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(1905.)

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MEETING HELD AT BREWERS' HALL, ADDLE STREET,
E.C., ON MONDAY, JANUARY 16TH, 1905.

Mr. T. F. REEVE in the Chair.

The following paper was read and discussed:—

The Chilling Process as applied to Draught and Bottle Beers.

By C. H. FIELD, F.I.C.

WHATEVER views we may hold as to the technical and scientific knowledge of our predecessors in the art of brewing, there can be no doubt that their beers were capable of being more easily digested, and possessed a more matured and rounder flavour than the majority of present-day beers. The necessity for quick production, which is one of the features of modern-day brewing, has brought in its train many evils, most of which are inseparable from producing a beer of full palate with high condition in an extremely short space of time. These

desirable results can only be achieved by means which involve the retention of certain elements, the presence of which may, however, lead to certain other undesirable results, if the beer is exposed to conditions favourable to their production. The difficulty being that the brewer cannot entirely control the operation of either.

These difficulties are naturally more emphasised in respect to bottled beers, and have led to the adoption of chilling and filtering as a means of producing a brilliant beer free from sediment. The results of exposing top fermentation beers to low temperatures are too well known to need any explanation here, as is also the operation of the filter; but I do wish to emphasise the point that by the elimination of certain proteid compounds, tannin, etc., the digestibility of the beer is greatly enhanced, and such beers are certainly much in favour with the public.

The recent development of the trade in chilled bottled beers affords undoubted evidence of the existence of a large and increasing demand for a lighter beverage possessed of the quality of digestiveness, and if this demand is sought to be met with, upon lines which are technically and practically sound, material advantage must accrue to the trade.

It therefore behoves us to concentrate all the thought and practical experience possible upon the subject of chilling beers, and to consider the respective results of the different methods available. Quick production is of course eminently desirable, but not at the expense of character and stability. The physical properties of beer components are well known, and the physical results of certain operations upon them equally so, and if the character of the national beverage is likely at all to suffer by aiming, only, at the quickest possible production, then the subject deserves the most serious consideration of all those interested in the trade.

Given a demand for a light beer, the question is, how can it best be met with credit and advantage to the trade as a whole; and I am of opinion that the answer to this lies in the conservation of natural fermentation gas, to impart to the beer a round and mature character.

There can be no doubt but that too little attention has hitherto been given to the properties of beer fermentation gas and the volatile ethers in this country. I was particularly impressed with this fact on a visit I recently made to a brewery in Germany, where they were producing a Lager beer by alternate top and bottom fermentation, collecting the

gas during top fermentation at temperatures as high as 77° F., and eventually re-saturating the beer with this gas at racking.

Although an extremely small quantity of hops was used, the beer possessed a marked hop flavour, and a character, generally, much superior to the ordinary beer not so treated. And the point which forced itself upon me was that if the gas exercises so great an influence in the case of German beers, how much more pronounced must it be with English beers, taking the difference of materials into consideration.

If the natural fermentation gas products are capable of being restored to top fermentation beers, any objection to chilling and filtering at once disappears, providing, of course, that sufficient time is given to chilling, and that the results sought for are not attained in too speedy a manner; it certainly gives a much more pronounced character to the beer, and with this the public will forgive some palate fulness.

That this can be done there is but little doubt, and there would appear to me ample scope for improvement in the character of the beer, as well as the conditions of brewing, by this means; particularly when we consider we require in the beer its natural gas, together with the ethers, etc., developed during fermentation, as well as a pronounced hop aroma.

On such lines the brewer is, with greater certainty than at present, better able to secure good results, by obviating the disadvantages of instability, such as sickness and acidity, through the precipitation during chilling of those nitrogenous matters, which encourage such diseases.

The system in operation at the brewery I visited in Germany, and which has also been recently adopted by an English brewing firm, is the Wittemann process and is thus described:—

The primary fermentation gas is collected in a closed fermenting vessel, and compressed and stored in a refrigerated chamber after being purified. The beer is run into storage cylinders in a refrigerated chamber, where it remains until precipitation of the nitrogenous and other bodies takes place, being subsequently filtered and then re-saturated with the compressed and refrigerated fermentation gas at the time of racking.

Recovery and Collection of Top Fermentation Gas.—The beer from which

the gas is to be collected is run into a specially constructed fermenting vessel—at from 16—20 hours after pitching—when the temperature has risen to about 64° F., and in this vessel the temperature may be allowed to rise as high as 80° F. (or such temperature as the brewer thinks fit), the froth is removed, and the skimming doors are closed, and the gas allowed to escape for about 30 minutes through the air-cock. This *drain-cock on yeast trap* should be left open until the gas yielded proves pure and strong, when this is also closed. This cock should, however, be tried from time to time.

The beer remains in this vessel from some 48—60 hours from time of collecting, dependent upon temperatures, or for such period as the brewer's experience enables him to collect the best gas, the temperature being kept at not lower than 64° F. and not exceeding 80° F.

As the fermentation gas collects in this vessel, and the pressure gauge indicates 4—5 lb. (5—10 lb. is the best gas yielding pressure), the gas compressor is started.

Gas Compressor.—It is of the utmost importance that no air is pumped with the gas. Whenever the pressure gauge falls below 2 lb. on gas collecting vat, and 1 lb. on compressor gauge, the compressor must be shut down.

In starting the compressor, care should be taken to first open the drain-cock in discharge pipe, closing it after the compressor has made a few revolutions; and to observe that the discharge pipe line remains cold. The cooling water for outside cooling should run in about $\frac{3}{4}$ -inch stream and the valve in return water line be opened about $\frac{1}{8}$ th turn.

The gas must not be compressed above 250 lb., the proper degree of compression being about 200 lb.

Gas compressing should be stopped if the amount of gas yielded during fermentation is insufficient to keep the compressor supplied for a run of at least 20 minutes' duration.

After the best gas is collected and compressed from the closed fermenting vessel, the skimming doors are opened, and the fermentation allowed to finish therein in the usual way—or the beer may be pumped back into the ordinary open fermenting vessels to finish, or dropped into skimming backs as the brewer may prefer.

The gas passes from the compressor to the acid absorption cylinder; the water in which, in circulating to and from the compressor cylinder, keeps the compressor cool and prevents the ethers from becoming

heated and destroyed, while also absorbing and holding back the acid vapours contained in the fermentation gas.

The water level in this cylinder must be maintained at three-quarters the height of gauge glass, and must be replaced with fresh water every time a batch of gas has been collected.

The gas passes from the absorption cylinder to the fermentation gas storage cylinders, where it is stored for a period of *not less than 36 hours*, at a temperature of about 32°—34° F., until such time as it is required.

All valves of storage cylinders must be closed when not in use, and the drain valves at bottom tried at least once a week.

Etherising.—The beer to be treated, after the fermentation has been completed at the brewer's own discretion, is passed through the counter current beer cooler, where it is reduced to about 40° F., into the cold storage vats, where it remains so long as is necessary to bring the temperature down to about 34°—36° F. The albumenoids and hop resins may be herein precipitated by means of (1) finings, or (2) top pressure of fermentation gas from the storage cylinders, which should never be allowed to fall below 5 lb. Precipitation may be accelerated by increasing the pressure. The beer here may be allowed to drop naturally brilliant without artificial means, in which case no filter is required.

The temperature in cold storage room should be equally maintained at the fixed degree.

Fourteen days' cold storage gives the best results and longest stability without deposit for high gravity beers; but for low gravity beers, and beers required for quicker consumption, any time between three and seven days may be taken, at the brewer's discretion, from the period of the temperature of the beer becoming reduced to 34° F.

When precipitation has taken place the beer is pumped (by the beer pressure regulating pump) from the cold storage vats to the filter, and then to the etheriser (or saturator), and from thence to the counter pressure racker.

The beer pressure regulating pump is set to 25 lb. pressure, which is done by regulating tension spring on steam regulator; and connect the suction inlet of pump to storage vat, and the outlet with the inlet of etheriser, and the outlet of etheriser with the filter inlet, or *vice versa*.

The gas pressure, regulated by the gas governor or regulator, should be 15 lb. on the average, and the temperature of the beer about 34°—36° F., according to character of beer. The quantity of beer required is governed by the small balancing cylinder of the "etheriser," which, when at the proper level within the etheriser, will automatically shut off the beer supply, and open when the supply is insufficient.

The etheriser and racker must be filled with cold water the night before racking. This water is to be forced out by carbonic acid gas shortly before etherising, discharging the water through the racker outlets and cooling the racker at the same time. After this is done, and the gas pressure in the etheriser set to 15 lb. (more or less, according to the temperature of the beer), the beer pump may be started, observing that an even pressure is maintained on the filter. After the etheriser is full to the proper level as regulated by the balancing cylinder, the beer can then be turned on to the racker.

For etherising, the oldest, and therefore the coldest, gas should be used; and never use it before 36 hours' rest, or storage.

The operation of racking should be carried on continuously, and at as even a speed as possible. *All interruptions to the even flow through the racker should be avoided, and the rate of racking maintained at about one barrel per minute, according to size of plant used.*

The recent development of the trade in chilled bottled beers under present methods cannot be claimed to be so profitable as it might be, and does not enhance the character of our natural beverage so much as some of us would wish it to. And if some means could be discovered whereby our draught beers could be produced with uniformity, stability, and excellence of character, and yet possessing the qualities of lightness and easy digestibility, a development in this direction could not fail of being more permanently advantageous to the trade from every point of view.

Chilling and filtering undoubtedly increases digestibility, but under present conditions the beer also loses some of its character; if, therefore, this character can be restored by re-saturation with the fermentation gas, the consumption of cask beers should be much increased.

That the gaseous products of primary fermentation do undoubtedly possess aromatic and other properties, which could not fail of imparting their character to beer saturated with it, must be easily recognised—so much so, that in order to obtain as much natural gas and compound

ethers, also hop aroma, in the beer as possible, brewers are obliged to blend old and matured beers with the new chilled beers, or have first to subject a beer to a period of storage before chilling; this is done in order to obtain that character we all seek for in a bitter beer, and which certainly hides any thinness that may be produced by precipitation of nitrogenous bodies and bitter principles from the hop.

The extent of their influence (the gaseous products of fermentation and compound ethers, etc.) is at present lying in the lap of the future; but to all whose desire it is that the best interest of the trade shall be promoted by the production of a natural beverage of the highest possible character, it is a question that should be made the subject of every possible research and experiment until it is brought to its logical and practical conclusions.

In the production of chilled and filtered beers in cask, as I have already pointed out, one must differentiate between CO_2 made from minerals and CO_2 produced from the natural fermentations; in the one case the flavour is insipid, in the other one obtains a warm aromatic flavour that overcomes any shortcomings produced by the chilling; besides which, once the plant is erected, the cost price of the CO_2 is practically nil.

One of the most important, and I may say vital, points in the production of such beers in casks is the exclusion of all air as soon as the beer is run into storage vats to the time it is on draught, and this is not so difficult as it may on the surface appear, as the plant necessary is simple—so is also the manipulation.

The beers treated in this manner will stand some 3—4 weeks or longer on draught, or can be readily bottled, as they are already saturated with the natural fermentation gas under any ordinary counter pressure bottler.

It would appear to have been demonstrated beyond doubt that the final character of a beer is, in a measure, determined by the amount of the compound ethers and the hop bouquet absorbed with the fermentation gas; and the higher the percentage of these the greater the improvement in the finished beer, not only in respect to character, but also as regards stability, brilliancy, and condition.

It may be worthy of note that, roundly speaking, 15—18 barrels of gas at ordinary atmospheric pressure are given off; for every barrel of beer fermented—*i.e.*, for every 40 lb. weight of extract fermented,

approximately 19 lb. is thrown off as carbonic acid gas, which would measure, at atmospheric pressure, 108 cubic feet—i.e., each lb. CO_2 given off from a carbohydrate measures 5.7 cubic feet.

These figures I have worked out from theoretical calculations based on the results obtained in practice.

In practice we find that it is only necessary to collect the gas from every eighth brewing. The large quantity of gas given off from one brewing is more than enough for the remaining seven.

This is done by means of a specially constructed gas suction and compression pump, with about a $1\frac{1}{2}$ -inch pipe leading to this and delivering to gas washing tank, and from thence to gas storage tanks.

The gas collecting and fermenting vessel is constructed of rolled steel sheets lined with a special enamel and fitted with man-hole attenuator coils, thermometer, and test cock, etc.; a pipe from the top leads to the suction pipe, and a slight pressure of at least 2 lb. is maintained in order to be sure of the exclusion of all air.

The wort can be allowed to remain in this vessel for complete fermentation, skimming through the manhole, or having a sluice attached for skimming, or run into other vessels—dropping vessels.

The temperatures to which the wort during fermentation may rise varies naturally with the brewing, but the higher the temperature, within reasonable limits, the richer the gas is in compound ethers.

The question of the conservation of the natural gaseous products of fermentation is of far greater importance than is generally recognised. Although the percentage of the "compound ethers" in beer, also in the gas, are small by comparison; their vital and determinate influences upon the character of the product is, indeed, out of all proportion to their quantity.

Perhaps the most striking development for many years past in the brewing trade has been that of the application of chilling and filtering to bottled beers. The extraordinary extent to which this method of treatment has been recently adopted only serves to emphasise, by comparison, the value and importance of a similar process adaptable to cask beers.

That, notwithstanding their lack of a certain amount of character, the chilled and filtered bottled beers produced have met with such appreciation as to induce so many brewers to adopt one or other of the various systems hitherto in operation, surely proves the existence of a

great and increasing demand for a lighter, cleaner, and more easily digestible beer than the ordinary running ales or the quickly-produced stock beers hitherto offered to the public.

These latter are more difficult of digestion, that only those following an active occupation can assimilate them with comfort, for which reason many who prefer beer to any other beverage go without it.

The fact that this bottled (chilled and filtered) beer with all its drawbacks is in such demand, should surely convince brewers that improved methods are essential if the trade in "draught beer" is to be maintained, and that those first to produce such a beer should have no reasons to regret having done so.

DISCUSSION.

The CHAIRMAN, in inviting discussion, said there could be no doubt this subject was one of considerable importance at the present time. The public were no longer content to pay for bottled beer of which two-thirds only could be poured out bright; nor to pay a sufficient price to enable the brewer to mature the beer properly in bottle as in the old days. It was therefore of the greatest importance that they should thoroughly understand how they could best and most economically meet the wants and tastes of the public by other means than those which were in vogue some 25 years ago. He was sure Mr. Field would be pleased to answer any questions the members might wish to put.

Mr. HOLLAND asked at what temperature Mr. Field pitched? He noticed that he did not collect the gas till the temperature reached 64°.

Mr. T. WATSON LOVIBOND asked whether Mr. Field proposed to use this process only for the production of chilled, bright beer in small casks for the family trade, or also in all large casks and hogsheads for the public-house trade. He should also like to know whether Mr. Field's opinion of the enormous difference between the value of ordinary carbonic acid gas manufactured in the usual way and the gas obtained from the fermentation of beer was based on experience or was derived from purely theoretical considerations.

Mr. ROBERTS asked if the author could give any idea of the cost of the plant for the production of, say, 500 or 600 barrels a week?

Mr. F. D. ELKIN asked whether it would be necessary to supply this chilled beer to either private or public trade in specially prepared casks ?

Mr. P. K. LE MAY said he noticed that Mr. Field passed the beer through filters before carbonating it; and he should like to know whether he ever found evidence of the cold carbonic acid gas causing a slight greyness to the finished beer in the bottle. He would also ask if the author had heard of, or tried, the conditioning and chilling of beer in the same jacketed vessel; and, if so, of what material it was made. He should like to add that he had conditioned beer, chilled it, and run it into a Seljon hogshead, and had drawn off the whole of it without venting the cask; the beer was in a bright and sparkling condition after it had been in the cask for a week, during which time the greater part of it had been drawn off.

Mr. CANDLER said they might send out beers which were quite sound, and when fined would be quite brilliant, but it rested with the tenant whether they showed those conditions in consumption. With regard to bottled beers, when chilling and filtration was practised the beer could be poured out of the bottle to the last drop; and he took it that, under Mr Field's system of dealing with beer in cask, brewers would to a great extent be relieved from the many difficulties which existed under the present system of dealing with cask beer in this country. With regard to the question of carbonating with either natural or artificial gas, from his experience natural gas was the correct thing. With artificial gas an unpleasant flavour was produced. He would like to ask if Mr. Field had had any experience with jacketed cylinders, and, if so, whether they were made of gun metal, copper, or of iron coated over with the usual preparations now in vogue. He would also ask if any flavour was communicated to the beer by the use of an iron cylinder or by its coating, supposing the beer was kept in it, say, six or seven days for conditioning and another three or four days for chilling. Lastly, he should like to ask whether, in conditioning beer in a cylinder, Mr. Field had any experience of acquiring condition with yeast—say about one pint of ordinary fresh yeast to five barrels, or whether he believed in Kräusening and ordinary priming, or whether he had ever used yeast in conjunction with either of those methods.

Mr. ROBERTS said that, as a user of carbonic acid gas, which he obtained from a large brewing firm in London, and which he presumed

was taken from beer, he should like to know whether there was any difference between that gas and what they would make themselves if they had vessels suitably fitted up.

Mr. E. M. STROUTS inquired the temperature of the beer in the cold stores. He understood Mr. Field cooled down to 34°, but he had been accustomed to get it below that—say 28°. Did Mr. Field consider there was any advantage in the extra 6°? He did not know anything about chilled and carbonated beer in casks, but he supposed the casks would want treating in some way; and he feared that it would be rather a slow process in the large cask trade.

The CHAIRMAN said the discussion consisted mainly of questions, and he was sure Mr. Field would take it as a compliment that he had excited so much interest and curiosity. It was evident that this was not the last they would hear of this process; it was a development likely to become more and more pronounced; and when the time came they would be able in their turn to give the result of their experience to Mr. Field.

Mr. FIELD, in reply, said that he pitched at the ordinary temperature of 60° F., but it rose to 63° or 64°. The gas production was very vigorous, and the largest part of it occurred before the yeasty head rose. The system was particularly adapted for supplying beer to public-houses in large casks, hogsheads, and barrels, which could be drawn off to the last drop brilliant and without losing condition, and to supply bottlers with a brilliant beer which only wanted bottling under a slight counter pressure. With regard to the small cask trade, this only required the addition of certain necessary and simple appliances, which were already available, by means of which the consumer would be able to rely upon absolute uniformity and condition in the beers, which should eventually lead to a revived demand amongst private consumers for beer in cask instead of in bottle. As regards the latter part of Mr. Lovibond's question, the value of the natural fermentation gas obtained from beer was based on unpractical experience, and not from mere theoretical conclusions. They did not want a special construction of cask, but merely a strengthening of the ordinary cask in use, which must be lined, however, to prevent the escape of gas through the pores of the wood and the joints, and the addition of extra hoops to withstand the pressure. They must dissolve about six cubic feet of gas for every barrel. As a rule, they could draw

off two-thirds with somewhat less gas than that, but after that they found that a little air pressure was quite sufficient; but if the beer is kept on draught three or four weeks it was not advisable to use air pressure, but a slight pressure of carbonic acid gas. With regard to the experience he had had, it was a fortnight or three weeks in a brewery in Leipsic, where they were using this system as well as ordinary carbonic acid gas; and he had had the opportunity of comparing the two methods, not only in the brewery itself, but also in two publicans' cellars in the town. One beer was saturated with natural fermentation gas, and the other with liquefied gas; and there was a marked difference in the beer at the two public-houses and in the brewery itself. He could not give any precise information as to the cost of the plant, but he thought it was not very expensive; there was very little extra expense at all. You had only one fermenting vessel to put up, which was one in eight, because the majority of brewers at the present time had already cold storage vessels. One or two other gentlemen had had similar experience to his in America, who spoke most highly of the system; and it was that which induced him to go to Germany to see it. Some large Burton brewers and some from the Midlands had also seen it. One gentleman had asked about filtering first and then saturating, instead of *vice versa*. After the beer was chilled and kept in cold storage tanks sufficiently long, and then filtered and saturated, you would get no haze, as both beer and gas would be at the same temperature. In the ordinary course, when beer was carbonated with liquefied gas, the expansion of the gas chilled the beer considerably; but when both were at the same temperature, between 34° and 36° F., no chilling took place. The object of re-saturating after filtering, instead of filtering after re-saturation, was to replace, by means of the gas, that flavour and aroma which was undoubtedly removed to some extent by the filter. The lower the temperature the greater the deposit of nitrogenous bodies and hop resins. If you chilled in the tanks and allowed sufficient time for precipitation, and then let the temperature rise a little to, say, 34°—36° F., and then filtered, you do not remove so many bitters as you do by filtering at very low temperatures, but it is claimed that the re-introduction of the gas after filtering imparted a roundness of palate and aroma which more than compensated for whatever the filter may have removed. With regard to the liquefied gas obtained from the com-

pression of fermentation gas collected from some large breweries, that was, of course, liquefied by being subjected to very high pressures, generating high temperatures which destroyed the ethers and all the aroma left in the gas. There was therefore a vital difference between fermentation gas compressed at 200—240 (and at the same time constantly keeping the gas cool) and that compressed at 1,000 lbs. In the one the ethers were retained and conserved, and in the other they were destroyed, so that beer carbonated with CO_2 was simply impregnated with gas, whereas the beer re-saturated with the natural fermentation gas treated by this system became not only impregnated with gas, but improved by means of the flavouring ethers, etc., introduced with it. With regard to Kräusening and yeast priming in the beer storage tanks in Germany, they nearly always Kräusen the beer and then filtered or added sweet wort in fairly large quantities—i.e., fresh wort taken just before or soon after pitching, and chilled it immediately before filtering; and that brought up the fulness of the beer considerably, in a similar manner to the ordinary English priming. That was done with Lager beer, which was weak to start with, though not so weak as was often supposed. The average beer consumed in Germany was of 19 lbs.—21 lbs. gravity, the Bavarian and Pilsener. There are weak beers brewed too, but they are not generally in vogue, as may be supposed. In addition to that, some breweries would add about 10 per cent. of very sweet wort, of about 30 lbs. gravity to bring up the fulness. So that, in drinking German beer, it was not all fermented wort, but part was unfermented. With regard to his experience with jacketed cylinders and their lining, there are a number of linings which all more or less answered the purpose. He had not had much practical experience of them, but he had seen them at work in various breweries. The steel cylinder he described was lined with a special lacquer, which lasted about two years. When the lining required renewing, it was heated up to about 150° F. and removed, and a fresh coat put on. It was a very simple and inexpensive process.

As regards Mr. Strouts' remarks, providing one subjected the beer three to four days (preferably, however, seven days) at temperatures between 34—36° F., one obtained as regards sediment all that would be required, without impoverishing the beer, so much of the hop bitters and aroma, etc., as one would by reducing the temperature as low as

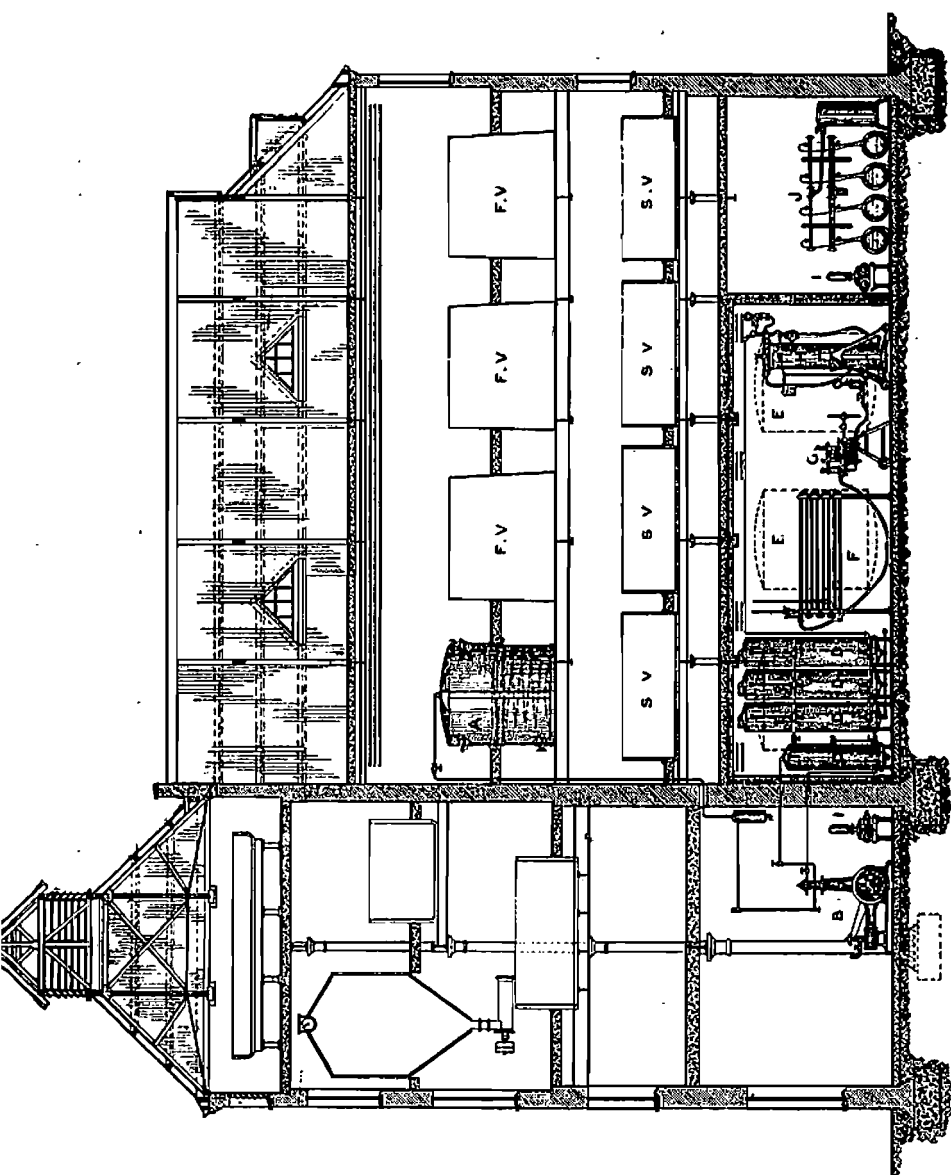
28° F. and filtering at this low temperature; this latter temperature was generally avoided on the Continent, and was certainly done so in the large breweries I have had experience in.

It was always desirable to line casks with one or the other coatings on the market, even for ordinary English beers, and if brewers would only go to the trouble of experimenting with beer from the same fermenting vessel at the same time filling half in lined casks and half in the ordinary sweet casks and comparing the two beers, in even six weeks' time the difference would be found to be most marked, the lined casks in each case giving the preferable results.

The plan I have before you, gentlemen, is the latest improvements to the Wittemann system, which, perhaps, many of you may already know.

The CHAIRMAN said that it only remained for him to propose a cordial vote of thanks to Mr. Field—not only for his Paper, but for the very lucid manner in which he had answered the questions which had been put. He was sure this was a question which would agitate all their minds for some time to come, and it must be admitted that improved methods in the treatment of beer put into casks, are likely to be a feature in the brewing industry of the future. All these things resolved themselves more or less into the question of expense. They could have perfection if they were prepared to spend money enough to attain it. The real question was, how to produce the best results at the smallest possible cost; and these were things which they would have to study very carefully in trying to meet the public wants.

Mr. LOVIBOND, in seconding the motion, said he should like to call attention to what appeared to him to be the two principal points which Mr. Field had brought before them: One was the enormous advantage alleged to be gained by the conditioning of beer with natural fermentation gas instead of with artificial or liquefied gas; and it seemed to him exceedingly probable that there was a great deal in what Mr. Field claimed. The next point to which he called attention, and the great point of importance, was the possibility of applying this system to the whole of their cask beer. At present, whatever might be done here and there experimentally, it was clear that this system of chilling and carbonating was at present confined to bottled beer. There was no doubt that if, by the adoption of Mr. Field's machinery or any other, they could adapt the same system to the supply of the whole of their



REFERENCE TABLE.

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| A. Fermenting and Gas Collecting Cylinder. | F. Counter-Current Cooler. |
| B. N. F. Gas Compressor. | G. Filter. |
| C. Do. Purifier. | H. Saturator. |
| D. Do. Storage Cylinders. | I. Beer Pressure Regulating Pumps. |
| E. Counter Current Cooler. | J. Golden Gate Racking Apparatus. |

cask beers, they would get a very great advantage; they would do away with the risk, which one gentleman had pointed out, of having their beer spoilt by the carelessness and ignorance of their tenants, and their tenants would gain the advantage of selling so many more pints of beer out of each barrel than they could hitherto, which they would appreciate. If Mr. Field's system could be adapted to the use of all cask beer, they would have made a very great stride. He was one of those who considered that carbonated beers were enormously inferior in every case to good bottled beer conditioned by fermentation in the bottle. There was no getting over that. They were all professional critics of beer, and they must admit that a bottled beer which had remained for, say, three or four weeks or months in bottle, if bottled under proper conditions and was good beer to begin with, was as much superior to carbonated beer as champagne is to cyder. But they could not lose sight of the fact that that meant cost, and a very heavy cost in bottles and in other ways. A certain class of the public in the large towns have now learned to like this hastily prepared carbonated beer; and there was an enormous trade to be done in it. Therefore they could all appreciate the efforts made by Mr. Field and others like him in perfecting this carbonating process. It had been a great pleasure to him to hear what Mr. Field had said; and he should go away in possession of some new facts which he hoped would have some effect when he got home, and he should always feel grateful to Mr. Field in the matter.

The vote of thanks was carried unanimously, and briefly acknowledged by the author.