

**Fertilizers.**

NO. II.

Bone dust, like all other fertilizers containing phosphoric acid, are very valuable on clay soils but, unless these are well supplied with organic matter, they should only be used in connection with farm-yard manure, muck, compost or some other substance containing a large percentage of organic matter. On very stiff and tenacious soils superphosphates would be preferable to bone-dust, but on all others the latter deserves the preference, unless it cannot be applied until shortly before the crop is sown. For in order to obtain good results, especially on the heavier soils, it should be sown the previous fall for all spring crops.

As a general rule bone dust gives the best returns when used for fall grains, but is also used with very favorable results on spring grains and root crops. It causes a very marked improvement in the quality of the potato, making it firmer and more mealy. It has generally not shown a very marked improvement on fodder crops if applied directly, but if liberally supplied to the previous crop it has generally shown its beneficial results on them the following season. In connection with compost, ashes and lime, and mixed with a large percentage of soil, it forms a very valuable fertilizer for meadows.

If it has been proven by experiments that bones will materially increase the yield of the crop on the farm, the best and most convenient way to apply it is to spread it, mixed with earth, on the manure heap. If it has not been treated in this manner, and the meal is of a coarse nature, it is advisable to mix it with moist earth and to allow it to ferment in a heap before applying it.

Bone dust should be sown broadcast on the land, and buried as deeply as possible with harrow or cultivator. They have not given their best results when applied in the hill or drill.

Last year Canada exported 8,257,000 lbs. of this valuable material to the United States, for which we received only a trifle more than 58c. per cwt., or in other words not quite a quarter of the fertilizing value of bone dust; for this substance, if of good quality, should contain 24% of phosphoric acid, 3% of nitrogen, and 31% of lime. These substances, at their present market prices—nitrogen in finely ground bone, 16½ cts.; phosphoric acid in finely ground bone, 8 cts.; lime is, generally, not taken into consideration, as the soils are generally well supplied with this constituent—would realize \$2.40, which would, therefore, be the value of a cwt. of fine bone dust. Every good farmer would denounce the practice of selling hay and coarse fodders; but what are Canadians doing when they sell bones, ashes and similar substances to the Americans (their competitors in agriculture); allow their manure heaps to be washed by rain, and other valuable fertilizing materials to go to waste? They are taking the very souls out of their farms, which, if they do not mend their ways, will become barren wastes before many generations have passed away. You may say other countries have pursued the same plan in years gone by. This is no doubt true; but they have had to buy fertilizers or their equivalent from other countries, and these again from others; but where are we going to buy when we find our farms at the verge of bankruptcy? And even if we could get them would it not be more economical to use our own

resources now and keep up our fertility than to buy it back again in future at a very much advanced price? Surely if our American brethren, who do not possess advantages superior to our own, can afford to pay the freight and the profits of the various middlemen in addition to the price the farmer here receives for these substances, the latter ought to make a fortune off them if he used them himself. Save all your fertilizing materials, they may only appear to be trifles, but trifle added to trifle will soon make a large amount, and it is from trifles that a large proportion of the profits are derived.

Bones are of comparatively little value if placed on the fields in their entire state, for they then require a long term of years before giving any returns; but if reduced to a powder (the finer the better), they are a very valuable fertilizer. This reduction is effected in various ways. The one which was among the first to gain any considerable extent of popularity was grinding them into powder by a mill constructed for that purpose. This product, which is always more or less coarse and splintery, has been almost entirely supplanted in Europe by the steamed bone-meal. This substance is prepared by steaming the bones for several hours in an iron vessel, and under a pressure of 50 to 60 lbs. It is then passed into another iron vessel, in which it is thoroughly dried and somewhat powdered, from here it is conveyed to a mill in which it is ground to a fine powder, when, after being freed from its coarser parts by sifting, it is ready for shipment. The meal prepared in this way is, owing to its fineness, considered to be twice as valuable as some of the grades prepared by the simple grinding process, notwithstanding the loss of some of its nitrogenous constituents during steaming. Both these brands are materially improved if their oil has been extracted previous to their grinding, for this substance will retard the decomposition of the bone considerably. Other methods, which are not now employed to any considerable extent by the manufacturers of fertilizers, but which are suitable for the farmer's use, as they do not require machinery, have been frequently described in the *ADVOCATE*, but for the benefit of those who may not have read them we briefly repeat:—Place the coarsely broken bone, with alternate layers of ashes, on a covered floor; wet the heap until all is moist; shovel over occasionally till a blow with the shovel will reduce them to a powder; pound them and sift out the coarser parts, and repeat with them the operation. Another more efficient, but more troublesome way, is to boil the bones in lye obtained by leaching ashes with warm water. Composting or fermenting them with liquid excrements is also employed to make them more soluble. Superphosphate of bone is made by treating the bone-meal with dilute sulphuric acid, and sometimes with liquid excrement, but in this latter process a large percentage of the nitrogen is liable to be lost. In Europe the steamed bone-meal is, however, preferred to this as well as any other preparation of bone. The bone-black, a by-product of the sugar refineries; bone-ash, the remnants from the bone used as fuel in some parts of South America, and their superphosphates, are substances having little or no nitrogen, and are but little used in Canada; but the bone-black, which in the French method of sugar-refinement receives a considerable addition of blood, is extensively used by that nation with good results.

[TO BE CONTINUED.]

**Barley Smut—A Word of Caution.**

BY THOS. ELMES, PRINCETON, ONT.

During the past two seasons smut has increased to an alarming extent. This season I have visited some of the best barley growing districts of Ontario, and find all fields affected, and some of them very badly indeed, sufficiently to ruin the crop for sale and for seed, if proper care is not taken.

The increase of smut is due to several causes, viz.: Sowing the same seed year after year on the same land. Unfavorable seasons, such as alternate heat, cold and drouth, and during the past two seasons its rapid increase has, perhaps, been caused by the "barley scourer" attachment on the threshing machines. These grind the smut to powder and rubs it into the grain, which, not being passed through the fanning mill, is deposited in the granary, where it sweats slightly, and becomes thoroughly impregnated with the smut, and when sown next season is sure to produce a great abundance of this fungoid growth. Many thousand bushels were rendered unsaleable last season, being blackened by being passed through the "scourer." This season it may reach the millions if the same plan is adopted. Smutty barley should not be passed through the "scourer," but through the threshing machine a second time to remove the beards and smut, for then while passing through the mill all the smut grains which are broken are blown out, or, if this be too much trouble at threshing time, pass the grain over a fanning mill immediately after the threshing is done. This will remove a good proportion of the smut, at least all that is light or broken. Smut is beginning to be a serious matter, as I do not believe there is a certain remedy for it.

I have tried the many so-called remedies, such as bluestone, washing soda, etc. These I applied according to directions; but as they made but little improvement in the crop, I thought I had, perhaps, not done it properly. But this spring I received from the Experimental Farm, Ottawa, Ladoga spring wheat, which had been thoroughly and scientifically treated—indeed the grain I received had become so harsh and dry from the poisonous dressing that we were afraid it would not germinate, but it grew well, and so did the smut, for it constituted 14 per cent of the entire yield; while four acres of Rio Grande wheat, of my own seed (not treated), just across the furrow, was without smut. I believe the best remedy for it is to reject all seed grain which contains smut, and not sow on land that has produced it, if possible; but I believe the germs will not remain in the soil more than one year, if not renewed by grain being sown on the same land. To satisfy myself that grain can be impregnated with smut, I took some barley entirely free from it; took smut from other grain, dampened it and rubbed the smut on it till it was thoroughly blackened. This I sowed close beside some not thus treated. The grain treated produced twenty-five per cent. smut, while the other was entirely free. So, I believe, the greatest caution should be used in the selection of seed, threshing, and cleaning the grain as soon as threshed. Believing this matter worthy of very serious consideration, I have written these few words of caution to my brother farmers, hoping it will prove a benefit and guidance to them in the future.

Experiments with wheats at the New York station give strong evidence that compacting the soil aids the plants to resist winter killing and favors increased yield.