

A DAY AT A BREWERY

GEORGE DODD

Those dwellers in and visitors to the 'Great Metropolis' who cross Southwark Bridge from the City to the Borough can scarcely fail to have observed the array of tall chimneys which meets the eye on either side of its southern extremity; each one serving as a kind of beacon or guide-post to some large manufacturing establishment beneath—here a brewery, there a saw-mill, farther on a hat factory, a distillery, a vinegar factory, and numerous others. Indeed, Southwark is as distinguishable at a distance for its numerous tall chimneys and the clouds of smoke emitted by them, as London is for its thickly-congregated church-spires. Let the reader, when next on the bridge, single out from among these chimneys one more bulky, though not more lofty, than the rest; and this will point out the spot where one of those gigantic establishments—a London Brewery—is situated; establishments which, whether we regard the extent of the buildings comprising them, the amount of invested capital by which they are maintained, or the systematic arrangements by which the daily operations are conducted, rank among the first in the kingdom, or indeed in the world. Without entering into the chemical niceties which are involved in the process of brewing, or into a history of beer and malt liquors generally, we hope to convey to the reader some idea of the astonishing magnitude of the arrangements and the labour by which a 'pint of porter' is produced.

On crossing Southwark Bridge to the Surrey side of the water, the Bridge-road passes over a narrow street running parallel with the river, to which we descend by a flight of stone steps; and on looking eastward along this street, we observe large ranges of buildings on either side, connected by a covered bridge or passage thirty feet from the ground. These piles of buildings form parts of the brewery of Messrs. Barclay and Perkins; and on

approaching the end of the right-hand range, we arrive at another street leading southward, both sides of which are in like manner occupied by the brewery buildings, extending to a distance of several hundred feet. Proceeding southward along this street, we pass under a light and elegant suspension-bridge, by which communication is established between the opposite sides; and beyond this we arrive at the entrance to the brewery, within which are two or three open yards or squares, surrounded by buildings of vast extent. The engraving represents some of the principal buildings of the brewery, together with the suspension-bridge, taken from a spot nearly opposite the principal entrance. The entrance gate is large and elegant, and fronting it is a building appropriated as offices and counting-houses, where thirty or forty clerks are employed.

Nearly in the middle of the premises is a building, called the 'tunroom,' in which some of the processes connected with the brewing are conducted; and from the leaded roof of this building we obtain a panoramic view of nearly all the various parts of the brewery. Towards the north-east, on the river side, is a wharf, from whence beer is shipped for exportation; to the north are two large ranges of maltwarehouses, separated by the street first alluded to, and connected by the covered bridge; westward is an open court, containing at various points in its circuit an engine-house with all the steam-engine apparatus, two water-reservoirs for the supply of the establishment, a cooperage, a building where casks are cleansed, sheds for containing empty casks, and various other buildings: southward is a most extensive range of storehouses, where the beer is kept in vats; and beyond these is a range of stables for the dray-horses: to the south-east is the fining-house and some of the storehouses; and, lastly, eastward are the porter and ale



Figure 1. Entrance to Barclay's Brewery.

brewhouses, connected by the suspension-bridge passing over a street below. Such are the extensive ranges of buildings visible from the elevated roof of the 'tun-room;' the whole covering a space of ground eight or nine acres in area, and from a quarter to a third of a mile in circuit.

The purposes to which these several buildings are applied will perhaps best be understood by following the processes in the order actually observed in the brewery; by tracing the water, malt, and hops through their successive changes, as far at least as may be done without discussing the scientific details of the processes.

The water used for brewing is that of the river Thames, pumped up by means of a steam-engine through a large iron main; the main passing under the malt-warehouses, and leading to the reservoirs in the open court of the brewery. The appellation given to these cisterns reminds us of the fact that every manufacture has its peculiar

phraseology, not easily understood by strangers: for when we hear mention made of the 'liquor-back,' it requires some explanation to show that this is but another name for 'water-reservoir;' water, in the language of the brew-house, being 'liquor,' and a cistern or reservoir a 'back.' Into these cisterns, then, the water is conveyed; and we have seldom seen a cast-iron structure present a finer combination of strength with elegance. Fifteen iron columns, each nearly half a yard in diameter, are ranged in three rows of five each; and on the top of these columns is the lower cistern, a cast-iron vessel about thirty-two feet long by twenty wide, and several feet deep. From this cistern rise the supports by which a second one, about the same size as the former, is upheld; and a light staircase leads up from the ground to the upper cistern. The whole structure, reaching an elevation of probably forty feet, is made of cast-iron.

By these means, then, the establishment is supplied with a reservoir of water for brewing, the water flowing into

the various vessels from the cisterns by the usual kinds of apparatus ; and the importance of these arrangements may be judged from the fact that a hundred thousand gallons of water, on an average, are required for the services of the brewery every day. There is a well on the premises, not far from the cisterns; but the water obtained thence is employed principally, on account of its low temperature, to aid the cooling of the beer in hot weather.

All the pumps by which the water is conveyed from the Thames to the cisterns and from the cisterns to the brewing-vessels, as well as various machinery used in the brewhouse, are worked by a steamengine situated near the water cisterns. There are two engines; one of forty-five and the other of thirty horse-power, used together or separate according to the extent of operations at different times. The construction of these engines, and the mode in which power is communicated from them to various parts of the establishment, resemble those generally observed in large factories, and need not claim particular notice here.

A visitor's attention may next be directed to the malt, and the means by which it is conveyed to the brewing buildings. On looking from the great brewhouse towards the river he will probably be struck with the appearance of a string of sturdy porters, each carrying a large sack on his back from a barge at the river-side to the malt-warehouses. These men follow each other pretty closely, each one bringing his sack of malt, weighing about one and a half hundredweight, from the barge, depositing the contents in the warehouses, and returning to the barge with the empty sack. If the malt-warehouses extended to the river, the bags or quarters of malt would probably be hauled up by crane and pulley from the barge lying beneath; but premises unconnected with the brewery intervene, and consequently the services of these maltporters are necessary. Each man carries his bag of malt into the warehouse, up several flights of stairs, and empties the contents into one of a series 'of enormous bins or boxes. These bins, which are about two dozen in number, are of such extraordinary dimensions, especially in height, that we may say, without exaggeration, that an ordinary threestoried house,-roof, chimneys, and all,-might be contained and shut up in one of them. They are formed entirely of wood, and are supplied with malt till full; the earlier portions of the supply being introduced at a door half-way up the bin, afterwards closed up.



Figure 2.

As the northern malt-warehouse is separated by a street from the brewery buildings, the malt originally deposited there is, when wanted, conveyed from the north to the south warehouse by an arrangement of a very curious kind. At the lower part of the front of each malt-bin is a little sliding door, eight or ten inches wide and rather more in height, which, when slid upwards, allows the malt to rush out with great quickness; and at these doors another set of malt-porters, such as are represented in the cut in page 20 [above], are employed whenever the malt is to be transferred from the north to the south warehouse. Each man brings a basket covered with leather, and capable of holding about two bushels, to a shelf or stage beneath the sliding door; opens the latter; fills his basket with malt; takes it on his back by means of a strap held in the hand, and carries it to a large funnel or 'hopper,' into which he empties the malt. In this manner each man will frequently carry four hundred loads in a day, of two bushels each, from the bins to the funnel; and as all the men deposit their loads of malt in the same funnel, it is natural to look to this as the immediate channel of communication. Dipping into this funnel is an apparatus called, in the language of the brewery, a 'Jacob's ladder,' consisting of an endless leather band, passing round rollers at the top and bot-

tom, and carrying a series of tin buckets, each capable of holding about two quarts. As the band travels vertically up and down, each bucket in turn dips into the malt, becomes filled, travels upwards to the top of the building, and empties its contents upon a canvas cloth: the buckets are thus, in fact, substitutes for porters, each one in turn conveying its two quarts of malt up to the top of the building.

The cloth on which the malt is emptied is stretched across the street from the north to the south malt-warehouse; and, to understand its action, we must beg the reader (claiming pardon for the homeliness of the simile) to imagine a jack-towel passing horizontally across the street, and stretched over rollers at the two ends. Each little bucket pours its contents on the upper stage of this towel or cloth, which is called a 'carrier;' and the deposited heaps travel from the north to the south warehouses, the lower stage of the cloth at the same time returning empty in the opposite direction. The covered passage containing this cloth or 'carrier' is that which meets the eye when looking eastward from the Southwark-bridge Road; and it was by this passage that we crossed from the north to the south malt-warehouse.

Having thus traced the malt in its progress from one warehouse to the other, we next watched its preparation for the brewing processes. The malt which had been originally deposited in the bins of the southern warehouse, as well as that which is brought from the northern, is emptied into one common funnel or 'hopper;' the former being brought in baskets by another set of maltmen from the bins, and the latter flowing down a pipe from the endless 'carrier' cloth. From this funnel the malt descends through a pipe into a lower receptacle in the mill or grinding-room, and is taken up by a second 'Jacob's ladder' to a hopper, or receptacle in the upper part of the mill-room, from which it descends into one or other of the grinding (or, rather, crushing) machines represented in the subjoined cut. Each of these machines contains a pair of steel rollers rotating nearly in contact, by passing between which the malt becomes crushed into the state called grist. This grist may have any degree of fineness suitable for the kind of malt-liquor to be produced, by regulating the distance between the rollers.

A third 'Jacob's ladder,' much larger than either of the others, carries the grist from the grinding-room to a

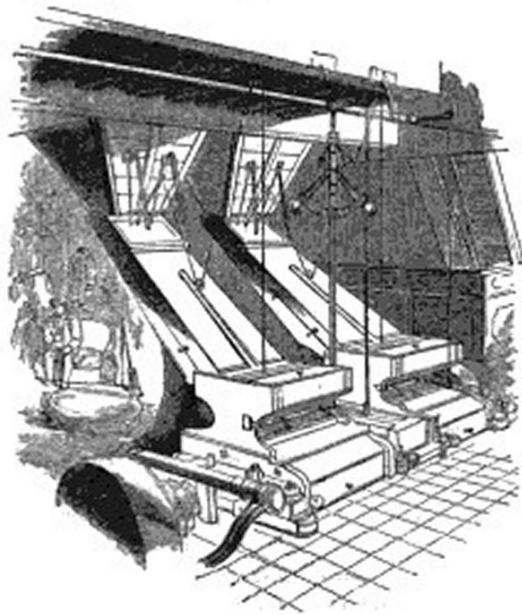


Figure 3.

height of. sixty or seventy feet in the middle of the great brewhouse and near its roof; where the grist is deposited in various channels, of which we shall have to speak presently. The stages or layers of these 'Jacob's ladders,' or, rather, the ascending and descending ladder, are each enclosed in an iron trunk or case extending the whole length; the ascending ladder having the buckets full, while those of the descending ladder are empty. The subjoined cut shows the appearance of two of the buckets seen through an open door in the iron case. The buckets and the endless leather band to which they are attached are set in motion by machinery connected with one or both of the rollers at the ends of the ladder; and when we state that these buckets raise up, on an average of the whole year, more than two thousand two hundred quarters of malt per week (for this is the quantity required for the brewery), it will be allowed that this 'Jacob's ladder' is a most industrious porter.

Of the great brewhouse itself, to which we have now arrived, it is no easy task to give a description. The first effect on the mind of a stranger is a state of bewilderment, which is not removed till matters are viewed a little more in detail. The dimensions of the room are so vast, the brewing utensils reach to such a height, and the

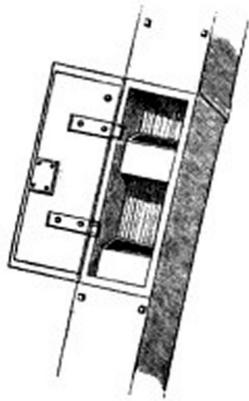


Figure 4.

pumps, pipes, rods, and other apparatus are so thickly arranged on every side, that unless we follow the actual brewing processes in their regular order, the whole assemblage, to the mind of a visitor, becomes a mass of confusion.

In the first place the reader must imagine a room nearly equalling Westminster Hall in magnitude, built entirely of iron and brick, and

uninterrupted by distinct floors or partitions, so as to be open from the ground to the roof, except where stages and platforms occur in various parts and at various heights. The room is lighted by eight lofty windows on the east side; and all round the walls just below the roof are openings for the exit of steam. The principal part of the room is occupied by ten enormous piles of brewing vessels, reaching from the ground to a great height.

Without troubling ourselves with detailed measurements, it will be sufficient to state the average diameters of all these vessels at about twenty feet; and the arrangement of them is as follows:- The piles of vessels are ranged in two rows of five each, occupying the greater part of the length of the room, parallel with the windows. Those nearest to the windows consist of a square iron vessel called an 'under-back' (i.e. lower cistern), near the ground; above this a circular vessel called the 'mash-tun;' above this again a square wooden box called a 'malt-case;' and, highest of all, a pipe to convey malt into this case. Each one of the set farthest removed from the windows consists, near the bottom, of a large furnace; above this, a copper-boiler enclosed in brick-work, and capable of holding nearly twelve thousand gallons; above this again, a vessel called a 'copperpan;' and at the top a 'copper-back,' for receiving the wort previous to its being boiled with the hops. These ten piles of vessels, as before stated, occupy the chief part of the brewhouse; but there is also, near each end, a very capacious square vessel, called a 'hop-back,' or 'jackback.' The pumps, pipes, iron platforms, iron flights of stairs, &c. are very numerous, and distributed in various parts of the building; but they are altogether subsidiary to the large piles of vessels just alluded to.

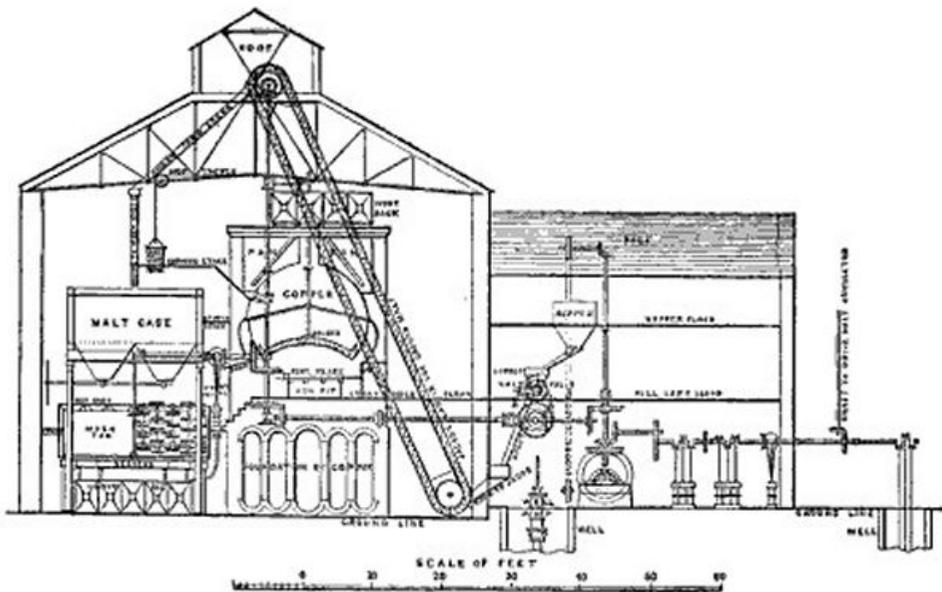


Figure 5.

Let us now see how far it may be practicable to explain, in a brief manner, the purposes to which these huge vessels are applied. To aid the description, we give a sectional representation of the principal vessels and working apparatus. The reader is supposed to be looking southward, with the windows on the left hand, and to have before him a vertical section of all the vessels in one of each of the five pairs alluded to above, together with the long 'Jacob's ladder,' and the malt crushing apparatus in the building to the right of the great brew-house. Most of the vessels and apparatus have the names attached, whereby the reader, by occasional reference to the cut, can follow the routine of processes.

To begin at the beginning, let us suppose the furnace-fires to be lighted. The door of each furnace is opposite the western wall of the building; and a passage leads along the sides of the furnaces, with the furnace-doors on the one hand, and large cellars or receptacles for coals on the other, one in front of each of the five furnaces. These cellars are supplied with coals in a very ingenious manner. The coals, when brought to the brewery, are placed in a coal-yard or court, and from thence are conveyed to another receptacle within the brew-house. Here a box, capable of holding about two sacks, is filled with coals, drawn up by means of tackle, placed upon a very ingenious railway situated between the wall and the furnaces, parallel to both, and wheeled along till it comes over any one of the five coal-cellars, where it is emptied. The coals required for the brewery, about twenty tons per day, are thus conveyed opposite to the doors of all the furnaces with great ease. The form of each furnace, and the details of its arrangement, do not require particular notice; but it is worthy of remark, that the smoke from all the furnaces enters one large subterraneous flue, which conducts it to a chimney situated in the open court, detached from every other building. This chimney is a fine specimen of brickwork, rising to a height of a hundred and twenty feet, and being, from its bulky area, a conspicuous object from the bridge.

The coppers, which are immediately over the furnaces, are employed in the first place to heat water for extracting the saccharine matter from the malt, and afterwards to boil the malt-extract thus obtained. The water is brought from the large reservoirs in the open court, through pipes, to the 'copper-pan' and also to the copper; and at certain times and in certain quantity is allowed to flow into the copper, where it gradually

acquires the temperature proper for the process of 'mashing,' or that by which the extract is obtained from the malt.

All kinds of malt liquor may be shortly characterised as being extracts of malt, boiled with or without hops, and then fermented; so that the main processes are those of extracting, or 'mashing,' boiling, and fermenting. The water in the copper is for the first of these processes; and while it is gradually heating, the malt is being conveyed to the 'mash-tun.' We have before stated, that the crushed malt, or 'grist,' is conveyed, by a long 'Jacob's ladder,' nearly to the top of the brew-house. Here the buckets deposit their contents into a small vessel, from which five pipes ramify, each pipe leading to one of the 'malt-cases.' The top of each pipe has a kind of sliding door or portcullis drawn across it, by the management of which the grist may be made to descend whichever of the pipes may be desired. The malt-case is merely a receptacle to hold sufficient malt for one mashing, until such time as that process is to be conducted; and when this time arrives, four valves are opened in the bottom of the malt-case, whereby the malt speedily falls into the 'mashtun.' This last-named vessel is circular, and is provided with a double bottom, the upper one of which is pierced with very small holes: the space between the two bottoms is placed in communication with the copper by means of a pipe, and a few large holes, closed with plugs or taps, occur in the lower or true bottom.

This being the arrangement, and the mash-tun being supplied with malt, a proper quantity of water is allowed to flow from the copper to the space between the two bottoms of the tun; and, percolating upwards through the small holes, it mixes with the malt. The malt and the water are then stirred about by means of a mashing-machine set in rotation by the steam-engine; and after this has continued for a certain length of time, the water, which now contains a large proportion of malt-extract, is allowed to flow from the tun into the square 'under-back,' the taps in the bottom being turned on for this purpose, and the holes in the false bottom being too small to allow any of the malt to pass. The liquor thus produced is called 'wort.'

A pump is next brought into requisition, to pump the wort from the 'under-back' into the copper. Here, for the first time, our attention is directed to the hops. Most persons are aware that it is the flower of the hop-plant

which goes by the general name of 'hops,' and that this imparts a peculiar bitter, without which beer would not be recognised as such. The hop-flowers are pressed into large canvas bags, and in that state are conveyed to the brewery, where they are ranged in large warehouses near the brewhouse till wanted. The bags are hauled up into the brewhouse, conveyed to the upper part of the copper, and the hops thrown in at a door in the copper called the 'manhole' (this being the hole at which the men go in to clean the copper after each brewing). The wort and the hops are then boiled together, until the flavour of the latter is sufficiently imparted to the former, the hops being constantly stirred by a rotating machine called a 'rouser.'

The boiled wort next descends, through a shoot or trunk, from the boiler to a very large square vessel, called a 'hop-back' (almost hidden behind the mash-tun in our section). As the hops as well as the liquid descend through the shoot, the hop-back is provided with a perforated false bottom, through which the wort flows, leaving the hops above the perforation. The capacity of this vessel cannot be less than four thousand cubic feet; and when filled with boiling wort and hops, the clouds of steam rising from the open surface are, as may easily be imagined, most profuse.

The wort is pumped from the hop-back into 'coolers;' but before we follow it in this process, it may be desirable to say a few more words respecting the great brewhouse. Three of the coppers and three of the mash-tuns, with the accompanying vessels, are employed for the brewing of porter, while the others are for ale: one hop-back, too, is for porter, and the other for ale. The fermentable matter obtained from the malt is not all extracted at one time; and, therefore, the 'grist' is covered with hot water two or three times, the extract or infusion each time being called a 'mash.' The hops, in like manner, do not lose all their valuable qualities by once boiling, and are, therefore, used again, in fresh portions of boiling wort. In order to convey the drained hops back again to the copper, a number of men strip off their upper garments, and get into the hop-back, where they shovel the wet hops, still scalding hot, into a tub or bucket, which is drawn up, wheeled along a stage, and emptied into the coppers. This operation has rather an extraordinary appearance, for the men are enveloped in steam, and are moreover liable to severe injury if any of the hot wet hops touch the upper and unclothed parts of

their bodies. The hops from the porter-brewing are re-conveyed to the coppers in this way; but those from the ale-brewing are carried up by a 'Jacob's ladder,' which dips at the lower end into the hop-back, and empties the hops into the boiler at the top. When the malt and the hops are thoroughly spent, they are thrown into the street, and thence carted away, the one under the name of 'grains,' to be used as food for cattle and swine, and the other as manure.

Adjoining the western side of the brewhouse are large ranges of buildings, through which the wort passes in the subsequent processes. The first process necessary after draining from the hops is a rapid cooling, which is effected in a manner somewhat striking to a stranger. At the upper part of a lofty building are two spacious cooling-floors, one over another; the sides of the rooms being open for the free access of air. Each floor is of immense extent, perfectly level, and perfectly clean, and exposes a surface of not less than ten thousand square feet. The floor is divided into compartments by raised ledges a few inches in height, and into the compartments thus formed the hot beer or wort is pumped from the hop-back. The surface of the stratum of beer being so very large in proportion to the depth, the air which is wafted over it from the open sides of the room cools the beer in a short space of time. In some particular states of the weather, when the beer is not cooled with sufficient rapidity by these means, it is passed through a refrigerator, in which it is brought into close connection with cold spring water, thus effecting a rapid reduction of temperature.

Our visit next led us into that part of the building where the process of fermentation is carried on. The cold beer or wort is allowed to flow into four enormous square fermenting vessels technically called 'squares;' and in these wooden vessels, one of which will hold fifteen hundred barrels of beer, the liquid is fermented with yeast for a certain space of time. On ascending a ladder to look into one of these squares, a visitor not only remarks the singular appearance of the thick masses of yeast covering the surface of the beer, but soon becomes sensible of the suffocating fumes of the gas emanating from it and hovering in a kind of mist over the surface.

The routine of operations next takes us to a spacious room called the 'tun-room,' in the lower part of a building, of which the middle story is occupied as hop-lofts

and the upper as the coolers just alluded to. This tun-room contains nearly three hundred cylindrical vessels, ranged with great regularity in about twenty rows of fifteen in a row, each vessel holding upwards of three hundred gallons. These vessels are called 'rounds,' and pipes and cocks are so arranged at the bottom of each as to allow them to be filled with beer from the fermenting squares, at a certain stage in the process. Between the rows of vessels are long troughs, into which the yeast, worked off by the beer through a hole in the top of each vessel, is conducted along a sloping shoot or channel, a mode of arrangement represented in the next cut. This process of working off the yeast is called 'cleansing,' and is important to the future quality of the beer; and although it is a process somewhat dirty and unpleasant in small or domestic breweries, yet here all is clean, regular, and orderly: indeed this is not the only proof which such an establishment affords that the large extent of the operations is the very circumstance which leads to cleanly and orderly arrangement, from the absolute necessity of economising room and time.

Sunk in the floor of the tun-room, beneath the 'rounds,' is an oblong tank, lined throughout with white Dutch tiles, and intended for the occasional reception of beer. This tank would float a barge of no mean size, being about a hundred feet in length and twenty in breadth.

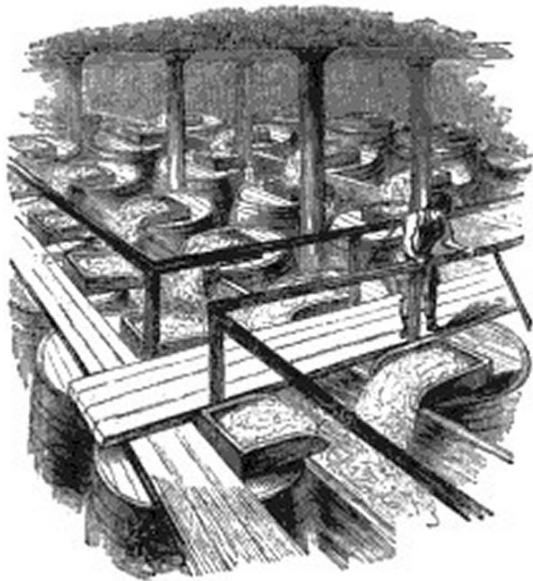


Figure 6.

On proceeding westward through the brewery from the main entrance, all the buildings which we have yet described are situated at the right hand; but we have now to cross to the southern range, separated from the other by an avenue, over which a large pipe crosses to convey the beer from the 'rounds' to the store-vats. These vats are contained in a series of store-rooms, apparently almost interminable: indeed all that we have hitherto said as to vastness is much exceeded by the array which here meets the eye. On entering the store-buildings, we were struck with the silence which reigned throughout, so different from the bustle of the manufacturing departments. Ranges of buildings, branching out north, south, east, and west, are crammed as full of vats as the circular form of the vessels will permit; some larger than others, but all of such dimensions as to baffle one's common notions of 'great' and 'small.' Sometimes, walking on the earthen floor, we pass immediately under the ranges of vats (for none of them rest on the ground), and may then be said to have a stratum of beer twenty or thirty feet in thickness over our heads: at another, we walk on a platform level with the bottom of the vats; or, by ascending steep ladders, we mount to the top, and obtain a kind of bird's-eye view of these mighty monsters. Without a guide, it would be impossible to tell which way we are trending, through the labyrinth of buildings and lofts, surrounded on all sides by vats. At one small window we catch a glimpse of a churchyard, close under the wall of the storehouse; and, on further examination, we find that the buildings belonging to the brewery, principally the store-rooms, have gradually but completely enclosed a small antique-looking churchyard, or rather burial-ground (for it does not belong to any parochial church). In this spot many of the old hands belonging to the establishment have found their last resting-place, literally surrounded by the buildings in which they were employed when living.

The space occupied as store-rooms may in some measure be judged, when we state that there are one hundred and fifty vats, the average capacity of each of which, large and small together, is upwards of thirty thousand gallons. The town of Heidelberg, in Germany, has gained a sort of celebrity for possessing a tun of vast dimensions, capable of holding seven hundred hogsheads of wine; but there are several vats among those here mentioned, in each of which the Heidelberg tun would have "ample room and verge enough" to



Figure 7.

swim about. Fig. 7 is a sketch of one of the largest vats, which contains about three thousand barrels, of thirty-six gallons each, and weighs, when full of porter, about five hundred tons!

Leaving this array of vats—these silent giants of the brewery—we next visited the ale department, of which little has yet been said. The distinction between ale and beer is well known by the taste, but is not easily described in words: ale is of greater specific gravity, lighter coloured, more transparent, and less bitter than porter. Whether or not we assent to the dictum of Autolycus, in the ‘Winter’s Tale,’ that a “quart of ale is a dish for a king,” it is certain that a malt liquor more or less resembling the ale of modern times was much in vogue among our forefathers centuries ago.

It was mentioned in a former paragraph, that two out of the five sets of brewing vessels are employed for the brewing of ale. These two are at the northern end of the brewhouse, and are used nearly in the same way as the porter vessels. The water is conveyed from the cistern to the copper, and there heated; the crushed malt is introduced, first into the malt-case, and then into the

mash-tun; hot water is allowed to flow to this malt from the boiler; the mashing process follows, and the wort, when drained off from the malt into the under-back, is pumped into the boiler; the hops are introduced and boiled with the wort; and, lastly, the whole contents of the copper flow into the hop-back, where the wort is strained from the hops. All this nearly resembles the process followed in porter-brewing; but the hot ale-wort travels by a very different route. We have alluded to an elegant iron suspension-bridge, which passes over a street from the great brewhouse to a building termed the “Ale-brewery.” Along the bottom or floor of this bridge are laid three pipes, one to convey gas for lighting the ale-brewery, another for cold water from the cisterns, and a third for conveying the hot ale from the hop-back to the coolers in the ale department. This latter structure, nearly fire-proof, is built with much elegance, and consists of the necessary rooms for the completion of the ale-brewing. The hot ale-wort, passing from the hop-back over the suspension-bridge, is conveyed to the top of the ale-brewery, where it is spread out on two cooling-floors, separated, like those in the porter-brewery, into compartments by means of raised ledges, and, like them also, exposed to the free access of air on all sides. The cooling being effected by exposure on these floors, and afterwards by passing through a refrigerator, the ale-wort descends to the story containing the fermenting vessels, which is on a level with the suspension-bridge; and here, in various vessels, some square and others round, the wort ferments, and assumes the state of ale. Again descending, the ale enters the ‘tun-room,’ to undergo the process of cleansing. About three hundred and fifty cylindrical casks, or ‘rounds,’ each containing about a hundred and fifty gallons, are ranged in great order throughout this large room; and here the ale remains till in a fit state to be vatted. Once again descending, we arrive at the level of the street, where, passing through a dark spacious store-room, we see immediately overhead an uninterrupted range of vats, into which the ale flows from the ‘rounds.’

The water conveyed over the suspension-bridge is deposited in a cistern at the top of the ale-brewery, and from thence flows to the various stories as required. Adjoining the southern end of this building are large ranges of storehouses occupied by ale-vats.

We now again cross to the principal range of buildings, and offer a few remarks descriptive of the mode of

filling the butts with beer. The butts in which the beer is conveyed to the publicans, and which are so well known in the streets of London, contain one hundred and eight gallons each. A hose, similar in form to those which are attached to fire-engines, is connected at one end to a hole in one of the vats, and at the other to the bung-hole of the butt, the latter being placed on the ground with that hole uppermost. Then, by means of a tap or valve governed by a handle, the beer is made to flow from the vat, through the hose, to the butt or barrel; and when one butt is in this way filled, the end of the hose is quickly transferred to the hole of a second butt, which is filled in a similar manner.

Fig. 8 represents a man engaged in this process of 'drawing off,' which is effected in cellars on the level of the ground, of which there are several. Some of the store-vats are ranged round these cellars; while those which are at a greater distance are placed in connection with the cellars by pipes and hose.

Most persons perhaps are aware that malt liquors, after fermentation, require a process called 'fining,' to render them more clear and transparent. The liquid with which



Figure 8.

this is effected is made at the brewery; and on visiting the building where the manufacture takes place, we found that, small as is the quantity required for each butt of beer, the process is conducted on a considerable scale. The building is at the left hand of the principal entrance to the brewery, and consists of three or four stories or tiers, each filled with square vessels, in which the fining liquid (a solution of isinglass and other analogous substances) is prepared. A very small quantity of this liquid is used to every butt of beer.

Westward of the main body of the brewery buildings is a large paved yard; looking across which towards the north-west, we espied such an array of butts, puncheons, and barrels as excited no small surprise. These were not filled with beer or ale, but had been brought empty from the cellars of the publicans, to be repaired and cleansed before again using. One of the undeviating rules in these establishments, - the golden rule, indeed, - is to observe the greatest cleanliness in every part of the processes; nearly every vessel, large and small, however frequently it may be emptied and filled, and in whatever part of the operations it may be employed, is cleansed after each time of using: according to the nature or condition of the liquid contained in the vessel, so is there a particular mode of cleansing adopted. The butts in which the beer is conveyed from the establishment are especially attended to in this respect. A chimney at the west end of the yard points out the spot where the cleansing or steaming house is situated, and in which the process is conducted in an ingenious manner. The butts or barrels to be cleansed are ranged, a certain number at a time, round the sides of the building, immediately over a horizontal pipe containing steam from an adjacent boiler; and from this pipe a number of jets or short pipes branch upwards, and pass into the bung-holes of the casks, one to each cask.

But these casks are not only cleansed after every time of using, they are also inspected and measured; and, if any leakages or injuries appear, the means of repair are at hand. Adjoining the building where the cleansing is effected, a very large cooperage is seen, occupying three sides of a square court. Here we trod our way with some difficulty among casks, old and new, - iron hoops that had seen hard service, and others destined to replace them, - staves of various shapes and sizes, - and all the tools and working apparatus necessary for a cooperage on a large scale.

Under a range of sheds forming part of the circuit of the large open court are the casks which have either been repaired and cleansed, or are waiting for those operations. There they lie, side by side, one on another, one behind another, in a solid mass of extraordinary extent. Some idea of the number of casks lying here ready to be filled may be formed from the fact that the whole number of butts, puncheons, barrels, and similar vessels belonging to the establishment is between sixty and seventy thousand!

It has not formed part of our object to detail the number of hours employed in each part of the brewing processes, nor the particular time of day at which they commence; but the reader will probably suppose that the operations are continued by night as well as by day. The coppers are almost uninterruptedly in use, and relays of workmen succeed each other to attend them. But not only within the brewhouse is activity displayed betimes in the morning; in the open court, long before sleepy London has roused its head, the draymen are busy in hauling up the butts of beer, and placing them on the drays. So many butts are sent out from the establishment every day, and the advantage of conveying them in drays through the metropolis at as early an hour as possible is so great, that by four o'clock in the morning all is bustle and activity—clerks and foremen superintending the operations, and men working the cranes by which the butts are lifted from the cellars to the drays. The form of these drays, of which seventy or eighty are constantly at work, is familiar enough to every Londoner; and we doubt not that the ears of many passers-by would be grateful for the addition of springs or some other appendage to the drays, whereby their rattling, shaking, deafening progress over the paved streets might be in some degree subdued: we believe that something of the kind has been already adopted.

If the brewers' drays are well known in London, what shall we say of brewers' horses? Who ever mistakes a brewer's horse for any other? Who, that has ever passed one day in the London streets, has failed to remark these noble but unwieldy creatures,—unwieldy from very strength? And the draymen too: here are specimens of the "physical man!" The horses seem made for the men and the men for the horses; and we can hardly fancy such horses driven, or ridden lady-wise, except by such men. In the course of our visit, we passed round the extensive stables where the horses belonging to the

brewery, nearly two hundred in number, are kept. Here were marks of the same well-organized system, the same cleanliness and order, as so many other parts of the establishment present. Southward of the little burial-ground and of the store-buildings is a very large paved court, around which are the stables and subsidiary offices: here, a dwelling-house and laboratory for the veterinary surgeon, under whose care the health of the valuable stud is placed: there, a blacksmith's shop, provided with the necessary arrangements for shoeing horses: farther on, a harnessmaker's shop, where necessary repairs to the harness are effected. But the principal of these buildings are, as may be supposed, the stables, one range of which extends nearly three hundred feet in length. A clear passage leads throughout from end to end, the horses being ranged on either side with great regularity; galleries or lofts for provender above them; and an open space for ventilation along the middle of the stables. At one end of the long stable is a building in which the provender is prepared for the horses: a small steam-engine, of five or six horse power, works machinery by which the oats are bruised or crushed before being given to the horses (a modern practice, productive of much benefit to the health of the animal); and another machine by which the chaff is cut. By an ingenious arrangement, the waste steam from this engine can be directed into a watertrough, whereby any desired temperature may be given to the water which the horses drink.

In our ramble through the brewery, we came to a building where "Barclay, Perkins, and Co.'s Entire" stared us in the face in all shapes, colours, and sizes; some boards higher than they were wide, others wider than high; some flat, some convex; some with gold letters on a green ground, others on red. These were the inscription-boards, so well known in the London streets, and so puzzling to strangers, who cannot conceive what the "Co.'s Entire" means. It appears that in bygone times, beer-retailers were wont to sell a kind of liquor called half and half, that is, half ale and half 'twopenny,' which had to be drawn from two casks. Afterwards a taste was gradually acquired for 'three-threads,' a compound of ale, beer, and twopenny, which the retailer was necessitated to draw from three casks, a process so troublesome, that it led to the brewing of a kind of beer which should combine the qualities of these three sorts, and which, being drawn entirely from one cask, obtained the name of entire butt beer. The circumstances

under which the necessity arose have long since passed away; but the term is still retained. The inscription boards, which inform us whose “Entire” is sold by the publican, are made in the part of the establishment to which we alluded above. One shop is devoted to the carpenters who prepare the boards, and another to the painters and gilders who finish them.

Before concluding our necessarily hasty sketch of this vast establishment, we may observe that it is something more than a brewery: it is a memorial of past times, carrying us back to the period when the Globe theatre occupied part of the site; and later, when Dr. Johnson was domiciled in an apartment over the entrance gate. In Boswell’s ‘Life of Johnson’ there are numerous letters and reports of conversations relating more or less to the brewery; but without entering upon these, we may briefly state how the great lexicographer became connected with this spot.

It appears that in the early part of the last century the brewery belonged to a Mr. Halsey, who reaped a fortune there, and upon the marriage of whose daughter to Lord Cobham the brewery was sold to the elder Mr. Thrale. Thrale was an active and liberal man; became sheriff of the county, and M.P. for the borough; and died in 1758, leaving his property to a son whom he had educated liberally. This son married a Welsh lady of good family, and, to use the words of Boswell, “although in affluent circumstances, he had good sense enough to carry on his father’s trade, which was of such extent, that I remember he once told me he would not quit it for an annuity of ten thousand a year; ‘Not,’ said he, ‘that I get ten

thousand a year by it, but it is an estate to my family.’” The beer brewed by Thrale at the period here alluded to was about thirty thousand barrels annually, not one-twelfth part of the quantity now brewed in the same establishment, which produces as much as the nine principal breweries did in 1760. In 1765 Dr. Johnson was introduced to Mr. and Mrs. Thrale by Malone; and from that time till the brewer’s death, Johnson lived almost entirely in their houses, at the brewery and at Streatham. Before the fire at the brewery in 1832, the room was pointed out, near the gate, in which the Doctor wrote many of his most celebrated productions, more particularly his Dictionary. In 1781 Mr. Thrale died, and as he had no sons, the executors, of whom Dr. Johnson was one, deemed it desirable to dispose of the brewery. It was sold jointly to Mr. Barclay and Mr. Perkins (the latter of whom had been the superintendent of the brewery) for the enormous sum of one hundred and thirty-five thousand pounds! Boswell relates: “When the sale of Thrale’s brewery was going on, Johnson appeared bustling about, with an ink-horn and pen in his button-hole, like an exciseman; and on being asked what he really considered to be the value of the property which was to be disposed of, said, ‘We are not here to sell a parcel of boilers and vats, but the potentiality of growing rich beyond the dream of avarice’.”

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