



Three Brewsters Win the Day

At the 2005 Home Counties Craft Brewing Festival in Sutton, the lads took a bit of a hammering. Novice Brewster Les Williams took the overall prize with her 1060 Belgian Wheat Beer. Les's beer was judged the best of 46 entries in the competition hosted by Richard Burns of Cheers. The use of White Labs Trappist yeast gave a characteristic Belgian nose. Les brews because she likes drinking *good* beer. She has been membership secretary of her local CAMRA branch for 27 years (*surely not - Ed*). She made cider from her own apples before she began to brew and has only been brewing for 18 months and indeed the winning beer was only a few weeks old. She started using a grain bag in a large curry pot, but found this inconvenient. She borrowed a copper manifold from a fellow member and this made a big difference, so she set herself up with a 10-gallon plastic brewery from the Hop and Grape. The mash tun is insulated with old sleeping bags (see Ron Allison's article for a posher method) and she makes a yeast starter in a demijohn; if they snap they make *ersatz* Victorian cloches for the garden. Wort is cooled by ice blocks around the fermenter. So, if you're worrying that your kit isn't fancy enough – take heart.

Sutton regular Marion Houghton did rather well with firsts for her standard and best bitter. She says, 'I am a rather unlikely middle-aged mum type, not with the typical home brewer profile I suspect, but immensely chuffed and honoured to be a winner in such august company.

I am one of Richard Burns' full mash protégées having caught his enthusiasm and attended one of his "how to mash" sessions about 5 years ago. I brew small scale in the kitchen – ok, I do the boil in the garden - just 5 gallons at a time using the time honoured picnic-cooler mash tun set up. I once read that women tend not to like beer/bitter because they don't like the smell of hops. I LOVE the smell, so I don't know what that tells you. I am not very technical with the chemical side of brewing. Both my winning brews were freely adapted clone recipes from the Graham Wheeler BYOBRAAH book - really just using them as a guide to beer type. "Pyrotechnicale" used fresh hops gathered from Richard's hop walk in September, I don't even know what type they are. I tend to brew what I like to drink, light hoppy bitters that are not too alcoholic, preferring to bottle rather than keg'.



Les William, Champion Brewster 2005

Our membership secretary Janette Edge took a second for her best bitter "Mongrel", a creditable attempt at replicating a sulphurous Burton bitter. The recipe contained 12% sugar (she bottled out – Marston's Pedigree contains 17%) and a little black malt for colour, while Southwold yeast (not currently available) provided the sulphur.

Another turn-up for the book came in the speciality class. The editor had been challenged by David Edge to brew a decent beer from dried malt extract to go with the article on page 7, so I was delighted to get a second place in the blind tastings. (*Graham did particularly well as extract beers seldom achieve distinction at Sutton - David*). Geoff Fryer led the judging team (Geoff Cooper, Mark August) and they praised the high standard of entries and stayed behind to enjoy the fruits and discuss the merits with the brewers. Next year's Sutton Festival on 18th November 2006 will be the 7th National Craft Brewing festival. As the last overall winner at Sutton from south of the Thames was Phill Turner in 2002 let's see if we can bring the cup home lads! Lasses, rather.

Results on page 2

BEST IN SHOW:

LES WILLIAMS, BELGIAN WHEAT BEER 1060

SPECIALITY

1st Place: *Les Williams*, Belgian Wheat Beer 1060
 Runner up: *Graham Kingham*, Dark Crystal Mild 1035
 Commended: *Mike Carter*, Saturday Night (and Sunday morning) 1080 Strong Bitter

BITTER TO 1042

1st Place: *Marion Houghton*, Pyrotecniale 1035
 Runner up: *Gareth Evans*, Woody Pecker 1036

BITTER 1043 TO 1050

1st Place: *Marion Houghton*, Ashes Ale 1045
 Runner up: *Janette Edge*, Mongrel 1043

BITTER ABOVE 1050

1st Place: *Gareth Evans*, CripALEd1066 Strong Bitter
 Runner up: *Ralf Edge*, India Pale Ale 1068 IPA
 Commended: *Gareth Evans*, "1056" Traditional IPA

PEOPLES CHOICE:

Robert Smith, Hopping Haze 1060 Strong Bitter

Derby Festival – 1st April 2006

The Midlands Festival will run again this year with the same successful format. First prize will again be the chance to brew your winning recipe at Rooster's in Knaresborough. Brupaks and the Hop and Grape will again be sponsoring prizes and running a small exhibition giving you the chance to see some of the new and interesting kit and ingredients you hear of. The brewer at the Brunswick was disappointed last year that nobody asked to see round his brewery, so we'll put that right. Two small changes, we're not taking entries on the day unless they're pre-booked and should the organisers chance to win any awards, the associated prizes will go to the next person in the class.

So a grand day out in Derby (contact Janette for details of accommodation and entertainment to make a weekend of it) and a chance to talk to fellow craft brewers and to see if their ale's as good as their talk – what more could you want? First prize? Bookings are already coming in, so get brewing! Entry forms from Janette or on the website under *Promoting Excellence*.

Inter Regional Challenge

Each CBA region is invited to enter a Pale Ale OG 1055±5. It is hoped that areas will have a blind tasting to choose their entry from beers brewed by members. Six bottles (500ml) of the chosen ale will then be posted at CBA's expense to the organisers. These entries would not be eligible for the best in show.

Additional bottles can be sent as a personal entry.

**CAMRA's National Winter Ales Festival
 18th-21st January 2006**

The Northern Craft Brewers on behalf of The Craft Brewing Association have reserved a stand at the Festival, again in Manchester in 2006. We will need support from our members to make this a successful event. Being on the "Northern" patch we anticipate that we (NCBA) will provide the main input, but volunteers nationally are also invited. The main areas of support we will need are:

- Staffing for all 8 sessions of the festival.
- Set-up and breakdown
- Beer, for sampling by festival visitors (and potential members). This can be bottled or barrelled (although clarity will need to be achieved on the day).

Contact Alan Pepper 01706 522006
 AlnPepr@M-cr.demon.co.uk

A Gentle Reminder

As ever your intrepid editor talked some of the members at the show, into writing an article for the journal, but he then gave the last entry form for the Derby show away, which had your names on the back! Tasting re OU notes. A comparison of brewing software. A crossword. These where the three subjects promised, so could the kind volunteers please come forward?

Regional Updates.

NORTHERN CRAFT BREWERS

28th January 2006. Meeting at the Black Horse, Preston. Speaker: Ian MacAnally whose RIMS brewery was featured in Brewer's Contact. Plus the competition for Pale Ale, 1055og. Winner will represent us at the Derby festival in April 2006.

MIDLANDS CRAFT BREWERS

14th January 2006. Meeting at the Swan in the Rushes, Loughborough. Compare pale ales og1055 ±5 - the best will go forward to represent the Midlands at the Festival.
 11th March 2006 Hop Comparisons, Coventry.

MID SUSSEX CRAFT BREWERS

8th March 2006. Roffey Hall, Horsham, West Sussex. Continental Brews. Come along to sample eight different styles and learn how to brew them. Hosted by Andy Dwelly.

SCOTTISH CRAFT BREWERS

22nd January 2006. Meeting at the Calton Centre Montgomery Street, Edinburgh.

We have listed below **other brewing groups**, some affiliated to the Craft Brewing Association, full contact details can be found on our website.

Anglia (Shed Beer)	County Beermakers (Essex)
Beeston Beer Circle	Darlington Trad Beer Group
Beds & Herts	Solent Beer Brewers

IN PRAISE OF AN EARLY MASTER *BY GUY HOWARD*

As I sit here, before my PC writing this article, with a pint of my latest ale (a very nice Golden Ale based on Crouch Vale's Millennium Gold), I'd like to propose a toast to some of the largely forgotten but hugely influential people who put Craft Brewing on the map. Politicians generally give me indigestion but Mr Reginald Maudling deserved a medal. In his budget of 1963, legislation was enacted that enabled Home Brewers to 'come out of the closet' and practice openly. As a result, an unstoppable phenomenon got under way and allowed amateur brewers to find voice.

Of all the early experts whose books I was keen to acquire, one stands out. I speak of Ken Shales whose two published works; 'Brewing Better Beers' and 'Advanced Home Brewing' were the backbone of my Beer production for several years.

After Home Brewing was legalised, Ken wrote articles for 'Amateur Winemaker & Home Brewer' magazine edited by Cyril Berry, another of the early masters of the craft. Ken lived in Basildon in Essex. Apparently, the town took on the pseudonym of 'Boozledon' in recognition of the large number of enthusiastic Craft Brewers who practised there! What was important to me however, was that as an Essex boy myself (born Epping, 1957) here was someone nearby who could guide me.

Unfortunately, Ken died suddenly early in 1971. My interest in beer, although lifelong (yes, even as a nipper!) didn't crystallise until 1972 with a Tom Caxton 'Mild' Kit. I discovered Ken's published works not long after but by then the great man was no more.

Ken's work was authoritative. His articles and thereafter his books covered the history of brewing, cleanliness, setting up for the first time, details of Hops, Yeasts and Wort production. How to manage the ferment and how to formulate a recipe. His recipes were all tried and tested and as such, his published works did not contain vast numbers of recipes - only those that had been made in quantity by him and his associates.

Picture the scene, the mid sixties to mid seventies. Where I lived in West Essex, there was not a Home Brew Shop anywhere within a 20-mile radius. Even if there had been, my parents didn't run a car and I didn't pass my motorcycle driving test until 1976 and so transportation and therefore the potential to shop was limited. Accordingly, obtaining raw materials was always difficult. Mail order was the only real way of sourcing malt and hops although occasionally, Boots would have something interesting and little independent Chemists might stock the odd esoteric ingredient - like Malt Extract! It was a case of keeping one's ear to the ground and snapping stuff up when it appeared.

Ken's work was scientific and made sensible use of whatever could be had at the time. In fairness, there were some very good mail order suppliers around but even so, the range of hops was limited. Yeast was

generally poor although one could rely on firms such as 'Edme' whose yeast was pretty basic stuff but always reliable. Pale, Black and Crystal Malt could be had but other varieties and adjuncts came to the market but slowly.

In the face of all this, Ken's recipes were reliable and scientifically worked out. The gravities were generally high, but this was largely a response to accountant influence in national brewing operations where gravities suffered to keep the Chancellor at bay. In this respect, I don't think that Craft Brewing has changed.

If one reads Ken's works today, one can picture a scene that seems almost like a cottage industry. Reliant upon plastic dustbins, old demijohns and flagon-size beer bottles, it is not surprising that full mash systems were considered too 'fussy' and ignored in favour of the convenience of Malt Extract beers. One has to remember that the well-developed equipment available to us today was not available then. Particularly final storage systems. Some of the early casking arrangements were most unreliable. The first really good cask I had was Hambleton Bard's 'Beersphere'. Thirty years on and I still use a 'Beersphere'. My current model is far better than the original design that seemed so groundbreaking in the 1970's. The large variety of ingredients available today was but a pipe dream in those formative years.

Many of Ken's recipes simply quote '3oz Hops' rather than the now familiar 'Challenger 72g (start of boil) Goldings 15g (last 15 mins) and the multifarious variations on the same theme. I can remember times when hops came as unnamed packages and you took whatever you jolly well got!

I remember 1970's teenage Friday evenings when 'me and my mate' sampled my latest brew, always one of Ken Shales extract beers. A few pints were consumed and comments were passed. Almost always complimentary. Ken once said that 'one's friends would not drink beer forever, if all that could be said of it that it was alcoholic and free.' I am convinced that if his time on this earth had been of a more normal span, then he would have been amongst the vanguard of full-mash brewers, as technique evolved and improved and the beer with it.

Here is a Mild recipe from Ken's second work 'Advanced Home Brewing'. 30 odd years on, it doesn't seem all that advanced now, but this beer provided cheap Friday night drinking for my chums and myself for several seasons

"Malty Mild"

(OG 1.035/60F)

Ingredients:

3lb (1.5kg) Diastatic Malt Syrup (DMS)

1/2 lb. (225g) Crystal malt

4oz (110g) Black malt

2oz (60g) Fuggles hops

1 teaspoon (heaped) salt

1.5 hallons (6.75 litres) water

1g Powdered carrageen (Icelandic)

Method:

Boil 30 minutes, stand 30 minutes, strain off on to 1lb (450 g) soft brown sugar (Sainsbury's).

Adjust to 4.5 gallons (20.25 litres) by adding cold water, cool, and pitch with Leigh Williams Vinotex Yeast Tablets. Rack at 1.009; keep for a further week under air lock, then prime with 2oz (60gm) sugar and bottle.

Making this beer today could be interesting. The technique and ideas postulated in the recipe aren't light years from where we are now. Using educated guesses and informed opinion would make this ale an interesting project, to drink whilst contemplating one's next full mash brew. After all, the choice of yeast and water treatment would all be much less of a guess today and even the choice of hops would be far more interesting.

Carbonation Explained

Carbon dioxide is a natural product of yeast fermentation. It is very soluble in beer, colourless, odourless and heavier than air. It forms a layer over the surface of fermenting beer, preventing oxygen from spoiling your brew. Cask ales contain roughly 0.75-1.5 litres of carbon dioxide per litre. Over-carbonated beers contain excess carbonic acid, which gives an acidic, prickly sensation that is felt throughout the nose and mouth. This stimulates a nerve in the mouth called the trigeminal nerve. This nerve senses hot, cold and irritants. Correct carbonation also influences beer flavour by carrying volatile constituents. When beer is drawn off from the cask the CO₂ is slowly released from the remaining beer to restabilise the situation. Beer will carbonate naturally in a cask, either quickly in response to priming with sugar, malt extract or fresh wort or more slowly if left in a warm place with no additions. Bottled beers are usually carbonated to a higher level than cask. This depends on correct priming and final gravities, warm and cold conditioning. The overall effect is enhanced by serving your ale at the correct temperature.

Practical Barrelling.

When barrelling or using a Cornelius keg, we often run out of gas as we share our drinks, risking oxidation of our brew. Several methods to rectify this are suggested below. The rate of carbonation, or the time it takes for beer and headspace pressure to equilibrate, depends on three primary factors: (1) the ratio of gas surface to beer volume, (2) the difference in carbon-dioxide concentration between the gas and beer phase and (3) time. If the surface area of gas is increased for a given beer volume, the carbonation rate will increase. Increasing the gas pressure will increase the carbonation rate.

A system will equilibrate given enough time so the beer will eventually reach headspace pressure. Therefore, one of the most reliable methods of carbonating beer to a desired level is to establish a constant pressure and temperature and wait. Suppose you want to carbonate the lager you just barrelled to 2.6 volumes. Also suppose that you plan to serve the beer from your beer refrigerator at

The point is, that Ken Shales work was scientific, not guesswork. I have personal experience of recipes so poor that I imagine the author must have wetted his forefinger in his mouth and then held it up in the prevailing wind to gauge whether or not his recipes would work!

I occasionally go back to Ken's books and my own personal brewing past to see if I cannot reproduce a beer from the 1960's and 1970's - using today's equipment and expertise. Not to mention improved quality and availability of ingredients to ultimately end up with something only hinted at in those far off days.

To me, Ken Shales was the master who set me off on a one-way road to brewing better beers. I'm still on that road, some 33 years later. My only regret is that I never had the opportunity to meet the man.

4°C. According to the gas chart the equilibrium pressure associated with 2.6 volumes and 4°C is about 13.5 psi. This method is so simple! Place your keg in the refrigerator, connect your cylinder to the gas inlet of the keg, set the regulator to 13.5 psi and wait. Gas charts can be found in any good homebrew book [eg New Brewing Lager Beer. Seven Barrel Brewery Brewer's Handbook .G Noonan BP Book.]; they show equilibrium carbonation levels in beer at various temperatures and pressures. A 25-litre barrel of beer usually takes 5 to 7 days to equilibrate.

Although this is not the fastest method, the risk of over-carbonation is minimized and the beer is carbonated in about a week. Many brewers are anxious to taste their new batch and don't want to wait that long. A faster way to reach equilibrium is to pressurise the keg as described above and then shake it. This is easier if you use a long piece of gas hose between the CO₂ bottle and the barrel. The principle involved is surface area - shaking the barrel increases the exposure of gas and beer. This method works best if the barrel is shaken, allowed to rest and shaken again. After several shake-and-rest cycles you'll notice a difference in the sound of the carbon-dioxide flow from the gas regulator. When the beer is equilibrated with the headspace pressure the sound of carbon dioxide flowing through the regulator will stop. Some brewers take this method a step further and increase the headspace pressure (the carbon dioxide concentration) above the desired equilibrium pressure. This is the second principle I mentioned in the three principles of carbonation rate. Although this method increases carbonation rate, it is not easy to control, as it required the brewer to know the headspace in the vessel accurately- i.e. if headspace = 20% of volume put gas up to five times equilibrium pressure. Since the pressure applied to the system is higher than the desired equilibrium pressure, the beer can be easily over-carbonated.

I personally do not like the technique, but many brewers use it and it's worthy of consideration. One tip to remember when using the "pressurize and shake" method

is to wait a couple hours between the last shake and the first pour! Another technique used to cut down on carbonation time is to inject the carbon dioxide into the beer from the bottom of the barrel. This method increases the gas surface area and also increases the time of gas exposure to the beer as the bubbles rise. Some brewers simply inject gas through the dip tube on the Cornelius keg and slowly bleed gas from the headspace of the barrel. Bleeding off the pressure is important to keep the gas flowing through the beer. The idea is to bleed the headspace so slowly that the headspace agrees with your target equilibrium pressure and the beer does not foam from the top of the keg. This can be accomplished by barely unseating the pressure relief valve on the top of

most Cornelius kegs. Barrels without the pressure relief can be manually bled. The recommended storage/ serving pressure for 25 litre barrels is 5 psi, due to the tap design spraying your beer everywhere.

Widget World Interchangeable Gas System offer cylinders, gauges and valves with full instructions for pressurising barrels. These are available from home brew outlets. Hambleton Bard S30 cylinders can also be used.

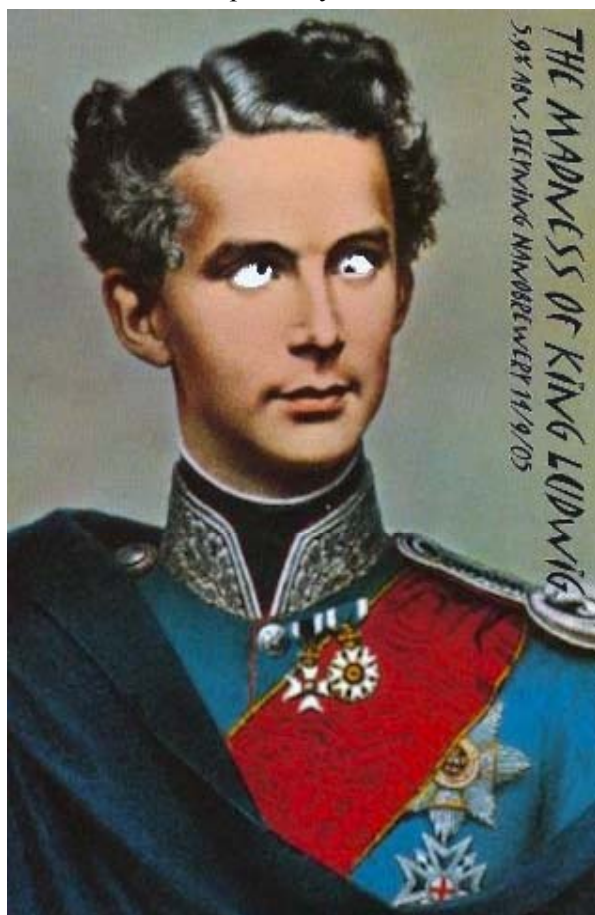
There is a gas chart on the UK Homebrew site at: http://clubs.wanadoo.co.uk/vault/uk-homebrew/Carbonation_Table.xls

Graham Kingham

Label corner

I give away a lot of my beer as I make far more than I can actually drink. Several recent batches have been surprisingly alcoholic and I don't want to catch people by surprise - so I've started making labels to put on the bottles. This one was for a König Ludwig Dunkel clone. King Ludwig was the last king of Bavaria, the one who did all the fairytale castles. He eventually went mad and died while committed; probably an assassination.

Boys' Bitter is a threatened style in the UK, and at 1036 our example is a little strong – 1032 would be more typical. Ten litres were made by boiling the last runnings of an IPA very hard on the gas cooker. Against my expectations the ale was both pale and very, very bright.



I took a standard portrait from his early years, added some googly eyes and a title in a suitably insane font. An awful warning on the dangers of drinking too much 5.9% ABV beer.

Andy Dwelly



A shade embarrassed to discover as we go to press that Crouch Vale make a beer of the same name. We should have stuck with our usual term – Vicar's P*ss!

David Edge

New Craftbrewing Book

Farmhouse Ales, Culture and Craftsmanship in the Belgian Tradition, by Phil Markowski.

Brewers Publications £15.00 guide price.

The text delves into Wallonian Saison and French Bière de Garde, giving both history and recipe information. The ingredients and processes are revealed throughout. The secrets of past masters have been collated during the authors visit to the region, giving a broad range of differing styles. Well worth a read if your interests lie in these styles

SUGARS – More Than Unfinished Alcohol - *Graham Kingham*

Sweet tasting substances trigger one of the four basic flavour detectors on the tip of our tongues. We generally name sweet things as sugars; these are a group of compounds commonly called carbohydrates, which are made up from varying proportions of carbon, hydrogen and oxygen; their names in science all end in **ose**. Sucrose $C_{12}H_{22}O_{11}$ is the most common form, it melts at $160^{\circ}C$ and caramelises at above $200^{\circ}C$. It is manufactured from sugar cane originating from Polynesia or sugar beet. In 1747 Andreas Marggraf, a German chemist, succeeded in extracting sugar from beet in a form that could be used in cooking.

During the Napoleonic Wars, (1793-1815) the British Navy blockaded French ports preventing goods from being imported. The farming of sugar beet then developed rapidly on mainland Europe in order to replace cane sugar.

Sugar is unusual in that it retains or even improves sweetness on heating. The cane is first crushed and hot water is added to extract the sugar. On first cooling, the solution forms pure white crystals; subsequent crops of crystals become progressively darker. The final black tarry liquid left is called molasses and consists of about one third sugar and two-thirds residue compounds. The brown sugars are given a variety of names, Muscovado, Demerara, Light Brown; some of these are white sugar coated with molasses. Apart from the sugars, which are extracted in mashing, (maltose 41% maltotriose 14% sucrose 6%), other sugars added to the brew kettle or used in priming beer, are classified as an adjunct.

Glucose is a monosaccharide, found for example in blood and grapes. It is the building block from which starch chains are constructed.

Sucrose is a disaccharide, found in beet and sugar cane.

Cellulose is a polysaccharide, found in plants and wood, which is indigestible by humans.

Maltotriose, found in malt is a trisaccharide that can be fermented by some brewing yeasts but not others.

There are other sugars called oligosaccharides, which are produced during mashing, such as maltotetraose. These consist of chains of molecules that cannot be broken down easily by yeast, we know them as dextrans. Their role in beer is to add mouth feel by increasing viscosity without adding sweetness.

Fructose is fruit sugar, also found in honey.

Lactose is also known as milk sugar. It is not fermentable by brewing yeasts, so they are often added to sweeten stout. Labelling legislation no longer allows the word 'milk stouts' to be used as they do not contain any milk.

Maltose is the main fermentable sugar found in barley after it has undergone the malting process.

Invert sugars, so called because they will bend a ray of polarized light to the left, are all liquids, such as honey, golden syrup, treacle and molasses. Each can be added to the kettle in small amounts, not normal in excess of 10%. The darker the liquid, the stronger the flavour, which may overpower a brew. Experiment with up to 5% liquid dark sugars in your brew. Inverted sugars are made from ordinary dried sugar, which has been reacted chemically, with an acid or enzyme plus water, dividing them into two parts: glucose and fructose 80%, and water 20%. Because of the water content of invert sugars they can harbour bacteria, so they are added at the kettle stage or, if priming they need to be sterilised before use.

Sucrose will ferment out, leaving pure alcohol. Because of this property all types of malts are compared with sugar for fermentability.

Sucrose has a base sweetness factor of 100%, fructose of 120%, glucose 70%, maltose 50% and lactose 40%. Liquorice 150% is a non-sugar sweetener added in small amounts, 2 - 3 100 mm candy sticks, or 25grams of dried root Liquorice, up to 100grams in Stouts. These can be either natural root sticks from your health shop or the black candied sticks, the kind sold in sweet shops. This is made by boiling the juice down from the root. Commonly called Spanish juice in old books.

Brewers Caramel is often used to add either colour or sweetness. It can be made either when sugar is reacted with ammonia to form a dark colouring, which when added will not add sweetness only colour, or heat treatment which will add both colour and sweetness. Liquid gravy browning adds colour.

What role does sugar play in formulating a beer recipe? Maltose comes naturally with the barley, the main flavouring ingredient. Brewing over 8% ABV can lead to a cloyingly sweet brew, so by adding up to 10% sugar, which will ferment out fully, a lighter and stronger beer, can be produced. At too high a level, in excess of 20 % a thinner, tasteless and higher alcohol brew would result, tasting distinctly cidery. Small amounts of the less refined sugars can enhance a beer flavour. Another use of sugar as an adjunct is to dilute the high nitrogen content of some barley grains.

The Belgians use candi sugar in a lot of their ales to enhance flavours, at the kettle stage or when priming. They can often be recognised by the sweet note given off when drunk. Candi sugar is made by slow crystallization of a hot sugar /caramelised solution mix, which then form on to hanging strings.

March 2006 Issue.

Simple Hop Drier

Beer to Whisky

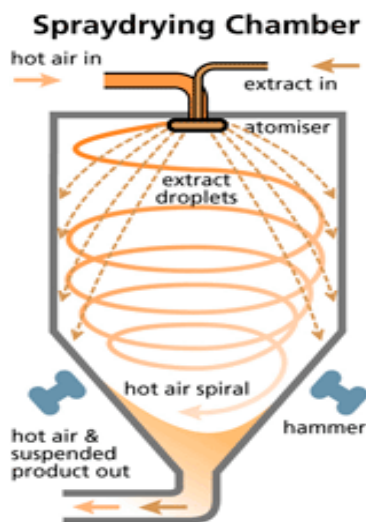
Bottle Rinser

Chlorine - the facts

Wort production 1 - Brewing with Malt Extract.

The next step up from kit brewing is to try out some of the array of malt extracts that are available to the budding craft brewer. The results will not be quite as good as a full mash beer, owing to the lack of controlled mashing conditions. However it helps to introduce some of the principles of brewing, with out the expense of purchasing more kit. Due to the variety of can sizes you can brew a smaller batch using a saucepan, once you have established your confidence, a larger brew kettle would be needed.

When manufactured, malted barley is milled and mashed normally, then the sweet wort is collected and dried under a vacuum, this creates a low boiling point, this is the usually preferred method, as it causes no flavour distortions. The resulting liquid consists of 80% solids and 20% liquid. Dried malt extract are called spray dried extracts, however in Britain we know them as "Spraymalt" this being Muntons trade name. These are produced as mentioned above, but are spray dried to a powdered form in less than four seconds, consisting of 97% solids. They will keep unopened for up to two years. Beware the resulting powder is hygroscopic (attracts moisture from the air) so seal the ends up well. The Lakeland Ltd. kitchen equipment company does a line of bag sealing gadgets called klippits that work well. Once opened it is sensible to treat a bag as biologically suspect and use only in recipes where a boil is specified.



There is another method called vacuum band drying where by the liquid malt is past over a band in a vacuum oven causing hot air to pass through it, making a hard honeycomb which has to be ground up. This produces some flavour changes, so is not recommended for the brewer. They are all non diastatic.

One often-cited reason for using Spraymalt is that liquid extracts are awkward to measure out easily, while powder can be measured precisely, and resealed for storage.

Store opened liquid extract in an airtight container in the fridge. It is recommended that unless you plan to use it within a week, you should throw it away.

There are two types of extract: *diastatic*, which has enzyme (amylase) activity to convert other grains used and *non-diastatic*, which has no enzyme activity due to high temperature in manufacture (80-85°C).

Please note that some labels state DME, which in Britain stands for Diastatic Malt Extract, if you are not sure ask. In America, DME means dried malt extract. "EDME" products are not all diastatic.

Most extracts are in a viscous liquid form. Warming the container in hot water will help to soften the contents, but be ware that any temperature over 70°C will destroy the enzyme activity present in diastatic malt.

Powdered extract (Spraymalt) is available in hopped and non-hopped varieties. These are often used for yeast starter cultures and when priming bottles or adding to a mash to correct a low extract rate. At present Muntons list seven different varieties, including a Beer Enhancer that is a blend of Maltodextrin and Spraymalt, this aids quicker fermentation and adds body to your beer, and wheat Spraymalt blend that aids head retention when added at the priming stage. Some of these Spraymalts can be used in exchange for sugars in recipes. Most Spraymalts are non diastatic.

They can be used for brewing in exchange for liquid extract, see below for calculation rates.

There is also wheat and barley mixed liquid extract available, in a ratio 55 wheat: 45 barley. Together with a full range of coloured malts from pale to dark, these enable you to mix and match, when designing a recipe.

The best recommended companies are Brupaks and Muntons. They supply malt extracts that are pure and suitable for brewing. The cheaper malt extract cans often contain other bulking ingredients, such as maize, corn, glucose, dextrose and barley syrups made by industrial enzymes acting on raw unmalted barley grains. These will have an adverse effect on flavour. Malt extract is used throughout the food and medical industries, so it is of prime importance that you purchase malt that was manufactured for beer brewing only. Brewing barleys contain a lower proportion of nitrogen, reducing the risk of haze.

Diastatic malts allow you to mash adjuncts (which lack diastatic activity). You will need to do a partial mash, by adding the extract to the kettle together with the water and the other grains, then bring the temperature up to 66°C for 30 minutes, do not exceed 68°C as the diastatic activity will be destroyed. Strain out your grain and proceed to boil as per normal with your choice of hops. Malts up to brown malt, which state that they are diastatic, provided by Brupaks can be used, or by kilning your self at home, as per the Durden Park method. Warning, this produces a lovely smell in the house when roasting.

I would always recommend using a water treatment first, to suit the beer style that you are creating by adding the relevant salts and correcting your pH with lactic acid if needed. I personally find the presence of chlorine in the water adds a tang to the finished beer. Chlorine will bond to malts to form chlorophenols, giving a medicinal taste. (A water fact sheet is available from the membership secretary), other treatments are optional.

With non-diastatic extracts you can only add malts that do not need diastatic enzymes to extract their sugars. You can use them by making an infusion, warming 5 litres of water in a saucepan to 65°C and steeping for 45 minutes, then straining into the boiler/ fermenter.

Darker malts (from crystal upwards) have had their starch converted during kilning, hence the reason for using non-diastatic malt extract.

It is always recommended that you boil the hops with the extract; otherwise protein that would normally be removed in a brewery wort boil (and subsequent cooling) will remain in solution within the wort. This will almost certainly result in chill haze and could also affect the final flavour & texture of the fermented beer.

Calculating Rates.

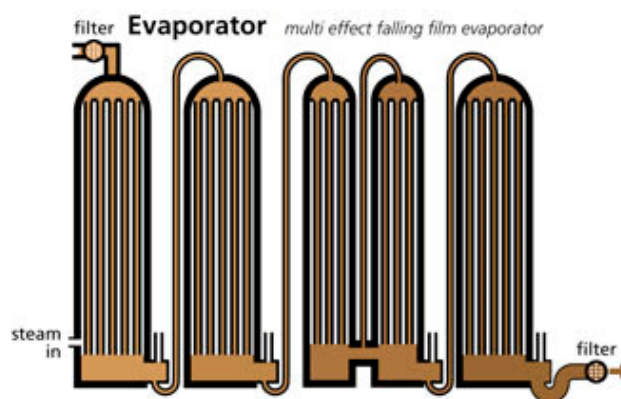
To calculate the amount of extract required when formulating a recipe, work out the number of degree litres of extract required. For example 23 litres x 45OG = 1035 degree litres. A kilogram of liquid extract will supply 300 degree litres so you need $1035/300 = 3.45$ kg. Dried extract will supply 380 degree litres/kg so you need $1035/380 = 2.7$ kg.

To convert a malt recipe to extract multiply the amount of grain by 0.75 for liquid extract, 0.6 for dried extract as these contain more usable material per unit weight than grain, this being the assumed average mash efficiency extract rate that you would achieve when using all grain. eg. 3.5 kg pale malt $3.5 \times 0.75 = 2.45$ kg malt extract

Suggestions for success.

- *If possible, make at least a portion of your wort from malt. (Try to have at least 25%, you can add up to 60% depending on your beer style.) By performing a "partial mash." In addition to enhancing flavour, it will add body and mouth feel*
- *Fermentation can be slower for extract brewing.*
- *If you can't at least partial-mash, try adding small quantities of a yeast nutrient. Brupaks have supplies available from your home brew stockists. Although it may not provide the full spectrum of amino acids necessary to avoid all fermentation problems, it should boost the attenuation rate.*
- *Don't add sugar to extract wort. I personally find it makes the beer too thin.*

- *Some yeast, especially lager strains, are very sensitive to wort composition. Experiment with different types of yeast combinations.*
- *Experiment and always keep notes for future reference.*
- *The final colour of the beer is often darker than a grain mashed beer when using liquid extract; spraymalt does not produce the same effect*
- *The reason being is due to the long heating process to reduce the water contents down during manufacture. The liquid extract continues to darken with age in the can, due to the presents of the remaining water. This is called a Maillard reaction, due to the amino acids and sugars forming a complex. Spraymalt does not darken with age as all of the water contents have been removed. The brown top of your daily loaf has under gone the same process.*
- *Try to use recently supplied cans, do not store them to long before use, with reference to the above.*
- *One comment when using liquid malt extract is that they can have a " tang" about them, one reason is due to the caramelisation in the can, and possibly chlorine in the water.*
- *Always clean and STERILISE all of your equipment first.*
- *If you like body and mouth feel, try using yeast that has a lower attenuation, such as Safale for bitters (but aerate well) or Windsor for brown ales and milds.*
- *Beers that use larger amount of hops, spices and dark grains can stand using a larger proportion of malt extract.*



Malt extract brewing offers a step towards full mash brewing and a chance to experiment in smaller quantities when researching new ideas, and enhancing stronger gravity brews, such as barley wines and stouts.

Two good books take you through extract brewing to full mashing with recipes for both. Home Brewing by G Wheeler and The Seven-Barrel Brewery Brewers' Handbook by G Noonan. See also: www.muntons.com

Graham Kingham

Wort production 2 - Ron's Folly – Ron Allison

Being a cautionary tale in which the Gentle Reader will find some initial smugness (quickly dispelled), problems, stupidity, clumsiness, and an end result, surprisingly, not entirely displeasing

Introduction

I have been brewing since 1970. My brewing notebook shows that my first brew began on 22 December 1970 using a Brewmaster Pale Ale kit that cost six shillings and nine pence. To this was added nine (old) pence worth of white sugar. The fermented wort was placed into quart bottles (does anybody remember the Whitbread flagons with screw tops of the period?) on 29 December. Half a teaspoon of priming sugar was added to each bottle. This was my first-ever brewing mistake – if I had added two teaspoons to each bottle then the result might have been different.

My notebook goes on to note the following. “Beer opened three weeks later. Colour ‘lagerish’, flat, insipid taste. All 16 pints poured down the drain!” Over the next 34 years I have brewed another 249 batches of beer, mainly successfully. Most of these were from kits but I did have a flirtation with full mashing between 1976 and 1980 making some 16 brews in all using a Burco boiler as the mash tun.

Following retirement and a move to Balderton in 2003, I heeded Clive La Pensée's exhortations in *What's Brewing* and joined the Craft Brewing Association. Margaret (my wife) and I have attended several meetings of the Association (very enjoyable) and spent a day with David and Janette Edge where I had a useful time going through a hands-on demonstration of the basic brewing from grain process. (*An invitation open to any member who'd like to see the mashing process – Ed*). Thus, emboldened by the meetings and demonstration I resolved to return to brewing proper beer.

Preliminaries

A keen observer in Lincoln High Street in mid-August would have seen Margaret and I staggering away from Tony Frecklington's home brew shop weighed under with a new fermenting bin, Brupaks mash tun, sundry other small pieces of equipment, malt and the like. The deathly pallor on Margaret's face was not due to the burden (after all she is a farmer's daughter) but rather a reaction to being told the cost of the shopping. Strangely, my explanation that if I brewed (and drank) a lot of beer, fairly, quickly, then the cost would be paid back in less than a year seemed to have no effect on the symptoms whatsoever. Several glasses of the stuff that cheers and a large ham sandwich in ‘The Strugglers’ was more efficacious.

Mashing and Sparging

The great day commenced on 25 August 2005. All the equipment had been cleaned with Chempro and the Burco had been filled and boiled the night before. The water was then heated to 77°C and some was run into the mash tun. A thinnish mix (probably too thin) was made by tipping all the malt (3 kg of crushed Maris Otter and 250 g of crystal malt)

into the mash tun, and stirring well. The temperature of the grist was 65.8°C. I draped an old sheepskin coat over the tun and left it for 90 minutes. The final temperature was between 62 and 64°C depending where the digital thermometer was placed in the tun.

I was very pleased with this – the mashing process must have worked – and I tried, but not too hard, to avoid feelings of smugness. Let sparging commence I thought. I had invested in a Listerman rotating sparging arm. A slight problem is that the connecting tubing is 3/8 inches internal diameter whereas the hose connector that goes over the Burco boiler outlet tap has an outside diameter of 1/2 an inch. However, the tubing had softened enough in boiling water to make it fit. (Does anyone know where to buy a connector with a 3/8 fitting?)

Smooth sailing so far but it was obviously time for things to go wrong and go wrong they did with a vengeance. I opened the tap on the mash tun and found only the merest of trickles coming out. At that rate, assuming it stayed the same, it would take many hours for the sparging process to be completed. What should I do? My solution was to rub the underside of the copper tubing at the bottom of the mash tun with a stainless steel spoon. It certainly improved the flow but, surprise, surprise, the flow was very cloudy! I kept on with the rubbing, the sparging arm rotated, and the cloudy flow continued. After a while I had a “bright idea”. With some difficulty I rigged up a jam-making jelly bag under the tap and trapped most of the floury substances.

After a while, the flow from the tap ran much quicker and clearer. With hindsight I stopped sparging too early - from memory it was after about 20 minutes.

Boiling

Time for another mistake and I duly made one. I added 4 to 5 litres of cold water to the Burco before I added the collected 17 litres of wort. This made the boiler full before I could add all the wort and so about one litre of wort had to be thrown away. This did contain a lot of cloudy material but also, presumably, some fermentable sugars.

Some of the heating elements in the boiler must have gone, as it took no less than two hours to reach a rolling boil. (*If a 3kW Burco is switched on as soon as there is a reasonable amount of wort in it will reach boil in about 45 minutes – about the time it takes to sparge – Ed*.) About 75 g of Goldings were added at the start, the remainder going in with the Irish Moss 15 minutes before the boil finished. The time devoted to boiling was 90 minutes.

The hot wort was run off into my old fermenting bin. There was just under 18 litres and it looked quite clear (good hot break?). Time for another problem. I pushed the plastic tubing well on to both ends of the copper coil that was being used for the cold break, but once the cold water tap

was turned on there was some leakage. I should have bought and used Jubilee clips - I will next time. The coil also became very hot so these two factors obviously produced some muffled swearing. Muffled, not because of the neighbours – they are some distance away - but because I didn't want to provide any evidence for Margaret's outrageous suggestion that New Zealanders swear a lot.



Some features of the Edge cooler that Ron didn't notice:

Jubilee clips;

a brass fitting to adapt the diameter to garden hose;

pipe lagging for hand grip insulation, and

the ends turn down so any drips don't go in the copper.

The temperature fell to 52°C quite quickly. For some reason I stopped the cold break then and siphoned the cooled wort to the new fermenting bin. There was a pleasing amount of sludge left behind (good cold break?). Cold water was added to bring the volume up to around 23 litres. After this, the temperature was still around 35°C.

Disaster

The wort looked fairly clear and it was with keen anticipation that I inserted the hydrometer. I couldn't believe the first reading. The SG was only 1017. Even allowing for the temperature correction this was only 1022 at 16°C and not the 1038 or so I had been expecting.

Checking and rechecking didn't alter the awful result. Loud and bad impersonations of Richard Wilson (repeat "I don't believe it" as many times as you like) didn't seem to help. Nor did bloody hell, bloody hell (better impression of Rodney Bewes in *Whatever Happened to the Likely Lads*). With enormous forbearance and self-control I explained slowly and patiently to my wife that this wasn't swearing, merely recalling a few moments from one of my favourite TV comedies.

My initial thought was to throw it all away and open a few recuperative bottles but we colonials are hardy and persevering types so I covered the bin overnight and in the morning went to Newark and bought 800 g of Munton's SFX malt extract. I dissolved this in some of the wort and added it to the bin. (Boiling the malt first might have been useful.) The hydrometer reading was now 1032 at 25°C - about 1034 at 16°C, if my interpretation of the table in Dave Lines Big Book of Brewing is correct.

The End Result

The yeast (Safale) was pitched and after five days the gravity was 1010 at 24°C. This dropped to 1008 after another three days. Three half-litre bottles were filled and the remainder was put into a Boots 5-gallon aluminium pressure barrel.

Two sample half-pints were tried after 10 days. There was a yeasty taste and smell and it was not particularly clear. To cut a long story short, the draught beer improved and after another two weeks was fairly, but not crystal, clear with no yeast taste or smell. It is drinkable, if a little thin and lacking in character. The bitterness from the 100 g of Goldings is pronounced but I like hoppy beer. The three bottles have cleared well and it will be interesting to taste these.

Looking Back

Obviously mistakes have been made and valuable lessons learned. I have exchanged a fair few emails with David Edge who has been very patient and helpful, as has Janette. It was David who pointed out that the final gravity, before the addition of the SFX malt, wasn't too bad for a first attempt with only 3 kg of malt. For some reason I had it in my head that this would, and should, produce a much higher figure.

The mashing process appears to have been reasonably efficient although there must be room for some improvement. I need to improve the sparging process and be a bit more sensible with hose joints, etc. Checking on recipes before beginning is an obvious must for the future.

I am investing in a new boiler and this together with enough malt and hops for two more 23-litre brews is being ordered from Hop and Grape. I hope to have another two brews under my belt (literally) by the time this account is published.

Brown my backside!

Those who have read Clive la Pensee's "India Pale Ale" will have noticed that Roger Protz (in the celebrity intro) mentions Thom Tomlinson's theory that IPAs were historically amber to copper coloured because copper coppers catalysed the browning reactions.

Graham Smith (Blink) tells me that the Museum Brewery of Burton has a copper copper and mash tun and they used to use copper fermenters. They regularly made very pale lager style beers of just lager malt and single hops - the Hop Pit range. *DE*

Cleaning Copper

Will the person who left a message about cleaning copper on Janette's answer phone please call again? The message was deleted before we got your details.

The Ultimate Beer? by James McCrorie

I have more than a few dear American friends, several of them quite outstandingly good brewers, so I hope they will take the following with a little pinch of salt.

Some American visitors to the UK seem to think that everything is bigger and better in the USA. Which reminds me of the old story about the London cabbie who got fed up with his American tourist passenger who was most un-impressed by the small size of the Houses of Parliament, 10 Downing Street and Buckingham Palace.

He drove him to Fleet Street, it was in the days when this was still the busy 'newspaper street', and stopped outside the Daily Express building. This was, and still is, a fine example of 'art nouveau' styling. He told the American that this was something they didn't have in the USA; an elephant's toilet. The American was unbelieving but the cabbie pointed out a lorry delivering rolls of newsprint and said, "there you are, they are delivering the toilet rolls".

American home and microbrewers have a bee in their bonnet about brewing the highest ABV beer ever sold.

In June 2003 Samuel Adams launched Utopias™, which, at 25% ABV set a new world record. In 1994 they had set the world record with their 'Triple Bock' at 17%ABV then went on to their 'Millennium™' at 21%ABV and, in 2002, Utopias MMII at 24%ABV.

Utopias™ is reportedly brewed with 2-row Harrington (American), caramel, Vienna, 2-row Moravian, and Bavarian smoked malts with Hallertau Mittelfrüh, Tettnang Tettnager, Spalt Spalter and Czech Saaz hops together with a 'hint' of maple syrup.

It is matured in ex bourbon, scotch, cognac and port casks before being blended and bottled.



It is bottled in a very collectable special ceramic copper coloured brew-kettle shaped bottle holding 25 American fluid ounces (26 Imperial) and, originally, only 8,000 bottles were released. The suggested retail price was \$100 per bottle but scarcity value soon pushed the price up in the shops the best price I saw in the USA was \$125.

I had a couple of tastings at GABF in 1993 and was not particularly impressed, certainly not enough to buy a bottle. I did turn down an invitation to a 'breakfast tasting'; one does have one's standards after all, low as they may be. The beer certainly had a great 'mouthfeel' and was a beautiful burgundy colour but somehow it didn't quite seem like beer to my plebeian taste, unlike some 19th century Scottish recipes of around 12% ABV which I've tasted.

Some months later I was invited to a private tasting at the White Horse on Parsons Green. David Grinnell, the Director of Brewing at The Boston Beer Company, together with a few colleagues, had been visiting Speyside to select some ex-whisky casks and had brought some bottles of Utopias™ for tasting.

Whilst not wishing to give away any trade secrets, he explained how they had searched for suitable high gravity yeast and eventually chose one from the British National Yeast Bank. The brew was based on an IPA recipe, i.e. lots of hops, and was fermented with considerably more yeast than normal. During fermentation the brew was 'fed' with various fermentable adjuncts, including maple syrup, and reached temperatures in excess of 25°C. It was then matured in casks, which had originally contained a number of differing spirits and wines before being blended and bottled.

The samples produced here seemed much more impressive than those I'd tasted at GABF and came straight from their impressive bottles. However the tasters, which included Michael Jackson, Ken Don of Young's and John Keeling of Fuller's, all seemed to agree that it reminded them more of sherry than beer. Indeed the discussion developed on whether it reminded them more of oloroso or of amontillado!

If you feel inspired by James's description then here is how one homebrewer in Texas (where else?) had a go. The "Beano" tablets he mentions are an enzyme preparation to reduce flatulence. US homebrewers use them to increase the fermentability of wort. They are not easily available in the UK and one suspects that the UK equivalents – peppermint oil or charcoal tablets might not work as well. However you could use Brupaks amyloglucosidase in the mash tun or fermenter instead – indeed John plans to do so next time. Note that White Labs super high-gravity yeast WLP 099 (<http://www.whitelabs.com/gravity>) does not ferment maltotriose, so an enzyme is almost essential if you want good attenuation. Over to John:

A 20% ABV all-grain beer by John B McKissack III

Here is the procedure I used to brew my 20% ABV all-grain beer.

1) Make a 2-gallon starter @ 1.066 gravity in 6.5-US gallon carboy (keep track of the gravity of your starter and volume as you will have to calculate it in with your wort to calculate you OG accurately). I used WLP099 High gravity yeast. It can ferment to 25% ABV according to White Labs.

2) Mash 31 lbs. of Maris Otter at 146°F (63½°C) overnight (or until conversion is complete)

3) Sparge very slowly until all sugar is extracted (I collected 18 gallons in two kettles).

4) Boil down wort to 4 gallons (I used two large pots) boil slow to reduce caramelization. I also put a clip on fan on each pot blowing on the surface of the wort. This eliminated boil over (it really did, I don't brew without one now) and caused the wort to boil down much faster by blowing the steam away. A better way to boil down is if you have a way to pull a vacuum while boiling it will take less than an hour and have zero caramelization. A friend of mine is a beekeeper and he is going to be getting one eventually. I can't wait.

5) Add hops at last 60 minutes of boil. The final wort had an OG of 1.246, but combined with the starter I had a calculated OG of 1.212

6) Added 1 gallon of wort to the 2 gallon starter

7) Oxygenate for 15 minutes minimum with O₂ and affix air lock. I use a welding oxygen cylinder I bought to use just for brewing (if you are just using air, aerate for over 40 minutes).

8) Can the remaining 3 gallons of wort in 1 quart mason (preserving) jars. Just siphon wort (so thick it siphons slowly) into jars, set lids on loose and set in water bath and bring to a boil for 15 minutes. Then tighten lids.

9) Let ferment until fermentation slows.

10) After fermentation slows add one quart of wort each day and oxygenate for 3 to 5 minutes minimum with O₂ or 9 to 15 min with air. (The oxygenation is essential to keep the yeast population up to pass 20%)

11) Let it ferment out.

12) When fermentation stops short (and it will) add 8 crushed Beano tablets to convert the nonfermentable sugars into fermentable ones. When fermentation slows add 5 more crushed Beano tablets if needed. This is what I did, next time I will add the Beano much sooner, probably one day after I add the last quart of wort. It will shorten the time. Not sure when, but I did rack some time after I added the last quart of wort but before I added the Beano.

The Recipe:

31 lbs. Maris Otter Pale
2 oz. Warrior (Pellets, 16.3 %AA) boiled 60 minutes.
2 oz. Amarillo (Pellets, 9 %AA) boiled 60 minutes.
Yeast: White Labs WLP099 Super High Gravity Ale

Now there is nothing special about the recipe. What is special is the procedure to get a 20% alcohol. You may want to use different grains to add more flavour and different hops, just pick a style. I picked Old Ale, but I hopped the hell out of it, hoping to balance the hop bitterness with the sweetness and high alcohol. My IBUs were 184 according to Beertools.com. I used Warrior & Amarillo because the AAs are so high and I like the hop flavour of Dogfish Head's IPA. When you taste it, it does not taste too hoppy at all. I hope it comes out with age.

Things I would do differently:

- a) Add Beano a little sooner.
- b) Add some grains that are a little more roasty

Just Brew It! - John McKissack III

John is preparing an article for Brew Your Own magazine, but it won't be published until the beer has been tasted. John's beer reached 21.4% ABV when Hurricane Rita struck so he's got other things on his mind at the moment...

Dried yeast update

In the last issue we did a round-up of dried yeasts available in the UK. Things have changed already:

Fermentis US-56 is now available in dried form from the Hop and Grape. It is said that this ale strain (as a liquid yeast) was single-handedly responsible for the US microbrewery revolution. It has a very neutral flavour like Nottingham, slightly lower attenuation like Safale and lower flocculation than either. First reports from US home brewers are very complimentary. The liquid equivalents are WY-1056 and WLP001.

There's better information on the *DCL yeasts* on the Fermentis website www.fermentis.com than on the link we gave - Fermentis now manufacture the yeasts sold by DCL.

We weren't sure about what strain was packaged as *Munton's Gold* so we consulted the Munton's knowledge base. Curiously three answers are given:

- 1) *S cerevisiae*.
- 2) The yeast is *S. aureus*.
- 3) The strain is *Cerevesie carlsbergensis*

Choose your pick. *Staphylococcus aureus* indeed!

Lacock Abbey Brewery

Last month we asked readers for their opinion about brewing without a boil. Three informed responses, for which many thanks.

1539 was before hops had taken a monopoly in British brewing. Herbs or other forms of flavouring fall into several groups. Plants such as hops, undergo chemical change during the boil and develop their flavour components. Tea and coffee don't have much to offer until they have done five minutes in hot water. They form totally new compounds, although in the case of the hop the bittering alpha acid isn't a million miles from the starting compound. These isomers can have quite different properties whilst still retaining their structural similarities.

Another group are the plants such as Mitcham mint, which we chop and use as it is on lamb or peppermint which is often infused in hot water to extract the flavour chemicals for medicinal purposes. In other words we use mint as we find it. Lemon balm is another example. Not so woodruff, which has to be dried before it develops any flavour and then can be hung in the liquid cold and infused that way. Woodruff peeps up white wine in May using this technique.

In the 16th century the gruit was still alive and well in the country gardens. This was a mixture of flavouring plants which changed from house to house depending upon what was available. Many were laid in the cold beer like woodruff or the hot mash liquor run over them on its way to the coolship. Early Porters (1730ish) frequently ran the hot wort onto hops in bags. Some isomerisation took place but this would achieve nowhere near the intense bittering we expect. It did leave the aroma components intact.

In the 16th century ale was drunk very young and spiced or flavoured with whatever was available. Under these circumstances it was quite possible that the wort was never boiled.

I have made a few unboiled beers, with minute amounts of hops, with tansy, just laid in and with tansy boiled for a few minutes, with the squeezed out slime from crushed comfrey roots and a few other things that I'd rather not mention. Many taste great. Why did I stop? The volume of beers one has to make means that if there is no great audience to drink it and it doesn't get boiled, much has to be dumped. But if anyone wants to have a meeting of medieval ales, I'll suggest some recipes and we'll do a non-hop beer festival next summer.

Clive La Pensée

I believe that the accepted wisdom from historians is that malt liquor intended for consumption without any other flavouring was not boiled in the medieval world, or at least this was commonly the case. What would you gain by doing so? ... clarity perhaps, but then it was drunk out of leather mugs. You don't need to boil fruit sugars extracted from grapes, apples etc. for wine and cider.

No ... I haven't tried it. Malt centuries ago would have carried more flavour than our ubiquitous modern pale malt. It was dried over hornbeam and would maybe have been a bit charred in places and certainly smokey, thus would not be completely bland. The strong beer would have kept reasonably well due to the alcohol content and the small beer drunk immediately before spoilage.

Keith Andrews

The brewery is intact and it's obvious that they did not boil. I spoke to the on site N.T. historian who stated that they heated the water, mashed, ran off and filled and mashed twice more. The first was for the gentry, the second for the senior staff and the small beer for the plebs. It all ran from the brewery through lead pipes to fermentation casks in the cellar. Some of the first beer was bottled. She thought that spices/hops would have been put in the mash. Another interesting point is that when the Temperance Society discouraged people from drinking beer, quite a lot of people suffered illness related to malnutrition and vitamin deficiency. No hot or cold breaks for them. The trub was full of goodness and would have been consumed within the beer.

Terry Cooper

Persistent infection problems?

Les Howarth reminded us that bugs can get into scratches in plastic. Chemical cleaners only sanitise the top layer, leaving the little critters to emerge when their protective top layer is dissolved by the wort.

"For much of my brewing in Banbury I suffered with phenolic brews which were fine when drunk young. I used copious amounts of Chempro to try and resolve the problem to no avail. Because of my Chempro usage I (mistakenly) believed that infection wasn't the issue and came round to the belief that chlorine from the Chempro was the cause of my problem. When I moved up to Scotland I scrapped my old pressure barrels and bought new king kegs. My phenolic problem disappeared immediately...for a few years before returning. Clive Donald tasted one of these brews and suggested a wild yeast infection. I decided that a persistent wild yeast infection lurking in my pressure barrels would explain the problems. So I moved to cornies and sterilise them with boiling water and I've now been clear of phenolic beers for several years. I even managed to finally drink a brew dry that had been in a corny for 10 months. So, problem solved, but I agree that wild yeast infections can be very persistent. I believe that steam/boiling water has the advantages of killing anything lurking in scratches or crevices out of reach of chemicals and is also rinse-free."

Scottish Craft Brewers: Using Yeast – a talk by Chris White

Chris White, founder of White Labs, took time out from a conference to address a packed and attentive audience at McCowans Brewhouse, Edinburgh on 20th September 2005. As his talk in England had to be cancelled due to lack of interest, your scribe was delighted to have the opportunity to meet him and indeed the Scottish Craft Brewers in the UK's brewing (if not real ale) capital.

Chris White studied Biochemistry at UC Davies where he took some classes at the Brewing School out of interest. His interest deepened and he went to San Diego to do postgraduate work on yeast in 1991. He then set up White Labs in San Diego in 1995 in a small (90m²) facility which was outgrown by 1998 and they moved to larger premises. During this period he was a keen home brewer and while his interest has been maintained, the success of White Labs means that he gets to brew rather less often.

Most of White Labs' production now goes to US microbreweries, typically producing 5000 - 10 000 bbl/pa. Note that corresponds to a brew length of 50 bbl – contrast with British micros where length is more like 5-30 bbl. (1 bbl = 1 brewer's barrel = 0.7 UK barrels = 1.2 hl).

Production is very different to a dried yeast plant - typically fifty strains (out of 400 in the 'fridge' at -70 to -80C) will be produced each week. About 30% of production is of 'private' strains. Most of production is lager yeast and during the vintage 50% is wine yeast. However Chris's heart is clearly in his ales, as we'll see later.

MICROBIOLOGY

The history of microbiology was, for the first few centuries, that of scientific brewing. In 1680, Antonie van Leeuwenhoek, the pioneer of microscopy first observed "little animalcules" in beer. The significance of these was not fully appreciated until Pasteur (the last Frenchman to teach us anything about brewing - DE) demonstrated that wort would not ferment unless inoculated with yeast around 1850. This was news! Brewers now realised that cleanliness was key to sound beer production, at least those who stayed in business did. Pasteur was without honour in his home country where small breweries fell by the wayside conspicuously earlier than they did elsewhere.

BEER DEMANDS STERILITY

Chris stated that the quality demands for brewing yeast are far higher than that for bread - the destination of most yeast produced - as it is only used for one cycle, as is distillers' yeast. Even wine requires less purity as other flavour elements disguise the characteristics of the yeast.

A characteristic of brewing yeasts is that they do not produce phenolic off flavours (POFs) and are thus known as POF-negative. Chris pointed out that all wild yeasts are POF-positive and thus brewing strains have been created by mutation and selection by brewers. Now those who have suffered phenols in their beer might wonder who would want a POF-positive strain. Wine makers, it would

seem. The flavours in some wines at least overpower the POFs and some wine flavours benefit from wild yeast "contamination".

While brewers started using single strains following Hansen's development of single-cell techniques at Carlsberg around 1880, they were first used for wine production in the 1920s. (Wine producers are still strangely reticent about their yeasts, allowing punters to romantically imagine that the yeast comes from the grape skins - DE)

Anyway, propagation has to be sterile. This is not a quick squirt of sodium metabisulphite - this involves man-sized autoclaves and clean rooms. The results aim to achieve less than 1 bug in 10⁹ cells; Chris reckons that the best dried yeast will achieve 1 in 10⁷. (For comparison, your scribe seldom counts yeast at home without spotting something suspicious swimming about by the time he has counted 100 cells, so purity is not the main reason for selecting liquid yeast - the main reason is flavour - DE)

YEAST PERFORMANCE

Chris listed a range of reasons for yeast death, taken from Walker's 1998 research at Dundee. We select a couple of points from this. Firstly yeast can be killed by shear forces when being pumped. However this should not be a problem for those using magnetic stirrers at a modest swirl, which is sufficient to aerate the wort and clear the evolved CO₂. On CO₂, Chris reckons that a small amount of dissolved CO₂ in a fermentation will seriously reduce yeast performance. Even the small partial pressure of CO₂ built up under an airlock will have an effect. He recommends racking or rousing to clear CO₂ and introduce some oxygen to ensure complete fermentation. Now this is similar the "dropping" method practised by Brakspear's and once advocated by Graham Wheeler. However dropping is often advocated after about 36 hours of fermentation. Chris is suggesting a bit later, but while there is still enough yeast around to mop up the oxygen avoiding oxidation. He cited Sierra Nevada who transfer at 1020, although acknowledges that few breweries do this.

UN-AMERICAN ACTIVITIES?

Chris compared the US and UK brewing traditions and described the US as having no middle ground; beer tends to be either anonymous swill from the big boys or aggressively hopped and strong from the micros. US brewers, he reckons are not very interested in flavours created by yeast, sticking to four or five 'boring' strains. Indeed he noted that the traditionalists in this regard were Anheuser-Busch and Coors who stick with their traditional strains which have flavour and flocculation characteristics that would not recommend them to new brewers.

He praised the British for taking more of an interest in highly-flavoured, low strength ales and making the most of yeast-derived flavours; White Labs use gas chromatography analysis of head space for fusels and esters to characterise their yeast. He advocates open

fermenters for flavour and was greatly relieved to discover that the Scottish Craft Brewers practice was open fermentation. US brewers use sealed fermenters because they are much easier to clean with cleaning in place (CIP) systems and small amounts of aggressive chemicals

He felt that closed fermentation practised in the US leads to greater concentration of undesirable volatiles in the beer; hence some craft brewers characterise their Trappist yeast as "bubblegum" and prefer the Abbey strain. These two yeasts will perform closer to type in open - or at least shallower - fermentation systems. The ideal system he believes is open fermentation, in a clean room. A quote: "I love open fermentation. I try to talk US homebrewers into it. It gives different volatiles and fermentation is faster because the yeast is healthier."

Chris also commented that while the Czech brewer Budweiser Budvar has clung to its traditional yeast they did not appear to give any thought to the change in its performance when they went from wooden fermenters to stainless cylindroconicals. One seldom hears Americans saying how much better things were under the communists and can only hope that Senator McCarthy does not read this journal.

USING YEAST

The audience was surprised to hear that the yeast can remove a considerable amount of the hop character from a beer if it overflows the fermenter or is skimmed; it might be necessary to double hopping rates to account for this. The number of times a yeast can be re-pitched depends on the cleanliness; Chris reckons 2-3 times at home and ten times commercially. Home brewers should be aware of the contamination in domestic kitchens and take appropriate care. Top-cropped yeast is healthier. He states that yeast recovered from bottle-conditioned beer is rarely very good due to stress – but "he would say that, wouldn't he"!

Chris reckons that a single tube is sufficient to ferment 20 litres of ale wort, without a starter. The brewers present generally preferred a starter, and he conceded that there was nothing wrong with that, but stated that during the short periods mentioned (12-24h) the main effect was to wake the yeast up – little cell multiplication would occur. The White Labs tubes contain around 100 billion cells, equivalent to a 'pint starter'. (This is about a quarter of the amount in an 11-g pack of Nottingham Ale yeast – DE) The White Labs tube gives a pitching rate of 5 million cells/ml into 20 litres. Recommended commercial pitching rates for ale are 1 million per degree Plato (i.e. 4 brewers degrees). It's up to the brewer whether to increase the amount of yeast in a starter or in the fermenter – clearly many US brewers produce prize winning ales just pitching straight – Ed). Chris suggests aerating the wort for 30 minutes.

Temperature control is key to a successful fermentation. The character of Belgian ales in particular is determined by yeasts and fermentation temperature. To retain esters (fruitiness), Chris suggests reducing the temperature of fermentation towards the end as the flavours are

developed in the first 72 hours. It is also wise to remove the green beer to a closed fermenter towards the end to reduce the risk of infection.

Lager requires a lot more yeast – four vials might be required. He suggests a starter or, as the substrates for ester formation are not present in the first 12 hours of fermentation, the fermentation could be started at 21°C. This allows yeast to multiply and the fermentation is then cooled to lager temperatures – say 13°C. He concedes that this opinion is not universally held. Similarly ales could be started at 21-24°C – even as high as 27 so long as it is cooled within 12-24h.

One final tip for those who have opened a vial and been sprayed by yeast. Crack the top open as soon as the vial is removed from the fridge and continue to release gas every hour or so until pitching.

NOTES ON SPECIFIC STRAINS

WLP002 has very high flocculation and will in consequence pull out a lot of hop character from the beer. The Edinburgh strain WLP028 in contrast is less flocculent, preserving hop character.

The high-gravity yeast WLP099 does not ferment maltotriose. In consequence to get very high alcohol content it is necessary to use an enzyme. Home brewers are reluctant to do this as the substance persists in the product potentially leading to bottle bombs. With high-alcohol beers (around 20%) this is not a problem, as the alcohol will stop the yeast.

The German lager yeast WLP830 is now their top seller (after WLP001 "Chico") although it is less popular in home brewing circles. It is exported to Japan, Brazil, Taiwan – and indeed back to Germany.

And so, back to the Waverley for the sleeper back to London. Haggis and neeps, Traquair ale and Lagavulin in the lounge car provided a fitting end to a delightful evening. Many thanks to Chris White for his time and openness, John Braithwaite of the Hop & Grape (White Labs UK distributor) for coming north and providing samples and of course the Scots for organising the event.

Compiled by David Edge from his notes and those of Les Howarth and Stuart McLuckie. Statements marked "DE" are his thoughts alone.

Back to Basics, Part Two

The next edition of our back to basics articles is a four page special all about Mashing, due to limited space in this edition we have decided to publish it on our web site. www.craftbrewing.org.uk – look under "Brewers Contact, The Draff"

Beer Academy – *Janette Edge*

My prize for being second in the CBA National Festival was a place on the Beer Academy Foundation Course. The Academy's mission is 'to promote a passion for beer' and their main audience seems to be people in the licensed trade. I set off on a grey day, anxious about what lay ahead, being only a novice brewer (modesty, Ed) and having last faced an exam several decades ago. The courses are run with 20 people from all sorts of places including tele-sales, people who have worked in the industry for all their lives, a Cask Marque inspector, landlords and some generally interested in the course – I did hope I could keep up!

We started promptly with a description of the brewing process and ingredients used. Hops "the spice of beer" were passed round to 'taste' – how horrid the lupulin is... it did explain where the bitterness comes from! We were talked through the tasting process and started by tasting four beers blind – a historical ale, a lager, a popular bitter and a stout from cans and bottles. These were not tutored tastings; rather participants recorded their impressions of the beer before being told what they were. There's a lot of material to cover so there's little time for discussion. We got through 13 'blind' tastings during the day! The most interesting session was with four little snacks to discover which beer went best with each. Some of the serving temperatures seemed inappropriate and there was little information on beer serving temperatures – back at our local café the Russian landlady serves each beer at an appropriate temperature.

A bit of history came after lunch then the various styles of beer were described with sessions on beer presentation, keeping and serving. Other modules covered health issues and the beer market – lots of big numbers. The day was drawing to a close and the exam papers were handed out - twenty questions. I'll say no more about the exam and leave you to discover what it is all about if you go along.

So – do you want to go? Many CBA members will already know rather more about the brewing process than this one-day course can cover and may or may not be interested in the industry trends and figures. That leaves the tasting elements. Certainly the pairing with food was interesting, as was the opportunity to taste a wider range of beers than just cask ale. However the bottom line is the price - £145 per person.

The course however does do a good job of meeting the needs of the target audience – people who work in the trade and perhaps have little or no interest in or knowledge of the product. They'd struggle to leave without an interest given the enthusiasm of the presenter. Courses run in about 20 towns throughout the UK – while they're generally held at breweries, the course is conducted in a classroom. More details see www.beeracademy.org or from Belinda Norton, Wessex House, 80 Park Street, Camberley, Surrey GU15 3PT, email Belinda@bii.org, phone 01276 417855 or just give me a ring.

A very merry Christmas to all our readers.
Wishing you all a prosperous brewing year.

Many thanks to all the contributors who have helped in writing and advising us over the
past year.

Best wishes from the editorial staff.

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Articles for publication should be
submitted to the editor by post or e-
mail.

Publisher: James McCrorie
82 Elmfield Avenue
London, SW17 8AN
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Copy date for March 2006 Issue is
24th February.

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Brewer's Contact is the Journal of the Craft Brewing Association and is privately circulated to members & friends. It is published by the Craft brewing Association, 82 Elmfield Road, London SW17 8AN

The opinions expressed are those of the Authors and not of the editor or the Association, allegedly.

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