Four Beers

Ludwig von Regensburg

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1 Introduction

Alcoholic beverages may be made from any raw material containing sugar. Beer is a beverage made from fermented cereal. Barley is by far the most widely used cereal, although wheat is also quite popular. Beer is usually flavoured by the addition of herbs – especially hops – and sometimes spices. Substances fitting this broad definition can be traced to the neolithic, and formed a significant part of the diet in northern europe through the middle ages and renaissance. The antecedents of modern beer can be clearly traced to medieval Germany.

I have devised a personal project to make historically informed beers for the SCA period. My chosen starting place for this project is to gain a reasonable understanding and proficiency in modern brewing methods, so far as they seem appropriate. These beers therefore represent my first "baby-steps" towards historically-informed beer making.

They are:

1. A beer made from a kit (Cooper's "Real Ale").
2. A beer made from malt extract and hops.
3. A lower alcohol beer differing from the above in type hops and type of yeast.
4. An unhopped, spiced "Ale".

> **Ale vs Beer**: In 16$^{\text{th}}$ C England a distinction was made between "ale", the traditional English drink flavoured with bitter herbs, and "beer" the popular German drink flavoured with hops [1]. Both words are of Germanic origin and had currency in England in the middle ages, but "ale" was the more common [2]. Post period, "ale" has come to have various meanings. In this document the word "beer" is used to cover both, unless a distinction is explicitly made.

2 A note on sources

Instructions for the modern home-brewer are widely available. I have made particular use of [3]. The only detailed period instructions come from Tudor England, courtesy of William Harrison's *Description of England* (1577) [4] in which he provides his wife's recipe. There is a number of sources for the following two centuries, but they closely align with Harrison's. I have leaned heavily on Ian Hornsey's *A history of beer and brewing* [5] for other details.

3 The beer-making process

As today, the principal grain used in beer was barley. First, the barley was *malted*: the grain was steeped in water, then when it had sprouted it was dried. The purpose of this is to stimulate the production of enzymes in the grain that will convert the carbohydrates it is storing into fermentable sugars. The malt is then crushed or ground and steeped in hot water. The hot water activates the enzymes and provides a medium for the resulting sugar. This process is called "mashing". The malty, sugar-rich liquid so obtained is called the "wort". In the renaissance, at least, the wort was boiled, and hops added. Boiling sterilises the wort, and aids in the extraction of alpha acids from the hops. This step is often called "bittering" as it is where the beer gains most of its characteristic bitter taste. The alpha acids also act as a powerful preservative, which was a key factor in the use of hops becoming practically universal. In modern beers, additional hops are often added late in the boil to add aromatic compounds, which would evaporate if added earlier.

The *bitter wort* must now be cooled before yeast can be usefully added. This could be done simply by waiting, however that is not the modern method as there are some advantages to rapid cooling, which requires a heat exchanger. Harrison says to put the liquid in the "cooler", but there is no further indication of this device's operation. Later evidence suggests that this was a large, shallow wooden tray (also called a "cooling ship"). When the wort is cooled (below 30° C) then the yeast may be "pitched". In early times it is generally thought that the fermenting tun was left exposed for the action of wild yeast, but by the renaissance it is likely that a somewhat cultivated yeast was deliberately introduced.

After a passage of days, depending on temperature and the amount of yeast pitched, the fermentation ceases, and the beer is transferred to a cask for storage and transportation, possibly with a pause for clarification beforehand. In period, almost all beer was drawn from a wooden cask; bottling became popular in the seventeenth century. Normal modern practice is to add an amount of sugar to the beer before bottling – "priming" – so that the so-called "secondary fermentation" carbonates the beer. The bubbliness of renaissance beer is difficult to ascertain, because while I have found no suggestion of secondary fermentation, there is some indication that the beer may have been placed in the barrel before primary fermentation had ceased. A seventeenth century instruction on bottling warns that the corks must be securely tied down. Experimentation with wooden casks would be instructive. In any case, the beer was preferably aged before consumption. Queen Elizabeth's beer was aged two months, that of her subordinates one month.

4 My Beers

Brews 2-4 should be regarded as experimental. A single, inexpensive malt has been used to create a base-line against which changes due to other ingredients can be easily judged.

4.1 Brew 1

2 Cooper's "Real Ale" kits.

The kit consisted of pre-hopped liquid malt extract and some yeast. The beer was made according to the instructions provided, except that for the required sugar was substituted the hopped malt extract of a second kit. This was fermented in a plastic barrel with an airlock till done (nearly a week). Prior to bottling the beer was transferred ("racked") into a second container, leaving

most of the dregs behind. The priming sugar (approximately eight grams per litre) was dissolved in hot water, then added to the beer when cool. The beer was then bottled.

Results: Frothy – needs careful pouring and takes a while for the head to settle (my measuring of the priming sugar was very approximate). Excellent head retention and rich, creamy mouth-feel. Good malty taste. Bitter.

4.2 Brew 2

2 kg light dry malt extract
20g Pacific Gem hops
20g Pacifica hops
2/3 pack Coopers Yeast

The malt extract was dissolved in hot water, the *Pacific Gem* hops boiled in the wort for fifty minutes and the *Pacifica* hops added for the last 10 minutes. The hops were held during the boil in a strainer with a cloth lining. The whole was cooled in my kitchen sink by running cold water from the tap and running the heated water out the window with some plastic tubing. Five litres of water was added to make the whole up to 15 litres. The beer was fermented under an airlock. I will add that the above hop specifications underestimates the amount actually used – my measuring equipment was very crude.

Original Gravity: 1.052
Final Gravity: 1.014
Estimated 5.1% alcohol by volume
Priming: 7g / litre (105g in 15 litres)

Results: Definitely beer. Decent head and body; a bit too gassy. Mild, but pleasant hop aroma. Malty flavour, bitter finish, not much in between. Aftertaste strangely like the aftertaste of honey.

4.3 Brew 3

2 kg Light Dry Malt Extract
42g Hallertau Aroma hops
2/3 packet random brew-shop yeast

One third of the hops was included at the start of the boil, another third was added after 30 minutes, the final third added for just the last 5 minutes of the boil. In this case the hops were added to the boil in nylon bags. Otherwise as above. Water was added to make the whole 17 litres. This was fermented "open", in a food-grade plastic bucket.

Original Gravity: 1.040
Final Gravity: 1.014
Estimated 3.5% ABV
Priming: 8g / litre (132g in 16.5 litres)

Very mild, malty flavour. Very little head. Fizzy and slightly sweet. I'm surprised by how little hop has come into this. I suspect the degree of dilution before fermentation was a problem, i.e. I need to boil in a bigger pot (turns out my 17 L pot isn't). I'll try it with breakfast on Saturday.

4.4 Brew 4

1 kg light dry malt extract
14 grams Juniper berries
6 Bay leaves
Whole cloves (some)
Ground ginger (tspn)
Ground cinnamon (tspn)
Ground black pepper (tspn)
1/3 packet of random brew-shop yeast
1/3 packet Cooper's yeast

The idea was to make an unhopped beer, although the necessary bitter herbs were lacking. While I have not seen this particular combination, the spices are all well-attested period beer flavourings, except for black pepper which is a substitute for long pepper, and Bay leaves, which was a desperate attempt on my part to find some suitable but non-toxic greenery. I boiled the malt extract, bay leaves and cloves for 30 minutes. The juniper berries were crushed and added to the wort in a nylon bag.

Original Gravity: 1.052
Final Gravity: 1.012
Estimated 5.4% ABV
Priming: 5g / litre (40g in 8 litres)

Pleasantly effervescent. Tastes rather like a dry ginger beer. Subtle lingering heat from the black pepper. Could benefit from being stronger, or from being weaker.

5 Next Steps

The next step will be to brew from malted grain, rather than malt extract. It will also be useful to try different types of malts. Having obtained a reasonable proficiency with modern mashing techniques, I will then attempt the recipe described by Harrison [4]. It will be interesting to see the relative efficiencies of the two mashing techniques, as well as sampling the progressively weaker beverages produced by the renaissance technique (as opposed to the single beverage produced by modern mashing techniques). It will also be fun to cultivate wild yeast.

I am currently procuring herbs suitable for making gruit ales, although it might take a while to aquire sufficient quantities of appropriate herbs. I have ordered bog myrtle (Myrica gale) seeds from France and will attempt to grow it. Other plants of interest are wild rosemary (Rhododendron tomentosum), heather (Calluna vulgaris), yarrow (Achillea millefolium) and mugwort (Artemisia vulgaris).

I am documenting my efforts on the blog *Ars Antica*: `nososeet2.blogspot.co.nz`.

References

[1] Patrick Bowman. Beer vs ale. http://nososeet2.blogspot.co.nz/2012/02/beer-vs-ale.html, 2012.

[2] *Oxford English Dictionary*. Oxford University Press. http://www.oed.com.

[3] Brian Kunath. *Mastering Homebrew: The Beer Maker's Bible*. The Apple Press, 1998.

[4] William Harrison. *A Description of England*. Project Gutenberg, 1577. http://www.gutenberg.org/ebooks/32593.

[5] Ian S. Hornsey. *A History of Beer and Brewing*. The Royal Society of Chemistry, 2003.