

## FOR THE BREWER.

## The Practical Valuation of Barley, Malt and Hops.

When your Secretary honored me with an invitation to read a paper before your Institute, it occurred to me that it might be of especial interest at the commencement of the malting, and stock brewing season if we were to take a brief review of the practical methods of our disposal to assist us in the purchase and valuation of our most important materials. I do not propose to enter upon any intricate questions of chemical analysis of such nature, because however useful such data may be, in most cases the brewer has to be guided by much more speedy tests in the purchase of his materials. I have heard the objection raised that it is useless to attempt to teach any brewer how to value his materials by written instructions, and that proficiency can only be gained by great experience. Now, I am willing to admit that this is not an exact truth, but my experience teaches me, that no matter how clever the brewer, it is often useful, or necessary, to jog his memory as to certain observations he should make when purchasing materials.

## I.—BARLEY.

We may look upon this year's barley as being generally of good quality. There will be some very fine samples, and some very bad ones. In some districts the produce will be of very mixed quality, since, owing to climatic influences, a large proportion of the seeds did not come up until the bulk of the crop was fairly well advanced—thus a portion of certain crops will be in a more advanced stage of ripeness than the remainder. It is true that we have had to contend with this difficulty to some extent for years past, but never to such an extent as this year. We shall have to exercise all possible care in the selection of maturing barley. There will probably be much difficulty on the malting floors to obtain an even growth of material. Fortunately the conditions of ripening are generally better than in former years, and, in this respect we are decidedly better off than for some years past.

In judging of the fitness of a barley for brewing purposes, the brewer should first of all see that its germinating power is complete and regular. The dead corns not only fail to yield any extract in the mash tun, but they are a continual source of trouble during the malting process, owing to decomposition changes which they undergo, and it is probable that under certain conditions they are thus able to infect larger proportions of healthy corn.

The evidence of germinating power, we may regard a healthy smell, and evenness of color, but only in so far as that a "nosy" or musty barley may have seriously suffered in germinating power. These observations on themselves are of sufficient, and must be further substantiated by the germinating test. Of course if time were no object, it would be most satisfactory to mald a sufficient quantity normally to brew a small quantity of beer in an experimental plant, but in most cases we must come to a conclusion far sooner than this, and must therefore content ourselves with a simple germinating test. For this purpose we can employ one of the usual germinating arrangements (such as are in general use among brewers and maltsters) or if we do not possess one, we can steep a given number of corns in water for about six hours, and place them into moistened sand, or between moistened blotting paper, being careful to renew such moisture

from time to time. After an interval of several days, we must count off the corns which have sprouted, and by carefully noting the numbers which have grown on the second, third, and fourth days, we shall be enabled to obtain information as to the regularity and vigor of germination.

In testing a new barley, however, great caution must be exercised, as the same often evidences not only great regularity of growth, but also such very slight energy of growth, that many corns only begin to grow after eight more days. This is due to the different proportions of moisture, and varying degrees of ripeness of the corns. As the barley is kept longer in stack these conditions become considerably improved, but it is quite impossible to predict how much time will be requisite to complete the after-ripening process, or what will be the subsequent germinating power of the grain. We can only obtain an approximate idea of this latter point by drying the barley at a temperature of 100 deg. to 110 deg. F. for 24 hours (in a laboratory hot-oven) before submitting it to the germinating test, as by this means we equalize the moisture percentage in the corns, and thereby increase the energy of germination.

Next to the germinating power, the composition of the starchy portion of the grain is of the greatest importance, as this is of vital bearing upon the future friability of the malted product. While mealy corns usually yield a good and friable malt, it is almost impossible to do much with a glassy barley; even if we employ the greatest skill, the malt will be hard in most cases.

Among the conditions which respectively favor the production of floury or steely barley it is not in our power to regulate the temperature, or the climate, atmospheric conditions, or condition of soil. At the same time, we have in our power another factor which is of the greater importance, namely, the manner in which the barley is sown. At this point, I think it is fairly well recognized that manures rich in nitrogenous matters tend to produce a floury barley. Yet it is more than probable that farmers often make a mistake in this respect, endeavor to obtain the highest possible yield from their land with the assistance of considerable quantities of Chili-nitre. A limited amount of such manure may improve a barley, especially if the soil is poor, but it is easy to understand that this limit may be readily overstepped, and the quality of the barley may become seriously deteriorated.

Regarding the difference between floury and steely barley (taking for instance, barley ripened under a tropical sun's rays as an example of the latter), it was until recently generally considered that the mealy barley was most rich in nitrogen; but the analysis of the present crop, at which this assumption was quite incorrect, that in fact, the steely foreign barleys frequently contain higher nitrogen proportions than the floury barleys. Now although it is true that the soil has some influence upon the composition of the endosperm or starchy portion of the corn, yet there are other points which have an important bearing on this question of manures. As we should mention, of a comparative size of the corns, definite moisture proportion, particular grouping of the component parts of the endosperm, and, perhaps, also the particular composition of the protein substance. We have, however, no reliable information upon these points. In order to examine the endosperm it is best to employ an apparatus such as is used in cutting sections for microscopical work. The method of biting a corn is primitive and uncertain, since according to the sharpness and the position of the teeth while biting, the section

may appear smooth or rough. The same thing may also happen when cutting the corn with a simple knife. Although a barley of which the germinating power is satisfactory, is always capable of being made into a valuable extract it will yield, since the higher the extract the less will be the cost of production per bushel, and consequently it must pay better to work a heavy barley.

An evidence of the latter we must look for large plump corn, weight per quarter or bushel, and weight of 1,000 corns.

The size of the corn is usually judged by the eye, but it may be possible to obtain figures for the same by placing a certain number of corns side by side on a graduated rule, first according to breadth, then lengthways. The quotient of the two measurements of width and length of corns will give us the figure required.

In order to arrive at the weight per bushel we can make use of one of the small barley weighing machines, which are generally used by brewers, and which give the weight of a bushel, and the weight of a miniature bushel of corn, or we can take a small vessel holding up to the brim any small proportional part of a bushel; this vessel to be loosely filled with the barley, and then to be "struck off" level. It is then carefully weighed, and a simple calculation will give us the weight per bushel. This estimation must, of course, be repeated once or twice, and the mean of the results taken. The weight of 1,000 corns should run between 40 and 50 grams, certainly it should not be below 37 grams.

It will be evident that the cleaning and grading of the barley must have considerable influence upon these weight estimations, but there are also other reasons why we should select a well-cleaned and graded barley. The seeds of weeds for the most part are not so objectionable as tasting matters, which flavors they would impart to the beer. The broken and small barley corns are very prone to decomposition, owing to their low germinating power, and their different behaviour during the steeping of the grain. They would become saturated with water more rapidly than the large corns, and would consequently either start growing too soon, or else the excessive saturation would damage their vitality. The color of the barley is a point on which there is some difference of opinion, and I believe it is of less importance than is generally admitted. My experience tends to show that the yellow barleys can usually be made up more readily into friable malts than the very pale straw colored sorts.

Yet we always find the latter class of material to fetch a higher price on the market. There is to doubt it is more sought after by our large pale ale brewers, not so much on account of its color *per se*, but rather because the pale color shows that the corns have grown under favorable climatic conditions, and has been thoroughly well ripened and harvested; the presumption would therefore hold good that this product could yield a good malt and sound beer. In truth, however, we admit that in judging of very dark skinned barleys, the coloring matter may not be completely exhausted during the steeping process, so that during the mash tun infusion we may extract an appreciable amount of color more than would be desirable for pale ales, but this need only be feared with very dark samples; medium colored grain may safely be placed on the same level with the very pale sorts, if the other conditions are equal.

Uniformity of color should be carefully looked into, since a barley of unequal color or size is usually a mixed product, and owing to the different behavior of the various qualities during the steeping and germinating process, it will be almost impossible to produce a commendable

malt from such material. We must also insist upon freedom from heated and discolored corns, the latter being due to heating in the stack, or long exposure to wet weather on the field. The corns which have started in germination on the field can readily be distinguished by the appearance of the germ, and by the softening of that end of the corn. Black ends at the base of the grain are a serious drawback, resulting on the grain having been exposed to the wet for a lengthened period, and indicating that the ripening process has not been carried out under favorable conditions; the grain is also probably infected with mildew.

It is most important to take notice of the smell of the grain. I have often been asked by brewers whether a "nosy" or musty barley is unfit for malting, and whether it would necessarily impart its odor to the beer. I may say that I have met with some very bad smelling barleys which made up into good malt, the mustiness having completely disappeared during the malting process, while the malt subsequently produced commendable running ale. At the same time no brewer would advise to purchase a nosy barley, since there is not the slightest doubt that it would impart its odor to the grain in germinating power, and would render a sound malt a matter of impossibility, as the musty smell is caused by the corn having been harvested under adverse conditions, or stacked before it was thoroughly dry. It is frequently, also, caused by threshing out the corn before it is dry, and subsequently not keeping it turned sufficiently often, and exposed to currents of air. With the assistance of the above-mentioned tests it is possible to form a very fair opinion as to the value of a sample of barley, and errors are seldom made when relying on these tests alone.

An estimation of the moisture proportion can readily be made in the laboratory in a few hours, and is an important item when purchasing large quantities of barley, as we may readily find a difference of some four or five per cent. in various samples, which means that we should pay for three or four pounds of water as barley to each 100 pounds of the latter.

Finally, we cannot be too careful in comparing the quality of the barley with the purchase sample. It is surprising how often deliveries have to be refused because the bulk has become musty owing to above-mentioned causes.

(To be Continued.)

"That carpenter a-workin' on th' new house nex' door is the meanest man I ever saw," said Johnny Makothings to his father, as he came in with a disappointed expression on his face.

"What you say?"

"W'y, I ast him to lemme his key-hole saw I cut a door 'n my pigin house, an he said he wouldn't lend that saw to his own father to cut his head off with."

**The Unmarried One.**—"Jack is not rich, but then one in moderate circumstances can be happy. Don't you think so?"

**The Married One.**—"Yes, but not two, dear."

**Tadlow.**—"I see there is a man in Boston who claims to have invented a field-gate which you can see through fog."

**Backus.**—"If he could succeed in inventing an opera glass with which you could see through millinery he'd make his fortune."

**She.**—"When I told Maul about our engagement she said that she really envied me."

**He.**—"Certainly; I don't wonder."  
**She.**—"Yes; she said she would give anything if she could be so easily suited as I was."

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