

Richard Arnold (1503)

To make 60 barrels of single beer, use 10 quarters of malt, 2 quarters of wheat, and 2 quarters of oats, with 40 pounds of hops.

Richard Arnold, *Customs of London*, 1503

Mrs Harrison's Ale (1577)

...Our drink, whose force and continuance is partly touched already, is made of barley, water, and hops, sodden and mingled together, by the industry of our brewers in a certain exact proportion. But, before our barley do come into their hands, it sustaineth great alteration, and is converted into malt, the making whereof I will here set down in such order as my skill therein may extend unto (for I am scarce a good maltster), chiefly for that foreign writers have attempted to describe the same, and the making of our beer, wherein they have shot so far wide, as the quantity of ground was between themselves and their mark. In the meantime bear with me, gentle reader (I beseech thee), that lead thee from the description of the plentiful diet of our country unto the fond report of a servile trade, or rather from a table delicately furnished into a musty malthouse; but such is now thy hap, wherefore I pray thee be contented.

Our malt is made all the year long in some great towns; but in gentlemen's and yeomen's houses, who commonly make sufficient for their own expenses only, the winter half is thought most meet for that commodity: howbeit the malt that is made when the willow doth bud is commonly worst of all. Nevertheless each one endeavoureth to make it of the best barley, which is steeped in a cistern, in greater or less quantity, by the space of three days and three nights, until it be thoroughly soaked. This being done, the water is drained from it by little and little, till it be quite gone. Afterward they take it out, and, laying it upon the clean floor on a round heap, it resteth so until it be ready to shoot at the root end, which maltsters call combing. When it beginneth therefore to shoot in this manner, they say it is come, and then forthwith they spread it abroad, first thick, and afterwards thinner and thinner upon the said floor (as it combeth), and there it lieth (with turning every day four or five times) by the space of one and twenty days at the least, the workmen not suffering it in any wise to take any heat, whereby the bud end should spire, that bringeth forth the blade, and by which oversight or hurt of the stuff itself the malt would be spoiled and turn small commodity to the brewer. When it hath gone, or been turned, so long upon the floor, they carry it to a kiln covered with hair cloth, where they give it gentle heats (after they have spread it there

very thin abroad) till it be dry, and in the meanwhile they turn it often, that it may be uniformly dried. For the more it be dried (yet must it be done with soft fire) the sweeter and better the malt is, and the longer it will continue, whereas, if it be not dried down (as they call it), but slackly handled, it will breed a kind of worm called a weevil, which groweth in the flour of the corn, and in process of time will so eat out itself that nothing shall remain of the grain but even the very rind or husk.

The best malt is tried by the hardness and colour; for, if it look fresh with a yellow hue, and thereto will write like a piece of chalk, after you have bitten a kernel in sunder in the midst, then you may assure yourself that it is dried down. In some places it is dried at leisure with wood alone or straw alone, in others with wood and straw together; but, of all, the straw dried is the most excellent. For the wood-dried malt when it is brewed, beside that the drink is higher of colour, it doth hurt and annoy the head of him that is not used thereto, because of the smoke. Such also as use both indifferently do bark, cleave, and dry their wood in an oven, thereby to remove all moisture that should procure the fume; and this malt is in the second place, and, with the same likewise, that which is made with dried furze, broom, etc.: whereas, if they also be occupied green, they are in manner so prejudicial to the corn as is the moist wood. And thus much of our malts, in brewing whereof some grind the same somewhat grossly, and, in seething well the liquor that shall be put into it, they add to every nine quarters of malt one of headcorn (which consisteth of sundry grain, as wheat and oats ground). But what have I to do with this matter, or rather so great a quantity, wherewith I am not acquainted? Nevertheless, sith I have taken occasion to speak of brewing, I will exemplify in such a proportion as I am best skilled in, because it is the usual rate for mine own family, and once in a month practised by my wife and her maid-servants, who proceed withal after this manner, as she hath oft informed me.

Having therefore ground eight bushels of good malt upon our quern, where the toll is saved, she addeth unto it half a bushel of wheat meal, and so much of oats small ground, and so tempereth or mixeth them with the malt that you cannot easily discern the one from the other; otherwise these latter would clunter, fall into lumps, and thereby become unprofitable. The first liquor (which is full eighty gallons, according to the proportion of our furnace) she maketh boiling hot, and then poureth it softly into the malt, where it resteth (but without stirring) until her second liquor be almost ready to boil. This done, she letteth her mash run till the malt be left without liquor, or at the leastwise the greatest part of the moisture, which she perceiveth by the stay and soft issue thereof;

and by this time her second liquor in the furnace is ready to seethe, which is put also to the malt, as the first woorť also again into the furnace, whereunto she addeth two pounds of the best English hops, and so letteth them seethe together by the space of two hours in summer or an hour and a half in winter, whereby it getteth an excellent colour, and continuance without impeachment or any superfluous tartness. But, before she putteth her first woorť into the furnace, or mingleth it with the hops, she taketh out a vessel full, of eight or nine gallons, which she shutteth up close, and suffereth no air to come into it till it become yellow, and this she reserveth by itself unto further use, as shall appear hereafter, calling it brackwoort or charwoort, and, as she saith, it addeth also to the colour of the drink, whereby it yieldeth not unto amber or fine gold in hue unto the eye. By this time also her second woorť is let run; and, the first being taken out of the furnace, and placed to cool, she returneth the middle woorť unto the furnace, where it is stricken over, or from whence it is taken again, when it beginneth to boil, and mashed the second time, whilst the third liquor is heat (for there are three liquors), and this last put into the furnace, when the second is mashed again. When she hath mashed also the last liquor (and set the second to cool by the first), she letteth it run, and then seetheth it again with a pound and a half of new hops, or peradventure two pounds, as she seeth cause by the goodness or baseness of the hops, and, when it hath sodden, in summer two hours, and in winter an hour and a half, she striketh it also, and reserveth it unto mixture with the rest when time doth serve therefore. Finally, when she setteth her drink together, she addeth to her brackwoort or charwoort half an ounce of arras, and half a quarter of an ounce of bayberries, finely powdered, and then, putting the same into her woorť, with a handful of wheat flour, she proceedeth in such usual order as common brewing requireth. Some, instead of arras and bays, add so much long pepper only, but, in her opinion and my liking, it is not so good as the first, and hereof we make three hogsheads of good beer, such (I mean) as is meet for poor men as I am to live withal, whose small maintenance (for what great thing is forty pounds a year, computatis computandis, able to perform?) may endure no deepeer cut, the charges whereof groweth in this manner. I value my malt at ten shillings, my wood at four shillings (which I buy), my hops at twenty pence, the spice at twopence, servants' wages two shillings sixpence, with meat and drink, and the wearing of my vessel at twenty pence, so that for my twenty shillings I have ten score gallons of beer or more, notwithstanding the loss in seething, which some, being loth to forego, do not observe the time, and therefore speed thereafter in their success, and worthily. The continuance of the drink is always determined after the quantity of the hops, so that being well hopt it lasteth longer. For it feedeth upon the

hop, and holdeth out so long as the force of the same continueth, which being extinguished, the drink must be spent, or else it dieth and becometh of no value.

In this trade also our brewers observe very diligently the nature of the water, which they daily occupy, and soil through which it passeth, for all waters are not of like goodness, sith the fattest standing water is always the best; for, although the waters that run by clalk or cledgy soils be good, and next unto the Thames water, which is the most excellent, yet the water that standeth in either of these is the best for us that dwell in the country, as whereon the sun lieth longest, and fattest fish is bred. But, of all other, the fenny and marsh is the worst, and the clearest spring water next unto it. In this business therefore the skilful workman doth redeem the iniquity of that element, by changing of his proportions, which trouble in ale (sometime our only, but now taken with many for old and sick men's drink) is never seen nor heard of. Howbeit, as the beer well sodden in the brewing, and stale, is clear and well coloured as muscadel or malvesey, or rather yellow as the gold noble, as our pot-knights call it, so our ale, which is not at all or very little sodden, and without hops, is more thick, fulsome, and of no such continuance, which are three notable things to be considered in that liquor. But what for that? Certes I know some ale-knights so much addicted thereunto that they will not cease from morrow until even to visit the same, cleansing house after house, till they defile themselves, and either fall quite under the board, or else, not daring to stir from their stools sit still pinking with their narrow eyes, as half sleeping, till the fume of their adversary be digested that he may go to it afresh. Such slights also have the alewives for the utterance of this drink that they will mix it with rosen and salt; but if you heat a knife red-hot, and quench it in the ale so near the bottom of the pot as you can put it, you shall see the rosen come forth hanging on the knife. As for the force of salt, it is well known by the effect, for the more the drinker tippeth, the more he may, and so doth he carry off a dry drunken noll to bed with him, except his luck be the better. But to my purpose.

Mrs Harrison's ale was a mix of malted barley, wheat and oats in a 16:1:1 ratio. As the Harrisons ground their own barley to save the payment to the miller, the amount of grain was much less than the other recipes use for the amount of water. The grain had to be mashed three times, with all three runs being used in the final ale. Hops were added to the first and third wort during the boil. This uses a top fermenting (ale) yeast. This recipe calls for small amounts of wheat flour and long pepper to be added at the end, (0.0125 of a handful and 300mg respectively) so we used the approach of cooks everywhere and did the quantities by dead reckoning. Specific gravity at the end was 1.0018.

We avoided changing recipes to suit modern tastes, but did use modern home brewing equipment, and used peletised hops and dry yeast. Peletised hops are simply hop flowers

compressed and packed in a nitrogen filled pouch, so keep at their peak condition. In the 17th c, the male flowers would also have been included. This would have lowered the yield slightly. The yeast was rehydrated in advance, so we were adding liquid yeasts to the fermenter as the originals did. The other change was adding Calcium Carbonate to the water for the mash. We did this because Sydney water is very soft and we needed to replicate the sort of water London brewers would use. There is a reference in *The London and Country Brewer* (1731) to people who "live on the black sandstone" tipping chalk into the wells from which they drew their brewing water. Harrison also recommended using the hardest water you could get to improve the yield of the hops.

The barley was a UK grown and roasted, pale roast two row barley, approximately similar to the seventeenth century grain but probably a different cultivar. The hops was East Kent Goldings, which goes back to at least 1700, and the yeasts were an English ale yeast. The ale yeasts are the wild grape yeast, *Saccharomyces cerevisiae* (which is identified as "ancient", possibly back to 3500-4000BC). Sterilising was done with a modern low residual mix (effectively lime water) which despite the modern packaging and colour (bright pink!) gets a mention in *London and Country Brewer*, other acceptable methods were Sulphur Dioxide fuming or scalding. Markham's in 1640 recommended bottling with "corks tied strongly" to improve ales and beers. The end result is about 3.8% alcohol.

William Harrison (1534-1593): *Description Of Elizabethan England*, 1577

Dead Ale from The Closet of Sir Kenelm Digby Knight Opened (1644)

ALE WITH HONEY

Sir Thomas Gower makes his pleasant and wholesom drink of Ale and Honey thus. Take fourty Gallons of small Ale, and five Gallons of Honey. When the Ale is ready to Tun, and is still warm, take out ten Gallons of it; which, whiles it is hot, mingle with it the five Gallons of Honey, stirring it exceeding well with a clean arm till they be perfectly incorporated. Then cover it, and let it cool and stand still. At the same time you begin to dissolve the honey in this parcel, you take the other of thirty Gallons also warm, and Tun it up with barm, and put it into a vessel capable to hold all the whole quantity of Ale and Honey, and let it work there; and because the vessel will be so far from being full, that the gross foulness of the Ale cannot work over, make holes in the sides of the Barrel even with the superficies of the Liquor in it, out of which the gross feculence may purge; and these holes must be fast shut, when you put in the rest of the Ale with the Honey: which you must do, when you see the strong working of the other is over; and that it works but gently, which may be after two or three or four days, according to the warmth of the season. You must warm your solution of honey, when you put it in, to be as

warm as Ale, when you Tun it; and then it will set the whole a working a fresh, and casting out more foulness; which it would do too violently, if you put it in at the first of the Tunning it. It is not amiss that some feculence lie thick upon the Ale, and work not all out; for that will keep in the spirits. After you have dissolved the honey in the Ale, you must boil it a little to skim it; but skim it not, till it have stood a while from the fire to cool; else you will skim away much of the Honey, which will still rise as long as it boileth. If you will not make so great a quantity at a time, do it in less in the same proportions. He makes it about Michaelmas for Lent.

We cheated slightly with this one, the malt was commercially extracted. Clover honey was sourced from Alex Schibner's dad, 500g were used with 500g light dried malt in 5l of water with an ale yeast and flavoured with cinnamon, nutmeg and cloves. The technique was much the same as for Mrs Harrison, we were able to save about 2h of boiling. About 4% alcohol.

Mr Webb's Ale - Digby (1644)

Five Bushels of Malt will make two Hogsheads. The first running makes one very good Hogshead, but not very strong; the second is very weak. To this proportion boil a quarter of a Pound of Hops in all the water that is to make the two Hogsheads; that is, two Ounces to each Hogshead. You put your water to the Malt in the Ordinary way. Boil it well, when you come to work it with yest, take very good Beer-yest, not Ale-yest.

Mr Webb's ale (really a low-hopped beer) used three times the malted barley of Mrs Harrison. As a result, only the wort from the first run through the grain was used. The amount of hops was only slightly lower than for Mrs Harrison, but still half of what a modern recipe would use. This uses a bottom fermenting (lager) yeast. There were no other additives, specific gravity at the end was also 1.0018. We used the "bruised grains of wheat" recommended by Digby for secondary fermentation where a beer yeast had been used. Approximately 3.2% alcohol.

The Closet Of Sir Kenelm Digby Knight Opened: Newly Edited, with Introduction, Notes, and Glossary, by Anne Macdonell, London: Philip Lee Warner, 38 Albemarle Street, W. 1910

Small Ale - After Parkham (1615)

Now for your second or small drink which are left upon the grains, you shall suffer it there to stay for an hour or a little better and drain it off also; which done, put it into the lead with the former and boil the other also, then clear it from the hops and cover it very close till your first beer be tunned, and then as before put is also to a barm and so tun it up in smaller vessels, and of this second beer you shall draw above one hogshead to three the better. Now there be divers other ways and observations for the brewing

of ordinary beer, but none so good, so easy, so ready, and quickly performed as this before showed: neither will any beer last longer or ripen sooner, for it may be drunk at a fortnight's age, and will last as long and lively.

This is our second small ale, made from the second run through our latest mash about a fortnight ago and bottled last weekend (the first run was used for another mead ale). Technique again as per Mrs Harrison, Kent Goldings hops and an ale yeast were again used. About 0.8% alcohol.

The English Housewife, by Gervase Markham, London, W. 1615