

James L. Seager

JAMES BLACK LIBRARY.

No.

17 1/2

A
TREATISE ON BREWING:
 WHEREIN IS EXHIBITED
THE WHOLE PROCESS
 of
THE ART and MYSTERY of BREWING
 the various sorts of
MALT LIQUOR;

WITH
Practical Examples upon each Species.

Together with the Manner of using the Thermometer and Saccharometer;
 elucidated by Examples,

AND
RENDERED EASY TO ANY CAPACITY,

- IN BREWING
- | | |
|----------------|------------------|
| LONDON PORTER, | WINDSOR ALE, |
| BROWN STOUT, | WELCH do. |
| READING BEER, | WIRTEMBERG do. |
| AMBER, | SCURVY-GRASS do. |
| HOCK, | TABLE BEER, and |
| LONDON ALE, | SHIPPING do. |

SECOND EDITION.

BY
ALEXANDER MORRICE,
 Common Brewer.

LONDON:
 Printed by Knight and Compton, Middle Street, Cloth Fair,
FOR THE AUTHOR:
SOLD BY H. D. SYMONDS, PATERNOSTER ROW.

1802

OK 3

THE NEW YORK
PUBLIC LIBRARY
790658
ASTOR, LENOX AND
TILDEN FOUNDATIONS
R 1918 L

INTRODUCTION.

IT may be necessary to give some Reason for laying these few Sheets before the Public.

I am convinced that the many raw, thin, pale Beers, which are in such frequent Vend, whereby the Brewery is injured, and the Public not benefited, principally proceed from the Liquors being improperly taken, and from not extracting that Quantity of Saccharine from the Malt which it really possesses; it having, by an improper Process, in the first Instance, so locked up the Pores of the Malt, that no After-heat can
A procure

INTRODUCTION.

procure the proper Extract. I am speaking of partially locking it up, which is so frequently passed over unnoticed. Were the Goods entirely fet, the most inattentive Observer could not avoid seeing it. Notwithstanding which, the ignorant Brewer continues his usual Process, runs his accustomed Lengths from this (originally) good Malt, and thinks that he has extracted the whole Virtue from it. But this is not the Case; for, though he may obtain the same Quantity of Liquid, it is very deficient of that Richness which he has a right to expect, and which is so gratifying to the Palate.

When we speak of the Bodies of Beers, Strength is not to be understood; but it is the Materiality of it which is distinguished upon the Palate, as light, heavy, thin, full, &c.

It

INTRODUCTION.

It is well known to every Brewer that the strongest raw Wort produces no inebriating Effects upon the Drinker : from this we are convinced that Fermentation does not set at Liberty, but positively creates, the spirituous Parts of the Liquor.

Fermentation is, then, the grand Field where the experienced Brewer is to reap the golden Harvest of his Labours : here is the most delicate Part of the Process, as every Error in this Stage must be a Diminution of the Brewer's Profits.

We have some Brewers in the Town Brewery who suffer their Ales to lie eight or ten Days in the Tun, which frequently causes it to be Yeast-bitten : the Loss which they sustain in Quantity may also be calculated, from its lying so long exposed in the Working Tun. I think it must be clear

INTRODUCTION.

to almost every practical Brewer, that this Mode of proceeding is improper upon many Accounts.

It must be visible to every Person, that Fermentation carried beyond a certain Period defeats its own Purpose ; for which Reason, it requires the strictest Attention of the Artift. A Delay of an Hour or two in cleansing it, when fit, will endanger your whole Gyle. To an improper Management in this important Part of the Process, may be ascribed the Quantities of thick, cloudy Beers, with which the Public are supplied ; which champ in the Mouth more like Hafty Pudding than a well brewed Beverage.

By a prudent Management, and a Knowledge of that grand Essential---Fermentation, there might be produced, without any Increase of Expense, a light, pleasant Drink, agreeable

INTRODUCTION.

agreeable to the Vision, and pleasant to the Taste.

The Crisis when to cleanse is of so delicate a Nature, that it is impossible to lay down any fixed Rule ; but Observation will point it out clearly to you. The Brewer who, by his Attention to the Particulars here recommended, attains this desired Perfection, secures to himself an unfolicited Extension of Trade, and renders those enormous Expenses that are daily incurred by Brewers to force a Trade unnecessary : it will save them the Unpleasantness of taking back Returns, or that most ruinous, though daily practised, Method of allowing the Victualler the Beer at a far reduced Price, to induce him to draw it. Again : his Beer, by being well brewed, and giving univèrsal Satisfaction, enables the Victualler to chuse
his

INTRODUCTION.

his Customers, and only supply those who pay him ready Money, or at a short, regular Credit.

Thus supplied by such a Brewer, he will be enabled, every twenty-eighth Day as it comes round, to pay his Book up; and without being obliged to resort to those shuffling Methods of mixing Table and sometimes Small Beer with the Porter, to lessen their monthly Payment, and pay themselves for those Risks which they are obliged to run, to get rid of an Article that is only marketable among those who cannot do without Credit; whereas the Vender of a good Article, not being compelled to resort to these Risks to get rid of his Commodity, will only trust where his Money is sure: he is thereby compelled to pay every Attention to his Cellar, to keep up his own Credit,

INTRODUCTION.

Credit, and, consequently, that of his Brewer.

I cannot here help observing, that Brewers are very frequently blamed when they are really blameless; for, if Beer is ever so well brewed, it is frequently spoiled by the Carelessness, Obstinacy, or Ignorance, of the Storehouse Cooper. If even the best Beer be laid into the Cellar of a slovenly or lazy Victualler, from the Gullyhole in whose Cellar issues Stenches, it cannot fail of hurting the Beer materially. Many Victuallers suffer their Tap Tubs to be mouldy; and, when a Butt wants fining down, appoint a Servant Girl to perform that Office; by whom the Bungs are left out, and many other Acts committed, which all tend to discredit the Brewer, although he does not deserve it.

If

INTRODUCTION.

If Brewers would make it a Point to encourage Cleanliness among Victuallers, and pay a greater Attention to their Cellars, they themselves would ultimately derive an equal Advantage from it.

PREFACE.

PREFACE.

WHEN we consider the wonderful Consumption of Malt Liquor, the vast Revenue derived therefrom, and the Fortunes that have been made by Individuals, few Apologies, I trust, are necessary for ushering into the World a Treatise, tending to cast a Light on the Manufacture of a Beverage in such general Use.

Perfectly aware of the Opposition every Work of this Kind, however modestly introduced to the Public, has to meet with, I purpose, notwithstanding, to describe the different Sorts of Beer, with the Manner of

B

manu-

manufacturing them, from my own Knowledge, having been some Years a Common Brewer; and also from the Information of others, of whose practical Abilities I have a great Opinion.

It is a very common Remark, that almost every old Woman can brew. I admit, that Ale which is brewed at Noblemen's and Gentlemen's Houses is generally cried up; but, look at and calculate the Expence they incur by the Party so brewing, through their not knowing the proper Heats that are necessary to extract the greatest Quantity of Saccharine from the Malt, and consequently they are giving Goods instead of Grains to the Pigs.

Again; the length of Time (often being Years) before it is fit for Use, convinces me that the Heats are generally improperly taken,
and

and the Fermentation imperfect: the first is the Preliminary, and the second the most essential Part, of the Process. Though I shall give every Information in my Power of the Criterion by which to judge when a perfect Fermentation has taken Place, yet nothing but Practice and your own Observation can make you Master of it.

HISTORY
OF
THE LONDON BREWERY,

From the Beginning of King William's Reign to the
Present Time.

IN the beginning of King William's Reign, the Duty on Strong Beer, or Ale, was One Shilling and Threepence per Barrel: the Brewer then sold his Brown Ale at Sixteen Shillings per Barrel, and the Small Beer (which was made from the same Grains) at Six Shillings per Barrel. These were mostly fetched from the Brew-house by the Customers themselves, and paid for with ready Money; so that the Brewer kept but few Servants, fewer Horses;

B 3 had

had no Stock of Beers or Ales by him ; no purchasing of Leafes of Public Houses ; no bad Debts ; and but a trifling Number of Casks ; and his Money, consequently, returned before he either paid his Duty, or for his Malt. The Victualler then sold this Ale for Twopence per Quart.

Soon after, our Wars with France occasioned further Duties on this Commodity. I think that in 1689 Ninepence per Barrel more was laid upon Strong Beer, and Threepence per Barrel on Small Beer. In 1690 the Duty was advanced Two Shillings and Threepence per Barrel on Strong Beer, and Ninepence per Barrel upon Small : and in 1692 an additional Duty of Ninepence per Barrel was laid on Strong Beer only. At this Period the Brewer raised his Price from Sixteen Shillings to Eighteen Shillings and Nineteen Shillings per Barrel ; and the
Victualler

Viſtualler raiſed his Price to Twopence Halfpenny per Quart.

Now we come to the Queen's Time, when, France diſturb- ing us again, the Malt Tax, the Duty on Hops, and that on Coals, took Place; and, as the Duty on Malt ſur- paſſed that on Hops, the Brewers endeavour- ed at a Liquor wherein more of the latter ſhould be uſed: thus the drinking of Beer became encouraged, in preference to Ale. This Beer, when new, they ſold for Twenty- two Shillings per Barrel; and, at the ſame Time, advanced their Ale to Nineteen Shil- lings and Twenty Shillings per Barrel: but the People, not eaſily weaned from their heavy, ſweet Drink, in general drank Ale mixed with Beer from the Viſtualler at Twopence Halfpenny to Twopence Three Farthings per Quart.

The Gentry, now, residing in London more than they had done in former Times, introduced the Pale Ale, and Pale Small Beer, which they were habituated to in the Country; and either engaged some of their Friends, or the London Brewers, to make for them these Kinds of Drink; and Affluence and Cleanliness promoted the delivery of them in the Brewer's own Casks, and at his Charge. Pale Malt being dearest, the Brewer, being loaded with more Tax and Expence, fixed the Price of such Small Beer at Eight Shillings and Ten Shillings per Barrel, and the Ale at Thirty Shillings per Barrel: the latter was sold by the Victualler at Fourpence per Quart, and under the Name of Twopenny.

This little Opposition excited the Brown Beer Trade to produce, if possible, a better Sort of Commodity, in their Way, than
heretofore

JAMES BLACK LIBRARY.

No.....

THE LONDON BREWERY.

13

heretofore had been made. They began to Hop their Mild Beers more, and the Publican started three, four, or six Butts at a Time; but so little Idea had the Brewer, or his Customer, of being at the Charge of large Stocks of Beer, that it gave Room to a Set of monied People to make a Trade, by buying these Beers from Brewers, keeping them some Time, and selling them, when Stale, to Victuallers for Twenty-five Shillings or Twenty-six Shillings per Barrel.

Our Tastes but slowly alter or reform. Some drank Mild and Stale Beer; others, what was then called Three Threads, at Threepence per Quart; but many used all Stale, at Fourpence per Quart.

On this Footing stood the Trade until about the Year 1722; when the Brewers conceived that there was a Mean to be found

found preferable to any of these Extremes ; which was, that Beer should be well brewed, and, from being kept its proper Time, becoming Mellow (i. e. neither New nor Stale), it would recommend itself to the Public. This they ventured to sell at Twenty-three Shillings per Barrel, that the Victualler might retail it at Three-pence per Quart.

Though it was slow, at first, in making its Way, yet, as it was certainly right in the End, the Experiment succeeded beyond Expectation. The labouring People, Porters, &c., found its Utility ; from whence came its Appellation of *Porter*, or *Entire Butt*. As yet, however, it was far from being in the Perfection which we have since had it.

Porter

Porter was, at different Times, raised to Thirty Shillings per Barrel, where it remained till the Year 1799, and was retailed at Threepence Halfpenny per Quart; when, in Consequence of Malt rising in Price to from Four Pounds to Four Pounds Ten Shillings, and Five Pounds, per Quarter, and Hops from Four Pounds Ten Shillings to Seventeen Pounds, Eighteen Pounds, and Twenty Pounds per Hundred Weight, Porter was raised to Thirty-five Shillings per Barrel, and retailed at Fourpence per Quart. Ale, likewise, experienced a Rise of from Forty-two Shillings to Fifty-two Shillings and Sixpence per Barrel.

The Prices still keeping up, at a Meeting of the principal Porter Brewers it was raised to Forty Shillings per Barrel to the Victualler, and is retailed at Fourpence Halfpenny per Quart.

Ale

Ale has also experienced a Rise; by different Brewers, different Prices, no doubt: but I believe, generally, in London, to Seventy-two Shillings per Barrel; and is retailed at Eightpence per Quart.

Table Beer is raised to Twenty Shillings per Barrel.

Hops were first brought into England from the Netherlands, in the Year 1524. They are first mentioned in the English Statute Book in the Year 1552, viz. in the fifth and sixth of Edward the Sixth, Chapter fifth: and, by an Act of Parliament of the first of King James the First, 1603, Chapter eighteenth, it appears that Hops were then produced in Abundance in England.

The neat or clear Duty paid by the Common Brewer in the London Brewery at this
Time,

Time, viz. 1801, with the Malt Allowance deducted, is Five Shillings and Sevenpence Halfpenny per Barrel upon Strong Beer; and the clear Duty of Excise upon Table Beer is Two Shillings and Sevenpence Farthing; and upon Vi, or Small Beer, Tenpence.

TREATISE

TREATISE ON BREWING,

&c.



AS I intend this Publication for young Brewers, and for the Benefit of Country Gentlemen, it may not be amiss, first, to give the Outline of a Brewhouse, with its Utensils; together with some Hints on the Subject of the Utensils used, which are—

The Liquor Back, Copper Back, Copper, Shutes, Jack Back, Backs or Coolers, Mash Tun, Under Back, Working Tuns, Stillions, Casks, and Vats.

The

The Liquor Back should be placed sufficiently high, to command the Copper, and much exposed to the softening Virtue of the Air. This I consider as particularly necessary, where you are compelled to use hard Water.

The Copper should be placed high enough to command every other Utensil in the Brewhouse, all of which you should be particularly careful to keep clean and sweet; for if the Fox, or Must, get into your Utensils, you will be much troubled to remove them.

If after having brewed they are likely to be still for some Days, cause the Backs, &c., to be well liquored down, and limed, which will prevent any Acidity remaining in the Wood. In Summer they should, in Addition, be filled with Water, which, by keep-
ing

ing the Wood swelled, will prevent the Vessels leaking.

I must here caution you to keep a wary Eye upon your Working Tuns; for it is generally admitted that there are not greater Thieves in a Brewhouse than they are:---- many, being partly under Ground, render your Search for the Leak fruitless.

C

MALT.

MALT.

Of Making Malt.

AS this Article stands first in the Brewery, I shall give you the Directions of a Maltster of Eminence for the making of it, which are as follow :

The Barley must be put into a leaden or tiled Cistern that holds five, ten, twenty, or more, Quarters ; it is then to be covered with Water four or six Inches above the Barley, to allow for its swelling : here it is to lie five or six Tides, as the Maltster calls it, reckoning twelve Hours to the Tide, according to the State of the Barley in Body or Dryness ; for that which comes off Clay,
or

or has been washed or damaged by Rains, requires less Time than the dryer Grain, that was inned well, and grew on Gravels, or Chalks ; the smooth plump Corn imbibing the Water kindly, whilst the lean and steely Barley will not do it so naturally. To know when it is enough, you must take some of the Corns, endwise, between the Fingers, and gently crush them : if they are in all Parts mellow, and the Husks open, or start a little from the Body of the Corn, then it is enough. The Nicety of this is a material Point ; for if it is infused too much, the Sweetness of the Malt will be greatly taken off, and yield the less Spirit ; and, of Course, will cause a Deadness and Sourness in Beer or Ale in a short Time, for the Goodness of the Malt contributes much to the Preservation of all Ales and Beers.

Then the Water must be drained very well from it, when it will become equal and better upon the Floor, which may be done in twelve or sixteen Hours in temperate Weather, but in cold nearly thirty Hours. After being taken from the Cistern it must lie thirty Hours, for the Officer to take his Gauge, who allows four Bushels in the Score for the swell here, or in the Cistern: then it must be worked Night and Day, in two or three Heaps, according to the Weather's being cold or hot; and must be turned, every four, six, or eight Hours, the outward Part inwards, and the bottom upwards, always keeping a clear Floor, that the Corn which lies next to it may not be chilled. As soon as it begins to come, or spire, turn it every three, four, or five Hours, as was done before, according to the Temper of the Air, which greatly governs this Management; and as it comes, or works

works more, the Heap must be spread wider, and thinned, to cool it. Thus it may lie and be worked upon the Floor in several Parallels, two or three Feet thick, ten or more Feet broad, and fourteen or more Feet in length, to chip, or spire, but not too much, nor too fast; and, when it is come enough, it is to be turned twelve or sixteen Times in twenty-four Hours, if the Season is warm, as in March, April, or May. When it is fixed, and the Root begins to be dead, it must be thickened again, and often carefully turned and worked, that the Growth of the Root may not revive: this is better done with the Shoes off than on.

Here the Workman's Art and Diligence is particularly tried, in keeping the Floor clear, and turning the Malt often, that it may neither mould nor acre-spire; that is, that the Blade does not grow out at the opposite

End of the Root; for, if it does, the Flower and Strength of the Malt is gone, and nothing left behind but the Acre-spire, Husk, and Tail.

When it is at this Degree, and fit for the Kiln, it is a Practice, often, to put it into a Heap, and let it lie twelve Hours, before it is turned, to heat and mellow, which will much improve the Malt, if done in Moderation; and, after that Time, it must be turned every six Hours within the twenty-four: if it is overheated, it will become like Greafe, and be spoiled, or cause the Drink to be unwholesome.

When this Operation is over, it must be put on the Kiln to dry, and must remain four, eight, or twelve Hours, according to the Nature of the Malt; for the Pale Sort requires

requires more Leisure, and less Fire, than the Amber, or Brown Sorts.

Three Inches thick was formerly thought a sufficient depth for the Malt to lie upon the Hair-cloth; but, now, six is allowed, often to a Fault. Fourteen or sixteen Feet square will dry about two Quarters, if the Malt lies four Inches thick; and it should be turned every two, three, or four Hours, keeping the Hair-cloth clear.

The Time of preparing it from the Cistern to the Kiln is uncertain, according to the Season of the Year: in moderate Weather, three Weeks are frequently sufficient.

If the Exciseman takes his Gauge on the Floor, he allows ten in the Score; but he sometimes gauges in the Cistern, Couch, Floor,

C 4

and

and Kiln ; and where he can make most, there he fixes his Charge.

When the Malt is dried, it must not cool upon the Kiln, but be directly thrown off; not into a Heap, but spread wide in an airy Place, till it is thoroughly cool: then put it into a Heap, or otherwise dispose of it.

There are several Methods used in drying of Malts, as the Iron-plate Frame and the Tile Frame, which are both full of little Holes; the Brass-wired and Iron-wired Frames, and the Hair-cloth. The Iron and Tiled ones were chiefly invented for drying of Brown Malts, and saving of Fuel; for these, when they are thoroughly hot, will make the Corns crack and jump by the Fierceness of the Heat; so that they will be roasted or scorched in a little Time. After they are off the Kiln, some will sprinkle
Water

Water over it, to plump the Body of the Corn, and make it take the Eye, that it may meet with the better Market. But, if such Malt is not used quickly, it will slacken, and lose its Spirits in a great Degree; and, perhaps, in half a Year, or less, may be taken by the Weevils, and spoiled. Such hasty Dryings or Scorplings are, also, apt to bitter the Malt, by burning its Skin; and, therefore, these Kilns are not so much used now as formerly.

The Wire Frames, indeed, are something better; yet they are apt to scorch the outward Part of the Corn, which cannot be got off so soon as the Hair-cloth admits of; for these must be swept, when the other is only turned at once. However, the last three Ways are now in much Request for drying Pale and Amber Malts, because their Fire may be kept with more Leisure, and the
Malt^e

Malt more gradually and truly dried ; but, by many, the Hair-cloth is reckoned the best of all.

Malts are dried with several Sorts of Fuel, as the Coke, Welch Coal, Straw, Wood, Fern, &c. ; but the Coke is reckoned, by most, to exceed all others, for making Malt of the finest Flavour, and of a pale Colour ; because it sends forth no Smoke to affect it with an offensive Tang, which Wood, Fern, and Straw, are apt to do, in a less or greater Degree.

There is a Difference in what is called Coke, the right Sort being large Pit-coal, charred, or burned, in some Measure, to a Cinder, till all the Sulphur is consumed and evaporated, which is called Coke ; and this, when properly made, is the best of all other Fuels ; but, if there are any Cinders among
it

it not thoroughly cured, the Smoke of these is capable of doing Damage; and this happens too often by the Negligence or Avarice of the Coke-maker.

There is another Sort, which is, by some, though wrongly, called Coke; and rightly named Culm, or Welch Coal, from Swansea, in Glamorganshire: it is of a hard, stony Substance, in small Bits, resembling a shining Coal, and will burn without Smoke; and which, by its sulphureous Effluvia, casts a most excellent Whiteness on all the outward Parts of the grainy Body.

Straw is the next sweetest Fuel; but Wood and Fern are the worst of all.

I have known some to put a Peck, or more, of Pease to Malt with every five Quarters of Barley, and they greatly mellow the
Drink:

Drink : Beans will do so, likewise ; but they will not come so soon, nor mix so conveniently with the Malt as the Pease will.

There is an Abuse sometimes committed by a necessitous Maltster, who, to come by Malt sooner than ordinary, makes Use of Barley before it is thoroughly sweated in the Mow : it will then never make right Malt, but will be steely, and not yield a due Quantity of Wort. I knew it was once done by a Person who thrashed the Barley immediately from the Cart, as it was brought out of the Field ; but they who used it in Malt suffered not a little, for it was impossible that it could be good, it not having thoroughly chipped or spired on the Floor ; which caused the Malt, when the Water was turned into the Mash Tun, to swell up and absorb the Liquor, and not to return its due Quantity again, as true Malt would : nor
was

was the Drink of this Malt ever good in the Barrel, but remained a raw, insipid Beer, beyond the Art of Man to cure; because (like Cider made from Apples directly off the Tree, that never sweated out their phlegmatic crude Juice in the Heap) a natural Liquor cannot be produced from such unnatural Management. Barley, certainly, is not fit to make Malt of till it is fully mellowed and sweated in the Mow, and the Season of the Year is ready for it; without both which there can be no Assurance of good Malt.

Several Instances of this untimely Method of making Malt I have known to happen, which have been the Occasion of great Quantities of bad Ales and Beers; such Malt, in Consequence of its retaining some of its Barley Nature, or the Season of the Year not being cold enough to admit of its natural
wörking

working on the Floor, is not capable of producing a true Malt, but will cause the Drink to stink in the Cask, instead of growing fit for Use; it not having its genuine Malt Nature to cure and preserve it, which all good Malts contribute to as well as the Hop.

Oats, malted as Barley is, will make a weak, soft, mellow, and pleasant Drink; but Wheat, when done so, will produce a strong, heady, nourishing, well-tasted, and fine Liquor.

To know good from bad Malt.

This is a Matter of the greatest Importance to all Brewers, both Public and Private. It is absolutely necessary to endeavour to be Master of this Knowledge, so as to judge truly between good and bad Malt,
without

without which you lie very much open to Imposition.

The best Way I know, is, to chew some of it in your Mouth; and if you find it Sweet and Mellow, has a round Body, breaks soft, is full of Flour all its Length, smells well, and has a thin Skin, then it is good. If it is hard and steely, and retains something of a Barley Nature, it has not been rightly made, and will weigh heavier than that which has been properly malted.

The foregoing Hints are for the purchasing of it: I shall, in its proper Place, shew how to ascertain the real Value every different Parcel is to you, by practical Examples upon the Saccharometer.

Of

*Of the Nature and Use of Pale, Amber, and
Brown Malts.*

The Pale Malt is the slowest and slackest dried of any ; and, where it has had a lesser Fire, a sufficient Time allowed it on the Kiln, and a due Care taken of it, the Flour of the Grain will remain in its full Quantity, and thereby produce a greater Length of Wort than the Brown high-dried Malt ; for which Reason it is sold for Two, Three, and Four Shillings per Quarter more.

This Pale Malt is, also, of all others, the most nutritious Sort to the Body ; it being, in this State, the most simple, and nearest to its original Barley-corn ; and it will retain an alkaline and balsamic Quality much longer than the Brown Sort.

The

The tender Drying of this Malt brings its Body into so soft a Texture of Parts, that it is customary with Brewers (if they can) to brew it with Spring or Well Waters, whose hard and binding Bodies are thought to agree best with this loose-bodied Malt, either in Ales or Table Beer, which permit and require hotter Liquors than the Brown can bear.

Amber-coloured Malt is that which is dried, in a medium Degree, between the Pale and Brown; and is much in Use, being free from either Extreme. Its Colour is pleasant, its Taste agreeable, and its Nature wholesome; which makes it preferred by many as the best of Malts. This, if used alone (which is seldom), may be brewed with soft or hard Water; and you must always remember, that the more Heat there is in the Malt, the less is required in the Liquor.

D

Brown

Brown Malt is the soonest and highest dried of any, even till it is so hard, that it is difficult to bite some of its Corns asunder; and is frequently so crufted or burnt, that the farinaceous Part loses a great Deal of its essential Salts and vital Property; which frequently deceives the ignorant Brewer, who hopes to draw as much Wort from this as from Pale and Amber Malts.

As it is much impregnated with the fiery fumiferous Particles of the Kiln, its Drink sooner becomes sharp and acid than that made from the Pale or Amber Malts, if they are all fairly brewed: for this Reason, the London Brewers mostly use the Thames, or New River, Water to brew this Malt with, for the sake of its soft Nature; which agrees better with the harsh Qualities of it, than any of the Well, or other hard Sorts.

HOPS.

HOPS.

AS they are one of the principal Ingredients used in Malt Liquor, it may be both proper and necessary that I should give you some Strictures upon them.

To give an Account of the Cultivation, Picking, Bagging, &c., of Hops, formed no Part of my Intentions in this Treatise; I shall, therefore, only give you some Hints on the Observations which I have made in the practical Use of them.

Hops, I believe, are generally admitted, like most other Vegetables, to be a Compound of Water, Salt, Oil, and Earth.---

D 2

When

When we pause, for a Moment, on the thus analyzed Article before us, we are to consider what are the Essentials of these component Parts that we are to strive to preserve, and what to reject. When I have considered the general Make of Coppers, I have found myself much at a Loss to determine, in my own Mind, whether a quick Fire and a short Process were best, or a longer Process, with a more moderate Fire, to prevent the Loss of essential Oils.

A Friend of mine, Mr. Blunt, whose practical Knowledge of Extracts is universally admitted, prefers a short or quick Process to a long one. I make Choice of a Dome Copper, as the finer and more essential Oils, possessing a greater Volatility, are more subject to Evaporation, whereas the more austere are left: this the Dome Copper prevents; for, when the finer Oils meet with a
Resistance,

Resistance, they are driven downwards, and must re-unite with the Wort.

The Quantity of Oil in Hops is great; the finer Part, of an agreeable Fragrance and great Volatility. It is endued with fine, odoriferous, aromatic Spirits, as appear by the Sense of Smelling, on being rubbed, which are easily communicated to any Liquid; and they are so tender, that they are not to be retained without being rammed and bagged, to prevent the Attraction of the Air.

The Care in bagging and keeping is of the greatest Importance: they should be kept in a dry, close Loft, and the Bags laid upon each other, though many pitch them endwise. If, in brewing a Bag or Pocket, a Part be left unused, let the upper Part of

the Bag be covered close over the Remainder ; and put some heavy Weight upon it to keep the Air from them, which will, otherwise, carry off their more valuable Qualities. New Hops should not be used alone, but mixed, in equal Proportion, with old.

It is the valuable Properties of the Hop which give to Malt Liquor that pleasant Taste and Smack upon the Lips, after it is drank ; they also contribute very much to the Preservation of the Beer.

PORTER.

PORTER.

AS Porter, in Point of Consumption, generally bears the Priority, I shall commence with it.

Under this Head, I must take Notice of the commonly received Opinion, that Thames Water is absolutely necessary to the brewing of good Porter. This is a mistaken Idea, as some of our principal Brewers use the New River.

Richardson, in his Experiments on the Gravity of Water, shews that the specific Gravity of Thames Water is 1000.3, and its Spiffitude 1000.182; and the Gravity of

D 4

the

the New River Water 1000.3, and its Spifitude 1000.344.

The Expence and Labour which this scientific Gentleman has bestowed on the Subject, who, by his nice Calculations, and liberal, fair Investigation of it; and for the Instrument (*viz.* his Saccharometer) he has made, by which the Brewery may derive an unbounded Advantage, and obtain that Rank among the Sciences which the Magnitude of its Object entitles it to, gives him a just Title to the Thanks of every Friend to Improvement; and, although my Instruments would not permit me to make the nice Calculations which Mr. Richardson's have attained, they are sufficiently so to convince me that his are just, and to the greatest necessary Nicety.

I would

I would not have it supposed, that, by paying Mr. Richardson the Praise which is so justly due to him, I mean to disparage the Instruments made by Messrs. Dring and Fage, Tooley Street, or Messrs. Quin and Co., Fenchurch Street: the Instruments made at each of these Houses I have heard much praised by Brewers who have used them; but, as I used Richardson's Saccharometer, I shall give my Examples as they were taken by his.

A Tinman, of the Name of Peyton, in Leadenhall Street, made me a double block Tin Jar Case, and six Essay Jars big enough to admit the Saccharometer; also a Refrigerator, &c. Three of the Essay Jars are intended for the first, second, and third raw Worts, and the other three Jars for boiled Worts, if so many are made.

The

The Advantages to be derived from this Instrument are two-fold. When you have brewed a Beer of the Consistency of other Brewers, or of the uniform Strength or Density that gives Satisfaction to your Customers, you can ensure a regular good Commodity always of the same Strength, instead of only boiling it by Time ; and, if you have a good Parcel of Malt, you may hereby take the Advantage of it, by increasing your Length without diminishing your Density ; and, should you have a bad Parcel of Malt, you will know how to save your Credit, by boiling it down till you obtain the Gravity you wish for.

Suppose you use of Malt ten Quarters, as follow :

4 Herts

- 4 Herts Pale.
- 3 Herts Amber.
- 3 West Country Brown.

- 10 Quarters Malt.

Take Care that it is sweet, and well malted; then see it well ground, that every Corn be broke sufficiently to admit the Liquor.

Take the first Heat of your Liquor at 160 Degrees by the Thermometer (those made by Mr. Atkins, of Fenchurch Street, London, with a blind Scale and Index, are found to be very correct and useful); mash one Hour, reserving some of the dry Malt to sprinkle over the Goods while spending: if you have a Cover to your Mash Tun, the better.---After remaining an Hour, set Tap, taking Notice what the Heat of your Extract is, and, also, if fine.

As these Observations must, in some Measure, guide you in your after Process, I shall,
in

in the first Place, suppose that the Wort comes down, to your Satisfaction, quite bright: this, you will observe, is the first raw Wort, not having passed the Copper.

When the Tap is quite spent, gauge the Content of your Underback; and fill one of your Assay Jars from it; then weigh your Wort by the Saccharometer (the particular Description and Use of which, with the Apparatus belonging to it, will be given in an Appendix, together with a Plate, at the End of the Work). Note down in a Book, to be kept for that Purpose, the Quantity of Worts in your Underback; and the Weight by the Saccharometer. Now weigh out your Hops (eighty Pounds), about half old and half new, good Brown.

I suppose your Copper charged again with Liquor, which, after having turned off below, turn over at 161 Degrees; mash for three Quarters of an Hour, and cover up your Tun. Get your first Wort into the
Copper

Copper with your Hops; boil it sharply for three Quarters of an Hour; and, a short Time before you turn out into your Backs, or Coolers, put into the Copper fourteen Pounds of Sugar, and fourteen Pounds of Leghorn Juice, keeping the Copper constantly rousing, till dissolved, and all the Wort out: then charge your Copper for your third and last Liquor.

After the second Liquor has stood an Hour upon the Goods, set Tap; and, when entirely spent, gauge the Underback, noticing what Quantity you have: weigh your Wort, as before, and get it up into your Copper Back.

You will now be able to judge how much Wort you have from both Liquors, and can tell exactly how much it will be necessary to turn over for the third, which do at 150
Degrees.

Degrees. Let your second Wort into the Copper, and boil it with the same Hops for one Hour: then turn it out. Mash your third one Hour, and, after being on the Goods one Hour, set Tap; and, when spent, proceed as before. Boil it till you obtain your Quantity, which you may do to the greatest Nicety; after which, turn it out into your Backs, where it must remain thinly spread, till cool enough to pitch the Tun, which do at 64 Degrees; but always take Care that your Yeast is good, and bites.

Cleanse the second Day after Brewing, as near 80 Degrees as you can. I advise you to use in your Tun a Thermometer of a red Composition, in Preference to Mercury, it not being so easily worked upon. Use at Cleansing a Quarter of a Peck of Flour, and two large Handfuls of Salt; which

which will assist the Working : rouse it thoroughly at the same Time.

Take Care to keep the Casks constantly filling when upon the Stillions ; and, when it nearly ceases to work, top it up with bright Beer : start about ten Hours after.— In proper Time bung it up for Use.

If the first raw Wort does not come down fine, take your second Liquor rather higher than is here directed : after this, Small Beer is to be brewed from the same Goods (the Directions to do which I shall give you hereafter) ; and, if your Copper is large enough, boil your three raw Worts at twice.

You might use three Pounds of Coccus Indicus Berry, ground fine, and four Pounds of Fabia Amara (these, if used, must be in
the

the Copper) : the former gives an inebriating Quality, which passes for Strength of Liquor.

The *Fabia Amara* (or Bitter Bean), which is but little known by Brewers in general, is by far the most wholesome Substitute for Hops, it having a very pleasant Bitter ; and it is also, in some Measure, a Substitute for Malt.

Quassia, ground small, is a great stomachic, and wholesome ; but is so powerful in its Nature as to leave a very unpleasant Taste in the Mouth long after the Liquor is drank.

I would wish you particularly to observe, that, when these Ingredients are made Use of,
it

it is with a View of saving Malt and Hops, when they fetch the high Price they have lately done.

I purpose to illustrate and exemplify the foregoing by giving you the whole Process of two or three Brewings, with the Manner of my Proceeding at the Time; for which Purpose, I have always kept a Book of the different Brewings, and Observations thereon, from January 1793.

EXAMPLE I.

Wednesday, January 16th, brewed for Porter: commenced at five o'Clock in the Morning; Thermometer in the Air 34 Degrees.

E

Kinds

Kinds of Malt :

3 West Country Pale.

6 Herts Pale.

8 Herts Brown.

8 Herts Amber.

—
25 Quarters.
—

Cwt. Qrs. lbs.

Malt, 25 Quarters.

Hops -----1 2 0

Cocculus Indicus Berry -0 0 6

Leghorn Juice-----0 0 30

First great Copper charged thirty-six Inches,
i.e. fifty-two Barrels and seven Gallons.

First Liquor 155 Degrees, all turned
down: mash one Hour. Set Tap at seven
o'Clock. Tap, 137 Degrees; Gravity,
twenty-one Pounds and a Half per Barrel.

Second

Second great Copper charged fifty Inches, i. e. thirty-six Barrels, one Firkin, and seven Gallons.

Second Liquor 160 Degrees, all turned down. Tap, 146 Degrees; Gravity, ten Pounds and a Half per Barrel.

First Wort into the Copper thirty-four Inches, i. e. fifty-one Barrels and two Gallons.

Third small Copper, with Liquor charged full, i. e. fifty-nine Barrels and one Gallon.

Third Liquor 150 Degrees, all turned over: mash one Quarter of an Hour. Tap, 132 Degrees; Gravity, three Pounds and a Quarter per Barrel.

Second Wort into the Copper twenty-seven Inches, i. e. sixty-two Barrels, one Firkin, and six Gallons. Boiled one Hour and a Half; came out thirty-four Inches, i. e. fifty-four Barrels, one Firkin, and seven Gallons. Pitched at 64 Degrees: cleaned, on Friday, eighty-eight Barrels.

	B.	F.
Started into a Vat, on Saturday	--88	0
Drawings off from Stillions, &c.	---	1 2
	<hr/>	<hr/>
	89	2
	<hr/>	<hr/>

EXAMPLE II.

Saturday, October 26th, brewed for Porter: commenced at five o'Clock in the Morning; Thermometer in the Air 49 Degrees.

Kinds

Kinds of Malt :

11 Herts Pale.
7 Herts Amber.
7 West Country Brown.
—
25 Quarters.
—

Cwt. Qrs. lbs.

Malt, 25 Quarters.

Hops -----	1	2	0
Cocculus Indicus Berry -	0	0	.4
Leghorn Juice -----	0	0	30

First great Copper charged thirty-six Inches, i. e. fifty-two Barrels and seven Gallons.

First Liquor 154 Degrees, all turned down : set Tap at seven o'Clock. Tap, 136 Degrees ; Gravity, twenty-two Pounds $\frac{74}{100}$ per Barrel.

E 3

Second

Second great Copper charged forty-eight Inches, i. e. thirty-eight Barrels, two Firkins, and six Gallons.

Second Liquor 164 Degrees, all turned down. Tap, 148 Degrees; Gravity, ten Pounds $\frac{7}{10}$ per Barrel.

First Wort in the Copper thirty-two Inches; boiled one Hour, and came out thirty-six Inches. Gravity, nineteen Pounds $\frac{7}{10}$ per Barrel.

Third Liquor charged small Copper full, i. e. fifty-nine Barrels and one Gallon.

Third Liquor 154 Degrees, all over. Tap, 133 Degrees; Gravity, four Pounds $\frac{1}{2}$ per Barrel.

Second Wort in the Copper twenty-seven Inches: boiled two Hours, and came out thirty.

thirty-six Inches. Gravity, nine Pounds $\frac{1}{10}$ per Barrel.

Pitched Tun at 64 Degrees; cleaned at 70 Degrees of Heat. Gravity of the Beer, in that State, fourteen Pounds $\frac{1}{4}$ per Barrel.

Cleaned, on the 28th, eighty-seven Barrels and one Firkin.---Started into twenty-nine Butts.

Having given you two Examples on the practical Part of the Procefs of brewing Porter, which have, from the Commencement to the End, answered our most sanguine Hopes, I shall now present you with the Particulars of a Brewing, which, by bad Management, remained in the Tun ten Days before it was fit to cleanse, and the Mode which I adopted to prevent the entire Gyle from being lost.

E 4

Wednesday,

Wednesday, September the 18th, brewed
Porter: commenced at five o'Clock in the
Morning; Thermometer 60 Degrees in the
Air.

Kinds of Malt:

13 Herts White.
6 Herts Amber.
6 Herts Brown.

—
25 Quarters.
—

	Cwt.	Qrs.	lbs.
Malt, 25 Quarters.			
Hops -----	1	2	4
Sugar -----	0	0	30
Cocculus Indicus Berry -	0	0	4
Leghorn Juice-----	0	0	30

First great Copper charged fifty-two Bar-
rels and seven Gallons: Liquor 156 Degrees;
all turned over. Mashed one Hour: set
Tap

Tap at seven o'Clock. Tap, 137 Degrees; Gravity, twenty-five Pounds $\frac{25}{100}$ per Barrel.

Second Copper charged thirty-eight Barrels: Liquor all turned down at 162 Degrees. Mashed one Half of an Hour; set Tap at Half past eleven o'Clock. Gravity, eleven Pounds $\frac{11}{100}$ per Barrel.

First Wort in the Copper thirty-two Inches: boiled one Hour; came out thirty-six Inches.

Little Copper charged full, and eight Inches, i. e. sixty-two Barrels: Liquor turned down at 150 Degrees; mashed a Quarter of an Hour. Tap, 144 Degrees; Gravity, five Pounds $\frac{5}{100}$ per Barrel.

Second Wort boiled two Hours, and came out thirty-five Inches.

This

This Wort was spread in the Cooling Backs; Part of the first, at pitching the Tun, I let down at 72 Degrees of Heat; the Remainder of the first, and the whole of the second Back, at 64 Degrees, being taken unwell. I left the third to be let down by a Servant, who delayed doing it till the Morning. The Part which was let down being in a large Square, and thinly spread, would not work at all; and his letting the Remainder down quite cold, made the whole a *Corpus Mortuum*.

After having waited many Hours without finding that the Yeast had bit, I proceeded to nail up Hop Bags round the Tun, and made a Fire in the Tun Room, but found no Alteration. I then caused the vapid Yeast to be skimmed close off, heated a little of the Wort, and pitched again with fresh Yeast; after which, I put in Half a Pound of Bay Salt,

Salt, and a Quarter of a Peck of Bean Flour ; roused it well from the Bottom, and filled two Firkins of scalding Liquor, bunged down, which I lowered into the Square. This set it in Action ; and, upon the Morning of Friday, the 28th, it cleaned eighty-four Barrels and three Firkins, which turned out good Beer, and gave great Satisfaction.

BROWN

BROWN STOUT.

—

THIS Liquor, since the Rise in the Price of Malt and Hops has compelled Brewers to run the uncommon lengths they have for Porter, has come in very general Use: I shall, therefore, give you the necessary Instructions for brewing it.

As I recommend but two Liquors, and one boiled Wort for your Strong, your Goods will possess too much of the Virtue of the Malt to brew Vi or Small Beer from: I shall, therefore, advise you to cap on a Quarter of fresh Malt, and brew Table Beer after it: not that I approve of capping on, convinced that you have not the whole
Virtue

Virtue from the Malt ; but the Excise will not admit of your brewing Strong and Table Beer from the same Goods without it.

Commence brewing early, as it will be necessary to liquor out all your Utenfils with hot Liquor. Notice the Heat of the Atmosphere, which had best be done by leaving a Thermometer exposed all Night.

I shall suppose that you brew from twenty Quarters of Malt.

Kinds of Malt :

12 Herts Brown.

4 Herts Amber.

4 Herts White.

—
20 Quarters.
—

Malt

	Cwt. Qrs. lbs.		
Malt, 20 Quarters.			
Hops -----	2	0	0
Cocculus Indicus Berry -	0	0	4
Sugar-----	0	0	28
Fabia Amara-----	0	0	6

Let your Malt be well ground. Charge your Copper thirty Barrels, which will enable you to spare the Quantity that the Malt will suck up, without endangering your Copper.

Turn your first Liquor down at 168 Degrees, being careful that the Men, with their Rakes, stir it well from the Bottom before they use their Oars, to prevent the Goods setting.

Mash one Hour and a Half, and let it stand the same Time upon the Goods; then
 fet

let Tap, making the same Observations as to the Heat and Density which you did in the Porter.

You will, of Course, have charged your Copper full of Liquor for your next Wort. After the Tap is spent, gauge your Underback; and you will be able to give a near Guess how much Liquor you will want for your third Wort.

Recollect that the Malt will not require more, as the fresh Liquor will only dislodge what it had imbibed of the former; therefore you will only calculate what you will lose by boiling, and the Hops.

Turn your second Liquor over at 174 Degrees: mash one Hour, and let it stand upon the Goods one Hour and a Quarter. Set Tap, making your Observations as before.

Charge

Charge your Copper fifty Barrels, for Table Beer. Get your first Wort into your Copper Back ; weigh out your Hops, two Hundred Weight of the best Brown. When your second Tap is spent, get it into the Copper Back : turn your third Liquor over for Table Beer, having capped on a Quarter of Amber Malt. Turn your Liquor down at 170 Degrees : mash one Hour and a Quarter, and let it stand upon the Goods the same Time. Set Tap, making your Observations as directed.

When in the Copper, put in fourteen Pounds of Spanish Juice, just before turning out. Boil your strong Wort two Hours, as hard as you can, putting in the Articles before-mentioned about a Quarter of an Hour before you turn it out. Endeavour to get about two Barrels and a Half, or rather more, per Quarter.

From

From the Time of putting in the Articles, keep rousing the Copper from the Bottom, to prevent the Sugar from damaging it, till you turn out. Pitch your Tun at 66 Degrees, using a Gallon of lively Yeast: cleanse the second Day after Brewing, as near 80 Degrees as you can; use some Flour, and Half a Pound of Salt, rousing the Tun well. Keep topping the Beer up well while working in the Casks; and, when done, fill it up with fine Beer: when settled, bung it down to go out.

We left the Table Beer Wort just turning out from the Copper, having used in it the Hops after the strong Wort. Pitch your Tun at 66 Degrees; cleanse it the next Day at 72 Degrees: at cleansing, two Pounds of Ginger, and some Flour and Salt, must be put into the Tun: rouse it well a little before.

F

Your

Your Casks, I shall hope, you have been particularly careful of: keep filling up till it has nearly left off throwing up; then top it up with bright Beer; leave it till the next Day, and bung it up. Before you send it out, put a little Finings into every Cask.

N. B. The same Hops serve for Table Beer.

READING

READING BEER.

THIS is a Beer much praifed by many Perfons : I fhall, therefore, impart the Nature and Procefs of brewing it.

Kind of Malt :

20 Quarters, all Pale.

Cwt. Qrs. lbs.

Malt, 20 Quarters.

Hops -----	1	3	0
Grains of Paradife-----	0	0	6
Coriander Seed, ground-	0	0	10
Sugar-----	0	0	28

Take your firft Liquor at 175 Degrès.---
Be careful that you do not fet your Goods ;

F 2

and

and let it on gently, using your Rakes. It may remain on the Goods two Hours. Set Tap, making your Observations. Charge your Copper for your second Liquor, which turn over at 178 Degrees. Let it stand one Hour and a Half. Set Tap, &c. Get your two raw Worts into your Copper Back, or as much as is convenient of it. I will suppose your third Liquor ready. By knowing the Quantity of Wort you already have, you will know how much to turn over; but be sure to have enough, as you can always boil it away till you obtain your Quantity. Let your third Liquor be turned down at 158 Degrees; remain on the Goods three Quarters of an Hour. Set Tap. Weigh your Hops, which must be the best Kent: boil your first Wort one Hour and a Quarter; then turn out. Get the Remainder of your second and the Whole of your third Worts into the Copper; boil them together
with

with the unufed Ingredients two Hours, hard. Pitch your Tun at 64 Degrees, ufing about a Gallon of Yeaf. When you fee the Head much up, skim it, and beat the Remainder well in: when it riles again, juft before it falls, skim it as before, roufing the Tun well.

Ufe, at cleanfing, Half a Pound of Bay Salt, and rather more than Half a Peck of malted Bean Flour; roufing your Tun well.

Keep your Cafks well filled, and top latterly with fine Beer. Put fome fcalded Hops into every Cafk, on which the Beer will feed.

AMBER BEER, or TWOPENNY.

THIS Beer is both pleafant and wholefome, and is in as great Request as Porter, during the Winter, when it is drank warm. It is, unquestionably, the moft profitable of any Malt Liquor, as it is fent out to the Customers within a Week from the Time of brewing, and ufually confumed within the following one.---I fhall give you fome Examples for your future Practice.

EXAMPLE I.

Commenced brewing at five o'Clock in the Morning; Thermometer 32 Degrees.

Kinds

Kinds of Malt :

2½ West Country Pale.

12¾ Herts Pale.

10 Herts Amber.

 25 Quarters.

Cwt. Qrs. lbs.

Malt, 25 Quarters.

Hops ----- 1 0 0

Leghorn Juice ----- 0 0 20

Moloffes ----- 0 0 30

Grains of Paradife, ground 0 0 4

Charged the Copper fifty Barrels and three Gallons. The first Liquor was all turned over at 169 Degrees. Mash one Hour : set Tap at seven o'Clock. Tap, 146 Degrees ; Gravity, twenty-six Pounds $\frac{6}{10}$ per Barrel.

F 4

Second

Second Copper charged thirty-two Barrels and seven Gallons. Turned all the Liquor down at 170 Degrees. Mash Half an Hour: set Tap at eleven o'Clock. Tap, 152 Degrees; Gravity, eleven Pounds $\frac{1}{2}$ per Barrel.

First Wort in the Copper fifty-one Barrels and two Gallons: boiled three Quarters of an Hour, and came out forty-seven Barrels, two Firkins, and five Gallons.

Charged the Copper for the third Liquor fifty-nine Barrels and one Gallon: turned all down upon the Goods at 160 Degrees: mashed twenty Minutes. Tap, 146 Degrees; Gravity, six Pounds per Barrel.

Second Wort came into the Copper forty-seven Barrels, two Firkins, and five Gallons:
boiled

boiled hard one Hour, and came out forty-two Barrels and one Gallon.

Pitched the Tun at 64 Degrees; came into the Square eighty-one Barrels, one Firkin, and seven Gallons. Cleaned on the Evening of the third Day, using at the Time four Pounds of ground Ginger, Half a Pound of Bay Salt, and a Quartern of Flour. Cleanse with the Sweets on.

EXAMPLE II.

November 15th, commenced brewing at five o'Clock in the Morning; Thermometer 50 Degrees in the Air.

Kinds of Malt :

15 Herts Pale.

10 Herts Amber.

—
25 Quarters.

— Malt,

	Cwt.	Qrs.	lbs.
Malt, 25 Quarters.			
Hops -----	0	3	20
Spanish Juice -----	0	0	20
Moloffes -----	0	0	30
Grains of Paradife -----	0	0	4
Fabia Amara -----	0	0	4

Charged the first Copper forty-nine Barrels: Liquor all turned down at 167 Degrees; should have been 170 Degrees, but was obliged to turn down eleven Barrels of Liquor nearly boiling, owing to the Flue drawing unusually, and turned in as much cold Liquor. Mashed one Hour and a Quarter. Tap, 144 Degrees; Gravity, twenty-six Pounds per Barrel.

Second Copper charged thirty-eight Barrels and a Half: Liquor all turned down at

172

172 Degrees. Tap, 150 Degrees; Gravity, ten Pounds $\frac{x}{2}$ per Barrel.

First Wort in the Copper thirty-five Inches; boiled three Quarters of an Hour, and came out thirty-eight Inches, or forty-nine Barrels, three Firkins, and six Gallons.

Third or little Copper charged full, or fifty-nine Barrels and one Gallon: Liquor 160 Degrees, all over. Tap, 140 Degrees; Gravity, six Pounds $\frac{1}{2}$ per Barrel.

Second Wort boiled two Hours: pitched the Tun at 164 Degrees. Cleansed, on the 18th, eighty-two Barrels and three Firkins: used at cleansing four Pounds of ground Ginger, Half a Pound of Bay Salt, and Half a Quartern of Flour.

EXAM-

EXAMPLE III.

Commenced brewing on the 27th, at five o'Clock in the Morning; Thermometer 58 Degrees.

Kinds of Malt :

8 West Pale, indifferent.

6 West Brown, do.

—
14 Quarters.
—

Cwt. Qrs. lbs.

Malt, 14 Quarters.

Hops -----0 2 6

Spanish Liquorice----0 0 12

Moloffes -----0 0 20

Grains of Paradise-----0 0 3

First

First Copper charged forty Barrels. Liquor all turned over at 172 Degrees.--- Mash'd one Hour. Tap, 136 Degrees; Gravity, twenty-three Pounds per Barrel.

Second small Copper charged full. Liquor all turned over at 178 Degrees. Mash Half an Hour. Tap, 154 Degrees; Gravity, nine Pounds per Barrel.

First Wort boiled three Quarters of an Hour.

Copper charged for third Liquor: all turned over at 165 Degrees. Mash three Quarters of an Hour. Tap, 143 Degrees; Gravity, five Pounds $\frac{1}{2}$ per Barrel.

Second Wort boiled two Hours and a Quarter.

Pitched

Pitched Tun at 64 Degrees. Cleaned the 30th; using two Pounds of Ginger, and a Quarter of a Pound of Bay Salt and Flour. Forty Barrels, and three Firkins.

LONDON

LONDON ALE.

ALE, of all Malt Liquors, is the most delicate in its Nature, and will bear less tampering with than any other; it will, therefore, require your nicest Care throughout every Part of the Process.

As Brightness or Transparency is a great Recommendation to Ale, and being sometimes kept for a Series of Years, I shall recommend hard Water, as the alkaline Qualities it possesses assist in preventing Acidity, and in the Preservation of the Beer.

I shall

I shall give you some Examples, and endeavour to assist you with some Observations on this Subject.

Commenced brewing at five o'Clock in the Morning : Thermometer 60 Degrees.

Kinds of Malt :

23 Quarters Herts White, good.

2 ditto Herts Amber, ditto.

—
25 Quarters.
—

Cwts. Qrs. lbs.

Malt, 25 Quarters.

Hops -----1 3 10

Grains of Paradise-----0 0 4

Coriander-----0 0 4

Orange Powder-----0 0 1

First

First great Copper thirty-eight Inches, or forty-nine Barrels, three Firkins, and six Gallons. Liquor in the Copper 168 Degrees, but gained 5 Degrees, and was all turned over on the Goods at 173 Degrees. Mashed one Hour: stood upon Goods as long. When the Tap was set, it was near 150 Degrees; when nearly spent, 140 Degrees. My Jar Cafe being full of cold Liquor, I took a Sample of the Wort from the Underback, and filled my Assay Jar, which I placed in the Jar Cafe till it had cooled to 80 Degree, when the Gravity was thirty-two Pounds $\frac{2}{100}$ per Barrel.

Second Copper was charged forty-eight Inches, or thirty-eight Barrels, two Firkins, and six Gallons. Liquor in the Copper 167 Degrees: all turned over at 172 Degrees. Tap, when set, was 153 Degrees, and the then Gravity was twenty-two Pounds. I

G

filled

filled a Jar with the Wort, and placed it in the Cafe till it had attained 70 Degrees of Heat; when the Gravity was twenty-two Pounds $\frac{7}{100}$ per Barrel.

First Wort, when in, thirty-six Inches; boiled one Hour: when out, forty Inches.

Third Liquor charged in the small Copper, full, or fifty-nine Barrels and one Gallon. All turned over at 149 Degrees. Mashed a Quarter of an Hour. Set Tap at two o'Clock: Tap, 139 Degrees.

Second Wort, when in, thirty Inches; when out, thirty-six Inches; having boiled two Hours.

Pitched the Tun at 62 Degrees. Cleaned on the fourth Day, at 74 Degrees; using
four

four Pounds of Ginger, Half a Pound of Salt, and Half a Peck of Flour.

Observe :----In Amber you have, before, been directed to cleanse with the Sweets on ; but in Ale you must work it low, in order to get the Sweets off. When you find it rises (as it will) three or four Feet high, just before it begins to fall, skim the Head off, beating the Rest well in, and rousing the Tun. If the Blebs are large, and blistered, your Liquors have been taken too high. If this is the Case, and you find it much upon the Fret, take Half a Pound of Salt of Tartar, a Quartern of malted Bean Flour, and some fresh elastic Yeast, and put them into the Tun ; rousing it thoroughly. This will cause it to work kindly ; but I recommend, that you will, not let it remain more than three or four Hours after, before you cleanse. Let it be constantly topped up till the Yeast

is all thrown out of the Casks ; then top it up with fine Ale. Before you bung it up, put in a large Handful of scalded Hops, cold: after which, bung up, and stow it for Use.

If you have Occasion to send it out before so fine as you would wish it, you may put in about a Pint of Finings, made from the best Ifinglafs.

N. B. The Examples I here give you are from different Parcels of Malt.

EXAMPLE II.

Wednesday, commenced brewing at five o'Clock in the Morning. Thermometer 52 Degrees.

Kinds

Kinds of Malt :

23 Quarters Herts White, not very
good.

2 Ditto Herts Amber, good.

—

25 Quarters.

—

Cwt. Qrs. lbs.

Malt, 25 Quarters.

Hops -----	1	3	12
Grains of Paradise-----	0	0	4
Coriander Seed-----	0	0	4
Orange Powder-----	0	0	1

First Copper charged forty-nine Barrels,
three Firkins, and six Gallons. Liquor all
down at 172 Degrees. Mashed one Hour :
stood upon the Goods the same Time. Tap,
151 Degrees. Gravity, twenty-nine Pounds
 $\frac{77}{100}$ per Barrel.

G 3

Second

Second Copper charged fifty-two Barrels and seven Gallons. Liquor all down at 171 Degrees. Mash Half an Hour. Tap, 156 Degrees. Gravity, seventeen Pounds $\frac{1}{10}$ per Barrel.

First Wort boiled about one Hour; the Gravity of which was twenty-seven Pounds $\frac{6}{10}$ per Barrel.

Third Copper charged fifty-nine Barrels. Liquor all turned down at 150 Degrees. Mashed three Quarters of an Hour.. Tap, 138 Degrees. Gravity, twelve Pounds $\frac{1}{10}$ per Barrel.

Second Wort boiled two Hours and a Quarter; the Gravity of which was sixteen Pounds $\frac{2}{10}$ per Barrel.

Turned

Turned out thin into the Backs, and pitched the Tun at 62 Degrees. It remained till the third Day, when it was cleaned at 73 Degrees: using at the same Time four Pounds of ground Ginger, Half a Pound of Bay Salt, and Half a Peck of Flour.

WINDSOR ALE.

THIS Ale has experienced so great a Demand in London and its Vicinity, for a few Years past, as materially to affect the London Pale Beer Brewery. It is a Liquor better calculated for Winter than for the Heat of Summer. The London Brewers, however, were induced to brew upon the same Principle, and in many Instances they excel the Original. I shall present you with the most approved and generally received Mode of brewing it.

Kind of Malt :

25 Quarters of the best Herts Pale.

Malt,

	Cwt.	Qrs.	lbs.
Malt, 25 Quarters.			
Hops -----	2	0	0
Honey-----	0	0	40
Coriander Seed-----	0	0	4
Grains of Paradife-----	0	0	2

Let your Hops be, of the best Kind, and put them into cold Liquor, the Night before, to foak.

Charge your first Copper full; and, as your Heats must be high, keep your Rakes moving during the turning down of your first Liquor, which must be done at 178 Degrees. Mash one Hour and a Quarter. Let it stand upon the Goods one Hour and a Half. Set Tap: observe the Heat and Gravity. Your second Copper (which must have been charged as soon as you turned your first Liquor over) being now ready,
turn

turn on at 186 Degrees. Mash one Hour : let it stand upon the Goods one Hour ; then set Tap, making the usual Observations. Get your first Wort, and as much of the second as you can, into your Copper Back, when the Tap is quite spent. Turn on your third Liquor at 160 Degrees. Mash three Quarters of an Hour ; suffering the Liquor to stand on the Goods one Hour.

Let your first Wort into the Copper, and put in the Hops: boil nearly an Hour, using the Ingredients enumerated, but do not put in the Honey till just before you turn out : when this is done, keep the Copper rousing from the Bottom till all the Wort is out.

Set Tap for your third raw Wort, getting it up to that Part of the second raw Wort which was not used in the first boiled.

[A fourth

[A fourth Liquor should now be ready in your small Copper, to wash your Goods for Small Beer or Vi: but, as I shall give one general Example at the End of this Treatise, I will proceed with the Strong Beer.]

Your second Wort being now in the Copper, boil it with the Quantity of Hops before mentioned about two Hours and a Quarter; and then turn out. Endeavour to get about two Barrels and three Quarters per Quarter: but in this you must be governed by the Price of Malt and Hops.

Pitch the Tun at 62, and cleanse as near 80 Degrees as you can, on the third Day after; using Salt, and Bean Flour.

WELCH

WELCH ALE.

—

THIS is the most luscious and richly flavoured Ale I ever drank. I saw the whole Process, at Carnarvon in North Wales; and though conducted by an old Woman, she seemed perfectly (as far as the Custom of the Country dictated) Mistress of her Business. She judged the Heat of the Liquor by her Finger and seeing her Face in the Liquor. When she was lading it on, having with me a Pocket Thermometer which I use in the Assay Jars, I put it into the Copper, and found the Heat to be nearly what I should have turned over at.

I shall

I shall give you, as near as I can, their Manner of Proceeding, from twelve Boles, or seventy-two Bushels, of Malt. Their Malt was all Pale, but higher coloured than the Ware, and equal to the best I ever saw.

Kind of Malt :

9 Quarters of best Pale Malt.

Malt, 72 Bushels, or 9 Quarters

	Cwt.	Qrs.	lbs.
Hops, best Kent-----	0	2	14
Sugar-----	0	0	20
Grains of Paradife -----	0	0	2

Two Liquors and one Wort for Strong,
and one Liquor and one Wort for Table
Beer.

Take

Take your first Liquor at 178 Degrees. Mash an Hour and a Half. Let it stand on the Malt two Hours; then set Tap. Turn your second Liquor down at 190 Degrees: mash an Hour and a Half: let it stand two Hours on the Goods. Set Tap: when spent, turn off below, and turn on for Table Beer. Let the Liquor be at 150 Degrees. Mash three Quarters of an Hour: let the Liquor stand on the Goods two Hours. Set Tap, and let it remain in the Underback till your Strong Wort is out. As soon as you have turned on for Table Beer, get your Strong Wort into the Copper, which boil an Hour and a Half with your Hops (before specified). Do not put the Sugar in till just before turning out.

Pitch your Tun at 62 Degrees; and use at cleansing Salt and Flour. Get your Fermentation as near 80 Degrees as you can.

Keep

Keep your Casks well filled ; and, when nearly done working, use fine Ale to top up with.

Before you bung up, put a large Handful of scalded Hops into every Cask ; then flow it cool, for Use.

WIRTEM-

790658

WIRTEMBERG ALE.

KINDS of Malt :

16 Quarters Pale Herts.

4 do. Amber do.

—
20 Quarters.
—

Cwt. Qrs. lbs.

Malt, 20 Quarters.

Hops -----1 2 20

Honey-----0 0 28

Sugar-----0 0 20

Hartshorn Shavings-----0 0 4

Ground Coriander Seeds0 0 4

Caraway Seeds -----0 0 1

Take

Take your first Liquor at 172 Degrees ; mash one Hour and a Half ; stand upon the Goods two Hours ; set Tap ; weigh your Wort ; and let your second Liquor be getting in Readiness.

When your first Tap is all spent, turn over your second Liquor at 180 Degrees : mash one Hour, and stand upon the Goods two Hours. Set Tap, and weigh as before. When spent, get the whole into your Copper Back.

Turn your third Liquor over the Goods for Table Beer at 150 Degrees ; mash three Quarters of an Hour ; stand on the Goods one Hour and a Half : and then set Tap.

Let your Strong Wort into the Copper ; boil it an Hour and a Half with the Hops and all the Ingredients, excepting the Honey

H

and

and Sugar, which put in only about ten Minutes before you turn out the Liquor ; rousing the Copper all the Time till quite dissolved.

Pitch your Tun at 62 Degrees : cleanse on the third Day after, as near 80 Degrees as you can ; using Half a Peck of Bean Flour malted, and Half a Pound of Bay Salt. Rouse the Tun well.

Put a large Handful of scalded Hops into every Cask : stow it cool.-----Procure about two Barrels and a Half per Quarter.

Having finished with the Strong Beer, we will return to the Table Beer, which we left spending, and which by this Time should all be in the Under Back. Get it into the Copper, with the same Hops that
are

are in the Jack Back, and put in fourteen Pounds of Spanish Juice, but not till the Copper is boiling hard, that the Ebullition may prevent its sticking to the Copper. Let it boil about an Hour and a Half, or till you have about twenty-five Barrels.

Pitch the Tun at 66 Degrees. Cleanse the next Day, using some Salt and Flour.--- Put in a little Finings before you send it out.

H 2

HOCK.

HOCK.

THIS is a Beer, that has, within a few Years, had a great Run ; I shall, therefore, give you the necessary Instructions for brewing it.

Kinds of Malt :

14 Quarters of Herts Pale.

6 Ditto Herts Amber.

—
20 Quarters.

—
Malt, 20 Quarters.

	Cwt.	Qrs.	lbs.
Hops-----	1	3	10
Cocculus Indicus Berry-0	0	0	4
Sugar-----	0	0	20
Fabia Amara-----	0	0	2

Take

Take your first Liquor at 176 Degrees : mash one Hour and a Quarter ; remain on the Goods the same Time ; and set Tap : when spent, turn off below, and turn your second Liquor all down at 182 Degrees. Mash one Hour ; continue on the Goods two Hours : set Tap, and when spent, turn the third Liquor over the Goods, for Table Beer, at 160 Degrees [If a Common Brewer, you must cap on with fresh Malt, as before observed, if not unnecessary]. Mash one Hour, and remain on the Goods two Hours. Set Tap : get your Strong Wort into the Copper, with the Hops and the other Ingredients, excepting the Sugar, which put in agreeably with the former Direction : boil it two Hours and a Quarter ; then turn out,

Pitch your Tun at 64 Degrees, and cleanse the second Day. Keep the Casks

H 3

well

well filled up; putting a large Handful of Hops into every Cask before you bung up.

Having left the Table Beer coming into the Under Back, we will thus proceed :---- When the Tap is spent, get it into the Copper with the same Hops which were just now used, and boil it one Hour and a Half, using fourteen Pounds of Spanish Juice when it is boiling sharply. Endeavour to get about twenty-five Barrels.

Pitch the Tun at 66 Degrees. Use at cleansing (which perform the next Day), some Flour and Salt. Put in a little Finings before you send any out.

N. B. Remember, after Strong Beer you are always supposed to cap on for Table. This is for the Common Brewer only; the Excise not having any Thing to do with the private Gentleman.

SCURVY-

SCURVY-GRASS ALE.

THIS Ale is not in such general Use in London, as, from its wholesome Properties, might be expected. Brewers are generally said to be their own Physicians; for nothing, I believe, is a greater Purifier of the Blood, or Antiscorbutic, than Sweetwort. The Process of brewing this Ale preserves that, with the Addition of the Virtues of the Scurvy-grass. I shall now proceed to give you the Directions for brewing this Liquor.

Kinds of Malt :

3 Quarters Herts Pale.

2 Ditto Amber.

—
5 Quarters.

— H 4

Malt,

Malt, 5 Quarters.

Hops, 25 Pounds.

Moloffes, 10 Pounds.

Garden Scurvy-grafs, 5 Bushels.

Alexandrian Senna, 2 Pounds.

Horfe Radish Root, 1 Pound, sliced
into the working Tun.

After having your Malt well ground, turn your first Liquor over at 170 Degrees : mash one Hour ; remain on the Goods as long. Turn over, the first Time, about ten Barrels. When you have set Tap, and it is spent, turn over your second Liquor at 172 Degrees : mash three Quarters of an Hour. Turn over for the second about seven Barrels. Set Tap : get your first and part of the second raw Wort into your Copper Back : when the Tap is spent, turn your third Liquor over at 160 Degrees ; the Quantity turned over should be about twelve Barrels,

Barrels. Mash twenty Minutes ; remain on the Goods half an Hour : fet Tap, and when spent get your Wort into the Copper (where I will suppose the Rest of your Wort has been), with the Fire damped closely up ; having put in your good brown Hops, and fresh got Scurvy-grafs, in the Quantities mentioned before. Boil the Whole one Hour and a Quarter ; moderately during the first Hour, but sharply at the latter End.--- A little before turning out, put in ten Pounds of Moloffes, keeping the Rake going in the Copper till the whole Wort is in the Jack Back.

Pitch your Tun at 66 Degrees. Cleanse on the third Day with the Sweets on. This Liquor is drank both warm and cold.

N. B. The Scurvy-grafs may be had all the Year round at Covent Garden.

TABLE

TABLE BEER.

TABLE Beer is a Beverage made Use of in almost every Family ; than which nothing can be more wholesome, or be more miffed. I shall, therefore, without any farther Preliminary, proceed to give you the Mode of manufacturing it.

Commenced brewing at six o'Clock in the Morning. Thermometer 63 Degrees in the Air.

Kinds of Malt :

4 Quarters Herts White.
 2 Ditto do. Pale.
 2 Ditto do. Amber.

8 Quarters.

Malt,

Malt, 8 Quarters.

Hops, 72 Pounds.

Spanish Juice, 12 Pounds.

Charged the first Copper thirty Inches ; turned all down at 168 Degrees ; mashed three Quarters of an Hour ; set Tap at nine o'Clock at 146 Degrees. Charged thirty Inches, or fifteen Barrels and a Half. Liquor all turned over at 172 Degrees ; mashed Half an Hour ; set Tap at eleven o'Clock : Tap 150 Degrees when nearly spent.

Charged Copper the third Time twenty-eight Inches, or about twenty Barrels : turned all over at 158 Degrees ; set Tap at one o'Clock ; mashed half an Hour : Tap 148 Degrees.

First Wort came into the Copper twenty-eight Barrels, one Firkin, and seven Gallons.

Boiled

Boiled one Hour, and let out twenty-six Barrels, one Firkin, and three Gallons.

Second Wort when in was three Inches : boiled one Hour, and turned sixteen Barrels.

Pitched the Tun at 70 Degrees : cleaned the next Day ; using at the Time one Pound of ground Ginger, four Pounds of Flour, and one Pound of Salt,

Let your Tun be thoroughly roused, and your Casks well filled.

Put the Spanish Juice into the first Wort about a Quarter of an Hour before turning out.

You may put Half a Pint of Finings into every Cask when sending out, if wanted for
immediate

immediate Use ; or, otherwise, it will become fine itself.

EXAMPLE II.

Thermometer 66 Degrees.

Kinds of Malt :

5 Quarters of Herts Pale.

3 Ditto do. Amber.

—
8 Quarters.
—

Malt, 8 Quarters.

Hops, 70 Pounds.

Spanish Juice, 12 Pounds.

Charged the first Copper ten Inches ; turned all the Liquor over at 167 Degrees ;
mashed

mashed one Hour ; remained on the Goods as long ; set Tap at 145 Degrees. The Wort, when at 86 Degrees, was of the Gravity of eight Pounds $\frac{1}{10}$ per Barrel.

Second Copper charged thirty-two Inches ; all turned over at 170 Degrees ; mashed Half an Hour ; remained on the Goods one Hour ; set Tap at 140 Degrees. The Gravity when at 50 Degrees was six Pounds per Barrel.

The third Copper charged, and the Liquor all turned over at 154 Degrees ; mashed Half an Hour ; remained on the Goods one Hour. Tap, 138 Degrees : Gravity, five Pounds $\frac{1}{100}$ per Barrel.

Boiled the first Wort three Quarters of an Hour, with the Hops. Went in at three, and came out at seven, Inches. The Gravity

vity when taken out of the Copper, in its highest State of Ebullition, with the Infusion of Hops, was twelve Pounds $\frac{4}{10}$ per Barrel.

Got the second Wort into the Copper : boiled two Hours. When out, six Inches Gravity, ten Pounds $\frac{4}{10}$ per Barrel.

Pitched the Tun at 68 Degrees : cleaned the next Day ; using one Pound of Salt, four Pounds of Flour, and one Pound of ground Ginger.

If you use one Pound of Grains of Paradise, ground, it will give a warmth to the Liquor.---Attend to the Hints before given.

BEER

**BEER FOR SHIPPING, FININGS, OR
WORKHOUSES,****AFTER ANY KIND OF STRONG BEER.**

I SHALL give you an Example, after
Porter.

25 Quarters of Grains.

Turn over fifteen Barrels at 160 Degrees ;
let it stand about two Hours, and then set
Tap. As this Liquor will only dislodge the
Wort that remained in the Grains and Hops,
your only Loss in Quantity will be in the
Copper. Boil it three Quarters of an Hour
with the same Hops, and your Produce will
be about thirteen Barrels and a Half.

Pitch

Pitch your Tun at 70 Degrees, and
cleanse the next Day.

This is sold to the Shipping at Ten Shil-
lings per Barrel.

I

SHIPPING

SHIPPING BEER,

WHEN YOU ARE OBLIGED TO USE FRESH MALT.

THIS Article is also sold, in the Season,
to Haymakers, &c.

Kinds of Malt :

$1\frac{1}{2}$ Quarter Pale Malt.

$1\frac{1}{2}$ Ditto Brown do.

—
3 Quarters.

—
Malt, 3 Quarters.

Hops, 14 Pounds, good brown.

Having your Malt well ground, turn
over your first Liquor at 172 Degrees, about
fifteen

fifteen Barrels: mash one Hour; stand one Hour and a Half on the Goods. Set Tap, and when spent, turn over about fifteen Barrels more at 180 Degrees. Mash one Hour and a Half; stand two Hours on the Goods: then set Tap. Get both Worts into your Copper, and boil them near two Hours; but endeavour to get about eight Barrels per Quarter, or twenty-four Barrels in the Gyle.

Pitch your Tun at 70 Degrees, using about Half a Gallon of Yeast. Cleanse the next Day.

If intended for shipping, the more new you send it out, the greater Satisfaction it will give: if disposed of elsewhere, it must be worked off clean.

TO MAKE UP A VAT
OF 150 BARRELS OF COMMON VI,
OR RETURNS OF TABLE,
Mixed to double its Value.

USE Half a Barrel of Colouring, $\frac{1}{4}$ Cwt. of Cream of Tartar, $\frac{1}{2}$ Cwt. of ground Alum, 1 lb. of Salt of Steel, and two Barrels of strong Finings. Mix these well together, and put them in the Vat, rousing it thoroughly at the same Time. Let the Vat remain open three Days, then close it, and sand it over. In a Fortnight it will be fit for Use. Your own good Sense will inform you how to advantage.

TO

TO BRING SEVERAL SORTS OF
BEERS,
Mixed together in one Vat,
TO ONE TASTE AND PALATE.

FOR every one hundred Barrels in your Vat take six Pounds of Porter Extract; six Pounds of Orange Pea, ground; one Pound of Alum, ground; one Pound of Heading; and six Pounds of Indian Bark. Mix them well with one Butt of Finings, and rouse it thoroughly at the Time. Let it continue open three Days; then cover it, and sand it over. It will be fit for Use in a Fort-night.

ON FERMENTATION.

WE have now before us a Subject of the first Magnitude, and the most delicate to be treated on, it being in perfect Embryo ; and in the Working Tun the decisive Stroke is exhibited which is to govern the entire Process of the Gyle.

It is by the Knowledge when to urge, and when to retard, the Fermentation, that you are enabled to gratify the Palates and Vision of your Customers ; and instead of pursuing it to the acetous, to stop it when it has attained the vinous, State.

It

It is not merely Potency that is necessary for the Satisfaction of Malt Liquor, for Flavour and Transparency are generally more required.

The first Stage of Fermentation commences at 40 Degrees, and the last at about 80 Degrees. It is by a perfect vinous Fermentation that the inebriating Quality (or Strength) of Beers is obtained. Be punctual in recollecting, that---the Moment the vinous Fermentation is completed, the acetous commences; therefore your Knowledge and Prudence will direct you to cleanse immediately.

Your Beer will rise three or four Times, and three or four Feet high. If it is Porter, merely skim off any dirty Head that may be upon the Yeast, and rouse the Tun well.—

Cleanse at 76 Degrees, with the Taste of the Hop.

Ale should be worked cool ; and, if in Summer, I would recommend no more Yeast than just enough to fave it. If the Blebs are about the Size of a small Nutmeg; with a light Head, the Liquors have been properly taken ; but if as large as a Walnut, your Liquors have been taken too high : if vapid, and without any or very small Blebs, your Liquors have been taken too low.— By these Hints you will be able to correct any Error in your next Brewing ; and I here give you some Hints to correct them in the present Case : but Prevention is always better than a Cure.

I shall suppose your Liquor to have been taken too high, and much blistered in the Tun ; in which I will also suppose there are
sixty

fixty Barrels.----Take one Peck of malted Bean Flour, one Pound of Salt of Tartar, and one Gallon of fresh and lively Yeast : mix them well together, and, after skimming off as much of the Head as convenient, put the above in ; rousing it well from the Bottom. Cleanse in three or four Hours after,

If your Liquor has been taken too low, and the Beer is vapid, and will not work, you must urge it, by putting in some Bean Flour and Bay Salt ; and, if necessary, fill a Cask of hot Liquor, and lower it into the Tun.

In Ale, you will observe the Blebs to be very dim just before it is fit to cleanse.

HEADING,

HEADING.

UNDER this Head it may be necessary to observe, that there are various Modes of making it. Some make Use of ground Copperas and ground Alum, in about equal Proportions ; others resort to Salt of Steel, of which, as much as will lie on a Shilling is sufficient for a Butt of Beer. But, as the Duties of a Brewhouse sufficiently employ every Person engaged in it, I recommend it to be purchased of those who make it their Business to have it ready prepared.

FININGS.

FININGS.

ON this Subject it is necessary to observe
----that you must have several Vessels, with
Isinglass in its different Stages. Take the
inferior Isinglass, of about 1s 2d or 1s 4d
per Pound, picked clean. Fill one Cask
half full of good stale bright Beer, and the
other half with the above Isinglass, when it
will soon open, and become as thick as your
Hand. Examine it well, and throw away
all the hard and indissoluble Pieces which
you may find among it. You must have
two Sieves and a Hand-brush: place the
coarsest Sieve upon an empty Cask, and
half fill it with the partly dissolved Isinglass;
then rub it round in the Sieve till you have
made

made all that you can pass through it ; and that which will not pass, put again into the Cask from whence you took it, and let it remain till more dissolved : keep doing this till your Cask is nearly full ; then, after putting some sharper Beer upon it (and, if much wanted, you may quicken it by putting a Spoonful of vitriolic Acid ; but this I do not recommend, if it can be avoided), when sufficiently dissolved, place the finest Sieve upon an empty Cask, and proceed as before, when it will be fit to put into the Beer.

For Ale, you should make Use of the best Ifinglass you can procure ; and always take Care to have a Sufficiency ready for Use.— When you put it into the Cask, make Use of a Stick to stir it up well : it will fall in a few Hours.

SACCHA-

SACCHARINES, BITTERS, &c.

MALT.

THE Pale Sort has most of the natural Grain in it, and is therefore the more nourishing ; but, for the same Reason, it requires a stronger Constitution to digest it.

Brown Malt makes a Drink much less viscid, and fitter to pass the several Strainers of the Body.

Pale Malt, as I have before stated, should always be brewed with hard Waters ; because the mineral Particles wherewith these Waters
are

are impregnated help to prevent the Cohesions of those which are drawn from the Grain, and the better enable them to pass the proper Secretions; and the viscid Particles of the Grain likewise prevent those of the Waters from doing the Mischief which otherwise they might occasion: but soft Waters are best calculated to draw out the Substance of high-dried Malts, which retain many fiery Particles in their Contextures, and are therefore better lost in a smooth Vehicle.

Hops are well known to be a subtle, grateful Bitter in their Composition; therefore, with this Liquor, they add somewhat of an alkaline Nature, i. e., Particles that are sublime, active, and rigid; by which Means the ropy and viscid Parts of the Malt are more divided and subtilized; and are, therefore, not only rendered more easy of
Digestion

Digestion and Secretion in the Body, but also, while in the Liquor, they prevent its running into such Cohesions as would make it ropy, vapid, and sour.

SUGAR.

SUGAR, SACCHARUM---a very sweet, agreeable saline Juice, expressed from the Sugar Cane, which grows plentifully in the West Indies. Used in the Copper.

HONEY.

HONEY is a sweet vegetable Juice, collected by the Bees from the Flowers of different Plants: it contains a Quantity of fixed Air, and

and is antiseptic, as well as detergent and diuretic. Chemists draw a Water, a Spirit, an Oil, &c., from Honey. When used in the Brewery, it is for Ale, and should be in the Copper, though some prefer the Jack Back, and others the Tun.

MOLOSSES.

MOLOSSES is that gross yet fluid Matter remaining of Sugar after refining, and which no boiling will bring to a Consistence more solid than that of Syrup. Properly, Molosses are only the Sediments of one Kind of Sugar, called Chypre, or brown Sugar, which is the Refuse of other Sugars not to be whitened or reduced into Loaves. It is generally used for Amber; sometimes in the Tun, and sometimes in the Copper.

SPANISH

STICK LIQUORICE.

STICK LIQUORICE. New Green Liquorice should be chosen smooth and even, about the Thickness of the middle Finger; ruddy without, yellowish within, easy to cut, and of an agreeable Smell. This Root, when carefully dried and powdered, is of a richer and more agreeable Taste than when fresh. This is used ground, and in the Tun: it is very balsamic and detergent.

SPANISH LIQUORICE.

SPANISH LIQUORICE, OF JUICE, is made from boiling the foregoing Root lightly in Water till the Fluid has acquired a deep yellow Tincture, and the Water, at Length, evaporated over a moderate Fire. There
K remains

remains a black solid Sediment, of a pleasant Smell; of a dark reddish brown Colour when in the Mass, and when drawn out into Strings, of a golden Colour, which we call Liquorice Juice, or sometimes Spanish Juice. Its Quantity amounts to nearly half the Weight of the Root. Long boiling impairs the Sweetness of the Juice, and gives it an unpleasant Bitterness.

COLOURING.

I SHOULD recommend to every Brewer to provide himself with a sufficient Quantity, as it gives a good Face to the Beer, and enables you to gratify the Vision of your different Customers.

I have

I have tried most Colourings, and find them very beneficial in Porter and Table Beer.

Unless you mix it up in your Finings, it should be put in just before sending out.

COCULUS INDICUS.

COCULUS INDICUS is used as a Substitute for Malt and Hops, and is a great Preservative of Malt Liquor: it prevents second Fermentation in bottled Beer, and, consequently, the bursting of the Bottles in warm Climates. Its Effect is of an ~~int~~ebriating Nature.

K 2 *BITTERS.*

BITTERS.

THE Qualities of bitter Bodies are supposed to be dry, warm, astringent, and earthy. According to Grew; all Plants that are bitter and pungent, either on the Tongue or in the Throat, are deemed good Cleanfers, &c.

Bitter Things are generally reputed stomachic; yet according to Abercromby they are naturally the reverse, and hurtful to the Stomach, and only become beneficial to it where their Astringency renders them proper.

Phil. Trans. No. 171, P. 1026.

HOPS.

HOPS.

Hops :---the principal Use of them is in the Brewery, for the Preservation of Malt Liquors, which, by the Addition of this balsamic Aperient and diuretic Bitter, become less viscid, less apt to turn sour, more detergent, more disposed to pass off by Urine, and in general more salutary. They are said to contain an agreeable odorous Principle, which promotes the vinous Fermentation. When slightly boiled, or infused in warm Water, their Spirits are increased.

 CALAMUS AROMATICUS.

CALAMUS AROMATICUS is a spicy bitterish Root, brought from Lithuania and Tartary:

K 3

it

it is knotty ; reddish without and white within ; is used in cephalic and stomachic Compositions, and in the Brewery as a Succedaneum for Hops, by slicing it thin, and boiling it a short Time with the Hops : one Pound of which is equal to six of Hops.

QUASSI LIGNUM.

QUASSI LIGNUM---Quassi Wood. This Wood is so called from a Negro who was named *Quassi* : he lived at Surinam, and used it medicinally. He had great Success in giving it in Fevers of the malignant, intermitting, and putrid Kinds. It is the *Quassia amara* of Linnæus. The Wood has no Smell ; is very bitter, and stronger and more concentrated than that of any one Medicament yet known : it is quite void of stiptical Effects.

Effects. 'When used in the Brewery, it is ground ; but it leaves so severe a Bitter on the Palate, long after the Liquor is drank, that it requires much Judgment in using it.

GENTIAN.

GENTIAN. This Root is one of the best stomachic Bitters in the Materia Medica : it procures an Appetite, and greatly assists Digestion. It has also been extolled as a Febrifuge and Alexipharmic, and as a certain Remedy for the Bite of a Mad Dog :--- on this Occasion it is not only recommended internally, but externally, in the Form of a Cataplasm, made of Venice Treacle and the Powder of this Root, applied to the Wound.

Chambers.

K 4

CORIAN.

CORIANDER.

CORIANDER, while green, has a nauseous disagreeable Smell; but the Seed, when dry, smells gratefully. It is reckoned very strengthening to the Stomach, and carminative. Matthiolus says it is antiseptic. It is much used by Brewers, to give a Flavour to Ales.

CAPSICUM.

CAPSICUM, or GUINEA PEPPER, is used in Ales and Amber. It is of a warm Nature; disperses Wind, &c. But I should recommend Ginger in Preference.

CARA-

CARAWAY SEED.

CARAWAY SEED is of a brisk aromatic Taste. It is one of the greater hot Seeds, and is esteemed stomachic and diuretic: it expels Wind, and strengthens Digestion, &c. It is put into Ales, for the Flavour: it is used in the Tun,

GRAINS OF PARADISE.

GRAINS OF PARADISE are of a warm Nature, and used in Ales; but more so in Amber Beer. They disperse Wind, and give a Warmth to the Stomach. They are always ground, and used in the Tun.

GINGER.

GINGER.

GINGER. This warm aromatic Root appears to be much less liable to heat the Constitution than might be expected, from the penetrating Heat and Pungency of its Taste, and the Fixedness of its active Principles.--- It gives Part of its Virtue to Water, tinging it with a pale yellow Colour.

As to its medicinal Use, it is hot and penetrating: it is also held good to strengthen the Stomach; and promotes Appetite. It also promotes Digestion; prevents Putrefaction, &c.

Chambers.

This Article when used in the Brewery is always ground fine, and made Use of in the Tun, at the Time of cleansing: principally in Amber.

SALT.

SALT.

SALT. Mr. Beaume defines Salts to be Bodies composed of Earth, Water, and Phlogiston, which are fapid, and have a Disposition to unite with Water, Earth, and inflammable Matter. Common Salt is a Genus of natural Salt ; of the Order of alkaline neutral Salts.

It decipitates in the Fire. Its Crystals are of the cubic Form, and composed of the muriatic Acid and fossil Alkali. The Acid arises from this Salt in white Fumes, on mixing with it the concentrated vitriolic Acid.

Edwards.

SALT

SALT OF TARTAR.

SALT OF TARTAR is made of Tartar, washed, ground, purified, and calcined by a reverberatory Fire; or it is made by pulverizing what remains in the Retort after the Distillation of Tartar. This Salt is aperitive. It is used to draw out the Tincture of Vegetables.

BEANS MALTED.

BEANS MALTED. Mr. Boyle has several Experiments on Beans treated pneumatically, to shew the great Plenty of Air they afford, on which their Flatulency depends. They tend to mellow Malt Liquor; and, from their Properties, add much to its inebriating Qualities;

Qualities ; but they must not be used in too large a Quantity.

OYSTER SHELLS.

OYSTER SHELLS. These are an Alkali of a more powerful Kind than is commonly supposed. The Proof of all Alkalies is in their Solution by acid Spirits ; and Mr. Homberg found that they dissolved much more easily, in the Acids of Nitre and Sea Salt, than Pearls, Coral, and the Rest, which he supposes to be owing to their containing in the Body of the Shell a considerable Portion of the Sal-salfus, which is easily perceived upon the Tongue, and which keeps the whole Substance of the Shell in a Sort of half-dissolved State.

These

These Shells are found to produce very great Effects on the Stomach when injured by acid Humours; and Mr. Homberg is of Opinion that their easiness of Solution is one great Reason of their good Effects, and that the Quantity of Sal-salsus which it contains contributes not a little towards it; since we are not to look upon that as mere Salt, but a Salt of a peculiar Kind, formed of Sea Salt by the Organs of the Animal, and the several Fermentations it undergoes in the Body of it. The hollow Shells are preferred; which, after being clean washed, lay in the Sun to dry: then pound them in a Mortar, and lay them in the Sun again to dry.

They are very good to recover sour Beer; but when used you must leave the Bung out.

ISIN-

ISINGLASS.

ISINGLASS,---the English Name of the Fish from which the Drug called Ichthyocolla, or Isinglass, is made. It is a Species of the Accipenser, or Sturgeon, and is distinguished by not having any of the Tubercles which the Body of the common Sturgeon has.

The particular Manner of using it I have before given you.

ALUM.

ALUM,---a Genus of earthy Salts, in the Order of earthy neutral Salts. It consists of the vitriolic Acid and a clayey Earth: it
changes

changes the purple Juices of Vegetables to a red Colour.

Quincy.

It is a Kind of mineral Salt, of an acid Taste, leaving in the Mouth a Sense of Sweetness, accompanied with a considerable Degree of Astringency.

Boyle.

When used in the Brewery, it is generally in the Vats, as it gives Beer the Smack of Age.

SACCHA-

SACCHAROMETER.

THE Saccharometer as applied to Practice.----As the Qualities of Water differ, the first Thing required is to regulate your Instrument till it becomes the exact Representative of the Water you are about to brew with.

The Doctrine of the Saccharometer is founded on the well known Theorem, that when a solid Body is floating in any Fluid, the Part of the Fluid displaced by it, is equal in Bulk to so much of the solid Body as is immersed in it, and equal in Weight to the Whole of that Body.

L

On

On this Principle, the Instrument, being immerfed in Water, should fink to a given Point upon the Scale, and there remain ftationary: but, as the fpecific Gravity of Water is not every where the fame, Mr. Richardfon, by his Invention of the Regulator, has rendered the Instrument correctly applicable to every Variety of Water; for, by drawing it outwards, or preffing it inwards, till the Instrument finks to the required Point in the Water intended to be made Ufe of, it then becomes the exact Representative of that Water, and is fit for immediate Application.

The Instrument being fo adjusted, the Water is then the true Standard of Comparison for our Experiments; and if on being immerfed in Wort it refuses to fink to the fame Point to which it defcended in Water, we are certain that the former is more denfe than

than the latter, by the Resistance it makes to the descending Instrument; and that if a Weight added to the Top of the Scale causes it to sink to the Point intended, the Weight so added must be the Representative of the specific Gravity of the Wort, or of the Addition made to the Density of the Water by the Accession of fermentable Matter; for that Part of the Fluid displaced by the Instrument is still the same in Bulk, but of greater Density, because the Part of the Instrument immersed is of the same Magnitude, though the Instrument itself is increased in Weight, agreeably to the Theorem just quoted.

*Circumstances in which the SACCHAROMETER
may be of considerable Utility.*

I have already pointed out the Use of this Instrument in ascertaining the Value of

L 2

Malts;

Malts ; but there are other Circumstances attendant on the Use of it in brewing : one of these is, that disagreeable Accident termed *setting the Goods* ; which is, converting the Malt in the Mash Tun into a Paste, or clammy Consistence, occasioned by an injudicious Application of Heat in the Liquor first turned on the Malt, which shuts up the Pores of it, and causes a great Deficiency in both the Quantity and Quality of the Extract ; in the Detection of which the Use of the Instrument is singularly advantageous.

The Occurrence of this Accident, *totally*, is not indeed frequent ; but I apprehend that its *partial* Appearance is more common than many are apt to imagine.

If the Brewer estimates his Loss by the Quantity deficient, or attempts to make
good

good the Deficiency by an Addition of Water (on a Supposition that his Wort is strong in Proportion to the Shortness of the Length, or Smallness of the Quantity extracted), he is egregiously wrong. The Instrument will shew him that not only his Quantity is less, but the Strength or Gravity of the Extract is also deficient; from the Discovery of which he will be enabled to guard against injuring the Reputation of his Beer, by a false Estimate of its Strength on that Occasion, and will be prepared to provide for the Prevention, or Remedy, of similar Accidents in future. The experienced Brewer will thence adopt a Practice productive of better Effects.

Mr. Richardson gives an Account of an Accident, that came within his own Knowledge, of setting the Goods, through the Inattention of a Servant; wherein, by two

L 3

mashings,

mashings, adopted to produce the Length of one, the Gravity of the Wort, which should have been thirty Pounds per Barrel, was only eleven; and still the Quantity was somewhat less, being thirty-one instead of thirty-two Barrels: the Loss, therefore, in the first Extract only, may be thus estimated :----

	lbs.
First Wort should have been 32 Barrels,	
at 30lb. per Barrel-----	960
Instead of which it was only 31 Barrels,	
at 11 lb. per Barrel-----	341
	619
Deficiency	619

Which divided by seventy-five Pounds, the average Amount of the fermentable Matter then extractable from a Quarter of Malt, the actual Loss appears, to be 8.25 Quarters of Malt.

Similar

Similar Accidents, though in a less wasteful Degree, no doubt, frequently occur, and pass unnoticed, for the want of these or similar Means of discovering them.

Again : the Saccharometer is particularly useful (indeed I know not how it can be dispensed with) in the making up a Vat of Beer, even if filled by successive Brewings. And, with regard to those made up in the usual Way, it is clear, that, without its or similar Assistance, the Party must be in utter Darkness, and perhaps depriving themselves of a considerable additional Profit, the Loss of which they are perfectly ignorant of.

It is very necessary to keep the Instrument clean, which is easily done, by plunging it, after every Experiment, in warm Water, and rubbing it with a Linen Rag,

L 4

or

or a Piece of soft Leather : recollecting, that the Ball will not bear rough Usage : because any Bruise which shall reduce the cubic Size of the Ball will not only render a fresh Adjustment necessary, but, by destroying the Relationship between the Instrument and its Weights, will render it useless till it is repaired.

Where you purchase your Instrument, Tables of Heat, Expansion, and every other necessary Information for your Practice, will be given you.

LICENSING.

LICENSING.

AS this Treatise is intended, principally, for the Use of young Brewers, any Information that concerns them cannot but be acceptable.

LICENCES, granted at the general licensing Day, shall be made for one Year only, to commence on the 29th of September. 26 Geo. II, C. 31, § 4: and Licences granted at a Petty Sessions, where a House has become unoccupied, shall be made till the next general licensing Day. 29 Geo. II, C. 12, § 24.

By

By the 30th Geo. III, C. 38, from October 10, 1790, the recited Duties under former Acts to cease, excepting Arrears and Fines ; and from that Day, Licences granted to sell Wine or Spirits by Retail are to be void. Persons whose Licences shall be so voided, were to be allowed a ratable Proportion for the Time unexpired, on taking out new Licences.

From October 10, 1790, Retailers of Wine and Spirits are to take out Licences, if within the Limits of the chief Office of Excise in London, under the Hands and Seals of two or more of the Commissioners of Excise in England, for the Time being, or of such Persons as they, or the major Part of them, shall appoint for that Purpose : but if in any Part of the Kingdom of England, not within the said Limits, under the Hands and Seals of the Collectors and Supervisors

Supervisors of Excise within their respective
Collections and Districts.

Persons applying for Licences to pay as
follow, viz.

	<i>l</i>	<i>s</i>	<i>d</i>
For every Licence to retail Foreign Wines in England, if the Par- ty has not a Spirits or Beer Li- cence -----	5	4	0
And if the Party has a Beer Li- cence, but not one for Spirits,-	4	4	0
If he has also a Spirits Licence---	2	4	0
For every Licence to retail British made Wines in Great Britain--	2	4	0
For every Licence to retail Fo- reign Wines in Scotland, if the Party has not a Spirits or Beer Licence-----	3	6	8
			If

	<i>l</i>	<i>s</i>	<i>d</i>
If he has a Beer Licence, but not one for Spirits-----	2	13	4
If he has also a Spirits Licence----	1	6	8
For every Licence to retail Spirits in Great Britain, if the Party's House is rated under 15 <i>l</i> -----	4	14	0
If rated at 15 <i>l</i> and under 20 <i>l</i> ----	5	2	0
If rated at 20 <i>l</i> and under 25 <i>l</i> ----	5	12	0
If rated at 25 <i>l</i> and under 30 <i>l</i> ----	5	18	0
If rated at 30 <i>l</i> and under 40 <i>l</i> ----	6	6	0
If rated at 40 <i>l</i> and under 50 <i>l</i> ----	6	14	0
If rated at 50 <i>l</i> or upwards -----	7	2	0

The Money for Licences is to be paid within the Limits of the chief Office of Excise in London, at the said chief Office of Excise; and for Licences taken out in any Part of Great Britain, not within the said respective Limits, to the respective Collectors of Excise granting such respective Licences.

Licences

Licences are to continue in force until the 10th of October ensuing the granting thereof ; and if granted between the 5th of April and the 10th of October, a ratable Proportion only is to be charged.

A TABLE

TREATISE ON BREWING.

A TABLE

OF THE

Clear Duties of Excise on Strong Beer,

Payable by the Common Brewers of London, with the Malt Allowances deducted from the original Duties.

Barrels.	l	s	d
1	0	5	7 $\frac{1}{2}$
2	0	11	3
3	0	16	10 $\frac{1}{2}$
4	1	2	6
5	1	8	1 $\frac{1}{2}$
6	1	13	8 $\frac{3}{4}$
7	1	19	4 $\frac{1}{4}$
8	2	4	11 $\frac{1}{4}$
9	2	10	7 $\frac{1}{4}$

Barrels.	l	s	d
10	2	16	2 $\frac{3}{4}$
11	3	1	10 $\frac{3}{4}$
12	3	7	5 $\frac{3}{4}$
13	3	13	1 $\frac{3}{4}$
14	3	18	8 $\frac{3}{4}$
15	4	4	4 $\frac{3}{4}$
16	4	9	11 $\frac{3}{4}$
17	4	15	7 $\frac{3}{4}$
18	5	1	2 $\frac{1}{2}$
19	5	6	10
20	5	12	5 $\frac{1}{2}$
21	5	18	1
22	6	3	8 $\frac{1}{2}$
23	6	9	4
24	6	14	11 $\frac{1}{2}$
25	7	0	7
26	7	6	2 $\frac{1}{2}$
27	7	11	10
28	7	17	5 $\frac{1}{2}$
29	8	3	0 $\frac{3}{4}$

Barrels.	l	s	d
30	8	8	8 $\frac{1}{4}$
31	8	14	3 $\frac{1}{4}$
32	8	19	11 $\frac{1}{4}$
33	9	5	6 $\frac{3}{4}$
34	9	11	2 $\frac{1}{2}$
35	9	16	9 $\frac{3}{4}$
36	10	2	5 $\frac{1}{4}$
37	10	8	0 $\frac{3}{4}$
38	10	13	8 $\frac{1}{4}$
39	10	19	3 $\frac{3}{4}$
40	11	4	11 $\frac{1}{4}$
41	11	10	6 $\frac{1}{2}$
42	11	16	2
43	12	1	9 $\frac{1}{2}$
44	12	7	5
45	12	13	0 $\frac{1}{2}$
46	12	18	8
47	13	4	3 $\frac{1}{2}$
48	13	9	11
49	13	15	6 $\frac{1}{2}$

Barrels.	l	s	d
50	14	1	2
51	14	6	$9\frac{1}{2}$
52	14	12	$4\frac{3}{4}$
53	14	18	$0\frac{3}{4}$
54	15	3	$7\frac{3}{4}$
55	15	9	$3\frac{3}{4}$
56	15	14	$10\frac{3}{4}$
57	16	0	$6\frac{3}{4}$
58	16	6	$1\frac{3}{4}$
59	16	11	$9\frac{3}{4}$
60	16	17	$4\frac{3}{4}$
61	17	3	$0\frac{3}{4}$
62	17	8	$7\frac{3}{4}$
63	17	14	$3\frac{3}{4}$
64	17	19	$10\frac{1}{2}$
65	18	5	6
66	18	11	$1\frac{1}{2}$
67	18	16	9
68	19	2	$4\frac{1}{2}$
69	19	8	0
70	19	13	$7\frac{1}{2}$

M

71

TREATISE ON BREWING.

Barrels.	l	s	d
71	19	19	3
72	20	4	10 $\frac{1}{2}$
73	20	10	6
74	20	16	1 $\frac{1}{2}$
75	21	1	8 $\frac{1}{4}$
76	21	7	4 $\frac{1}{4}$
77	21	12	11 $\frac{3}{4}$
78	21	18	7 $\frac{1}{4}$
79	22	4	2 $\frac{1}{4}$
80	22	9	10 $\frac{1}{4}$
81	22	15	5 $\frac{1}{4}$
82	23	1	1 $\frac{1}{4}$
83	23	6	8 $\frac{1}{4}$
84	23	12	4 $\frac{1}{4}$
85	23	17	11 $\frac{1}{4}$
86	24	3	7 $\frac{1}{4}$
87	24	9	2 $\frac{1}{2}$
88	24	14	10
89	25	0	5 $\frac{1}{2}$
90	25	6	1

Barrels.	l	s	d
91	25	11	8 $\frac{1}{2}$
92	25	17	4
93	26	2	11 $\frac{1}{2}$
94	26	8	7
95	26	14	2 $\frac{1}{2}$
96	26	19	10
97	27	5	5 $\frac{1}{2}$
98	27	11	0 $\frac{1}{2}$
99	27	16	8 $\frac{1}{2}$
100	28	2	3 $\frac{1}{2}$
200	56	4	7 $\frac{1}{2}$
300	84	6	11 $\frac{1}{2}$
400	112	9	3
500	140	11	6 $\frac{1}{2}$
600	168	13	10 $\frac{1}{2}$
700	196	16	2 $\frac{1}{2}$
800	224	18	6
900	253	0	9 $\frac{1}{2}$
1,000	281	3	1 $\frac{1}{2}$
2,000	562	6	3

M 2

3,000

TREATISE ON BREWING.

Barrels.	l	s	d
3,000	843	9	4 $\frac{1}{2}$
4,000	1,124	12	6
5,000	1,406	15	7 $\frac{1}{2}$
6,000	1,686	18	9
7,000	1,968	1	10 $\frac{1}{2}$
8,000	2,249	5	0
9,000	2,530	8	1 $\frac{1}{2}$
10,000	2,811	11	3
20,000	5,623	2	6
25,000	7,029	18	1 $\frac{1}{2}$
30,000	8,434	13	9
40,000	11,246	5	0
50,000	14,057	16	3
60,000	16,869	7	6
70,000	19,681	15	9
80,000	22,493	7	0
90,000	25,304	18	3
100,000	28,116	9	6

The

The following is the Clear Duty of Excise paid by the London Common Brewers on Small and Table Beer, with the Malt Allowance deducted.

Barrels.	Small Beer.			Table Beer.		
	l	s	d	l	s	d
1	0	0	10	0	2	$7\frac{1}{4}$
2	0	1	$7\frac{3}{4}$	0	5	$2\frac{1}{2}$
3	0	2	$5\frac{3}{4}$	0	7	10
4	0	3	$3\frac{3}{4}$	0	10	$5\frac{1}{4}$
5	0	4	$1\frac{1}{2}$	0	13	$0\frac{1}{2}$
6	0	4	$11\frac{1}{2}$	0	15	$7\frac{3}{4}$
7	0	5	$9\frac{1}{2}$	0	18	$3\frac{1}{4}$
8	0	6	$7\frac{1}{4}$	1	0	$10\frac{1}{2}$
9	0	7	$5\frac{1}{4}$	1	3	$5\frac{3}{4}$
10	0	8	$3\frac{1}{4}$	1	6	1
11	0	9	1	1	8	$8\frac{1}{4}$
12	0	9	11	1	11	$3\frac{3}{4}$
13	0	10	$8\frac{3}{4}$	1	13	11

M 3

14

Barrels.	Small Beer.			Table Beer.		
	l	s	d	l	s	d
14	0	11	6 $\frac{1}{2}$	1	16	6 $\frac{1}{2}$
15	0	12	4 $\frac{1}{2}$	1	19	1 $\frac{1}{2}$
16	0	13	2 $\frac{1}{2}$	2	1	8 $\frac{1}{2}$
17	0	14	0 $\frac{1}{2}$	2	4	4 $\frac{1}{2}$
18	0	14	10 $\frac{1}{2}$	2	6	11 $\frac{1}{2}$
19	0	15	8 $\frac{1}{2}$	2	9	6 $\frac{1}{2}$
20	0	16	6 $\frac{1}{2}$	2	12	2
21	0	17	4 $\frac{1}{2}$	2	14	9 $\frac{1}{2}$
22	0	18	2	2	17	4 $\frac{1}{2}$
23	0	19	0	3	0	0
24	0	19	10	3	2	7 $\frac{1}{2}$
25	1	0	7 $\frac{1}{2}$	3	5	2 $\frac{1}{2}$
26	1	1	5 $\frac{1}{2}$	3	7	10
27	1	2	3	3	10	5 $\frac{1}{2}$
28	1	3	1 $\frac{1}{2}$	3	13	0 $\frac{1}{2}$
29	1	3	11 $\frac{1}{2}$	3	15	7 $\frac{1}{2}$
30	1	4	9 $\frac{1}{2}$	3	18	3 $\frac{1}{2}$
31	1	5	7 $\frac{1}{2}$	4	0	10 $\frac{1}{2}$
32	1	6	5 $\frac{1}{2}$	4	3	5 $\frac{1}{2}$
33	1	7	3 $\frac{1}{2}$	4	6	1
34	1	8	1	4	8	8 $\frac{1}{2}$

Barrels.	Small Beer.			Table Beer.		
	l	s	d	l	s	d
35	1	8	11	4	11	3 $\frac{1}{4}$
36	1	9	8 $\frac{1}{4}$	4	13	11
37	1	10	6 $\frac{1}{4}$	4	16	6 $\frac{1}{2}$
38	1	11	4 $\frac{1}{4}$	4	19	1 $\frac{1}{2}$
39	1	12	2 $\frac{1}{2}$	5	1	8 $\frac{1}{4}$
40	1	13	0 $\frac{1}{2}$	5	4	4 $\frac{1}{4}$
41	1	13	10 $\frac{1}{2}$	5	6	11 $\frac{1}{2}$
42	1	14	8 $\frac{1}{4}$	5	9	6 $\frac{1}{4}$
43	1	15	6 $\frac{1}{4}$	5	12	2
44	1	16	4 $\frac{1}{4}$	5	14	9 $\frac{1}{2}$
45	1	17	2	5	17	4 $\frac{1}{4}$
46	1	18	0	6	0	0
47	1	18	10	6	2	7 $\frac{1}{4}$
48	1	19	7 $\frac{1}{4}$	6	5	2 $\frac{1}{2}$
49	2	0	5 $\frac{1}{4}$	6	7	10
50	2	1	3 $\frac{1}{4}$	6	10	5 $\frac{1}{4}$
51	2	2	1 $\frac{1}{2}$	6	13	0 $\frac{1}{2}$
52	2	2	11 $\frac{1}{2}$	6	15	7 $\frac{1}{4}$
53	2	3	9 $\frac{1}{2}$	6	18	3 $\frac{1}{4}$
54	2	4	7 $\frac{1}{4}$	7	0	10 $\frac{1}{2}$
55	2	5	5 $\frac{1}{4}$	7	3	5 $\frac{1}{4}$
56	2	6	3 $\frac{1}{4}$	7	6	1

Barrels.	Small Beer.			Table Beer.		
	l	s	d	l	s	d
57	2	7	1	7	8	8 $\frac{1}{4}$
58	2	7	11	7	11	3 $\frac{1}{2}$
59	2	8	8 $\frac{1}{4}$	7	13	11
60	2	9	6 $\frac{1}{4}$	7	16	6 $\frac{1}{4}$
61	2	10	4 $\frac{1}{4}$	7	19	1 $\frac{1}{2}$
62	2	11	2 $\frac{1}{2}$	8	1	8 $\frac{3}{4}$
63	2	12	0 $\frac{1}{2}$	8	4	4 $\frac{1}{4}$
64	2	12	10 $\frac{1}{2}$	8	6	11 $\frac{1}{2}$
65	2	13	8 $\frac{1}{4}$	8	9	6 $\frac{3}{4}$
66	2	14	6 $\frac{1}{4}$	8	12	2
67	2	15	4 $\frac{1}{4}$	8	14	9 $\frac{1}{2}$
68	2	16	2	8	17	4 $\frac{1}{4}$
69	2	17	0	9	0	0
70	2	17	10	9	2	7 $\frac{1}{4}$
71	2	18	7 $\frac{1}{4}$	9	5	2 $\frac{1}{2}$
72	2	19	5 $\frac{1}{4}$	9	7	10
73	3	0	3 $\frac{1}{4}$	9	10	5 $\frac{1}{4}$
74	3	1	1 $\frac{1}{2}$	9	13	0 $\frac{1}{2}$
75	3	1	11 $\frac{1}{2}$	9	15	7 $\frac{1}{4}$
76	3	2	9 $\frac{1}{2}$	9	18	3 $\frac{1}{4}$
77	3	3	7 $\frac{1}{4}$	10	0	10 $\frac{1}{2}$

Barrels.	Small Beer.			Table Beer.		
	l	s	d	l	s	d
78	3	4	5 $\frac{1}{4}$	10	3	5 $\frac{1}{4}$
79	3	5	3 $\frac{1}{4}$	10	6	1
80	3	6	1	10	8	8 $\frac{1}{4}$
81	3	6	11	10	11	3 $\frac{1}{4}$
82	3	7	8 $\frac{1}{4}$	10	13	11
83	3	8	6 $\frac{1}{4}$	10	16	6 $\frac{1}{4}$
84	3	9	4 $\frac{1}{4}$	10	19	1 $\frac{1}{4}$
85	3	10	2 $\frac{1}{2}$	11	1	8 $\frac{1}{4}$
86	3	11	0 $\frac{1}{2}$	11	4	4 $\frac{1}{4}$
87	3	11	10 $\frac{1}{2}$	11	6	11 $\frac{1}{2}$
88	3	12	8 $\frac{1}{4}$	11	9	6 $\frac{1}{4}$
89	3	13	6 $\frac{1}{4}$	11	12	2
90	3	14	4 $\frac{1}{4}$	11	14	9 $\frac{1}{4}$
91	3	15	2	11	17	4 $\frac{1}{4}$
92	3	16	0	12	0	0
93	3	16	10	12	2	7 $\frac{1}{4}$
94	3	17	7 $\frac{1}{4}$	12	5	2 $\frac{1}{4}$
95	3	18	5 $\frac{1}{4}$	12	7	10
96	3	19	3 $\frac{1}{4}$	12	10	5 $\frac{1}{4}$
97	4	0	1 $\frac{1}{2}$	12	13	0 $\frac{1}{2}$
98	4	0	11 $\frac{1}{2}$	12	15	7 $\frac{1}{4}$
						99

Barrels.	Small Beer.			Table Beer.		
	l	s	d	l	s	d
99	4	1	9½	12	18	3½
100	4	2	7½	13	0	10½
200	8	5	2½	26	1	9
300	12	7	10	39	2	7½
400	16	10	5	52	3	6
500	20	13	0½	65	4	4½
600	24	15	7½	78	5	3
700	28	18	2½	91	6	1½
800	33	0	10	104	7	0
900	37	3	5½	117	7	10
1,000	41	6	0½	130	8	8½
2,000	82	12	1	260	17	5
3,000	123	18	1½	391	6	1
4,000	165	4	2	521	14	10
5,000	206	10	2½	652	3	6½
6,000	247	16	3	782	12	2
7,000	289	2	3½	913	0	10½
8,000	330	8	4	1,043	9	7
9,000	371	14	4½	1,173	18	3½
10,000	413	0	5	1,304	6	11½
11,000	454	6	5½	1,434	15	7½
12,000	495	12	6	1,565	4	4½

A GLOS-

A GLOSSARY

*Of some of the Technical Terms made Use of
in this Work.*

ASTRINGENT—Binding.

PUNGENT—Heat on the Tongue, sharp.

BALSAMIC—Unctuous.

APERIENT—Gently Purgative.

DIURETIC—Having the Power to provoke Urine.

VISCID—Glatinous, ropy.

DETERGENT—That which cleanses.

FEBRIFUGE—Good in Fevers.

ALEXIPHARMIC—That drives away Poison.

CATAPLASM—a Poullice.

REVERBERATORY FIRE—A Furnace of an intense Heat, where the Fire is reverberated upon the Matter to be melted or cleaned.

A RETORT—A Chemical Glass Vessel to which the Receiver is fitted.

AROMATIC—Spicy, fragrant.

CARMINATIVE—Whatever promotes insensible Perspiration.

ANTISEPTIC—An Antidote to Putrefaction.

PNEUMATIC—Consisting of Wind or Spirit.

CEPHALIC—

CEPHALIC---Medicinal for the Head.

ALKALI---Any Substance which, when mixed with Acid, produces Fermentation.

NARCOTIC---Producing Torpor or Stupefaction.

COKE---Fuel made by burning Pitcoal under Earth, and quenching the Cinders.

PHLEGMATIC---Dull, cold, frigid.

CRUDE---Harsh, unripe.

FARINACEOUS---Mealy.

TO CAP ON---To put fresh Malt on the Goods.

GOODS---Malt when wetted, before the Virtue is extracted.

GRAINS---Husks of Malt exhausted in brewing.

MUSTY---Mouldy.

WEEVIL---A small Insect that infests Malt, and eats out its Flour.

FOXED---Tainted.

MUST---Unfermented Extracts of fermentable Subjects.

PHLOGISTON---A Chemical Liquor extremely inflammable.

ERRATA.

Page 67, line 9, for "third Wort," read "second Wort."

-----112, --- 1, for "let out," read "came out."

----- 4, for "turned sixteen Barrels," read "turned out sixteen Barrels."

INDEX.

INDEX.

A

	Page.
<i>Ale, London</i> - - - - -	83
<i>Ale, Windsor</i> - - - - -	92
<i>Ale, Welch</i> - - - - -	96
<i>Ale, Wirtemberg</i> - - - - -	100
<i>Ale, Scuroy-grass</i> - - - - -	107
<i>Amber Beer, or Twopenny</i> - - - - -	74
<i>Alum</i> - - - - -	147

B

<i>Brown Stout</i> - - - - -	64
<i>Bean Flour Malted</i> - - - - -	144
<i>Bitters</i> - - - - -	136
<i>Brewhouse, Utensils used in</i> - - - - -	19

C

<i>Colouring</i> - - - - -	134
<i>Calamus Aromaticus</i> - - - - -	137
<i>Coculus Indicus</i> - - - - -	135
<i>Coriander</i>	

	Page.
<i>Coriander</i> - - - - -	140
<i>Capsicum</i> - - - - -	140
<i>Caraway Seed</i> - - - - -	141

E

<i>Excise Duties payable</i> - - - - -	162
--	-----

F

<i>Fermentation</i> - - - - -	122
<i>Finings</i> - - - - -	127

G

<i>Ginger</i> - - - - -	142
<i>Gentian</i> - - - - -	139
<i>Grains of Paradise</i> - - - - -	141
<i>Glossary</i> - - - - -	175

H

<i>Hock</i> - - - - -	104
<i>Hops</i> - - - - -	39, 137
<i>Honey</i> - - - - -	131
<i>Heading</i> - - - - -	126

I

<i>Isinglass</i> - - - - -	147
----------------------------	-----

Liquorice,

L

	Page.
<i>Liquorice, Stick</i> - - - - -	133
<i>Liquorice, Spanish</i> - - - - -	133
<i>Licensing</i> - - - - -	157
<i>London Brewery, History of</i> - - - - -	9

M

<i>Malt</i> - - - - -	129
<i>Malt, how to make</i> - - - - -	22
<i>Malt, to know good from bad</i> - - - - -	34
<i>Malt (Pale) Nature and Use of</i> - - - - -	36
<i>Malt (Amber) Nature and Use of</i> - - - - -	37
<i>Malt (Brown) Nature and Use of</i> - - - - -	38
<i>Molosses</i> - - - - -	132

O

<i>Oyster Shells</i> - - - - -	145
--------------------------------	-----

P

<i>Porter</i> - - - - -	43
-------------------------	----

Q

<i>Quassia</i> - - - - -	138
--------------------------	-----

R

<i>Reading Beer</i> - - - - -	71
-------------------------------	----

Shipping

S

	Page.
<i>Shipping Beer</i> - - - - -	116, 118
<i>Sugar</i> - - - - -	131
<i>Salt</i> - - - - -	143
<i>Salt of Tartar</i> - - - - -	144
<i>Saccharometer, Use of</i> - - - - -	149

T

<i>Table Beer</i> - - - - -	110
-----------------------------	-----

U

<i>Vat, to make up one of 150 Barrels to double its Value</i> - - - - -	120
<i>Vat, to bring several Sorts of Beers, mixed together, to one Taste and Pa- late</i> - - - - -	121

FINIS.

Fig:4.

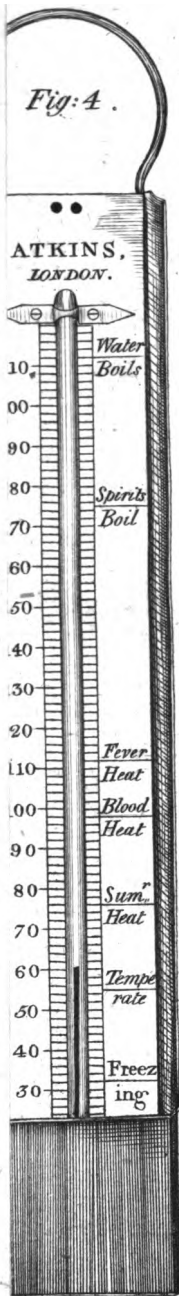
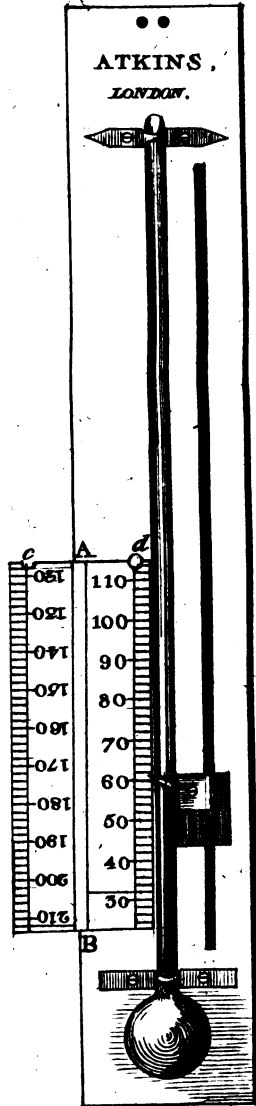


Fig:5.



APPENDIX.

troublesome Method of reducing the Worts to one standard Temperature.

The Facility with which the Knowledge of using this Instrument may be acquired, and the expeditious Mode of ascertaining the Value of the Extract by it, are likewise strong Recommendations in its Favour ; for any one of ordinary Talents may learn the Method of applying it in a Quarter of an Hour.

The Use of the *Thermometer* and *Saccharometer* in the Brewery has, perhaps, very much contributed to the Improvements that have been lately made in the Art of brewing Malt Liquors ; for by taking Notes, and comparing them, different Brewers are enabled to communicate their practical Modes of working in an easy Manner, and, consequently, to adopt any improved Plan which one may suggest to another. Indeed, the Advantages resulting from the Use of these Instruments are such, that their immediate Adoption cannot
be

APPENDIX.

be too strongly recommended to every one who has hitherto refrained from applying them to those valuable Purposes.

The grand Obstacle to Improvement in every Manufactory is the apparent Difficulty of introducing a new Mode of Practice, which is considerably increased, if the Workman has never seen the Machine or Instrument he is to use; but the great Utility of these Instruments to the Brewery, and the Simplicity of their Construction, has overcome those Prejudices; and it is found that a Miller or Baker may as well be without a Pair of Scales, as a Brewer without those Instruments.

As Mr. Atkins's Saccharometer is now become the Standard of Comparison generally referred to by the Brewers in Town, when speaking of the Value of their Malt, or the Extract of it, the following Description of the Apparatus, with the Method of using it, will be found extremely useful.

APPENDIX.

The Saccharometer is made of Brass, of the Form represented in the Plate, Fig. 1. It consists of a hollow ball A, with a square stem b, c, projecting from the upper Part of it, and a round Leg d, e, with the Weight W, at the Bottom.

The Figures and Divisions engraved on the Stem indicate the Gravity or Strength of Worts from 1 to 40 Pounds per Barrel. Near the Top of it, at c, above the Divisions, the four Sides are marked 0, 1, 2, 3. The Sides marked 1, 2, 3, are represented in the Plate detached from the Saccharometer, with the Weights in their Places on the Top.

For Worts of different Strengths there are three additional Weights, which, when used, must be put on the round Wire a, at the Top of the Instrument: they are marked 1, 2, 3, as represented in the Plate.

This

APPENDIX.

This Saccharometer is adjusted in Water at 60 Degrees of Heat by Fahrenheit's Thermometer, so as to sink to W, on the Side of the Stem marked O, without any Weight on the Top. This Side of the square Stem shews the Gravity of weak Worts from Water just impregnated with the saccharine Matter to 10 Pounds per Barrel; the Ball of the Instrument being immersed in your Wort in the Jar, the Division on the Stem immediately above its Surface will indicate the Gravity in Pounds and tenths of a Pound per Barrel.

If your Wort is heavier than 10 Pounds per Barrel, a Part of the Ball will appear above the Surface of it, and the Instrument will require one of the Weights to be fixed on the Top. If the Weight marked 1 is sufficient to sink it to some Part of the Stem, the Side marked 1, as represented in the Plate, with the Weight on the Top, will shew the
Gravity

APPENDIX.

Gravity of your Extract, which will be from 10 to 20 Pounds per Barrel.

If the Weight 2 is necessary, the Side numbered 2 must be referred to, which will indicate the Gravity from 20 to 30 Pounds.

When the Weight 3 is used, the Strength will be shewn by the Side 3, and will be from 30 to 40 Pounds, which is as strong as it is found necessary to make any Extract.

The Scale which accompanies the Apparatus is a very simple Contrivance to ascertain the Gravity of Worts at any required Heat; it supercedes the Necessity of referring to Tables or Calculations, or waiting to cool your Worts down: in a Variety of Cases where Dispatch is of Importance, as in boiling down your Worts, it is found extremely useful.

On the ivory Part of the Scale are laid down the Degrees of the Thermometer, and on the
box

APPENDIX.

box Part of it the Divisions, as on the Saccharometer.

Having ascertained the Heat of your Worts by the Thermometer, and the Weight by the Saccharometer, slide the Degree of Heat on the ivory Slide opposite your Weight on the box Part of the Rule; and against any other Heat you have the Gravity at that Temperature.

One or two Examples of the Method of using these Instruments, will, I should hope, render it perfectly intelligible to every Capacity; if, however, it should not be understood immediately, a little Practice with the Instruments will soon render it familiar.

Suppose the Heat of your Worts in the Assay Jar is 130 Degrees by the Thermometer, and the Saccharometer immersed in the Jar with the Weight No. 2 on the Top of it; the Side marked 2 must, in this Case, be referred

APPENDIX.

referred to; and, if the Surface of the Worts cuts the Stem at the Division marked 28, it will indicate that the Worts at that Heat are 28 Pounds heavier than Water; but if the same Extract is cooled down to 60 Degrees (the standard Temperature), you would find that it would then weigh 33,7 Pounds per Barrel.

In order to save the Trouble and Time of cooling the Worts down, and to prevent the considerable Error that would otherwise take Place, the Scale is found of the greatest Importance; for if 130 on the ivory Slide, that is, the Degree of Heat, is put against 28, the Gravity by the Saccharometer, according to the Directions just given, you will find against 60 Degrees, the real Gravity, 33,7 Pounds.

Another Example on the Rule, will, I should hope, render its Use perfectly easy.

Suppose

APPENDIX.

Suppose the Heat of your Worts in the Affay Jar 100 Degrees, and the Gravity by the Saccharometer 17,6 Pounds; slide 100 against 17,6, and opposite 60, on the ivory Slide, you will have $19\frac{9}{10}$ Pounds, the real Weight, at 60 Degrees of Heat.

These Examples will suffice to shew the Utility of its Application to any other Degree of Heat or Strength.

The Thermometer, which forms a Part of the Apparatus, and which is packed in the same mahogany Box with the Saccharometer and Scale, is absolutely necessary where the Brewer has none but the common large Ones used for taking the Liquor in the Copper, &c., which are generally too bulky to be admitted into an Affay Jar; they are likewise equally useful for taking the Heat of the Worts in the Coolers, &c.

O

Fig.

APPENDIX.

Fig. 3 is a Representation of an improved Assay Jar, for examining the Gravity and Heat of your Worts at the same Time. It is made of Copper, or Tin, with 2 Apartments, one just large enough to admit the Saccharometer, the other for the Thermometer, with a Communication between them; by this Means you are enabled to ascertain the Strength of your Worts much more expeditiously than you can with the common Assay Jar. Three of these Jars will be found necessary to contain your different Extracts, a Specimen of each of which should be kept until you pitch your Tun.

Fig. 4 is a Representation of a common Brewer's Thermometer, in a tin Case. The Use of this Instrument having been so fully explained already, and being pretty generally known, little need here be said about it.

Fig.

APPENDIX.

Fig. 5 is a blind Thermometer with a pocket Scale: it is useful in many Respects, particularly when it is desirable to keep your Heats a Secret. A, B, is a pocket Scale graduated to the Thermometer Tube: if the Notch c be placed against the brass Pin d, and laid along by the Side of the Tube, the Division on the Scale opposite the Quicksilver will shew the Degree of Heat.

If you want to turn over your Liquor at 165 Degrees, for Instance, and wish to employ yourself on some other Business, having one of these Thermometers, you need not stand at the Copper Side to watch it, but may fix the Index (which slides in a Groove) to 165 on the Scale, and leave any one of your ordinary Workmen to take your Liquor, and turn over when the Quicksilver rises to the Index: this will save the Brewer a great Deal of Trouble, and prevent the Disclosure of your Process.

Various

APPENDIX.

Various other Kinds of Thermometers with private Scales are likewise made and sold by Mr. ATKINS, No. 136, *Fenchurch Street, London.*

Knight and Compton, Printers,
Middle Street, Cloth Fair.

H. B. 1/2

Es