



Mash efficiency revisited

Ron Allinson



Introduction

My article on poor mash efficiency published in *Brewers Contact*, March 2007, elicited a fair number of responses so many thanks to John Alexander, Keith Andrews, Geoff Bagley, Steve Barton, Ray Carson, Gary Clay, Steve Djurovich, and Nick Mayes who replied either publicly or privately. And apologies to anyone whose name has been inadvertently omitted. To try and keep this follow-up to a reasonable size I am dealing only with some of the points raised, but everything I received was read very carefully and much appreciated.

Queries and Comments

Several correspondents asked why I used the figure of 290 in the formula for calculating mash efficiency. This is a simplification and I thought it was a reasonable average of the actual figure when several different malts are being used. You can see this by examining the table in Graham Wheeler's book. Also, I imagine few of us know the actual figures for the grains we use in any case, as it will vary from season to season, and probably maltings to maltings.

Is 290 a reasonable average as I have just claimed? Well, let's see, using a recipe for a Golden Ale:

	<i>Actual figure</i>
Maris Otter, 5 kg	297
LC Crystal Malt, 0.5 kg	268
Torried Wheat, 0.5 kg	284
Average	293.5

Calculation of ME using 290
 $(4500 \times 25) / (290 \times 6) = 65\%$

Ditto using 293
 $(4500 \times 25) / (293.5 \times 6) = 63.9\%$

Yes, it is less, but a one-degree mistake in reading the hydrometer might have caused a bigger difference. Then again, take a dry stout recipe of 25L

	<i>Actual figure</i>
Pearl Malt, 4 kg	297
Flaked Barley, 1 kg	253
Roast Barley, 0.7 kg	270
Average	286

The calculation using 290 gives a ME of 60.5% and with the actual value of 286 ME = 61.4%

Thus, the realism of 290 varies according to the malts used (note, I originally used 295 in my calculations) and whichever figure you use, the ME is poor!

Incidentally, both beers were very drinkable. I am, however, going to revert to using the actual values as calculating a weighted average is both simple and quick.

The pH of the liquor was also queried by a number of members. I no longer measure this as each time I did I got a value of 6.0 or thereabouts. I thought that my Severn & Trent water had a pH of 7.4 but I have now found out from their

website that Newark water is actually 7.9. The question was raised about measuring the pH in the mash tun but I am not sure what this means. Is it, say, after 30 minutes, at the mid-point, at the end of the mash or what? My mashes are certainly on the acidic side as the copper manifold in the bottom of the mash tun is nice and bright at cleaning time.

At least one colleague commented on the long time I devote to sparging. The reason is very simple. My rotating arm sparger doesn't spin at a great rate (mainly, presumably, because of a lack of head of the hot liquor tank) so collecting around 32L, which is my norm for a 25L brew, takes about 50 minutes.

There were several comments about the accuracy of my readings. I have checked my hydrometer and it gives 1000 at 20 degrees in tap water. I doubt if I can read the hydrometer to within more than 1 or 2 degrees of what it should be but that mistake is consistent.

I haven't checked, mainly because I can't be bothered (and I can hear the sharp intakes of breath from more precise members), the accuracy of the markings on the fermenting bucket but one day I will get around to it. However, even if I find the measurements on my fermentation bucket are a litre or so out, then I don't think that will improve, or worsen, my figures by a large amount.

Suggestions

There were two particularly interesting suggestions, both concentrating on sparging technique. The first is from Steve Barton, and I quote part of his reply:

'I mash for 75 mins using approximately 16-17 litres of water with 4-4.5 kgs of

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malts, which is the maximum volume of my homemade mash tun. This is significantly more than Ron describes in his article. Temperature loss is usually 2°C and I run off 16–17 litres until the mash tun is dry, (I recycle the first 2–3 litres).

[Comment – this is a much sloppier mash than I use, normally 2.2:1 to 2.5:1. I usually lose 1.5 to 2 degrees over a 90-minute mash]

The mash tun is then half-filled with sparge water at 80°C and I do a static sparge for 15 mins. I got this idea from one of the local brewers. I then run off about 7–8 litres until I've collected approx. 25 litres in total. This whole process is repeated as I usually make 10-gallon batches (45 litres) having collected approx. 11 gallons (50 litres) as I know from experience I will lose this volume in evaporation.

[Comment – this is an interesting idea and I have used it once. My mash efficiency was 69%, still not good, but better by a few percentage points than my average figure. Whether it was due to the technique is not clear from one experiment. I must try it again]

Compared with Ron's process far more wort comes from the initial mash and much less from the sparge, and I think this is where the efficiency discrepancy lies.'

The second is from John Alexander and again I quote (very slightly edited):

'Overall I do not think that Ron is actually doing a great deal wrong and the cause of low extract probably lies with the grist/liquor ratios. The total weight in the recipe is 5.9 kg and to extract all the saccharine matter from the grist would demand 4 kg × 7.5 litres = 44 litres of liquor. (7.5 litres per kilogram roughly equates to 7 barrels per quarter of grist, the ratio used in the traditional brewhouse) Within the 44 litres we have a theoretical extract of 5.9 × 297 = 1752°. Ron has a gravity of 45 in 25 litres, which equals 1125°. Therefore his mashing efficiency is 1125 / 1752 = 64%.

If the boiler was large enough to hold 44

litres and we boiled for 3–3.5 hours down to 25 litres we should hit a gravity of about 1070. However, as the sparging is reduced to only collect 32 litres, roughly 627 degrees of extract remain in the grain and so the actual gravity is 1045.

[Comment – this is a great deal of wort to reduce and a very long boiling time that must affect both the colour and flavour. I don't fully follow the arithmetic either. Also the gravity of my final runnings at somewhere around the 32L stage is normally around 1010 which might suggest that most of the sugar has been extracted.]

The higher the original gravity, more malt is required than usual to compensate for the saccharine matter left in the goods due to the limitation of sparging to keep the volume of the wort collected to no more than can be evaporated within two hours. Old time brewers could carry out a second mash and produce a small beer.

What I suggest that Ron does to test this theory is to mash 4 kg of pale malt with 10 litres of liquor and sparge with 20 litres to collect almost 30 litres in the copper. Copper up for 75–90 minutes. After cooling and adjusting the volume to 25 litres, take a sample of the wort and check its gravity at 20°C. I think that he will find his percentage mashing efficiency rises dramatically! I would also suggest that a second mash be carried out. Re slurry the mash with 10 litres as before and let it stand for 30 minutes or so. Then sparge with 20 litres of liquor, copper down to 25 litres, cool and adjust as before and check the gravity. This will confirm the extract that was left in the goods.

[Comment – this is another interesting suggestion but I fear that I have not yet tried it. I really should try it out before too long.]

Most home brewers are probably achieving 250 LDK with their regular brews, which works out at 250 / 297 = 84%, or 250 / 305 = 82%. It is also important to know just what method of calculating the mashing efficiency we are using. A brewery mashing efficiency of 85% is based on the weight of the ingredients. However, when we calculate using the percentage contribution of

extract, the percentage recovery of extract ranges from 94–97%. When the CBA and SCB visited the Caledonian brewery, in Edinburgh, in 2005, I was standing beside David Edge when I asked Robert Burton what yield he got from the mash. He stated 286 LDK. 286 LDK against a laboratory extract of 297 LDK equates to 96%. Against more recent extract values of 304 to 307, 286 LDK works out at 94–93%.'

Conclusions

Despite all the feedback I received, I am still not clear why my mash efficiency is typically around 63 to 65%. Measurement errors can work both ways and could cancel each other out. I don't think possible measurement errors are a significant factor here nor are calculation mistakes. I am beginning to think that it may be sparging but the figures I get from successive gravity measurements during the sparging suggest that most of the sugar is being extracted – or do they? I measure the gravity of the first running, take a sample after 5L, measure, and so on. For example, from two recent brews:

27L Best Bitter, OG 1047 using 7.1 kgs grain:

1st running, 1084, after 5L 1084, 10L 1066, 15L 1045, 20L 1034, 31L 1013. Total wort collected 34L. Final gravity, after boiling down to 27L, 1047.

25L Golden Bitter, OG 1059, using 7 kgs grain:

1st running 1090, after 5L 1082, 10L 1075, 15L 1040, 20L 1022, after 25L had been collected figure for the entire 25L was 1058, gravity at the 30L point, 1013. Total wort collected 32L. Final gravity, after boiling down to 25L, 1059.

Note – the sparging method advocated by Steve Barton was used for this beer.

Perhaps the final word might be the message received from one of my responders to the effect that

'Ron Allison must have something [in that he has won awards] two years in a row, and in more than one category... What ever

he's doing, he just needs to keep on doing it ... Quite possibly his very inefficiency may be what's setting his beers apart.'

Well, even if my little successes have got something to do with a poor technique somewhere in the brewing process, it is still annoying not knowing why. Further comments will be welcome.

Why Not Take A Few Steps Backwards?

Ron Allison

We Kiwis are a determined and enterprising lot, or should that be stubborn and (as our cousins across the Tasman say) a sandwich short of a picnic. Read the following and make up your mind.

For some time I had had the idea of trying a full mash using the Burco boiler I purchased in the 1970s. I used this technique about a dozen times then and my notes indicate that I was very pleased with most of the beers and especially the Barley Wine. These days, the trusty Burco is used as a hot liquor tank, even though it is a little on the small side.

A useful tip if anyone is going to try mashing in this way, or indeed in any other way, is to check the capacity of the mash tun in relation to the quantity of beer being

brewed. I put the unopened bags of grain inside the Burco the night before and thought it might be a bit of a squeeze. I used my Hop and Grape boiler as the hot liquor tank.

The night before I brewed I remembered another trait of the Burco – the thermostat isn't the most brilliant. After a lot of trial and error I set it at 65 degrees. As this was the mash temperature I was aiming at. However, the thermostat doesn't cut in until about 62 to 63 degrees and doesn't cut out until around 68, so 65 is a rough working average.

In the morning I ran in some hot water and then started adding the grain to the removable perforated insert in the Burco. Alarm bells began ringing about half way through; it was looking quite full and there was still a fair amount of grain and water to go. Cautious addition and stirring took place and by the time all the grain had been added, the insert was absolutely full to the brim. The mash was stiffer than usual, I estimated about 2:1 instead of my normal 2.2 to 2.5:1.

Anyway, on went the lid and mashing commenced. Fairly frequent thermometer readings were taken and these confirmed the temperature variations mentioned previously. After 75 minutes, the usual starch iodine test was done and no change in the colour was perceived. After another 15 minutes the mash was sparged.

For various reasons my normal rotating arm was not used. Instead I used a watering can. With hindsight, I should have used a

different technique. I collected about 5 litres before doing any sparging. I then added water at around 80 degrees until the boiler was full to the top. I collected another 5L or so and repeated the process. The gravity of the first running was 1070, then the readings were: at 5L 1050, 10L 1020, 15L 1015. Alarm bells began ringing again after the 10L reading - much too low.

I stopped taking readings after 15L had been collected. In total 25L were collected and this was boiled for 90 minutes. The total amount of wort after the cold break was 17.5L. The gravity was 1043. I added 250 gm of soft dark sugar that had been simmered for 10 minutes and allowed to cool. After this, the amount of wort had risen to 18.5L and the gravity to 1045.

The mash efficiency calculated before the sugar was added is 42.5%. Even by my standards this is woeful. I put the atrocious result down to the sparging technique.

In case anyone is wondering what I was brewing, it was a variation on Dave Lines recipe for Guinness. I slightly altered his proportions and added some malted oats, which brought the total amount of grain to 6.1Kgs, and sugar. I used Windsor yeast and a generous amount of hops, produced an IBU of 59.

What is the beer like? After 9 days in a Boots barrel, has plenty of condition, a thick brownish head, and is smooth and pleasantly bitter. Definitely a dry and traditional stout and I like it. I have a few bottles so at some stage my opinion will be tested.

Chevalier Barley

Chris Ridout

Pictured is a plot of Chevalier barley growing at Thornbridge Hall, from a project to evaluate the qualities of malt produced by this variety. Chevalier was the premier malting barley, which dominated production from about 1820 to 1900, and was eventually succeeded by higher yielding varieties.

Undoubtedly, the variety produced quality malt, since beers made with Chevalier continued to win champion

prizes at the Brewer's Exhibition up until 1914. If you want to make a genuine Victorian beer, this would be your choice of malt. Chevalier was grown as a 'landrace', a genetically diverse seed mixture that was consistent in appearance, growth habit and grain quality. Genetic diversity could be important in organic production where fungicide use is limited, because it reduces the chance of diseases developing.

This is a joint investigation between Chris Ridout and Stefano Cossi at the Thornbridge brewery, and we will keep you updated as the project progresses.



A Bottle Cleaning Machine

Derek Spedding

In a recent survey of Brewers Contact readers, some respondents complained that there were too many articles from members who were obsessed with building gadgets to help them brew. Well I don't apologise for another one.

To me, a big part of the enjoyment of this hobby is to build 'summat for nowt' using discarded bits and pieces and all the bits used to build this one excluding the plywood came from a scrap photocopier.

The latest gadget to roll out of the *Northern Craft Brewers Toy & Novelty Workshop* is probably of little use to but the odd few brewers, but it shows what can be made with worn out parts yielded from the above source.

Some time ago, some very old screw

top bottles were obtained and sold at one of our meetings for I think, £1 each. These had been stored in an old cellar for the last 100 years or so but looked just the thing for the authentic bottling of old ales and after a few beers it must have seemed to me a good idea to buy a few. I found 30 of them in my rucksack the next morning.

In the sober light of day when I had good look at them I found only about 6 of them were of any use, the rest, after cleaning there remained an unhealthy looking scum on the inside of the bottle which could have been beer stone or residues of 100 year old horse liniment. Who knows what had been stored in them?

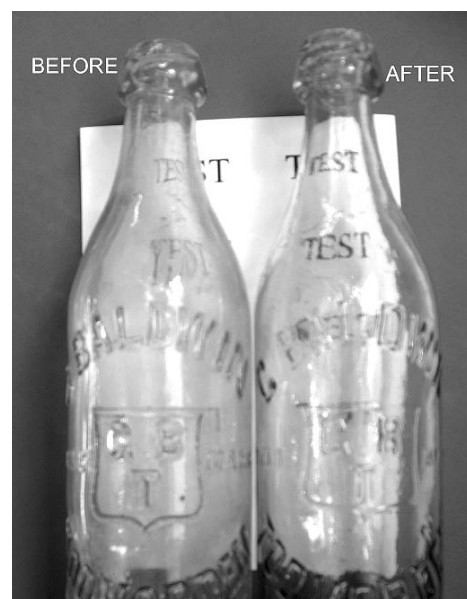
I tried chempro, brasso, dog shampoo, Tesco's finest sparkly cleaner stuff, bottle scrubbers on the end of an electric drill, builders brick cleaner (hydrochloric acid). I even tried a tip from the bottle collectors website that said to try soaking with the tongue burning mouthwash that you can usually find in the bathroom cabinet. None of which seemed to make any

improvement to the internal condition of the bottles.

Not really wanting to risk poisoning myself (I can do that quite easily by drinking some of my less successful brews) I gave up on them and dumped them in a corner of the garage and forgot about them for several years until one of our members showed me a website with a plan for a bottle cleaning machine on it. Perfect for building from parts from my scrap box.

The pictures are self explanatory, all the parts used are scrap or worn out and the only thing to note is that although the motor is rated at 24 volts it runs quite happily from a 12 volt car battery charger and rotates the bottle at about 20 RPM.

A small amount of copper nails and rivets etc are placed inside the bottle and the machine is left to run overnight or even a few days for the really stubborn dirty ones, and the results are amazing ... perfectly clean and polished internally ready to sterilize and fill.



The London Amateur Brewers

Ant Hayes has started up a new brewing club in North London and the next meeting will be held on Monday 7th

January and 4th February at 6pm to 9pm, upstairs at The Wenlock Arms, 26 Wenlock Road, London N1 7TA.

The pub is about ten minutes walk from Old Street underground station, off City Road (turn right up Windsor Terrace for about 200m or so).

It is an excellent pub, and usually has around 12 guest ales on. Everyone

welcome: kit brewers, partial mash, all-grain, and all levels of experience, London residents, commuters, novice brewers and any one interested in the subject of brewing.

Ant is a beer judge and craft brewer who originates from South Africa, so be prepared to learn about the beers of the world!

A yeast experiment

John Kerrane

This article is based on a talk at a meeting of Northern Craft Brewers in April 2007. I am no sort of expert; I am just passing on the results of a simple experiment I carried out into various readily available commercial yeast strains.

When I joined the NCB a few years ago, I was surprised by several of the practices which seemed standard among members, and one of these was that a lot of members use a fresh sample of bought commercial yeast for each brew. The yeast I use was originally recovered from a bottle of Guinness in 1983, and re-cultured for each brew ever since from the sediment in bottles of my strong bitter. However, after hearing about members' practice, and reading several articles on yeast in *Brewers' Contact*, I began to wonder whether my yeast was losing its vigour, so I decided to set up an experiment.

I acquired five different commercial yeasts from Hop & Grape of Darlington, and I set up a 20 litre batch of wort for a simple beer, using the following recipe:

3.2 kg Pale Malt
100 g Goldings hops
10 g Goldings hops (last 10 mins of boil)

This is a rather higher hop rate than I would normally use, but I knew I would be handling the beer a lot, and I wanted to minimise the risk of infection. This gave me a cooled wort with an original gravity of 1.039. I split the wort into six demijohns, pitched each with one of the commercial yeasts, and one with my own recovered yeast, and observed the progress of fermentation in each sample by taking regular readings of the specific gravity. However, whatever the fermentation characteristics of a yeast, it's no good if it doesn't taste right, so I organised a blind tasting with a group of my friends who meet regularly to check on the quality of my beer. I also did the same thing at the NCB meeting where this talk was given, to compare the opinions of my tasting group with those of the NCB members.

Process and observations

The five commercial yeasts I used were:

White Labs Liquid Burton Yeast WLP023
Safale US-56 (now US-05) dried yeast
Safale S-04 dried yeast
Danstar Windsor dried yeast
Danstar Nottingham dried yeast

Since I always use a yeast starter for my own recovered yeast, I set up yeast starters for all six yeasts 24 hours before pitching for an equal comparison. The two Danstar yeasts were re-hydrated according to instructions supplied, in 50ml cooled boiled water. The yeast starters consisted of 25 g of Munton's Light Spraymalt dissolved in 100 ml cooled boiled water (50 ml for the Danstar yeasts) and then each starter was pitched with one of the yeasts. My own yeast was recovered by pouring off the beer from a bottle of my own strong bitter (O.G. 1.054, and about 10 months old), checking that the beer was O.K. by tasting it, agitating the 10 mm of beer left in the bottle vigorously, and using that to pitch the yeast starter.

The starters containing the dried yeasts all frothed up within 15 minutes, the Safale US-56 very vigorously. The White Labs yeast was frothing within an hour. After 24 hours, the recovered yeast was starting to show some signs of life – just a few tiny bubbles on the surface.

The following day I set up the six demijohns as described above, each containing just over 3 litres of wort. I wanted to leave plenty of headroom in the demijohns to allow for any vigorous fermentation. I pitched them with the starters, labelled them, fitted fermentation locks and put them in an insulated cupboard heated by a shielded light bulb

controlled by a thermostat, which was set to give a temperature of 18 to 21°C, checked using two thermometers. All were visibly working within six hours except the one containing the recovered yeast, which was working after 24 hours. The specific gravities were checked after 6 hours, 24 hours, 2 days, 4 days, 7 days and 14 days, and are summarised in table 1.

Only the recovered yeast showed any sort of skimmable head. After 4 days, each sample was racked to a second clean demijohn, leaving behind the sediment, which had settled on the bottom of the original demijohn. At this stage, the samples containing the Safale S-04 and the Nottingham yeast looked clearer than the rest. The Safale sediments were the most firmly stuck to the bottom of the demijohns, requiring a bottlebrush to remove them. Only the Windsor yeast left no ring of yeast and trub on the inside of the demijohn, while the ring on the inside of the sample containing the recovered yeast was the most pronounced and the most difficult to remove.

After 14 days, the samples were bottled in clear glass bottles (to keep a check on the clarity – see table 2). Each bottle was primed with a 5ml teaspoon of a solution of 60 g Munton's Light Spraymalt made up to 200 ml with boiling water and well stirred. Each bottle was placed in a thick brown paper bag. At this stage, the Danstar yeasts and the recovered yeast were almost completely clear, the Safale yeasts and the White Labs yeast a little less so.

The bottles were kept a room temperature for 6 days, and then stored in my keeping cellar at about 10°C. After 6 weeks in store, the tasting took place, and I made a note of the condition and the firmness with which the slight yeast

Table 1. Progress of specific gravities with time after pitching

	6 hrs	24 hrs	2 days	4 days	7 days	14 days
White Labs Burton yeast	1.030	1.010	1.006	1.004	1.004	1.003
Safale US-56	1.028	1.009	1.008	1.005	1.004	1.004
Safale S-04	1.024	1.011	1.010	1.006	1.006	1.005
Nottingham	1.034	1.030	1.022	1.012	1.010	1.006
Windsor	1.013	1.012	1.012	1.010	1.009	1.007
Recovered yeast	1.039	1.030	1.021	1.008	1.003	1.003

All samples started with an original gravity of 1.039

sediment in each bottle stuck to the bottom.

I have carried out this experiment three times, with broadly similar results. The figures and observations above refer to my first trial. On the second occasion, I did not use yeast starters except for the recovered yeast, but pitched the yeasts directly according to the manufacturer's instructions. This made little difference except for the White Labs yeast, which was much slower to start – this time, the O.G. was 1.041, and the specific gravity of the sample containing the White Labs yeast was still at 1.041 after 6 hours. On the second and third occasions, I used a sample of recovered yeast from a younger bottle of strong bitter (4 months old), and on each occasion, the specific gravity, instead of staying the same, had dropped by 2 degrees after 6 hours. (1.041 down to 1.039; and 1.040 down to 1.038).

Tasting results

At the first and second sessions, over half the members (4 out of 7) of my tasting circle picked the recovered yeast as having the best flavour, with no other yeast getting more than one vote, although the White Labs yeast was several people's second choice. On the third occasion, the favourite was Danstar Windsor yeast (3 out of 6), and this was repeated at the NCB meeting (5 out of the 10 people who reported results) with the White Labs yeast again in second place. The Safale S-04 received no votes at any of the tastings, and the Safale US-56 received only one, at the NCB meeting.

Conclusions

First of all, I had half-expected nobody to be able to taste any difference between the beers produced using the different yeasts, but at all the tasting sessions, people were very definite that there was a difference in flavours between the various samples. I was pleased to see that the tasting results from my own tasting circle (on the third occasion) were very similar to those from the discerning palates of the NCB members. I was surprised that the beer produced using Safale S-04 was not more popular, as a lot of NCB members seem to use it.

After considering the results, I decided that my recovered yeast was at least as good as the rest, even if it is a little slow to get going, and I have stuck with it. I suspect that in recovered yeast, or any liquid yeast, there are very few active yeast cells, and so a yeast starter is important, and it is better to use yeast from a bottle of beer, which, while still mature, is as young as possible. It is not really surprising that the recovered yeast performed reasonably well, and gave the strongest attenuation, as it has probably adapted to my brewing procedures and conditions over the years.

If you have trouble with infections in your beer between boiling and pitching, and I understand from reading *Brewers' Contact* that this is a worry for some people, then Danstar Windsor yeast would seem to be a good choice, because of the rapid build-up of alcohol, which would tend to halt any infections before they got serious.

If you would like to establish your own yeast strain by recovering yeast from a

commercial beer, the Guinness option is no longer available – nowadays it is filtered and pasteurised – but there are plenty of other bottle-conditioned beers available. Find one you like, and then consult the *Good Bottled Beer Guide*, by Jeff Evans, published by CAMRA. This will tell you whether the yeast doing the bottle conditioning is the brewery's fermenting yeast, or whether the beer has been filtered, pasteurised and then pitched with special bottling yeast. I would expect such bottling yeast to be bottom fermenting, and to stick firmly to the bottom of the bottle, which is not really what you want as fermenting yeast. It would probably be best to pick a beer from a brewery which has been established for some time, as they are more likely to have evolved their own strain, and I believe some micro-breweries use a new sample of commercial yeast for each brew, in which case you would be going to some trouble to recover a yeast you could have bought more cheaply from a home-brew supplier.

The beer in this experiment was tasted after it had been in the bottle between five and eight weeks. It is highly hopped, and benefits from longer storage – it is better after at least three months.

This has been a very limited study. There are a great many commercial types of yeast available – White Labs alone have a vast range – and I could spend the rest of my life investigating different yeast strains, but there are other aspects of brewing I want to investigate, so, for the time being, this is as far as I'm taking it.

Table 2. Observations after bottling

	Clarity On bottling	Clarity After 18 days	Clarity After 28 days	Condition	Yeast Sticking
WLP023	Slightly cloudy	Clear	Very clear	✓✓	✓✓✓
Safale US-56	Slightly cloudy	Clear	Very clear	✓✓	✓✓
Safale S-04	Slightly cloudy	Very clear	Very clear	✓✓✓	✓✓
Nottingham	Almost clear	Clear	Very clear	✓✓✓	✓
Windsor	Almost clear	Very clear	Very clear	✓✓✓	✓
Recovered	Almost clear	Slightly cloudy	Clear	✓	✓✓

N.B. The Windsor yeast sample consistently gave the thickest and most long-lasting head.

Brewers and Distillers

Brewers and distillers recognised in the online edition of the Oxford Dictionary of National Biography

Wednesday 3rd October 2007 sees the ninth online update to the Oxford Dictionary of National Biography, www.oxforddnb.com with the addition of 111 biographies of noteworthy men and women.

A special focus of the update is the addition of 20 new biographies on some of Britain's best-known brewers and distillers, many of which have been written by the leading historian of the brewing industry, Professor Richard G. Wilson. These new lives supplement the Oxford DNB's existing coverage of 100 biographies of manufacturers of alcoholic drinks.

- **Henry Boddington** (1813–1886), the Manchester brewer who started with a small brewery and turned it into the largest in Manchester where he sought to brew the 'perfect pale ale'. Unusually for a man of his origins he kept a memoir – 'the record of an unimportant life' – in which he set out 'the necessity for sobriety and chastity, the necessity to rise at five o'clock, the necessity of cleanliness in person and dress'.

- **John Smith** (1824–1879), of Tadcaster who bought a brewery at the age of twenty-three which was eventually lauded as one of the finest in Northern England. Smith owed his success to an expert appreciation of the new market for pale ales (which made full use of Tadcaster water), the importance of the railways for establishing a national brand, and the growing market of nearby Leeds. Smith's work was carried on by his brother William, who built the state-of-the-art new brewery in 1883–4. Tadcaster became known as 'the Burton of the north' and the Smith brewery became a by-word for a well-run business.

- **Tetley family** (per. c.1778–1959), Joshua Tetley opened a small brewery in Leeds in 1792 which grew to be the largest in the north of England, due largely to Joshua and his son's understanding of new

markets and tastes following the Beer Act of 1830, the rise of the railways, and the 'beer boom' of the 1850s. The business remained in the family and was later controlled by Joshua's son Francis William Tetley, his grandson Charles Francis Tetley – who became a prominent Leeds politician and benefactor of University of Leeds – and by his great grandson, Charles Harold Tetley.

- **Tennent family** (per. c.1740–1890), Glasgow brewers best known as pioneers of lager production in Britain. From the 1880s Tennent's became the first lager 'to be brewed and marketed successfully by a British company', making it one of the most famous beer brands in the country.

- **Samuel Arthur Brain** (1850–1903), founder of the Cardiff brewery which now sponsors the Welsh national rugby team. Brain came to Cardiff in his early twenties, when the city was booming. Employed as a clerk in a brewery, he had the good fortune to marry the daughter of the Old Brewery, and had the opportunity to buy the business in October 1882 at a time when Cardiff's population was taking off. He transformed the business by acquiring a string of public houses, supplying workingmen's clubs, and brewing light pale ales, which were popular among late-Victorian drinkers.

- **Simonds family** (per. c.1768–1960), were small farmers from Arborfield, who became maltsters in Reading. In the late eighteenth century William Blackall Simonds acquired a greenfield site to build a new brewery by the river Kennet – convenient for transporting barge-loads of hops and malt – and installed a steam engine to grind the barley. But local magistrates prevented him opening new public houses, so his attempts to sell more of his high-quality beer were thwarted. His eldest son Blackall Simonds took advantage of new licensing laws in the 1830s to open beer shops, and the firm took off, exporting its product as far afield as Australia.

- **Charles Cooke** (1840–1911), Hereford MP and a colourful propagandist for cider. His passionate promotion of his local drink

led to him being named the 'member for cider'. Such was his dedication that he ensured Herefordshire cider was stocked in the House of Commons' bars and advised daily consumption of six apples and a pint of cider before bed.

- **Bessie Williamson** (1910–1982), unusually the female manager and owner of the Laphroaig distillery on the island of Islay.

- **Meux family** (per. 1757–1910), the London/Herefordshire brewing dynasty with an extraordinary history of commercial success, insanity, and gold-digging marriages. The Meux made their fortune from the Horseshoe brewery in London's Tottenham Court Road, where they constructed a huge vat to brew porter (dark beer). When the vat burst, in 1814, eight people nearby were drowned. In a cast of remarkable characters, the most extraordinary was Valerie, Lady Meux (1852–1910). A Devon butcher's daughter and one-time actress, she became one of the country's wealthiest women through marriage into the brewing family.

Since April 2006 the complete Oxford DNB has been available to 48 million residents in England and to all residents of Northern Ireland via their public library. There is further extensive public library access in other parts of the United Kingdom and worldwide. Remote log-ins allow library readers to consult the online Oxford DNB from home.

Essex Wine Federation

The Essex Wine Federation have opened their beer classes for their 2008 show. Classes include: bitter, lager, dry stout, barley wine and a 3 bottle class, consisting of bitter, dry stout and barley wine. The show is to be held on Saturday 12th April in Ingatestone, Essex. Show schedules will be available in the New Year.

For details please contact: mikedavey@hotmail.com or telephone 020 8527 2506.

Review: *Brewing Quality Beers – The Home Brewer's Essential Guidebook*

Les Howarth

Given this book's title, I'd hoped for a book that gave advice that could turn average or good beers into fantastic beers. Does it do this? In a word, no. Instead Burch seems to be aiming at the brewer who wants to brew with minimal investment in equipment or consideration of procedure; neither of which is a recipe

for highest quality beers. For example, I've never tried mashing in an oven and it may well work but I have my doubts. I'm not sure that the temperature control on the average oven is either accurate or precise enough for best control of mashing temperature. By this I mean if you set your oven to 65°C how sure can you be that its average temperature will actually be 65°C; and even if it is, how much will it vary from 65°C during the mashing process and, last but not least, how sure can you be that you'll be able to achieve 65°C each time you brew? If you are not 100% sure of the answer to any of these questions then you cannot be sure that you'll achieve your desired mashing conditions each time.

The advice to sparge the grain after

mashing "as thoroughly as possible until the runoff is clear" is incorrect and is a recipe for harsh brews due to the tannins extracted from the grain husks by over sparging (been there done that). Nor is the suggestion to sparge with hot tap water likely to result in best quality beer for similar reasons. You won't be able to optimise sparge water composition and temperature.

At this point I decided that this book had too much disinformation to be of any use, let alone live up to the promise of the title, and decided that I was wasting my time reading any further. I suggest that you also save unnecessary reading time, confusion and \$5.95 by avoiding this book.

2nd edition, Byron Burch, Joby Books (1992) ISBN 0-9604284-2-9 \$5.95

The ATC 800 Digital Temperature Controller

Steve Djurovich

The ATC 800 is a relatively inexpensive digital temperature controller, which cost around £32.00 from eBay.

Home brewers have been latching onto this device lately as an effective way of controlling temperature in fridges and freezers, when pressing them into service to provide ideal conditions for fermentation and conditioning/dispense. Unmodified fridges aren't much use unless you brew traditional lager, and freezers are only good for storing hops, yeast, and wort for use in yeast starters.

Note: when you see 'fridge' take that as fridge or freezer. Which you have fridge or freezer, upright; or chest, it works just as well.

The ATC800 enables us to control the temperature in fridges from 5°C to 40°C. The quoted reading accuracy is $\pm 1^\circ\text{C}$ and it displays to 0.1°C. I've tested this against a digital thermometer which I know to be pretty accurate, and the claim appears to hold true. The unit sits outside the appliance and has a small temperature probe on the end of about a metre of cable,

which is placed inside the fridge. The ATC800 measures about 18cm \times 10cm \times 5cm, and is designed to be panel mounted, with 4 screws holding it in place in a suitably sized cutout in the panel. You could just as easily mount it in a plastic or metal enclosure from RS, Maplin etc, or leave it un-mounted if you don't mind the cables trailing.

How it works is this; it has two outputs – cooling and heating. Looking at the wiring diagram you can see that the live power to each circuit passes through the unit. You wire up your fridge power cable to the cooling output (terminals 3 and 4), and a heater to the output of heating circuit (terminals 1 and 2). It is rated at 10 amps for heating, and 25 amps for cooling. The heater can be a low-wattage light bulb, or a proper low-wattage enclosure heater, also obtainable from RS or Maplin. The heater goes inside of the fridge. You set the temperature on the unit, and it senses the temperature in the fridge. It will then either switch on the cooling circuit (the fridge compressor), or the heater, to bring the temperature in the fridge to that set on the unit. It completely bypasses the fridges built in thermostat – just set it 'coldest' so that whenever the ATC800 feeds power to the fridge, it cools. By periodically switching between heating, neither heating nor cooling, or cooling, the unit maintains the temperature in the fridge to a narrow band around the set value.

It has a couple of extra features. The first is called 'temperature difference'. You can set a value between 1°C and 5°C this will allow the ATC800 temperature controller, to sail past the set value, before it kicks in to return the temperature to that set value. I set that to the minimum of 1°C, as I can't see the point of setting a higher value. The second feature is however, very important. It has a built in 3-minute delay between activations of the fridge compressor. This prevents possible damage to the compressor that could result from rapid on/off switching, such as can happen when using a PID controller. Obviously there is no delay in switching on the heater.

When wiring it up, it pays to wire the cooling and heating output power cables to trailing plug sockets. That way you don't have to hard wire your fridge and heater to the unit, but simply plug them into the trailing sockets enabling you to interchange appliances easily.

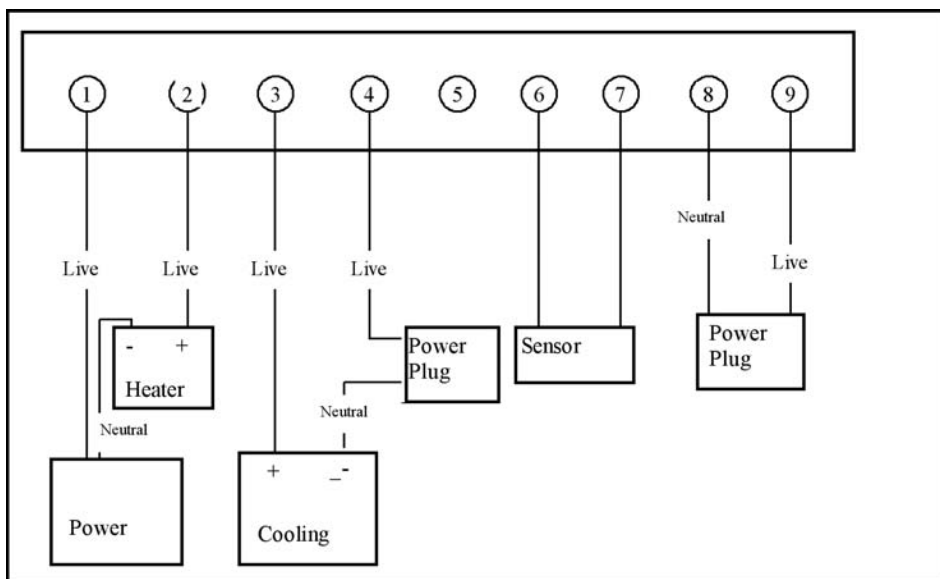
From the diagram you can see that terminal '5' has nothing wired to it. Nothing in the literature refers to it. Discussions between users on Jim's Beer Kit forum have concluded that it's probably an earth terminal, but nobody has tried out that assertion. What works fine is wiring all the earth leads to the earth line of the incoming power cable feeding the unit itself (via terminals 8 & 9). The neutral (blue) feeds of the heating/cooling

circuits don't pass through the unit, only the live (brown) feeds do. The neutrals can be connected using electrical wiring blocks. I used one long wiring block to complete the neutral feed in each circuit, and to wire all the earths to the common earth.

Important: Keep the heating and cooling circuit neutrals separate from each other!! The unit will work in temperatures from -5°C (23°F) to 70°C (158°F).

In use, you simply dial in the required temperature on the unit and it brings the fridge to that temperature very quickly, and holds it there within a degree or so. For fermentation temperature control, it's a breeze. Set it and forget it. Temperature steps are easy to perform, e.g. fermenting at 18°C, and then dropping to 12°C to drop out the yeast and clear at the end. For conditioning and dispense of ales, set to 11°C or 12°C and that's that.

I'm looking at incorporating an enclosure fan in the fridge to evenly distribute the heating/cooling to give even more consistent results. All in all it's a very nice piece of kit, and has quickly and easily overcome one of the biggest difficulties facing homebrewers – achieving and maintaining the right temperatures for fermentation, conditioning, and dispense, no matter what the ambient temperature is. The boiler water jacket is officially retired!



Brewery Vernacular

Nick Willers

I've been bewildered by all the technical terms that surround the (dare I call it) hobby (I can hear people reaching for the 'phone), but am happy to pass on what I think the terms mean. Doubtless others have done something similar before. Perhaps it would be worth inviting some new definitions?

Cornie: Most of what follows.....

Attenuate: Supper.

Comatose: A complex sugar that refuses to ferment.

Estery: A form of English spoken by people from parts of the southeast.

Firkin: Small fir cone.

Galactose: Cosmic sugar.

Lactose: Severely frost bitten.

Lambic: Shepherd's pen.

Lauter: To loiter, loudly.

Maltster: Chinese generic version of popular chocolate sweet.

Quaff: Past tense of quiff.

Rouse: Collective noun for arguments.

Saccharometer: Device for monitoring mailbag production

Sparge: Three-stripe copper surplus to requirements.

Tun: What they call 2240lbs up North.

Von Trappist: Austrian singing troupe brewing Edel'weiss' beer.

Wort: Past tense of 'art', for fans of the KJV Bible.

The Goldilocks approach to fermentation in conical fermenters

Steve Flack

One of the aspects of brewing most often overlooked by homebrewers is temperature control of fermentation, yet it can critically affect the final product. Yeast is like Goldilocks – it doesn't like it too hot or too cold – it prefers it just right. Like many homebrewers, I'd spent many years moving fermenters to parts of the house with a more appropriate temperature and not making proper lagers because I couldn't keep the beer cold enough. Recently I decided to splash major cash on a conical fermenter and hoped that at the same time I would be able to combine it with the long desired temperature controlled fermentation system. One design requirement was that the temperature control system wouldn't require me to drill any holes in my shiny and expensive fermenter.

The fermenter I chose was a 14 US Gallon Blichmann Fermentator. A fermenter such as this is rather large and while our American friends may be able to get fridges big enough to hold one, those are quite a rarity over here – especially at the sort of prices a homebrewer appreciates! Consequently my approach would be to fitting a cooling coil/probe. One major advantage the Blichmann has over competing designs is the access door on the lid that is very similar to a lid from a Cornelius keg. I hoped this lid would allow me to fit cooling to the fermenter without drilling holes in the fermenter itself.

Dealing with the cooling side first, an old keg lid was drilled with two 13-mm holes and two 8-mm-1/4" BSP male iron compression fittings with backnuts fitted. The fittings were drilled though with an 8-mm drill so that some 8-mm copper tubing could be passed straight through the fittings. After some trial and error, a suitable length was found that allowed the lid to be removed from the keg yet still gave an adequate depth for the cooling loop. The cooling loop was completed with some 8-mm 90° copper bends. The

cooling probe was then connected to the recirc circuit of a Maxi 110 beer cooler sourced from eBay. Beer coolers such as the Maxi 110 are widely used in pubs to cool beer on the way to the hand pump or tap. The Maxi 110 is a relatively small unit and cost me around £70 for a reconditioned model. They are expensive new but can be picked up for rather less than I paid if you hunt around.

Below:

Top – Cooling loop in place.
Middle – Showing length of probe.
Bottom – Detail showing fittings in lid.

Right:

Top – Heating mat in place.
Middle – Temperature Controller.
Bottom – Finished system.



To tackle heating, I took inspiration from the FermWrap heaters found on US homebrew stores' websites. These are low wattage flexible electric sheets designed for wrapping around glass carboys. I discovered that similar 240-V versions are sold quite cheaply (£15-20) on eBay as terrarium heaters. I purchased an appropriately sized 25-W heater and wrapped it around the cone of the fermenter. As a stroke of luck, the one I bought turned out to be self-adhesive.

The two sides of the equation were brought together using an ATC-800 based temperature controller. These are sold on eBay for controlling the temperature of aquaria. The ATC-800 has the advantages that it can control both heating and cooling, requires no additional parts such as solid state relays and comes with a temperature probe – all that's needed is some sort of box to put it in. It's also nice and cheap (around £30-40)! The temperature probe is fitted inside a stainless steel thermowell that fits in the airlock bung besides the airlock. One important point here is that there are two types of probe supplied with ATC-800s - one is stainless steel and the other plastic coated. The plastic coated one WILL NOT fit in the thermowell.

So how well does it work? In tests with 30 litres of water, the fermenter was able to maintain a steady temperature between 10°C below ambient and 7°C above. These figures could probably be improved with some elementary insulation but maybe with global warming I won't need it!

Sources:

14-US Gallon Blichmann Fermentator; 8-mm ID PVC tubing - Hop and Grape.

8-mm copper tubing and fittings, armaflex insulation for coolant lines - BES Ltd Maxi 110 Beer Cooler; 25-W terrarium heater, ATC-800 - eBay.

Stainless thermowell and bung - MoreBeer, USA.

Box, cable glands etc for ATC-800 - Maplin.

Malt extract – yes or no?

Will Hanrott

The question in the title is silly really as we all use Malt Extract in some form or another; it's just that most of us make our own by way of a mash. The purpose of this article is to encourage discussion as to the employment of Malt Extract from a tin or a sachet and as to whether such substances have any place in the serious brewery.

I suppose that most of us started brewing from kits or perhaps tinned extracts before moving on to mash. Those that have been brewing as long, and longer than I will be familiar with the early writers and their opinions. The late Ken Shales observed that mashing was a “kerfuffle undertaken to prepare very small quantities of special beer for the purposes of shows ... so we will agree to disagree with those of the other school and continue to use malt extract!” Dave Line came out with the opposite view and I quote: “more and more home brewers are beginning to analyse their beers critically and appreciate that the limitations imposed by these syrups cannot be overcome”.

However, towards the end of his life he became more kindly disposed toward Malt Extract and indeed his book, *Beer Kits & Brewing* is virtually devoted to it.

The Americans and Charlie Papazian in particular, praise the use of Malt Extract throughout their literature. Indeed Papazian claims that good extract beer is indistinguishable from a mash beer.

What made me turn a small part of my attention back toward experimenting with Malt Extract was the notion that as my brewing technique was now (hopefully) rather more scientific than it was 30 years ago, then perhaps I could make an extract beer that would be as acceptable as my grain beers?

We all know that we have CBA colleagues who make perfectly good extract beers and I have often heard it said that the difference, in some cases, was undetectable. Indeed, a Brown Ale of my own based solely on extract was judged by my peers at a recent Midlands meeting and found to be OK in most respects.

Clive Donald of Brupaks has written a pamphlet called *Brewing with Malt Extract* and states within that Brupaks are the sole distributor of the finest grade of brewing malt extracts anywhere in the world. Brupaks extracts are, apparently free of the so-called ‘Malt Extract tang’. (I've never been entirely sure what this actually is. Can anyone enlighten me?) *Possible chlorine reaction when using fresh tap water or using old tins of extract. Ed*

For the purposes of experiment, and writing as one who brewed many hundred gallons of extract based beers in the 1970's, I decided to take Brupaks at their word. I have to point out, incidentally, that I did not undertake this experiment to prove that grain beer is better than extract beer. I hope that I will show that this was an entirely objective experiment to see, honestly, whether good-quality malt extract has a place in my brewery.

Rather than formulate my own recipe, I followed the Brupaks pamphlet and made up a 23-litre batch of their ‘London Bitter’. Ingredients for 23 litres:

3kg Brupaks Premium Grade Pale Malt Extract
350g Crystal Malt
90g Liberty Hops (4.9AA)
50g East Kent Goldings Hops (finishing)
Wyeast 1028 or 1968

This was published with an OG of 1.040 an ABV of 4% and EBU of 35.

I used my usual technique in that I prepared my brewing liquor in the usual way using data from the Brupaks website versus my local water analysis and made adjustments with CRS. This is a relatively new innovation for me and my thanks are due to Peter Fawcett for his advice.

I boiled the full volume of liquor with the malt extract and hops for the time stated in the recipe. I only deviated from the recipe in that I had a quantity of hops left over from the boil. These hops were not of my usual variety, so I used them as an aroma hop by soaking in the wort cooled to 70°C for 30 minutes before cooling to pitching temperature.

After cooling, I aerated by pouring from the cooler into the fermenter and pitched the Wyeast starter.

The ferment proceeded pretty much as one might expect and after a week I racked into a second container and fined the beer with gelatine. After another week the beer was casked.

I rarely leave beers long enough and was sampling this one as soon as decency allowed. My wife thought that the beer was the bee's knees! Praise indeed!

Trying to be objective, I felt that this beer was a good, solid ale that was acceptable enough to offer to my friends. I detected none of the flavour profile that I associate with my former life of 30 years ago as an extract brewer. It certainly did not taste like a kit.

In comparison to the sort of beers that were brewed in the 1970's by me and others, this beer was very long on malt and cane sugar was completely absent. The hops were far fresher than anything I could have got back then and the yeast was considerably more sophisticated.

Combine this with far better technique and a much more rigorous hygiene regimen and I guess that I should not be surprised that the beer was considerably better.

All in all though, I did not feel that the beer came up to the standard of my grain beers and this seemed to be echoed by David Edge when he and I were sampling my beers back in August. The look on David's face when I presented the extract beer after a session of sampling grain beers said it all – not bad, but not as good as grain!

Despite this, I do feel that the extract beer would be a most acceptable tippie as a 'beer ordinaire' for everyday drinking.

The old arguments of time saving and cheapness don't really apply anymore. I took almost as long in the garage producing this extract beer as I would my grain beers. The old techniques of using saucepans on the hob and diluting to

length with tap water have long gone from my brewery, so the boil (at a full 25 litres) took quite a while to achieve.

As to cost, well, premium extract is not cheap! I reckon the price that I pay for bulk grain made the extract look very dear. However, I did not have to mash, so as usual, it is a case of you pays your money and you takes your choice.

The quality of ale though was good enough for the early writers to feel vindicated in their support for malt Extract as a base for their beers. Years ago, lots of different adjuncts in the beer seemed very fashionable whereas today, I guess that it is universally accepted that the basis of all beer is malt – as much as possible!

I suppose that I have satisfied my curiosity as to whether Malt Extract has a place in my brewery. So to return to the question in the title, yes or no? Well, I'm not proud; I'll use it again – but only the best variety! What do other brewers think?

Newcastle Brown Ale

Doug Hodkinson

Newcastle Brown Ale was originally brewed as two beers and blended. The practice is still alive and well with one Tyneside craft brewer. Doug Hodkinson writes:

I've never brewed NBA for regular supping but I have made it regularly for entry in competitions. I aim for an equivalent OG of 47 and a bottling SG of about 1.013. I also try to get a reasonable colour match (NBA is not particularly deep in colour). I sometimes have had to match the sweetness by the addition of Canderel tablets.

Although I have made this beer type from a single mash, I now blend a strong ale and a lighter beer, as did the original commercial recipe. Initially I blended a strong ale and a light ale, but generally had to adjust the colour using brewer's caramel, so I now blend with London brown ale as the weaker beer. My recent

blends have featured a Traquair House type as the strong ale.

I got the basic recipe for Traquair House Ale at a meeting of the Scottish Guild of Judges some years ago, where a consultant for Traquair House disclosed that the beer was based on 99% pale malt, 1% roasted barley, mashed at 64°C (147°F) and hopped with 5lb Goldings, plus 3 lb Goldings late hopped, to 200 gallons of beer; alcohol 7.2%. It is an excellent ale.

While I brew a Traquair type regularly for supping, I brew London Brown for competition only, and normally modify part of the resulting wort to make a sweet stout, again for competition only. My NBA blend is 70% London brown and 30% Traquair type. The flavour, colour and sweetness are generally OK although the nose has less caramel than the commercial. This blend has won a 1st and a 3rd in National shows and is a reasonably good match to the commercial. I think that while it is possible to make NBA type from a single mash, the use of strong ale adds character to a blended type.

Recipes:

Doug's Strong Ale: for 25 litres og 1072 at 70% mash efficiency. Approximately 40 IBU, 30 EBC:

99% 8.33 kg Pale Maris Otter
1% 0.08 kg Roasted Barley
Mashed at 67C for extra body
112 g Goldings 5.5% AA for 60 minutes
38 g Goldings 5.5% AA for 15 minutes

Doug's Brown Ale: for 25 litres OG 1.050 at 75% mash efficiency. Approx 23 IBU 90 EBC:

65.3% 2.81 kg Pale Maris Otter
4.2% 0.18 kg Flaked Barley
3.0% 0.16 kg Crystal Malt 120EBC
8.1% 0.35 kg Chocolate Malt
3.0% 0.13 kg Cara - Pils
8.1% 0.35 kg Lactose
8.1% 0.35 kg Brown Sugar.
45 g Goldings @ 5.5% for 60 minutes.

Doug's Northern Brown (NBA type). Blend 3 parts of the strong ale with 7 parts of the brown ale.

Dried yeast update (2)

– new strains

David Edge

We seem to have new dried yeasts coming out of the woodwork every five minutes! However, we don't hear much about how they perform. Here are some reports from the members of the Norwich and Norfolk Craft Brewers and the Midlands CBA.

Brupaks Blanche wheat beer yeast

Chris Ridout produced a clean beer with a fine Belgian character with this yeast. One commentator thought of Duvel; it certainly would not have been out of place in a Belgian bar. He achieved the character that has eluded others by fermenting at 10–12°C – there's always a catch! The instructions with the yeast suggest fermenting at 18–23°C to produce typical wheat beer aromas. Ralf Edge took his advice and split a batch of 'Detonator' strong bitter (see website for recipe) and fermented at 10°C it produced a spice Belgian note that was a nice change in a beer than can be a bit on the sweet side – it's now the standard yeast for this brew.

Safbrew T-58

Steve Flack tried this in a summer ale. While it was fermenting and until it cleared – a tedious process as others have observed – he felt that the aroma was rather like Hoegaarden. However, once it was bright, it revealed the pleasant spice notes that the manufacturer claims. Fermentation was around 18°C, but this yeast's vigorous fermentation can raise the temperature – by 6°C in the case of Steve's next brew with it!

Safbrew S-33

We don't quite know what to make of this one. The data sheet claims it is a 'very popular general purpose yeast,' in the same breath as 'for the production of ... Belgian type wheat beers, Trappist, etc.' and 'Final gravity: high.' Does the last really mean what it says or should it say high attenuation which would make more sense for a tripel yeast. One member has tried it in a well-controlled commercial

environment and was unable to get it to clear. He believes that the datasheet is wrong and it is a highly attenuative yeast. We've asked the GB Fermentis rep, but had no response. Perhaps only for the adventurous? But then, curiouser and curiouser another informed source compares it to the EDME strain! Before my time... Finally as we go to press, a report arrives from Guy Howard

'I have produced two batches of Summer Ale. Batch one was pitched with S-33 rehydrated and aerated before use. Compared to my normal yeast (Nottingham) the ferment got strongly under way in a few hours and fermentation proceeded evenly and without bother, getting to quarter gravity in about the same time as Nottingham. S-33 appears to drop out of solution very easily and rapidly but does not display the limpet-like quality of Nottingham, so that one has a thick but rather mobile deposit at the bottom of the FV. The first batch was not fined but left in the second stage for one week and bottled thereafter. Quite a lot of yeast dropped out of solution in the bottle leaving a very bright beer, but a deposit that required very careful pouring. Batch two was exactly the same but the beer was fined in the second stage with Brupaks Auxiliary Finings. The deposit in the bottle was no more than a 'paint-coat' in thickness and pouring was rendered much easier as a result. Both beers were however, very bright in the undisturbed bottle.

"The manufacturers claim that S-33 produces superb flavour profiles and is ideal for bottle conditioning. I would not take issue with either of these statements. Flavour of both beers was very pleasant indeed, producing a nice, zesty drink with an active bead and reasonable head retention.

"One odd thing that I noticed was this. Although S-33 is a bit mobile at the bottom of the bottle, it doesn't rinse out very cleanly, leaving a 'bloom' on the bottom of the bottle. This was easily removed with VWP though. I have another couple of sachets of S-33 (I use two sachets of yeast in my brews) and so I plan to experiment further."

I went to try them for myself and was well impressed with a pair of very clean flavoured golden ales. So on balance,

worth a try in a hoppy ale if you're prepared to take the risk of a less than crystal-clear beer.

Safale US-05 (formerly US-56)

This strain has intrigued both groups, as it isn't obvious from the datasheet why one would use it as opposed to Nottingham or S-04. One suggestion was that the equivalent liquid strains are used to emphasise hop character. However, a pair of beers presented at a Midlands meeting had come from a common wort split between a yeast from a respected London brewery and US-05. There was no comparison – the US-05 was devoid of hop character, the other beer radiated it. Meanwhile, a recent issue of *Zymurgy*, the magazine of the American Homebrewers Association tested Safale US-05 against the equivalent liquid strains from Wyeast (Y1056) and White Labs (WLP001) and concluded that the choice between liquid and dried could be made on processing convenience; flavour differences were not significant.

Peter Fawcett brewed an 'American Lite Amber' with this yeast. "It was rehydrated and fermented at 20–22°C and dropped after 48 hours @ 1.023. After five days the considerable yeast head was skimmed off and after seven days when the gravity had fallen to 1.009, the beer was transferred to another tank, fined and packaged into kegs and bottles after a further three days. Initial impressions from the keg were favourable; malty and slightly fruity with some hop aroma from the Willamettes coming through. The bottles sampled after a longer period of time seemed blander in flavour with quite a dry finish and "not quite up to standard" comments from the tasting panel. Nonetheless I believe this yeast would be a fairly good choice for higher gravity beers where the stronger esters produced by some yeast strains are not always desirable."

Dry vs liquid?

As we've noted above, our American chums are coming round to dried yeast. However Ray Ashworth is still far from convinced. He split a batch between his usual yeast (Charles Wells'), Nottingham and S-04. When he brought the Wells and Nottingham to a meeting, again it was hard

to believe they were made from the same sweet wort. But why didn't he bring the S-04? Ah, well, that barrel had already been finished! More research needed.

Two Christmas trees

I suspect that Nottingham Ale and S-04 are the most popular and successful general-purpose home brewing yeasts in the UK because they are idiot novice-proof. Nottingham can live without well-aerated wort while S-04 has the edge if you can't keep the fermenter cool. If you want to fling a packet of yeast in one Saturday and rack the next, they can't be beaten. Fancier yeasts are like professional photographic film. It performs much better if you take it out of the fridge and shoot the roll in a day, but if you're one of those photographers with a Christmas tree at each end of the roll, stick to Boots' own brand.

To coddle or to abuse?

A big thank you then to all those who ferment under carefully controlled conditions and report back on the performance of yeasts. So, if you're planning to try one of these yeasts, you might need to coddle it. Ray Ashworth will tell you that Wells' is a fantastic yeast. Buy him a second pint and he'll add "so long as you aerate well and keep it relatively warm. The optimum pitching temperature is about 20°C, which is what Charles Wells pitch at. But it will perform quite vigorously at 23°C and give a pleasant estery nose if it is allowed to rise to 27°C – not ideal though, got to admit! Yet at Woodforde's in the middle of the summer, we were often caught out with FV temperatures as high as 27°C – yet the beer was always OK and the yeast lived on for another day's brewing".

Another informed commercial source reports forcing his standard yeast to produce a batch at 29°C. There were discernible spicy and solventy notes, but you had to look for them and they weren't out of place in the particular beer he was brewing.

So more responses please – there are yet strains out there to try:

- Brupaks top fermenting Belgian ale yeast (suggested by Steve Flack)
- WB-06 German Weissbier yeast from Fermentis
- Munich Weissbier yeast from Lallemend, not yet in the shops, though Hop and Grape might be able to get some if there was a reasonable order
- SB-12 ale and SB-14 lager yeast – who knows about these?

The 8th National Homebrewing Festival

On Saturday 17th November above the Robin Hood Pub in Sutton, Richard Burns of 'Cheers Home Brewing' sponsored the 8th National Homebrewing Festival. A delightful afternoon was had by all the discerning drinkers and craft brewers, where, to quote from his web site advertising the event, '*And gentlemen in England now abed, shall think themselves accursed they were not there*'. A most enjoyable and friendly event, with all beers having been drunk, by the end of the day!

It was encouraging to note that two of the winners this year are both new to mash brewing and the judges commented afterwards on the high standard of brewing. The competition winners were:

Ordinary Bitters up to 1042

- 1st Paul Rasell, 'Cockeyed'.
2nd Nick Reese, 'Autumn Blaze'.

Special Bitters 1043 to 1055

- 1st Simon Howard, 'Briars Best'.
2nd Matt Bourne, 'Octoberfirst'.

Speciality Beers

- 1st Mike Carter, 'Little John Stout'.
2nd Tony Brown, 'Burns Mild'.

Tom Corr won a highly commended for his wonderful hoppy tasting bitter, 'Ainslinn Ale'. Paul Rasell, 'Cockeyed', won Best in Show. Mike Carter's entry was aptly named 'Little John Stout' (OG 1060).

Not to be outdone, Richard's recipe was used for the 'Burns Mild', he also produced a barrel of this year's cider, 7% ABV which was made on the 'Cheers cider weekend' at Raglands Lane Farm.

Craft brewing member, Phillip Wilcox in August this year, took over a small brewery and launched 'Wibblers Brewery' in Chelmsford (www.wibblers.com). He presented five Cornelius kegs of his recent beers for the judges to comment on only, and for the afternoon guests to enjoy. They were:

Barrow Boy 3.5% ABV, a light session beer.

Apprentice Ale 3.9% ABV, so called because the old apprentice, his dad, added some Polish hops. The brew ended up a copper brown colour, but very drinkable.

Apprentice Ale 2, the intended ale.

Rodford 4.3% ABV, made with amber /crystal malts, with a very biscuity taste.

And finally for the hop heads an IPA, *IP Wakey* 6.1% ABV, very powerful brew!



Paul Rasell receiving his award from Richard Burns



It was delightful to see our new typesetter, Matt Bourne receiving his first award after only starting mash brewing last year.

Kiss of Death, Phenols!

By Ant Hayes

Moritz Kallmeyer, Drayman's Brewery's head brewer, calls phenols the 'kiss of death for a brewery'. Your customers

won't know what they are, but they won't like them, and they won't forget them. Getting rid of them is difficult – getting your customers back even harder.

For the home brewer, phenols are tricky because it is often difficult to pinpoint and eradicate their source. This isn't helped by most homebrew texts grouping them together, or confusing them. For example,

'medicinal' is used as an aroma descriptor for both 4-ethylphenol, which has an infection source, and chlorophenols, which are as a result of chemical taints. They don't specify whether medicinal to them means the smell of medicine, or the smell of antiseptic.

The table below sets out to subdivide the phenols that you might find in your beer and to give tips on how to manage these.

Phenol	Source	Detection	Management
Polyphenols There are two types: • Tannins – bind to protein • Non-tannins – don't	Malt	Astringency	Sparge pH (keep slightly acidic). Sparge temperature (keep below 78°C). Monitor gravity of final runnings (keep above 1.006). Don't crush too fine. Don't get grain fragments into the kettle. Use adjuncts as they supply little/no polyphenols.
Polyphenols	Hops	Astringency Hoppy, fruity, grassy aroma	Hopping rate & hop varietal selection. (Contribution much less than malt's – between 5% and 25% of total polyphenols).
Guaiacol & syringol	Typically rauchmalt	Smokey taste (guaiacol) Smokey aroma (syringol) Often confused with 4VG	A little rauchmalt goes a long way.
4-vinyl-guaiacol (4VG)	Yeast	Clove Spicy Herbal Vanilla (a breakdown flavour from 4VG)	Yeast selection - defining characteristic of weizens. Some barley varieties & wheat have elevated ferrulic acid. Promoted by low mash temperatures (ferrulic rest – 113F). Increased by high sparge temperatures that leach out ferrulic acid – a precursor of 4VG. Promoted by higher fermentation temperatures. Diminishes with time in packaging – becomes vanillin.
Chlorophenols	Chlorine + phenol	Antiseptic (TCP) Mouthwash Hospitals	Keep chlorine away from your beer (e.g. treat water with carbon filter or metabisulphides). Beware of bleach and tap water. Linked to poor draught line cleaning. Chlorinated cleaning detergents mixing in the drains can contaminate your beer (such is the level of flavour activity). Taints plastic fermenters – difficult to get rid of.
Bromophenol	Fire retardant in older buildings Packaging materials	Old television set Hot bakelite Electricity short smells	More odour active than chlorophenol. Causes split panels (there is a level of blindness amongst tasters). Watch for contamination from source materials.
Other phenols (e.g. 4-ethylphenol (4-EP), 4-ethylguaiacol (4-EG), etc.)	Brettanomyces, wild yeasts, bacteria	Barnyard, Band-aids, mousy, bacon, spice, clove, tarry or smoky aromas.	Sanitation.

The development of the Yorkshire Square fermenting system

Ian Priddey

The Northern CBA held its quarterly meeting at The Works public house in Sowerby Bridge on 27 October 2007, where the main feature was a talk on Yorkshire Squares. The talk was given by Peter Robinson, local CAMRA member and author of several articles published jointly by the Halifax Antiquarian Society and the Brewery History Society.

Peter began by discussing the various types of fermentation systems that emerged in different breweries, generally on a regional basis that were designed to promote fermentation and separation of the yeast. For example in London beer was transferred into Pontos, small fermenting vessels where the yeast could overflow into another collection vessel. In the Midlands the Burton Union system of wooden barrels held together in "union" with a yeast collection trough above them, evolved and is still in use at Marston's brewery. Some breweries dropped the beer into another fermenter (rather similar to racking from a primary fermenter into a carboy for secondary fermentation) whilst the use of yeast sluices or parachutes that could be raised or lowered, enabled yeast to be collected and drained away for reuse.

In the north the Yorkshire Square system evolved in the late 1700's, closely associated with the brewer Timothy Bentley, who established a brewery at Sowerby Bridge in 1792 before moving in 1794 to found the more famous Lockwood Brewery in Huddersfield, where the Yorkshire Stone Square system was first brought to a high state of development.

Yorkshire Squares' main feature is that above the main vessel was another smaller vessel of the same dimensions but being only about 30 inches in height, with a central circular hole in its base of about 18 inches. This manhole came with a lip, or collar, of about 6 inches, which allowed the beer to rise up into the top chamber and drain back, with the exception of that liquid and yeast that remained below the level of the collar, where it remained in what was effectively a yeast-collecting trough. A drain plug allowed wort that had separated from the head to be returned to the lower vessel, or retained with the surplus yeast. Frequent rousing of the wort would take place to oxygenate the yeast and maintain a vigorous fermentation. This may be a factor in why I find some traditional Yorkshire beers to have a higher than usual level of diacetyl.

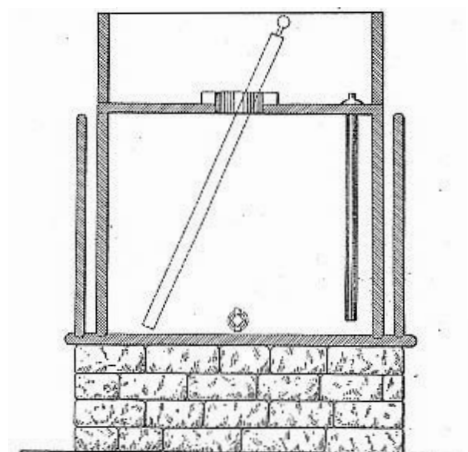
Most of the early fermenters seemed to be of about 20 barrels capacity. The early fermenters often had a second or outer square built around them, about 3 or 4 inches less in height than the main chamber and a gap of about 2 inches away from the inner vessel. This allowed either cold or warm water to surround the fermenter in order to control the temperature of the wort, with surplus water flowing over the top of the outer vessel. Initially the Yorkshire Squares were made of local flagstone slabs cemented together but later on more came to be made of slate, often from Wales and made in the Merseyside region. Examples can be seen at Samuel Smith's brewery in Tadcaster.

Later in the development of the system came the use of other materials, including stainless steel, which remains in use, for example Tetley's brewery in Leeds. There has even been the development of "round squares", for example the one in use at Black Sheep's brewery at Masham. Whilst

many of the breweries that used to use Yorkshire Squares have closed, or replaced them with more modern fermenting systems, it was good to know that the system was still in use and producing good beer. Peter was able to illustrate his presentation with slides of squares that remain in derelict sites, ones in working breweries that no longer exist and ones that are still in use today.

Following on from Peter Robinson's presentation, CBA member Harry Golding discussed the work of the Brewery History Society, with examples of their publications and membership details. Membership gives access to their archive and quarterly magazine, which has included articles on the history of brewing science and the development of India Pale Ale.

The meeting concluded with a demonstration by Derek Spedding of a hand held steamer bought from Aldi for £14 that can be used for sterilizing items - and even raising the temperature of a mash (without increasing the volume in the way that addition of hot liquor would) by connecting the steamer to the mash tun outlet with silicon tubing.



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