, with a sufficient quantity of water, and one quart of spirit of wine; draw off about a gallon, This last will keep longer than the former method.

VIRTUES.—*It is an excellent sudorific, and, if joined to an acid, is preferable to treacle water.*

A strong Palsy Water.

TAKE the spirits of five gallons of the best old sherry-sack, distill'd in an alembick; take cowslip flowers, the flowers of borage and bugloss, and of the lilies of the valley, of each one handful; take also rosemary-flowers, sage and betony-flowers, of each one handful; take each flower in their season, and so put into some of the spirits aforesaid, in an open-mouthed glass of near a quart, for that will hold them all, with the spirits, till you are ready to distil the water: but this, and the rest of the spirits, must be most carefully stopt till you use it. Take lavender flowers in their season, strip them clean from their stalks, and fill a wide-mouthed gallon glass with them; pour into them the remainder of your spirits; then stop them close with cork and bladder, as before, and let them stand six weeks to digest in the sun; then put all together, these and the first steeped flowers, with all the spirits in both glasses; add also balm, motherwort, spike-flowers, bay and orange leaves, if to be had, of each an ounce, cut small, and put to the former flowers and spirits: distil all these together in an alembic; make three runnings of it; first a quart glass, which will be exceeding strong; then a pint glass, which will be almost as good; lastly receive from it a pint glass full, or as much as runs strong; for when it runs weak, which you may know by taste and colour, which will be whiter, let it run no longer: put your three runnings all together; then take citron-peel, the outside yellow rind, or lemon-peels thin pared, also pine seeds hull'd, of each six drams;

drams; of cinnamon one ounce; of nutmegs, mace, cardamums, cucubies, and yellow Sanders, each half an ounce; of lignum aloes one dram; make all these into a gross powder, putting among them also half a pound of jujubes new and good, being stoned and cut small: put all these ingredients into a white sarsenet bag, to be hung in the water aforesaid: take also of prepared pearls two drams; of prepared smaragd a scruple; ambergrease, musk, and saffron, of each a scruple; of red roses, well dried and sweet, one ounce: these may be put into a little bag by themselves, and hung in the spirit as the other; close it well, that no air get in, for six weeks; then take out the water, and press the bags dry; keep the water in narrow-mouthed glasses close stoppt.

VIRTUES.—*It is so strong and powerful, that it cannot be taken alone, but must be dropt on crumbs of bread and sugar by any one for prevention: take first and last, about a quarter of a spoonful, and at four in the afternoon: fast always before and after it a full hour at least. It is of great use in all swoonings, weakness of heart, and decayed spirits, in all palseys, apoplexies, both to help in, and prevent, a fit; it will also keep all cold dispositions off the liver, restores lost appetite, and fortifies and strengthens the stomach; it will alone cure a dropsy, if taken at first, and the patient be kept from small and cooling liquors.*

A second Palsey Water.

WHEN the first water has run what is strong, there will be some small water at the bottom of the alembic; pour it out from the herbs and flowers, and drain them; put them into a gallon of the best sherry; so let them stand close stoppt five weeks; then

then distil them, and let it run as long as it continues strong; then pour it into the glass where the sarsenet bags are, and let them be in this second liquor close stopped six weeks; then you may use it as the former with bread and sugar.

VIRTUES.—*Though this is not so powerful as the former, it is too strong to take alone. Both are good to bathe outwardly the part affected with weakness by palsy, and generally help any violent pains or aches that any part is vexed with; but because bathing wastes most, and this sort is less costly, they commonly use this second sort.*

A good Cordial for the Spleen.

TAKE four ounces of harts-horn, one ounce of cardamums, one ounce of cinnamon, one ounce of saffron, two handfuls of red sage, as much balm; steep these twenty-four hours in two quarts of sack, or as much good brandy, which you please; distil it in a cold still as quick as you can, and let it drop on four ounces of sugar candy. Drink of this when low-spirited.

A Snail Water, good in Consumptions and Jaundice.

TAKE a peck of large shell-snails, lay them on a hot hearth before the fire; let them lie till they have done hissing and spitting; then wipe them from the froth, and break them in a mortar; have a quart of earth-worms, slit and scoured clean with salt and water; beat them with the snails; then take angelica, celandine, wood-forrel, agrimony, bear-foot, barberry-bark, great dock roots, of each two handfuls, rue half a handful, rosemary flowers one quart, half a pound
of

of harts-horn, turmeric and fenugreek, of each two ounces, half an ounce of powdered saffron, and three ounces of cloves fresh beat; shred these ingredients, and infuse all in three gallons of strong ale, for twelve hours; then distil it, and draw off what runs good, and take three spoonfuls of this in a glass of sack or whitewine, an hour before every meal; and use moderate exercise with it. .

A Poppy Water for Surfeits and Over-eating.

BREW ten 'gallons of strong ale-wort; when it is cool, work it with yeast, and add as many fresh red poppies as the wort will conveniently wet, so that you may stir it daily; let the poppies infuse in this wort three days and nights; then draw it off in an alembic as quick as you can, till the whole is distilled off; mix the small and strong together, and take a glass, at any time, with or without sugar, after a full and disgusting meal.

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A
 COMPLETE SYSTEM
 OF
 DISTILLING.

PART III.

OF MALT LIQUORS.

OUR work would seem to be imperfect, as a *complete* system of distilling, if we were to omit the artile of Brewing. We shall therefore give such directions on this head, as may be necessary to be observed in all private families. And first we shall instruct our Readers.

How to chuse good Malt.

MALT is chosen by its sweet smell, mellow taste, full of flower, round body, and thin skin. There are two sorts in general use, the pale, and the brown; the former is most used in gentlemens houses, and private families; the latter in public brew-houses, as seeming to go further, and make the liquor higher colour'd: Others again mix one third brown with

two thirds pale ; but this depends upon the liking of the drinkers. The sweetest Malt is that which is dried with coal or cynders.

In grinding it, see that the mill be clean from dust, cobwebs, &c. and set so as to crush every grain, without grinding it to powder ; for you had better have some small grains slip through untouched, than have the whole be ground too small, which will cause it to cake together so as you cannot get the goodness out.

Of Hops.

Hops are chosen by their bright green colour, sweet smell, and clamminess, when rubbed between the hands.

Of Water for brewing.

WATER out of rivers or rivulets is the best, except polluted by the melting of snow, or land water from clay or plowed lands. Snow water will take near one fifth part more of malt to make the beer good. If you have not river-water, a pond that has a bottom not over muddy, and is fed by a spring, will do ; for the sun will soften and rarify it. Very hard Water drawn from a deep well into a wide cistern or reservoir, and exposed to the air and sun, in two or three days has been brewed with success by a little addition of malt. Rain-water comes next to river for brewing. In short, all water that will raise a lather with soap, is good for brewing.

Of Brewing Vessels.

To a copper that holds 36 gallons, the mash-tun ought to be at least big enough to contain six bushels
of

of malt, and the copper of liquor, and room for meshing or stirring it: The under-back, coolers and working-tuns, may be rather fitted to the conveniency of the room, than to a particular size; for if one vessel be not sufficient to hold your liquor, you may take a second.

Of cleaning and sweetening Casks and Brewing Vessels.

If a cask, after the beer is drank out, be well stoppt to keep out air, and the lees remaining in it till you want to use it again, you will need only to scald it well, and take care of the hoops before you fill it; but if air gets into a foul empty cask, it will contract an ill scent in spite of scalding. A handful of bruised pepper boiled in the water you scald with, will take out a little musty smell; but the surest way is to take out the head of the cask, and let the cooper shave and burn it a little, and then scald it for use; if you cannot conveniently have a cooper to the cask, get some lime-stone, and put about three pounds into a barrel, (and proportionally to larger or smaller vessels) and put to it about six gallons of cold water; then bung it up, and shake it about for some time, and afterwards scald it well: or, for want of lime, take a linen rag, and dip it in melted brimstone, and fasten one end to the bung, and light the other, and let it hang in the cask. You must give it a little air, else it will not burn; but keep in as much of the sulphur as you can. Scald it afterwards, and you will find no ill smell.

If you have any new casks, before you fill them, dig places in the earth, and lay them half their depth, with their bung-holes downward, for a week; and after well scalding them, you may venture to fill them.

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Another way to proceed, if your brewing vessels are tinged with any ill smell, is to take unslacked lime and water, and with an old broom scrub the vessel whilst the water is hissing with the lime; and afterwards take all this lime and water away, and put fresh water into the vessels, and throw some bay or common salt into each, and let it stand a day or two; and when you come to brew, scald your vessels, throw into them a little malt-dust or bran; and this will not only finish their sweetening, but stop them from leaking.

But since there is so much trouble in getting vessels sweet after they have been neglected, you ought to make all thorough clean after brewing, and once a month to fill your vessels with fair water, and let it off again in two or three days.

Of Mashing or Taking your Liquors.

SUPPOSE you take six bushels of malt and two pounds of hops, and would make of it one barrel of strong, and two barrels of small beer. Heat your first copper of liquor for mashing, and strew over it a double handful of bran or malt; by which you will see when it begins to boil; for it will break and curl, and then it is fit to be let off into the mash-tun, where it must remain till the steam is spent, and you can see your face in it, before you put your malt in it; and then you begin to mash, stirring it all the while you are putting in the malt: but keep out half a bushel dry, which you are to strew over the rest, when you have done stirring it, which will be as soon as you have well mixed it with the liquor, and prevented it from clodding. After the dry malt is laid on, cover your mash-tun with the malt-sacks or cloths, to prevent losing any spirit of the malt, and let

let it so remain for two hours. Mean while have another copper of liquor hot ; and at two hours end begin to let off your first wort into the under-back. Receive a pailful of the first running, and throw it again upon the malt. You will find that the malt has sucked up half of your first copper of liquor ; and therefore to make up your quantity of wort for the strong beer, you must gradually lade out of the second copper, and strew bowl after bowl over the malt, giving it time to soak through, and keeping it running by an easy stream, till you perceive you have about forty gallons, which in boiling and working will be reduced to thirty-six.

If you throw into the under-back (whilst you are letting off) about half a pound of hops, it will preserve it from foxing, or growing sour or ropy.

Your first wort being all run off, you must fasten the tap of the mash-tun ; and take the copper of hot liquor for your second mashing, stirring up the malt as you did at first, and then cover it close for two hours more. Mean while you fill your copper with the first wort, and boil it with the remainder of the two pounds of hops, (or what quantity you like) for an hour and a half, and then lade it off into the coolers.

Contrive to receive the hops in a sieve, basket, or thin woolen bag that is sweet and clean ; then immediately fill your copper with cold liquor ; renew your fire under it, and begin to let off your second wort, and throw a handful of hops into the under-back, for the same reason as before : you will want to lade a few bowlfuls of liquor over the malt to make up the copper full of the second wort ; and when you have enough, fasten the tap, and mash a third time after the same manner, and cover it close for other two hours ;

hours; and then charge your copper with the second wort, boiling it for an hour with the same hops.

By this time you may shift your first wort out of the coolers into a working-tun, to make room for the second wort to come into the coolers: and then your copper being empty, you may heat as much liquor as will serve you to lade over the malt, or, by this time, rather grains, to make up your third and last copper of wort, which must be boiled with the same hops over again; and then your coolers are discharged of your second wort, to make room for the third; and when they are both of a proper coolness, they may be put together before you set them a-working, unless you have a mind to keep and work them separate, and call the second wort Ale.

If you would extract almost all the goodness of the malt in the first wort, by way of making *October* beer, you begin to let off soon after you have mashed, (by a small stream) and throw it upon the malt again, pail after pail, for an hour, stirring it frequently in the mean time, and then let it all run off, and put it all over again, and let off by a very small stream. But when you have your quantity for strong beer, you must proceed in your second mashing in the same manner as before.

During the time of shifting your liquors out of the copper, 'tis of consequence to take care to preserve it from receiving damage by burning: you should always contrive to have the fire low, or else to it at the time of emptying, and be very expeditious to put in fresh liquor.

Of Working the Liquor.

IN this, regard must be had to the weather; liquor naturally grows warm in working; therefore in
mild

mild weather it should be cold before it be set on, but a little warm in cold weather. The manner of doing it is, to put some good sweet yeast into a hand-bowel or piggin, with a little warm wort; then put the hand-bowel to swim upon the wort in the working-tub, and in a little while it will work out, and leisurely mix with the wort; and when you find the yeast has gotten hold of the wort, you must look after it frequently; and if you perceive it begins to heat and ferment too fast, lade some of it out into another tub; and when grown cold, it may be put back again; or if you reserved some of the raw wort, you may check it leisurely by stirring it with a hand-bowel. The cooler you work your liquor, the better provided it does but work well.

If you happen to check it too much, you may forward its working, by filling a gallon stone-bottle with boiling water; cork it close, and put the bottle into the working tun. An ounce or two of powdered ginger will have the same effect.

There are variety of methods in managing liquors whilst they are working. In the North they beat in the yeast of strong beer and ale once in two or three hours, for two or three days together. This they reckon makes the drink more heady, but withal hardens it so as to be drinkable in a few days; the last day of beating it in, (stirring the yeast and beer together) the yeast, as it rises, will thicken; and then they take off part of the yeast, and beat in the rest, which they repeat as often as it rises thick; and when it has near done working, they tun it up so as it may but just work out of the barrel. Others again do not beat it in at all, but let their strongest drink work about two days, or till they see the ferment is over; and then they take off the top-yeast, and either, by a tap near

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the bottom, let it off fine, or else lade it out gently, to leave the sediment and yeast at the bottom. This way is proper for liquor that is to be drank soon; but if it be to keep, it will want the sediment to feed on, and may probably grow stale, unless you make artificial lees. This you may make of a quart of brandy, and as much flour of wheat or beans as will make it into dough. Put them in lumps into the bung-hole as soon as it has done working or else take a pound of the powder of oyster-shells, or of fat chalk, and mix it with a pound of treacle or honey, and put it in soon after it has done working.

It would add to the goodness, as well as fining of your malt-liquor, if you took two quarts of wheat or beans, and made them very dry and crisp in an oven or before the fire, and boiled them in your first copper of wort. They would strain off with your hops, and might be put with them into the second copper.

Of the fining of Malt Liquors.

It is most desirable to have beer fine of itself, which it seldom fails to be in due time, if rightly brewed and worked: But as disappointments sometimes happen, it will be necessary to know what to do in such cases.

Ivory shavings boiled in your wort, or hartshorn shavings put into your cask just before you bung it down, will do much towards fining and keeping your liquor from growing stale.

Isinglass is the most common thing made use of in fining all sorts of liquors; they first beat it well with a hammer or mallet, and lay it in a pail; and then draw off about two gallons of the liquor to be fined upon it, and let it soak two or three days; and when it is soft enough to mix with the liquor, they take a whisk,
and

and stir it about till it is all of a ferment, and white froth; and they frequently add the whites and shells of a dozen eggs, which they beat in with it, and put all together into the cask: Then with a clean mop-stick, or some such thing, stir the whole together; and then lay a cloth or piece of paper over the bung-hole, till the ferment is over; and then bung it up close, and in a few days it will fall fine.

But if you want to fine only a small quantity of liquor, take half an ounce of unslacked lime, and put it into a pint of water, and stir them well together, and let it stand three or four hours, or till the lime settle to the bottom; then pour off the water clear, and throw away the sediment; then take half an ounce of isinglass cut small, and boil it in the lime-water till it dissolves; then let it cool, and put it into your vessel, &c.

Of recovering and preserving Malt-Liquors

STORMY weather, but especially thunder, will greatly affect your Beer, and often ferment it, though brewed six months before. Iron hoops, or iron laid upon the vessels, are supposed to have a preserving influence from thunder. In such weather you should examine your cellar, and draw your vent-pegs; and where you perceive it upon the fret, draw out the bung, and let it remain some days till you are sure it is quiet. It is a fault to be too hasty in bunging up liquor; it had better be a week too long out, than stopt an hour too soon. Were it not for preserving the colour of your liquor, some cherry-brandy thrown into the bung-hole would stop it from fretting.

If your strong beer grows flat, you may quicken it by drawing off one gallon out of every ten gallons, and boil it with as many pounds of honey as you

boil gallons; and when it is cold put it to the rest and stop it close.

A spoonful of the juice of the herb horehound strained to a pitcher of stale beer, (and cover it close for two hours) will make it drink like new.

Or if you would bottle beer that is stale and flat, you should contrive to do it at a time when you have liquor working in your tun; and leave room in every bottle to hold the quantity of a coffee-cup, and fill them up with new drink out of the tun, and cork them, and in three days it will be very brisk, and drink pleasant; but you must not propose to keep it long, for it will burst the bottles.

Of the Season for Brewing.

THE season for brewing keeping-beer, is certainly best before Christmas; for then your malt is in perfection, not having had time to contract either a musty smell, dust, or weavels, (an insect that eats out the heart of the malt) and the waters are then seldom mixed with snow; and then four pounds of hops will go as far as five pounds in the spring of the year; for you must increase in the quantity of hops as you draw towards summer. But, in short, chuse moderate weather as much as you can for brewing; and if you have a kindly cellar besides to keep your liquor in, that will not be much affected by extremity of cold or heat, you may reasonably expect great satisfaction in your brewery.

Avoid as much as possible brewing in hot weather; but if you are necessitated to brew, make no more than for present drinking, for it will not keep.

To brew Strong Beer.

To a barrel of beer take two bushels of malt, and half a bushel of wheat just cracked in the mill, and some of the flour sifted out of it; when your water is scolding hot, put it into your mashing-vat; there let it stand till you can see your face in it; then put your malt upon it; then put your wheat upon that, and do not stir it; let it stand two hours and a half; then let it run into a tub that has two pounds of hops in it, and a handful of rosemary-flowers; and when it is all run, put it into your copper, and boil it two hours; then strain it off, setting it a-cooling very thin, and set it a working very cool; clear it very well before you put it a-working; put a little yeast to it; when the yeast begins to fall, put it into your vessel; and when it has done working in the vessel, put in a pint of whole wheat, and six eggs; then stop it up: let it stand a year, and then bottle it.

A good table-beer may be made by mashing again, after the preceding is drawn off; then let it stand two hours, and let that run, and mash again, and stir it as before; be sure you cover your mashing-vat very well; mix the first and second running together.

To make China Ale.

To six gallons of ale take a quarter of a pound or more of China-root, thin sliced; and a quarter of a pound of coriander-seeds bruised; hang these in a tiffany, or coarse linen bag, in the vessel, till it has done working; and let it stand fourteen days before you bottle it; though the common sort vended about town, is nothing more (at best) than ten shilling beer
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put up in small stone-bottles with a little spice, lemon-peel, and raisins, or sugar.

To make Alderberry-Beer, or Ebulum.

TAKE a hoghead of the first and strongest wort, and boil in the same one bushel of picked alderberries, full ripe; strain off, and, when cold, work the liquor in the hoghead, and not in an open tun or tub; and after it has lain in the cask about a year, bottle it; and it will be a most rich drink, which they call Ebulum; and has often been preferred to port wine for its pleasant taste, and healthful quality.—*N. B.* There is no occasion for the use of sugar in this operation; because the wort has strength and sweetness enough in itself to answer that end; but there should be an infusion of hops added to the liquor, by way of preservation and relish. Some likewise hang a small bag of bruised spices in the vessel. You may make a white Ebulum with pale malt, and white alderberries.

To make improved and exceedingly wholesome Purl.

TAKE Roman wormwood two dozen, gentian root six pounds; calamus aromaticus, or the sweet flag-root, two pounds; snake root, one pound; a pound or two of galingale roots; horse radish one bunch; orange-peel dried, and juniper berries, each two pounds; seeds or kernels of Seville oranges, cleaned and dried, two pounds: these being cut and bruised, put them into a clean butt, and start your mild brown, or pale beer upon them, so as to fill up the vessel, about the beginning of November, and let it stand till the next season; and make it thus annually.

A
 COMPLETE SYSTEM
 OF
 DISTILLING.

PART IV.

OF MAKING AND REFINING BRITISH WINES.

To make Wine of Grapes of British Growth.

WHEN the vines are well grown, so as to bring full clusters, be careful to disencumber them of some part of their leaves, that too much shade the grapes; but not so in the hot season, that the sun may not too swiftly draw away the moisture and wither them: stay not till they are all ripe at once; for then some will be over-ripe or burst, or incline to rot before the underlings come to perfection; but every two or three days pick off the choice and ripest grapes, and spread them in dry shady places, on sideways, that they contract not a heat and must; and so those that remain on the clusters, having more juice to nourish them, will grow bigger, or will be sooner ripe; and when you have got a sufficient quantity, put them into an open vessel, and bruise them well with your hands; or if they be too

too many for you, gently prefs them with a flat wooden beater, that is, a thick board fastened at the end of a staff. As for treading of them with the feet, though used in other countries, I approve it not, it being a nasty, slovenly way. Take care you break the stones as little as may be, for that will make the wine of a bitterish tang.

Having bruised the Grapes well, so that they are become pulp, or mash, having a tap at the bottom of your cask, tie a hair-cloth over the faucet, and let out that which will run voluntarily of itself, as the best Wine: then take out the pulp, and gently prefs it by degrees in a cyder-press, till the liquor is sufficiently drained out; then having a new cask well seasoned, and aired with a lighted rag dipped in brimstone, till it become dry; pour the liquor in through a sieve-funnel, to stop the dregs, and let it stand only with a pebble-stone lightly laid on the bung-hole, to ferment and refine itself, ten or twelve days; then draw it gently off into another cask well seasoned, that the lees or dregs may remain in the first cask; and stop it no otherwise than before, till it is quite passed over its ferment, which you may know by its coolness and pleasant taste: And thus of your ordinary white grapes you may make a good white sort of wine; of the red grapes a claret; and if it want colour, heighten it with a little brazil, boiled in about a quart of it, and strained very clear. The white grapes, if not too ripe, give a good Rhenish taste, and are wonderful cooling; and a sort of Muscadel grapes growing in many parts of Britain, may, by the help of a little loaf-sugar to feed on, be brought to produce a agreeable sweet wine, little differing from Canary, and altogether as wholesome and pleasant; so that with small charge, labour and industry we might well furnish ourselves with what we now are beholden for to strangers,

strangers, at great expence, hazard of the seas, and a vast deal more toil and labour than this would require.

Another way to make an excellent Wine of Grapes

TAKE ripe grapes gathered in a dry day, and put them into a press made for the purpose, with a fine canvas to contain the grapes; then press them gently so as not to break the stones; then strain the liquor well, and let it settle in a cask; then draw off the clear liquor with a syphon into a well-seasoned vessel; stop it close for forty-eight hours; then give it vent by a hole made with a gimblet, in the thickest part of the vessel or cask, and put therein a peg which may be easily moved; then in two days time stop it close up, and it will be fit for drinking in about a quarter of a year's time, and not fall far short of French wine in goodness. To season your cask or vessel, take scalding hot water, put it into the vessel, and then dry it with a rag dipt in brimstone, and fix it in the cask with the bung or cork.

English Malmsey.

TAKE of English galingal and cloves, each a dram beat them to powder, and infuse them a day and a night in a pint of aqua vitæ, in a wooden vessel kept close covered; then put it into good claret, and it will make twelve or fourteen gallons of good malmsey, in five or six days: the drugs may be hung in a bag in the cask.

To make Raisin Wine.

TAKE three hundred pounds of Malaga raisins not
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picked; put them into a hoghead of spring water; let it stand a fortnight, stirring it twice a day; then press it into a tub, and put to it a piece of bread toasted, and spread with yeast, and let it ferment twenty four hours; afterwards put the liquor into a vessel, where it may work fourteen days longer; fill it up again as it works over, and when it has done working, stop it close up. You may put eighteen gallons of water upon the raisins for a small wine, and press it out in a week's time: you may bottle it off when it is about two months old.

Another Raisin Wine.

TAKE two gallons of spring water, boil it about half an hour; put it into a stean with two pounds of raisins stoned, as much sugar, the rind of two lemons, and the juice of four lemons; then cover the stean, and let it stand four or five days; afterwards strain it out, and bottle it. It will be fit for drinking in a fortnight's time, and be a pleasant liquor to quench one's drought in the summer.

To make Strawberry, Raspberry, and Cherry-Wine.

MASH your strawberries or raspberries, and put them into a linen bag, as you do when you make the grape-wine, and press them into a cask, and order it in the same manner as the grape-wine. Thus cherry-wine may be made: you must break the stones of the cherries, which is not done in the grapes.

To make a Wine like Claret.

TAKE six gallons of water, two gallons of cyder, eight pounds of Malaga raisins bruised; put them
all

all together, and let them stand close covered in a warm place for a fortnight, stirring it every other day very well; then strain out the liquor into a vessel, and put to it a quart of barberries, a pint of the juice of raspberries, and a pint of the juice of black cherries; work it up with mustard seed, cover it with dough three or four days by the fire side; then let it stand a week, and then bottle it off; and when it becomes neat, it will be like common claret.

To make a Wine almost equal to Sack.

To every quart of water put a sprig of rue, and to every gallon a handful of fennel roots; boil them all half an hour; then strain it out, and to every gallon of this liquor put three pounds of honey; boil it again two hours, scum it well, and when it is cold, pour it off, and tun it into a cask; keep it in the vessel a year, and then bottle it off for drinking.

To make Currant Wine.

TAKE currants when they are ripe, bruise and strain them; dilute it with an equal quantity of water boiled with fine sugar, a pound to each gallon of liquor; dissolve in the liquor half an ounce of isinglass to every four or five gallons of liquor, and there will arise a thick scum; which being taken off, your liquor will be pretty clear; draw it off into a close vessel; it will finish its working, and become quite clear in three weeks or a month's time; then it may be bottled with a lump of loaf sugar. The longer it is kept, the richer it will be.

To make Gooseberry Wine.

To every four pounds of gooseberries put a pound and a quarter of sugar, and a quart of spring water; bruise the gooseberries, and let them stand in the water twenty-four hours, stirring them often; then press out the liquor into a proper vessel, that it may ferment; and when it has done, stop it up, and let it stand about a month; then rack it into another vessel for five or six weeks longer; after which bottle it off and put a small lump of sugar into each bottle; cork them well, and then let them stand about a quarter of a year before you drink them.

To make Damascene Wine.

TAKE two pounds and a half of sugar to every gallon of water; boil and scum it for about two hours and to every gallon of liquor put five pints of stoned Damascens; boil them till it is of a beautiful colour; then strain it through a sieve; let it work in an open vessel four days; pour off the lees, and then put it into the same vessel again, to finish the fermentation, and afterwards stop it close for six or eight months; and then, if it is clear, you may bottle it up. You may keep it a year or two in bottles.

To make Cowslip Wine.

TAKE a quantity of water, and to every gallon put two pounds of sugar; boil it about an hour, then let it cool; make a toast, and spread both sides of it with yeast; but you must, before you put it into the liquor, add to every gallon an ounce and a half of syrup of citron; beat it well in; then put in the toast
whil

while it is warm ; let it work for two or three days ; in the mean time put in your cowslip-flowers, bruised a little, about a peck, together with two lemons sliced, a pint of white wine to a gallon ; let them stand two days, and afterwards turn it into a sweet cask.

To make Black Cherry Wine.

TAKE six gallons of spring water, boil it an hour ; then take twenty-four pounds of black cherries bruised ; take care not to break the stones ; pour the boiling water upon the cherries, and stir them well together ; and after they have stood twenty-four hours strain it, and to every gallon put two pounds of sugar ; mix it well, and let it stand a day longer ; then pour off the clear into a vessel, and keep it close stoppt ; when it is very fine bottle it off for drinking.

To make Sage Wine.

TAKE six gallons of water, boil it a quarter of an hour ; then let it cool till it is blood-warm, and put twenty-five pounds of Malaga raisins picked and rubbed clean ; shred them into the water, together with half a bushel of red sage shred, and a pint of ale yeast ; stir them all well together ; let them stand covered in a warm place six or seven days ; stir it once a day ; then strain it into a cask, and after it has worked three or four days, stop it close up, and let it stand about a week longer ; then put in it two quarts of Malaga wine ; and when it is fine, bottle it.

To make Wine of Quinces.

TAKE quinces, clean them with a coarse cloth, and
grate

grate them with a grater ; press them through a linen strainer, and afterwards through a flannel : to every gallon of liquor put two pounds of refined sugar ; and when the sugar is melted, pour it off as often as there is a settlement at the bottom ; continue doing thus twenty-four hours ; and when it is fine, put it into a cask ; let it remain a week unstopt ; then stop it up close for six months , then if it is fine, you may bottle it ; but if not, you must draw it into another vessel and stop it up again.

To restore Pricked Wines.

TAKE the wine down to the lees in another cask, where the lees of good wine are fresh ; then take a pint of strong *aqua vitæ* ; scrape half a pound of yellow bees' wax into it, and by heating the spirit, melt the wax over a gentle fire ; then dip in it a cloth, and set it on fire with a brimstone match ; put it flaming in at the bung, and stop the cask close :

To restore Wine decayed by too much vent or souring.

STIR and ferment it well with a flat-ended stick, till you have removed it in all parts, and made it ferment, but touch not the lees ; then pour in a pint of *aqua vitæ*, and stop it up close, and at the end of ten days it will be tolerably restored. Wine that is decayed by too much vent, may be recovered by putting burning hot crusts of bread into it.

To cure musty Wine, or that which tastes of the Cask.

RACK it off upon lees of rich wine of the same sort ; then put into a bag four ounces of the powder of lenerel berries, and two ounces of the filings of steel ;

steel ; let it hang by a string to the middle of the wine, and so by degrees lower it as you draw it off.

To binder Wine from turning.

PUT a pound of lead, that has been melted into fair water, into your cask pretty warm, and stop it close.

To take away the ill Scent of Wine.

BAKE thoroughly a long rowler of dough stuck well with cloves, and hang it in your cask, and it will draw the ill scent from the wine to itself.

To remedy a bitter or sour Scent.

TAKE half a peck of barley, and boil it in two quarts of water, till one half of the water be wasted ; strain it, and when well settled, pour it into the wine cask, stirring it well, without touching the lees.

To keep Wine from souring.

BOIL a gallon of wine with some beaten oyster-shells, and crabs' claws calcined ; strain out the liquid part, and when it is cool, put it to the wine of the same sort, and it will give it a pleasant and lively taste. A stone of unslacked lime will keep wine from turning.

To sweeten Wine

FILL it upon the lees ; put a handful of the flowers of clary, and infuse in it, and add a pound of mustard-

mustard-feed dry ground, which in a bag must be sunk to the bottom of the cask.

To make Wine settle well.

TAKE a pint of wheat, and boil it till it burst in a quart of water, and become very soft ; then squeeze it through a new linen cloth, and put a pint of the liquid part into a hoghead of unsettled white wine, and it will fine it.

To make Claret rough.

PUT a quart of claret to two quarts of flocs ; bake them in a gentle oven, till they have stewed out a great part of their moisture ; then pour off what is liquid, and squeeze out the rest ; and half a pint of this will rough ten gallons.

To recover the lost Colour of White or Rhenish Wine.

RACK the wine from the lees, and if the colour of the wine be faint and tawney, put in coniac lees, and pour the wine upon them, rolling and jumbling them together a considerable time in the cask ; and in ten or twelve days rack off the wine, and it will be of a proper colour, and drink brisk and fine.

To help Wine that is lowering or decaying.

TAKE roch-allum powdered an ounce, draw out four gallons of the wine, and strew the powder in it ; beat it well for the space of half an hour ; then fill up the cask, and set it on broach, being careful to let it take vent ; so that by these means in three or four days you will find it an agreeable brisk wine.

How

How to rack Wine.

THIS is done with such instruments as are useful and appropriated to the manner of doing it, and cannot be so well described by words, as by seeing it done; however, this observe in doing it: Let it be when the wind sets full north, and the weather is temperate and clear, that the air may the better agree with the constitution of the wine, and make it take more kindly; as it is moreover most proper to be done in the increase of the moon, when she is under the earth, and not in full height, &c.

To give Wines an agreeable Flavour.

TAKE powder of sulphur two ounces, half an ounce of calamus; incorporate them well together, and put them into a pint and half of borage-water; let them steep in it a considerable time, and then, drawing off the water, melt the sulphur and calamus in an iron pan, and dip in it as many rags as will soak it up; which put into the cask; then rack your wine, and put in a pint of rose-water, and, stopping the hoghead, roll it up and down half an hour; after which let it continue still two days; and by so ordering any Gascoign or red wine, it will have a pleasant scent and gust.

To mend Wines that rope.

WHEN you have set your cask abroach, place a coarse linen cloth before the bore; then put in the linen, and rack it in a dry cask; add then five or six ounces of the powder of alum; then roll and jumble them sufficiently together; and, upon settling,

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ting, it will be fined down, and prove a very clear, pleasant wine, both in taste and scent.

To mend White or Rhenish Wines.

IF these wines have an unpleasant taste, the best way is speedily to draw either of them half off, and to either of the halves put two gallons of new milk, and a handful of bay-salt, and as much rice; mix and beat them well together, for half an hour, with a staff or paddler; then fill up the cask, and when you have well rolled it, turn it over in the lees; and two or three days after you may broach it, and it will drink very fine and brisk.

Another Way to mend the Colour of White Wines, &c.

TAKE a gallon or more of morning's milk, put it into the cask, and mix it well by rolling; then, when you perceive it is well settled, put in two or three ounces of ising-glass, and about a quarter of a pound of loaf sugar, fine scraped; and then fill up the hoghead, or other cask, and roll it four or five times over, and this will bring it to a colour and fineness.

To meliorate vitiated Wine.

LET your wine be what it will; take a pint of clarified honey, a pint of water, wherein raisins of the sun have been well steeped; three quarters of a pint of good white wine, or claret, according as the colour of your wine is; let them simmer, and boil a little over a gentle fire, to the consumption of a third part, taking off the scum as fast as it rises; put it very hot into the vitiated wine, and let it stand,

stand, the bung-hole being open ; then, in a linen rag, put a little bruised mace, nutmeg, and cloves, and hang the bag in the wine, by a string, for three or four days ; and so either new or old wine will not only be fined, but much bettered ; for by these means they are restored from their foulness and decay, and yield a good scent and taste : you may, to perfect this work the more, when you take out the spice, hang in a small bag of white mustard seed, a little bruised, and the work is done.

To make Ice in Summer, for cooling Wines, &c.

To make ice, take a stone bottle that will hold about three quarts of water, put into it two ounces of refined salt-petre, half an ounce of Florence or-rise, and fill it with water boiling hot ; stop it close, and immediately let it down into a well ; let it remain there three or four hours, and when you break the bottle, you will find it full of hard Ice ; or for want of this opportunity, dissolve a pound of nitre in a bucket of water, and it will cool your bottles exceedingly.

An excellent way to make and order Cyder.

TAKE red-streaks, pippins, pearmains, rennetings, golden-pippins, &c. when they are so ripe, that upon shaking the tree they will fall with tolerable ease ; bruise or grind them very small, and when they are come to a mash, put them into a hair-bag, and squeeze them by degrees, not over hastily ; then put up the liquor, well strained through a fine hair-sieve into a cask well seasoned, and aired with a lighted rag dipped in brimstone ; then mash the pressings with a little warm water, and add a fourth of it,

when pressed out, to the cyder; and to make it work kindly heat a little honey, three whites of eggs and a little flour together; put them into a fine rag and hang them by a string to the middle of the cyder-cask; then put in pretty warm, about a pint of new ale-yeast; let it work, and well purge itself from dross five or six days; then draw it from the lees into smaller casks, or into bottles, as your occasion serves; if the latter, leave an inch vacant from the cork, lest the bottles fly or break; and, if any such danger appears, which you may perceive by the singing of the air through the porous parts of the corks, then it will be requisite to open them, to let out the fermented air. In winter, cover the casks or bottles warm, for fear of freezing or chilling; but in summer place them as cool as you can, lest the heat make it ferment, so that it taint, become musty, grow thick or ropery; and that it may the better feed, and keep its body, put small lumps of loaf sugar into it.

Summer Cyder for present spending.

TAKE codlins, or other juicy summer apples, not too sweet; or, if they be, allay them with those that are sharper; gather them not too ripe, but when they begin to turn; and lay them to sweat in hay or straw, for two or three days; then quarter them and take out the cores and kernels; then bruise and press them as the former; boil some sliced codlins, and sliced quinces in fair water, with a few tops of rosemary, and blades of mace; and mash this water with the pressings of the apples; press it out as before, and mix one fourth part with the cyder; put it up, and add two quarts of white or Rhenish wine to every twelve gallons; purge it
as

as the former ; draw it off when settled, and keep it cool for present spending, for it will not keep longer than September. Some think the cyder will be better if the apples are not cored.

Another Receipt to make good Cyder.

TAKE pippins or pearmains, or harveys, before they are too ripe, and let them ly a day or two in order to sweat ; grind them, and press out the juice, and put it presently into a hoghead, leaving it room to work ; let it have no vent, except a little hole near the hoops ; put in three or four pounds of raisins, and two pounds of sugar, to make it work the better ; rack it often, in order to fine it, into small vessels, close stopt, except a small hole as before : If it works after it is racked off, put into the vessel a few raisins for it to feed on, and bottle it off about March.

N. B. You must never mix summer and winter fruit together. But if you would have your cyder stronger than the common method of making it, put your apples into a lever-press, and squeeze them gently, and but little, and then let it work as before.

To make Perry.

TAKE pears that have a vinous juice, such as the gooseberry-pear, horse pear, both red and white ; the john, the choke-pears, and other pears of the like kind ; take the reddest of the sort ; let them be ripe, but not too ripe, and grind them as you do your apples when you make cyder, and work it off in the same manner ; if your pears are of a sweet taste, mix a few crabs with them.

To

To make Mum.

TAKE a hogthead of water, boil away about a third part, and brew therewith seven bushels of wheat-meal, one bushel of oat meal, and one bushel of ground beans; tun it, but do not fill the vessel too full at first; as soon as it begins to work, put therein of the inner rind of fir three pounds, tops of fir and birch one pound, *carduus benedictus* three handfuls, flowers of rosa folis one handful and a half, alder-flowers two large handfuls, cardamum-seeds bruised three ounces, barberries bruised one ounce: Let the liquor work over the vessel as little as may be; then fill it up and stop it; having first put into it ten new-laid eggs, not broken nor cracked; stop it close and drink it when it is two years old.

To make Mead.

TAKE six gallons of water, put in the whites of three eggs, mix them well together, then add ten pounds of the best honey; boil them together about an hour, and then put in cinnamon, cloves, and mace, a sprig of rosemary: When it is cool, put in a spoonful of yeast, and put it in a barrel, and, as it works over, keep filling the vessel; when it has done working, stop it up close; and when it is well settled down, bottle it for drinking.

To make Metheglin.

TAKE spring water as much as you please, make it so strong with honey as that it will bear an egg; boil it very well till a good part be wasted, and
whilst

whilst it boils, put in a good quantity of whole spice, rosemary, balm, and other cordial and agreeable herbs; when it is well boiled, let it cool, having strained it from the herbs and spice; when it is almost cold put in a little yeast; and when it is cold, put it into a vessel, with the spice that was boiled therein; let it stand a few days, then bottle it up.

To make Shrub.

TAKE brandy two quarts, the juice of five lemons, and the peels of two lemons, half a nutmeg; mix them together in a large bottle, stop close, and let them stand three days; then put in three pints of white wine, and a pound and a half of sugar; mix and strain twice through a flannel, and bottle it up for use.

THE END.