Every Man his own Brewer;

OR, A

COMPENDIUM

OF THE

ENGLISH BREWERY.

CONTAINING

The Beſt Inſtructions for the Choice of HOPS, MALT, and WATER; and for the Right Management of the BREWING UTENSILS.

LIKEWISE,

The Moſt Approved Methods of Brewing LONDON PORTER and ALE. Of Brewing AMBER, BURTON, WESTERN and OAT ALES. Of Good TABLE BEER, and MARLBOROUGH, DORCHESTER, NOTTINGHAM, and BRISTOL BEERS.

AND

Of manufacturing Pure Malt Wines. Of Fermentation; Caſual Diſtemperature in Brewing, with the Cauſe and Remedy. The Theory of Britiſh Fruits, as applied to the Improvement of Malt Liquors.

Of AIR; its Properties and Effects on Malt Liquor. Of the THERMOMETER, its Uſe and Application in Brewery. Of FIRE, and its Action on Malt and Vinous Extracts.

Together with

A Variety of MAXIMS and OBSERVATIONS deduced from Theory and Practice. And ſome Uſeful HINTS to the Diſtillery, for Extracting a Fine Spirit from Malt and other Ingredients.

The Whole Illuſtrated by Several EXPERIMENTS.

By a GENTLEMAN, lately retired from the Brewing Buſineſs.

LONDON:

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MDCCLXVIII.

THE

PREFACE.

MALT liquors, though of great antiquity, were never known in any conſiderable degree of perfection but in England, and this perhaps in a great meaſure owing to our having the beſt materials, and uſing them properly, in the preparing of our Malt and Hops, with Coke, Culm, or Cannel coal, neither of which are the produce of any other country, and if imported from hence, eſteemed too dear for the purpoſe.

In the ſouthern parts of Europe, malt liquors are very rarely attended to; and in the northern, where much uſed, the malt and hops are cured with ſtraw, furze, or other ſuch dry vegetables as emit a diſagreeable ſmoke, and when ſteeped in the maſh-tun, give the liquor a tincture extremely diſguſtful to an Engliſh palate; and I fancy there is, beſides, ſome very eminent defect in their mode of brewing, and management after being brewed: for although I am a ſtranger to their methods, I am not ſo to the taſte of their beer in various parts of the north, and from that taſte conclude of their method, and conceive them much ſuch kind of brewers, as Xenophon, in his return from Perſia with the remains of the ten thouſand Greeks found in Armenia: his account of their corn-wines is, "That it was in ciſterns in their cellars, and their manner of drinking it was by ſuction through reeds, perhaps only an extract from the corn, ſimply, without any farther manufacture; as, like our oat-ale, to be ſpeedily drank; or, as has been uſual, until of late years, in Scotland,

Scotland, to anſwer the purpoſe of a few days."

In England, ſo far as Cæſar was a judge of this matter, ſomething more muſt have been done to their corn, drank by the Britons in that early age; for he ſays, we had plenty of vines for grapes, but only uſed them for our arbors; and that their corn-wine was in his opinion much preferable to that made from the grape, as it reſpected the human conſtitution: from whence one would be apt to conclude, beer was then made to ſome degree of excellence. That it was in great vogue as early as the conqueſt, we are well informed, and the general drink of the higher rank of the people, and would be ſo ſtill, did not certain circumſtances intercept that courſe, by the varying our order of food, from that which was ſimple and plain, to mixt diſhes, and high ſauces, which require liquors more light and ſharp to properly digeſt: hence an affection for thin wines, or wine and water, Claret, Old Hock, Rheniſh, &c. have aſſumed the place of beer in moſt genteel families; and in the cyder

cyder counties, that liquor is moſt eſteemed.

THIS has induced me to conſider what kind of fine light liquor may be made from corn of any ſpecies, that may be at once pleaſant to the palate, anſwer the purpoſe of nearly as good a diluter as wine, and better adapted to an Engliſh conſtitution, without any dread of the gout, nor ſuch like conſequences, the uſual effect of thin wines. And I think this really practicable, from a particular circumſtance that has occurred to my obſervation. I was once on an election, at a certain borough in Wiltſhire, and, in the courſe of our canvaſs, drank ſometimes to the amount of two quarts of beer in the forenoon, not only without ſenſible prejudice, but that it rather mended my health, and gave me briſk ſpirits. As I had not been uſed to drinking, eſpecially in the morning, I admired at this, and found, on the moſt ſtrict ſcrutiny, that nothing was uſed in this liquor but malt and hops, and that its happy vinos flavor was merely the reſult of good ingredients, well cured, a fine

a fine chalk water, and not being too much boiled: I readily concluded, that ſomething might be done to give a diſtinguiſhed reputation to malt liquors, and operate as a counterbalance to the too free uſe of wine as a diluter; and I think I am enough maſter of the ſubject to make it ſo. But, as it is neceſſary, that all the various kind of malt liquors made in this kingdom, be ſo delineated, that different palates may have their choice; and as the London brewery ſupply at leaſt one eighth of the people with the favorite brown drink called Porter, it ſeems to claim a right to the firſt ſection of this Work, next after conſidering the ingredients, from which that, and all other malt liquors are deduced, though on a different mode of preparation, and then the Brown Ales of the north in due order: after this, I ſhall enter on the finer beers of the ſouth and weſt, and endeavour an inveſtigation of their reſpective qualities, aiming to ſet the whole in ſo clear and intelligent a light, that if the reader has the leaſt idea of the common order of brewing, and proper utenſils prepared

pared for the purpoſe, he will be left entirely at his own election, to have light or full, ſtrong or ſmall, brown or pale beer; or the various mediums, wherewith to be merry or healthy, as may beſt ſuit his pleaſure or intereſt.

THE

INTRODUCTION.

THE rectitude of all kind of compoſitions, eſſentially depends on a thorough experimental acquaintance with the virtues and qualities of the ingredients, of which ſuch compoſition is to be formed. In Medicine, the Doctors preſcription avails the patient little, if he that makes up the doſe is unſkilled in drug or Botany. The Cook will not ſucceed better in his ragouts, &c. who labours from receipt, without a perfect maſtery in the requiſite materials: this is ſo obvious to common ſenſe, that a writer would be inexcuſable, that preſumed to direct the Art of Brewing Malt Liquors to any degree of perfection, without firſt inſtructing the reader, inaſmuch as the reſult of long practice can, how to make choice of proper ingredients.

The ſeveral kinds of Grain for Malt.

Malts are made, or, if you pleaſe, manufactured from various kinds of grain

and pulſe, as wheat, white rye, barley of various ſpecies, oats, beans, peaſe, &c. and at certain times, and on particular occaſions, have been uſed in part, or in the whole, in the Brewery.

Wheat has the moſt ſpirit and body, and was formerly the only grain eſteemed worth malting, and may probably be ſo ſtill, if other reaſons did not interfere than what relate to its qualities, as the beſt Brunſwic Mum is made from this grain.

Oats, eſpecially, thoſe called the Short Small, are much inferior in quality to wheat and barley; but when well choſen and properly malted, make a much finer beverige, for our meals, than either of the above.

Peaſe and *Beans* are generally uſed as correctives, and to give a ſmoothneſs to liquors, as will be mentioned in due place.

Barley is the grain moſt generally malted for the Brewery; and as is ſuppoſed for this reaſon, that comparing its powers and price with thoſe of wheat, it beſt anſwers a general purpoſe, tho' the Diſtillers ſeem to be of a different opinion. However, as the Brewers and gentry

gentry in all parts of the kingdom concur in giving the preference to barley malt, it is of the kind that ought to be preferred, and of the ſoil for raiſing it, that I am now to ſpeak.

Of the proper Soils for BARLEY.

Barley, being a much weaker grain than wheat, or more defective in power to force its way through ſtrong clays, is moſt ſown upon lighter ground; or, to prevent its catching the tincture of the common manure of horſe-dung, is ſown on the ſame ground after a crop of wheat, which has previouſly drawn off that fœtid tincture, and prepared the earth kindly to receive it; it is otherwiſe ſown on marled lands, on ſandy loams, on ſtony or gravelly ſoils, mixed with a light black earth, on ſaponaceous chalks, or on freſh lands at firſt breaking up; the ſeed is uſually choſe from poor lands, thin of body, to improve and plump up on richer ſoil; this produces a grain thin of ſkin, but replete of flour, and is the kind moſt properly calculated for malting, and to give ſpirit and flavor to the liquor extracted; its appearance muſt be bright and clear, its form ſhort and

plump, and on feeling it be found hard and ſound; in the heap well ſcreened, free from chaff and darnel, or any other wild ſeeds; and after all, its real value known by its weight, which is readily computed by a ſmall meaſure of different ſamples, always taking care, that ſuch ſamples be perfectly hard and dry.

Factors in this experiment uſe a cubical inch meaſure, and thence compute the weight of a buſhel; but as every one may not be ſo provided, or underſtand proportional arithmetic, it is more ſimple, and anſwers much the like purpoſe, if different ſamples are to be had to ſelect the moſt weighty, ſuppoſing it to have all other right apparent qualities, which may be once more tried, by breaking the grain with your teeth, and ſeeing that the flour within be white and clear of ſpecks, for Corn injured by weather, or other accidents, may look tolerably, and weigh well, yet very unfit to malt for manufacturing of fine well taſted beer; and having provided the brewer, the gentlemen, &c. with proper grain, the next conſideration is, that it be well malted.

MALT

MALT *from* BARLEY.

It is not one in ten thouſand who brews, that can be ſuppoſed to malt their own corn, nor one in a thouſand that purchaſe corn to malt, ſo that, generally ſpeaking, their confidence muſt chiefly be placed in the ſkill and integrity of the maltſter, both as to weight and quality; as corn in the malting improves in meaſure, and ought to make a ſuitable allowance; as to the quality, various conſiderations take place, what fuel it is dried with; what the complexion of the malt you intend to uſe, and what kind of malt the fabricator is moſt accuſtomed to make, for its moſt probable he will only perform in one kind to perfection, be his ſkill and integrity what it may; and the plain way to know wherein his perfection conſiſts, is to taſte the ſeveral beers at different places, from his malt, I ſay at different places, becauſe ſome may unſkilfully miſuſe the beſt malt, and injure the credit of the maker; but if any one ſkilful brewer makes fine beer from it, it may be concluded in the maltſter's favor, and that it is in your power with his malt to make

fine liquor, tho' it is better ſtill if you find many in the ſame road. Theſe are the plaineſt rules that can be given under this head, and if you grind the malt yourſelf, do not let your mill be ſet too fine, that which cuts the grain in half is ſufficient, and beſt that it be quite cool before you uſe it; and here to avoid repetition, as I ſhall again be obliged, under the ſeveral heads of Brewery in different parts of the kingdom, to define the various kinds of malt in uſe, and the effects they produce, for the preſent quit the ſubject, and conſider the next article in due order.

HOPS.

Hops ſeem to be the natural growth of this country, as they appear wild in the hedges all over the kingdom, and when in the bud are, by the country people, eat in the nature of aſparagus; they are ſomewhat bitter, but have not an unpleaſant taſte; from whence I conclude the ſoil ſuited to the ſubject; but by conſtantly riſing from the ſame root, and without cultivation, their powers neceſſarily weaken, and require a ſkilful hand to nurſe them into full ſpirit and vigor. The

The moſt noted counties for the cultivation of this product are Kent, Surry and Worceſterſhire, on the ſides of Maidſtone, Farnham and Worceſter. The great marts for them are, Stourbridge Fair in Cambridgeſhire, Weyhill Fair in Wiltſhire, and the Burrough of Southwark: There are, no doubt, good and bad in every county, but the moſt eſteemed are from Farnham, the next from Maidſtone, and the laſt from Worceſter.

The cultivation of Hops is a very precarious undertaking, as they riſe and fall often from ten guineas, or upwards, to two and a half the hundred weight, and the medium of ſix pounds but a reaſonable profit.

Thoſe who chuſe fine pale beer, muſt uſe a fine Hop in its full flavor and perfection, and ſo in proportion to the complexion they propoſe for their beer; not that a fine Hop will harm brown beer, but make it better; but a brown Hop, ill cured, will utterly ſpoil pale beer, both in flavor and colour; on the other ſide, an ordinary Hop may be uſed in brown beer, without the ſame apparent injury to the liquor, as the ſtrong fire

taſte of the brown malt, will probably overcome the indelicacy of an ordinary Hop.

The Hop, after great care and expence in the cultivation, is ſubject to be deſtroyed by the blight, and very much injured by bad weather, and at laſt often ſpoilt in the curing; when any thing of this kind happens, eſpecially in Worceſterſhire, they are fumigated with ſulphur to recover their colour; in this caſe great caution is requiſite in the purchaſer, not that ſulphur will much injure fine beer, rather perhaps the contrary, ſo there be not too much of it, but the Hop will not have the due effect that might otherwiſe be expected from it.

Moſt perſons who raiſe Hops have kilns of their own, and thoſe who grow but ſmall quantities borrow the uſe from their neighbours, ſo that any animadverſions on that head would be idle, as the formation and uſe of them is perfectly known; but it may be remarked, that quick curing, and careful removing, contribute to the preſerving them in their full ſpirit and flavor; becauſe it will ſave the ſeeds that reſt immixt among their leaves, and which, if

if I may ſo ſpeak, are the ſoul of the plant.

After what has been ſaid, I preſume neither the public, or private brewer, can be at any loſs in what manner to ſelect the commodity he propoſes to uſe. The new Hop of like quality will always be preferred to the old, and bear a price accordingly; but the old, that is to ſay, of the laſt year, if in every other reſpect fine, is not to be deſpiſed; for which reaſon it may not be bad advice to thoſe who uſe any conſiderable quantity, that when the price is very low, to purchaſe as many new Hops as may in part furniſh them for the uſe of the ſucceeding year, as it ſeldom happens, that the riſe is not conſiderable, whether a lucky ſeaſon preſents or not, owing to the management of thoſe who make it their buſineſs to jobb the market, againſt whoſe influence there is no contending. And tho' it may be almoſt as impoſſible to direct the purchaſe of this commodity by precept, as to make a good Cook by a receipt; yet, if his ſenſes are perfect, can feel that the hop be ſomewhat moiſt in the hand; ſee that it be full leaved, and within

the leaves replete of ſeed and well colored, and ſmell that the flavor be rich and pleaſant, he cannot be importantly miſtaken.

LIQUOR.

This is a term uſed in Brewhouſes for ſimple water; and as I would not willingly affront thoſe wiſe gentlemen by calling it out of its name, the reader, I dare ſay, will excuſe me in calling it liquor, tho' perhaps not converted until it gets into the Brewhouſe.

It is requiſite to the extracting of ſpirit from malt, that liquor be as ſoft as poſſible; that is to ſay, to draw the more ſpirit and ſubſtance out of malt; but as in all extracts, our mode of reaſoning will be the ſame, and while it is agreed, that the ſofter liquor extracts moſt, it is far from being agreed, that it does not extract too much, for ſo it has appeared to me in various inſtances in tea, rhubarb, &c. as well as in malt and hops.

I am ſpeaking now of making a fine commodity, in which a due medium ought to be preſerved, and muſt from long experience, and as it appears to me from common ſenſe too, aſſume ſo much

of

of the dogma, as to aver, that if water be bright, and with a ſmall addition of ſoap, will waſh linen as well as ſofter water, ſuch liquor is better adapted to the making of fine beer than ſofter water At the ſame time is is certainly true, that thoſe places that lye on the margin of chalk hills, ranged athwart this iſland, have much finer beer, with leſs care, than any other part of the kingdom; but this is not the kind of ſoft water in queſtion, it is not the wa- of Thames, Severn, or Humber, or of any river in the kingdom, whoſe ſoft quality reſults from dirt and naſtineſs, nor can fine beer be made from them; tho' ſomething of the kind may, when purged to a certain degree of ſharpneſs, but never like what ſprings in a chalk well.

On the other ſide, there are waters in various parts of the kingdom ſo mineral tinctured, as not capable of being adapted to the Brewery.

The next preferable waters to the chalk, are thoſe which ſpring from the rock or gravel; either of theſe may ſometimes prove too ſharp, more eſpecially for common brewers, who chuſe

not to leave in the grains any ſubſtance for the hogs; but in this caſe the remedy is very eaſy and natural; for if ſuch water be drawn into ciſterns or tubs, two or three days always makes the neceſſary difference, and if well or ciſtern be lined with chalk-ſtone, this ſuper ſharpneſs inſtantly diſappears; and ſo it will in boiling, for then the ſpirit of the dirt evaporates, and the meer earthy parts remain at the bottom, a kind of *caput mortuum*.

It is hence plain that river water, however it may anſwer the purpoſe of the common brewer, is not well adapted to that kind of brewery, calculated to the uſe of genteel tables, nor will ever make ſuch fine beers as are manufactured from the chalk ſprings; but as this argument will be better underſtood, in the courſe of the future ſections, and all that can be farther ſaid as to the choice of water, let it in general be as free from harſhneſs as poſſible, but at the ſame time perfectly bright, as the ſeparating it from dirt and naſtineſs will permit; and be aſſured, that it is abſolutely impracticable to make beer ſtand the glaſs, that is brewed

ed from a muddy ſtream; time, fermentation, and finings may throw the foulneſs in ſome meaſure down, and it may, like the beſt London Porter, look tolerably clear at the bottom of a well ſcowered pewter pot, or clean ſilver tankard; but bring this ſame liquor in a glaſs to the candle, and then the *deceptio viſus* becomes too apparent; the ſeeming fineneſs is nothing more than a glare thro' the liquor from the burniſh of the reſpective metals.

The next thing to be conſidered in due order is the form, fitting up and furniture of a Brewhouſe, that may at once anſwer convenience and utility.

The BREWHOUSE.

The ingenious reader is here to take notice, that in diſſertations of this kind, it is not neceſſary to give more than one form and diſpoſition, from which any proportional, greater or leſs, may by the common rules of arithmetic be readily deduced; and in the next place, to conſider that ſituation will ever vary the given plan; as we cannot conſtruct a building in what form we like, or ſpecial

cial rules direct; in such places, as we have not ground at command, and this will likewise in some measure vary the internal disposition in the placing of the respective vessels, and some of the conveniences be necessarily wanted, and some not in all places equally requisite.

The best form of a building for this purpose, where ground is at command, is an oblong square, and in the proportion of sixty to ninety feet, or the breadth two thirds of the length, which will, whether the proportions increase or decrease, answer every beneficial purpose, for the disposition of the requisite furniture within. Antecedent to the building, it is first necessary to consider from what distance you are to obtain the water you desire for brewing, in what manner it is most conveniently, and at least expence to be conveyed to, and in what manner to be received at the brew-house, to be ready and fine for use; as this not at first regarded, may in the future occasion much inconvenience and expence, and perhaps after the charge of building make the whole useless. In London, or where water is laid in to all parts in plenty, this is not a material consi-

conſideration, other than having a proper receiver for it to fine; and for the liquor called Porter, that is not eſteemed abſolutely requiſite, as ſuch is not intended to be fine beer; but in the country it is quite otherwiſe, whether very fine beer be intended or not.

The judgment to be made of this depends on the diſtance of the water, and how far it may be afforded to lay pipes for its conveyance to the Brewhouſe; for as to the raiſing it to a proper level, by wind, fire, or horſe engine, is quite inſignificant, as the expence for particular uſe is now ſo low as not to merit regard, and may ſerve various other purpoſes in the houſe, laundry or garden.

The water being conſidered, the ſcite of the Brewhouſe muſt be as near as poſſible north and ſouth, at the ſouth end a dead wall, againſt which on the inſide to place one or more coppers; on the outſide and above the level of the coppers is to be conſtructed a brick ciſtern, well cemented and ſtuccoed or plaiſtered within, to receive the water from the engine, with leaden pipes through the walls to the coppers, and with braſs cocks as of courſe; in this ciſtern the water

water muſt ſtand ſome time to fine for uſe; no certain time can be given, as it muſt depend on the nature of the water, the order of the weather, and common obſervation, when proper for the purpoſe, only that it may be as fine as poſſible, and as little time in the ciſtern as may for that end be found neceſſary. This ciſtern, where much water is to be uſed, may be of thirty feet by ten in length and breadth, and the depth equal to the breadth, and in that proportion for larger or ſmaller Brewhouſes; from whence may be readily computed the quantity of water required to any apportioned building for the deſign in queſtion, this being calculated to that of ninety to ſixty feet with proportional veſſels.

The placing of the copper determines all the reſt, as it muſt be ſomething above the common level of the maſh, tun, and cooler, in order to the readier conveyance of the liquor to the maſh, and of the wort to the cooler.

In great Brewhouſes the medium height is twelve feet from the ground, and is well apportioned to the largeneſs of their veſſels; and as the maſh-tun muſt

muſt ſtand above the receiver; and as the upper cooler muſt have another under it, and that above the veſſels that are prepared to receive the wort.

The building, as to the length and breadth, or as a proportion thereto, is previouſly given, but the height remains, and muſt remain indeterminate, only noting, that as the malt ſhould be ground above the maſh-tun, and above all, as much light and air as poſſible; any ingenious man conſtructing ſuch a building, may form a very near judgment what height may be proper; the break of the ſide walls up to the roofing, whether by lattice work, or clap boards eaving over each other, muſt be above the malt mill, from ſix to twelve feet, according to the other dimenſions of the building; and as to the apertures below, by ſingle or double doors on the north, eaſt, or weſt ſides, ſuch ſimply depend on what is to paſs through them moſt conveniently, and of that, the deſigner only can make a proper judgment, becauſe he can only know what opening may be wanted.

The Brewhouſe prepared, and all the requiſite ingredients furniſhed, our next con-

conſideration is to enter into the practiſe of brewing the various kind of malt liquors in their utmoſt purity and perfection freed from thoſe bad arts, which it is even dangerous to expoſe in print, leaſt it ſhould infect more than are yet concerned in ſuch pernicious ſecrets.

The malt liquors that chiefly circulate in the home markets, are, London Porters, Burton and Yorkſhire Ales, Dorcheſter, Marlbrough, and Ramſbury Beers. Thoſe principally exported are, the ſaid London Porters and Briſtol Beers; and as theſe are all calculated for the markets, and, tho' generally eſteemed, cannot be expected to equal the excellence of ſuch as are for domeſtic uſe, for the ſervice of great families, where this perfection ſprings merely from ſkill, and wholeſome ingredients.

The beers brewed for domeſtic uſe are as various in their complexions and qualities, as thoſe for the market, or as cuſtom or fancy happens to dictate. In general, the northern taſte, is Brown, or Brown and Ambers mixt; the ſouthern, Amber, Amber and Pale mixt, or Pale only; and the mode of brewing, either of theſe ſimple or mixt, will

will be noted in due order, and their respective qualities properly inveſtigated; and here I ſhall beg leave to make a brief digreſſion.

In my memory, brewing for the markets, was within a very narrow compaſs, but has extended, by degrees, on its being apparent, that at a low duty, brewers could make their beer better, and ſell it as cheap as it could be brewed in private families, free from caſual expence, hazard and trouble, and the revenue at the ſame time conſiderably benefited. But as common brewhouſes increaſed in the metropolis, and were diſperſing all over the kingdom, the government, as in a fit of the ſpleen raiſed the duty, put a full ſtop to theſe growing improvements, until the difference between ſuch private families that can, or that cannot conveniently brew for themſelves in London, is eight ſhillings in every thirty ſix; and in the country, the ſame in every thirty two gallons of ſtrong beer; and it is in a purſuit like this, or ſomewhat ſimilar, that our internal trade, like the priſoners on the iron bed of the Attic robber, is put on the full ſtretch, waſting its genial ſpirit, and gradually declining

ning into ruin. When it was more than probable in this particular caſe, that had common brewing been permitted, by means of a ſmall duty, to have taken its free courſe, a better ſupply would in time have reſulted, and common juſtice ſo far have taken place, that all would have paid alike for ſtrong beer; I would not willingly accuſe men in power for having heads finely turned for calculation, any more than prophetic foreſight; but if it be true, as is but too evident, that our internal trade in general is on the decline, and high duties on the manufactures, and on the manufactory materials, foreign and domeſtic, the true cauſe of that decline, the conſequence is likewiſe very evident, that both trade and ſupply will dwindle into nothing together, and prove to ſome purpoſe the folly of high duties. I ſhall now return to my ſubject.

THE

The Philosophy of Brewing;

OR, A

COMPENDIUM

OF THE

ENGLISH BREWERY.

MY Philosophy here, is not intended that mode of speaking in words, and terms, unintelligible to nine tenths of those, who may desire a thorough acquaintance with the subject, but merely that plain sense and reason of things, whence springs an accurate knowledge of the virtues and qualities of the several species of Grain, Vegetables and Seeds that may be used in the Brewery, and how the same may be in various cases applied for Health, Pleasure, and Profit.

Wheat is the prime seed, for the manufactures of Bread, Beer, and Spirits; and

and the flour of infinite utility in a number of occupations, not at preſent to the purpoſe. It has been ſlightly mentioned before, but here more maturely to be conſidered, becauſe, tho' at preſent but little regarded in the brewery, is yet an important article.

The chief countries for raiſing this grain, and that lye to the northward of the great range of chalk hills, are the counties of Huntingdon, Northampton, and Leiceſter, moſt generally clay ſoils, with very few ſtratas of marle; and as the lands are neceſſarily to be manured for three ſucceſſive crops or more, and wheat the firſt of theſe, it follows, that ſuch manure muſt be uſed as ſuch counties can afford, which is moſt generally horſe-dung, with ſuch other mixtures as may be had, none of which are proper for any grain to imbibe, that is to be uſed for fine beer; and ſo far the diſuſe is accounted for; but where this grain is raiſed on marled lands, or freſh ground, the ſenſe of its fœtidity vaniſhes, and we come to conſider it in its pure and natural ſtate. That it has more ſpirit and body than barley, is, I preſume, not queſtioned, but in what proportion, nothing

nothing but experiment can announce, and that evinces it to be nearly on a level with the cuſtomary difference of price at market, tho' that variance often depends on other circumſtances, and is not an expreſs rule; but it has been found, and the diſtillers know well, that a buſhel of malted wheat, is equal to one and a half of barley; and here the benefit of uſing wheat in preference is evident, as it ſaves one third in the expence of malting, which I ſuppoſe is ſo far the ſame in the brewery, as in the diſtillery. This is an evident advantage, the hazard in uſing it for beer, as tainted by the manure, is a ſenſible objection; but as that is poſſible, in many places, to be avoided, I think is not an abſolute objection. The next objection I can ſay from experience is a miſtake, which is, that it draws off from the maſh, thick and mummy; and ſo it may, if good management be wanting; but as eight buſhels of wheat malt make the ſame quantity of beer as twelve of barley malt, and the conſiſtence not more clammy, the liquor with due care in the maſhing will run off equally fine, from the one, as from the other. The white

wheat,

wheat, pale malted, is in this caſe to be much preferred, as it will work more free than when quick dried, and will preſerve ſomewhat a better color than the red wheat; but if the land on which it is raiſed be not conſidered, the beer will not be agreeable to nice palates, and herein is all the hazard.

Oats are much on the other extreme, they have neither in them the harſhneſs of the barley, nor mumminess of the wheat, the flour ſweet and delicate, and when properly ſelected and tenderly malted, bid the faireſt of any to act as a vinous diluter, and may, well managed, anſwer a better purpoſe for digeſtion than light wines, and much apter for an Engliſh conſtitution; they muſt not be thrown off with cold water, as is cuſtomary in oat ale, they muſt be maſhed warm, and if poſſible the whole thrown off into the receiver, with the liquor only once run through them, quickened with freſh currant juice, or white bulaſſes, boiled about fifteen minutes, and worked off like other beer, with as little yeſt as poſſible, this will be a real wine.

The

The fruit juices as above, may be preſerved with virgin honey, or loaf ſugar, as moſt convenient to ſeaſons of brewing, when not to be had freſh; and about a pound of either is ſufficient to a hogſhead of beer; they will aſſiſt as well to the flavor and fineneſs, as to the quickning it for uſe, and at the ſame time eſſentially contribute to the correcting that ſcorbutic dryneſs, ſo common to all malt liquors, owing to the heated quality of the grain in malting; theſe fruit juices may be ſafely thrown into the boil, and will aſſiſt all future fermentations in the wort, and in the tun; and as to the method of uſing or applying hops, a neceſſary quantity will be ſeen in the next ſection.

What may be ſaid upon HOPS *different from other People.*

It is not the Brewers buſineſs to raiſe or cure Hops, but to know when they are good, and how they are to be properly uſed.

The running the liquor through part of what is to be uſed, to prevent foxing may be well enough, but the boiling them in the groſs ſeems a miſtake.

Hops are allowed to have two diſtinct qualities, as almoſt every thing in nature has, and ſuch qualities diametrically oppoſite to, and as correctives to each other a kind of counterbalance, that neither may be too prevalent; and one being the ſoft ſaffrony quality we eſteem homogenous, the other the reverſe; common ſenſe ſeems to dictate an abſolute ſeparation; but how this is effected by boiling, I muſt confeſs I am not chymiſt enough to diſcern.

The firſt quality to be extracted, is a ſoft, pleaſant, bitter and aromatic taſte, the reſidue of no real uſe, either as to health, pleaſure or preſerving the beer. The extract is to be made by decoction, in a machine commonly uſed for extracts, by an equal degree of heat; and the ſufficiency of the extract, or ſeparation of qualities, to be eſtimated by a very eaſy experiment, by three trials; as ſuppoſe it be found, that the extract in groſs may be made in ſix hours, the medium in four, and the latter, or the moſt proper to be uſed, in two hours, the diſtinction will be given by the taſte; and this experiment evince, what it is that gives beer the fine, and what the

fœtid

fœtid flavor, and then every one may apply them as may beſt ſuit the purpoſe.

The general rule for hopping, is as to the time of beer being to be kept, and proportion of barley malt to be uſed; that is to ſay, to every quarter of malt, for ſo many months as you intend the beer to keep, for each month one pound of hops.

If hops be uſed by decoction, and properly drawn, the extract from one pound is amply equal to the like quantity uſed in the groſs; and the different manner of employing it only this, that inſtead of boiling a conſiderable time in the wort, it be only thrown in about five minutes before the wort is run off into the cooler, taking care that it be of ſuch a degree of heat, as not to check the boil; and when hops are well choſen and ſo uſed, neither the public brewer, nor private family, if their malt be perfect, need fear having a fine flavored beer. And the choice of malts are to be ſelected from the following table, which is only intended here to ſhew, what extracts will fine ſpontaneous, and what muſt be precipitated, or made fine by art, in proportion as they

are lower, or higher, ſlower or quicker dried, as the ſame are uſually meaſured and determined by the thermometer, in every body's power to experiment; and which, after having once tried, an attentive obſervation will ſufficiently anſwer the ſame end. This is very far from being a needleſs curioſity, as it is extremely proper for every one that brews, to make a certain judgment when his beers will come about, for uſe, from a natural effect, or by art. And as it is agreed, that extracts from pale malts, gradually perfected, will in proportion be ſooner fine than ſuch as are malted quicker, and as there are various degrees of malts from very pale or white, to very brown or black, and as we cannot always command our choice, it is very neceſſary at all times to know, how ſuch as can be immediately got may anſwer what we intend. There is no depth of philoſophy, or uncommon cunning, requiſite to underſtand this, but only that kind of ordinary attention, neceſſary for every one that may attempt brewing to any degree of perfection.

The

The TABLE.

Malt, its degree of dryneſs,	The time Beer will be in order,	Fine in the natural way, or by precipitation.
124 Pale Yellow	60 days	
129 Bright ditto	120 ——	Theſe fall naturally fine.
134 Amber	4 months	
138 Light Brown	3 ——	
143 Brown	4 ——	Bright by precipitation in a ſhort time.
148 Middling	6 ——	By precipitation in that time.
152 High brown	12 ——	
157 Dark brown	18 ——	Theſe will fine to ſome tolerable colour but never bright.
162 Brown, with black ſpecks	2 Years	

Theſe are hints ſufficient to guide any one in the choice of his malts, as it reſpects the color of his beer, and the time it will be fit for uſe if judiciouſly brewed; and the experiment is to be made in the kiln as ſoon as the malt is perfected, and uſed as ſoon after as poſſible to preſerve the genial ſpirit. It has been ſaid before, what quantity of hops are requiſite to each quarter of malt, and how the ſame are to be prepared; but here it muſt be conſidered,

that if the beer is to be ſent into a warmer climate in the caſk, one third more hopping is abſolutely neceſſary, or the increaſed heat will awaken the acid ſpirit of the malt, give it a prevalency over the corrective power of the hop, and ferment it into vinegar: to avoid this ſuperior expence of hopping, the London and Briſtol beers are uſually drawn off and deadened, and then bottled for exportation; this really anſwers the purpoſe one way; but whether counterbalanced by charge of bottling and freight, &c. thoſe who deal in this way can beſt determine. By a parity of reaſoning, beer brewed here in the ſummer require more hop, than in ſpring or autumn, and by a continued parity, leſs in the winter than in warmer ſeaſons; but as nothing but neceſſity can induce brewing in either hot or cold weather, this is only hinted where ſuch neceſſity preſents.

The London Brewery is now arrived to a certain pitch of excellence, and with the moſt ordinary malts and hops can, and do ſometimes manufacture by much the beſt beer in the kingdom, and would be every where ſo eſteemed, did not

not avarice too often gain the aſcendant, and put the brewers upon ſchemes to ſpoil their own commodity by blending different beers, and uſing other artifices, that makes them oftimes ſomething more than diſagreeable; but as their bad practice will neither alter the nature of malt and hops, nor demean their ſkill when they employ it juſtly, this brown beer, uſually called Porter, will ever, when properly brewed, command a preference, and is moſt in order to lead the way to the beſt inſtruction in the Art and Myſtery of Brewing malt liquors.

The Method of Brewing LONDON BROWN BEER, *under the Name of* PORTER.

It has been cuſtomary in the practice of brewing, to run their liquor out of the copper into the maſh tun, to await the ſteam flying off until the brewer could ſee his own face in it, and then pour in the malt; this being an uncertain courſe, and ſubjected to many inconveniencies in the maſhing, a quite different, and much more eſtimable method is now purſued, by firſt judging of the requiſite heat in the copper by

the thermometer, by firſt ſupplying the maſh tun with a proper quantity of malt, and by running the liquor into the falſe bottom, from whence it ſprings up through holes in the maſh tun, and intermingles with the malt; it is then raked to open and ſeparate the grain, and then finiſhed with oars or paddles to perfect the ſeparation, and give all the viſcous juices into the decoction, the oars move perpendicular, as the rakes in an horizontal line, and ſo theſe two various operations act to full effect.

The approved cuſtom is to rake half an hour, and oar one hour, in the firſt maſh, and to allow the ſame ſpace of time, viz. one hour and a half for ſetling.

After this time for ſetling the griſt at the bottom of the tun becomes more compact, the liquor is a longer time running through it, conſequently draws off more from the body of the malt, and becomes more clear and tranſparent.

The infuſion having now received all the power from the maſh the adapted heat could give, it is then drawn out of the tun, and the thermometer is ſet at the under back cock, from whence to form a judgment of the rectitude of the proceſs. The

The water ſhould as near as poſſible boil for every maſh, the fire then damped, and the water lowered again with as much cold, as will reduce it to the degree of heat requiſite to the maſh.

This is the practice, tho' I am at a loſs for the reaſon why it ſhould be firſt heated ſo high, and then cooled to a medium, ſince, as the brewer works by a thermometer, he might aſcertain the heat without this double trouble; but ſo it is, and I ſuppoſe there may be a reaſon for it out of the road of my apprehenſion, and my buſineſs here is only to ſtate facts.

As to the number of the maſhes to be made from the ſame griſt, whether two, three, or four, is an arbitrary circumſtance, not always the ſame, but the common brewers lengths for this ſpecies of beer are at a medium, two barrels and a half to each quarter of malt, each barrel 36 gallons; I am more particular in this, as the country barrel is but 32 gallons.

It ſeems needleſs to mention here, that the extract from the tun is paſſed into the under back, and thence pumped into the copper, except that in its courſe it paſſes through a certain quan-

tity of hops in nets or wicker baſkets, to prevent the acid of the malt riſing into a ferment out of time and foxing the liquor.

Worts in this courſe are moſt uſually boiled to a heat of 212 degrees or upwards, and the more above that the ſtronger the liquor is; the perſon who would brew by ſome rule, and does not conceive the meaning of this, muſt excuſe me if I ſay, that nothing but the uſe of the thermometer can aſcertain the proper degree of heat, and if not uſed, inſtruction this way is vain, as all elſe muſt depend on practice; and as the knowledge and uſe of the thermometer is eaſily obtained, and the inſtrument every where to be had, I will attempt in ſome part of this work to give a conciſe and plain deſcription of its uſe and application to this ſubject, ſuch as a very moderate head may underſtand, and ingenious mind find various uſes for.

As the wort iſſues from the copper it loſes more heat than at any equal ſpace of time afterwards, and as the air differs ſometimes ſeveral degrees in the ſame day, if the wort in the cooler was ſuffered to continue until the return of a greater heat in the air, it would expand,

and

and be put again in motion, and this probably produce a certain degree of fermentation carefully to be avoided, and is what the brewers term the *backs being set*.

This is a plain reaſon why wort ſhould not be permitted to continue ſo long as to be ſubject to this injury, as it may happen in little more than twelve hours; hence it is likewiſe plain, that the worts ſhould be ſpread thin in the cooler, ſo as to be drawn off in that ſpace of time; in the ſummer it is ſufficient if the floor of the backs be covered; in winter may be allowed the depth of two inches.

Worts often, by caſual defects or irregularities in the coolers, make a true judgment of their degree of heat, or temperature, uncertain, and in ſuch caſe difficult to determine by the thermometer; in ſuch caſe the heat of the hand may be applied, and the beſt gueſs that can from thence be made; it will cool ſomething as it runs into the working tun, and that difference muſt be allowed for; in general, what ſtate the worts, for the ſeveral ſpecies of malt liquors ought to be in, when the yeaſt is apply-

-ed, may be nearly ascertained by the subsequent table, calculated to the heat of the air in various habits, and when their state is so untoward for proper fermentation, and can't by any other means be reduced in time to a proper degree of coolness, the air may be admitted about an hour before sun rise, as then in its coolest state.

The TABLE.

Heat of the air,	Common small,	Keeping Beers,	Amber or Ales.
25	75	59	55
30	70	56	54
35	65	53	53
40	60	50	52
45	55	50	51
50	50	50	50
55	}		
66	}		

I must confess, that there seems to be some mistake in this table; but as it is the calculate of an ingenious man, and perhaps false printed, and as an investigation would be too curious for the present design, I must wave my opinion until experiment shall evince its rectitude,

tude, or give me opportunity of forming another more correct.

To attain a certain degree of heat, adapted to the ſtate of the air, is doubtleſs an important point, and could we aſſure it, the moſt tender part of the whole proceſs would be eſtabliſhed on a ſtable baſis; as it is I can only ſay, that even an attempt of this kind merits eſteem, and if correct, honor; but at laſt I am apprehenſive, that the changes of air in this climate are ſo ſudden and common even in the ſpace of twelve hours, almoſt every day, that was a table calculated on the moſt abſolute certainty, it would in this caſe but little avail us.

Yeaſt is uſed to produce fermentation, and that from the ſtrongeſt beer the beſt, and ſo in proportion. The quantity neceſſary, may be from three pints to a gallon or upwards, as the wort for different beers may require, and this only to be judged of from its nature and operation, as it is not to be all applied at once, but the fermentation ſo gradually to be ſupported, until it has paſſed through a due courſe of working, and then when fallen from its prime altitude about

about half way, is as the brewers term it, to be cleanſed; that is, drawn off into the caſks, and there prepared for a new fermentation; as the preceeding will by that means be checked, it is therefore neceſſary on the cleanſing, that ſome more yeaſt ſhould be added to the tun before removal; and the beers before they be thus divided, ſhould be well ſtirred for at leaſt half an hour, eſpecially in ſtrong beers, becauſe of their greater tenacity, than liquors of a leſs degree of ſtrength, even to an hour if very ſtrong, as it will by that means be more ready to ferment again in the caſks, and one ſixth part of the yeaſt reſerved for this ſpecial purpoſe. And it is only to be obſerved, that when after long working the head ſinks in the middle, is more ſolid, and the colors vary to a higher yellow or brown, the wort is then in a proper ſtate for cleanſing.

Beers brewed for keeping, without precipitation or fining, paſs through the firſt proceſs of ferment till ſo attenuate, or broken, that the liquor becomes light, the yeaſt head deſcends to half its greateſt height, and a vinous ſmell enſues;

enſues; it is then in a proper ſtate for cleanſing.

As to beers that require precipitation, as produced from quicker dried malts in various degrees, as Porter, &c. the top of the yeaſt when roſe to its height, that part which appears foul is to be ſkimmed off, and the remaining head from time to time gradually beat into the wort, as much as poſſible, to ſeparate the cohefing particles, and ſed with freſh yeaſt; the head is to be beat in every two hours for ſome ſmall ſpace of time, until reduced to the loweſt it is capable; the whole of this proceſs then, depends on obſerving when the head ceaſes to riſe to its accuſtomed height, and then to examine from the bottom, whether the lees are formed into large white flakes, and readily ſubſide, the ſweet of the wort gone off, and the drink become vinous, the head is to be beat in as before, and then in a proper ſtate for cleanſing; the fermenting in winter or ſummer is only attended with this difference, that in ſummer two thirds of the quantity of yeaſt will feed it.

This intends only the mechanic operation, the regular and ordinary courſe of the proceſs, diſtinct from a philoſophic enquiry into the qualities of the reſpective materials, and eſſentially concerns thoſe to thoroughly underſtand who are not practiſed brewers, and is calculated to avoid a variety of repetitions, or of ſaying the ſame thing over again, when we come to diſtinguiſh the ſeveral methods of brewing, as to times, ſeaſons and malts.

The firſt proceſs is with the water in the copper, which is to be thinly ſpread over with malt duſt or bran, to prevent in ſome meaſure evaporation. The degree of heat proper for the maſh, is moſt correctly known by the thermometer, but where that is not in uſe, the heat to be acquired is nearly to a boil, and computed by the bubbles of air breaking through the cover of the ſurface, it is then much too hot for the firſt maſh, and when let into the tun before the malt, becauſe, without the thermometer, you can only judge of its proper degree of heat, in the old way,

way, by ſeeing your face in the water; then about ſeven eighths of the malt intended for the whole gradually ſhot in, ſufficiently cool after being ground; the maſh is after this, and as the malt ſhoots, to be moderately diſperſed by oar or paddle, for an hour at leaſt, and to have an equal time for ſetling. Antiſts uſe the rake firſt half an hour, and the oar an hour, and allow the ſame time for ſetling, as is remarked in the preceeding ſection; the rake is certainly beſt at firſt, as it readily ſeparates the grain, and prevents a poſſibility of clotting, as the rake or oar is employed, and the maſh cools, more liquor ſhould be gradually let in from the copper, until, at the concluſion of ſtirring, a ſufficient quantity is furniſhed for the firſt wort.

When that is ſupplied, the copper muſt be repleniſhed for the next maſh, and when the firſt wort is run clear off, let in ſomething warmer than in the firſt, in which caſe your judgment muſt be meer gueſs-work without the thermometer, but the feel by the hand will in ſome meaſure determine it tolerably well,

well, after a little practice, but for various reaſons never be certain.

In the running off the firſt maſh, about one fourth of the hops intended for the whole muſt be put into a fine net, faſtned to the maſh cock, or ſome other way ſo placed, that the liquor may paſs through the hops in its paſſage to the receiver, and carry the prime flavor of them with it. This is done to prevent the acids riſing in the wort to a ferment out of time, and tainting or foxing the drink, which without this precaution commonly happens, and the ſame hops are to continue for the like purpoſe in the ſecond running.

When the ſecond maſh is provided from the copper, the firſt wort is to be pumped or laded into the copper, and here no rule can ſpecially direct, only in general that the time of boiling, and quantum of the hops to be uſed, is to be proportioned to the time of keeping and ſtrength of the wort, more malt requires more hops, and more hops more boil, as longer keeping is required. The medium is one pound of hops to one buſhel of malt, I ſuppoſe both good of their kind, that the hop feels well in the

the hand, with a quick aromatic flavor, and the malt ſweet and floury; if ſuch drink be boiled one hour, at eight buſhels to the hogſhead, and brewed in October, the ſeaſon kindly, it will very well anſwer to a year's keeping, and of this proportion, higher or lower, a tolerable judgment may be formed.

It is uſual among the great brewers to blend their old and new beers together, either when overſtocked, or when deficient of ſuch as are proper for the tap, as ſo blending bring them to a medium between mild and ſtale, it is true, that drinks this way will never be right, tho' perhaps not totally unwholeſome, neceſſity ſeems to have no law, the brewer does not chuſe to loſe his over ſtale beer, and proceeds in this manner, in the guile of new beer intended for blending with the old, inſtead of eight he uſes fourteen pound of hops, and this quantity being preſumed a proper corrective, the new is then ſtarted into the ſtale, and when blended, is intended for keeping, from ſix to twelve months.

The proceſs of the ſecond wort being the ſame as the firſt, they are both in the ordinary courſe, after each other from

from the copper, to be run off into the upper cooler back, and there laid as thin as poſſibly the extent of the back will permit.

The manner of their hopping may be, either by a ſeparate decoction, or as groſs in a bag, when the decoction is prepared ſeparate, the quantum thereby extracted of pure bitter may be equally divided into the two boilings, each about five minutes before the drink is run off into the cooler. This will be the beſt liquor, but as moſt people chuſe to have as much as they can out of the hop, and think they procure it by boiling, they are ſo to uſe it to what degree they pleaſe.

When the two boilings are blended together in the wort tun, the next conſideration is the management of the ferment or working.

I muſt here premiſe, that the rule preſcribed, of only two extracts, is on a ſuppoſition, that good ſmall beer is to follow from the ſame maſh; and as in that caſe, the two extracts will be of greater body, than if three had been drawn in proportion, leſs yeaſt will be required in the fermentation nearly two eighths

eighths, ſo that if eight pints is uſually thought requiſite to a quarter of malt thrice drawn, ſix will in this caſe be ſufficient, if brewed in October, or when the natural ſtate of the air is in the like degree of warmth; and in the ſummer four pints uſually ſufficient, and the ſmall beer requires only one third of the quantity adapted to the ſtrong.

One other obſervation is extremely requiſite as to yeaſt; it is to be carefully regarded from what fountain it proceeds, as there is a very material difference in ſuch as are from ſmall beers, and ſo upwards to very ſtrong, the ſtrong being much ſuperior for the purpoſe; therefore, when it is ſaid that ſuch a quantity is proper, it is intended it ſhould be above the common medium, and if poſſible from the ſtrongeſt beer, for on the ſtrength of the yeaſt depends the proportional quantity, as well as upon the quality of the air, and ſeaſon of the year; nor is the whole quantity proper to be uſed at once, as too violent a fermentation will break the air bubbles that ſpring in the ferment, and deſtroy the gradual action, which can only preſerve the due order of this

proceſs,

proceſs, intended to attenuate the parts, to throw off the moſt pungent, and cauſe the heavier to ſubſide. There is often various heterogeneous matter, by the working thrown up to the head of the wort; and if not ſkimmed off, will in the event ſubſide, and foul the drink, or give it an ill taſte. This muſt be carefully attended to.

When the fermentation is determined in the tun, the reſidue of the yeaſt is to be thrown in, and the wort to be moved with ſcoops, or ſuch like inſtruments, for about an hour, and then cleanſed into the caſks, where it will by this method obtain another free fermentation.

The yeaſt being formed of the coarſer oils of the worts, therefore great care ſhould be taken, that the cleanſing be effected when the head is fallen half way from its prime height, as if ſuffered to ſink lower, part of theſe oils mix with the beer, and give it a flat greaſy taſte, in the Brewers technic, termed *Bitten*.

On the contrary, if cleanſed too ſoon, as not having been ſufficiently fermented, precipitated their lees, or thrown up their

their coarser oils, the vinous quality will be less, and the liquor heavy as ill brewed ales, and in the brewers phrase are said *not to be sufficiently opened.*

The first token of fermentation is a clear white line composed of slight air bubbles, ranging round the side of the tun, it is then said *to have taken yeast.*

When these are extended over the surface, as they gradually spread, the wort is said to be *creamed over.*

As these continue to rise they form a thin superficies, the fermentation increases more on the sides than in the middle, by which it is perpetually repelled, by the wort parting from the tun side.

After this the head becomes uneven, it has the appearance of rock work, and is only remarked by its height; it then becomes lighter, more uniform, and of a greater depth, rounder and higher in the middle, and having a tendency still to rise, is not yet *fit to cleanse.*

When rose to its utmost height, as may be perceived by its inclination to descend, it gradually falls into a hollow in the middle, it then appears more solid, and the colours changing to a high-

er

or yellow or brown, the wort is prepared for *cleanſing*.

After this no farther fermentation ſhould be permitted, for as has been ſaid, the head may in decline injure the drink.

I have been more particular on this head, as upon a thorough acquaintance with this branch of the proceſs, moſt eſſentially depends the producing of good beers, and therefore commands a more curious and correct attention.

As to ſmall beers, ſuch being haſtily carried on, it cannot be ſuppoſed that the like ſigns ſhould be regularly attended to, but may be in ſome meaſure determined, by obſerving, that as in the coldeſt ſeaſons the head will riſe to ſix inches, and in what is generally the warmeſt weather to one inch, the medium is three and one half inches, and the fall being one half, it is then in due order for cleanſing.

When beers are cleanſed or put up in the caſks a freſh fermentation enſues, in expectation of this, the bungs are laid gently on; and when the ferment is concluded, to be ſtopped looſe, but the vent peg for a time left a little looſe, until

until it is obvious that no farther ferment will for the preſent enſue; if then the liquor ſtands ſtill, and was brewed about October, nothing more is expected until the approach of ſummer, when the vent is to be looſened again, and its laſt ferment finiſhed.

Of Cellars for Beer.

The beer being in the caſks, proper cellarage becomes a neceſſary conſideration; of this, ſituation dictates much, and the reſt determined by art; in ſome towns, and in particular at Nottingham, the cellars are generally formed out of the rock, in ſome parts ſeveral ſtories deep, in ſuch places, by means of the equality of the air, beers well brewed, with ſufficient malt and hops, will be preſerved in good order many years; but as ſuch convenience is rarely to be had, the next beſt are dry vaults; the next ſuch as are conſtructed with thick walls on the north ſide of a houſe, and the door immediately opening from within the houſe, as in ſuch caſe, but little difference occurs from equality. The laſt are ſuch as the neceſſity of ſituation preſcribes, but will not anſwer the purpoſe for keeping beers, as being

ſubject to all the inequalities of air, and intemperatures of weather.

The difference of air in the ſhade, and in the power of the ſun, in the hotteſt days, is computed at ſixteen degrees, and the difference between the greateſt heat and cold in the latitude of London, as 75 is to 25; but in the common courſe of ſeaſons as 80 to 30, and beer cellars generally in winter hotter than the external air ten degrees, and in ſummer colder by five; but as from what has been previouſly remarked, ſituations are very different, and the temperature of the air conſequently the ſame, it will neceſſarily follow, that experience only can fix our judgments, as to the quality of the air, in this or that kind of cellar, as it may happen to be ſituate or conſtructed; and as cellars are not poſſible to be alike in all places, the above hints are as ample directions as can in ſuch caſe be given, in general they ſhould be as free from the various affections of the weather as poſſible, and the quality of the air, as to the extremes and medium being adjuſted by the thermometer, a concluſion may be formed to ſomething near an exactneſs, how far any

any cellar is to be depended upon for keeping beers, and to furniſh them accordingly.

The Care to be taken to have CASKS *always ſweet.*

What ever care may be taken that the ingredients be good, and the proceſs of brewing conducted with ſkill to the cleanſing, if the caſks be not ſweet the whole guile is utterly deſtroyed; as for this negligence, no apt remedy has been hitherto known, nor is there any neceſſity there ſhould, as the having veſſels in good order demands a moſt accurate attention; but this evil is not without remedy, if conſidered in time, before the drink is ready for cleanſing.

The foulneſs of veſſels moſt uſually reſults from their not being ſcowred in time, after being cleared from the drink, as a thick clammy ſubſtance adheres to their ſides, fill up the uneven ſpaces in the ſtaves, and ſuch matter hardning by the bungs being left open, as uſual in empty caſks, the power of boiling water, or ſuch like ſimple menſtruums, will not operate to any utility.

In the utenſils for brewing that are negligently left foul, the like difficulty doth but in part occur, as they are all

ſo open to be come at, as with birch brooms, labor, water and wood aſhes, they may at any time be ſufficiently ſcowred; nor are they in the like manner ſubject to the ſame ſtubborn adheſions, tho' the ſediments neceſſarily left, will give trouble enough, if not timely waſhed away.

When caſks are thus fouled, but two obvious remedies preſent, by the ſlack of time, or by taking out the heads; lime ſuffered to ſlack in the caſk, when the only aperture is the bung, may by its ſtrong alcalious ferment and auſterity diſſolve the corroded ſediment, and then warm water and wood aſhes probably waſh away the relicks left by the lime ſlack; after which, and when dry, if the fœtid ſour flavor is not thoroughly emitted, perhaps a few brimſtone matches may operate to effect.

If theſe fail, and the leaſt bad ſcent remains, after 24 hours being bunged up, the next recourſe is to taking out the heads, ſcraping the inſide as clean as poſſible, and then firing off the reſt with fir deal ſhavings.

We ſee by this what trouble and expence negligence produces, for had

theſe

theſe caſks been, as ſoon as out of uſe, well cleanſed with warm water, and when quite cold bunged, ſo as to be kept from air, and dirt, all rectification had been needleſs, but permitted to be filled in that bad ſtate, in one week, not only the drink be turned ſour, but attended with ſo rank a flavor, that even a new fermentation will not ſufficiently remove to make good vinegar.

Of Brewing in general.

All malt liquors are in one ſenſe brewed the ſame way; that is to ſay, the water goes into the copper, paſſes thence into the malt maſh, through that into the receiver, then into the copper again, thence into the cooler, thence into the wort tun, there fermented, and thence cleanſed into the caſk; in this general light the proceſs is alike, but in the mode of conduct, in the difference and quantity of the ingredients for the like proportion, in the color, flavor, fermentation, aptitude for precipitation, fining and quickening for uſe ſo very different, that we are obliged to give the drinks of various taſtes and qualities, as diſtinct denominations, as is given to the variety of foreign

wines, which being extracted from very different juices, merit that diſtinction; but the diſtinction of beers, ales, &c. reſult not ſo much from the difference in the firſt principles, as from the methods of manufacturing the ſame ingredients, by which they become, as it were, in their varied ſtates another kind of liquors, in ſo much that the word beer is in a great meaſure equivocal; ſo that a foreigner, who having taſted but one kind, and ſays he does, or does not like beer, in effect ſpeaks nothing determinate.

It is for this reaſon that a book written on the ſubject of malt liquors, muſt neceſſarily delineate the various ſpecies of beers or ales, extracted generally from the like ingredients, with ſome trivial exceptions, but materially altering, in the manner ſuch are manufactured; and as to the choice and application of them, as it reſpects precipitation, fineneſs, flavor, keeping, and other requiſite qualities, in which is conſidered, the nature of the barley, the fuel with which it is dried into malt, the high, low, and different mediums in the curing, the knowledge, uſe, and application of the

hop,

hop, and of ſuch foreign ingredients, as are ſometimes found neceſſary to bring liquors by art to the like apparent degree of perfection, as the ſame naturally arrive at, as when the ſkillful brewer only employs the common ingredients; and here it is previouſly neceſſary to ſay ſomething more critically on hops and yeaſt.

On HOPS.

I have conſidered this vegetable before, as ſeemingly compounded of two diſtinct qualities, the auſtere, or coarſe and harſh, and the aromatic, ſweet and unctuous; but it is poſſible, that this diſtinction only reſults from a different degree of maturation, produced by the power of heat, from the ſame genial principle; and as all vegetables, and fruits, are moſt perfect and delicious in their higheſt ſtate of maturation, in ſuitable climates, and hops only partially matured in this climate, it ſeems to follow as of neceſſary conſequence, that if we would obtain the full flavor and perfection of this vegetable, it muſt not be ſo uſed, as by any means to extract the immature, or auſtere, ſo as to blend it with the mature or aromatic, leaſt

the harſhneſs of the one, intermixing with the ſoftneſs of the other, deſtroy the main intent of taſte and flavor in the drink; I muſt therefore, as in a former ſection, here again give it as a right method, to extract the requiſite quality by a ſeparate decoction, as from thence only can be judged when you are arrived at a proper period.

Of YEAST.

It is ſaid by a very ingenious writer, thoroughly converſant in the practice of brewing, that if in the wort tun you ſuffer the head to ſink too low before cleanſing, that the coarſe oils of the yeaſt will intermix with, and greaſe the drink, and conſequently taint it.

It is ſaid again by the ſame writer, ſpeaking of the amber beer, that the yeaſt at a certain period is beat into the wort, and that notwithſtanding contrary opinions, he does not apprehend any ill conſequence therefrom.

This is the ſenſe, tho' not the expreſs words, and then it remains only to conſider, what difference there can poſſibly be, between letting the yeaſt fall gradually, and forcing it into the drink, as the latter ſeems to me to more

more eſtabliſh an intermixture than the former.

This I am the more particular in mentioning, as moſt of the drinks I am now to ſpeak of, have the yeaſt beat in, thence ſuppoſed made heady, and ſeemingly ſtronger than ſuch as are otherwiſe treated, brewed from the like quantity of malt, and I ſhould think, if the firſt principle be true, they will be greaſy and ill taſted. And this perhaps is what thoſe, who like to be intoxicated for a little money, call ſoft and ſmooth.

I ſhall therefore in the firſt place give the manner of ſo uſing the common ingredients, of water, malt, hops, and yeaſt, as to make a pure and perfect drink, at all ſeaſons of the year, of ſeveral degrees of ſtrength, and for various times of keeping, and calculated as well for the lower, as for the higher order of families; that is to ſay, for ſuch as brew much, and for keeping; as for thoſe who brew only a ſmall quantity from two, three, or four buſhels to thoſe who uſe as many, or more quarters of malt.

Moſt large and opulent families, who uſe much malt, have their own regular brewers; and as they generally ſucceed pretty well, may not be eaſily induced to vary in the minuteſt manner from their cuſtomary method; but it muſt be obſerved, that there is an eſſential difference between drinks brewed tolerably well, and ſuch as are at the ſame time intended to be of the vinous kind, calculated for health and pleaſure, and to bring malt drinks once more into vogue, by exalting the taſte, flavor, and power of dilution equal to wine, without any of the ordinary bad effects uſually reſulting from malts or wines.

Laying aſide vulgar opinion, that foreign wines are uſed by the rich, rather from vanity than taſte, it muſt be obſerved, that experience will always be ſuperior to cuſtom. Men who live luxuriouſly, and whoſe palates reliſh high ſauces, moſt neceſſarily, amongſt other diſorders, be ſubject to ſcorbutic humors, which vinous drinks, and light diluters, ſeem calculated to repel; from whence, by a parity of reaſon, it ſhould ſeem true, that unctious, nutricious fluids, have a quite contrary effect,

and

and ſuch are beers much boiled, and aley. Our buſineſs then is to prepare our malt drinks, as nearly as poſſible to anſwer the like purpoſe as foreign wines, in which view it is, that I propoſe the following directions; but as either prejudice, or a different turn of thinking, may induce many to better approve the mode of their anceſtors, I ſhall, after what I have to ſay on my own theory, diſtinctly ſtate the methods of the moſt noted breweries in England, as alſo private practice.

The Method of Manufacturing pure Malt Wines.

I preſuppoſe the copper placed at a proper height, and a tube ſo fixt, as to convey the water from thence into the falſe bottom of the maſh tun, and the copper to contain a ſufficient quantity of water to ſupply the maſh. The malt and hops in fine condition, and all the veſſels duely proportioned to the quantity cuſtomarily brewed, the rule now preſcribed is for the paler kind of malts, and for making two hogſheads of drink for keeping, with a reſerve for fine table beer, which, tho' beſt brewed alone, will by the method here propoſed anſwer very well and ſave a double brewing.

I likewiſe preſuppoſe the malt ground in an upper floor, over, and calculated for ſhooting into the maſh tun.

The PROCESS.

Into the maſh tun ſhoot twenty buſhels of malt, while freſh, but cool from the mill for the firſt extract, if you muſt make two extracts, as one only is beſt.

The water is to be heated in the copper, up to 140 or 45 degrees by the thermometer, as the malt is browner or paler, or as the ſeaſon of the year preſents. This is intended for October, and two or three degrees difference within the ſaid numbers, or under the loweſt, not very material, eſpecially if the malt has been long ground, becauſe then the extract will be readier.

The water iſſuing into the falſe bottom of the maſh tun, from the copper placed a proper height, will riſe through holes in the bottom of the maſh, in bubbles, to the ſurface of the malt; it is then to be moved with fine iron rakes for half an hour, and again, if not ſufficiently ſeparated, with oars or paddles ſome time more; and then to reſt one hour and a half; or until a fine white flake

ſlake ſettles at the bottom, and the extract comes off clear.

As this firſt extract is ſuppoſed for one hogſhead, it is neceſſarily preſumed, that the copper ſhould contain one hundred and ſixty gallons, to allow for imbibing, or what the malt will retain.

Then let two pounds of hops be put into a bunting bag, net, or prepared tube with a grate, or any vehicle that will retain the hop, and ſuffer the extract to paſs freely through into the receiver.

The reaſon of this is to prevent the acid of the extract riſing prevalent, and tainting, or, as brewers term it, foxing the drink, a taint that once attained, is hardly to be entirely remedied.

The maſh tun is then to be ſupplied with two buſhels of freſh malt, and the extract made in the ſame manner as before, except that the water let down from the copper may be filled up to full 145 degrees, and requires only one hour's raking or oaring, and the like time for ſetling.

While this ſecond extract is ſetling, the firſt is conveyed by pump, or lading, from the receiver into the copper; and here

here appears the convenience of two coppers, as in common brewhouſes, but as that is not in this caſe preſumed, one may ſuffice.

As to the time requiſite for boiling, depends upon circumſtances, that only the brewer in practice can truly regulate; extracts from the paler malts for keeping the year round, are not neceſſarily boiled more than half an hour; and it is left to conſider only when the drink is intended to fall fine, on which intention more or leſs boiling may be proper, and the above time is given as a due medium; but one rule never varies, which is, to let down the wort into the cooler as gently, and diſpoſe it as thin as poſſible, ſo as juſt to cover the bottom, and to paſs it cool into the tun.

The quantity of hops requiſite, will eſſentially depend on their goodneſs. The quantity of malt uſed, and the time propoſed for keeping; the time here propoſed, is the circle of the year, the quantity of malt 22 buſhels; and as the quantity of hops, in practice, is ſix pounds and a half to eight buſhels for a year's keeping, ſeventeen pounds four-

teen

teen ounces may be ſufficient for twenty-two buſhels; two of theſe have been employed in the extract, and to continue the third extract for table beer, ſo that only fifteen pounds fourteen ounces remain, from which an extract is to be made by decoction, the reaſon of which has been previouſly noted.

For this extract no regular preſcript can be given, as the proper height muſt entirely depend on the taſte, and arrive at perfection ſooner, or later, as quickened or retarded in the decoction; I can only obſerve, that a medium degree of heat, as equally preſerved as poſſible, will produce the fineſt extract, and even gradually diſſolve the coarſer oils; to avoid which, when the leaſt auſtere or harſh taſte riſes, you have gained as much extract as you ought to have, the quantum may be in any diviſion diſpoſed to the two malt extracts, a few minutes before they are ſeverally let down into the cooler back, and will anſwer a much better purpoſe, as to complexion, flavour, and keeping the drink, than if boiled groſs in the wort.

It is a known truth, that no active ſpirit can be produced from malt, except

cept it be firſt fermented, and the means of fermentation is equally known to be by yeaſt, ſo that only remains to be rightly appriſed of the quantity and quality. The curious always ſelect their yeaſt, when it is to be had from the beſt keeping ſtrong beers, becauſe of its greater ſpiſſitude, ſlower in its operation, more to be depended on, and producing a more cool and regular fermentation, as that from ſmaller drinks, acting too ſudden, puffs up the wort to a kind of fret, or efferveſcence, and for that plain reaſon, to be as much as poſſible avoided.

As to the quantity; this materially reſults from the ſtate of the air when it is to be uſed. The medium of air in Middleſex in October, is at about 45 degrees; and the proportion of yeaſt to one quarter of malt, in that ſtate of the air five pints, to a quarter of malt, or ſomething more, by which calculation any other proportion is readily known.

Fermentation in its proceſs has various appearances; its firſt is a white circle round the ſides of the tun, next in an even thin cruſt, then in a rough form, then more ſmooth and higher in the

the middle, and then begins to ſink. When declined about half way down, is what the brewers call *fit for cleanſing*, or, as they ſpeak in the country, *tunning off*. The fermentation then being determined, the drink muſt be caſked.

As on caſking the fermentation is impeded, the following proceſs enſues. I ſhould have obſerved before, that one fifth part of the yeaſt pre-aſſigned ſhould be reſerved, and now on cleanſing thrown into the wort, and that well ſtirred for an hour before, put into the caſks, hence a freſh fermentation ariſes in the caſks, and when that is over, the operation is totally finiſhed.

The ſpring following, it will probably ferment again for the laſt time, ſo that on the approach of March, the vent peg ſhould be looſened, and when the ferment riſes, if the caſk lie on the bulge, the bung looſened, and ſo the head bung, if they ſtand perpendicular; perhaps a vent peg in the center of the bung may be ſufficient.

This drink, accident omitted, will fall ſomewhat fine at Midſummer, or perhaps ſooner, as incidents occur, without uſing art; but will not be fine enough

enough for bottling perhaps until September following.

To avoid breaking into the proceſs, the table beer, or what was intended for it, was left in the maſh tun, and two buſhels of malt from the three quarters reſerved to be thrown in, as alſo one pound fourteen ounces of hops, the main courſe of the proceſs is to be purſued as before for the ſtrong beer, but from this, one hogſhead is to be extracted. There is only to be obſerved in this laſt extract, that if it is intended for ſummer drink, and to fall fine in due time, four pounds of hops is ſufficient; and if for more early uſe, or what is called preſent ſpending, the reſerved quantity is very ſufficient; and on theſe principles, to be only boiled half an hour, or fifteen minutes, at diſcretion; in the laſt caſe it will come round, and may be drawn from the caſk, or bottled in ſix weeks; the yeaſt to be uſed in fermenting the wort, if from ſtrong beer, need be little above the proportion of one third the quantity of what was applied to the preceding extracts, but that as it is found to operate.

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I have only left to obſerve on this head, that after the hops in the net, or other machine, the extracts paſſed through, and thoſe left in the decoction, are done with, they may be dried again, and burnt, the aſhes being replete of fine ſalts, will be an excellent manure, for a bed of light earth, whereon the moſt curious ſeedling flowers are to be raiſed.

Of LONDON AMBER *and* BURTON ALES, *as managed by the common Brewers.*

Practice will always have the advantage, when at the ſame time theory, or the principles of an art, are thoroughly underſtood, without which, the beſt practice in theſe kind of compoſitions, are apt to deceive, without the practiſer being able to account for, or amend his error; when a miſtake happens, and therefore a previous theory requiſite, this will appear more evident, as we proceed in diſtinguiſhing the various kinds of malt drinks; but here the gentleman is to take care to diſtinguiſh himſelf from the brewer, as the latter forms his mode of management from a view of profit, does many things a private family muſt not do, to make his drink ſtronger or more

more heady, than the quantity of the ingredients, or natural quality of the extracts, will regularly bear; while the former is only concerned, to have his drink as ſtrong and fine, as the meer common ingredients and plain management may effect, unleſs he brews for election beer, or ſuch like wiſe purpoſes, and then may uſe the brewers art in what manner he pleaſes, but will hardly be induced to injure himſelf and family, for the vanity of ſaying he has ſtronger drink with one, than his neighbours with two quarters of malt.

This I preſume may be a ſufficient hint, to avoid being prejudiced to that part of practice, where health and pleaſure are proſtituted to licentious profit, and only to ſelect from practice, what may conduce to the eſtabliſhing the art of brewing on the baſis of rectitude.

AMBER is the medium degree of color, between the high brown and clear pale malts, and conſequently dried to the like proportional height, and at that height of drineſs will require two barrels of water to wet one quarter of malt in the firſt maſh, as near half that quantity will be retained after the extract; but

but as the grain will be nearly full, the ſecond extract needs little more than half the quantity of water, unleſs, as in the former chapter, it is ſupplied with freſh malt, and then in a common proportion.

The proceſs is thus purſued. The water is heated for the firſt maſh to an ebullition, and reduced again, by *cooling in*, as the brewers term it, i. e. uſing as much cold water, as will bring the whole to an even temperature, and then letting it down into the maſh tun, it is then raked and oared one hour and a half, and after the ſame time ſetling, is let gradually off into the receiver, and thence pumped into a ſecond copper; this is purſued in the ſame order by a ſecond, third or fourth extract, if ſmall beer is not to follow, and then uſually boiled a full hour; in this courſe the hop, both as to quantity, quality, and application, is quite arbitrary, or dependent on the time the drink is to be kept; ſome ſuſpend part of the quantity in the firſt water for the extract, and boil the reſidue in the wort, and ſome run the extract through part, and then boil the remainder; and is uſually

calcu-

calculated at one pound of hop to one quarter of malt for one month's keeping, and ſo in proportion for any given time; but in ſummer requires double the quantity, and more, the medium is about three pounds for two months keeping.

The working is the ſame as in the preceding chapter, except that the yeaſt is periodically beat in, as the brewers ſay, to attenuate the combined particles, and make the drink fall ſpontaneouſly fine; and if this be true, and all the effect, it is very happy for thoſe who drink it.

Beſides this, to the like purpoſe, after cleanſing, and to bring it early about, the brewer uſes an artificial fermentation from time to time in the caſk; this rouſes the active ſpirit, breaks and diſperſes the unctious quality, and the baſis that feeds it being ſo diſturbed, it quickly comes round.

The brewers that are critically correct in the management of the fermentation, propoſe the thermometer for their guide, to be truely informed at what degree of heat the wort ought to be, when the yeaſt is applied; and as by

by their calculate, the extremes are 25, and 55, the medium heat of the air is 40 degrees, and this the beſt ſeaſon; in ſuch caſe the heat of the wort ſhould be at 52 degrees by the like meaſure.

The reaſon of this exactneſs ſeems to be, that if the wort be too cold, a longer time is required to make them ferment, and then with more difficulty become fine; on the contrary, if too hot, a waſte of their ſpirituous parts enſue; and if not kept a time to remedy the defect, may be foxed.

As to the quantity of yeaſt to be uſed, ſuppoſing the air at the above medium of 40 degrees, and no ſmall beer to be made, the ſum will be eight pints to a quarter of malt, at the higheſt degree of heat ſix pints, and at the loweſt nine pints; but this, as ſaid before, depends on the ſtrength of the yeaſt, and to be computed accordingly, and always a fourth or fifth part reſerved for the caſks after cleanſing. Note, the quantity of yeaſt required is moſt to beer long boiled.

BURTON ALE is the like kind of liquor as amber, and the proceſs much the ſame, but there is a material difference

rence in the lengths, or quantity extracted from the like proportion of malt, as alſo in the quantity of hop, as this is intended for longer keeping; as the length of the amber is from $1\frac{1}{2}$ to 2 barrels, and the Burton from one, to $1\frac{1}{4}$ from a quarter, or eight buſhels of malt. The quantity of hop is from one pound to ſeven, and the medium for ſix months keeping four pounds.

This is as much as is neceſſary to ſay on the proceſs of Amber and Burton Ales, they are both ſoft heady drinks, in no reſpect calculated for private families, nor for drinking as diluters any where; but if the latter of theſe was brewed in London, as the duty is on the barrel, and the retale price much higher in proportion, the profit muſt be conſiderably greater, than in brewings of a more extended length, both in reſpect of the duty, and expence of the manufacture, which is too obvious to need farther explanation; and conſidering the high price of malt and hops, and extravagance of the duty, I can perceive but one reaſon why any wholeſome diluters are brewed at all for ſale; and that is, for the great brewers to break the

the little ones, and then take the chance of better times; and if the ſame ſcheme rules above, I can only ſay, that it is to be lamented, not only as to this, but various other manufactures.

TABLE BEER, *an entire Brewing.*

It has been ſeen in every proceſs, that water is the firſt article, and ſo it muſt continue, but how it is to be managed, I, and the practiſed brewers, are not ſo well agreed about; their mode is, as before hinted, to firſt raiſe an ebullition by heat, and then, as they term it, *cool it in*; that is, to bring it to a due temperature, by a certain proportion of cold water; my proceſs is, to bring the water at once to the like temperature, before ebullition, or if you pleaſe to ſave double trouble, and for ſome other reaſons.

It is to be noted here, that when a certain judgment is to be made of a due temperature, we are equally guided by the thermometer. But the brewers hypotheſis is, that water in the copper is colder at the bottom, than at the top; and conſequently, not of equal temperature in every part. This may be true, as no doubt but the heated particles by

an increaſed levity fly up; but they ſay again, what is equally true, that as the heated particles fly off in ebullition from the ſurface, the moved water rolls downwards, the next heated parts replace the falling, and ſo a kind of circulation enſues, and conſequently is nothing hotter at top than at bottom, except juſt within the ſphere of ebullition; but ſuppoſe it otherwiſe, the cooling in can be no more preſumed to make the water of an equal temperature, than its being left at the ſame degree of heat, without riſing to an ebullition; for as it is in a quiet ſtate, or not much diſturbed as when boiling, and is neither let down immediately from the top or bottom, it ſeems in the paſſage through the cock to be ſo intimately mixt, or the variation ſo trivial, as that half a degree of heat, the moſt poſſible difference, can never make it eſſentially neceſſary to purſue the brewers double proceſs; more eſpecially, as experience evinces, that in the variety of powers, and heats, occurring in the ingredients for the extract, the ſum of half a degree of heat, or more, is not to be aſcertained by the moſt practiſed judgment; but it is a known

known truth, that if the water be not too hot, or not above 145 degrees, it being five or ſix degrees lower, will anſwer very well to any ſpecies of malt uſually employed, nor needs it that curioſity is carried to ſuch refinements, as to make the brewing of fine drink, ſo difficult and abſtruſe an art. Beſides, if the old way of trying the heat of water for the extract was found as to this particular very well, the experiment, as has been before hinted, is very eaſy, to find ſufficiently near, what the proper heat ought to be, by the thermometer at that medium; but as that way will not ſuit the preſent practice of the water riſing up to the malt, by a falſe bottom, inſtead of the malt being put to the water, what I have mentioned is only material, as to the experiment what degree of heat the water ought to have, by knowing what it is, when, according to the old meaſure, you can ſee your face in the ſurface, as may be done in any veſſel, merely to regulate the judgment by, if any doubt ariſes concerning the ſum previouſly given. And this I am the more particular in, as I do not find that the beſt practiſed brewers

are able to determine this point to any degree of certainty; nor poſſibly can, unleſs the quality of the ingredients be firſt well aſſured.

The PROCESS.

The firſt act of this proceſs having been thoroughly canvaſſed and conſidered, the next reſpects the malt proper for a fine vinous diluter, adapted to health and pleaſure.

Experience has ſhewn, that malt liquors either new, ſtrong, or aley, are not calculated for digeſtion, whatever other purpoſe they may anſwer. The lengths uſually run for common ſmall beer, are five barrels from one quarter of malt; but as this is too much for the preſent intention, as rather too weak, it is preſumed, that a length of four barrels may be a proper medium, being nearly the ſame, as the beſt Dorcheſter ſmall, and anſwers every deſired purpoſe, at a much cheaper rate,

The malt that produces the cleaneſt drink, and that ſooneſt ſettles ſpontaneous fine, is that which is moſt gradually kilned, and with the ſweeteſt fireing, as the curing, whence any ſmoak reſults, alters the taſte and very nature of

of the drink paſt remedy. This is the fineſt pale from the coake kiln, and extracts with leſs violence of heat, produces the ſame real ſpirit in the ferment, but is not ſo ſtrong, or groſs flavored on the palate, as what is in proportion higher dried.

The ſeaſons for brewing are October and March; tho' by various accurate obſervations it appears, that the air is ſeveral degrees hotter in October, than in March, the former ſucceeding the warmer, the latter the colder ſeaſons; on the other part, the warmth increaſes on the latter, and decreaſes on the former; and tho' the former is manufactured at a higher degree of heat in the air, the latter comes on ſooner. Theſe particulars make the apparent difference in ſome meaſure conſentaneous, and experience has given to theſe ſeaſons a general approof.

This drink is not to be run off at more than two gradual extracts, in the proportion above-mentioned, of four barrels to a quarter of malt; and as intended for ſix months before tapping, or ſomething more, ſo as the two brewings come properly round in due order, the

maſhing, hopping, and working, is much the ſame as in the laſt chapter, except as the acid will not be ſo prevalent, more yeaſt may be requiſite to a due fermentation, unleſs ſome vinous acids be thrown into the wort, not at preſent in practice.

It is a matter of diſpute among the informed in this art, whether high or low, tender or violent maſhing be beſt; but this argument, being rather between the brewer and the gentleman, profit and utility, than the nature and reaſon of things, it may not be improper here to conſider, that body is in ſome degree to be attained, as well as ſpirit, tho' not in the ſame degree for private uſe, as for ſale, and if over forced, makes the drink heavy and flatulent. The brewer uſually exceeds the proper medium of body; and for this ſpecial caſe of *Table Beer*, it would be very improper to maſh up to that medium, whether we conſider it in the appearance of ſalutary or bright; it is plain then, what the operation of maſhing ought to be. The merely ſeparating the malt, its parts, in ſuch a manner, as that every grain alike malted, may ſuffer an equal

equal extract, for as, if not well ſeparated, it will clot, or ſet, ſo if too violently forced, it will, like all other vegetables, emit a very diſagreeable, and perhaps not very wholeſome, ſubſtance, that will utterly deſtroy the intention of an antiſcorbutic diluter; the action of maſhing with propriety will then depend on the eye and judgment of the agent; as becauſe of various incidents, not theory, nor practice, can abſolutely dictate, and may only, as in general, be ſaid, that if moderately raking, will not produce a due ſeparation, apparent enough to any attentive eye; a farther proceſs muſt neceſſarily enſue, until ſuch ſeparation be effected, which uſually happens, if room enough in the tun, in half an hour or leſs, and then requires not any farther maſhing, but one hour afterwards will not be too much for the extract and ſetling, in a degree of heat as equal as poſſible; an hour may be ſufficient, as a ſecond extract is to be made in the like manner. In the proceſs for ſtrong beer, the extract paſſed into the receiver through two pounds of hops reſerved from the decoction; in beer of the moderate quality here pro-

poſed, one pound is ſufficient, as this is not in the like manner apt to run roapy, fox or taint, the fluid being lighter and thinner, and be conſidered as a general rule, whereby proportionally to be governed, according to the greater or leſſer quantity of malt uſed, and the lengths or quantity of drink to be extracted, and will hold as a maxim univerſally true, more eſpecially if the whole be of only one extract.

There is ſome diſpute, tho' I know not on what good grounds, whether in fermenting the wort, it is neceſſary to be worked in the tun at all, or only after cleanſing in the caſks? it is certain, that fermentation attenuates, and the purpoſe of attenuation is to ſeparate the groſs parts, and make the drink equally in all parts fine; the moderator in this is the hop, as without it, no ſooner the oils of the wort are ſo attenuate, as that the acid may predominate, but the wort becomes ſharp and pungent, from the operation of the air, as from the malt; therefore if the objection to the working in the tun before cleanſing be only the air's impreſs, it ſeems of little avail. The truth is, that the fermentation

mentation is to be as gradually and evenly continued as poſſible, until, by raiſing a ſmall quantity through the center of the wort, from the bottom of the tun, it appears bright, it is then in a ſtate for cleanſing; but as in cleanſing a flatulent diſorder will enſue, it is neceſſary that a light fermentation be, in the caſk, again encouraged.

I have only one obſervation more to make, which is, as this *Table beer* that is propoſed as a ſubſtitute for wine ſtrictly ſo called, or as other light diluting liquors of the vinous kind, the curious herein, ſhould make their wort from one extract only, if convenient, as it will be ſufficient to bring away the more lively and ſpirituous power of the malt, and the drink ſooner become ſpontaneouſly fine and tranſparent, the body, with a little longer continuance in the maſh be ſufficient, and at the ſame time to take due care, that the wort be ſupplied only with the moſt pleaſant extract of the hop, by decoction, as previouſly directed.

There will no doubt remain after this ſome ſtrength in the maſh, and thoſe who are not curious may eſteem

this waſte; but I am writing for health and pleaſure, and as but few will brew for the propoſed purpoſe, but what can either afford waſte, or that have not more ways than one for the diſpoſition of the reſiduum, I have only to remark, that as four barrels of fine beer from one quarter of malt will not, on an average, including all expence to a private family, coſt above forty ſhillings, or three pence halfpenny the gallon, it matters little what becomes of the waſte.

OAT ALE.

This drink, I preſume, by the ſimple manner of obtaining it, was probably the ſame as our anceſtors, the Britons, prepared for their feſtivals, and of which *Cæſar* ſpeaks in his Commentaries with much reſpect, and of the like kind, as the Indians in ſome parts of America extract from their maiz; and as being of a lighter quality than the preceeding, is here, in its proper ſtation, at the election of ſuch as may be pleaſed with the finer kind of malt liquors.

The oat is certainly the weaker ſpecies of grain, that is uſed in theſe ſorts of extracts; and the beſt oat for the purpoſe

purpoſe is the *white ſhort ſmall*, as being the plumpeſt, as having the thinneſt ſkin, and as yielding the moſt flour.

The malt is to be prepared in the like ſlack manner, as the paleſt barley, and may after grinding receive the air for two or three days with ſome benefit, as it will open with more facility to the following extract.

One quarter of malt is here propoſed to make an extract, or length, of two barrels, and conſequently muſt be ſupplied with one hundred gallons of water, to allow for what the malt may imbibe; the water, according to a preſcribed mode is to be cold, as intended only to extract the more ſpirituous, and to leave the coarſe oily quality behind; for which reaſon it is neceſſary that it be 24 hours in ſteeping,

The water is to be given in to a falſe bottom, as in previous brewings directed, but raked only at various periods, ſo as to preſerve a due ſeparation, leaving it at leaſt four hours to ſettle, as then the extract will be as perfectly made as this proceſs intends.

It may be now perceived, that the heat of the air in the proper ſeaſon for

this drink, between March and September, and the natural heat of the malt, will give a moderate warmth to the extract, ſufficient to draw off the finer oils, in ſome meaſure balance the ſaline, and fit it for fermentation without boiling.

For which purpoſe, and to give the extract its full power, the natural heats are to be as much as poſſible preſerved by well cloſing the maſh tun; and this with much the beſt effect if the entire extract be made at once, as the decoction will be more regular, the heats better preſerved, and no mawkiſh grainy taſte enſue.

When perfectly ſettled, it may be run off, either through, or without a decoction of two pound of ſuperfine hops, becauſe there is no fear of the wort, in this mode of operation, becóming roapy, tainted, or foxed, as when the groſſer parts are extracted by ſuperior violence, or as when the nature of the malts are more groſs, and the uſe of the hop will rather be to correct its future fermentation; but when the hop is in the wort, it will not ferment, without the aid of, herhaps, a pint

pint or more good yeaſt. And as attenuation will not in this caſe become much wanted, a very ſlight ferment in the wort tun, and ſtill ſlighter in the caſk, will anſwer every requiſite purpoſe.

This drink will precipitate in about a fortnight without fining, and may, according to the heat or coolneſs of the ſeaſon and temperature of the cellar, be drawn off from the tap, or bottled at pleaſure.

No fixt rule can be given for this, but as it may be as ſoon as thoroughly fine, the experiment is ſo very eaſy and natural, as it would be an affront to common ſenſe to dictate a determinate meaſure, when none but thoſe who have it can poſſibly judge when it is come round.

A General Essay.

The lightneſs of the above ſubject, naturally leads me to conſider malt liquors more generally, in the different parts of England, under the management of common brewers, or private families.

Wiltſhire is the moſt remarkable for the uſe of the lower or ſlack dried malts, and the inhabitants more generally accuſtomed

cuſtomed to the brewing of bright beers, and this again more in the diſperſed parts in the country than in the great towns, not even Marlbrough excepted, where indeed approved drink is brewed for ſale, but not of ſo happy a kind as in the villages about Saliſbury Plain, where every little alehouſe can furniſh a traveller with a better beverige than Marlbrough, or any other town I have paſſed. There muſt be ſome reaſon for this; and as what has been ſaid before may give the hint, is by the practice here confirmed, as the people are more generally freſh and healthy, than in moſt other parts.

It is ſaid by ſome, that if the water be clear, it is not much to the purpoſe from what ſprings derived; I muſt confeſs, there appears to me a ſenſible diſtinction, eſpecially as it reſpects chronical diſorders, from which thoſe who are in the vicinage of chalk ſprings of the ſaponaceous kinds are moſt free, and when with ſuch kind of ſoft waters, the fine ſort of malt and hops, and a peculiar management in brewing are combined, the effect muſt be excellent, and ſo it proves.

The

The advantage of cellars, in ſome other places, may in ſome meaſure ſeem to balance the account, but here is not the ſame neceſſity, the beverige I am ſpeaking of needs them not, as undeſigned for long keeping, nor in my opinion any long kept beers anſwer the end I have in view, as their lengths muſt be ſhort, their boilings high, the body of the malt too much forced, and too groſsly hopped to anſwer any good purpoſe, as from hence a variety of diſorders enſue, that I cannot with pleaſure enumerate.

All theſe light Wiltſhire Beers are manufactured after the like mode of management, as in my ſection of table beers, and with the like ſpecies of malt and hops, except as to the decoction of the latter; but to balance that, great care is taken, not to extract to any degree of violence, nor indeed is there any neceſſity, as two pound of hops is ſufficient to a quarter of malt in the ſummer, and half that quantity in the winter for ſix weeks keeping, and ſo long as this drink is found healthy and pleaſant, the brewings come quick round, as the cuſtomers drink plentifully, and find no inſalutary effect; hence I would

I would draw a very fair concluſion, that admitting the premiſes true, the beer brewed from the ſame ingredients in the like manner, will be equally pleaſant and healthy.

Theſe drinks have all a little turn of the acid, much like the *Pruniacs*, or *Maravela* white wines, and anſwer in the ſame manner the purpoſe of dilution, without any ſudden intoxicating qualities, may be drank freely when the blood is warm, and a little lowered in quality, prove excellent table beers.

Marlbrough Beers are brewed higher, and of a more potent quality, as being intended for the London and foreign markets, but are not boiled to the ſame degree as either London Porter, Amber, Burton, or any of the northern drinks; the malt is finer, the hop more carefully conſidered, and to give it an equal power with beers of the like value at market, and avoid the effects of evaporation by over boiling, bean or wheat flour, or both, are ſometimes uſed, proportionate to the quantity brewed.

This does no harm to the quality, while it increaſes the ſtrength, but gives it a particular tang on the palate that ſome people do not diſlike, but this may be

be owing in part, either to beating in the yeaſt, or letting down the ſediment, either of which contribute to deſtroy the vinous product of meer malt and hop, and gives it a particularity, that is but indifferently reliſhed by thoſe unaccuſtomed to its flavor.

The lengths of this beer is much the ſame as of moſt that are brewed for ſale in the country, but not quite ſo ſoft and mummy as the Burton.

The malt for the extract is uſually the amber, or ſomewhat paler, as either ſeparate or mixt, as beſt conceived by the different brewers, tho' all paſſes under the like denomination.

The great brewers have a ſingular advantage in making their own malt, as they can manufacture it to their liking, both as to leiſure and color, and thereby ſuit it to the propoſed market.

It is calculated for a twelvemonth's keeping, but as it naturally precipitates often long before that time, it is for ſome markets racked, and for ſome bottled much earlier; it is a good beer, where none more curiouſly brewed is to be had, and would the manufacturers abate ſomething of their ancient cuſtoms, might

might be as excellent for keeping, as the generality of Wiltſhire drinks are for preſent ſpending.

Dorcheſter Beers ſeem to be deſigned on nearly a ſimilar principle as the Marlbrough, except that either by letting down too much of the ſediment from the cooler back into the wort, or to ſome practice in the working, the former has a much more ſickly flavor, ſufficiently evident both in the ſmell and taſte, but is much better preſerved, in being the ſame throughout than the Marlbrough, as that ſeldom furniſhes two bottles alike in a dozen; what the reaſon of this difference may be, whether in the working, cleanſing or bottling merits not much enquiry; but it ſeems to me true, that a bad flavor in the ordinary courſe is much eaſier preſerved, than that which is good, and perhaps at laſt, its feeding, as they term it, whether by ſediment, by bodies of a more potent nature, or by ſuffering it to be yeaſt bitten, by the too great precipitation, or beating in to the wort, may in ſome meaſure contribute.

" It is ſaid to be brewed from barlies well germinated, but not dried to the deno-

denomination of malt; and that its peculiar taſte proceeds from the ſlackneſs of the malt, and the quantities of ſalt and wheat flour, mixed with the wort when under fermentation, which gives it a mantling and frothy quality."

I am apprehenſive there muſt be ſomething more than this, as I know not any malt liquors, low boiled and ſlack hopped, that when early bottled, has not the like mantling and frothy quality, as it is a kind of effervesſence or fret, occaſioned by a defect in the counterpoiſe of the malt and hop, as a due proportion of the latter gives wing to the impriſoned air, and corrects the acid, boiling high has in ſome meaſure the like effect; this is obvious in the London Porter, that when well brewed, and of a due age, rarely mantles in the bottle, and the ſame in all ſtrong beers, that are boiled and hopped high; but from whatever cauſe it ſprings, as many may be aſſigned, where other ingredients are uſed, as will appear in due place, it is certain, that neither its ſmell, taſte, flavor, mantling, or froth, will ever recommend it, to a judicious palate, or

to

to anſwer any pleaſing or ſalutary purpoſe.

As to taſte, all beers will be ſenſibly different, tho' brewed in the ſame manner, and from the like ingredients, becauſe of various incidents occurring in the operation; ſo that the perfection of brewing, if that may be attained, is, as in cookery, to have no one taſte predominant; for however that may diſtinguiſh different drinks, it can only be agreeable by habit. The expert in the brewing art, like the wine coopers, have found means to make marketable drinks have always ſomething a like taſte, by adding, when wanted, more of ſuch ingredients as give it a predominance; ſo that any one may ſay, this is Dorcheſter, that London beer, and indeed they are ſufficiently diſtinct both in taſte and quality; but if either ſtand a proper age, this diſtinction is cured, in deſpight of art, and at length reduced to that natural ſimplicity, as is common to the Wiltſhire beers previouſly mentioned, in their prime ſtate for drinking, being ſufficiently old, when keeping beers are immature and diſagreeable; ſo that however the controverſy may be in

in reſpect to different taſtes, time meliorates the like ingredients into one common medium, and prevalence only abounds, when ſomething uncommon, either by accident, or art, creates a ſenſible diſtinction.

A learned writer in the Philoſophic Analyſis, has given us a long tract on taſte, its ſimple and compound nature, the different ſpecies and combinations, very ingenious, but not calculated to our preſent purpoſe.

One other writer has delivered himſelf briefly, and more to the point in view, deducing the diſtinctions of taſte in the following manner. The *acid*, a ſimple taſte.—The *ſweet*, an acid, ſmoothed with oils.—*Aromatic*, a ſpirituous acid, and volatile ſulphur.—*Bitter*, an oil impregnated, with alkaline, or acid ſalts, ſhakled with earth; the *auſtere*, an aſtringent bitter, and laſtly, the nauſeous and rank.

The *Auſtere* affects all drinks, wherein the hop has been too violently forced, and the nauſeous or rank, ſuch as have been treated in the ſame manner, and have out lived their ſpirituous powers. A medium age in ſome meaſure rectifies

rectifies the former, and old time reduces the latter to a kind of empyreumatic dreg, common to ill drawn diſtilled liquors.

I have previouſly remarked in my obſervation on hops, that the acid is an immature ſpirit, and here muſt remark again, that the gradual diſtinctions abovementioned vary their taſtes, and blend into a kind of neutral, as the genial warmth of the ſun create in them a new birth and activity; hence ſprings that equal and agreeable reliſh, neither acid, ſweet, nor bitter, that we find in all fruits arrived at a ſtate of perfection, which in cold climates, it is difficult to attain, and which hot climates too highly elevate. This is obvious to the moſt ordinary apprehenſion, as it will ever be found, that ſuch fruits, as have a harſh ſour at their plenitude of ripeneſs, have the auſtere in concluſion ſtrong upon the palate; thoſe that ripen on a medium, have a pleaſing undiſtinguiſhed ſenſation, with but a light tincture of the auſtere; and ſuch as ripen high, are totally ſweet.

It is in a great meaſure the ſame in vegetables, aud flowers, as in fruits, but

but with more earthy parts, therefore more auſtere; under which of theſe heads barley and hops may be ranked, is not ſo very material, as it is to evince the neceſſity of ſo uſing them, in malting, decocting, and otherwiſe manufacturing, as to bring the liquor they produce to an even ſtate on the palate. Of this two kinds are apparent, the Burton and Wiltſhire beers; the former has an even ſoftneſs, the latter an even ſmartneſs; the former brewed high, and calculated to lull; the latter low, and to awake the ſenſes. The one, like the fabled waters of *Lethe*, to make men forget themſelves; the other, like the ſprings of *Helicon*, to give them ſpirits and memory.

As to the *Marlborough* and *Dorcheſter*, of which ſo much has been ſaid before, I have only to obſerve, that the diſtinctions given them by art, is, as to the main purpoſe, as with the ſnuff-makers in London, merely conſidered to peculiarize a denomination; but as to a ſalutary or inſalutary, are neither materially good or bad, nor do either merit imitation in a private family.

NOTTING-

NOTTINGHAM BEERS for keeping, are uſually brewed from amber, dried into 132 or 138 degrees. The cuſtom has been to cloſe the extract in the copper, and in the maſh, by a cover of waſte malt, bran, &c. to keep in the ſpirit, as ſuch brewers conceive, and a judgment made of the degree of heat in the extract, by a previous ebullition in the copper, and a ſurvey of their own faces in the maſh tun. The lengths are according to the powers or violence uſed in maſhing, or the various extracts made, diſcharged of any ſequent utility, but not boiled ſo high as the Burton Ales; nor have they the ſame ſoft opiumatic quality; but being much higher hopped, are ſuppoſed to be much better calculated for keeping; the wort has its proper ſtate of working; the yeaſt is beat in before cleanſing, and the drink in the caſk fed with bean or wheat flour, or with materials of later invention; the convenience of cellarage gives it many advantages, if well improved; is in general a much cleaner liquor than Burton, or Dorcheſter, but does not circulate in London or foreign markets to the amount of either; nor is it ſo much the dependent

dent buſineſs of the town, as being, I ſuppoſe, better employed in the hoſiery, and other manufactures.

BRISTOL BEERS, I mean only ſuch as are calculated for foreign markets, none elſe being uniform, or of the like kind, and chiefly conſiſts in a degree of ſtrength, ſimilar to good table beer, at the lengths, when brewed diſtinctly, of about four barrels to the quarter of malt; it is a brown beer, from a malt of about 140 degrees of drineſs. The manufacture is after the common mode of operation, except as to hopping, as intended to come forward ſooner, or later, as occurrences preſent, and as calculated for the reſpective markets, principally the Mediterranean, and Weſt India Iſlands.

There are beers brewed of a higher quality for the ſame places, but not in like proportion, as not being equally eligible in warm climates, where a kind of ſmartneſs is more required than ſtrength.

In this manufacture are two plain points in view, profit and quick return; to this end the expence of hop and high boiling are as much as poſſible avoided,

and drawing it off into bottles as ſoon as fine, prevents the acid gaining a too early predominance; and on the other ſide, by a moderate hopping, the bitter is ſoon meliorated, and the liquor reduced to an equal taſte.

In the Weſt Indies, it often acts the Phyſician on Engliſh conſtitutions; as that climate, and manner of living, ſubjects them to a coſtive habit, which this beer is apt to remove, and has been the ſaving of many, in that dangerous diſtemper the dry gripes, by purging of the acrid humors; it has not quite ſo potent an effect, on the like habits in the Mediterranean, but it keeps the body open, and is found at once grateful and homogeneous.

I am the more particular in this, as London Porter has not the ſame effect, tho' both from the ſame, or like ingredients, that is to ſay, malt and hops; but Porter malt is of another kind from the kiln, the quality of the drink is higher, and the ſuperiority in boiling and hopping, makes it rather incline to a coſtive; than laxative quality, tho' much brewed for the ſame markets.

It is plain hence, that the *Wiltſhire*, the

the *Briſtol*, and the *London* beers, are calculated to diſtinct purpoſes, the firſt as a fine diluter, and to allay thirſt; the ſecond to open the body; and the laſt for a keeping drink; the firſt more vinous, the ſecond more fermentable, and the laſt more permanent and ſtaple.

Thus we ſee, in the ordinary way, what different ſpecies of liquors may be produced from malt and hops, by various application and management; this in part depends on that branch of the manufacture, termed boiling. It has been in ſome meaſure treated of already, and is here propoſed to be ſo much farther diſcuſſed, as that private families may thoroughly underſtand, whether it be moſt eligible to boil high, low, or to any medium time required, or not at all.

One writer has given us a tedious verboſe eſſay to prove, that malt liquors ſhould not be boiled, either malt extract or hop. "His aſſertions are, that the boiling of wort, not only evaporates, but deſtroys the fine thin ſubtle ſpirits, and as it were fixes and ſtagnates the whole, whence a groſſer taſte enſues, which by habit is eſteemed; but by the flowneſs

of its operation is longer on the ſtomach, and emits groſs fumes to the head; and inſtances the diſtinction of taſte between boiled and unboiled wort, with or without hops, as the former will be found to have loſt its pleaſing ſweet reliſh, and alſo its opening and penetrating virtues, by which its nature and operation is altered, which fermentation does in ſome degree recover, but cannot regain its fine ſoft virtues. The unboiled, tho' it drinks ſmaller in the mouth, moſt naturally warms the ſtomach, and paſſes the body quicker by urine, which are ſufficient teſtimonies of its ſuperior merit."

This theory ſeems not to prove any thing, and may or not be right, as meer aſſertion dictates. Mr. *Combrune*, a practicer in the London brewery, ſeems to be of a different opinion, and I wiſh that both arguments may let us into ſo juſt a light, as to be the criterion of correct practice.

The laſt writer admits, it has been a queſtion, whether boiling be neceſſary to a wort? but obſerves, that hops are of ſo reſinous a quality, that as the whole of their virtues is not yielded by extrac-

extraction, decoction or boiling, is as needful as the plant itself; and with fermentation productive of that uniformity of taste in the compound, which constitutes good beer; and reasons thus.

Worts are composed of oils, salt, water, and some small portion of earth, from both the malt and hops. Oils are capable of receiving a degree of heat much superior to salts; and these again surpass, in this respect, the power of water, before a wort can be supposed to have received the whole of the first it can admit, such a degree of heat must arise, as will be in proportion to the quantity of oils, the salts and the water. When this happens, the worts may be said to be intimately mixt, and to have but one taste; the fire made fiercer would not increase the heat, or more exactly blend together the constituent parts; this purpose once obtained, the boiling of the wort is compleated. And farther remarks.

That the water is first saturated, the salts next, and lastly the oils, and a violent agitation ensues; but when the parts are united, the vehemence of the ebullition fails; the noise ceases, the

worts boil ſmoother, the ſteam, that before clouded the copper, riſes more upright, and when the fire drives any part of the drink from the body of the wort, it aſcends perpendicularly; ſuch are the ſigns by which we may be ſatiſfied, that the extracts are become nearly of one taſte; if at this time it is turned out of the copper, it appears pellucid, and forms no conſiderable ſediment. To this rule is annexed the following table.

A TA-

A TABLE, *ſhewing the time each* WORT *requires to boil, for the ſeveral ſorts of* BEERS *in every ſeaſon.*

Degrees of heat in the air.	Brown beer keeping ſtrong beer	pale, and keeping ſmall		ſmall beer			amber burton		ſmall amber	keeping amber
	hours	hours	hours	hours	hours	hours	hours	hours	hours	hours
35	1	2	4	$\frac{1}{2}$	1	2	$\frac{1}{2}$	$\frac{1}{2}$	1	2
40	1	2	4	$\frac{1}{2}$	1	2	$\frac{1}{2}$	$\frac{1}{2}$	1	2
45	1	2	4	$\frac{1}{2}$	1	2	$\frac{1}{2}$	$\frac{1}{2}$	1	2
50	1	2	4	$\frac{1}{2}$	1	2	$\frac{1}{2}$	$\frac{1}{2}$	1	2
55	1	2	4	$1\frac{1}{2}$	2	0	$\frac{3}{4}$	$\frac{3}{4}$	1	2
60	2	4	0	$1\frac{1}{2}$	2	0	$\frac{3}{4}$	1	$1\frac{1}{2}$	2
	1ſt	2	3 wort	1ſt	2	3 wort				

It may perhaps be objected, by long boiling of the laſt worts, the rough and auſtere part of the hops may be extracted, and give a diſagreeable taſte to the liquor; but this only happens, either in beers long to be kept, or in ſuch as are to be brewed in very hot weather. In the firſt caſe, the roughneſs wears off by age, and grows into ſtrength; and in the laſt, it is a check to the proneneſs muſts have in ſuch ſeaſons to ferment.

N. B. When there are but two worts, in brown ſtrong, ſteeping ſtrong, keeping pale ſmall, or common ſmall, the boiling is to be obſerved, as marked for the ſecond or third worts.

Thus far I have traced the argument under the dictature of two quotations from different opinions, but muſt obſerve, that one reaſons on health only, the other on practice; and it remains to conſider, whether fermentation alone would anſwer the end of a double proceſs, for keeping beer, as for preſent ſpending? whether it would ſo blend the oils, ſalts and water, as to bring them to an even taſte? and whether, in reality, an even taſte enſues, on this practice

practice of boiling, when the hop is ſo included in the proceſs.

What effect fermentation alone would have on the hop, I muſt own myſelf a ſtranger to; but on the other ſide, am very well aſſured, that London beer in the wort ſo boiled has not an even taſte; nor could I ever find, that even time produced that effect, either in porter, or amber; when new, they have generally an auſtere bitter, eſpecially porter; and when old, a harſh unpleaſant ſtaleneſs. It is invariably true, that all keeping beers, muſt have the bitter aſcendant, or it could not be preſerved; and when that bitter wears off, and the acid is on the point of riſing predominant, then the drink, if ever, attains an equal taſte; ſo that as to keeping beer, for which only the above rules and tables ſeem calculated, to me it appears impoſſible, that the ſalts, oils and water, ſhould be ſo intimately blended by boiling, as to produce an even taſte; but on the contrary, a certain time of boiling may anſwer for preſent ſpending, and then only conſidered by the proportion and quality of both malt and hop, for which to make rules, or affix tables, would

be, perhaps, more curious then pertinent, or to be depended upon, and ſo the table intimates, otherwiſe, the one and other, would have required the like time of boiling, and is what I preſume the ingenious writer intended when he formed the table.

There are not in the whole ſyſtem of brewery, any who underſtand the art, in all its incidents and variegations, ſo well as the London brewers, at leaſt ſo far as profit extends; for I know not any other, that can draw two barrels and one half of potent liquor from one quarter of malt, without the minuteſt tincture of the grains, unleſs they uſe ſomething more than malt and hops; what they do uſe beſides, is not in one reſpect very material, as long experience evinces, that the drink is neither intoxicating, nor unwholeſome, and when happily manufactured, and the hop by time duely meliorated, I am not acquainted with a more agreeable beverige of the like body; ſo that their practice would not be amiſs in private families, if ſuch drink could be expended as quick as in publick houſes with a briſk trade, that draw a butt a day; but here we muſt ſtop, for

for as this becomes preſently flat, unleſs bottled in time, or expended quick, it may be reaſonably concluded, that over boiling has too much diſſipated the genial ſpirit, and left only the coarſer oils to ſupport it for a limited time, and that determined, as none of the fine ſpirits remain, it neceſſarily becomes irrecoverably flat and vapid; to amend this, they blend it with new beer, which brings that ſoon round, but is neither in taſte, nor quality, any thing like the beer, of the like denomination, of one entire guile, and keeping.

At laſt to thoroughly underſtand, whether boiling high, or low, or not at all, be beſt; as much depends on the queſtion, it is requiſite to enquire critically, what the power of fermentation is capable of effecting; as to me it ſeems obvious, that if it will anſwer the propoſed end, the ſaving of double trouble and expence, which is no mean conſideration; that it may well enough in ſome particular caſes, is out of doubt, but as particular caſes are but little to the purpoſe, as to the general end, I have traced out the ſequent theory.

The Theory of Fermentation, as it reſpects the Queſtion, whether boiling of WORTS *be eſſentially neceſſary?*

The ſame ingenious perſon, who has given us the above rules and table, has alſo given a Treatiſe on fermentation, by which he almoſt proves boiling the wort unneceſſary; as the ſame general effects ſeem to be produced by the former, as by the latter. But whether the former would have been ſo produced, without the previous operation of the latter, remains indeterminate. As it ſeems, that the fermentable quality of the wort is diſſipated by boiling, and only recovered again artificially by yeaſt, it would prove, that an intimate commixture, or blent, of all the different parts, is not concluſively effected by the operation of boiling, and conſequently that ſome farther proceſs is requiſite, and that is fermentation, but it is difficult at the ſame time to apprehend, why that elaſtic air, or ſpirituous acid that is the means of fermentation, ſhould be firſt evaporated, and then again attracted as neceſſary to completion.

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The argument of the ſame perſon, that dried grapes will make wine when fermented with water, in no ſenſe proves the wiſdom, or neceſſity of firſt evaporating the juice of the grape, and then uſing water as a ſubſtitute, to extract a vinous fluid; ſuppoſe it as well ſo done, which in fact is but partially true, nor do the natives of Spain ever uſe ſuch a ſubſtitute, however neceſſary it may appear, where freſh fruits are not, for the like purpoſe, to be had.

In the next place, it is extremely material to conſider, whether one fermentation is ſufficient to the end propoſed? And whether, if the fermentable quality is not thrown off by boiling, a regular and proper ferment of the wort will enſue, without the uſe of, or with very little aid of yeaſt, in the ſame manner as vinous fluids uſually act; were theſe particulars aſcertained, the doubt, whether boiling be neceſſary would be readily determined, as the ſame writer who directs boiling is pleaſed to ſay, that,

" Fermentation is, where the communication of the external and internal air of a muſt is open, and in a perfect ſtate, when the power of repelling is equal to that

that of attracting the air." Quere how this can be, when the internal air is previouſly evaporated?

If any dependance may be had on the other writer pre-mentioned; he pretends, that beer ſimply fermented in the tun will keep a twelvemonth; which may perhaps be true, but not much to the purpoſe of this enquiry; but to evince how little dependance is to be had on writers, who have neither hypotheſis nor fact to ground their opinions on; this ſame orator has propoſed to give us the proceſs, but ſo far from anſwering the end in view, that not one word is mentioned, of either the mode, or effect of fermentation without boiling.

Here we are in the dark again, as to practice; but in theory it ſeems extremely plain, that if a ſufficient fermentation may be ſo attained as to diſpoſe aſſimulate, and intimately blend the water, oils and ſalt, and better if effected ſpontaneous, without the aid of yeaſt, it does not appear in what conſiſts the utility of boiling the wort.

The proceſs will then ſtand thus.—The heated water—the maſh—the fermentation—the cleanſing; and if this proceſs

proceſs on experiment proves juſt, much labor and expence will be ſaved, eſpecially if all is completed at one extract; for as to the reſinous quality of the hop, and for the ſolution of which boiling ſeems materially intended, it may only be managed here, as one would wiſh all private families to do, whether the wort be boiled, or not; that is, to make the extract from the hop ſeparate from the wort, except the reſerved part, for the malt extract to paſs, in order to prevent roapineſs, or taint; and as this book is principally intended for the uſe of private families, that however this theory may, at firſt ſight, be reliſhed by the prejudice of cuſtom, it is evident enough, that an experiment cannot be attended with any kind of hazard, for early drink, if the fermentation be as amply perfected without, as with boiling the wort, the only point in queſtion, reſting ſolely in this, Whether it be abſolutely neceſſary to boil the hop? but if it ſhall appear, that much cleaner drink is made by a ſeparate extract, as that may be done to what aſcertained height the agent pleaſes, which perhaps in boiling cannot be ſo certainly effected,

effected, nor can perceive, even for keeping beer, wherein boiling is neceſſaay; at laſt it remains to conſider, if the paſſing of the extract through the hop, as is ſaid to prevent roapineſs, may not have ſo much corrective power over the ſpirituous acid, as to interrupt fermentation, and then it ſhould ſeem that ſome yeaſt muſt be neceſſary; but not any thing like the proportion when all the hop is uſed in boiling; but if the whole of the hop extracted, intended as a future preſervative, be paſſed into the working tun, with the malt extract, it is evident, that much the ſame quantity of yeaſt will be neceſſary, as if the wort was boiled, or no expectation of the drink's keeping a twelvemonth, or perhaps more than one month; this, however it reſpects boiling, is clear enough to evince the neceſſity of an additional acid, to give the wort a fermentable power, unleſs it ſhall appear, that after fermentation be finiſhed, the hop extract may be properly applied, which, as it is not cuſtomary, experiment can only determine.

We ſhall ſee preſently, whether this may not be effected with propriety, as I have

have always found, that the hop extract, without boiling, in a proper quantity, has ever been a better remedy for recovering ſtale drinks, than any teſtaceous powders whatſoever; that teſtaceous powders will have the ſame immediate effect is true, and equally true, that ſuch remedy is but partial and tranſient, which is not the caſe in the application of the hop extract; and altho' the proportion cannot be aſcertained but by experience, as the degree of ſtaleneſs muſt firſt be known, yet is ſeems to prove concluſively, that, the like application of the hop extract to drink after cleanſing and a finiſhed fermentation, may equally preſerve the drink, as if boiled in the wort, and to a much better purpoſe, as it reſpects time, labor, expence, taſte, and flavor; for as the main purpoſe is ſo intimately to blend the acid and alkali, as that neither be predominant, if preſent ſpending is the intent, or time of keeping in view, you have by this means at command, as it were to a day, when your beer is in fine order, without any other mode of precipitation whatſoever, attenuation, or

divi-

diviſion of the groſs parts being previouſly performed by ferment.

And here I ſhall venture a ſingular remark, that I conceive will ſufficiently juſtify this hypotheſis. It is, that beer brewed on the approach of winter, is uſually expected to ferment again in the ſpring, having at that time, either gathered more external air, or having more internal acid, than aptly counterpoiſes the hop, in which the prepared hop extract being at command, this improper ferment may be either timely prevented, or, when in ferment, permitted, or impeded at pleaſure; ſo that every one in this particular may uſe their own judgment's dictate, whether it be beſt to ſuffer, ſtop, or avoid any kind of ferment at the uſual ſeaſon.

I am ſenſible that groſs hops, and other ingredients, are to this purpoſe ſometimes applied, but on very uncertain principles; as it can never be preſumed, that the hop in ſuch caſe can operate to any material effect, as there is not any inherent power in the drink to form any effectual ſolution of its reſinous juices, and only its natural attractive power in force to imbibe the fermenting

menting acid, which wheat, or bean flour, would equally effect, but will not in the event produce a like conſequence, as the hop extract, ready prepared for an intimate aſſociation, or involution; and am apprehenſive, that the uſing of the hop extract in the caſk only will, when duly conſidered, appear to anſwer every requiſite purpoſe.

What makes this hypotheſis more meriting experiment, is the various incidents that occur in the nature, quality, and management of the reſpective ingredients before they come to the brewers hands, that cannot be ſo well remarked and remedied in a complex, as in a more ſimple proceſs, nor can the accidental evils reſulting from the former, be ſo readily retrieved, as from the latter; nor is the latter ſo liable to accident as the former; and this naturally leads us to enquire, to what diſorders, and to what cauſe, drinks are ſubject.

Caſual Diſtemperature in BEER, *the Cauſe and Remedy.*

We have a certain criterion, by which we can ſo diſtinguiſh malt liquors, as to determine their perfect, or imperfect, ſtate; from which, as it happens to

to vary, either by miſconduct or accident, is termed diſtemperature. The general rules are, an agreeable flavor, even taſte and tranſparency, and when defective of the latter, is always failing in the former; and if tranſparency is brought about by time, or art, it is uſual to be ſucceſsful in the former.

It has been obſerved before, that the pale drinks come round of themſelves; the brown commonly require forcing; this is ſuppoſed to be owing, in the firſt inſtance, to the drying of the malt; and in the next, to the boiling of the hop, from whence the coarſer oils are violently extracted, and produce in brown beers the following diſorders, a *Stubbornneſs*, that is with great difficulty precipitated; a ſecond inſtance, is what is called *Grey beer*, on the ſurface of which ſwims an oil, that muſt be attenuated before any proſpect of precipitation takes place; the third inſtance, is what the brewers call *Cloudineſs*; and this is generally deemed incurable by any of their chemical noſtrums; to which diſorders the pale drinks are not ſubject, as being neither in the kiln ſo high heated in their malts, nor their hop ſo violated in

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the boil; ſo that thoſe who only uſe the fine malts, and are tender of forcing the hop, have nothing of this kind to guard againſt, nor probably would it be ſo with thoſe who uſe the brown malt, if they did not uſe the very worſt, and ſo unſkilfully torture the hop.

It muſt be noted, that even in the firſt inſtance of ſtubborn beer, it is not capable of being fined down, until a kind of ferment is firſt obtained, to break the coarſe oils into the body of the drink, by mixing a large ſolution of iſinglaſs with oil of vitriol, and this more than once uſually repeated.

In the caſe of *Grey Beers* a triple quantity of the like mixture is requiſite, and at laſt, perhaps, *Aqua Fortis* neceſſary, to make them precipitate; the great misfortune is, that the precipitation is but partial, as ſuch beers are never bright,

The *Cloudy Beers* ſeem to be above the reach of cooper and chymiſt to reduce at all; and thoſe who attempt it are drove to the pitiful ſhifts of coloring them with calcined treacle, to deceive the unwary drinker,

Is it not very extraordinary, that when it

it appears to the brewer himſelf, what the true cauſe of ſuch diſeaſes are, that he will not avoid the error, when if, at ſometimes, profit may reſult, from a bad or overtortured commodity; yet, as the reverſe forms an interchange to his loſs, and his reputation always in queſtion, not to ſay ſomething more, one would naturally conceive, that when the remedy is ſo much in his power, the avoiding improper ingredients muſt neceſſarily occur, as the baſis of the diſeaſe is certainly known. At the price malts are now at, ſome excuſe may be admitted, where profit is in view; but in private families, perſons of fortune, who have nothing in view but an agreeable drink, to brew coarſe malts and boil hops, as evidently productive of the evils prementioned, is wholly inexcuſable.

It has been often repeated, as agreed by the moſt adroit practicers, that pale or amber beers never prove *ſtubborn*, or want any force or artifice, but time, to bring them into proper order, much leſs ſuch as are *grey*, or what is ſomething worſe, *cloudy*.

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The laſt is, by univerſal opinion, totally incurable, and after various remedies attempted to no purpoſe, the drink is loſt; on theſe conſiderations it is, that an hypotheſis may be formed, without the reflexion of being whimſical.

It is ſaid, that the coarſe oils which cauſe the diſeaſe, need a powerful attenuator to reduce them to an even quality with the aſſociate liquor; and that the remedy appears not in ſudden or haſty violence, by cooperage or chymiſtry, but it does not appear that the application of ſimple menſtrums, and ſome labour, may not effect a cure, in which light a plain experiment may merit attention.

The buſineſs ſeems to be, to reduce the ſuper-powerful heated malt and hop, to the like degree of heat, as pale or ſlack-dried malt, and unboiled hop, naturally arrive at; what may effect this, muſt at the ſame time attenuate and blend particles of a ſeeming different quality, this muſt be an acid in quantity and quality ſufficient to the end propoſed; it is ſaid, that aqua fortis, in any ſafe quantity, nor perhaps is of the right quality to effect it, nor any thing chymical

mical whatſoever; but it does not follow, that however ſtrong ſuch acids may be, that thoſe of another kind may not have a proper effect.

Acids are as various in their operations and effects, as the modes of production, that gives birth to their exiſtence; cream of tartar, is not the like kind of acid, as the ſpirituous ſpringing from the ripe grape, tho' deduced from the ſame fountain, nor will either aqua fortis, or oil of ſulphur, operate in thick worts like the juices of our own fruits duely proportioned; and to be conſidered with this ſingular diſtinction, that the former may be the cauſe of much miſchief; the latter a ſalutary benefit.

This argument concerns only ſuch as brew from brown malts, of the ſorts that are too highly heated, and that violate the happy natural quality of the hop, by an exceſſive extract. But as ſuch caſes may often occur from a cuſtom in brewing, an intimation of the remedies may not be omitted. For the firſt claſs, called *Stubborn beers*; in this the brewers diſſolve eight pound of iſinglaſs in ſtale beer, to force one butt; and when that will not effect the cure, often

often repeated, ſix ounces of the oil of vitriol are added, and that failing, eight ounces of the vitriol concrete are mixt and applied.

All theſe failing, the next term is *Grey*; in this caſe the quantity of iſinglaſs is trebled, the vitriol increaſed to twelve ounces, and a ſmall portion of *Aqua Fortis* immixt; and here art determines, as to any abſolute remedy.

When beers are in ſo opake or dark a ſtate, as to become incurable, they are termed *Cloudy*, that is, are ſo replete with floating unattenuated oils, as to obſtruct the power of viſion, and appear muddy; as this diſeaſe may not by any known art be cured, the coopers trick then is to apply ſalt of ſteel, and this giving it a flowery head, makes it paſs common obſervation, and copperas anſwers ſomething a like purpoſe, but gives an ugly yellow caſt to the liquor, that is at once nauceous and unwholeſome, and this heightned again, by calcined or burnt treacle.

Theſe are the arts of men unſtudied in the philoſophy of nature, that have never reflected on the true cauſe why beers ferment at all; it being evident,

that oily ſubſtances never ferment; and when ſuch are over powerful in the liquor, can only be attenuated by fermenting acids, internal, or external. We know that all acid fruits will ferment naturally, when immixt with genial oils, ſo their power be ſtrong enough in the contention to obtain victory; when ſugars are added to freſh fruits, a ferment enſues, the oils of the ſugars are ſuddenly diſſipated, and an even vinous quality is the conſequence. When fruits are full ripe, or ſufficiently maturated by heat, they have an oil of their own that anſwers the ſame end; ſo are wines in warmer climates ſpontaneouſly fermented; it ſhould then ſeem juſt, that if acids of a natural form, and in a ſufficient quantity, be employed, they muſt in courſe produce the ferment required, without any improper or inſalutary hazards.

The fourth ſtage of diſeaſe in beers, is uſually termed *ſick*, or flat; I am not ſenſible of the true cauſe, an ingenious writer ſuppoſes the want of external air, and propounds the altering the ſituation of the caſk, by turning it upſide down, and by ſo throwing the lees into the body,

body, to throw it into a ferment; as this diſeaſe ſeems of the leſſer kind, the cure may with more facility be effected. In ſmall quantities common experience informs us, that external air is the cauſe of flatneſs; but if that be wanted it ſeems eaſily obtained. I am apprehenſive that the true cauſe is, the liquor not having been duely fermented before or after cleanſing, or perhaps from ſome defect in the caſk, or from both; but whatever the cauſe may be, if a freſh ferment will recover it, the remedy is very plain.

In the preceeding ſtages it has been preſumed, that the diſeaſe, more or leſs, has reſulted from the ſuperiority of the oils floating unattenuate in the liquor.

In this fifth ſtage we come to conſider the acid as predominant, as having by time gained the aſcendant. This is termed *ſtaleneſs*, and is only to be partially cured by teſtaceous powders, or ſuch like alkali's, but has ſometimes an odd kind of remedy applied by brewers, which is, to blend about an eighth part with new beers; this in effect ſpoils both, but as it comes early round, is well enough to put off to ſuch cuſto-

mers as only purchaſe beer by the ſingle butt, or that have not guiles in ſtore, it flattens ſuddenly in the drawing, has always two taſtes, and is very apt to prejudice the bowels of thoſe who drink much.

The uſual remedies are calcined oiſter ſhells, with ſalt of wormwood, unſlacked lime, ſalt of tartar, ſalt of wormwood and ginger, and ſuch like, all which may in ſome meaſure anſwer; but if ſuch beers be not gone too far, it ſeems to me very plain, that the moſt apt and natural remedy is, what the liquor craves, that is, freſh hops, or their decoction; it is impoſſible to preſcribe quantity, as that muſt be conceived from what degree of ſtaleneſs the beer is arrived to; but as all theſe things flatten the liquor, in proportion as they abſorb the acid, it is probable, that an intermixture of bean or wheat flour with treacle, may recover it to briſkneſs; and as this, at laſt, is only propoſed for preſent ſpending, any of theſe remedies may anſwer; I take the hop to be much the beſt, and have tried them all.

Beers in the ſummer ſeaſon are often on the fret, and if then wanted, will not

not readily fine down with common precipitants; ſo that ſomething of the like kind, as in ſtubborn liquors, is uſually immixt with the iſinglaſs, at firſt gentle, as cream of tartar, about the quantity of two ounces, and that failing, four ounces of oil of vitriol are uſed in the ſucceſſive finings, which generally conquers the fret.

Thoſe who make beer for ſale, and draw out too great lengths, by which it neceſſarily fails in ſtrength, attempt to give it a heated body, by uſing half an ounce of coculus indicus, in the cuſtomary precipitants on fining, as likewiſe melaſſus, ginger, grains of paradiſe, and ſuch like; all which are ſaid to add greatly to its ſtrength.

As to the melaſſus, either a large quantity muſt be uſed to anſwer any important purpoſe, or it will not avail; and if ſuch quantity be uſed, the value ſeems to overbalance the intent, which is, to make low beers of equal eſteem to thoſe brewed to a proper body.

What grains of paradiſe, or calamus aromaticus, may add to the ſtrength of beer, I am not informed, nor do I conceive that to be the purpoſe of its

application; the calamus or ſweet flag is a fine bitter, with no diſagreeable flavor, and is ſometimes uſed inſtead of the hop; when the price of that commodity runs high, it is uſually boiled in the wort with the hop, and is ſuppoſed to ſave about one pound in ſix, and is thought innocent

Theſe intimations, tho' they chiefly concern brown beers, are of neceſſity to be ſometimes uſed in pale beers, that are ſick or flat, and ought therefore to be ſo well underſtood, as when abſolutely wanted, to be employed as beſt judgment may direct.

The pale beers, tho' of themſelves falling fine, and in ſuch caſe not needing the aid of art, yet as they may become by time or accident ſtale or flat, ſome remedy is likewiſe requiſite. It has appeared above, that what cures ſtaleneſs creates a flatneſs; and as the latter is conſequent of the former, if we can give a remedy from common practice, the end will be fully anſwered, firſt preſuming, that whatever common malt drink is ſo prepared as to be extremely briſk, that the like preparation will be the means of recovering flat beers,

beers, and of this briſk kind is the weſtern *white ale*; and as ſuch preparation is ſuppoſed to have nothing in it but what is ſalutary and nutricious, the parallel ſeems to beſt anſwer the intent.

Western White Ale.

This drink is prepared from pale, ſlack dried malt of the loweſt quality, and without the uſe of any hop, or other alkaline preſervative, as being for ſpending immediately after fermentation, which is brought about without yeaſt in the following manner.

When the extract is drawn off into the *wort ton*, a paſte is prepared from wheat flour, bean flour, or malt flour, it matters not which, except as to body; either of theſe flours are made into a paſte with white of eggs, and being thrown into the wort ſets it a fermenting, whence ariſes a fine white froth, which no ſooner falls than the liquor becomes drinkable, tho' not fine, nor is uſually permitted ſo to be, as it then turns ſtale, but is for the preſent extreme briſk and agreeable.

This is not cleanſed into caſks as other ales, nor is a wort tun, as above-mentioned, commonly employed; but

as great neatneſs is requiſite, it is moſt uſually let down from the maſh into glaſed jars, called ſteens, and worked in, and drawn from them for uſe.

As we ſee by this proceſs what may be effected, in order to produce briſkneſs in malt liquors, tho' more of the like preparation muſt perhaps be uſed to ferment old, than new beers, yet it ſeems to follow as a neceſſary conſequence, that the ſame mode of operation will have the like effect on the one, as on the other, without the leaſt hazard of health.

What gives me a high opinion of this preparation, is, that all over Flanders, an ale of the like kind, in taſte, and color, is drank very freely by the ladies, and ſeems the cauſe of their plump and healthy appearances. Whence I conclude it generally good, and if it will remedy flatneſs in old beers, merits a ſerious attention, and the more, as the experiment is cheap, ſafe, and readily put in practice.

Fermentation is likewiſe often procured, by an immixture of lees of wine with wheat flour, and is ſo uſed in warm climates to leaven their bread, or what

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our bakers call ſetting ſpunge. That a ſtrong ferment may be thereby obtained is out of doubt, but how far it would operate in the producing briſk action in the beer, is what only experiment may determine; it will certainly have as good an effect as cream of tartar, and is, for one reaſon, much more to be depended upon, as cream of tartar, tho' deduced from the ſame ſource, is not commonly to be had genuine, and as being ſophiſticated with allum, is not rightly calculated to the intent of recovering beers upon the fret.

It may not be amiſs in this place to give one uſeful hint, as all that can be ſaid is not more than ſufficient to furniſh our tables with an agreeable ſubſtitute for wine and water, and equally calculated to anſwer the end in view; it is to give the preference to wine caſks, where they may be obtained, for the following reaſons.

The caſks uſually employed are either new, or old, that is, have had beer in them before, or when new much labor and time is required to wear off the taſte of the wood; and if old, are rarely ſo neat as is requiſite; and in either caſe

produce taint, or diſeaſe in the liquor; but wine caſks, the white wine eſpecially, are not ſubject to the like conſequences; they are likewiſe well eloſed in the ſtaves, and retain an acid ſpirit, that at once give life, vigor, and flavor to the drink; thoſe in which ſherry has been are the beſt, but any are better than beer caſk, and may generally be had cheaper.

Hence ſprings a conception that may not be improperly brought to the common account of manufacturing fine beers. I preſume it to be generally admitted, that the more vinous flavor beers acquire, they will not only be more pleaſant, but alſo more ſalutary; and if they may be ſo improved, as to obtain this end, may become at the ſame time agreeable to our palates, and conſtitute a manufacture, that may prove of importance to the wealth and happineſs of the community.

If there be any diſpute in a man's mind, whether malt extracts, and thoſe from vinous fruits, will operate properly together, the fact is too plain from experience to leave it a queſtion; and as to any doubt, whether vinous fruits of

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our own growth will have a due effect, a very eaſy experiment will ſolve.

We really want a fine liquor of our own for the ladies, at an eaſy expence; and I hope common prejudice will not acquire ſuch a predominance over common ſenſe, as to pervert a well grounded hypotheſis, into whim and conceit.

We find our beers, in the preſent mode of manufacturing, calculated only for ſuch, as uſe much exerciſe or labor; in others, they not only create a kind of indolent ſottiſhneſs, a ſcorbutic laſſitude or wearineſs in the joints, and men that drink much, of the heavier and ſofter kind, become gradually pale and ſickly, breaking out into the like kind of diſorders, as thoſe who delight in rich ſauces.

If it be aſked, why it happened not ſo to our anceſtors? my anſwer is, it did the ſame to thoſe who lived equally ſedentary, or idle lives; and that the preſervation of thouſands in the preſent age has been owing to the ſuper expence they have been at for wines, and being ſatisfied with plain food, and ſtore of vegetables, ſuch live ſtill without diſeaſe, while multitudes fade gradually

away, without the leaſt ſurmiſe of what has injured them.

Fellows of colleges, and ſuch like ſober people, who are fond of ſoporific draughts, if their natural ſtamina be found, live ſometimes free from external humors longer than their neighbours; but it may be obſerved, that an uncommon drowſineſs enſues, that diſtinguiſhes them from men in active life, and who are curious in their drink; it is the ſame in the trading world, that have more uncorrected malt and hops in their bellies than activity in their limbs, or that do not enjoy a free air, and ample reſpiration; fox-hunters, porters and coalheavers, tho' they drink much, phyſic it off by ſweat; and as to country labourers, as they cannot afford the like quantities of high brewed drinks, their natural phyſic moves hand in hand with their work and plain food ſo as rarely to be troubled with thoſe kind of ſcorbutic evils, which affect numbers that can better afford to dye, with diſeaſes of their own forming.

It is agreed by all who have conſidered the ſubject, that a ſuperfluous boiling of malt and hops, eſpecially the high

high heated malts, produces a quantity of the coarſer oils, inſomuch as not only to abſorb the ſpirituous, but likewiſe to involve the qualities of both in the common deſtruction; hence the ſeveral degrees, of the ſtubborn, the grey, the cloudy, beers, and which of the leaſt diſeaſed are not to be recovered to perfection, by any chymical arts or cooperage; may it not then with good reaſon be concluded, that either leſs heated malts, and leſs boiling of both malt and hop, ſhould be excluded, or ſome vinous acids in ſuch courſe immixt, as may counterbalance the evil, eſpecially if profit obliges the brewer to run out too great lengths in the extract, and acquire by ſuch profit all that is nauceous and contemptible, to cheat the ſwine of their due, which Providence intended for their regale.

It may be objected, that if vinous acids will with propriety immix with the malt extract, that ſuch drink will not keep a due time. I ſay, doctors doubt that, as I have known wines from Engliſh fruits only, keep full as long as any beer ought to keep, and longer with a body of malt than alone, which I conceive

ceive will not be queſtioned when duely conſidered.

Whatever gentlemen's fancies may be to have long keeping beers, it ſeems not to be the brewers intereſt whoſe view is profit; and tho' I could wiſh, for health ſake, that gentlemen would not conſider long keeping beers as an act attended with rectitude, however it may affect their vanity, as the two moſt important ſeaſons come ſpeedily round, and a judgment eaſily made what the brewers may want, I ſhould think, that a ſuper ſtore of ſix amply ſufficient; but in this I preſume not to dictate, but merely as it reſpects the point in queſtion, whether the uſe of our own vinous acids, would not only ſave them labor and hazard, but at the ſame time give health to their cuſtomers, and be of extenſive benefit to the trade; at all events an experiment may be made at a very ſmall expence, both with and without the over forcing the malt; though I can tell them, without the ſpirit of prophecy, which will have the beſt effect, both for profit and health. And that this my hypotheſis may be more thoroughly underſtood, both by the gentleman, and

common

common brewer, I shall make some observations, on the nature and qualities of our own acid fruits, simple or immixt with other bodies, as have presented to me in practice, or have been the result of well grounded information; and tho' not correct parallel, may be sufficient hints, to such as have a pleasure in being informed.

Elder berries are said by the brewers to be only used as a coloring to the drink, and perhaps only used in London; and tho' I much doubt the fact, because I have known them have a very different effect, yet admitting the brewers assertion, they are no doubt the least vivid of any fruits we grow, but am afraid the fine latent quality of this berry has been misunderstood, by a defect of quantity, so that when only a slight flavor has resulted, it may have been supposed from some other cause, the brewers great skill, or what not, but I have known two bushels of this berry turn the extract of six bushels of pale malt into a very good hogshead of strong wine, without other commixture. The truth is, that the quality of this berry is hid, it produces a thick heavy fluid, that

that without quickning moves on very ſlowly to perfection, and ſo would the beſt ſherry wines, and even run roapy, if not broke by thinner bodies; after fermentation it emits a ſtrong vinous flavor, much reſembling the coarſer clarets, and of ſome Spaniſh wines; if quickened with livelier juices, the currant or ſuch like, ſome decoction of the hop may be neceſſary, to preſervation for time, but merely as it reſpects the malt wort anſwers ſufficiently alone, it is in body much more powerful in proportion than the malt extract, and requires a boil to open it of about fifteen minutes; it is not the beſt fruit we grow for the purpoſe, as will be ſeen preſently; but if the white berry be uſed, and the brewing moderately flavored, by a decoction of the elder flowers, the product has more the reſemblance of Frontiniac than may be readily conceived, tho' not quite ſo juſtly as the following.

It is a little deviating from the point, to mention another kind of manufacture, that has nothing to do with malt, and is neither properly fruit, nor but partly our own produce, and is equally common to all nations. This digreſſion is

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made to evince, that we do not employ the gifts of Providence to the beſt advantage, and that a wine more nearly reſembling Frontiniac, than from the elder berry and malt, may with facility be obtained, and has ſome conſonance with the practice of brewery.

This is a compoſition of honey, raiſins and elder-flowers, boiled up with water, and fermented in the ſame manner as malt liquors.

The chief uſe of our honey, as to drink, is in what we call mead or meath, compounded only of the manufacture of the bee, water and ſpices; it is in that ſtate neither a very wholſome or palatable liquor, its oils are coarſe and ſtrong, and require time to digeſt into any kind of utility, and in its beſt condition, is but very moderate; it is probably not much mended by a fermentation with yeaſt, which only add to its coarſe quality; and as the breaking of this is requiſite to its becoming vinous, and fruits are a very apt and natural remedy, capable of improving it into an agreeable wine; but as that practice has never yet perhaps been conſidered, the aid hitherto given had been by dryed grapes, which certainly make

make it a much better liquor, than when brewed with water only, and the elder-flowers are nearly to give it an imitative quality of Frontiniac, which it nearly resembles.

Its oils are coarser than from fine pale malt, and participates much with the high dryed, and with those of our boiled hops; how much time would wear these off I am not aware, as not being usually considered as a keeping liquor; that it abounds with acid salts is obvious enough; but as they are much over powered in the first instance, by those strong oils, it may be long before reduced to an even palatable vinous fluid.

Honey, as to its body, is equal to a strong malt extract, and more nearly resembles its nature or quality, than is generally imagined; its aromatic power is superior even to the prime decoction of the hop, but that is too high to be grateful to the palate, as being like other perfumes, most agreeable in a very moderate state, and therefore to be at once agreeable and wholsome, must owe its rectification to more vivid juices, and those of our own product will no doubt have the happiest effect, whether from the

the grape, the currant, the bollaſs, the damſin, or the cherry.

As to any rule, in the order and application, it can only be general, the ſeaſons being here ſo various and uncertain; but as the buſineſs in all ſuch compounds is, to bring the liquor to an even and agreeable taſte, it will only happen, that the more or leſs of the vivid juices applied will bring the wine ſooner or later round, without any other hazard, or inconvenience, and the ſame whether boiled or not, but if afterwards it may not ferment naturally, it were to be wiſhed, that ſomething might be uſed rather than yeaſt to ſet it a working; and if it be found to ferment too high, ſo as to fret away its ſpirit, as may be the caſe when the vivid juices are too predominant, the beſt remedy is a pint, or to a large quantity, a quart of proof brandy, no matter whether French, Spaniſh, or Engliſh, the firſt may leaſt injure the flavor.

A THEORY *reſpecting* BRITISH FRUITS, *as applied to the improvement of* MALT LIQUORS.

The taſte of the Engliſh being generally more in favour of ſimple than compound

compound qualities, in their common diet, eſpecially ſuch as they have not been accuſtomed to, it may be no eaſy matter to perſuade them to a variation in the mode of their malt drinks, however juſt it may appear to their reaſon and judgment, but when they reflect on their only favorite compoſition punch, and conſider the ſequent theory, it may happen to change their opinions, and give them a taſte for further experiment, in particular thoſe who perfer their own health and countries welfare, to an indolent habit of prejudice.

It is commonly known, that elderberries work well with malt, and when rightly applied anſwer an important end; honey would no doubt operate very well, but its luſcious balſamic quality, is perhaps too high, when uſed with malt, to be eaſily forced into brightneſs in the liquor; dried grapes may have ſomewhat the like effect, and both would give the drink a vinous flavor, but the latter much more clean and agreeable on the palate, and produce a much lighter drink than malt alone; our other products do appear in the ſame light, our malt alone has a ſtrong body, but flatulent effect;

effect; our native juices a weak body, with vivid ſalts, therefore to give a quick active ſpirit to our drinks, that an incorporation would produce what may be reaſonably expected, both as to health and pleaſure.

As to health, it is generally agreed, that malt extracts, eſpecially thoſe of the groſſer kind from high maſhing, are as apt to create ſcorbutic humors, as rich groſs foods; and it is as generally agreed, that freſh fruits are the reverſe; it ſeems then, that an intimate and judicious incorporation of malt and fruit extracts, would have a happy effect.

Our fruits are apples, pears, the large and ſmall white plumb, the damſin, grapes, currants, gooſberries and Morrelli cherries.

The *apple* is not generally to be recommended in this particular, as it makes an excellent antiſcorbutic liquor of itſelf, is ſufficiently plentiful to be uſed alone, wants not a good body, and is of too auſtere a quality for the purpoſe in view, a particular ſpecies, high ripe excepted.

The *pear*, is not abſolutely eligible, without the aid of more ſpirited ſalts,

or much time to bring it round; its extract alone has somewhat the semblance of Champaign wine, and sparkles like it, but has notwithstanding an austere quality, that would but ill commix with the coarse oils in the malt.

There are various fruits besides those pre-mentioned, that being too weak and flatulent, would not be of benefit tho' of a much higher flavor, as Mulberries, Raspberries, Strawberries, and such like, and our common hedge berries are too austere, costive and immature for any use in fine drinks, tho' one of them very injudiciously used by the wine brewers, who might have discovered a much more apt fluid, than could possibly be produced from baked sloes.

The large white, usually for its seeming likeness in shape, called the *Egg-plumb*, only ripens to maturity in fine seasons; and if we could from it prepare a good vinous fluid, it is not at present cultivated in sufficient plenty, tho' enough may be had to mix with other bodies; its juices produce a wine of the Rhenish kind, and possibly as good in a state of perfection but unripe requires the soft oils of sugars, to give is a palatable

table pleaſantneſs, and in a proper quantity would operate well in a malt extract, particularly in the diſtillery, producing an effect not common in Britiſh ſpirits.

The ſmall white or bully, is of much the like kind as the Egg-plumb, in taſte and flavour, but is more plenty, ripens better, and not having a ſufficient body of its own, is applied with the Belvidere raiſin, to furniſh out the manufacture of Rheniſh wine as uſually imported from Hamburgh, and might be turned to a like account here, in the ſame manner, or for a curious ſummer drink, with the malt extract, to counterbalance its ſprightly ſalts, and give it a proper body.

The *currant* is of a more delicate texture, oils are ſoft, its ſalts briſk and ſpirituous, and its ſeeds or kernels, when bruiſed with the fruit, have together a pleaſing palatable reliſh; it would make of itſelf a very agreeable wine, if the cultivation and quantity might be found to anſwer; but that not being preſumed, a pretty light wine is uſually prepared from a proportion of water and refined ſugar, ſo that it is not ſo much ſuppoſed to want body, as ſufficient quantity to

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anſwer any material purpoſe; and as the malt extract when drawn fine, will ſuit ſomething a like end as wine, or a beverige ſo much reſembling it, as to prove an agreeable antiſcorbutic, and may be ſo applied, as to produce the reſemblance of wine properly ſo called, it may prove a manufacture of great conſequence to the nation, in which light their utility ſeems to merit regard.

But of all the fruits this country produces to any degree of perfection, that which claims our higheſt eſteem, that beſt ſuits a compoſition with the malt extract, and that moſt reſembles the beſt clarets in taſte and flavor, is the *Damſin*, as it may be cultivated to a more advantageous purpoſe than any other, its body is powerful, its oils ſomewhat coarſe and rough, and obtains its ſprightlineſs from time, and a happy fermentation. Thoſe who uſe this fruit ſimply, ferment it with ſugar, but with the malt extract will ferment alone, and its beſt preſervative afterwards will be a due proportion of its own kernels bruiſed; and that proportion only known by experience, as it depends on the quantity uſed in the extract, and the time

time for coming round required; it may be ſo prepared as to keep many years, or to be drinkable in as narrow ſpace of time as him who employs it pleaſes.

The nature of this compound will not be ſubject to the like neceſſity of keeping, as wines made entirely from the grape, as it does not imbibe the like quantity of air, nor conſequently require the ſame power of fermentation; when new wines are boiled, as ſometimes happens to be the caſe, when ſlack vintages happen, and the fruit proves immature, theſe come round earlier than is common to ripe fruits, and are drinkable within the year, which the latter are not, nor generally in leſs than two years, and it will be ſeen in the ſequel, what the nature of the operation in theſe ſeveral caſes preceding will be to prepare the reſpective compoſitions for coming round early, or for long keeping as may beſt anſwer various intentions.

I have not hitherto mentioned the grape of our own produce, as it either is preſumed to not anſwer in this climate as uſed alone, or is generally planted for the like purpoſe, as peaches, nectarines,

&c. merely for pleaſure; and as the expence of cultivation, rent of the land, and hazard of the ſeaſons, are the means of their not anſwering ſo well as various other cultures, without conſidering that the land proper for the vine, is of the leaſt value of any, nor will commonly produce any thing elſe, that may materially turn to account, nor is it uſually conſidered what kind of vine is proper for this climate.

It is certain that our ſeaſons are precarious, not only for the wine, but for all other kind of fruits; but be the ſeaſons ever ſo precarious, it will not eſſentially hinder their being uſed in the malt extract, as only a leſs quantity, or more fermentation, will be requiſite to the perfection of this kind of compoſition; there is no doubt, that the more mature the fruit may prove, the better it will be, both as to management and taſte, it will avoid vicious, and untimely ferments, and all the conſequent effects; but this we ſhall likewiſe conſider in the proceſs, ſo as to regulate the effects of bad ſeaſons, by a very eaſy attention, and common diſcretion, ſo as in ſome meaſure to make all ſeaſons nearly

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anſwer alike, whatever kind of fruits are uſed, and that may as effectually anſwer the purpoſe of the common brewer, as the gentleman, or private family of a lower degree. My view in this is at the ſame time health and profit, and hope it will have the happy effect of producing a new manufacture that may prove of public utility; and as many may conceive new experiments hazardous and uncertain, they may be informed, that this is not in the nature of expenſive projects, as the effect may be as well experienced for five ſhillings, as for five hundred pounds; not that a ſmall quantity can be preſumed to anſwer as well, as what will produce a body, but it will readily evince the effectuality, and three months drinking prove the ſalutary effects, eſpecially in the ſpring.

I have omitted ſpeaking of the *Morelli-cherry*, as being of ſomewhat the like nature as the *Damſin*, but ſeldom arrives at the ſame maturity, without more care than uſual in the planting, and not being appriſed of its eventual effects, other than that it produces a rich vinous fluid, but reſembles not in taſte or flavor any wines that I am acquainted with,

except one ſpecies of the Biſcayan, ſeldom drank in this country; if it be found to anſwer in other reſpects, it is to be wiſhed, that more heat of the ſun might be given in the placing it; and if that cannot be afforded, I am apprehenſive, that no quantity may be raiſed to anſwer any important purpoſe.

As to *Gooſberries*, I do not conceive they have power inherent to anſwer the end propoſed. The women make with them a pretty vinous fluid, as with currants, and ſo employed, may beſt anſwer their natural properties.

The Proceſs of MALT *and* FRUIT EXTRACTS.

The three malts in a proceeding diſcourſe conſidered, were from wheat, barley, and oats, and the proportion of body preſumed, as four is to ſix, and of ſix to eight buſhels, as propoſed to produce the like value of ſtrength, and therefore whatever quantity of vinous extract is allowed to the firſt number to make one hogſhead of drink, the ſame muſt be allowed to the other number of buſhels of the reſpective malts, ſo that each drink may be equally ſtrong and vinous.

The

The oat is no doubt the more delicate grain, and will probably turn out the moſt pleaſing drink, and more eaſily come round without forcing: the beſt time for this proceſs is moſt probably in October; but, as ſome of theſe fruits come earlier, a proper regard muſt be had to their ſeaſons, as it is certainly better to have them freſh and in full perfection; either of them may be preſerved, but they will faint and be ſickly, as whether preſerved in ſugar or treacle, they will be apt to ferment out of time improper to this proceſs, as an intimate commixture is propoſed in the firſt inſtance, when both malt and fruit are in their full ſpirit and vigour, conſequently ſome of this ſpecies of brewage muſt be earlier, ſome later; but that which is lateſt probably turns to the beſt account.

It muſt be alſo conſidered, that the ſummer-fruits are of a weaker body than ſuch as ripen in autumn, and, conſequently, in equal quantities come more ſuddenly round, ſo that the currant and ſuch like muſt either afford a larger quantity of juices, or be intended for earlier uſe than the damſin, that

comes not ſo ſoon to perfection; ſo that according to the vinous quality intended muſt the proportion be, perhaps as eight is to twelve; for nearly ſo much is the difference between the power of the damſin to that of the currant, as may be eaſily proved and diſtinguiſhed both as to ſtrength and flavor, by a ſeparate and diſtinct fermentation, and the farther forcing by boiling, baking, or diſtillation: thus, and in either of theſe ways, will an experiment of the power of the reſpective fruits be made, and by that judgment firſt acquired, may the raw juices, in their prime ſtate and ſeaſon, be properly applied, and the proceſs correctly purſued, only obſerving, that, to avoid the coarſe oils of yeaſt, or the diſagreeable effluvia of the hop, as has been previouſly hinted, the bruiſed kernels will beſt ſupply the place of the hop, and the fermentation better created by lees of wine, if the natural courſe ſhould not produce a ſufficient effervescence.

There is, at the ſame time, to be conſidered, the different parts of this iſland, as to the late or early ſeaſon for fruits, ſo as to make the difference of a month;

month, and moſt of the earlier may continue on the tree till September, and ſometimes later.

The mode of brewing is this, the malt is maſhed as uſual in other operations of the like kind, but of only one extract if convenience permits; the extract to paſs through the kernels bruiſed of the ſtone-fruit, or, if deſigned for currants, through a light decoction of the finer hop into the receiver, and thence into the copper.

One gallon of the lower fruit-juice will be ſufficient to ten gallons of the malt-extract, and ſo on in proportion; but if more be uſed, there is no other nicety in the matter, than that more will encreaſe the ferment when caſked.

The fruit-juice and malt-extract are to be boiled together about fifteen minutes, little more or leſs, as the incorporation appears to ſucceed, by the breaking of the head, or other apparent commixture; the wort is then transferred to the cooler, as in the ordinary courſe, and thence into the caſk, without any regard to a ferment in the wort-tun.

What the incorporation wanted in the boil, muſt be perfected in the caſk;

and if a due ferment then does not come fairly on, to be improved as prementioned, or with white of eggs, and wheat flour immixt into a paſte; but if the natural runs ſo high, as to weaken and carry off the ſpirit of the drink, the uſe of brandy will be a ſure and ſpeedy remedy: and I think more inſtructions are not neceſſary on this head, nor need any thing elſe be ſaid, only in general, that the ſeaſons be ſo conſulted, as that the malt-extract may require more or leſs heat from the copper as the ſtate of the air happens to be, which will be better underſtood as we purſue the ſequent ſubject.

Air, *its* Properties *and* Effects *on* Malt Liquors.

Air is that power, which, under the denomination of the Atmoſphere, incloſes and ſupports the whole body of the terreſtrial globe, and all the bodies therein contained, fills up every ſpace, and acts in every part; its motion, as perceivable by the glaſs, is a fluctuation like the waving of the waters in a rivulet, and replete with infinite animalcula: it is conceived by ſome who ſtudy ſuch ſubjects, from its activity, that air has a ſpirited

ſpirited fire inherent, which gives it action and vigour; this they call Æther, which may poſſibly be true; but of this I know juſt as much, as of that ſpirited power that gives motion to the animal frame.

It is, however, probably true, and much to the preſent purpoſe, as we find the air brightens as we aſcend to any conſiderable height, it gradually fails in its compreſſive force or gravity, ſo as to permit the blood to burſt from the veins, and in the event deſtroys human exiſtence; when, if it was ſimply the ſame, as we find it in the common order of nature, it ſhould ſeem to operate to the ſame effect every where.

As we are placed, the only alteration ſeems to be at the direction of the winds, that vary its quieſcent ſtate into tumultuous motion, which, as ſuch happen, diſturb the human frame, and diſorders all kind of liquids, as the ſame are parts of its own body, and as it enters into the moſt combined ſolids.

Our books give the weight of water to gold as 1000 to 19636, and of air to the ſame as $\frac{3}{11}$; in ſome it is calculated as 1 to 850, air to water. It matters

not much to the preſent purpoſe that we be perfectly correct, as neither air nor water are always of the ſame; as ſometimes the air is more replete of aqueous particles, more oils, and more ſalts, the Barometer gives us its gravity at different times and places, and eſtabliſhes, as far as is neceſſary, our knowledge herein.

We are ſenſible of its elaſtic power, as not common to the other elements; and that it will occaſionally rouſe or depreſs fermentation in liquors, as the ſtrength or weakneſs of the compoſition happens to be, and the ſame in giving ſpirit or flatulence, to ſuch as have paſt the ordinary courſe of ferment, as it chances to reach the ſubject, more compound, or more pure and unmixt: in rainy ſeaſons, the aqueous particles, burſting from their confines, bring down with them other weighty commixtures, and leave the air more light and pure, and the more ſo, when the atmoſphere is ſo diſordered, as to violently diſencumber itſelf by burſts of thunder, and diſſipation of livid flames: the air in this ſtate of levity is to be duely attended to in the care of our liquors, whether in the cop-

per,

per, the cooler, the wort-tun, or the caſk, and the effect as much as poſſible prevented by an excluſion of the atmoſpheral emiſſions.

The judgment to be made in this caſe may be deduced from the ordinary courſe of our ſeaſons, in their moſt ſerene and placid ſtates reſpectively; and as we find the air then operate on our liquors, preparing or prepared, ſtrong or weak, for keeping or preſent uſe, ſo we may conclude, on the conſequence of any occurring or uncommon violence.

The higheſt heat in ſummer ſuppoſe at 75 degrees, and the moſt piercing cold in the winter at 25 degrees, the ſpring at 40, the autumn at 45 degrees, by the Thermometer; the medium of theſe, compounded and divided by four, will be the ordinary heat of the air; and as ſuch degree of heat may be found to operate on ſimple or compound fluids, will be a ſteady direction how to order them, as to heat or cold, through the whole courſe of the year, and give us a more ready idea how we ought to act in the two moſt important points boiling and fermenting.

We have seen that the air surrounds, presses upon, and binds all bodies, and in that light appears the common preservative of nature, and *in vacuo*, by the air pump, we find glass shiver to pieces; and hence it being concluded, that air is absolutely necessary, and can fill only the vacant parts it is proposed to subsist, that whatever we force from thence may be in some measure detrimental, and carried too far, produce a flatulent or vapid effect. Both boiling and fermenting require being well considered, as both create a violent emission of air, internally seated, and impedes for the times of action the entrance of the external; and therefore such operation to be no farther pursued, than either the cominution of parts proposed to be effectually compounded, or the throwing off any heterogeneous parts, that would, if continued, injure the composition; and as in the hottest seasons the ferment will be necessarily strongest, so must the time of boiling be proportionally abated, as they are both intended to the same purpose, a happy junction of the homogeneous compound, so mixed and blended,

as

as to become one and the ſame body, without diſtinction of taſte or flavor.

The ſtate of the air is likewiſe to be conſidered in the forming of the extracts, particularly as it reſpects the nature of the *Malt*, that has previouſly imbibed more or leſs fire, as in ſuch caſe more or leſs heat is required to form the extract; and the ſame if malt has lain a longer or ſhorter time in the air when taken from the kiln, as time will be the cauſe of imbibing much air, and a more ready extract, and therefore needs not the ſame heated powers to force it.

The water from whence an extract is to be formed, will be of nearly the ſame degree of heat as the air in the ſhade; from thence may be readily computed what farther heat may be neceſſary.

Water is not to be conſidered as an active body, but as ſet in motion by the vivid quality of the air; nor perhaps, as has been hinted before, is air an active body, but as irritated by ſome other power inherent, as being only a thinner or leſs compounded fluid, and ſo both air and water of themſelves are inert; but as air has a ſpirit inherent, if that be by

by any violence emitted, an inertion neceſſarily follows. It appears from a plain fact in practice, as when the internal air boiled out from the wort, it will not ferment, but by the application of ſome ſubſtitute, to attract the external air and ſet it a working.

The air in all ſolids and fluids is as the openneſs or cloſeneſs of ſuch bodies are capable of receiving it, which experiment can only prove: as to fluids it is apparent, that thoſe of a more oily, gummy, or balſamic compoſition, will not admit the ſame quantity of air as thoſe of a lighter body, leſs immixt with ſuch groſs parts, conſequently not ſo much air in wort as in water; and if air, with its inherent ſpirit, be the common nurſe of vegetable as well as animal life, if that be ſo, as ſeems unqueſtionable, it muſt be juſt reaſoning, that, by boiling, fermenting, or any other means, if too much air be emitted, ſo much vegetable life is deſtroyed, ſo much imperfection created, and ſo much liquor ſpoilt; and it ſeems very idle to firſt throw off the ſeeds of vivid vigour, and then attempt to recover it again by a pernicious ſubſtitute, eſpecially as it is agreed,

agreed, that no rule has yet been formed to aſcertain the requiſite quantity of air, ſo as to preſerve a due equilibrium, it were ſurely beſt, that we preſerve as much of the ſpirit of our drink as poſſible; and the medium appears to me very obvious, which is to boil beers no longer, than as the wort may be left in ſuch a thin and fluid ſtate, as of itſelf to ferment without the uſe of yeaſt, as is agreed will happen of courſe, if too much air be not emitted: but ſhould it ſo be, as by many concurring and unforeſeen incidents, it may that, in this courſe, a ferment fails, a vinous fluid immixt will certainly have its due effect.

Fermentation ſeems to be the effect of air; but as ſevered from its igneous particles, and ſubſiſting in acid ſalts, or igneous ſpirit, or both, that inflame oily ſubſtances, and ſet them in a fret, when ſuch have abſorbed more air than they can contain, they become gradually thinner; and, as the power of the air refines them, the water, the acid ſalts, the igneous particles, and the oils, become a pure and tranſparent liquor.

This, if any thing we know, is the true cauſe of fermentation, as appears by

by every experimental inſtance, and, in particular, from the practice of London brewers, and the nature of yeaſt, apparently an open body, apt to receive the circumambient air, which having before been expelled and repelled by the operation of heat, is here again recovered to act, perhaps with ſomething more power, than would have happened in the natural order of the malt-extract too violently heated; tho' it be agreed, that no power of fire can force it higher than 212 degrees on the Thermometer.

What is apt to the yeaſt by its open and attractive body, is natural to all vinous fluids, which contain the like quantity of air as the yeaſt attracts, and has therefore the ſame power of producing a fermentation in malt-extract, that have emitted their ſpirits in the boil, as yeaſt has, without a commixture of thoſe coarſe and ill-heated oils, that, while the air aſſiſts the ferment, ſuch oils contaminate the liquors in a manner that too often proves irremediable, an effect vinous fluids cannot poſſibly produce, and therefore, in my humble opinion, much to be preferred, where health,

health, pleaſure, and palatable liquors may be affectionally courted.

FIRE, *its action on* Malt *and* vinous EXTRACTS.

FIRE, as conſidered under that general term, is of two kinds, that which is the ſpirit of the air, and preſumed cauſe of motion, uſually called Æther or Elementary, and the other produced by attrition, termed Culinary. They may, for ought I know to the contrary, be eſſentially derived from the ſame ſource, and perhaps not inherent, as generally ſuppoſed, in ſome bodies that ſeem to produce them, it being a queſtion, and may perhaps ever remain ſo, whether fire, produced by the friction of two bodies, is from either or both of them, or only from the intervening agitated air? And if only from the laſt, then the difference is only this, that the pure æther, having caught an inflammable ſubſtance, loſes its diſtinction as elementary, and becomes culinary.

What perplexes human wiſdom in this particular is, that certain bodies put together, free from any ſeeming atrition, yet produce heat, and ſome even flame, as oil of vitriol and ice, will produce a ſtrong heat, and ſulphur, filings

lings of ſteel, and water, produces flame, tho', perhaps, the reaſon in both caſes may be juſt as readily underſtood, as what has been ſaid of air producing fermentation; becauſe there is a ſecret, in apparent attrition, in all mixt bodies, that produce heat, or flame.

The action of fire upon liquids, paſſing through the pores of the containing veſſel, is the gradually forcing them into ebullition, and here its power determines; by this power the internal air is ejected, and forms a kind of concave over the mouth of the veſſel; and tho' in a rarified ſtate repels and excludes the external air from entering ſo long as the ebullition continues; and as that declines, the body of a malt-extract cloſes; and when the excluded air is totally evaporate, the extract is ſo cloſed, as to admit but little external air; and thus, having ejected its ſpirit, becomes weak, ſick and flatulent.

To recover this, the elementary fire is called in aid, in the manner as is prementioned in the ſubject on air; hence it appears, that the action of fire, in its various application, reverſes the effect, by emitting, and by reviving a ſpirituous

tuous power requiſite to fermentation.

Fire, under whatever denomination traced, dilates ſolid and rarifies fluids, which is only a farther extent of dilatation; and as it gives motion to all kind of bodies, ſo will it open and expand them; hence it is, that the oils in the wort, being opened by the admiſſion of the external fire, the impriſoned particles acquire their releaſe, the oils become more thin and fluid, and after ſome ſtruggle in the ferment, blend in common with ſuch bodies, as were previouſly in a ſtate of more levity, and thence remain totally indiſtinct.

There are various mixt bodies, beſides thoſe pre-mentioned, that act by attrition unperceived, and even produce flame, not as from themſelves, as fire inherent, but as operating, on the elementary fire, to the like effect in part, as from the motion of the electric globe; ſo oil of cloves, or ſpirit of nitre, act on ſteel filings, but producing a groſſer ſpirit, than is the reſult of electricity, ſo as even to burſt into flame; can it be then doubted, what is the true cauſe of fermentation in malt or more vinous fluids, as ferment is evident attrition but of bodies

dies not groſs enough, by action, to produce perceptible fire.

I am the more particular in this, as it ſeemed generally queſtioned, what is the cauſe of fermentation? But it appears plain that diſſonant bodies, acting on each other by attrition, produce heat, and ſome fire, as is common with two ſticks rubbed againſt each other by the power of the hand, and of others that act of themſelves, and fret the air into fire, and before theſe acquire heat and commixture are perceptibly in a ferment, ſo it may reaſonably be ſuppoſed to happen, that the like kind of ferment in liquors may be produced by the diſſonance of acid ſalts and oils, or other balſamics, and theſe in the ferment agitating the fire in the air, a general effervescence enſues, and burſt into a kind of ebullition, reſembling that which reſults from boiling, by the power of culinary fire, and therefore not to be any farther encouraged, than to procure an equal taſte, and to bring the drink round clear and tranſparent.

In wines produced only from the grape the culinary fire is never uſed, but to the juices of immature fruits; nor will thoſe

thoſe which are too highly ripened ferment alone, becauſe their fine ſalts are maturated into a kind of unctious ſweet, or by the action of elementary fire on them evaporated; hence it ſeems plain, that where ever theſe ſalts may be retained in a due medium they will, with the aſſiſtance of elementary fire, only fret the oils into a ferment.

This is not in foreign wines generally permitted, their ſtate of fermentation is uſually moderated with quick lime, ſo that the oils are not ſufficiently blent with the ſalts, but float about in the liquor, as ſometimes in our beers, and neither are of themſelves, nor can be made bright, but by lowering and forcing. This ſome call adulteration, and may in ſome caſes be truely ſo, but in general are much the better for forcing in the ordinary way; and mixing the heavier with lighter wines, as by ſuch means, when well blended, they may acquire a bright countenance, come ſooner into drinking order, have a more pleaſing flavor, and paſs better off the ſtomach than genuine wines uſually do; but if ſmall wines are not to be had, and thoſe of a richer kind prove very ſtubborn,

born, the action of fire is called in aid, as powerfully inherent in oil of vitriol or arſenic, either of which break the unctious connexions, and with the aſſiſtance of that fire, which gives motion to, and is imbibed in air, a ferment takes place, and the wine becomes bright, and will hold ſo, if preſently bottled, otherwiſe it generally, in a few weeks, returns to its former ſtate.

The forcing, and bottling, draws into it a great quantity of æther, which expands itſelf over the whole body of the maſh, acts upon, breaks and diſſipates the incoherent oils, and procures an effectual blent.

When a light ferment is only requiſite, it is preſumed, that the oils and ſalts are nearly equal, and the liquor in due time have come round without forcing, but not to attain that brightneſs, which only the ſpirit of the air conveyed in certain mixtures can give; theſe mixtures are white of egg and iſinglaſs, ſeparate, or beat up together, with a certain portion of the liquor.

It ſeems certain, that if fire be the univerſal cauſe of motion, as generally admitted, and that from any of theſe mixtures

mixtures motion enſues, then it will follow, that in ſtubborn caſes, where moſt motion is required, whatever imbibes moſt elementary fire, is the likelieſt to ſucceed in breaking the coarſe oils, and blending them with the acid ſalts.

This argument attended to, may be the means of diſcovering what is the true remedy for cloudy beers, as well as for wines over-burthened with coarſe oils, and intimate to us by eaſy experiment, how much of this vivid ſpirit may be at all times requiſite to produce brightneſs.

That it is high in all acids is very evident, that it is low, or little apparent in oils or balſams, is equally evident; and therefore when either appear predominant, the remedies are diſſolving or feeding, and both on the different occaſions tend to the like purpoſe, equal taſte and complexion.

WATER, *its* NATURE *and* PROPERTIES.

Air and fire, I preſume, may have been ſufficiently conſidered as to the purpoſe in view, water is compounded of both, and various other caſual matter, ſo as never to be procured pure, participating of every thing it touches; and

and tho' in its moſt perfect ſtate infinitely heavier than air, yet paſſes through certain pores with more facility than air, which may be contained in a bladder, but water will find its way out, and the ſame through the pores of leather.

It is ſuppoſed an univeral diſſolvent, but that ſeems a miſtake, as oils will diſſolve reſinous gums, which water cannot effect; ſo will ſugars ooze through the ſame caſk that will retain water.

The properties of water are owing to its component parts, natural or acquired; its pure compoſition is formed of air and ſalts, what other particles may caſually adhere diſtinguiſh its particular uſe and application, with or without a mineral tincture, for drinking alone, for vegetable extract, or for the laundry; but how it reſpects the preſent purpoſe is to be ſingularly conſidered.

This element, however primarily compoſed, is exhaled in vapor from that great abyſs the ocean, and leſſer liquid ſtreams, in its lighter ſtate, quitting its terrene parts and weightier ſalts, mingling with the æther, and forming itſelf into clouds; as theſe exhaled vapors increaſe, and grow too weighty for the

the air to ſupport, or are precipitated by wind and fire, the clouds burſt, they fall in ſhowers, and the earth is repleniſhed with moiſture; the parts that fall on the higher lands either trickle thence down their ſides, or are conveyed by latent conduits into the plains or lower grounds, ſome remaining under ground as in wells, ſome burſting out in ſprings, and ſome flowing in rivers or leſſer ſtreams, always moving horizontal, as one of the expreſs properties of all liquid bodies.

When waters are ſo conveyed from the hills through lalent conduits, whatever happens to be the nature of thoſe hills from whence they flow, ſuch will be, in ſome meaſure, the nature of the water, as from chalk hills, ſoft and ſoapy, from gravels, ſharp and quick, from ſands clear and tranſparent, they find with difficulty their way through clays, and when they do are muddy, but ſomewhat ſaponaceous, eſpecially if the clay be of the marle kind; any of theſe waters may be adapted to the brewery or laundry with a little management, and all require ſome care and ſettlement.

As to ſuch as paſs through ſulphurs, ſteels, alums, &c. &c. as they participate of the like qualities, are rarely applied to the brewery, and never to the laundry; I have known ſome mineral waters uſed in malt extracts, but only for particular purpoſes, that have no ſhare in the preſent ſubject; what is right for the laundry will always be proper for the brewery, and both equally require tranſparency, eſpecially fine malt liquors, tho' not ſo much regarded, in brown malt extracts.

The naturaliſts are very nice in their diſtinctions between fluids and liquids, and eſteem water, as only a kind of fluid, which aſſume the figure of the veſſels they are contained in, and always have their upper ſurface parallel with the plain of the horizon; and ſuch likewiſe are oils and mercury, conſequent, as they ſay, of their weight and inteſtine motion of their parts every way, which motion appears from their diſſolving hard bodies; ſo aqua fortis diſſolves copper, and that what ſtrong waters are to hard bodies, other liquids are to other ſubſtances.

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This may be very true, but as to the motion, which ſeems to be the power that cauſes diſſolution, is not ſo properly the water, as that inherent ſpirit, which is the ſoul of its component parts, air embodied with vapor, actuated by a kind of electric or ætherial fire, which indeed ſeems to be the ſame in every vivified ſubject; hence we may conceive or eſtimate the value of pure water, as unmixt with other matter than vapor, air, and æther, in which perfect ſtate it would be much lighter than we ever find it, as the pureſt I ever met with, will weigh fifteen ounces to the pint meaſure; and if in that ſtate of levity it may be required, will certainly beſt anſwer the purpoſe, of either malt, or vinous extracts, as more penetrating and diſſolving than liquids, in a higher degree of gravity, conſequent of more weighty mixtures, as will be the caſe in ſome ſeaſons of the year more than in others, by an intermixture of nitre, even in its falling from the clouds, which is generally underſtood to be its pureſt ſtate.

The THERMOMETER; *its Uſe and Application, in the* BREWERY.

In the courſe of this work, the thermometer has been often mentioned as a proper inſtrument to aſcertain liquid heats, and as this work is chiefly intended for private families, many of whom may neither underſtand, nor be aware of its utility, it appeared to me extremely neceſſary to delineate its nature and properties.

That the thermometer is conſidered as an inſtrument of conſequence in natural knowledge may be in ſome meaſure conceived, from the pains that has been taken by the beſt mathematical heads to bring it to perfection, as by it, and no other certain means, we come to be informed of the true ſtate of the air, in the courſe of its ſeveral gradations of heat and cold; and thence enabled to judge, how to uſe or apply ſuch or ſuch matter, ſimple or immixt, as may moſt certainly anſwer our purpoſe in view, and that makes it as neceſſary in various other caſes, as in this the ſubject in queſtion.

The diſcovery of this inſtrument has been aſcribed to many, and it is moſt probable

probable in this, as in many other caſes, that none are the full diſcoverers, but that time and application have gradually produced it, into that ſtate of perfection, in which it now appears.

It is ſaid to have made its firſt appearance here rearly in the ſixteenth century; but not being, as now hermetically ſcaled, or ſtopped with the like metal, as that of which the tube is compoſed, the incloſed liquid was influenced by the preſſure of the air, and effect of the heat or cold; but this defect being ſoon diſcovered, that remedy was applied, and the inſtrument came into credit; but at the ſame time the gradations being only calculated, to this or that particular climate, the next employment of the beſt heads, was to make it of general utility, by the means of ſome ſtandard fluid, capable of acting in the like manner univerſally.

The great Sir Iſaac Newton eſteemed this as a matter meriting his warmeſt attention, as did Halley and others; their aim was in the firſt place, to procure a proper liquid; in the next, to fix two invariable points to reckon from, whence to eſtabliſh a proper diviſion. Mercury,

after various experiments, was found to be a proper fluid, and the freezing point, or 32 degrees, as the moſt proper to meaſure from; both of which are ſtill continued as the beſt ſtandard of judgment.

The mercury has its reſidence in a globular receiver, at the foot of a glaſs cylinder carefully graduated, ſo as when affected by the air, or plunged into any liquid, or other body capable of receiving it, the true meaſure of heat is thereby known; as the freezing point is ſetled at 32 degrees, ſo is the higheſt of heat in the air in this climate for any continuance found to be at ſixty degrees; and whatever appears to be above or below theſe ſeveral degrees of cold and heat, are eſteemed as approaching to extremes.

In reſpect to uſe of this inſtrument in the brewery, or other mixt bodies, ebullition or boiling is found to be the higheſt extreme of heat that may be acquired, and is 212 degrees on the ſame ſcale.

In the forming of extracts from malt, hops and water, the heat of the reſpective bodies are diſtinctly conſidered,

as

as well as when united; the water is uſually, before the application of fire, ſuppoſed to be of the ſame heat as the air in the ſhade; and that heat afterwards increaſed in the copper, to ſuch a height, as ſuited to the heat of the malt, that ſo the extract may with more facility be completed; but as the heats of the malts are various, according to the mode of drying, ſo the heat to be apportioned can only be known by this inſtrument, or to what degree the water ought to be heated. In the beſt ſeaſon for brewing the air is at 40 degrees, if malt is heated to the ſame degree; and it is requiſite, that the whole heat of the extract ſhould be 135, then will remain 55 degrees for the heat of the water; to aſcertain this, the inſtrument is firſt tried in the ſhade for the heat of the air, next in the body of the malt in heap, and laſtly, plunged into the heated water, and the ſeveral degrees therefrom obtained added together to complete the experiment.

The firſt thing is then to know, what heat you would have in the whole, or in the ſeparate parts; and this according to what kind of drink you would,

and for what time of keeping, whether you would have the malt forced, or only a clean extract; all which essentially depend on the well calculating the requisite degree of heat.

The thermometer recommended as the best, is said to be formed on the projection of Farenheit; but as this has been long conceived, I may suppose the like fashion is every where attended to, and no great difficulty in providing the right at any instrument-makers in London.

A certain writer recommends the same sort as improved by Mr. Bird; his reasons are, "that it is scarcely possible any glass cylinder, so very small, should be perfectly regular, the quicksilver during the expansion, passing through some part of the tube wider than others, the degrees will be shorter in the one case, and longer in the other; if the divisions therefore are made equal between the boiling and the freezing points, a thermometer, consisting of such a tube, cannot be true; to rectify this, Mr. Bird put into the tube an inch of mercury, and measuring with his compasses the exact length of this body of

of quickſilver in one place, he removes it from one end to the other carefully, obſerving in the ſeveral places, how much it increaſes or diminiſhes in length, and thereby aſcertain where, and how much, the degrees are to be varied; and by this contrivance his thermometers are perfectly accurate." And I think Mr. Bird has done very well, and ſet good example to the trade; and the only queſtion is on this head, whether it is impoſſible to blow theſe tubes true, or as nearly true as any art can rectify them to; but this is left to other kind of artiſts to determine; as they may ſome way be had true, their utility appears obvious in the brewery, and may at the ſame time anſwer various uſeful purpoſes, they not only merit the attention of every gentleman, but likewiſe of every brewer, who may have pleaſure in the excellence of his liquors, and may be the means in due time of forming malt liquors into a ſtaple commodity.

I do not think it a matter of mere curioſity, to be informed by the thermometer of the ſtrength of the wort, if it was only conſidered as a general proof of the condition of the malt and

hops employed; from whence, by various experiments, to form a true judgment of what kind of ingredients are beſt or turn to moſt account, as none will preſume, that beer ſhall be of the ſame ſtrength from the like quantity of malt and hops of every kind of growth, and drying, tho' extracted, and worked by the ſame rule, as they will certainly prove eſſentially different.

The rule is ſaid to be, that worts are hotter than water in the like ſtate, as in ebullition, which is a fixt point, and what difference there is between them, is the value of the ſtrength of the wort.

If then I have my choice of four different kind of malts and hops, formed into worts in exactly the ſame manner, whatever each of theſe exceed 212 degrees, the heat of boiling water ſufficiently proves the different value of the reſpective ingredients. tho' it may be objected, that ſome malts require a higher degree of heat to the extract; but even this ſeems to be in doubt, as, before the uſe of the thermometer, all kinds of malts were extracted by the ſame degree of heat; and however the brewers

brewers may have varied this mode, to force the mash for profit, it concerns not the gentleman to act otherwise than before.

The experiment may be made by very small quantities, without the hazard of much expence; and if the power of the wort be only the point in view, the best judgment imaginable may, by this experiment, be made of the goodness of both malt and hop.

As to any doubt, whether the thermometer may be used in boiling liquor, that is to say, whether the tube will stand that heat without flying in the violence of ebullition, it matters not much; for if it can be proved by the same instrument, that water boils at 212 degrees, the like proof may be made at what sum wort boils, the mode of proof being the same in both cases, or neither any proof at all.

But suppose a certain space of time be given, below the boiling point, both as to the water, and as to the wort; that is to say, if ebullition first took place as a fixed point, the fire then damped, and a few minutes space allowed to experiment the quantity of degrees on the

thermometer, in the water, and in the wort, if then the ſpace of time after ebullition was given equal to both, would not the proof be the ſame, as if given at the boiling point?

I know not how far this may ſeem a curious enquiry, or merely ſo, but ſurely ſomething may be deduced eſſentially contributing to the more thorough underſtanding of this art; and I ſhould think one farther experiment extremely neceſſary; as thus;

If a ſingle extract be made from four buſhels of malt, for table beer, and the like from eight buſhels to the hogſhead, for ſtrong beer, the extract made in the like ſpace of time, from the ſame malts and like heat of water, and maſhed in the ſame manner, and theſe ſeverally experimented as above, at a heat the thermometer would bear; this would give us an ample idea in what manner for the future to prove the ſtrength of different worts, and at the ſame time the value of the malt, when purpoſely varied, as likewiſe the ſtrength of the hop, produced in a certain quantity from the like mode of extract, by decoction from two and from four pound of hops, in the

the different malt extracts, and added to the worts in the boil, after proving the ſtrength of each reſpective wort; whence will be known what addition ſuch, and in proportion any quantity of the like malt extract, will give to the ſtrength of the wort.

Again, by the like mode of management, the ſtrength of the hop may be ſeparately found, the given heat being determined from decoctions of the like value, extracted in the ſame ſpace of time from the like given quantity; ſo if one pound only of different ſamples be proved the ſame way, the goodneſs of the reſpective ſamples muſt be neceſſarily known; but as to flavor, that can only be known by the palate, and thence a judgment made how to ſuit different beers, and when to give the preference to the balſamic, and when to the coarſer extracts, and the application be accordingly ſuited.

I am the more fond of this theory, as I could never yet diſcover any certain method to judge of the value of malt or hop, though various rules have been given for that purpoſe; no doubt experience may do much, but certain rules, readily applied,

applied, gives that knowledge to the unpracticed, which experience cannot without them obtain; the use of our senses, as to seeing, feeling, smelling, in the first instance, are not sure guides to an eventual proof, the artifice of sophistication, or giving a false similitude to all kind of drugs and vegetables, is now but too well understood, not to deceive the most practiced, in which light it seems evident, that the last proof is best made first, as that gives to the most practiced double experience.

It has been mentioned before, that experiments of this kind may as well be tried by a small as a large quantity of different liquids; to which it may be objected, that as to point of time, large and small quantities will not retain the same degree of heat, which in general is very true; but if an experiment kettle be set in the same manner as the brewing copper, it will, on the fire being damped, retain, for a certain space of time, as much heat as a large copper; and as only five minutes may be necessary, there cannot be any material error.

MAXIMS *deduced from* Theory *and* Practice.

MALTS are to be ſelected, not ſo much from their beauty and appearance, as from their ſoundneſs and quality, and as adapted to the purpoſe for which they may be intended, the diſtinct color of the liquor, and the time for coming round.

Well malted corn will always be hard, ſound, freſh and ſweet, to have neither taſte nor ſmell of fire, earth or water; the flavor grateful to every noſe, and the taſte pleaſant to every palate.

Plumpneſs of grain is not always the beſt ſign of its virtue, as ſometimes moiſture is the ſole cauſe; but if with ſuch plumpneſs it is hard and firm throughout, and bright and clear within, it will yield the more powerful extract. Spaniſh grain is harder and thinner than the Engliſh, but yields a much finer flour, and more in proportion; it is raiſed in a drier ſoil, and has a thinner ſkin, ſo will weigh more buſhel for buſhel; and this aſſiduouſly to be attended to in the choice of our grain for malting, if curious in the effect, or in eſtimating the profit.

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The *hop* muſt ever be ſuited to the kind of malt we propoſe to uſe, and the purpoſe we purſue in uſing it, whether it reſpects fancy, health or profit, as taſte, general or particular, is not ſo much governed by intrinſic virtue as by habit, the being accuſtomed to, or that kind of flavor. In Germany, where fine oils ſeldom arrive, the goodneſs is eſtimated by what we call the badneſs of the commodity; and in Greenland, train oil is in higher eſteem than ſack; it is ſomewhat the ſame with our malt liquors in different parts of England; and our brown beer brewed in London, unleſs in a ſtate of perfection very rare to be met with, but ill reliſhed by thoſe in different parts of the kingdom, who are either uſed to coarſer, ſofter, or more delicate extracts; and as it is to the hop that we chiefly owe our notion of taſte, the ſpecies is to be carefully adapted to that kind of taſte, to which thoſe for whom the liquor is prepared have been moſt accuſtomed, otherwiſe, however fine, will be but ill reliſhed.

This, however odd it may ſeem, is univerſally true; and though it be well known that we have much finer bitters than

than hop, yet to thoſe habited to ſome one ſpecies of that vegetable, the other bitters would be for the preſent, until uſe had wedded them to a new reliſh, very diſagreeable. We ſee it here ſignificantly in the taſte of thoſe who are fond of mild London porter, the bitter of which, to any other taſte, is really nauſeous.

In the uſe of water in the brewery, another conſideration takes place, as it matters little to thoſe who brew for profit, what kind of water they uſe, ſo it be ſoft. Water in general has no taſte, nor will, like artificial compounds, change its taſte, by a various ſtimulus of food on the palate; ſo that only two conſiderations take place in reſpect to that element, that which will beſt contribute, by its ſimplicity and tranſparency, to make the fineſt, and that which by its ſoftneſs will draw moſt ſtrength from the malt, and make the coarſer liquor; it follows, that the rule in ſuch caſe muſt be to adapt the water to the intent, or be ſatisfied with ſuch kind of drink as this or that kind of water, with ſuitable malt and hops, will produce, it being equally vain to attempt the making of fine

fine beer with muddy water, high dried malt, and bad or over-boiled hops, as to make a heavy beer, with tranſparent water, pale malt, and prime decoction of the rich hop.

In the making of all malt extracts, no doubt the degree of heat is primarily to be conſidered; but let this be ever ſo well known, the application muſt be ſingularly regarded, ſo as to be experimentally informed, how much extract may be made from any given quantity of malt, without prejudice to the drink.

In reſpect of profit, this not ſo much regards the brewer, as how much may be forced from the grain, good, bad, or indifferent: if then the gentleman purſues the brewer's plan, his knowledge of acquiſition may be ſoon obtained: but if his view be a fine drink, his enquiry muſt tend only to know how much of what is ſweet, pleaſant and wholeſome, may be drawn from any given quantity of malt of the kind he is accuſtomed to uſe.

The way to be well informed, is by making three diſtinct extracts from the ſame quantity of malt, purſuing the like farther proceſs with all, and cleanſing them

them into ſeparate caſks, and then, however one part may be ſtronger than the other, his palate will ſoon inform him of the diſtinction, and what would have been the effect, if one or both of the ſucceſſive extracts had been thrown together, and the ſame in three diſtinct brewings, from the like malt in quantity and quality, of one, two, or three extracts; but this demands more time and expence.

An experiment of ſomething of the like kind reſpects the hop: the buſineſs of profit is to get all out, of health to get all out that is good, and to be thoroughly informed how to ſeparate the good from the evil qualities, is by three gradual decoctions, in equal ſpaces of time, and theſe ſeveral extracts, after experimenting the diſtinction, gradually commixed, from whence a judgment very readily made, of the effect, each ſeparate or together, would have on the taſte and even quality of malt liquor; and at laſt it may be a very ſober queſtion, whether at any time hop ought to be put in the boil? as it is certainly one cauſe, why much yeaſt is requiſite in the future fermentation; and this is the more

more to be regarded, as in the firſt place, the hop cannot be requiſite in the boil; and in the laſt place, ſome of its fineſt qualities muſt then evaporate, and the coarſe oils remaining as well contribute to cloud the beer, as to impede future ferment.

I take it for granted, that acids will thin the worts: it proves ſo in the event, when the ſtrongeſt chymicals are uſed for that very purpoſe to be had; and why not in the firſt inſtance, as it is certainly better to prevent a diſeaſe than provide a remedy? This I confeſs is mere theory, and I wiſh it may appear on the other ſide, that the whole proceſs now in vogue is not big with abſurdity. We know that acids only in this caſe procure a ferment; it is admitted by the uſe of yeaſt an acid of the worſt kind, and afterwards of oil of vitriol, and even aqua fortis, are often found neceſſary; yet will the brewers apply, in the very firſt inſtance, a ſubject of a quite different quality, and the worſt part of that ſubject: as thus, they will boil the hop in the wort, to increaſe the quantum of coarſe oils, to ſeparate or break them, they will uſe yeaſt; and after all, when the beer

beer turns cloudy, they wonder how it happened.

The comminution of parts wanted in the boil, and in the future ferment, is of the oils and ſalts produced from the malt extract: to effect this, they evaporate what ſhould procure that comminution, and add more coarſe oils by the hop.

Can there be any doubt, that if an extract from the hop, or, if they pleaſe, even the groſs hop, was put into the caſk, after cleanſing off, the liquor would not preſerve it as long and as well as if tortured in the boil? Experience has evinced much better, with this ſingular advantage, that it would prevent a future untimely ferment in the caſk.

By this mode of management, it will likewiſe be more certainly known what hop was neceſſary, as after the laſt ferment in the caſk, it would plainly appear, by the courſe of the different ferments, what of the hop quality was more particularly requiſite to correct any ſuperabundant acid in the wort, if ſuch, on the depreſſion of any violent ferment, remained.

That in the event the acids would become prevalent, without the aid of the hop,

hop, or ſome like ſubſtitute, I have no doubt, and in ſuch caſe ſtaleneſs enſues, but cloudy beer never.

Stubborn beers are evidently the effect of ſuperabundant oils, and ſuch earthy qualities, as violent extracts force from the maſh, and from the hop tortured in the boil, increaſed and eſtabliſhed by evaporation of thoſe fine fluids, which ſhould preſerve natural mediocrity.

This is proved more ways than one, by the ſuperfluous oils floating in the body of the drink, as with a proper glaſs we ſee animalcula floating in the air, and by the eſtabliſhed practice of manufacturing fine beers, where no ſuch oils are apparent, conſequent of the malt being more ſlack dried, the wort leſs boiled, and the hop leſs tortured.

Brown malts and brown hops therefore require more care in every part of the proceſs; that is to ſay, ſhould be leſs forced in the firſt inſtance than pale bright goods; as alſo leſs boiled, as the oils are thicker and coarſer, and ſhould be as little as poſſible ſevered by evaporation from the acid ſalts; but practice is the very reverſe, upon a preſumption that much boiling produces a happy commixture,

commixture, and ſo with moderate boiling, without the hop, would probably happen; but if the wort, before boiling, be overburthened with coarſe oils, as ſeems to be the caſe, the addition of what is drawn from the hop can never be preſumed to leſſen the evil: nor does it appear, how far boiling contributes to thin the oils, other than as ſuppoſed to open the bodies, and free the inherent vivid ſpirit; which taking wing, the wort gradually forms itſelf into a cloſer conſiſtence; and as the boil continues, becomes a kind of ſalve, and I believe a very good one for many purpoſes; and although boiling is not carried to that excels, we may reaſonably deduce an effect not very agreeable, though moved through but part of its progreſs, as we ſee it turns to an impure liquid often incurable by human art.

The ſum of all our theory, and of all our practice, centers in this, that whatever grain we uſe for the brewery, ſhould be from ſweet land, ſound and healthy, the malt made from it dried ſlow and ſlack, the extracts made from it not too much forced, the boil moderate, the fermentation briſk but equal, if poſſible without

without yeaſt; and when the ferment ceaſes, then to apply the extract of the hop, unleſs it happens, as may be the caſe in ſome ſeaſons, when the air is over-heated, that the ferment proves too violent, for the moderating of ſuch ferment, apply the hop.

If beer be fermented in the wort tun, it is neither neceſſary nor proper to ferment again in the caſk. It is urged in practice, that the wort in caſking will be flat, and therefore needs a freſh ferment: it may be ſo; but as it is likewiſe the practice to fill butts of beer with the flat liquor, from time to time thrown into the tap-tub, and that beer never failing to come round again in a very moderate ſpace of time, ſo as to be in common draught, it muſt ſeem ſtrange, if freſh brewed beer would not take the ſame courſe much earlier, the ceaſing of the ferment being only a temporary allay of the ſpirituous parts, which muſt certainly revive again, and often with too much vigor and agitation, and then the fine hop extract is a ſure remedy.

It is the ſame when beer is to be bottled: it is by all prudent managers then purpoſely

purpoſely left open to become flat, but revives again ſufficiently in the bottle.

The truth is, that flat beer, whoſe ſpirit is not evaporated by time through the pores of the caſk, is in a mere ſtate of quieſcence, until rouſed again by the action and re-action of the internal and external air, cloſed up together with the drink in caſk or bottle, and in time reſumes a briſkneſs but little below fermentation. Such as are in haſte to bring this about apply loaf-ſugar, which certainly effects it. Patience will have the like effect; but here it muſt be obſerved, that high boiled beers imbibe leſs air, and are always longer in coming round, and the ſpirit at laſt extends itſelf no farther than to produce a thin cream, or ſmile on the ſurface, the only happy quality I know in high boiled beers.

The compoſition of water, ſalts and oils, in the ordinary courſe of management, aſſume their different periods: if an alkalous quality proves predominant, in proportion to its ſtrength, the time of keeping may be nearly adjuſted. If the ſalts and oils are ſo duly balanced, as to produce an equal taſte, the drink

will come round in about ſix weeks; and if the acids prevail in about a fortnight, if no freſh ferment enſues in the caſk.

Theſe maxims are to be underſtood of the temperate ſeaſons, as no regular judgment can be made of their courſe, when the heat of the air is above ſixty, or below thirty-two degrees, on the ſcale of the thermometer.

If worts are neither boiled nor fermented, they will generally remain in a quieſcent ſtate, they will act on the body only like honey and water mingled cold, and have no effect on the brain; but if a ſpontaneous ferment enſues, they will then acquire ſtrength, and operate in the ſame manner, as if the whole proceſs had been purſued, but not quite ſo heady and intoxicating as if fermented with yeaſt, and ſtill leſs, as when yeaſt is beat into the wort.

Acids are the moſt light fluid body, and moſt apt to receive the external air, by attraction or ſimilarity, than alkalis, and therefore beſt adapted to procure fermentation, which the quieſcent ſtate of unctious bitters utterly reſiſt. Yeaſt is an open ſpungy body, that attracts, ſimiliriſes,

similarises, and retains the external air; but being mixed with coarse oils, is, without great care in management, apt to contaminate the drink.

Vinos acids will, when well adapted, produce the like effect as yeast, as to the ferment, but will rather improve the relish than contaminate the liquor: oils they have immixed, but they are too highly maturated to produce any bad effect; they are rather sweetly balsamic, than entertaining any nauseous quality.

When beers take an untimely ferment in the cask, it is either owing to the season, the bad state of the cask or cellarage, to the internal air that wants vent, or that the external air enters in too large a quantity, and sometimes of all together. The remedy is fresh hop, or the balsamic decoction. Beers in that state will not force the fresh hop as in boiling, nor will it operate so quick on the untimely ferment as the balsamic decoction.

All ferments after cleansing ought to be prevented, as it works off the finer spirit of the drink. This is commonly apparent in cyders prest from immature fruits, and if not timely prevented, turns

them into vinegar: ſo it will happen in beers, though not ſo ſuddenly. The remedy for cyders is brandy; the ſame will do for beers; but if not well conſidered, produces a flatneſs.

If beer be cleanſed into wine caſks, as generally beſt, the bitter ſhould be ſomething the predominant quality, though intended to come round early, becauſe of the acid in ſuch caſk contained.

The beauty of cellarage conſiſts in an equal degree of heat and perpetual dryneſs, both as it reſpects the preſervation of the caſk, and timely mellowing of the beer, it being obſerved, that vaults cool in ſummer are warm in winter: high heats ſet beer on the fret, and ſharp cold coagulates the oils, and makes the drinks appear foul, as the heat opens the body of the oils, and ſets the ſalts afloat; hence it ſhould ſeem, that conſtantly preſerving a due mediocrity of the heat of the air in all ſeaſons, muſt be the trueſt means of having well brewed beers always in perfection, which is no mean advantage in great families, though it ſignifies little to thoſe who brew only from ſeaſon to ſeaſon,

ſeaſon, or to the common brewers, who regulate their ſtore by the cuſtom they have forced, or that would occaſionally force the drinks to come round, much earlier than at firſt intended, by giving free entrance to the external air, and other practices. In great families, they have uſually good vaults, the effect of nature or of art; but middling families are moſt commonly defective in this particular, and yet can afford to keep a ſtock of beer.

Vaults are not good under ſtreets or open yards, as in one caſe the paſſage of carriages ſhakes the earth and diſturbs the beer; and in the other, wet oozes through the crown of the arches, and damps the cellars.

In the common cellarage under the houſe, the beers are often diſturbed by the electrical fires in ſtormy weather, and other ſhakings; which is not the caſe in well conſtructed vaults in the like ſituation. An abſolute remedy for this is not practicable. Cold may be in part kept out by horſe-dung cloſing up the apertures; and I conceive the ſame will guard againſt heated air; ſo may it in ſome meaſure be equaliſed by

a ventilator, into what ſtate we pleaſe of coolneſs, and at the ſame time the vicious air extracted ſo in winter by the uſe of ſtoves brought to a ſimilar medium; but good vaults much the beſt effect of art, and, in the ordinary courſe of time, much the cheapeſt.

In cellars raiſed and thatched after the manner of our ice-houſes, and the foundation laid ſix feet below the ſurface, and in a dry ſoil, may probably make the beſt cellars in the country at leſs expence than arched vaults, as neither heat or cold have any effect on the internal parts of ſuch ſtructures, as thatch, well laid on, has always been found the moſt of any thing impenetrable to air.

When beer is come round fine, the time of tapping it ſhould not be omitted, becauſe if it takes a fret, it will rarely recover its natural fineneſs again.

Fine beers that come round early, need not curious cellarage; it is ſufficient they are kept dry, and out of the weather: but in curious vaults, they will be longer coming round, and keep better, after being tapped in a long draught.

All beers are in a better condition to bottle after being flat in the draught, than when firſt tapped.

Low fermented fine beers in the bottle require being kept cool; high fermented brown beers moderately warm; the one has internal air enough in the body to rouſe the ſpirit; the other may want ſome aid from the external air.

In whatever cellars beers are, they ſhould, if poſſible, be ſo placed, as not to need a removal, as that will throw the lees into the liquor, give it a bad taſte, and make precipitation abſolutely neceſſary; and in pale beers flatneſs genarally enſues.

As the oils, in the extracts from pale malts, ſeldom overbalance the ſalts, there is not generally any need of precipitation; but if, by the extract being too violently heated, or by the hop being boiled in the groſs, the oils ſhould prevail, and not be ſufficiently attenuated in the conſequent ferment, in ſuch caſe, iſinglaſs diſſolved in ſtale beer, or the ſame diſſolved in the liquor from the caſk, beat up with white of eggs, and ſtrained through a fine ſieve, will be the beſt method of fining down.—

The white of twelve eggs to one gallon of diſſolved iſinglaſs.

Beers brewed from brown malts will always need precipitation or time; the latter hazards ſomething worſe than foulneſs, and the former very precarious, eſpecially if the color be very high, the hop high in quantity, groſs in kind, and much boiled; in ſuch caſe no finings at preſent known, will at all times ſo attenuate, as to produce tranſparency; therefore is the color of the malt, the kind and quantity of the hop, and the time of boiling, to be carefully attended to, if a bright beer be propoſed.

Oils do not only float on the ſurface, but are diſpoſed through the whole body of the liquor, when opake or cloudy, and are only to be recovered by acid fruits, external air, and loaf-ſugar.

All ferment produces attenuation, but attenuation may be carried ſo far, as to make beer worſe than cloudy.

Beers turning to a harſh ſourneſs, are not to be recovered by teſtaceous powders, ſalt of wormwood, or lime, nor will they make good vinegar, without paſſing through a freſh fermentation. There is no remedy ſo good as the hop,

and

and that only partial; but if, upon an equal taſte being produced, it be immediately bottled off, it may prove tolerable, and that is the moſt that can be expected: and as in this caſe a flatneſs muſt neceſſarily enſue, it muſt be quickened by time, loaf-ſugar or raiſins, in proportion as expected to come round.

Molaſſus gives at once both ſtrength and flavor to beer, and is no otherwiſe obnoxious, than that the law forbids common brewers its uſe, in favor of the malt-duty; but when it is uſed, as it may, to recover ſour beer, the penal laws ſeem not to affect it.

The berries of Coculus Indicus will bring low beers, produced from long extracts, to a degree of ſtrength that common drinkers are very fond of; but if they are not pernicious, they are much queſtioned, and no wiſe man will uſe them for his own family. Such, or any other ingredients, than malt, hops, fruit acids, or dried grapes, are an improper mixture; and when the malt and hops are really fine, and not too forced in the extract or boil, fine beer will always be produced by them alone.

When oils meet with the griſt negligently emitted from the maſh-tun, they unite and entangle the ſalts, in the common order of device, paſt ſeparation; the liquor then is in much the ſame ſtate as water-gruel will be, when the oat-meal is injudiciouſly attempted to mingle in hot water; it runs into clots, that are not eaſily ſevered again. If the griſts ſo emitted be harſh and coarſe, they will form themſelves into leſſer bodies, and float about the whole ſubſtance of the liquor; but if of a finer griſt, they will gather into larger conſiſtencies, and in time precipitate with their own weight. Air will eſſentially contribute to this, as it will gradually concrete theſe floating particles, and aſſiſt their deſcent; but it is poſſible, that before this happens, the ſtrength of the drink may be exhauſted. How far ſoap-lees may contribute to diſſipate this cloud, or in what quantity they may be ſafely applied, experiment can only determine. I am fully perſuaded, that no ferment will act to any purpoſe, that will not totally deſtroy the liquor, by emitting both body and ſpirit. Prevention is in every man's power in the

firſt

firſt inſtance, by avoiding a too powerful maſhing, by letting the maſh reſt a due time, and by letting down the extract through more than one ſtrainer, ſo that the liquor may run off pure and tranſparent.

It is a known truth, that unctious bodies will not, by any power, ſo mix with acids, as to produce one uniform taſte, until ſo thinned by fermenting in other liquids, and the acids ſo formed by the ſame means, as to meet in one common quality. This gives us a reaſon for the neceſſity of fermentation, in order to the procuring an even taſte to theſe kind of compounds.

Grains of Paradiſe will give a particular flavor to beer; but it rarely happens, that any flavor, ſo obtained, will pleaſe, but where habit has given it a reliſh.

Fermented liquors, in a lively condition, are never at reſt; the great ferment ſets all the parts in motion, and the leſſer agitation continues it; and if that ſeems inclined to fail, it muſt be revived by art, or the drink becomes flat or ſour.

To know the art of managing beers after caſking, is at leaſt as requiſite, as

ſkill in the previous proceſs: the want of underſtanding this, is the true cauſe why they ſeldom come round happily, or are preſerved throughout in equal taſte and flavor, though ever ſo well manufactured: for which reaſon theſe aphoriſms have been formed, that every gentleman who eſteems malt liquors, may be himſelf a good brewer.

A SUMMARY *of the Principal Matter contained in the preceding Sections.*

Mr. Combrune has very well obſerved, that if a proper liquid was uſed in the ſteeping of barley for malt, as lime-water, or ſuch like, it might contribute to the purity and perfection of malt liquors: from whence may be concluded, that fine acids are more wanted than oils to the attainment of ſuch perfection.

There may, however, be bad acids, as well as bad oils, ſuch as will not, at leaſt in the ordinary courſe of management, aſſimilate with the finer, and are what have a bad effect on the palate; but if ſuch could by any means be thrown off in the barley ſteep, the leſs difficulty there would be in the management of the future proceſs.

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The throwing off the groſſer parts of ſugar by the power of lime, ſeems not to be a parallel, as that gentleman is pleaſed to think, as in one caſe it operates on a ſolid, and on the other as a fluid body; but it is a good hint, as it reſpects precipitation in fluids, and in that light has been mentioned before, particularly in reſpect to foreign wines.

The Spaniards uſe it as a precipitant, as well as to ſtop violent fermentation, eſpecially in their dry mountains, which are uſually brought down to the maritime coaſts in ſkins, and much diſturbed in the journey.

A diſtinction muſt here be made, that at firſt ſight may ſeem inapparent: it is, that lime ſo uſed in the wines abroad, and here as a precipitant to ſugar, is not made from chalk, but from ſtone of quite another nature: our ſugar-bakers uſe that made from the blue Maidſtone ſtone, and has double the power of chalk, both as to heat and ſtrength of cement. In Spain, it is caſual from what ſtone, but never from chalk; and the Italians chiefly make their lime from marble: nor, in my opinion, will chalk-lime ever act pro-

erly

perly in any of the caſes pre-mentioned, as being replete with groſs oils, and therefore extremely inapt; for although chalk, in its natural ſtate, is very well conſidered in water for brewing, it is not to be conſidered in the ſame light for precipitation, after being fired into lime, nor for the extracting or deſtroying of bad qualities in the barley ſteeping; and is merely mentioned here, to prevent an indiſtinction in the uſe of the word Lime.

The philoſophy of brewing is no way ſo well underſtood, as by practically conſidering the ſeveral ingredients, diſtinct and united, as bodies of a different nature or quality in their ſeparate ſtate; by being judiciouſly embodied, become neutrals, as is intended in all kind of well conſidered compoſition.

Malt liquors may be formed from the grain, and water, which is a mere menſtruum only, and the grain ſo extracted will probably remain in a quieſcent ſtate ſome time, flat, ſweet, and mawkiſh, but will not be in any ſenſe the liquor in view, or calculated for the caſk or the cellar, indiſpoſed to pleaſure at home, and inutile as to emiſſion abroad;

abroad; therefore are its oils broke and thinned by fermentation, its ſpirit awakened and ſet afloat, and its acids corrected by the hop; ſo that when brought to one body in taſte and quality, it loſes all its diſtinct powers, and is then that liquor we call Beer, reduced by art to the like quality, as if the mere effect of a ſimple extract, as wine from the grape.

When this is not effected, the art and myſtery of brewing is not well underſtood: this however muſt relate to the future, as well as the preſent; and to make a good judgment of time, extremely material, as the corrective quality of the hop muſt be ſuperior for the preſent, if intended for time, otherwiſe it is merely ale, and may be formed with little corrective; but to judge well of the application of correctives, ſo as to come round into an equal taſte in the time propoſed, is, as to this branch of management, a material conſideration; but even this muſt be attended with a thorough knowledge of the qualities of the reſpective ingredients, ſo as not any extracts or decoctions be made but of the better qualities,

tles, otherwiſe, though the liquor be preſerved the appointed time, the taſte and flavor may be utterly ruined, as will always happen in violent extracts, eſpecially from high dried malts, and overheated hops: the correctives to theſe, if any can be, are the acid juices of vinos fruits, the grape or currant; ſuch, in a freſh ferment, will in ſome meaſure remedy a bad taſte, but it is beſt never acquired.

Forward beers, inclinable to acidity, will, when bottled, continue in much the ſame ſtate as in the caſk, without any aſſiſtance; and the ſame of backward beer bottled too early; the bottles give the one no other alteration, than as the air acts upon them in the time of bottling, and ſhould be cloſed preſently; the other, if left open a time, may acquire ſome acidity, to give them a forwardneſs, but not to any material purpoſe: ſo that the firſt conſideration is the beſt to make a near gueſs of the proper time for bottling; but as this may be readily conceived by pegging, the only difficulty then is, ſo to calculate time, as that they may not come round too ſoon, or too late for convenience,

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as it anſwers no proper end to have it before, or after it be wanted.

It is undoubtedly true, that both in boiling and future fermentation, the finer ſpirits evaporate, and ſuppoſed that amends may be made by attenuation of the groſſer parts, a kind of ſubſtitution that is very hazardous and uncertain, eſpecially as to taſte and flavor, it may even improve in ſtrength, and I am apprehenſive, has ſome reſpect to health, as the lighter fluids are the moſt ſalutary.

It is univerſally admitted, that there are both groſs and pernicious qualities reſident in both malt and hops, and how far ſuch are capable of being attenuated, is not all the queſtion, as how far they may become ſalutary when ſo attenuated, ſuppoſing that may be fully effected. Nature operates more gradually, and to much better purpoſe, than culinary fire; the ſalts and oils of vegetables are thinned, purified and refined, in a very different manner by the ſunbeams, than human art has any acquaintance with; and where nature operates highly, as in hot countries, we find common metallics maturated into gold, and every where fruits and vegetables

vegetables exalted in taſte and flavor, in proportion as favored with the ſun's propitious power: therefore, to firſt throw off the fine qualities of the vegetables we uſe in brewing, and attempt, by a violent attenuation of the reſidue, ſeems as inconſiſtent with our natural ſkill and powers, as to turn alchymiſts, and tranſmute baſe metals into gold.

If this were not evident in the brewery, as well as to common ſenſe, it would be ſufficiently apparent in the diſtillery, where the grain is forced to a higher degree than in the brewery. Here is the higheſt experiment made, whether coarſe oils can by violence be tortured into any degree of purity; and though they attempt to keep as much of the fine ſpirit in as poſſible, they produce nothing at laſt but a fœtid extract. Some have attempted to rectify with chymical acids, and ſome have been wiſe enough to uſe vinos fluids to attenuate the groſs oils: had the latter taken place to a proper degree, the ſpirit would have nearly reſembled that extracted from fermented wines; nor ſhould I think them wrong, if in ſuch caſe they worked by compreſſion, as pre-

preſerving the fine ſpirit from flying off, is of much more conſequence than admiſſion of the external air, and the oils ſooner maturated into ſome degree of fineneſs, though not of the kind which are gradually formed in the common order of nature. Hence a ſlow procedure ſeems requiſite; but how that may operate to preſent advantage, is not ſo readily determined.

It is generally agreed, that the beſt ſpirits are drawn from the ſmalleſt wines, and gives us a ſenſible diſtinction between the French and Spaniſh brandies; the latter draw more from the like quantity, but at the ſame time proportionally leſs in value. I have drawn a very fine ſpirit from our own fruits, that I think at leaſt equal to the beſt French in taſte and flavor; but how far plantations for the like purpoſe would anſwer here in reſpect to profit, is only at preſent to be gueſſed: theſe are, however, hints ſufficient both to the brewer and diſtiller, ſo to improve their reſpective products, as to ſtrike out ſome new mode of manufacturing malt, ſo as to furniſh out a ſtaple commodity more univerſally ſaleable; and this to be the more reaſonably

ably conſidered, as that neither hot nor cold climes can produce the like, and conſequently the higher probability of ſucceſs: but what may not concern profit, may be eſſential to health; and what may not be the buſineſs of the brewer, may be the happineſs of a private family.

In this light it is, that I beg leave to recommend it to ſerious reflection, whether, as it is agreed that coarſe oils are extracted both from malt and hop, that it would not be nearer the maturation of nature, and to bring ſuch to ſome degree of purity, rather by a gradual heat permanently even, than by ſudden violence?

I am ſenſible it requires both time and attention; but to imagine, that even the groſſeſt oils would not exalt by a moderate continued heat, rather ſeems the effect of impatience than judgment. I am likewiſe ſenſible, that ſome learned chymiſts ſuppoſe the requiſite heat to be between 94 and 212 degrees, on the thermometer, gradually increaſed; that this mode will exalt the oils, I am in no doubt, but what is the event? Why truly, that the finer parts take wing as-

faſt

faſt as they become fine, and the groſſer either not properly exalted, or vaniſhed.

The manner of making vinegar intimates ſomething to the preſent purpoſe. Fermentation is in this caſe carried to an extreme, and the oils not previouſly exalted, precipitate: hence the acid qualite preſides, and only ſo much of the finer parts remain as contribute to the body or ſtrength of the liquor, whence it avoids freezing when oleaginos bodies are congealed. Vinegar then is only fermentation carried too high for drinkable liquors, and evinces, that ſuch liquors ſhould not be too highly fermented. Acid fruits and ſugars, not ſo highly fermented, operate to the like effect, and produce the fineſt vinegars. Nature has previouſly attenuated the groſs oils, ſo that they either become wine or vinegar, as the oils are more or leſs attenuated by art: hence we deduce the medium in view, both in reſpect to body, taſte and flavor, which are all in ſome meaſure deſtroyed, and in ſome meaſure preſerved in vinegar. From theſe various modifications, we ſee deduced the purpoſe of the ſeveral extracts made from malt; that ſuperabundant oils

oils produce cloudy beers; a regular and ſlow commixture of oils and ſalts, a proper liquor, pure and tranſparent for the table; and from a forced fermentation, vinegar.

All diſtillations emit the lighter, and retain the heavier parts of the malt, and conſequently conſiſts more of the acid ſalts, than of the oils or earthy parts: hence it may be readily conceived, that the ſpirit is more in the ſalts than in the oils; but this is ſo light and volatile a ſpirit, as not, without being entangled with the oils, to be retained in beers; but ſuch oils ſhould not be ſo predominant, as to impede the operation of the ſpirit, which gives it a vivid countenance, nor ſo groſs, as to deſtroy the taſte and flavor.

The ſame cauſe that affects the taſte and flavor of beer, will operate, in ſome meaſure, on diſtilled and high fermented extracts, on the brandies and vinegars; and all tortured malt and hops will produce that effect, whether from the kiln, the extract, or the boil, or from all together. Hence neither good brandies or fine vinegar, any more than pure beer, is to be expected from contaminated fluids;

fluids; ſo that however the oils, happily exalted, may be extremely requiſite in either caſe, yet the forcing out of ſuch as are too immature to blend in the liquor, will ever be fatal.

I am apprehenſive, from theſe, and various preceding remarks, that could an extract be made from fine malt, by an equal degree of heat, like that of the Mary Bath, and regulated by experiment and taſte, to a fixed ſhare of time, as in ſuch caſe neither the ſpirit would evaporate, nor fœtid oils extracted, that beers might be produced of quite another nature than any at preſent in uſe, more vinos, pleaſant, and ſalutary.

It is very true, that in the preſent mode of management, the boiling of malt liquors contributes to their preſervation, and ſo it does to their bad qualities; but if the ſame may be done in reſpect to the former, and the latter be avoided, it muſt certainly be better; and why the beſt part of the hop may not have the deſired effect, as the bad part of the malt, ſeems not a very difficult point to be reſolved.

Worts ſo extracted, would neceſſarily paſs through a natural ferment, and the

ſalts

ſalts and fine oils more readily mix, and an equal taſte be produced by a very calm and moderate efferveſcence, there not being any neceſſity to draw the external air in aid, when the internal has never been evaporated; and it only then remains to avoid all hazard of cloudineſs, that the extract be perfectly ſettled, before ſtrained off into the wort-tun.

This would at the ſame time ſave half the expence now laid out in the brew-houſe, half the labor, and much of the hazard occurring by the preſent mode of proceſs: beers would then be almoſt as eaſily made as wines, and perhaps nearly as good too, at leaſt by the aid of ſome hints pre-mentioned, be entirely freed from that ſcorbutic quality they now ſo eminently poſſeſs, and be in ſome meaſure, as wines are, rather a remedy than a diſeaſe. But as that which appears ſometimes evident to reaſon and common ſenſe, may not be found true in experiment, it may not be amiſs here to give ſome inſtances of the like way of thinking reduced to practice, as is the caſe in ſome families, though not exactly after the mode above preſcribed, but

but ſeem founded on the like ſentiments of not torturing either malt or hops in the boil.

The mode of proceſs with ſome, is to heat the water up to within twelve degrees of ebullition, and in that ſtate run it gradually off to the malt, until a ſufficient ſupply be given for the quantity intended, maſhed as the liquor comes down, and ſtands for ſettling two hours: the hop is then put into the receiver, and the extract let down upon it; and after two hours infuſion, it is returned to the copper, and heated up to the like degree as before; thence is let down into the back to cool, then cleanſed into, and fermented in the caſk.

This is, as to the main purpoſe, what may be deſired, but is not the thing propoſed, as the proceſs ſeems in many reſpects precarious, as the firſt heat may ſet the malt, and the uncertain ſtate of that heat not accounted for; as it is the opinion of the ſkilful in this art, that by too ſtrong heats, more oils are thrown into the maſh than can be converted into ſpirits, and fermentation by that means clogged and impeded: if this be true in the diſtillery, it is equally the ſame in

the brewery, and correſponds with what has been previouſly hinted: however, as the liquor produced in the ſaid mode of proceſs has generally proved very good, the ſetting of the finer parts of the malt has not perhaps occurred to obſervation, as not very apparent where the malt has been coarſe ground, as it is the flower only that ſets with too bold a heat.

This practice, or ſomething like it, is not uncommon in many parts of England; that is, neither to boil the water nor the wort, nor to ferment in the tun, but in the caſk only: but the ſame perſons have not generally the patience to let the drink take its natural courſe into ferment, without the application of yeaſt, or ſuch like improper powers; ſo that their drinks may be paſſably good, but far from being perfect; it being an eſtabliſhed truth, that if extracts are not overpowered with oils, there can be no neceſſity for an artificial ferment, nor will ever be overpowered with oils, unleſs violently forced in the extract.

Tea is a more delicate vegetable than any of which we treat, yet if it be forced in the extract, becomes extremely nauſeous.

ſeous. The Chineſe, for the market, force it in the ſame manner as our brewers do malt and hops, and for the like reaſon, which is profit; but people of fortune and nice palate underſtand it better, both as it reſpects health and pleaſure, as making but one ſimple extract: for this purpoſe it is beſt opened by the higheſt degree of heat water is capable of receiving; it cannot ſet, as being all leaf, and no flour; what remains after the firſt extract is beſt liked by habit, as ſeeming ſtronger; but theſe are ſuch as cannot, or will not afford to have a more delicate taſte, and give themſelves very little concern about either the ſalutary or inſalutary effects.

Rhubarb is one other inſtance of the regard we ought to have in all kind of extracts, and has ſome ſimilarity with the ſubject in queſtion, eſpecially that branch of it, the hop. The firſt extract made by decoction from rhubarb, in its prime ſtate, is mild, balſamic and pleaſant; the next rough and harſh; the taſte inconceivably corroding and nauſeous; when together immixed, ſeem merely calculated to ſtop fluxes, and that not without ſome danger of a worſe event:

the two former extracts immixed, act as a kind of alterative, that neither bind nor purge; and the firſt extract alone operates as a pleaſing, modeſt opener.

It is in ſome meaſure the ſame in the management of malt and hop extracts; the qualities of theſe are not in any part ſo high as in rhubarb, nor ſo low as in tea; but we always find high boiled beers from forced extracts of malt and hop, at any drinkable time, binding, and ales of leſſer extracts opening.

There are many other inſtances to be given, why the immature qualities of vegetable products ſhould never be forced into, or commixed with the more mature and ſpirited; but theſe, as above, being the moſt obvious and common, are, I hope, ſufficient to ſatisfy any rational mind, what ought moſt to merit eſteem, and be the object of practice.

EXTRACTS *formed from native and exotic Ingredients, ſeparate and immixed.*

Extracts for the compounding of liquors in various countries, reſembling beers, has been the cuſtom of ages, and are introduced into this country at a very high price, with the duties annexed, when

when as good, or better, may be made at half value.

Malt liquors manufactured in England, with all their faults and defects, are vaſtly ſuperior to any thing which the northern countries can produce, and the ſouthern aim at nothing of the kind; but as wines come cheap where duties are low, our beers muſt do ſomething more than excel, muſt be vinos and pleaſant, as well as fine, ſtrong, and powerful, or we muſt never preſume to eſtabliſh a manufacture for export of any conſequence; and as this may not ſpeedily be effected, wherever an import appears, that we can imitate or excel, reaſon and intereſt make it requiſite that we ſhould attempt it; and the firſt I would wiſh my countrymen to imitate and improve upon, is the Brunſwic Mum, for which reaſon I have here-under given the original receipt, with ſuch hints for improvement, as may probably tend to the common benefit.

BRUNSWIC MUM.

The original receipt is not here given in the order as preſcribed in the record of the town-houſe of Brunſwic, as that is very defective of inſtruction, in reſpect

to the process; but shall faithfully transmit the ingredients in the proportion directed. Sixty-three gallons of water is to be boiled, until one third be consumed. This quantity, so boiled, is to be let down, *as I suppose*, upon seven bushels of wheat-malt, one bushel of oat-meal, and the same of ground beans; *and then, I suppose, for it does not appear, the extract is to be drawn off, or let down into the receiver; nor does it appear, whether it is to go into the copper again and be boiled, nor how, previous thereto, the mash is to be managed, or how prevented from running ropy, as the consistence is very thick: it is only said*, that when it is tunned, the hogshead must not be filled, *and, as it seems, is only worked in the cask; and whether so spontaneous, or by art, is inapparent*; but assoon as it begins to work, put into it three pounds of the inner rind of fir, one pound of the tops of fir and beach, three handfuls of Carduus Benedictus, a handful or two of the flowers of rosasolis; add burnet, betony, marjoram, avens, penny-royal, and wild thyme, of each a handful and a half; of elder flowers two handfuls, or more; seeds of cardamum bruised, thirty ounces; barberries

berries bruiſed, one ounce. Let the veſſel work over as little as poſſible; *and when finiſhed*, fill it up. Laſtly, ten new laid eggs, unbroken; ſtop it up cloſe, and drink it at two years end.

It is farther ſaid, that our Engliſh brewers, inſtead of the inner rind of fir, uſe cardamum, ginger and ſaſſafras; and alſo add elecampane, madder and red ſaunders.

MUM, on being imported, pays one pound five ſhillings the barrel, which I ſuppoſe may be the ſame meaſure as is above called a hogſhead, as it is impoſſible to extract what we call a hogſhead from forty-two gallons of water remaining after evaporation in the boil, or even what we call a barrel of thirty-ſix gallons, as the malt propoſed will abſorb at leaſt one third of the forty-two gallons unevaporated; and then, until better informed in the meaſure, we can only act preſumptively, and ſo make a hogſhead of mum with ſo much water as will amply anſwer the purpoſe: nor can the extract be made from wheat-malt, unleſs unground, at 212 degrees the boiling point: nor is it eaſily conceived, how water ſo flatted in the boil

can produce a liquor of any kind of eſtimation or ſpirit, to keep two years.

The myſtery of the ten unbroken eggs muſt remain a myſtery, for any thing I can conjure about it: but as I have not any apprehenſion of their uſe whole, I have ſome of their being broken, as they would then ſoon rot and ſpoil the liquor: but perhaps, in the mode given, they may, in a gradual decay, feed and refine it.

If any one ſhall be curious enough to attempt the making of this liquor, as it is ſaid ſome here do, perhaps it may turn out better, if the ſpirit of the water is not deſtroyed in the boil; and I am afraid, that if the wheat-malt be unground, yet that the boiling water will ſet the oat-meal and bean-flour in the maſh, whence I preſume that may not be involved until the maſh be cool, or that they be ſeparately maſhed cool, and then immixed with the wheat extract. But this is all conjecture, and there I muſt leave it.

MELASSUS BEERS.

Theſe are variouſly manufactured in different countries, according to the ingredients to be mixed in ſuch countries produced.

produced. In England we only uſe melaſſus as malt, and add no other ingredient but hop, and that in a ſmall quantity, as it is rather conſidered as a kind of vinos ale than beer for keeping, it being more wholeſome than uſually malt liquors are, and makes a pleaſant ſummer drink.

The proportion is twelve pound of melaſſus to the barrel of water: the mixture is made with the water very little warmed, then boiled half an hour, to which add the extract from one pound of hop, and let it be fermented in the caſk: this will be fit to bottle in about ſix week, or may then be drank from the caſk; if it is not then fine, it may be thrown down with a ſmall quantity of iſinglaſs, but this ſeldom neceſſary, and only occaſioned by the hop, and may probably anſwer better, if the calamus aromaticus be uſed inſtead of the hop.

In *Newfoundland* the mode of proceſs is much the ſame, but inſtead of hop-ſpruce, the tops of pine branches, or the buds, are cuſtomarily applied: many there, for certain reaſons, do not take

ſo much trouble with it, but it anſwers accordingly.

In *Penſylvania* their mode of proceſs is; to five pounds of melaſſus put half a pint of yeaſt, and a ſpoonful of powdered raw ginger: put theſe into a veſſel, and pour on them two gallons of boiling water, and bar them well up, as we do, in a maſh, till a fermentation enſues: to theſe add thirteen gallons of water lukewarm, let the liquor ferment twelve hours, or until the ferment ceaſes; then bottle it off, with a raiſin or two in each bottle, taking care at the ſame time not to cloſe the bottles too ſoon: it would do full as well, or perhaps better in the caſk, if a quantity ſufficient, and is ſo done with the better ſort of people.

In *Carolina*, the pine tops from the turpentine tree are boiled until the rinds are looſe; they are then ſtripped off, they ſtrain the liquor, proportioned to ſuch a quantity of water and melaſſus as intended for the brewing, and are uſed merely as an hop extract, but are an higher bitter: this compoſition is boiled about half an hour, and then ſet to cool; when lowered to a proper degree of heat, they ſlice into it a certain quantity of the ſweet

ſweet or Spaniſh patata, which ſets it a working: when the ferment is over, it ſtands ſome time to cool and ſettle, and then is cleanſed into the caſk, as in the brewery here.

When ſpruce can be obtained, the pine tops are rarely uſed, as being rather a diſagreeable bitter, and not eſteemed ſo wholeſome as the ſpruce, which is ſcarce in a flat country, as it grows chiefly amongſt the rocks.

The people of Carolina are now upon a new plan of brewery, by attempting to malt their rice; in which, if it does not anſwer to their wiſh in brewing, may ſucceed in diſtillery, as the beſt ſpecies of arrac being drawn from that grain, that of a lower quality is from the cocoa-tree, the wine of which is uſually called toddy, extracted from it by tap in the like manner, as another vinos fluid is from our birch-tree. It is moſt probable they will not ſucceed in the rice brewery, becauſe of the heat of the air in that climate apt alone to fox malt liquors, and give them a kind of empyreuma; but if it anſwers in the diſtillery, it will be an eſſential benefit to the colony, and therefore wiſh them to

ſet out wiſely, as, according to the old adage, not to ſpoil a ſheep for a half-pennyworth of tar; for if the extracted ſpirit will not anſwer their end without a too-violent extraction, their labor will be in vain, as the making a bad commodity is worſe than making none. Credit depends on the firſt attempt; and if that fails, it will be difficult afterwards to bring it in faſhion.

Theſe are the general foreign breweries, or attempts at brewing, as of ſome diſtant reſemblance to malt liquors, or as propoſed to anſwer the like purpoſe; after having gone through ſome remarks on the different ſeaſons in this climate for brewing, from whence may be deduced ſome conjectures, whether it may be worth our while to attempt at excellence in theſe kind of foreign manufactures, as not having the materials at home, and tranſmitted hither ſo burthened with high duties. The melaſſus, no doubt, would contribute much; but, as is obſerved before, that may not be uſed in trade, and neither ſpruce nor fir of any avail without it; as, ſuppoſe either honey or ſugar were to be uſed as ſubſti-

tutes,

tutes, I apprehend they would not in all reſpects anſwer the purpoſe; or if they did, no ſooner was ſuch a manufacture to take place, but a high duty would be palmed upon it, even if requiſite to our health, as ſomething of a more vinos nature is really wanted to counterbalance the groſs products from beers, as now brewed for the uſe of thoſe, who cannot in any ſenſe drink wine, and from whence more inſalutary conſequences enſue, than even the beſt phyſicians generally conceive. I have therefore, in the courſe of this work, as far as modeſty would permit, attempted to ſtrike out a new mode of brewery; and that it may have ſomething more of ſpirit and vigor to convince, I ſhall conſider the ſtate and nature of the ſeaſons, according to the brewers own notion of the effect they reſpectively have on the preſent manner of brewing with the cuſtomary ingredients, and what effect muſt be neceſſarily produced, by giving a more vinos palate to their liquors, without offending the legiſlature.

The brewers ſay, that the two beſt ſeaſons for brewing are March and October,

tober, or nearly about thoſe times, or as the uncertain temperature of the air this climate happens to preſent. Their reaſon is, that in a colder ſeaſon a proper fermentation may not be obtained, and in a warmer it operates too violent.

There is no doubt, that in the colder ſeaſons the oils ſtagnate or thicken as the degree of cold may be; and that in the warmer, both oils and ſalts are more thin and ſpirited; and was this all the impediments to brewing, the remedy would be very obvious, and they might, as they generally do in London, brew at all ſeaſons, but not equally well in the ſame mode; for if the oils are equally forced in winter, the extracts equally violent, it muſt be proportionally difficult to produce a proper ferment, becauſe the ſalts being then entangled in the condenſed oils, no vivid operation can enſue, but by another kind of violence of heat, to break ſuch condenſation, and give the lighter ſpirits means to act: hence ſprings an evident conſequence, an addition of heat, and of yeaſt: but if in the extract was fewer oils, and more acid ſpirit, it would

would not be equally requiſite either for more heat or yeaſt.

It is true, ſeaſons may be ſo cold, that even acids may be bound up; but as that rarely happens in this climate, it is little to the purpoſe of this argument; and therefore, if leſs violence was uſed in the extract, or that ſupplied with a ſufficient quantity of vinos acids, the drink would be equally powerful, if not more ſo; the fermentation would go on, as in more propitious ſeaſons, and the pernicious quality of the yeaſt avoided.

That yeaſt is pernicious, themſelves allow; they admit its conſiſtence to be of the groſſer oils; they have too many of them before in the extract, or they would never have foul beers; and that even the lees of wine would do as well, cannot be denied; and then, if the extract can be prevented running roapy, or condenſing in the receiver, the ſeaſon ſeems to be no kind of impediment.

When it is conſidered again, that high boiled beers cannot be ſubject to any abſolute neceſſity of being worked in the wort-tun, but may have all requiſite fermentation in the caſk, where they

they may be kept much warmer; this ſo much counterbalances the ſeverity of the ſeaſon, as to bring the operation nearer to what is uſually done when the temper of the air is more favorable.

If then we turn ourſelves to the other extreme, and ſuppoſe we are brewing at Midſummer, it has been obſerved before, that groſs oils foul the beer, and that there is an over quantity of ſuch in the ordinary courſe of proceſs, is allowed: it ſeems then happy, that a violent fermentation enſues; but if it be otherwiſe, how happens it, that yeaſt is uſed at all to give power to ſuch fermentation? for if, by the heat of the ſeaſon, the oils are ſo thinned, as to unimpriſon the acid ſalt, why will not fermentation enſue without the aid of yeaſt? Theſe awakened ſpirits on the wing will neceſſarily act with vigor, and meeting but with a ſlight reſiſtance, aptly produce a ferment, intimately tending to comminution; and if the oils and ſalts by this means amicably immix, the main purpoſe of the proceſs is anſwered; it only remains then, that the drink be cleanſed into the caſks properly, receive what external air may be requiſite, and not

not ſuddenly chilled by too cool a ſituation in the cellar.

It may hence ſeem ſtrange, that yeaſt may be thought neceſſary in either of the pre-mentioned ſeaſons, as attended with a variety of bad effects, and not one known good property without it: what the artiſts call *yeaſt bitters*, and what every body calls headineſs, is, without this ſubject, or ſimilar ſubſtitute, totally unknown. There is much talk of cocculus indicus, grains of paradiſe, daucus, calamus aromaticus, and melaſſus, to poiſon the beer; yet moſt of theſe do leſs harm than yeaſt to make the drink heady, and ſome of them a real benefit.

The reaſons of uſing yeaſt in general, I take to be, cuſtom and impatience, and that it may in ſome meaſure contribute to rectify an error ſpringing from a view of profit, by which, like what is ſaid of the conjurers in ancient times, that raiſed ſpirits they could not always allay: but if it be true, as themſelves admit, that the oils are generally too powerful for the acid ſalts, why may not a proper addition be adminiſtred in time, rather than be drove to the unhappy

happy alternative of either an exceſs of yeaſt, or aqua-fortis, and at laſt perhaps totally loſe their beer, as that which may be eaſily corrected in the firſt inſtance, while all the fluid is in a kind of ferment, than when cooled into a ſtubborn opake body; or rather, why do not practiced brewers act ſo in the proceſs, as not to need any of theſe reliefs; but where profit governs, or ſeems to govern, men ſeldom reaſon correctly, I wiſh I could ſay honeſtly, as the injuring the health of our labouring people is a kind of high treaſon againſt the community; but as men ſometimes, in what are eſteemed higher profeſſions, ſet the example, unconvicted of evil, proceed without any regard to conſequences; ſuch are ſafe enough, whoſe ignorance or avarice dictate each motive of action, and are in ſome reſpects more excuſable than ſuch private perſons, as that merely through cuſtom, commit a gradual ſuicide on themſelves, and ruin the health of their families, which muſt be the caſe with thoſe, that will not take the pains to conſider the evil effects of a notorious ſcorbutic fluid.

Spring

Spring drinks are generally required to be more than ordinary wholeſome, the humors are then all afloat, and our paſſions at war with our minds; it is then that vinos fluids act to moſt effect, as antiſcorbutics, and all nature in a ferment: malt fluids then aſſume a ſpontaneous effervescence, and genial heat and moiſture contend which ſhall have the beſt ſhare in a happy production.

It is in this ſeaſon that brewers may venture much farther than in the four preceding months, in the making of ſtrong extracts, becauſe of the vivid ſpirit of the ſalts, and readier commixture with the oils, opened and thinned by the emotion of the natural heat of the air, then more than at any other ſeaſon peculiarly agitated; but it does not follow, that oils, even then, ſhould be ſo forced from the malt and hop, as to impede that natural fermentation in liquors, which this ſeaſon in ſo particular a manner encourages.

That Spring is a very good ſeaſon for brewing, is out of the queſtion, though not perhaps ſo good as Autumn; but this depends on weather, and what may be proper at one time in March, may at another

another be beſt in April, or even in May, as that month is ſometimes very cold; but as that is uncertain, and the general probability againſt it, the rule is beſt in March; but if neceſſity engages us to defer it longer, a ſhrewd gueſs may be made, what the temperature of the ſucceeding months will be: if February be unuſually warm and temperate, it commonly prognoſticates a wet, cold, latter ſpring and ſummer.

The general reaſon for brewing in March is, as the weather is not uſually ſo cold as to impede, nor ſo hot as to over-forward fermentation, and that the drinks may paſs on cool through the ſummer, in which lights the ſeaſon is ſingularly eligible; but as fermentation has been evidently ſhewn to depend on the acid ſalts having full play, and as theſe may be always obtained, either from the air or acid fruits, the relief is very eaſy and natural, and the ſuper-abundant oils ſo ſeparated or commixed, as not to obſtruct a due and proper comminution of parts, to ſuch a degree at leaſt, as that in the ſequent ſeaſon the acids may not riſe too predominant.

The

The general opinion ſeems to be, that March is the beſt month for brewing pale untortured malts, as ſuppoſing the atmoſphere then more replete with ſoft and kindly fluids than in October: that it is more replete with vapor, I have no doubt, but much queſtion their ſuperior ſoft and kindly nature, becauſe of the frigid particles then uſually remaining in the air, and even in ſome ſeaſons to the concluſion of May; but that the ſucceeding ſummer may give ſuch drinks a more meliorating quality, has ſome appearance of reaſon.

If any thing be wanted in pale malts, it is an additional heat to open and mellow them; but as that is artificially obtained in the extract, if then any harſhneſs remains in the liquor, the ſummer air may in ſome meaſure aſſiſt to ſoften it; but this ſeems to me a reſource of no very important uſe, if of any conſequence at all.

It is certain, that the ſpring is uſually ſelected for the brewing of pale malts, but ſuch only more particularly as are intended for a ſummer beveridge, or that are to come round early. Pale malts certainly make the beſt ſummer drinks,

drinks, and if not too highly forced, or contaminated with ſediment, have a more vinos quality, and are leſs ſcorbutic than thoſe extracted from a higher dried commodity, and in ſuch caſe are never known to come foul or cloudy.

AUTUMN commands a certain advantage in the brewery, that no other ſeaſon can equal; that is to ſay, ſoft water, fine air, and a cooling ſequence. *October* is, in the order of nature, warmer than *March*; and if the latter ſummer proves fine, the moſt equal ſeaſon of the year.

As in this month our latter fruits ripen to perfection, if any vinos fluids are requiſite, they are then to be had freſh and fragrant; but pale malts are only to be uſed with them in mixed drinks, though always of uſe to correct the coarſe oils extracted from brown malts, or to procure a ſpontaneous fermentation.

Brown malt extracts have the benefit of the enſuing ſeaſon to gradually meliorate through a declining temperature for near three months, and to be in a kind of inert ſtate for near three months more, when a ferment may again take place,

place, and carry them happily over the ſummer; and then, if not too high brewed, may be in a proper condition for fining and tapping.

Beers not coming round in this time, are either overburthened with malt and hops, or with coarſe oils, or with altogether, and no true gueſs to be made when they will be in order; the liquor, well conſidered in the brewing for coming round about this time, makes it well ſuit the courſe of the enſuing winter, when it is rather drank as a kind of cordial than as a grateful beverige; and though the malts brewed from, and the hops uſed, be of the coarſer kind, in this ſeaſon, either the grape or morelli cherry will give it a vinos flavor, diſperſe all unctious fœtidity, and that heady quality which ordinary ingredients are apt to form in the drink; and as the generality of the people are more under ſhelter in the winter than in oppoſer ſeaſons, more affected by the cloſeneſs of the air, and more ſubject to ſcorbutic habits than in ſummer, it would be very happy, if they could ſo contrive the management of their beers

for

for winter uſe, as to make them at once grateful and ſalutary.

The experiment often made upon that coarſe acid melaſſus, and the reſulting effect, may evince how much happier the conſequence would be in the uſe of acid fruits, that are generally plenty at this time of the year; but we ſee not our error, becauſe groſs oils will not expreſsly poiſon. Perhaps theſe hints, ſo often repeated, may put it into the head of ſome ſenſible brewer, to proceed upon a new plan, and by that means at once to recommend himſelf to the Public, and to Fortune. Autumn the beſt ſeaſon, the experiment very cheap, as none need break in upon their ſubſtance, to experience the effects of mixing acid juices with our malt extracts, and of fermenting without yeaſt, the two moſt important points hitherto conſidered in the perfecting a ſalutary beverige.

INDEX.

INDEX.

A

B

C

D

Damsins,

G

H

I

K

L

M

N

S

T

V

W

Y

FINIS.