THE

SECRETS

OF

THE MASH TUN;

OR,

THE REAL CAUSES OF FAILURE IN PRODUCING GOOD ALE OR BEER

EXPOSED:

The only true and economical mode of Brewing.

WITH EXAMPLES

FROM ONE QUARTER TO TWENTY QUARTERS,

FOR THE

Use of Brewers, Butlers, &c. &c.

BY A BREWER OF 25 YEARS' STANDING.

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PREFACE.

It is strange how often some people require to be told a thing before they will believe it. You may even succeed in proving to them clearly enough that it would be all the better for them if they would believe you,—still they remain incredulous. Why is this? Farmers are generally business-like practical men. They are always ready to patronize anything that is at once good and cheap, and, what is better still, they can see the real value of a thing as soon as anybody. Now then, my first little work, the "Farmers' Friend," is not in the hands of above *half* the Farmers of England. I am dissatisfied with this state of things. *Every Farmer in the three Kingdoms must have a copy.* Nothing less will satisfy me. The trifling price cannot be an objection;—no, or so many hundred would not have bought the work. It

must be because they have not had time or inclination to examine into its merits. This is the only "reasonable reason" that I can see, and a pretty reason too it is for a body of English Yeomen—"their Country's boast and pride"—to give!

However, here is another freshener for their memories. Let them read this little work, and see what they have been about all their lives. They will see it clearly demonstrated that they might have been hundreds of pounds richer if they had understood the real "SECRETS" of Brewing. Such a fortunate season as the present may not again fall to the Farmers' lot. They should therefore take advantage of every new discovery in the principles of domestic economy, (as they take advantage of every new rise in the markets,) to provide against bad times. It is better to learn how to save before all your money is spent, than to begin thinking about it only when it is too late.

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SECRETS OF THE MASH TUN.

THIS little book is intended to elucidate the active principles that are ever at work in beer until it is used, especially in stock beer or beer stowed away. Many think that *boiling* secures it in a sound mild state:—others put their trust in well *hopping* it, thinking that the bitter of the hops is a sufficient antidote against all the changes to which beer is liable. There are *very few*, who are aware that all depends on the first operation in

brewing:—viz. the preparation of malt, and the mashing so as to produce a *good wort*. By a good wort, I mean not only a strong wort, but a wort of good quality —a wort of the nature of saccharine or sugar. Unless this is effected there will be no security for the stability of the beer. In the best made malt there is more than one half of unchanged starch, the rest being saccharine matter and mucilage. Now the grand object is to change this starch and mucilage into a good sound saccharine matter. If this become produced and properly managed afterwards, according to my instructions, there is no fear of beer not keeping—because you will have removed the

cause of the acetous acid, ropiness, hardness, and other bad qualities, which always spoil the beer that is not rightly managed.

OF MALT.

In making Malt, care ought to to be taken, after it once begins growing, to keep up a gentle warmth, and consequently a gentle fermentation continually going on, until it is thrown on the kiln. Some persons think that if they can produce the desired change of the barley into malt with the smallest portion of roots, there will be more goodness left in the malt; but you must not attempt

trusting to this plan, unless you take especial care *to keep the roots alive the whole of the time they are on the floor.* Any maltster can do this now, as the law allows him to sprinkle at six days old, by giving notice to the Excise Officer. In dry windy weather, in the spring of the year, it is a good plan to give a floor of malt of twelve quarters nine or ten water-pots full of water at six days old, and this will carry on the roots alive until they arrive at the kiln.

This is not merely a theory of my own, as the following facts prove. I once knew a firm that acted on the principle of growing their malt as little as possible; thinking that to be the best means

of obtaining the largest extract. Now, their malt roots began falling off at (or about) seven days old, and by the time that the malt reached the kiln, *the roots were nearly all off*, and the dust flew every time the corn was turned. Although this malt was made from the best barley and yielded a good extract in quantity, yet the ale made from it was most difficult to ferment—sometimes making a cauliflower head for about twelve hours—then sinking down on the head of the ale of a brown colour, about as thick as half-a-crown, and never rising again. Although the ale was tunned and well filled up, it had a very disagreeable taste, and the parties were obliged to sacrifice

their old stock ale to mix with it, without being able, even then, to give satisfaction to their customers. Although there was a frequent change of store yeast the results were nearly the same. All this loss was occasioned by not keeping the roots alive while on the malt floor—because, the roots being dead and off, the essence of the acre-spire was greatly weakened—consequently there was not that *diastase* or essential oil which resides in the spire and which is absolutely necessary to produce the three grand fermentations:- viz. 1*st*. The changing of barley into malt. 2*nd*. The changing of the starch or unchanged flour of the malt into a good saccharine or sweetwort in

the mash tun—and 3*rdly*, the changing of the wort into beer, by producing a good vinous fermentation in the fermenting tun.

With regard to the preparation of the malt for the mash-tun, different brewers hold different opinions. I knew one brewer who used rollers or crushers, and he told me that after his malt had been crushed, and the mash stirred for one hour, then allowed to stand two hours more—some of his malt was not wetted through on account of the crusher having compressed the body of the corn so close, that the liquor could not enter. Where there is *force enough* and the *crusher properly set*, it will answer the purpose well, if the malt is kind: but if

the malt is unkind, the old-fashioned mill-stones, kept well pecked and with a good edge on them, will cut the malt into little bits, without flouring it. This, or a good steel mill I hold to be the best mode of preparation for the mash-tun, especially for unkind malt.

OF WATER.

In addition to the remarks on this subject in the "Farmer's Friend," page 6, I may suggest the following.—Hard water will not require boiling before mashing, but soft water, especially from ponds or rivers, ought to be

boiled ten minutes before it is used. One quart of clean wood ashes (to three barrels of liquor) put into a bag, and hung in the copper during the time the first liquor is hotting, will help to soften the liquor, and assist the yeast in the fermentation. It will also produce the clearest and whitest and most solid yeast, of double the value of yeast in general. This one fact will be of incalculable benefit to brewers who have not a good sale for their yeast, as it will improve it in quality and in colour to a great degree.

OF HOPS.

Read attentively my remarks in the "Farmer's Friend," page 8,

The quantity of hops will depend upon taste, and the time the ale is intended to be kept before using. For present use about three quarters of a pound to the bushel—for keeping six months one pound to the bushel and for twelve months the same as for six months, with the addition of one pound to each barrel, which must be previously scalded and put into the store vat as soon as it is stored away.

Many different things can be used as bitters—but hops are the only bitter allowed to a licensed brewer. For fine ale and a nice flavour I have used camomile flowers instead of hops, and have given great satisfaction. From one to two ounces of Gen-

tian bruised and boiled in the wort, with or without the hops, forms an excellent bitter and strengthener of the stomach. A Gentleman in Essex told me that the best ale he ever had was bittered with wormwood grown in in his own garden. Quassia is sometimes used on account of its cheapness: it is a strong and lasting bitter. For porter, bitter aloes are sometimes used, but they must be used *very sparingly*.

OF MASHING.

In mashing *particular attention must be paid to the heats,* for on that and the stirring and the

manner of infusion, the whole of the success of the *diastase* or saccharizing principle depends. As there will always be a difference of circumstances, this difference must be taken into consideration: for instance; suppose you mash with an *iron false bottom* with a descending shoot, *that* will lower the heat of the first liquor. In that case you must take your first mash at six or eight degrees hotter than if the false bottom were a *wooden* one. In either case, as soon as the liquor begins running, do you begin stirring. Where the mash can be commanded *stir it by hand,* and after the mash is once well wetted, take especial care to keep the whole in gentle motion, and the

stirrers under, so as not to expose the mash to the action of the atmosphere. This is far preferable to stirring with the mashing machine, as in the latter case part of the mash is almost unavoidably exposed.

In private families it is best to put the liquor for the first mash into the mash-tun a little too hot, and as soon as it has cooled down to 172 F., begin introducing the malt. When you have well wetted the whole, cover up. After it has stood thus for three quarters of an hour, introduce more hot liquor at the heat of 185 F., then stir for twenty minutes, cover up, and keep your beer-house shut to exclude the cold air. By thus keeping the heat in the mash-

tun to 150 or a little higher, the *diastase* or saccharizing principle will perform its office. Where you wish to obtain the far greater part of the extract of the malt in the first mash, let it remain three hours before you let run. After you have run the first wort off, sparge or sprinkle with a watering pot (if you have no other means) at 180 F. to make up the the quantity required. In case the first two worts are intended to be mixed together, after the first wort is run off, introduce nearly the whole of the liquor and then cover up, but do not stir it. (You may reserve a small quantity of this liquor covered up to sprinkle over the goods after the second mash is run off.) If

you look at the mash after a short time, you will perceive the whole in a gentle fermentation and little air bubbles rising to the surface, you may then be sure that the change is rapidly progressing, and the whole of the malt is held in suspension in the liquor. Look at it after it has stood thus for about two hours, and if the whole of the malt is still held in suspension, let it remain from half an hour to an hour longer. When it is not intended to make small beer, sparge with about from 9 to 18 gallons to each quarter of the liquor which you have reserved; or, if none has been reserved, let the heat of the sparging liquor be from 130 to 150 F. Cold liquor would get the remaining good-

ness out of the malt, but it would be more of a starchy quality, fit only for small beer to be used immediately.

It is well known to practical brewers, that the malt made from barley the growth of 1844 was of a very steely nature. I was engaged by a Brewer during the summer of 1845, to brew for him—and not one single barrel of that brewing was returned. Now it is a fact that many other brewers had large quantities returned, and one celebrated brewer I was told had sometimes one hundred barrels per day sent back to him. the system I adopted was this:—For mild ale I used to introduce nearly two barrels of liquor to each quarter at 178, (there was

an iron false bottom) mash it until it was all wetted, then cover up for about three quarters of an hour. I then introduced one barrel of liquor to each quarter at 180 F., and mashed it well by hand (taking care to keep the oars under) for twenty minutes. This was the only mashing. After the first wort was drawn off (which generally brought away three-fourths of the extract of the malt) I introduced one barrel of liquor to each quarter at 175, and let it remain on the goods for two hours and a half. I then sparged about half a barrel to each quarter at 140 F., and this produced such a good sound saccharine wort, that the wort which was left in the underback the

next morning (the draining of the malt) had not the least acetous acid perceptible: it was as sound and as good in quality as the first drawn wort.

The acetous or vinegar acid is the effect of too high heats, as well as atmospheric influence. Few brewers are aware of the fact. As the saccharized portion of the malt is the first to dissolve in the liquor, they generally mash again at a much higher heat, and the third time at a higher heat still, thinking to rob their malt of all its goodness. This they effect, wholly regardless, however, of the quality of their extract, and actually producing the germs of that very acetous acid which they are so anxious to avoid.

It is well known that if barley-meal were introduced into liquor at the heat we introduce malt, it would set, and we could not obtain any wort from it. Now, as the saccharine portion of the malt is the first to dissolve, the starchy or barley portion is next to be acted upon. In this case the heat of the liquor used for the second mash should never exceed 185 F. Indeed 180 F. for the second mash, and 160 for the third are preferable to higher heats.

Some brewers are anxious to obtain the very dregs of the starchy portion of their malt, and make use of it for their first mash the second day.—They thus introduce into their ale the *most unstable qualities*

possible, qualities that make it turn grey, ropy, sour, nauseous, that in fact totally spoil it. No such return wort should ever be used unless it is of perfect saccharine quality: but for keeping ale it should never be used at all.

A writer on brewing says that the *diastase* or saccharine principle will not act unless the heat of the mash in the mash-tun exceed 160 F. But I am informed by a gentleman engaged in a large distillery that it will act well at 130 F. The best heat undoubtly is 150 F., although it will do at 145 F.

Brilliancy when running from the mash-tun tap is a necessary quality—for unless it is bright here, there must be starch held

in solution in the wort. This will not only endanger its brilliancy in the glass, but also its flavour and durability afterwards. It is impossible to fail in this point if my instructions be properly followed.

OF BOILING.

When you intend to increase the strength of the extract by reducing the quantity, (by boiling) it is best to boil the wort with only a few hops, or without any at all, for one hour, or more. Then in order to obtain and retain the fine aromatic flavour of the hops, let them be mashed

with enough wort to cover them, taken from the underback when you first let run. Cover them up, and when the wort in the copper is nearly reduced enough, introduce them into the copper. Let them boil *very slowly* for three quarters of an hour, then boil them well for one hour in the second wort to obtain the bitter. If you want to obtain more of the extract of the hops in the first wort, let them remain with the wort, either in the copper or in the hop-back for another hour. Remember that by fast boiling the finest flavour of the hops is dissipated.

In brewing common ale it is best to draw your extract of such a quality that it will not require

reduction by boiling. Introduce your hops into the copper when the wort is first pumped in out of the underback, *boil it slowly* for three quarters of an hour, and let it stand half an hour longer to infuse.

In private families when very strong ale is to be made, the hops should be mashed with a small quantity of liquor at 160 F., when the malt is mashed. They will thus give out more of their bitter without any waste of your wort by long or fast boiling, and you get the finest flavour of both hops and malt.

OF FERMENTING.

Some persons are fond of a high flavour, and in such case they should pitch the heat at setting to ferment, as high as 74 F., taking into consideration, however, the quantity of wort, situation, heat of air in the tun-room, and the quantity of yeast employed. Half the quantity of yeast required at 60 F. will effect the change at 74. The heat of the tun-room should if possible be from 54 to 60; for when once the fermentation has commenced it ought not to be checked or stopped until the desired attenuation is accomplished. *Immediately* this is effected, the ale must be cleansed, by turning it into

barrels to facilitate the discharge of the yeast. To assist in thoroughly cleansing it, add from two ounces to a quarter of a pound of bean or wheat flour to each barrel.

Suppose you wish to tun twenty barrels, take four pounds of flour, put it into a pail with some of the tun or fermenting ale, and beat it all up well together with a rod or wisp, then divide it proportionally to each barrel just before tunning, and tun on it. If it be desirable to assist the discharge of the yeast when the ale has just done fermenting, it is better to make the same quantity of flour into dumplings with some of the fermenting ale and drop them into it just after cleansing.

They will dissolve and throw the yeast up well to the last.

Many brewers like to *add a flavour to their ale*—but, as I was once told by a brewer who used to send for years seven hundred barrels of ale a week to London, and as I have found in my own practice, there is nothing like the malt and hops themselves. The difference of flavour can be produced wholly by fermentation. A part of one brewing fermented at a high heat will have a very different flavour from another part fermented at a low heat.

It is a good plan to add to the yeast as much wort at 80 F. as you intend to use yeast. Work it up well and let it remain one hour or two in this state before

you introduce it into your wort.

When you intend the fine flavour of the malt and hops to predominate, the pitching heat must not exceed 60 F. (except in small quantities, and then it should be 64 F.,) the fermentation must be continued longer and the heat in the tun must not exceed 70 F. In case it should come on too fast, do not next time use so much yeast; or you may skim it or separate it, or put in small casks containing cold liquor. It is best not to use all the yeast at first setting it to ferment: for you can then accelerate it by adding more, or retard it by witholding. When it is necessary to add more yeast, it ought to be put in a vessel with

some warm wort and a little flour added, and put in a warm place until it rises well. It should then be poured into the tun, but it must not be roused or stirred as this has a tendency to spoil the fine flavour.

OF CLEANSING OR TUNNING.

As soon as the ale is tunned (after a high fermentation) keep it well filled up every two hours for the first twenty-four hours, and every four or six hours until the fermentation has apparently ceased. You must take especial care however that the beer used

for filling up is clear, and to effect this, it ought, if used from the stillion, to be shifted and poured off once or twice. Some brewers use for this purpose two stillions; others have two small coolers placed one above the other, and the yeasty beer is allowed to make its deposit. This it will soon do if expanded. In winter it should be kept up to 54 F.

After a *low fermentation* the ale should be filled up every four hours for the first twenty-four hours, and then every six hours, until it has apparently ceased. At the finish it should be filled up with clear ale previously brewed. This is called topping up.

The ale which I brewed in the year 1845, was on the high fer-

mentation principle. After the fermentation ceased in the barrels it was racked once, which separated it entirely from the lees or remnants of yeast. This is an excellent plan when the ale is required for immediate use. Many brewers object to it on the ground of loss and expense: but if care be taken in racking it there can be no loss at all; and with regard to expense, one man can rack forty barrels in a day, which would not cost more than one penny per barrel.

The mode of racking is as follows:—get two or three clean barrels, and after you have racked one rinse it out with a pailful of table beer, and the second with the same. As soon as they are

rinsed out use them to rack into again. The racking instrument is a copper tube, with about three feet of leather pipe or hose sewed on. With two of these a man could rack the quantity mentioned above into the same barrels, except the first two.

OF STOCK ALE.

For this kind of ale when rich, i. e. of from 36 to 40lbs. density per barrel, the slow fermentation is preferable. If intended to be kept twelve months it should be attenuated down from 20 to 16lbs. density at the time of cleansing, and kept well filled up as before

directed. Rack it once and as soon as it is stored away put to each barrel half a pound of the best hops you can procure, after having first scalded them with beer or first wort at 160 F. Then bung up tight, leaving the vent peg lightly in and cover the head of the cask with clean sand.

OF THE LEES FROM THE ALE.

They should be poured into a clean flannel bag (which will discharge them perfectly clean) and mixed with the next ale at tunning, or put into the waste butt.

OF CHECKING OR STOPPING FERMENTATION.

To effect this object, many contrivances have been resorted to, such as separating the quantity, lowering the heat by applying cold liquor, the attemperator, skimming, &c.

The best method, however, is the following. When the tun is attenuated to the weight desired, and the fermentation is so strong that the ale is in danger of being reduced too much, add to each barrel, two ounces of calcined *roach alum*.* The ale will not reduce more than about two pounds per barrel after this application. When the ale has been tunned, if, on applying the saccharome-

* After this application tun as soon as you conveniently can.

ter, you find the ale reduced to the desired weight for sending out, apply to each barrel one ounce of calcined roach alum and bung up. This will not want finings generally, as the alum has a chemical effect on the yeast, makes the ale fine and sparkling, and helps to prevent the acetous acid.

HOW TO CALCINE ALUM.

Put it into a tin or iron vessel, place it on the fire and let it boil up. Then pour it out on a clean wet stone, and with a rolling pin or any round instrument reduce it to powder. Put it into a small saucepan in small quan-

tities and when it has boiled pour it on a wet plate. It is then to be used as above directed.

OF ACCELERATING THE FERMENTATION.

To do this increase the heat of tun-room, or add half a pound of flour, one quart more yeast, and one ounce of ginger grated, to every four barrels. Or put in two or three small casks filled with boiling liquor. If you have an attemperator, use that and keep all external cold air away. In small quantities for private families, put one-fourth of the fermenting ale into the copper

and raise the heat to 120, then put it back and cover up, and add a little more yeast if necessary.

OF THE DEGREES OF ATTENUATION,

ACCORDING TO THE STRENGTH OF ALE AND THE TIME IT IS INTENDED TO BE KEPT BEFORE USING.

Ale intended for *immediate use*, of the strength of 38lbs. density * (by the saccharometer) should be attenuated to 14lbs. at the time of cleansing.

	of 28lbs.	density to 13lbs.	at	cleansing.
	of 18lbs.	do. to 12lbs.		do.
Table beer	of 14lbs.	do. to 9lbs.		do.

* lbs. of density means lbs. per barrel heavier than water.

When ale is to be kept nine or twelve months—for a wort of

40lbs. den.	attenuate	to 18lbs.	at cleansing
30lbs. do.	do.	to 15lbs.	do.
20lbs. do.	do.	to 12lbs.	do.
Table beer 16lbs. do.	do.	to 11lbs.	do.

For the information of private families it may be well to add, that one bushel of malt of an average quality will produce nine pounds density:—and in ordinary mashes you generally obtain a little more than half the extract of the malt in the first wort. If you have no instrument, and the ale is intended for keeping, your palate must be your guide, bearing mind, that the richer the wort, the greater change propor-

tionally ought to take place before cleansing. In rich wort the following may serve as a rule. Suppose it to be in sweetness equal to a cup of tea with two tea-spoonsfull of moist sugar dissolved in it. As the fermentation proceeds the sweetness will change into spirituosity, and when it is of the sweetness of a cup of tea with only *one* tea-spoonfull of sugar in it, then cleanse it. In weaker worts a *little less degree of change*, and in table beer for keeping, let it make a good cauliflower head and cleanse the day after brewing.

OF YEAST.

It is impossible to state the

quantity necessary to effect the desired change. Ale brewed from hard water will require more than that brewed from soft; and *the better the wort in quality* the more yeast it will take. In a wort of 36lbs. or 40lbs. density, there being nearly twice as much saccharine matter to change, you must use more yeast in proportion to its strength. Some advise 1lb. of good yeast to every 10lbs. of density. This is a good rule to begin with, and after once or twice brewing you will find no difficulty in ascertaining the exact quantity required.

In small quantities, in mild weather one quart of yeast to one barrel; yeast of a middling consistency for table beer three half pints.

OF UTENSILS & BARRELS.

For full instructions on this head, see the "Farmer's Real Friend," page 26.

OF THE THERMOMETER.

This is a very necessary instrument in the brewery, as it indicates the temperature of the air, of the liquor, and of the wort, and also of the fermentation as far as regards the heat.

Good ale has doubtless been brewed without this instrument, yet it is better to have it, as our sense of feeling varies so much according to the temperature of the body.

In using the thermometer you have merely to immerse it in the fluid and move it slowly about for a short time. Some persons hang it in the copper or tun and then they have merely to look at it, and lay it down in the wort in the cooler with a piece of string attached. When it is taken up you look where the bead stands in the glass tube, and that point is the temperature of the air or fluid from which it is just taken.

The thermometer consists of a glass tube, with a small globe charged with quicksilver at the bottom, affixed to a plate of brass or wood and divided into 212 degrees. This 212 degrees is the boiling point—but it begins at Zero or O which is 32 degrees be-

low the freezing point, Fahrenheit's thermometer.* Brewers' thermometers generally have a strong tin case to shield them. The price varies; a common one costs about 5*s*.—the brass plated ones as much as 18*s*.; and those long ones made expressly for the copper or tun as high as £2.

OF THE BRASS SACCHAROMETER.
(Dring and Fage's.)

This consists of a hollow oval ball with a square brass stem, marked on one side O. W. and figured from 1 to 20. On another side is marked 1 and it is figured from 20 to 40. On another side

* Zero and O begin at the Freezing point in Reaumur's thermometer.

is marked 2 and it is figured from 40 to 60. There is likewise a scale for regulating the degrees of strength according to the heat: for instance, a wort of 10lbs. density (that is heavier than water) at a temperature of 150 degrees, will be about 8lbs. heavier when at 60 degrees. This is the temperature at which the instrument is adjusted.

Below the ball is a smaller ball attached, which is hollow, and into which shots are introduced to adjust the weight of the instrument.

In using this saccharometer, fill your essay jar with wort. The jar has two compartments: put the saccharometer into the the larger and the thermometer

into the smaller. Notice the line on the stem the wort cuts, and the temperature. Set the temperature on the ivory slide to the weight on the scale. Then against 60 on the slide will be found the exact weight of the wort on the scale.

When the wort is strong enough to carry the saccharometer high so as not to cut the figures on the stem, put the weight marked No. 1 on the top of the saccharometer, and to the side of the stem marked 1, where the wort cuts will be the weight according to the temperature. In case the wort is strong enough to carry the instrument above the figures with this weight, take it off and put on the weight marked No. 2, proceeding as before.

OF THE GLASS SACCHAROMETER.

For ascertaining the specific gravity of worts, &c.

This instrument consists of a glass globe surmounted by a stem containing a scale shewing the gravity of the wort or liquor per barrel, in pounds and quarters, from O (the weight of water) to 50lbs. It is used without weights.

Example 1*st.*

Fill your essay jar with wort or liquor intended to be tried. Immerse the saccharometer and take notice what division of the stem comes level with the surface of the liquor. Suppose it to mark

9½ on the stem, put this down on a piece of paper; then take out the saccharometer and immerse the thermometer, which must be stirred in the liquor for about half a minute. Observe at what degree the quicksilver stands, say 90 temperature; then look in the first column from O (water) to 10lbs. in a line, and under 90 temperature you will find 1¾ which must be added to the above 9½. This gives 11¼lbs. the true gravity of the liquor per barrel.

Example 2nd.

Immerse the saccharometer. Suppose the sunk division 18 comes level with the surface of the wort, take out the saccharo-

meter and immerse the thermometer. Suppose the quicksilver settle at 120; look at the column from 10 to 20 in a line, and under 120 temperature you will find 4¼. Add this to the 18 which gives 22¼lbs. the true gravity per barrel. You must proceed in the same manner with the other columns.

The following table shews the quantity in pounds and quarters, to be added for the difference of temperature at which the wort may stand above 50 degrees F.

TABLE.

Temperature	50	60	70	80	90	100	110	120	130	140	150
Water to 10 lbs.	0	¼	⅜	1¼	1⅜	2½	3¼	4	5	6	7¼
10 to 20	0	¼	⅜	1¼	1⅜	2½	3½	4	5¼	6¼	7½
20 to 30	0	¼	⅜	1¼	2	2⅜	3½	4½	5½	6½	7⅜
30 to 40	0	½	1	1½	2	2⅜	3⅜	4⅜	5⅜	7	8
40 to 50	0	½	1	1½	2¼	3	4¼	5¼	6¼	7¼	8½

Many have supposed the saccharometer not to be a true index to the quantity of saccharine fermentable matter contained in any given wort, but only to its relative density compared to others from the like materials. It is true that a thick cloggy wort appears heavier to the eye than one which is brilliant. It is not meant that the

hydrometer will inform the brewer whether his process is just, to the obtaining transparency, proper flavour, and the preservative principles, which, abstracted from more immediate views of profit, are the properties most to be wished for in beer." *Baverstock, page* 9. His opponent, *Candidus*, writes as follows:—"In two gyles, the one brewed from malt only, and the other having in it a solution of sugar, the malt in both instances being from the same flooring, the fermentation similar, and the final gravity equal by the same instrument, the latter product was infinitely superior to the other as an agreeable vinous beverage, possessed a gratefulness on the palate and

was a liquor to which the best judges would give the preference."—*page* 156. "As a measure of sweets," says *Ham, of Guernsey*, "so far he is right. For though it cannot possibly express the sweets contained in any extracts, it exactly ascertains their *relative* value or amount of fermentable matter, containing saccharine, mucilage, and perhaps a little oil."

There can be no doubt about the correctness of the above remarks. By having the heats in the mash tun too high or too low, and not managing other matters properly, there comes forth a mucilaginous wort. This is particularly the case in weak worts: indeed it frequently happens in

strong ones: and although they may weigh as much by the instrument as those of better quality, yet they have no foundation for brilliancy and durability.

Let any one taste a weak wort made from all malt; I mean the first, second, and third mashes put together. Then let him taste a third wort of the same strength, after ale has been brewed, and his palate will inform him which is the best quality, although by the instrument they be both alike.

The price of *Dring & Fage's* saccharometer case, including a thermometer, saccharometer, and weights is £5 5*s*. The price of a glass saccharometer (which can be bought of most watch-makers) is about 6*s*.

EXAMPLE 1.

Journal of a day's brewing with One Qnarter of Malt, to brew 108 gallons of mild Ale, for *inmediate use.*

Date.	Malt	Hops	No. Mash.	Gall. liquor	Heat liquor	Time stirring	Time stand.	Time boiling	Heat to ferment	Quant. Yeast	Atten-uate	Fill up
				70	170	until all is wetted	¾ hour	about ¾ hour	from 70 to 74 F.	from 2 to 3 quarts, according to consistency	to nearly half its weight	every 2 hours for the first 12 hours: then every 6 hours until the fermentation ceases
	bush.	lbs.	1	then add								
May	8	6		36	185	20 min.	2¾ hrs.	infuse ½ hour				
			2 spurge or sprinkle	54	180	none * *see below*	2½ hrs.	1				
				18	180	to go with the second wort						

* Although I advise no stirring in the *second* mash, yet, if it does not mash itself well (as it generally will) after the liquor has been on it one hour, stir it for a quarter of an hour, and let it stand the remainder of the time.

EXAMPLE II.

Journal of a day's brewing with One Quarter malt for keeping Ale, and Table Beer.

Date	Malt	Hops	No. of Mash.	Gall. liquor	Heat liquor	Time stirring	Time stand.	Time boiling	Heat to ferment	Yeast	Attenuate	Fill up
Oct.	bush. 8	lbs. 8	1	72 add 20 sparge 9	174 190 180	until wetted 20 min.	1 hour 2½ hrs.	¾ hour and remain in the copper 1 hour	from 64 to 70 according to circumstances	3 pints	to half its weight	every six hours
			2	54 sparge 18	180 140	as in Exa. I.	2½ hrs.	1¼ hour		1 quart		

In small quantities, as in this case, it should be a moderately warm room to ferment in. When it is nearly attenuated enough, skim it again and again every six hours, keeping it closely covered up. When you tun it, take care not to disturb the deposit at the bottom of the vessel, and fill your store cask quite full. If it be an upright cask, put the spurge or top cork in; let the yeast come up on the top of the cask, and be taken off, with care, frequently, and the cask kept quite full until it ceases fermenting.

EXAMPLE III.

Journal of a day's brewing with Five Quarters of malt, to make 16 barrels of mild Ale for immediate use.

Date	Malt	Hops	No. of mashes	Barr. liquor	Heat liquer	Time stirring	Time stand.	Time boiling	Heat of pitching	Quant. Yeast	Attenuate	Fill up
May 8	qrs. 5	lbs. 32	1	10 add 7	170 185	until all is wetted. 20 min.	1 hr. $2\frac{3}{4}$ h.	$\frac{3}{4}$ hour stand $\frac{3}{4}$ hour to infuse	70	at first 2 gall. if hard liquor, $2\frac{1}{2}$ gall.	down to 14 lbs. at cleansing	every 2 hours for the first 24 hours, then every 6 hours
			2	7	180	see Exa. I.	$2\frac{1}{2}$ hrs.	1				
				sparge								
				$2\frac{1}{2}$	140	to be boiled with second wort						

EXAMPLE IV.

Journal of a day's Brewing with 5 quarters of the best pale Malt, to make 12 barrels of strong Ale, for use at 9 months old.

Date	Malt	Hops	No. of mashes	Quant. liquor	Time stirring	Time standi.	Time boiling	Heat pitching	Yeast	Atten-uated	Heat liquor	Fill up
					until		¾ hour					
	qrs.	lbs.	1	10	wetted	¾ hr.	then	F.	3 gall.	down	174	every
Oct. 4				add			kept at					
	5	40		4	20 min.	2¾ h.	boiling	60		to	185	six
							heat					
							1 hour			18 lbs.		hours
			2	5	see		1 hour				180	
					Exa. I.		infuse					
							1 hour					
				2							140	

In private Families, when it is intended to make small Beer, to give to Labourers, three or four barrels of liquor may be used after this, either hot or cold, and boiled with the Hops, as the hops retain the goodness of the last wort they were boiled in to the extent of one barrel of wort to every sixty pounds of hops.

EXAMPLE V.

Journal of a day's brewing with 10 Quarters of Malt, to make 34 barrels of mild Ale, to use in 3 months.

Date	Malt	Hops	No. mashes	Quant. liquor	Heat liquor	Time stirring	Time standi.	Time boiling	Heat to pitch	Yeast	Atten-uate	Fill up
						until		1 hour				
	qrs.	lbs.	1	22 bar.	170	well	1 hr.	slowly	from	from	to	every
Oct.				add		wetted	}	stand				
	10	65		12	185	30 min.	2½ h.	½ hour	60	4	16 lbs.	4
									to	to		hours
			2	16	180	see	2½ hrs.	1½hour				
						Exa. I.			64	5		
								stand ⅔				
										gallons		
								hour				
				sparge								
				5	140							

Although it is recommended to infuse the Hops after boiling when it is more convenient, it may be done by infusing them as directed previous to the boiling, taking care to raise the heat to nearly boiling, then check the fire.

EXAMPLE VI.

Journal of a day's brewing with Ten Quarters malt, to make 20 barrels of strong Ale, and Eight barrels table Beer.

Date	Malt	Hops	No. mashes	Quant. liquor	Heat liquor	Time stirring	Time standi.	Time boiling	Heat to pitch	Yeast	Atten-uate	Fill up
Nov.	qrs. 10	lbs. 80	1	18 bar. add 6	172 190	until wetted 30 min.	1 hr. } 2½ h. }	1 hour infuse to 1 hour	60 to 64	6 to 7 gall.	to 20 lbs.	every 6 hours
			2	10 sparge 4	180 140	see Exa. I.	2½ hrs.	1½hour				
			3	10	160	15min.	1 hour	1 hour	68	1 to 1½ gall.	to 9 lbs.	every 6 hours

EXAMPLE VII.

Journal of a day's brewing with Twenty Quarters of malt, to brew 68 barrels of Ale, for immediate use.

Date	Malt	Hops	No. mashes	Quant. liquor	Heat liquor	Time stirring	Time standi.	Time boiling	Heat pitching	Yeast	Atten-uate	Fill up
						until						every
	qrs.	lbs.		40	170	wetted	1 hr.	1 hour			to	2 hours
Nov.			1	add			}	infuse	70 F.	90 lbs.		for the
	20	120		24	185	30 min.	2½ h.	½ hour			lbs.	first 24
									it			hours,
									ought		14	then
									to rise			every 6
									to 80 F			hours
			2	36	180	read		1 hour	in from			
				sparge			2½ hrs.	stand	36 to 48			
				10	140	No. 1		½ hour	hours			

This Ale, if once racked, may be sent out for use at a week old. If the quantity of Yeast mentioned do not produce the change fast enough, after the first 24 hours, add more according to the former rules. It is a good plan to keep a Journal, and then you always have a reference at hand.

EXAMPLE VIII.

Journal of a day's brewing with Twenty Quarters of best malt, to brew 50 barrels of sixpenny mild Ale, to use at one month.

Date	Malt	Hops	No. mashes	Quant. liquor	Heat liquor	Time stirring	Time standi.	Time boiling	Heat pitching	Yeast	Atten-uate	Fill up
	qrs.	lbs.	1	35 bar. add	172	till wetted	1 hr.	1 hour infuse		75 lbs.		every 4 hours the
	20	120		20	185	30 min.	2½ h.	½ hour	70	if thin, 10 lbs.	14	first 24 hours, then every
			2	23 bar. sparge 7	180 150	see Exa. I.	2½ hrs.	1 hour infuse 1 hour		more		6 hours

TO THE READER.

I have now fully instructed you on the subject of Brewing, but as the temperature of the air in this variable climate may influence the process, and the quality of your malt as well as that of your water will not at all times be the same, to guard as much as possible against such contingencies I have always found a Book of Reference of great service:—for by careful attention to the circumstances, you may, in case the ale should turn

out of a better quality than usual, have a correct rule as it were to work by, and produce good ale at all seasons, and with the help of this Journal you may also guard against failure when any defect may arise.

Let me, therefore, recommend you to keep a CORRECT JOURNAL, *and to purchase of the Publishers of this work my*

BREWER'S JOURNAL,

sewed, in stiff covers, price 1s.