

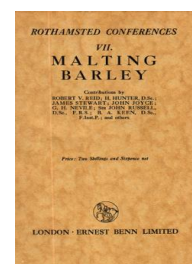
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## Malting Barley

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## Cultivation and Treatment of Barley Grown for Malting on Lincoln Health

**G. H. Nevile**

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of a barn or granary, and when delivering to the buyer to mix it and put it through the winnowing machine, and then sack and weigh it up from the winnower.

The best method I know of taking the sample to sell by, in either case, is to have an extra sack by the side of the threshing machine and to place a handful of barley in it out of every sack as it is filling. If the first method of delivery is adopted, and when this sample sack is shot and mixed, this will be the sample to sell by; but every sack of this lot will not be like the sample, nor, necessarily, exactly like the other sacks of the same lot. Hence the necessity of the buyer knowing that this is the method adopted, and he should know what to expect. But if the second method of delivery is followed, of shooting it in a heap, mixing and winnowing, and sacking it up and then delivering it, then the sample sack can be shot out, mixed and nicely winnowed, as the bulk will be later, and in this way one is able to present to the buyer every sack of grain like the sample by which it was sold; and hence all the sacks, too, will be like each other sack, whereas, by sacking and delivering it direct from the machine, however careful one is in threshing, one cannot depend on having the barley in each sack alike.

In the Somerset National Farmers' Union we get many cases of dispute brought to us every year arising out of this method. I may say that we in Somerset, together with the corresponding County Branch of the Corn Merchants' Association, generally manage to settle these disputes by our good offices, or by arbitration, and without resorting to the law, but, generally, at more or less loss to the grower.

## CULTIVATION AND TREATMENT OF BARLEY GROWN FOR MALTING ON LINCOLN HEATH

BY G. H. NEVILLE

*Wellingore*

THE "Heath," in Lincolnshire, is the local name for the tract of land whose western edge is the oolitic limestone escarpment running between Grantham and Lincoln. The escarpment itself rises about two hundred feet above sea-level, and drops sharply to the vale of the Witham and Brant on the Lias clay formation. The villages are all on the edge of the escarpment, and the parishes are long narrow parallel strips, partly on the Heath and partly on what is locally termed the "lowfield." Farms are large, and, like the parishes, usually contain a proportion of Heath and a proportion of lowfield land. The Heath itself is almost

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entirely under the plough, an occasional field of permanent grass being found alongside the farmsteads. Near the villages the land is of good medium quality, with 6 to 10 in. of soil above the oolite Brash, but as we proceed eastwards the land gets lighter and thinner, and there is not more than 4 in. of soil. Probably two-thirds of the Heath is on this light dry 4 in. of soil, and it is on this that the best-quality barleys are produced.

This is essentially a sheep and barley district, and the farming system is the four-course one where barley is followed by seed, wheat and roots. Occasionally, on what I will call the 7 in. land, a second crop of barley is taken and, normally, barley replaces part of what should be the wheat area. Since the War, potatoes have been grown in places, as, although crops are light, the Limestone Edwards always command a sale at prices above those of the fen and silt lands. Lately sugar-beet has been introduced, and has here displaced roots and, consequently, some sheep, but the soil is too shallow and dry to anticipate a crop of more than 8 tons to the acre on the 7 in. soil and 6 tons on the 4 in. quality. With the reduction in the price now coming into force it looks as if this area is among those which will have to relinquish the growing of this crop.

With all the Heath devoted to arable crops it will be noted that there is no pasture for the cattle required to tread the straw into manure in the yards in winter. It is for this reason that, where possible, farms have a proportionate area, say one-third, on the lowfield, and this is largely second-class pasture-land, the remainder being devoted to wheat and oats, with one-fifth or one-sixth as summer fallow.

Farms here can be stocked for about £10 or less per acre, and are run on the most economical lines. Rent varies from 30s. per acre on the good land to 12s. on the poor.

The limiting factor in crop production in this area is undoubtedly drought. The mean average rainfall is 24 in., and this amount would prove ample for a maximum crop production provided it was evenly distributed. Unfortunately, in every year we may anticipate a period of at least four weeks practically without rain, and on these shallow soils this annual drought is the determining factor in the yield of our spring-sown crops. To take two examples. In 1927, between 15th April and 15th June we had less than 1 in. of rain, or one-quarter of the mean. Since then it seems to have rained continuously. The interesting point to me was that the heavy rainfall from 15th June onwards was in time to secure maximum crops of barley. These were fully 20 to 25 per cent. above the average in quantity. The 4 in. land produced 5 quarters per acre instead of 4 quarters, and on over 80 acres of my best land I had 7 quarters per acre, while some of my neighbours had yields of 8 quarters in individual fields. The later rainfalls, of course, spoiled the quality, and there were very few first-class samples.

In 1925, after good rains in May, only 1 in. of rain fell between

27th May and 5th August, by which time the barley was ripe. Although in yield the crops were only average the quality was excellent, and good prices were realized. In trying to understand the factors governing crop production I have been struck by the small average size of the head. The Spratt-Archer barley which I grow has normally 18 buds per side in its early stages, but of these I find that at harvest only the 12 lower seeds per side have matured. I had imagined that after the drought in May and early June in 1927 the damage had already been done, and was agreeably surprised to find that the rain subsequent to 15th June was still early enough to produce heads much above the average. It is apparent that if the normal head has only 12 seeds a-side, and we can increase that to 15 or 16, the yield must be increased very largely, and, as fresh tillering after 15th June is improbable, the large crops this year may be attributed to this cause.

On our farms, for barley, sugar-beet and potatoes the most important time for rainfall is May and early June, and it has often struck me that an insurance company that would ensure us 1 in. of rain in each half of May and in the first half of June should do good business. It would seem that only a small premium would be necessary, as our need of rain would set off the fine-weather requirements of pleasure-seekers who take out "pluvius" policies for cricket matches, shows and the like.

To return to the cultivation of our Heath farms. Starting with the clover seed in the rotation, about two-thirds of the seed area would be grazing seeds, where 5 lb. of white clover, 5 lb. of alsike and 7 lb. of Italian rye-grass would be a usual seed-mixture. Although perennial rye-grass stands a summer drought better, the Italian is preferred as essential for the first early bite for lambs. Half the rye-grass is frequently sown mixed with the barley in the drill when the latter is sown, and this rarely fails from drought. The remainder of the rye-grass and the clovers are sown with a small seed-drill across the barley drills in April. These grazing seeds should carry two ewes and pairs throughout the summer on the good land, though 5 mouths are sufficient on the light land. The ewes and singles run chiefly on the lowfield grass-land, which should carry a ewe, a lamb, and half a beast per acre. The remaining one-third of the seed area is sown to a mowing mixture of red clover and Italian rye-grass, and this feeds the horses and cattle in winter. The weaned lambs run on the aftermath before it is ploughed for wheat. Generally half the grazing-seed area is reserved for barley instead of being sown to wheat, and this swarth-land barley is reputed the better, both in quantity and quality.

On the better land, where, if clean, an extra barley crop may be taken, roots follow the wheat, and large areas of swedes and turnips are grown, as the sheep are carried well into the spring. Possibly 20 per cent. of the root area is taken for beet or mustard seed. An acre of swedes should carry 8 sheep for the 20 weeks of winter on the better land, but 100 sheep-weeks is all that is expected of the 4 in. land. It may

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be well to note here that where sheep are fed on sugar-beet tops they should run on these only in the daytime, and go on to seeds at night, to give them time to cleanse their mouths and stomachs of grit, which otherwise may cause serious losses.

On a typical four-course farm, such as I have in mind, a ewe flock of 30 large Lincoln ewes per 100 acres would be carried, and sales would average 34 to 35 head per 100 acres. Where the sheep are largely sold as clipped hogs the wool clip is expected to pay the Lady Day half-year's rent. The sheep, while on roots, would receive on the average half-a-pound of cake or meal per day, so that 4 or 5 cwt. of cake or corn is eaten on each acre, and this, with a little phosphatic manure applied to the roots, is, in many cases, the only extraneous help the land receives, and it is surprising the high state of fertility that is maintained by this system. Of horned stock some 4 or 5 cows, with their progeny—say, 18 head in all—is carried per 100 acres.

The cows calve in the spring and rear a calf apiece on the grass-land in the lowfield in the summer, and in winter they go into yards, where they live on barley straw, roots and a foddering of clover hay. In some cases they may get 2 to 3 lb. of cake a day. Sales per 100 acres would be 4 to 5 head, sold as stores and drape cows. As on the lighter land it is necessary to work as much of the twitch out as possible before the roots, much of the manure made in the yards goes on to the clover-land before it is ploughed for wheat.

After harvest, when the root-break has been ploughed, the swath-lands for barley are tackled, generally before Christmas, and the root-break follows as the sheep clear it. In a favourable February the drill is got to work as soon after 10th February as possible on the 4 in. soils, and it is recognized that the earlier sowings give the best qualities. On the 7 in. land the middle of March is probably as good a time as any, though here, again, February sowings have an advantage if there is an early spring drought. Swath-land may receive five harrowings—three down the furrows and two across—and one or two cultivations and two or three harrowings are usual on the root-land. Disc drills are largely employed, and a full seeding of 11 or 12 pecks is favoured. Lighter seedings are considered to encourage tillering, which is looked on with disfavour as promoting second growth. Myself, I consider this a fallacy and operative only where the seed has been sown too deep. I find that with the average crop there are only three heads to two roots. I myself advocate shallow sowing, and, under favourable conditions, this results in a large number of tillers at a very early stage of growth. A deep-sown seed throws up a long, spiky plant, which does not multiply until a fresh crown root system has formed near the surface, and then the primary seedling root dies off. The secondary shoots so formed are necessarily much later than the first, and may well result in small heads of unripe corn at harvest.

Where shallow sowing is adopted, rapid root development takes place,

and half-a-dozen shoots are soon developed, all within a few days of one another ; if the plant is a thin one all of these may develop good heads. With a fair plant, however, it is rare for more than, say, three out of six shoots to come to maturity, but these should all be good heads. Other limiting factors—drought, a cold spell or insufficient food-supply—have brought their influence to bear, and the plant has restricted itself to what it can bring to maturity. The disadvantages of surface-sowing are the depredations of birds—particularly the finches—the possibility of frost injuring the plant before it is established, and the risk that the surface soil may dry out before the roots have got down if it is a rainless season.

I hold the opinion that, with shallow-sown crops, the straw is stronger ; there is a minimum of laid corn, a thin plant fills out well owing to its tillering capacity, and, where the plant is a good one, a large increase in the plant population is possible. Necessarily, in any individual case the adverse factors must be balanced against the advantages, and it is perhaps fairest to put the case no higher than to say that sowing too deep is a limiting factor.

As already mentioned, little artificial manure is used on the greater number of Heath farms.

A phosphatic manure is applied to the roots, and some of the more successful farmers now use a dressing of kainit for their barleys, as they consider it brightens them. Years ago large quantities of salt, then at 17s. a ton, were used, and this practice is coming into favour again.

Two of my friends had an interesting experience this year. They had adjoining fields, both swath-land, similarly cultivated, sown with Webbs' New Cross on the same day, and harvested at the same time. Both had good crops, but when it came to sale-time one sample fetched 70s. the quarter and the other 50s. The only difference in cultivation appeared to be that the better sample had had 4 to 5 cwt. of salt per acre as against a smaller amount of kainit. I think Rothamsted recognizes that chlorides produce a bright barley, but this difference in value is rather striking. There may have been other factors. Salt is also considered to strengthen the straw.

Personally, I like to employ a complete manure, consisting of 1 cwt. sulphate ammonia, 1 cwt. potash salts or 2 cwt. kainit, and 2 cwt. slag or North African phosphate—or other cheap raw phosphate. Manurial trials carried out under Rothamsted supervision have shown little benefit from superphosphate on this land. On two occasions, however, on land not in good heart, where slag had been distributed by an old rotary distributor which was working badly, I found the fields in regular waves of high and low barley, which coincided with nothing but the faulty slag distribution. As the nitrogenous manures had been sown by hand across the waves I formed the opinion that the nitrogenous manures had given their best effect only on the well-slagged portion, and there was certainly a very marked difference in the crop.

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As regards quality, I have employed artificial nitrogenous manures freely and have found no ill effects.

On the other hand, I think too-liberal manuring with organic manures is liable to result in a coarse-skinned, nitrogenous, dull sample of barley, which in a wet season is associated with a long, weak straw, liable to go down—at all events on the 7 in. land. As with us the wet years do not predominate, the crops following roots and sheep do not suffer much on the lighter land.

The favourite types of barley for our Heath-land are at present undoubtedly Spratt-Archer and Webbs' New Cross. Of the two, I think the Spratt-Archer has proved the favourite with the brewers this year, and I think myself that it is the better yielder. I have given a good trial to Beaven's 1924 and Plumage-Archer and have never had a really good sample on this land. These barleys undoubtedly require moister conditions of soil or climate.

A local practice is to grow our barleys for malting on the Heath, and on the lowfield for seed. One season on the cold, damp clays seems to rejuvenate the barley, which undoubtedly degenerates if grown on the Heath for too many years in succession.

On the lowfield it takes on a thicker coat and develops a larger and more nitrogenous seed, with a strong germ, which, in appearance, would not naturally attract buyers looking for a good malting type to sow.

1925 was a dry year, when June and July were, with us, practically rainless. In that year I sowed a 10 acre field, after sugar-beet, half with Spratt-Archer—which had been grown on the Heath for several years—and half with Beaven's 1924. This latter was a beautifully even piece, every plant the same length of straw and ear, with every appearance of pedigree and breed. The Spratt-Archer was most uneven, all humps and hollows, and apparently grown out.

When harvested, the Beaven's 1924 yielded 46 bushels, against 42 bushels for the Spratt-Archer, but the latter sold for 70s. per quarter against 55s. for the 1924.

The Beaven's had not finished well under the dry conditions. Crops grown subsequently from the same stock of Spratt-Archer after one year on the lowfield have proved quite satisfactory and given good yields this year.

It is generally accepted by Heath growers that the best barley crops for both quality and yield are those following grazing seed—the swath barleys. Barley, after a white straw crop, again gives good malting quality, and, where the season has been kind, winter-sown barley is possibly the best of all for quality, with a particularly small plump berry, but it has proved a light yielder. This winter-sowing is not a regular practice for the Heath, but I have experimented for several seasons, using Spratt-Archer, with varying results. On the first occasion, in 1925, on which I tried it on a large scale I was lucky, and had 5 quarters per acre, which sold at 90s.—the best barley I have

grown. Next year 15 degrees of frost in mid-November caught the barley before the green leaves were through the sheath, and that was fatal.

In 1927 the barley passed the winter well, and looked very promising until May, but our drought was from 15th April to 15th June, just when it was ready to shoot, and the crop was consequently very light and the quality inferior. So far, this winter it has done very well. There is always a tendency to loss of plant in the winter-sown crop, chiefly, I think, caused by insect pests. Somewhat large claims are made for sugar-beet as a preparatory crop for barley. I have always had a satisfactory crop following beet, but I know of no definite rotational experiments where the beet and other crops were treated alike.

Where the beet has had a complete dressing of artificials, and the tops have been eaten off by sheep, this is likely to give a larger crop than where the preceding crop has been unmanured. Again, where the heavy crop of roots has been eaten off by sheep the yield may be greater than in a crop following beet, though the quality of the latter will be superior, due, as I think, to the heavier organic manuring in the former case.

This year I had in the same field 10 acres following potatoes—5 acres after beet, and 5 acres after mangolds. The preliminary crops had the same treatment—viz. 10 loads of dung per acre and similar dressings of artificials—the chief difference being that the potatoes had dung from the pig yards, whereas the roots had cattle manure. The potatoes were only a half crop, owing to blight, but the beet and roots did well—the beet, indeed, yielding about  $11\frac{1}{2}$  tons per acre. The differences were very marked in this year's barley crop. A month before harvest the barley following potatoes was 8 in. taller, greener, with a tendency to lodge, and eventually was quite a week or ten days later in ripening. This was apparent to a drill row. There was no apparent difference in the mangold and beet portions. These stood well and were altogether brighter than the potato barley. When I had threshed  $7\frac{1}{4}$  quarters per acre from the roots area I anticipated, from the number of loads carried, that I should get over 8 quarters, if not  $8\frac{1}{2}$  quarters, per acre from the potato piece, but as a matter of fact it threshed out at just the same as the first plot, at  $7\frac{1}{4}$  quarters. No doubt several bushels were lost owing to lodging and difficulty in harvesting, but there was nothing like the difference that the weight of straw had promised. It must be noted that this was a very wet year in July, August and September. Had we had a dry period in those months it is quite probable that the potato portion would not have been laid, but would have produced a heavier and better finished sample than the root portion. Pre-War farmers used to tell us that potatoes killed the Heath-land, but where artificials are used I do not think it is so. Possibly after a light winter rainfall it might be found that potatoes had unduly depleted the land of moisture.



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Before concluding, I should like to touch on the economics of these barley and sheep farms. It is claimed that the re-establishment of the gold standard has steadily reduced the cost of living to the general mass of the people. This is undoubtedly true, but if merit is claimed for the reduction in the cost of living to the consumer, the responsibility for the loss to the producers cannot be shirked. Nearly four years ago the agricultural index figure stood at about 70 per cent. above the pre-War basis—its peak in recent years—and since then it has steadily dropped till it reached 37 and 38 per cent. in the last months of 1927.

It is doubtful whether the general public recognize that this represents a loss of turnover of over £40,000,000 a year to the agricultural community, or about 20 per cent. of the earning power of our farms, omitting vegetables and fruit gardens. To come down from the general to the particular, I have examined the sales on a neighbour's farm and I find that over a number of years the average sales have been per 100 acres of total farm—grass and lowfield included—55 quarters of barley, 42 quarters of wheat, 4¼ beast, 35 sheep, and about £66 worth of various produce—pigs, poultry, potatoes, wool, etc. On the 1924 figures these were worth £625 for the 100 acres, and at present prices this amount would be reduced to £484—a loss of 28s. per acre, or just over 22 per cent. The particular farm on which these figures are taken has never yet shown a loss (no interest on capital being charged) and it is indicative of the great economy with which these farms are worked that last year, with sales down to £5, 8s. per acre, there was still a small margin of profit. It is doubtful whether that will be the case this year. Of this small total the plus value of malting as against feeding barley accounts for about 12s. per acre. Both malting barley and sheep have been relatively high in price compared with beef and wheat—the staple produce of the lowfield farms—and, taking 1 quarter of corn and 1 live cwt. of beef per acre as a high measure of the productivity of this class of land, it is seen that at the recent low-price levels the sales would not amount to much over £4 per acre.

Our malting barleys have to find a market in the face of a tax, in the form of the duty on beer, which amounts to £85 per acre. This has reduced the consumption of malt from 6,000,000 quarters in 1913 to 3,600,000 quarters in 1926. As 900,000 quarters of the latter were foreign barleys, only 2,700,000 quarters of our home-grown barleys are now required by brewers out of a crop which in a good year may amount to 4,000,000 quarters of malting quality.

In my opinion a reduction of the beer duty by the equivalent of 1d. per pint, making up the Budget deficit so caused by an all-round tax on imported meat, with a preference to Colonial produce, would benefit the whole of the rural community, and our barley-growers in particular. To ask the consumers to pay the higher price for home-grown meat would be only reclaiming a small part of the benefits the gold-standard policy has already conferred on them.