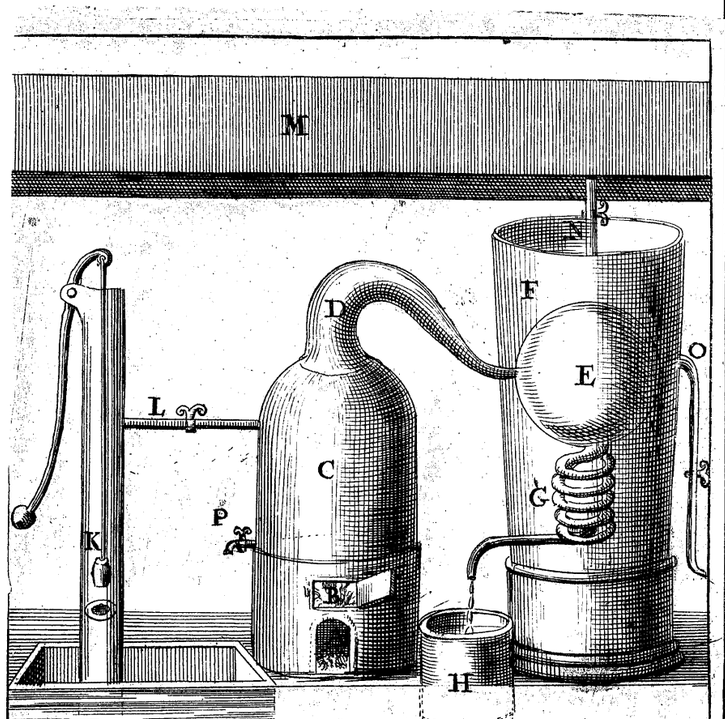
33-1



A *The Ash Hole*
B *The Fire place*
C *Ye Body of ye Still*
D *The Swan Neck*
E *The Globe for receiveing ye vapour*
F *The Tub fill'd with water*
G *The Worm issuing from the Globe*
H *Ye under Back for receiveing ye Spirit*
I *The Wash Back*
K *The Pump for throwing Wash into the Still*
L *The Pipe conveying the same*
M *The liquor Back*
N *a Pipe for conveying of liquor into ye Tub*
O *a Pipe for discharging the liquor as it grows hot*
P *A Cock to draw of ye Distilld (Wash*

THE

Practical Distiller:

Or, a Brief

TREATISE

OF

Practical Distillation.

In which the DOCTRINE of

FERMENTATION

Is Methodically Explain'd in a New Method.

WITH THE

Description of a New ENGINE-STILL,

Engraved on a Copper-Plate; which, for its Dispatch of Business, is preferable to any other.

To which is added, by way of Appendix,

A TREATISE of making Artificial Wines from several Fruits of the *British* Production, interspers'd with many useful Reflections and Observations.

LONDON:

Printed for B. LINTOT, at the *Cross-Keys*, between the Two *Temple-Gates*, in *Fleet-street*. MDCCXVIII.

Price One Shilling.

THE

CONTENTS.

Of

Of DISTILLATION.

SPECULATIVE and Practical Knowledge being vastly different, my Purpose here is to treat of the Practical Part of Distillation: The Speculative Part of it has, I confess, been very Ancient; yet an unactive Theory cannot acquire those Advantages that practical Experience does. This gradually improves by sensible and visible Effects, thus gaining by Time many new Illustrations: Which Illustrations represent it still capable of further Improvements, as the subsequent Sheets, I presume, will evidently demonstrate. And these Improvements, or Practical Experience, are

are the moſt convincing Proof of Truth that Human Wit can give.

The Animal, Vegetable, and Mineral Kingdom afford a great Variety of Subjects aſſignable for this Uſe; and indeed if we traverſe the ſpacious Field of Nature, we may obſerve almoſt every thing fit for the ſame: For not only in the diſtinct Provinces of Animals, Vegetables, and Minerals, we may conſpicuouſly diſcern the Motions and Effects thereof; but the whole World of Sublunary Bodies is one and the ſame Compoſition powerfully impregnated with fermentatious Particles, which in every Region and Corner are in a perpetual Motion; from which the Formation, Decay, and Tranſmutation of Bodies depend: For not only in the Bowels of the Earth, and in the Waters, the Corpuſcles thereof are plentifully diffus'd; but they are likewiſe expanded through the whole Atmoſphere of Air.

Diſtil-

Diſtillation then being an Art by which the Quinteſſential Particles, and moſt Exalted Eſſences of Bodies, are extracted from the more groſs and terrene Parts of Animals, Vegetables, and Minerals; and Fermentation being the principal Matter on which that Art depends, eſpecially in relation to the Vegetable Kingdom; I ſhall wave treating of the other Two, as foreign to my Intention, and proceed to demonſtrate the Manner and Nature of Fermentation, and how its Operation is perform'd, that the Rudiments of this Art may be more readily explicated.

Of FERMENTATION *artificially perform'd.*

IN the Works of Art, ſo various and manifold a Proviſion is obſerv'd in Fermentation, that it is wholly impoſſible to enumerate every Species, or to reduce them to any determinate Order.

However, according to our Obſervation, we ſhall affix ſome remarkable Examples, conformable to which many other Phœnomena may be accounted for.

As to that Part of Fermentation, which in proper Subjects is accompliſh'd by Human Induſtry, theſe Three Things are firſt to be conſider'd.

Firſt, Of what Nature and Compoſition are thoſe Bodies, which are moſt fit for Fermentation, and thoſe which are partly the Reverſe thereof.

Secondly, What are thoſe Things which are moſt requiſite for promoting or intercepting the Motion of Fermentation.

Thirdly, How different is the Motion and the End of Fermentation, as alſo what are the Effects and Alterations conſequential thereto.

As to the Firſt Propoſition requir'd in Bodies when tending to Perfection, that their Fermentation may be regular,

there ought to be ſome heterogeneous or diſagreeing Particles therein; otherwiſe thoſe fermentatious Particles, included in that Body, are not ſo readily capable of expanding themſelves. Thus in Compact or Solid Bodies, or in thoſe endow'd with a glutinous Quality, Fermentation does not ſo readily ſucceed; but thoſe which are of a liquid Nature, as Wine, Beer, the Juices of Fruits and Herbs, very readily ferment. Next to theſe, are thoſe Things endow'd with a ſoft, tho' thicker Conſiſtence, as Bread, many Eatables, and Phyſical Compoſitions.

In the Second, 'Tis requir'd there may be a Diſſonancy of Parts, or a Confuſion of all the Principles together; to wit, that ſome Particles may reſiſt others, and excite them to Motion. For the moſt Simple Bodies are the leaſt apt for Fermentation, by reaſon thoſe Particles, which are coherent in their Nature, lye generally ſluggiſh and inactive: But in thoſe endow'd with diſagreeable Qualities, there is an

immediate Conflict for Power; and ſome being repugnant to others, excite them to Motion.

The Third Condition is, That in a Body to be thus fermented, there ought to be neither too much Crudity, nor Maturity. In the firſt, thoſe active and ſubtile Particles are not ſo readily diſengag'd from the groſſer; nor are they ſo fit for Motion, as is evident in Juices expreſs'd from unripe Fruits. In the other Sort, the Particles being render'd too volatile, are not contain'd in the Bond of Mixture; but immediately evaporate, and turn themſelves to Putrefaction. Hence Juices expreſs'd from Fruits too ripe, do not ſo readily change into a Vinous Nature, but they as ſoon corrupt and decay.

As to the Second Propoſition, there are many Ways by which Fermentation is either hinder'd or promoted; the Principal of which is, that there may be an Addition of ſome proper Ferment to that Body which is to be fermented, whoſe Particles, when they are

are firſt put in Vigor and Motion, rouze thoſe which are ſluggiſh and inactive. In this manner, Yeſt, Eggs beaten, and the like, promote an entire Fermentation in Bodies adequate thereto; and to which may be juſtly aſcrib'd the Nitrous Particles of the Air inſinuating themſelves in the Pores of the Fluid rarified by Motion, whereby Fermentation in general is very much hinder'd or promoted: Which Aſſertion is manifeſted by the *Southern* and *Northern* Winds heating or cooling the Atmoſphere; the one by its Warmth giviug a remarkable Impreſs to the Motion of Fermentation; and the other, by conſtipating the Aerial Particles, not only prevents, but even hinders its progreſſive Power.

As to the Third Propoſition; Altho', properly ſpeaking, the Motion of Fermentation is only a Verſion of confus'd Principles from a State of Crudity to Maturity; and the Completion thereof, no more than the Tendency of any Thing to its ultimate Perfection: Yet by

by frequent Practice, this Denomination is attributed to many other Motions, and far more different Effects.

When therefore the fermentatious Particles of any Body are evidently in Motion, the Alterations arising from thence may, in some measure, be referr'd to these Heads:

First, Either the Exaltation and Perfection of the Parts of the same Body are observ'd, or its Dissolution and Corruption compleated. Or,

Secondly, There is either intended a Dissolution of the Parts of the same Body, or a Precipitation of the Parts of another already dissolv'd.

It now remains, that I briefly treat of the Motions of Fermentation.

Of Fermentation, *as it is observ'd in the Exaltation of Bodies, and their Tendency to Perfection.*

THE Exaltation of Parts is most conspicuously discern'd in those Things destin'd to Human Use, in as much as by Fermentation they obtain a greater Vigor and Perfection; as are, first, Aliment and Medicines, in many of which we endeavovr to extract the Spirituous Parts from the rest; and therefore study to procure a pleasant and grateful Taste, and other engaging Qualities, as is observable in Bread, Beer, Wine, Cyder, and many other Things: But in some, the Spirituous Parts being depress'd, we attempt to extract the Saline, as in Vinegar, Hydromel, Broths, Pickles, and Preserves, which consist of Salt or acid Liquors. Amongst the Aliments applicable to Human Use, Bread, Beer, Wine, Cyder, *&c.* deserve the first Rank: For whatsoever

ſoever they have of Virtue or Power, may be moſt juſtly aſcrib'd to Fermentation; the Efficacy of which is evidently prov'd by the following Experiment.

Take the ſtrongeſt Wort that can be got; diſtil, and nothing ſhall ariſe, but only a ſimple or inſipid Water, totally enervated of Spirits and Power: But if the ſame Wort ſhould be firſt duly fermented, and then diſtill'd; in the firſt Diſtillation there wou'd aſcend a ſtrong Water, which by re-diſtilling, there is obtain'd a Spirituous Fluid diveſted of its groſſer Particles. I inſert this, to prove the abſolute Neceſſity there is of Fermentation for extracting the Spirituous Particles of thoſe Bodies, without which there is no Poſſibility of obtaining them.

Fermentation then being an inteſtine Motion of Particles, or the Principles of any Body tending to the Perfection of the ſame Body, or its Mutation into another; ſo the Elementary Particles being either naturally or occaſionally urg'd

urg'd into Motion, remarkably move themſelves, or are mov'd by others, the ſubtile and more active Particles every way expanding themſelves, and endeavouring to evaporate; which, as they are entangled by the groſſer, are detain'd in their Flight: In the Interim, the groſſer themſelves being very much attenuated by the Conflict and Expanſion of the ſubtile, till each being elevated to their moſt exalted State, either procure a due Perfection to the Subject, or elſe accompliſh thoſe Alterations and Changes deſtin'd by Nature.

Fermentation then being ſo eſſentially neceſſary for unfettering the Parts of that Body, whoſe Spirituous and Sulphureous Particles are imperceptible till aſſiſted thereby; I now come to explicate what the Spirituous and Sulphureous Particles conſiſt of, when their Bodies are thus opened by a previous Fermentation.

Of the Motion of Fermentation, *as it is obſerv'd in the Decay, Putrefaction, and Corruption of Bodies.*

NAtural Bodies impregnated with a moderate Portion of Spirit, Salt, and Sulphur, continue not long in that State: But thoſe active Principles are perpetually inclin'd to Motion; for when they firſt unite from a State of Crudity and Confuſion, there is a progreſſive Motion to Perfection; by means of which, when they arrive to their moſt exalted State, they continue not long in that Poſition, but from thence haſten to a Diſſolution of the ſame Subject. And thoſe Things which are endow'd with the greateſt Volatility, the Bond of Mixture being diſcover'd, they firſt break forth, afterwards the reſt ſeparate into Parts, till the Form of the Compoſition is totally alter'd: The Spirit arriving to its moſt exalted Perfection, firſt evaporates, with

with a Portion of the Aqueous Particles and a purer Sulphur, diffuſing a pleaſant and grateful Odour: Afterwards the groſſer Sulphur, with the Salt, being ſeparated from that Power which confin'd it, ſuffering a Flux, gradually evaporate; and thus united, occaſion a fœtid and ungrateful Smell. Together with theſe are the watry Parts conſum'd, which change the Texture of the Subject into a *Caput Mortuum*, or *Terra Damnata*.

The Proceſſes of this Sort are demonſtrated in Subjects either Natural or Artificial. Concerning Natural Things, a Separation of the Elements, and their Diviſion into Parts, from hence owe their Beginning, as well in the Corruption of living Bodies, or the Extinction of Life and Vegetation, as well as in their Reduction to Putrefaction.

InVegetables, as Accretion and Maturity depend upon the Unition and mutual Adheſion of their Principles; ſo their Declination and Decay are dependant

on their Separation and Diviſion. In Plants and Fruits, from a crude Juice, and acid Spirit, and Sulphur, gradually exalted, they come to Maturity, on which the Sweetneſs, Smell, and delightful Colour depend. From thence the Spirit and Sulphur, with the other Elements gradually evaporating, they are ſoon reduced to Rottenneſs and Decay: If afterwards the more ſubtiliz'd and pure Particles of their Spirits and Sulphur evaporate, and there yet remains a Portion of Earth and Salt with an Equality of Sulphur, the Matter then does not ſo readily putrify, but changes and withers. But if the Salt and groſſer Sulphur, ſuffering a Flux together with the other elementary Particles, diſengaging themſelves from the Subject, the Bond of Mixture being divided, preſently the external Humidity remaining, exerts its Power, and turns that Body to Putrefaction.

Of

Of PRINCIPLES.

BY the Name of Principles, I comprehend the moſt ſimple and uncompounded *Ens* or Power, by the Combination and inteſtine Motion of which Bodies are produc'd and increaſe; and by a mutual and alternate Separation and Diſſolution, they are chang'd and decay: In the mean time, the Particles which are united to, or ſeparated from thoſe Subjects, are viſible to us under the Form of Spirit, Sulphur, Salt, *&c.*

Of the Spirituous and Sulphureous Parts of Bodies.

BY the Name of Spirits may be comprehended the Sulphureous Parts of Bodies divided by Fermentation: In

In which Operation, the Volatile Saline Effluvia are conjoin'd to a Portion of the Aqueous Particles, brought to Maturity by Nature, and ſeparated by Art into a Volatile *Ens*; in which is contain'd the moſt eſſential Power of that Body thus ſeparated or divided by Fermentation, which the Parent of Nature has conſtituted in this World, as the Inſtrument of Life, Soul, Motion, and Senſe of all things. And whilſt, according to their Nature, they are always endeavouring to evaporate, leſt their Compoſition ſhould be too ſoon deſtroy'd, they are ſometimes united to groſſer Particles; by ſubtilizing and refining of which, they diſpoſe their Subjects to Maturity, as is obſerv'd in the Production, Growth, and Fermentations of Bodies. From the Motion of which, the Vivacity of Bodies, the Origin of Plants, the Perfection of Fruits, Liquors, and other Preparations proceed: They determine the Form and Figure of any thing prefix'd, as by Divine Appointment: By their

their Preſence they preſerve the Bonds of Mixture, and divide them at their Pleaſure: They check the inordinate Motions of Salt and Sulphur. The Perfection and State of all things conſiſts in a Plenitude and Exaltation of Spirits; and their Changes and Declinations, to their Loſs and Deficiency.

Sulphur is of a Conſiſtence ſomewhat thicker than a Spirit; and after that, is very active: For when the Compoſition of Bodies is opened, the Spirits firſt break forth, preſently the Sulphureous Particles attempt to follow. The Diſpoſition of any thing, as to its Colour, Conſiſtence, and amiable Texture, are principally dependant on its Sulphur. Hence, for the moſt part, ariſe the Variety of Colours and Smells, the Beauty and Deformity of Bodies, and that vaſt Variety of Taſtes, in the Embraces of which the Spirit immediately reſides, by which it is united to the more ſolid Embraces of others.

As to the Subſtance of Sulphur, although 'tis leſs ſubtile than that of

Spirits, yet 'tis of greater Energy and Power. For this, unleſs it is reſtrain'd, and the Particles thereof are inſeparably detain'd by the Intervention of other Bodies, not only quits its Subject, but by a too impetuous Eruption deſtroys it: For the Corpuſcles thereof being gently agitated, promote Digeſtion, Maturity, Sweetneſs, and many other perfect Qualities to Bodies; but being too intenſely mov'd, they break forth in Flame and Conflagration.

The Subſtance of Sulphur is never obſerv'd perfect. From other Bodies it does not ſeparately exiſt, but readily evaporates; the Particles thereof being united to Salt and Earth, remain as fix'd and immoveable, as is obſerv'd in Metals, and ſome Stones; or being diluted with Spirit and Water, or united with other Principles, is excited to Motion. For firſt, either the Corpuſcles thereof being entangled by Salt and Earth, or too much impregnated with Humidity, are obſcured; ſo that from thence they feebly exert themſelves;

ſelves; from whence proceeds the cold and moiſt Diſpoſition of Things; the Qualities thereof are ſluggiſh, and of leſſer Efficacy, and their Bodies are leſs inflammatory; as is conſpicuous in unripe Fruits, crude Juices, and green Woods. Or,

Secondly, The Particles of Sulphur, with the Spirit, begin to diſplay themſelves; and being more cloſely united, remarkably exceed the other Principles; and ſo by their Motion evaporate the ſuperfluous Humidity, occaſioning thereby a warm Diſpoſition, active Qualities, a vegetative Power and Maturity to Bodies: Which Exaltation of the Sulphur is demonſtrated in Wine, in Liquors long fermented, ripe Fruits, and the florid Conſtitution and Vigor of Animals. Or,

Thirdly, The Sulphureous Particles being too much rouz'd by Fermentation, diſſolve the Bonds of Mixture, and endeavour to fly away. And according to their different Diviſion or Separation, the Diſſolution of Bodies

differently depend: For either they gradually, and, comparatively ſpeaking, inſenſibly evaporate with the Water and Spirit, and leave the Subjects wither'd and dry; which, when they are diveſted of their Sulphur, are reduced into Powder. Or, *Secondly*, In Bodies replete with Sulphur, when the Compoſition is diſſolv'd, and the Spirits begin to evaporate, the remaining Particles of Sulphur being very much agitated, are wont to acquire Heat; and being united with a cloſer Contexture, are ſo remarkably endow'd therewith, that they are ſometimes ſet on Fire; as is manifeſted in Dung and Hay growing hot; and in this manner violently breaking forth, they emit a fœtid Smell, and promote the Subject to Putrefaction.

There is a Third Method of Eruption, in which the Sulphureous Particles ſeparating from Bodies, violently ſeizing each other, and uniting together, break forth into Fire or Flame; by which means, being not confin'd, they

they break all Obſtacles, and totally deſtroy the Compoſition of the Subject. And in this manner, either ſpontaneouſly, or by a proper Effervescence, they acquire Heat; as when Hay is laid up too moiſt, or as the Wheels or Axles of Carriages by Motion grow hot, ſo the Particles thereof being violently moved, rouze thoſe which are next to them, and excite them to the like Method of Conflagration.

Of SALT.

SALT is of a more fixed Nature than either Spirit or Sulphur, neither is it ſo apt to evaporate; but contributes to the Unition, Solidity, Weight, and Duration of Things; it hinders the Diſſolution of Bodies, and very much prevents Putrefaction, Corruption, and Inflammability; in as much as it fixes in its Embraces, and detains in its Body the Spirit and Sul-

phur, which would otherwiſe be endow'd with too great a Volatility. Hence ponderous Woods, Stones and Metals, and thoſe Bodies impregnated with Saline Particles, hardly burn, and are longer preſerv'd from Corruption.

Not only the Duration of the Individual, but alſo the Propagation of the Species, depend on the Principles of Salt; becauſe the Increaſe of Minerals, the Fertility of the Earth, the Vegetation of Plants, and the repeated Formation and Production of Animals, owe their Origin to a Seminal Salt: For the Salt being render'd Fluid, unites the Corpuſcles of the Spirit and Sulphur, being too much divided or unactive, and excites them to Motion; and being thus united, principally ſerves for the firſt Formation of Bodies.

Having treated of thoſe active Principles, which conſtitute the firſt Formation of Bodies; I come now to treat of thoſe Parts, which chiefly contribute

tribute to their Bulk and Conſiſtency. Hence either Liquids or Solids are, in Proportion, larger or ſmaller: For Earth and Water, by the Unition of the other Principles, fill by their Interpoſition thoſe void Places, expand and enlarge the Lineaments of the Body, being otherwiſe too imperfect and contracted.

Of WATER.

WATER is generally the moſt convenient Vehicle of Spirit and Sulphur; by the Intervention of which, they are alternately united with Salt: For the other Principles being diſſolv'd, or at leaſt dilated with watry Particles, continue in Motion.

When there is a Deficiency of Water, thoſe active Principles being too cloſely united, mutually waſte and impair each other: And when by this means a Supply of Aliment is intercept-

ed,

ed, the Body withers and decays. If there is too great a Portion of Humidity, theſe Elements are too much ſeparated and divided. Hence the Subject is unactive, and of leſſer Efficacy, and appears unfit for Motion. Moreover, Bodies which are too moiſt are very ſubject to Putrefaction and Decay, by reaſon of too great a Humidity; the Unition of the Spirit, Salt, and Sulphur, is render'd too expanſive, that they cannot be ſo mutually incorporated, neither are they, when united, ſo readily, retain'd in the Subject; but a larger Portion of the Water exhaling, and the Compoſition of the Subject being divided, the Spirit and Sulphur, where-ever there is a Paſſage, readily break forth, and leave the Subject inſipid, or too much actuated by its Saline Principles. Hence the Infuſion of Vegetables, Decoctions, the Juices of Herbs, or any other liquid Preparations, if the Quantity of Water is greater, or diſproportionable to the other Principles, their Compoſitions are deſtroy'd.

Water is eaſily extracted from any Subject by Diſtillation: For when the Spirit and Sulphur are frequently ſheath'd in the Embraces of Salt or Earth, and are hardly diſentangled therefrom, unleſs obtain'd by a more intenſe Heat, and often require a previous Putrefaction; Water, as before-mentioned, is very readily, and often, with little or no Trouble, extracted from any Body by Diſtillation; but generally ſome of the looſer Particles of the Spirit and Sulphur ariſing therewith, partly impregnate the Water with thoſe eſſential Qualities, as are conſpicuous in its Taſte and Smell.

Having ſeparately treated of the Elements or Principles of Natural Bodies; it now remains, that I proceed to demonſtrate the Cauſes and Effects of their Affinity and Coherence, becauſe theſe ſo readily agree with thoſe, and are hardly or ever ſeparated from each other.

By the mutual Coherence of ſome, and the vaſt Diſparity of others, ſuch

different Effects are produced, that the Knowledge thereof very much illuſtrates the Doctrine of Fermentation.

Betwixt the Spirit and Sulphur, there is ſome Affinity and Similitude of Parts, which in both are very active, and eaſily divided. Hence the Spirit being extracted from any Subject by Diſtillation, plentifully carries the Sulphureous Particles therewith, as is obſerv'd in Spirituous Liquors extracted from any Body: To ſome of which, if fair Water is added, the Sulphur being precipitated thereby, the Liquor appears cloudy; but the Spirit without the Sulphur is indifferently mingled with the Water, which from the Volatility it is endow'd with, is eaſily ſeparated by Diſtillation.

Although Spirit and Sulphur are Principles very nearly related to each other, and becauſe they are of a quick Motion, and both inflammatory; yet are they not of the ſame Nature, as is aſcrib'd by ſome: For Sulphur plentifully

fully ſubſiſts in thoſe Bodies which are almoſt deſtitute of Spirit, as is evident in common Sulphur, Antimony, and ſome Minerals, in which the Particles thereof are ſo very fix'd, and by their Nature almoſt immoveable. Which is very different from the Nature of Spirits: For thoſe being plentifully diffus'd in any Compoſition, never lie idle, but are always in Motion; and where they are differently diſpos'd, they occaſion various Alterations in the Subject. Moreover, if they are impregnated with Vigor, they eaſily and without Noiſe ſpontaneouſly break forth: And Sulphur, altho' it is very prevalent, does not ſo eaſily evaporate; but an intenſe Heat or actual Fire is requir'd, that there may be a Paſſage for its Eruption; and at length breaks forth not without a Stench.

Hence, if we attempt to diſtil Oily or fat Subſtances with a moderate Heat, theſe, altho' they are very ſulphureous, are wont to afford a Liquor only watry, or in the leaſt inflammatory; but if

we urge a generous Wine, which is turgid with Spirit, with the gentleſt Heat of a *Balneum*, an inflamable and burning Spirit is extracted from thence by Diſtillation.

Having briefly, tho' evidently, treated of the Nature of Fermentation in all its Branches applicable to the Rudiments of Diſtillation; I now come to treat of the Art it ſelf, in a Method totally different from the common Practice, and conſequently preferable thereto, which I freely ſubmit to the Judgment of the Impartial Reader.

Before I attempt to deſcribe the Form of this Engine-Still, and the Nature of its working with that Expedition, that in One Hour it ſhall diſpatch more Buſineſs, than any other of treble its Dimenſions ſhall in Two or Three, with ſeveral other Advantages accruing thereby; I think it proper to ſhow the many Inconveniencies attending the working of the Stills now made uſe of, from whence the Compariſon between the

the one and the other may be more rationally accounted for.

Firſt, As to the Degrees of Fire in working the common Stills, every mean Stoker knows, that if the Fire is not nicely regulated, when the Still firſt begins to work, the leaſt Error committed then, frequently terminates in the blowing up of the Head, or throwing the Waſh foul into the Worm, which proceeds from too intenſe a Heat at firſt, and the Form of the Head, Neck and Worm, where the Vapour is thrown into the Head from the Body of the Still, and from thence is diſcharg'd by the Swan-Neck into the Worm, form'd into ſo many Circumvolutions for condenſing the exhaling Vapour ariſing from the Waſh boiling thus violently, that 'tis not diſcharg'd from the Neck into the Worm, in Proportion to what is crowded into the Head, from whence this Inconveniency proceeds.

Another and indeed as material a Reaſon as the former, is this, That by

the Method now made uſe of, great Part of the more ſubtiliz'd and Æthe-rial Volatility of the Spirits is always loſt, in which the purer and more eſſential Gaſs of its acid Particles con-ſiſt; in as much as the Vapour being violently thrown into the Worm, it muſt indiſpenſibly paſs at leaſt thro' one half thereof before it is condens'd into a Fluid; and by that time 'tis diſ-charg'd into the Cans or Under Backs, confirms what I before-mention'd, that the moſt volatile Effluviums of the Spirit are inevitably loſt by this Me-thod, which very much deprives it of that pungent Quality it would other-wiſe be more fully impregnated with; which the continual Puffing of Wind at the End of the Worm, if the Hand is held thereto, plainly evinces, occa-ſion'd by the continued Impulſe of Air included in the Body of the Still Head, Beak and Worm, which the different Motions of the Stream, partly inter-cepted by the Intermiſſion of Air crowd-

crowding thus plentifully from with-in, farther demonſtrate.

This being premis'd, I now come to deſcribe this New-Invented Engine, and the manner of its working; which how far preferable it is to all Inven-tions in Diſtillations hitherto diſcover'd both for Profit and Diſpatch of Buſi-neſs, I leave all Perſons to examine.

The Engine, at firſt View, ſhews the Deſign of its Invention: The Globe may be made of Pewter thinly caſt, which I think preferable to Copper, *&c.* the Intention of which is ſubſti-tuted in the Place of Worms, now made uſe of; which being in the Cen-ter of the Globe join'd to a Worm affix'd thereto, in Proportion to the Bigneſs of the Globe, gives room, when the Still works, for the exha-ling Vapour ſufficiently to expand it ſelf in the Cavity thereof; which by the Liquor contain d in the Tub en-circling the Circumference of the Globe, immediately condenſes the Vapour, thus moving

moving perpetually in the Sphere of its Activity, into a Fluid Body; and as ſuch, is receiv'd at the Beginning of the Worm, by the Turnings of which it is compleatly condens'd and refrigerated, before it is diſcharg'd into the Under-Back, or receiving Can. The Advantages of which have been already partly prov'd, from what was premis'd, when I objected againſt the Uſe of Worms in general; the Principal of which was, That by all Stills working with Worms only, the moſt volatile and ſubtile Effluvia's of the Spirit were always loſt in Diſtillation, in which its purer Particles conſiſt; which by this New Method are center'd and fix'd in the Globe, as the Vapour is condenſing; and which there is no Poſſibility of loſing afterwards, provided the Water is ſhifted ſometimes in the Tub; which turning of the Cocks readily performs, without any manner of Trouble, the Waſte Pipe carrying off the hot Water; and the other coming

from the Liquor Back, readily ſupplies the Tub with cold. Which undeniably proves what I before aſſerted, both of the Uſefulneſs of its Diſpatch, as well as the Advantages obtain'd by a Spirit preferable for its Redolency to any other, in that no Part of its moſt refin'd and eſſential Particles are loſt, but all are fix'd and center'd in the Body of the Fluid. Another Advantage is, that if your Fire is not ſo nicely govern'd, as in the common Way of Diſtillation, 'tis leſs ſubject to make your low Wines foul: For as the Vapour violently ruſhes from the Head and Back of the Still, is partly intercepted by the Turnings of the Worm, and occaſions that Inconveniency; ſo in this 'tis wholly prevented by the capacious Form of the Globe, which readily receives the flying Vapour ariſing from the boiling Waſh, and as freely gives Permiſſion for its Circulation in the Cavity thereof; and by Conſequence is the leſs

ſub-

ſubject to the Inconveniency before recited.

Thus having finiſh'd what I promis'd of Diſtillation in general, as to the Invention of this New Engine; I now come to treat of the Art it ſelf, in a Method totally different from the common Way of Practice; which, as it may give a new Turn to the Thoughts of many profeſſing the ſaid Art, ſo I doubt not but the Advantages ariſing therefrom will be equally ſatisfactory.

The Spirits generally made in this Kingdom are produc'd from decay'd Wines, Cyder, Perry, Fruit, Sugar, Moloſſoes, Malt, *&c.* the Difference and Goodneſs of each being the Reſult of what they are made from, and the Art of the Artificer, eſpecially in the Four laſt, operating accordingly, each ſtriving by different Methods of fermenting, rectifying, *&c.* to exceed each other; which the Difference of Spirits extracted from one

one and the ſame Ingredient, evidently evinces the different Art of its Profeſſors; and within theſe few Years have very much, by various Experiments, improv'd themſelves by the Addition of different Ingredients in Fermentation or Rectification, to give a finer Flavour to the ſaid Spirits. But amongſt all their Inventions, there is nothing that has rack'd their Wits more, than ſtriving to imitate *French* Brandy. Hence *Spiritus Nitris Dulcis*, the Infuſion of Oaken Chips, *&c.* have had by turns their different Trials; yet are ſtill very defective of anſwering what was propos'd from them: Tho' I deny not each give a peculiar Flavour to the Spirits they are mixt with, whether Sugar, Moloſſoes, *&c.* altho' 'tis impoſſible Spirits extracted from ſuch glutinous Bodies can be ever brought to that Perfection, as to be impregnated with thoſe Particles of Sulphur exhaled to their moſt volatile and ſubtile Effluvias by Fermentation, as

is produc'd from Wines themſelves: The Reaſon of which, when I come to ſpeak of Spirits extracted from Fruit, I ſhall readily define.

As decay'd Wines diſtill'd come the neareſt to *French* Brandies, ſo the Reaſon thereof is very plain: For the Brandies made in *France* being diſtill'd from the thinneſt and pooreſt of Wines, afford the fineſt Brandies; which proceeds from the fix'd Salts and Sulphurs with which thoſe Wines are impregnated, by long Fermentation changing from a grateful and pleaſant Odour to a volatile acid Pungency, by ſome of the ſubtiliz'd Effluviums of the Spirits evaporating, and the Saline Particles too powerfully expanding themſelves through the Subſtance of the Liquor, in Proceſs of Time impregnate the ſame with that volatile, acid Taſte and Smell, as is perceptible therein. Which is the Reaſon why *French* Brandy is preferable to any others diſtill'd from Wines, in as much as a Por-

a Portion of that acid Volatility ariſing in Diſtillation, gives that grateful Odour and Taſte to the Spirits diſtill'd therefrom; which vellicating the nervous Membrane of the Tongue, afford that delightful and pleaſant Taſte, ſo conſpicuouſly grateful to the true Judges thereof.

As what has been premis'd, ſufficiently proves the Nature of all Vinous Spirits to be preferable to any others, both for Odour and Flavour; ſo it as equally demonſtrates the Impoſſibility of making any others, extracted from Sugar, Moloſſoes, *&c.* to come nigh or equalize the ſame; from the following Conſiderations.

Firſt, From the conſtituent Principles of which each Body conſiſts.

As to the Juice of the Grape or Muſt, when firſt expreſs'd, there is no Occaſion for the Addition of any other Body, (as there is in Beer) to promote its Fermentation; For it is ſo fully impregnated with ſuch active Principles, that of its own

Accord it very readily throws it ſelf into a violent Fermentation, proceeding from the different Particles of which it is compos'd, invelop'd or ſheath'd in each other, till ſeparated by Fermentation, the ſpirituous and more ſubtiliz'd Particles violently ſhaking the groſſer Fæculencies; till by a continued Fermentation, the wnole Compoſition in Time is chang'd from a thick to a lucid Fluid: The groſſer Body ſubſiding to the Bottom, conſiſts of the Salt and Sulphur, with a ſmall Portion of Spirit, and a larger Portion of earthy Particles; which, whilſt the Fermentation is continued, gradually ſeparate, or ſometimes mutually uniting with each other, are fix'd to the Sides of the Veſſel, under the Form of Tartar. In the Interim, the Fluid, thus diveſted from its groſſer Body, is, by Time, render'd clear and very Spirituous: Which proves the vaſt Diſparity there is between Vinous Spirits, and thoſe extracted from groſſer Compoſitions;

poſitions; for the other is ſo loaded with glutinous and aqueous Particles, that it can never ferment of it ſelf, ſo as to yield a Spirit, unleſs aſſiſted by a large Portion of Yeaſt, and other Materials, to promote a Fermentation; by opening its viſcous Body, ſo as to make way for its Saline, Sulphureous, and Spiritous Particles to exert themſelves; which when accompliſh'd, are far ſhort of thoſe extracted from Wine.

This being undeniably prov'd, I now come to ſhow, how from Fruit, and other Materials, ſuch a Spirit may be extracted, as ſhall come the nigheſt to *French* Brandy of any Spirit whatſoever, that of Wine excepted: Which it will nearly equalize.

The

The PROCESSES.

TO every Hundred of fine *Malaga* Fruit add Forty Five or Fifty Gallons of Water: Let there be in the Bottom of the Tub a Cock and Tap-Ouze, as is made uſe of in Brewing: Let them ferment of themſelves ſeveral Days, ſtirring them down two or three times in a Day. Draw off the Liquor into a cloſe Cask. Add to each Quantity of Liquor, in Proportion to the Quantity of Fruit, two of the following Balls: Take three Quarters of a Pound of Bean Flower, and a Quarter of a Pound of *Salt-Petre*; mix them well together, by firſt rubbing your *Salt-Petre* fine; beat them into a Paſte with ſome of the ſtrongeſt Vinegar; make them into Balls, about the Bigneſs of a Pullet's Egg; dry them in the Sun, and put one or more into

to each Cask of Waſh; expos'd in Summer to the Heat of the Sun, and in Winter in a cloſe Room with a Stove in it. Keep open the Bung ſometimes; let it ſtand till it ſmells very ſowre, which the Compoſition will very much contribute to, by promoting with the Sun's Influence a new Fermentation; and the fix'd Salt contain'd in the Nitre expanding it ſelf gradually through the Subſtance of the Fluid, gives it that volatile Acidity, on which the deſir'd Fragrancy of the low Wines made into Spirits depends. Then, to give it a Vinous Flavour, make uſe of the following *Arcanum:* Take a Hundred or more of new and ſound Prunes, bruiſe them well, add about Twenty Gallons of Water, ferment as you did your Fruit for ſeveral Days; draw off your Liquor, which keep in a Cloſe Cask, for the Uſe that ſhall be afterwards mention'd. Put your Prunes in a ſmaller Cask cloſe cover'd; let them ſtand till they grow ſowre;

take five or ſix Gallons of your Spirit when made; put your Prunes into your Still, and the Prune Waſh, mix your Spirit with them, diſtil with a very gentle Fire; ſo will your Spirit aſcend, impregnated with all that eſſental and volatile Acidity from the Prunes, a Gallon of which is enough to flavour half a Hogſhead of your Spirit made from your Fruit; with which you may flavour other Spirits, to enhanſe the Price of them. 'Tis impoſſible to expreſs how fine a Spirit may be thus made, but by the Experience I have had of it.

As to your Fruit, it will make very good Vinegar, if you barely cover it over with warm pale Malt, letting it ſtand ſeveral Days. Draw off your Liquor as you did the other, and proceed in the ſame manner, by adding a Ball or two of your Compoſition. When your Liquor is drawn off from your Fruit, it will in a few Days grow very hot, if cloſe cover'd.

cover'd. When that Heat is off, throw up your Liquor, if fine, upon your Fruit, which will help to ſharpen it very much; and by ſtanding thereon, and ſhifting it, 'twill be converted into good Vinegar. When it is ſharp enough, draw it off, and fine it down with Izing-glaſs.

Explication of the PROCESS.

THE Fruit being no more than a dry'd Grape, retains in a great meaſure its fix'd Salt, Sulphur and Spirit, which lie ſluggiſh and inactive, as long as they are cloſe pack'd together: But when they are infus'd in Water, the Fluid entring the Pores of the Fruit, thoſe fermentatious Particles contain'd in its Body begin now to exert their Power, and ſo very readily ferment of themſelves, (like the Juice of Grapes, altho' not ſo violently,) without the Addition of any

other Material to promote them; which ſhows that in their Nature they are replete with the Particles before-mention'd. The Waſh, with the Addition of the Compoſition, is expos'd for ſome Time to the Heat of the Sun, which gives it a new Turn, and very much contributes to the Completion of its Acidity; on which, with the Addition of a Portion of its Spirit when diſtill'd, impregnated with the Prunes, that vinous Fragrancy ſo like to that of *French* Brandy, is perceptible.

The Prunes are firſt fermented to open their Body, as that of the Fruit; otherwiſe that acid Pungency could not poſſibly be obtain'd, which is the Conſequence of a new Fermentation after they are diveſted of their Liquor; and when diſtill'd with the Waſh and Spirit, the Spirit riſes as before-mention'd, replete with all thoſe Qualities requiſite for compleating the thing deſign'd.

Of Artificial WINES.

AS the Doctrine of Fermentation has been already explicated in a Method totally new; ſo in treating of this Subject, its Effects will be ſo remarkably conſpicuous, that the Proceſſes thereof, as they are vaſtly different from thoſe already mention'd, ſo the Conſequence deducible from the ſame will be equal thereto.

In Order to which, I ſhall firſt ſpeak of the making of Artificial Wines, as hitherto practis'd; which being compar'd to the ſubſequent Method, I flatter my ſelf from the Diſparity of the Compariſon, that every impartial Perſon will readily acquieſce, that the ſtated Rules here laid down, are preferable to any others ever yet publiſh'd on this Subject.

The Wines frequently made in this Kingdom, are thoſe of Gooſeberries,

Currants, Mulberries, Elderberries, Rasberries, Cherries, Damsons, *&c.* and those from foreign Materials are *Malaga* Raisins, *&c.* So that as the Method of making any from Fruits of the *British* Production, is one and the same, I think it needless to treat of each; but having demonstrated any of them, the Method of making any of the rest is readily comprehended.

Of Gooseberry *or* Currant Wine.

TO a Quantity of either of the Fruits bruised, is added discretionally by the Makers a Quantity proportionate of Water, in which they are infused for some time: Then they are strain'd off; and to every Gallon of Liquor they add so many Pounds of Sugar: Then they barrel it up, with some Flour and Whites of Eggs to promote its Fermentation, and fine it down. Others add toasted Bread smear'd over with Yest,

Yest, when they cask it up; and others add White-Wine, to increase the Charge more than the Goodness, each thinking their own Way best. But how defective all are in obtaining the true and essential Flavour of the Fruits by either of the preceding Methods, Reason will, upon comparing the Inconveniencies attending the same, sufficiently refute them. First, if your Fruits and Liquor stand too long together, instead of obtaining a Vinous Flavour, the fix'd Salts included in your Fruits will impregnate the Liquor with that Acidity, that when it comes to be mix'd with your Sugar, it will not fail of changing, in Time, rather into a Vinegar, than a Vinous Body. In the next place, as the Sugar is the Basis upon which the Strength and Preservation of your Wine depends; so by this Method its glutinous Substance, in which its Spirituous Quality consists, is not sufficiently opened by such a Fermentation, as that its Sulphureous Particles uniting with the Fluid already impregna-

pregnated with your Fruits, is requiſite for its Preſervation. Which is evident from this, that many of the Artificial Wines ſo made, in a little time turn ropy and ſowre; which proceeds in a great meaſure from the Sugar not being throughly open'd by Fermentation. That its Spirituous and Sulphureous Particles are partly intercepted by this Method of proceeding, from a thorough Expanſion of themſelves in the Subſtance of the Fluid, on which its Preſervation principally depends, is evident: Which Objection readily leads me to confirm what I before propos'd, of making any of the recited Wines, to be not only more fully impregnated with the eſſential Flavours of the Fruits from whence they are made, but totally prevents any of thoſe Accidents before-mention'd.

The

The PROCESS.

TAKE Two Pounds of Loaf Sugar to every Wine Gallon of fair Water: Let your Sugar be thoroughly diſſolv'd: Then add a Quantity of new Ale-Yeſt proportionate to that of your Liquor: Cover it up cloſe: When it begins to ferment, ſtir down your Yeſt gently; but do it not too often, leſt your Liquor ſhould taſte of it: Let the Fermentation continue for three or four Days, till you find the Body of the Sugar well divided, and your Liquor taſtes ſtrong and ſpirituous; at that time draw it off clear from your Yeſt; which you muſt do before your Yeſt ſubſides to the Bottom: Then have in Readineſs another open-headed Cask, with a Tap and Tap-Ouze at the Bottom; in which put your Fruit whole and thorough ripe, as * Gooſeberries, Currants,

* They may be gently bruiſed.

Mul-

Mulberries, Cherries, *&c.* in Proportion to the Quantity of Liquor before fermented: Six Pound will be full enough to every Gallon of Liquor. Pour your fermented Liquor upon them firſt: Set in a cool Place: Cover them up cloſe with Cloaths, and the Head of the Cask: Let them ferment ſeveral Days, ſtirring them gently down; and when you find the Liquor taſtes well impregnated, draw it off into a cloſe Cask, which muſt be nearly fill'd: In which put to every Twenty Gallons of Liquor thus drawn off, a Quarter of a Pound of Cream of Tartar finely powder'd, and an Ounce of Izing-glaſs diſſolv'd and ſtrain'd, which in ſome Time will fine it down. Stop it up cloſe, till fit for Uſe.

Expli-

Explication of the PROCESS.

THE Sugar being firſt diſſolv'd and then fermented, more readily inſinuates it ſelf into the Subſtance of the Fruit, which, as it is of a Vinous Nature, promotes its Fermentation; and by uniting with the fix'd Salt contain'd therein, hinders it from too powerful an Expanſion, in which the acid Quality of the Liquor impregnated with the ſame conſiſts: Which by this new Method of the Sugars being previouſly fermented, totally prevents; and not only that, but is of an equal Service for preventing your Wines from being ropy. If your Wine is made from Gooſeberries; after your Liquor is clearly drain'd off, if you barely cover your Gooſeberries with Liquor made pretty warm, and expoſe them cloſe cover'd for ſome time to the Heat of the Sun, 'twill be converted into good Vinegar.

In this manner may any of the fore-mention'd Fruits be made into fine Wine, amongſt which that of Apricots is wonderful pleaſant; which you may cut in Quarters or Halves, leaving out the Stones and Kernels, and proceed as before. When your Liquor is drawn from them, you may take them out whole without waſhing them; and with Loaf-Sugar and Water boil'd into a Syrup, you may boil them a little time; and when cold, put both the Syrup and them into Glaſſes, which you may preſerve all the Year for Tarts, *&c.*

Clary Wine.

TO every Hundred of fine *Malaga* Raiſins, add Thirty Five Wine Gallons of fair Water: Let them ferment ſeveral Days of themſelves, till the Liquor taſtes ſtrong and vinous, or till the Sweetneſs thereof is almoſt loſt. Put your Liquor, as before, into a cloſe Cask,

Cask, with Cream of Tartar and Izing-glaſs: And to flavour it, ſome Days before you draw off all your Liquor from your Fruit, draw off three or four Quarts, and infuſe in it, in a cloſe Viol or Bottle, a good Quantity of Clary Flowers, with a Part of which you may impregnate the reſt of your Liquor before you ſtop it up; taking care you uſe not too much of the Infuſion, but only enough to give it a true Flavour. This comes the neareſt to *Rheniſh* Wine of any.

Black-Cherry Wine.

TO every Hundred of *Malaga* Raiſins add Forty Gallons of Water; Let them ferment for ſeveral Days, as that of Clary Wine. When the Liquor is drawn off, add Six Pounds of Black Cherries to every Gallon: Ferment them together for three or Four Days, or until the Liquor is deeply tinctur'd:

Draw

Draw off; and to this Quantity, when you put it up, add two Ounces of Roach-Allum in fine Powder, and the Whites of Six Eggs well beaten into a Froth: Mix all together, and ſtop it up cloſe.

Elder Wine may be made in the ſame Nature.

After your Liquor is drawn from your Cherries, you may put them into a Still, with a ſufficient Quantity of Water, and diſtil with a gentle Fire: From which you may extract a very fine Spirit.

The ſame may be done from your Gooſeberries, Currants, *&c.*

FINIS.