equally spread before harrowing for grain, &c. It should not be forgotten that lime has the two-fold power of consolidating light land and disintegrating heavy land. It also *cooks*, if we may so express it, all the inert vegetable matter in the land, and aids the formation of nitrates in the soil, besides supplying lime, and in many cases, phosphoric acid to the plants.

Heavy clays, or soils rich in vegetable matter, are those most benefited by burnt lime. In the reclamation of peat-bogs it is of the highest value.

Liquid Manure.—It is hardly necessary to insist on the absolute necessity of preserving every drop of the urine of our stock. The evidence collected by Monsieur Gigault in his tour in North-Europe, and published in the Report of the Commissioner of Agriculture (1894), will convince the most incredulous of the importance of this liquid. How it is to be preserved from waste, whether by tank on dairy-farms, or by the use of straw, peat, or other absorbents, must be left to the jugdment of individuals.

Green-fodder crops are now, comparatively speaking, commonly grown on all well farmed occupations. Of these, a considerable experience in this country induces us to uphold our old and favorite mixture, first tried by the MM. Guèvremont, at Sorel, twelve years ago; it consists of 2 bushels of oats, 1 bushel of pease, and 1 bushel of Scotch tares (vetches) to the imperial acre, sown in succession at intervals of a fortnight or so from the earliest date in spring till the first week in September. If a couple of pounds of *rape-seed* be broadcasted after the last harrowing and rolled in, not only will the bottom of the fodder be thickened, but, after the crop is mown, a nice bite will be soon ready for the sheep.

The cultivation of *rape* in this province would, as we have remarked times without number in this periodical, if the crop were fed off by sheep, soon change the whole face of the country. Rape *may* be mown for the cows, but it is more especially intended for the use of the flock. An acre of good rape or cole-seed, will fat—ripe fatten shearlings, or twelve to fifteen lambs of the year; besides, the good the treading of the sheep, with their little pointed hoof, to say nothing of the manure they leave behind them, will do to the succeeding crop of grain must be seen to be believed. This is the way to improve the ends of the long farms of some districts, that lie so far from the homestead that they never see the dung-cart.

Bouillie Bordelaise has thoroughly answered as a cure for the potato-disease, in some cases, and deserves to be tried everywhere. It seems to have the effect of continuing the growth of the tops long after they would naturally perish. If farmers would take the same pains to destroy the last brood of the Colorado beetle that they take to destroy the earlier broods this plague, too, would soon be eradicated; but, as an old *habitant* told us, and very right he was, there is no use in one farmer doing it unless all the rest follow his example.

Hoed or root-crops, we so fully treated last summer (v. numbers of the Journal for 1894), that it can hardly be necessary to go over the subject again. Suffice it to say that the profits on such crops are not to be looked for from the yield of roots, &c., alone, but from the additional yield of the succeeding crops of grain, hay, &c., brought about by the perfect cultivation the soil receives, or ought to receive, during the growth of the, so-called, *fallow*-crops.

Bacon, as will be seen in another part of this No., is greatly in demand in England, but, unfortunately, both the bacon and hams that have reached that market, hitherto, have not suited the taste of the English so well as the hams and bacon sent thither by the Scandinavians and the Irish. As we are all well fitted for the production of the food required to make good hogs, barley, pease, and the by-products of the dairy being plentiful here, so all we need is to secure a good stamp of hog, and that can be easily bred by a cross of the Yorkshire and the Tamworth, or the latter and the Berkshire.

Fruit growing pays well in suitable localities, but as we have never been lucky enough to have an orchard in Canada, we must leave the treatment of this subject to others.

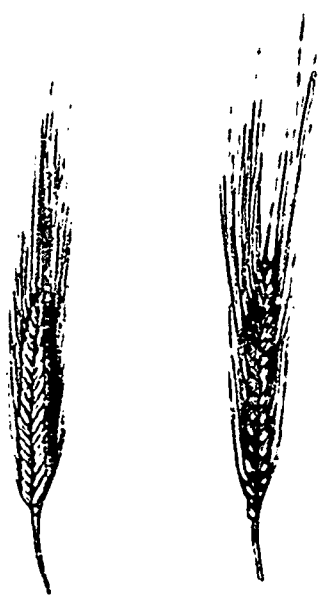
BARLEY.

A LECTURE

(By Arthur R. Jenner Fust)

The fruit of Sir John Barleycorn, as the old English term has it, is too well known to need a general description, but a short delineation of the different varieties of this grain may not be superfluous.

Barley may be divided into two chief kinds: two-rowed and six-rowed; again, into malting and grinding barley; once more, into spring and winter-barley; and, lastly, into common and naked barley. In the annexed engraving *a* is the 4-rowed, called in Scotland *bere* or *bigg*; *b* is the ordinary two-rowed barley, the only sort grown in England—at least I never but once saw the former, and then it was only grown one season (1853), as the malsters did not like it at all. There is a six-rowed barley, but I never saw it and I fancy it has almost entirely vanished out of cultivation in Britain.



Two rowed Barley. Four rowed barley.

It is of course very easy to distinguish between these two sorts of barley when in the ear; but after threshing, it is not so simple a task. In classing barley by the grain, the following difference may be observed: In the 4-rowed and 6-rowed the middle line of the bosom is so traced as to give the grain a twisted form, by which one of its sides is larger than the other; but in the 2-rowed the middle line passes straight, and divides the grain into two equal parts. It is also shorter and plumper than the other. In the two groups of grain, the natural size has been preserved; but in the engraving of the barley in ear, the natural size has been diminished by one-half.

Bere or Bigg Two rowed Barley.

The signs of barley being fit for malting, a very important point as far as value is concerned, in the shrivelled skin across the middle line. The difference of price in England used to be very great between malting and grinding barley; but now the duty, there, is levied on the beer instead of on the malt, it is not so great. (1) The *swell*, as it was technically termed, amounted sometimes to as much as 15 0/0, i. e. the bulk of the malt exceeded the bulk of the barley by that amount. Barley was never sold by weight, as malting barley weighing 52 lbs. a bushel was often worth $2.50 a quarter more than grinding barley weighing 54 lbs. Here, unfortunately for the careful growers, there is very little difference in price between the two kinds, and it is not invariably the maltster fault, for I remember well that, when I had a brewery, if I gave one farmer an extra price for a fine sample, the next that came with a lot to sell insisted upon getting as much as his predecessor in spite of a possible inferiority in his grain. Of course he did not get it; but it created a dissatisfied feeling, which frequently led the disappointed man to refuse to deal any more.

A good crop of barley is a splendid sight. I once saw, in Cambridgeshire, England, 72 bushels an acre, standing bolt upright, and the waving ears, with their golden beards, were a glorious spectacle. The ordinary crop used to be about 48 bushels, but in the Eastern counties, 64 were not uncommonly seen. Somewhere about 1835, Dr. Chevalier, a Suffolk physician, found a *stool* of barley, the beauty of which induced him to preserve the ears and propagate the seed with great care; hence, the celebrated Chevalier barley; the finest malting barley ever seen. This was not its only peculiarity, for whereas, before its discovery, no barley fit for the brewer would grow on the clay soils above the chalk, the Chevalier was found to answer famously there; and the consequence was, that instead of growing six or seven quarters of oats to the acre, the farmers of heavy land in the Eastern district succeeded in producing seven to eight quarters of the finest malting samples. In the long run, the landlords of course raised the rent, but it was a profitable discovery to the tenants all the same; the Chevalier barley entirely changed the whole system of farming in that part of the country, and a slovenly district was converted into one of the best farmed parts of England. In this case, barley at first was sown on a summer fallow, whereby the land lay without a crop from August, when the wheat was cut, till the following February twelvemonth, when the barley and grass-seeds were sown. A long time, to be sure, but as the average yield per acre was 60 bushels, and the price 5 s. sterling, the gross return equalled £15, or £7.10 a year, the time between crop and crop being of course two years. Later, rape was sown on the fallows in June or July with bone-dust, guano, or dissolved bones, fed off with sheep, to each being given a pound of linseed cake, or ½ a pound of cake and ½ a pint of beans or lentils. With this, or with heavy dressings of dung ploughed in during the autumn, and the barley sown on the stale-furrow—the strong point of heavy land farming in the Eastern counties—the crop was enormous; a farm I rented for a few years having averaged 64 bushels an acre for 14 years. The course of cropping was as follows: fallow or rape, barley, seeds (red clover), wheat; and the acre-yield: 64 bushels of barley, 3½ tons of clover, cut twice, and 40 bushels of wheat. In process of time, it was found that red clover, would not bear the frequent repetition, and it was replaced in the second round by beans, and in the third round by hop-clover, commonly called trefoil (trifolium procumbens). In the two last rounds of the twelve years, the wheat was found to fall off in yield, but it was no use going on sowing red clover, and the lost had to be borne. I mention this because I must keep on dinning it into people's ears that our most valuable friend red clover cannot be played tricks with. It has its fancies, and if those fancies are not indulged, evil will come of it. The writers in the American papers talk of sowing red clover for manuring purposes as if it was a plant which, like wheat, would, if the land was kept in good heart, come every year. It is not so, as our East Anglian brothers found out long ago, and if we persist in neglecting to profit by their experience, we shall inevitably find that red clover will refuse to grow altogether.

Good Chevalier barley weighs from 52 lbs. to 56 lbs. a bushel. In Worcestershire, on the New Red Sandstone formation, it has been known to go as high as 60 lbs. I have found some samples in Chambly, on the Longueuil road, weighing 57 lbs., but the ordinary barley of the province does not exceed 52 lbs.

Malting.—The conversion of barley into malt is conducted as follows: The grain is steeped in water for from 48 to 72 hours, according to its quality—(1) in mild weather, the water is changed the second day—it is then, after draining, turned out of the steep into a frame, called the couch, where it lies for about 24 hours—depth of couch, about 20 inches—The grain now begins to heat, becoming about 10° hotter than the surrounding air, and it is turned over, and gradually thinned down to 5 or 6 inches. The roots begin to show; the stem or *acrospire* springs from the same end, and turning back, runs along the grain under the husk. To bring this acrospire far enough up and not too far, is the great point in malting. In England, the quality of the barley is so superior that three fourths is found sufficient, but, here, it is better to let the germ almost protrude. In proportion to the progress of the acrospire, the starch of the barley undergoes a change: barley usually contains 8 0/0 or 9 0/0 of sugar and gum; after malting, it contains about 30 0/0 of these substances In the process, some of the nitrogenous matter originally contained in the seed is lost: barley contains 3 0/0 of gluten, malt only 1 0/0. In the brewer's mash tun, a further portion of the starch is changed into gum and sugar.

When the acrospire has proceeded far enough up, the malt is dried to prevent further growth, which, if allowed, would exhausts the whole contents of the husk. The process is a most interesting one, and in our En-

(1) It is still 4/%.

(1) Heavy 2-rowed barley requires 72 hours, and must be sprinked on the floors while growing, 6-rowed does not need this, and is therefore more popular in the States.