THE
COMPLETE
DISTILLER:
CONTAINING,

I. The Method of performing the various Processes of Distillation, with Descriptions of the several Instruments: The whole Doctrine of Fermentation: The manner of drawing Spirits from Malt, Raisins, Molasses, Sugar, &c. and of rectifying them: With Instructions for imitating to the greatest Perfection both the Colour and Flavour of French Brandies.

II. The manner of distilling all Kinds of Simple Waters from Plants, Flowers, &c.

III. The Method of making all the compound Waters and rich Cordials so largely imported from France and Italy; as likewise all those now made in Great Britain.

To which are added,

Accurate Descriptions of the several Drugs, Plants, Flowers, Fruits, &c. used by Distillers, and Instructions for chusing the best of each Kind.

The Whole delivered in the plainest manner, for the Use both of Distillers and Private Families.

By A. COOPER, DISTILLER.

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M.DCC.LVII.
THE

PREFACE.

It is now some Years since I first formed a Design of compiling a complete System of Distillation; and accordingly read most of the Treatises on that Subject, and extracted from each what I thought necessary for my Purpose, proposing to supply the Defects from my own Experience. It is, however, more than probable, that this Design had never been executed, had not a French Treatise of Distillation, fell into

* This Treatise is intitled Traité Raisonné de la Distillation; ou La Distillation réduite en Principes: Avec un Traité des Odeurs. Par M. De' Jean, Distillateur. Printed at Paris, in the Year, M.DCC.LIII.
into my Hands; but finding in that Book many useful Observations, and a great Number of Recipes for making various Sorts of compound Waters and Cordials, I determined to finish the Work I had begun, being now enabled to render it much more useful than it was possible for me otherwise to have done. What I have translated from this Author, will, I dare say, be kindly received by our Distillers, as the manner of making many of the foreign Compound Waters, &c. has never before been published in the English Language. And I flatter myself, if the several Hints interspersed through this Treatise are carefully adverted to, Distillation may be carried to a much greater Degree of Perfection than it is at present; and the celebrated Compound Waters and Cordials of the French and Italians, imported at so great an Expence, and such Detriment to the Trade of this Nation,
P R E F A C E.

Nation, may be made in England, equal to those manufactured abroad.

My principal Intention being to render this Treatise useful to all, I have endeavoured to deliver every thing in the plainest and most intelligible Manner. Beauty of Stile is not, indeed, to be expected in a Work of this Nature; and therefore if Perspicuity be not wanting, I presume the Reader will forgive me, if he meets with some Passages that might have been delivered in a more elegant Manner. I have also, for the same Reason, avoided, as much as possible, Terms of Art, and given all the Recipes in Words at length.

Distillation, tho' long practised, has not been carried to the Degree of Perfection that might reasonably have been expected. Nor will this
 PREFACE.

this appear surprizing, if it be considered, that the Generality of Distillers proceed in the same beaten Track, without hardly suspecting their Art capable of Improvements; or giving themselves any Trouble to enquire into the Rationale of the several Processes they daily perform. They imagine, that the Theory of Distillation is very abstruse, and above the Reach of common Capacities; or, at least, that it requires a long and very assiduous Study to comprehend it; and, therefore, content themselves with repeating the Processes, without the least Variation. This Opinion, however ridiculous it may appear to those not acquainted with the present Practice of Distillers, but, I am satisfied, been the principal Cause why Distillation has not been carried to the Height it would otherwise have been. I have therefore endeavoured in the following Treatise to destroy this idle Opinion, and show
PREFACE.

The Distiller how he may proceed on rational Principles, and direct his Enquiries in such a manner as cannot fail of leading him to such Discoveries in his Profession, as will be attended with Advantage both to himself and his Country.

But it is not to those only who make Distillation their Profession, that I have laboured to render this Treatise useful; I have also endeavoured to extend its Utility to those who distil Simple and Compound Waters for their own Use, or to distribute to their indigent Neighbours. And for this Reason I have adapted most of the Recipes to small Quantities, and briefly enumerated the Virtues and Uses of each Composition.

The short Descriptions of the most capital Ingredients, and the Directions for choosing the best of each Kind,
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Kind, I flatter myself will not be considered as improper: Because the Goodness of every Composition, must, in a great Measure, depend on the Goodness of the Ingredients.

As Typographical Errors are almost impossible to be avoided, the Reader will, I hope, pardon any he may chance to meet with in the ensuing Treatise; and the rather as, I dare say, there are none but what he may himself very easily correct.

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A Complete System of Distillation.

Distillation is the Art of separating, or drawing off the spirituous, aqueous, and oleaginous Parts of a mixt Body from the groffer, and more terrestrial Parts, by means of Fire, and condensing them again by Cold.

We shall therefore divide this Treatise into three Parts; in the first, we shall explain the Method of distilling Spirits from various Substances; in the second, the manner of drawing simple Waters; and in the third, the best Methods of making cordial or compound Waters.
Of the Distillation of Spirits.

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 the means of a previous Fermentation, and a subsequent Treatment of the fermented Liquor by the Alembic, 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.
of Distillation.

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 vegetable 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 in England, though 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 fermentated.

But in order to brew with Malt to the greatest Advantage, the three following Particulars should be carefully attended to: 1. 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
should be reduced to a kind of coarse Meal; for Experience has shewn, that by this means, the whole Substance of the Malt may, through 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 the 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 to 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 Sullage of populous Towns. But whatever
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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 it too little be used, a viscid clammy mixture will be produced,
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 the Summer, the Water applied to the Malt must be colder than in the Winter; and in hot sultry Weather, the
of Distillation.

The Tincture must be suddenly cooled, otherwise it will 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.

CHAP. 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.

By Fermentation is meant that intefline 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 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, Connexion, 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 Connexion 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 spongy Matter.

When these compound Particles are diluted with a small Quantity of an aqueous Fluid, they feel slippery, clammy, 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 Subject 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...
come 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 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 this Commotion; for, by this 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 Particle, loosens the others, and finally produces a Separation of the original Connexion 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 neither give a sufficient Impulse on the compound Corpuscles, which are groser than its own constituent Particles, nor divide the oily or saline Particles of the Subject from their Connexion with the others, which detain, and, as it were, envelope, or defend them from its Action.