BREWERY HISTORY

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A BELGIAN BREWERY AND ITS BEERS*

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Some time ago I was commissioned by a gentleman who had bought a small brewery in Belgium to fit up the brewery with the necessary plant, and brew under English conditions in order to get inside the Belgian tariff wall, and also save the large costs or shipment from this country. There was also small bottling plant at the brewery.

I found the brewery premises in excellent state - beautifully constructed - on the tower system - with tiled floors on every storey.

Almost all the windows were broken and half the roof tiles were off, whilst every particle of brass or copper had been removed by the Germans, including the copper, with its dome, mash tun taps and pipes, refrigerator, and every bearing from the shafting and boiler house fittings.
There was a hand malt hoist on the top floor, a good malt store and a cold liquor tank. On the next floor was the mill, hop store room, and hot liquor tank. On the third floor was the malt hopper, mash tun fitted with rakes, main steam engine, and beneath this was a flat cast iron cooler. On the ground floor was a space where the refrigerator had been, and also a large cast iron tank. Below were very line cellars. The Bottling Room adjoined the brewery.

The Belgian method of brewing top fermentation beer is very simple. The wort runs from the tun to the copper, from there to the flat cooler, with a small hop strainer. The wort is left on the cooler all night. In the morning it is run over the refrigerator and into a large collecting back. There yeast is added and left for a further 24 hours, and the wort is then run, in the case of large breweries, into casks the size of a puncheon, and in smaller breweries into ordinary casks. It is really the Burton Union system on primitive lines - yeast working out of the bung hole.

However, the beer turned out is astonishingly good and cheap.

As is well known, the question of an ample supply of brewing and refrigerating water is an important factor. There was no water suitable for refrigerating or even drinking during the summer. It was cold enough in the winter, but not in the summer. Once I had to pitch at 72ºF. Needless to say, the beer hardly kept a fortnight, so I was compelled to install a water-cooling plant.

The late brewer used to cart his water from a well, which I found full of refuse. Carting the water was a terribly slow game, so I put down a pump in the cellar and pumped the water through about 150 yards of hose. As the pipe had to cross a town street it was very difficult to manage, for the only time I could pump with any safety was between 2 and 7a.m., and even then had to have a man in the street holding up carts, etc. I applied to the authorities for permission to put an iron pipe under the road and under someone else's land during a thick fog. When each section was in and covered I went along and camouflaged the newness of the soil. So after many vicissitudes, we got the water - the brewing water - and the best water, undoubtedly, in the neighbourhood.

I sent samples to London, which were condemned as totally unfit for brewing owing to the immense quantities of free and albuminoid ammonia, also that there were many pathogenic bacteria, and even to wash casks was dangerous. This was a serious matter, and something had to be done. After consultation the following

treatment was suggested: 7 grains of Chlorinated Sulphite (to take the taste and smell of the Chlorine away), again mixing and standing for an hour.

This was an excellent method of treating the water, for the combinations formed were useful constituents in a brewing water, while the water was rendered absolutely sterile by the free Chlorine, and then it did not matter if a little unboiled water did get into one's squares or casks. At all events, after adopting this treatment the beers were excellent in every way.

A Lebrun ammonia compressor and a Bandelot type water cooler were placed on the top floor with a large reinforced concrete tank to hold a good reserve supply of water for refrigerating the attemperating purposes. This concrete tank was erected on the top of 6in. of granulated compressed cork, thoroughly insulated round the sides and top after completion. It worked very satisfactorily. An hour or two before refrigerating the compressor was started, the water being cooled from 70º - 50º.

The tiled floor of the malt room was covered with wood. I did this as the malt was increasing considerably in moisture, although the tiles were apparently dry. I feel sure this is a point that is often overlooked in English breweries. Tiles or brick always contain much moisture, and to stand malt sacks directly on top is distinctly harmful.

The Mill was a Meura two-roller, but without the Meura shaking device.

The first brew yielded a bad extract and I found a fair-sized place at the back where whole corns had been slipping through underground. After this had been remedied it worked fairly well, though it always gave too much flour, and a modern mill would have soon paid for its installation by saving extract.

The Malt Grist Hopper I had lined with zinc sheeting - a most necessary precaution, I think. In its original state there were several cracks, and malt dust used to come out in clouds.

The 17-quarter Mash Tun was of great width in comparison to its depth, fitted with rakes and a small Meura mashing machine. This mashing machine was only fitted with 9 rakes, and the grist came out half dry. I bought a second-hand Steele's and put this in instead. There were many disadvantages about the mash tun, and I think the disadvantages were so marked that they are worth considering.

The goods lost heat - after an initial of 150º the wort ran off at 130º, even though the mash tun had been well heated up. It was so very wide and shallow, and there was such a mass of iron in the shape of rakes, connecting girders, and driving axles, which conducted away the heat.

To remedy this the space was lagged between the match-boarding of the sides and the tun, and a steam coil placed underneath the tun, in the cavity between the bricks which supported it.

There was another defect: Instead of having, as one does in England, pipes carried to, say, a couple of inches above the bottom of the tun to run the wort off the mash tun furnished with channels - channels which went radiating across the tun from each of its six taps. Into these channels all the bits used to run when taps were first set, and the wort always ran very thick for half.

I had to pump back the first wort into the mash tun. It is advisable either to pump the wort back through the sparge arms or to place a large flat wooden table-top on top of the mash, otherwise a large hole is made in the goods.

This mash tun has made me very certain about one thing, and that is that the mash when coming from the mashing machine should always be conducted to the centre of the tun. Invariably the last running from No. 6 tap were considerably higher than No. 5. and No. 5 higher than No. 4, and so on down to No. 1 tap, which was always low. This happened even though the rakes were used, and though the level of the goods after all the wort was off was perfect. The fact was, of course, that the grist dropped in on the mashing machine side, and although the rakes levelled up the husk of the grist, they did not move the flour and many of the actual grits themselves.

I think this is a point often overlooked in England. When there are no channels to divide up the mash tun into definite areas, you cannot very easily make a dis-

tinct test. I mean to say, should you really be drawing off wort and water together, you cannot very well tell, because they will get much more mixed when running to five or six holes. Particularly so, as there is always an inch or so of wort below the level of the top of the draining off pipes.

Another point in connection with mash tuns is this: Quite often you find mash tuns where in order to furnish a means of underletting someone has run a water pipe below or about the level of the bottom of the tun, and then connected up from this pipe to the wort draw-off pipes.

An arrangement like this renders the separate taps to each draw-off pipe useless, inasmuch as the wort when shut off by one tap can run up the underletting water pipe and down any of the other draw-off pipes. One might as well have one tap only for all the pipes. The proper way, and the way which is always done in Belgium, is to run your underletting pipe across the mash tun above the level of its highest possible content, and then to connect from this with 6 vertical pipes to the draw-off pipes.

I got a second-hand copper from England, but in order to comply with the Belgian law, I had to fit a long gauge glass, with a board behind it marked off in centimetres, running the whole height of the copper. The Excise then gauge the vessel, and the charge is taken when the wort has reached boiling point in the copper. This is a nuisance, not only to the Brewer, but to the Excise, for I filled the copper twice during a brew, and in large breweries there may be several coppers This means that the Excise have to be at your brewery for several hours when taking a charge.

Belgium, however, is a country of small breweries, and no doubt the safest way to check the small brewer is when the wort is boiling and well mixed.

Duty is paid on the materials used, but the brewer is allowed to get more than a certain extract from his materials. I think it worked out at about 94 brewers' lbs. per qr. If he got more than this from the materials he had previously entered in the excise book he was liable to a heavy fine. The Excise did not take every charge, but about one in ten, or less. They came in in unexpectedly, always trying to catch one getting too much extract.

From the copper the wort ran to a hop-back, which was placed in a room originally the brewery stables, but I didn't like having stables adjoining my main brewery building, so I concreted the floor, cemented the walls, put a good drain outside, and then made use of a large rectangular cast iron tank which I had found on the place. I got some second-hand plates from England, and with the aid of cast iron blanks at the sides made an excellent hop-back. Of course, a rectangular hop-back is a disadvantage, but it acted quite well as a strainer.

From here the water was pumped to the floor level to another cast iron tank. This vessel served two purposes. Before being used as a feeder for the refrigerators, it was used to hold the weak worts from the mash tun. These were pumped to it and, in fact, it held the whole of the second copper. The weak wort was kept at 150º with a naked steam jet, while the first copper was boiling, and then immediately the first copper was out, it could be refilled in five minutes from this vessel. Underneath this feeder vessel on the floor below were the two Lawrence refrigerators, bought in London. These had large cast iron troughs, and as it was impossible to make good close joints with them, I was always nervous about the interstices of these joints.

The fermenting room was built where the original large flat cooler had been. Two small fermenting vessels, two larger ones, and one very large 150 brl. tun were installed.

When the trade commences at 10 Bls. a week of one beer, at a gravity of 1020, it is advisable to have fermenting vessels or different and progressive sizes, otherwise the beer is likely to be unfit for sale before it goes out. I did not like doing away with the large flat cooler, but in this case it had to be done, otherwise we were short of room. I am myself still a believer in thie old large flat cooler, provided it can be placed in a lofty situation, free from the danger of infection from malt or mill room dust. I have worked in one large the brewery where the flat cooler was used, the results were not so good. It seems, however, that it is a question of elimination of albuminoid sludge, and I believe that either a very large hop-back is necessary, or a large flat cooler, also horizontal refrigerators are to be preferred to verticals.

The copper, hop-back, receiving vessel, 3 pumps, 5 fermenting vessels, and piping, were installed without

the help of a single fitter or engineer who had worked in a brewery before.

The main classes of beers were as follows:-
Biere "**Blonde and Brune**" 1015-1025.
Sterk - A very sweet ale of from 8º grav. to 15º grav.
Baviere 1030 - Superior top fermentation beer.
Bock 1045 - Low fermentation and lagered.
Pale Ale Anglais 1060.
Scotch Ale 1080.
Stout Double 1072.
Stout Ord. Cheap 1048.
Xmas Ale 1110.

When I left a year ago Biere Ordinaire was being sold at about 40 francs per Brl., or 15/- at the then rate of exchange. The duty paid amounted to only 2/- per Brl. British Beer cost to buy from the agent about 400 francs per Brl., owing to a tariff of 48 francs per Brl. And to high transport costs, owing to its comparatively gravity, but in spite of this there was still a very big import of British beer into Belgium, where, above all, if they can afford it, they like their beer strong. Bass was the main importer.

German double Munich was also being sold extensively ill the country, and also special beers like Lambic and Geuze, which are a kind of sour beer which is sold only in bottle, and is usually drunk with an addition of sugar. Of these we decided to brew the top fermentation beers and to add the bottom fermentation ones later. I found it impossible to get the same flavour that other local brewers were getting until someone mentioned Saccharine and Glycyrrhizine to me. Saccharine was supposed not to be allowed, but laws in Belgium, while being well thought out and drawn up, are only made to be broken, and even large Brussels breweries were, I found, using Saccharine, while Glycyrrhizine was extensively used to give a sweet soft taste on the palate.

Glycyrrhizine, or Liquorice Root, is legal in Belgium, and, indeed, legal over here. It has 40 times the sweetening power of cane sugar, and if used in small quantities one must be careful not to exceed more than 20 grammes a brl.- I think it is a splendid adjunct for a weak beer or stout.

No doubt many stout caramels in this country have a quantity of liquorice in their composition, but in the use of Glycyrrhizine, it is much better that it be not raised over a temperature of 140ºF. The Belgian instructions for its use states it is not to be added to the copper, but either to the fermenting vessel at the time of pitching, or after fermentation.

A certain amount is insoluble, and a deposit is thrown down when it is added to beer, so I advise adding it a day or so before the beer is actually fined. I should be very interested to know if anyone has any experience in the use of Glycyrrhizine in this country. I believe it is used a good deal by brewers in the north.

The Belgian seems to be a great believer in yeast washing and aeration, both for top and bottom fermentation yeasts. I found at this brewery a cylindrical vessel with a kind of dolly tub vacuum washer. The pitching yeast was placed in this tub when about half full of cold water and then aerated and washed by means of this dolly tub business. It seems extraordinary to me that so little of this kind of thing is done in this country particularly in breweries which have a supply of compressed and filtered air in their fermenting rooms. These breweries supply air to their worts up to about ½ gravity in order to benefit the yeast, but they seldom seem to use their compressed air either direct on the yeast itself or when mixed with water. I have no practical experience of this procedure myself, but to free the yeast from the fermentation sludge that must be adhering to it, and to give it air at the same time could only, I believe, do good.

The boiler was fitted with a safety whistle and a composition lead plug which melted at the temperature of .steam of about 2 atmospheres pressure, but which did not melt at the temperature of boiling water. A pipe from this whistle led through the top of the boiler to the lowest water level consistent with safety, consequently, while the water remained above this level the whistle was shut off by the fusible plug, but if the water got too low steam was admitted to the plug, which then melted and the warning whistle blew loudly. This seems a much better idea than the fusible plug above the fire itself, which we have so commonly over here, as when this plug goes one has no alternative but to draw fire and shut down the boiler. With the Belgian warning whistle one simply turns the whistle off, pumps water into the boiler, and reprimands the stoker. Moreover, as a seal is attached to the whistle which has to be broken to stop the continuous whistling noise, you can always tell if the whistle has gone off at any time.

There were many - Want of stability in the Stout, which was due to the slack black malt, mash tun rapidly losing heat, absence of enough hops, and want of preservative. To cure the slack malt I had some metal cylinders made of about 1½ cwts. Capacity, and airtight. These were sent to the roast malt factory to be filled. The' extra expense of carriage was, of course, not inconsiderable, but I felt it was fully worth it.

Whilst I was absent, owing to a mistake I found that I had only put 7lbs. of hops per qr. into the coppers instead of 11. However, I reckoned all would be well, as 7lbs. is no small amount. This brew kept fairly sound for about six weeks, but almost every barrel was complained about and returned to the brewery, while the brews before and afterwards with 11lbs. of hops kept perfectly sound. I mention this because we brewers talk much about how the stability of beer may be increased, and one method - addition to hop rate - is too often neglected.

The Pale Ale, after about three weeks in cask, fretted, refusing to fine. This was my first real experience of a wild yeast fret, and I found it was due to the following cause: We had some ten barrels of English Pale Ale in stock, but it was too expensive for the Belgian to buy, so I decided to make a blend, and accordingly brewed a Pale Ale of about 30 brls. length, which, however, did not ferment low enough. At racking, I added ten brls. of English to the thirty of Belgian Pale Ale. The result was excellent for about three weeks. The taste was everything that could be desired, it fined brilliantly immediately, and there was a most perfect hop flavour and body. On these samples I received several very large orders, but after three weeks or so disaster overtook us with this fret. I tried every kind of finings, English, Belgian, including Irish moss solution, but all to no purpose. The trouble arose, not through the actual mixing of the Pale Ales, but through the addition of a number of secondary yeasts to a beer not fermented quite low enough. To anyone else who would wish to blend I say, see the new beer is fermented as low as possible, also be very careful to add the old beer only in a brilliant condition.

It is most disheartening to go down to one's store of bottles and see a film of Mycoderma appearing on the tops of every bottle. I was greatly troubled by it, in spite of the bottes being well dried before filling, and in spite of using Soda and then SO_2 in the washing water. Eventually the trouble was cured by reducing the space left in the bottle after filling to only half an inch. I had changed from the use of ordinary corks to the use of crown corks, and one is apt not to allow for the greatly increased air space given by crown corks.

It was very difficult to get the "Xmas Ale" to attenuate low enough. I used to have pressed pitching yeast sent over from England, and I assumed that 1lb. of pressed yeast would give the same results as 2lbs. of liquid yeast. But this was not the case in practice, the pressed yeast did not start nearly so rapidly, and although rousing was done often, I found it very difficult to get this beer with an O.G. of 110 below 1040. The consequence was that when this beer was bottled at about six weeks old, it eventually became so lively in bottle that it burst nearly all the bottles. The only way to cure this that I knew was to have it much older before bottling. Perhaps, however, if a little cold water malt extract had been added to the barrels, and a good secondary fermentation started by the breaking down of the dextrin, more early bottling might have been possible.

* "Some Experiences in the re-establishment of a brewery in Belgium; with note on Belgian Beer." A paper read by Mr. S.H. Evershed, Jun., before the Midland Section.

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