and the thick residue into another vessel, it must be boiled down nearly solid or it will not keep. This substance or residue contains potash and other earthy salts and some sugar. In the continental factories they ferment the sugar into spirit, and burn the residue in a potash kettle into potash, and as the latter substance is nearly as valuable as sugar—if not wanted on the farm—it may be sold as potash; but as it will not be exactly like the ordinary potash of commerce it must be sold for what it is, or it will be condemned and sacrificed by the potash inspector at Montreal. The sucrate of lime thus obtained can be converted into sugar by the carbonatation process, hereafter described.

By this means, the farmer, while he is feeding his cattle and stock with the boiled roots, is accumulating a store of a valuable article to be afterwards turned into money, as occasion offers. It must be borne in mind that the smaller the roots are cut up, even into dice of half an inch square, the more surface is obtained, and the more juice extracted by the steam, while the roots, by cooking, are all the better for the stock.

Hydrate of lime has been mentioned in the first of these articles. It is the same as powdered quicklime, and is prepared by dropping boiling water on newly burned lime, which must be covered up, and water added from time to time till the lime falls into a fine dry powder; this must be sifted in a fine sieve to take out the pieces of unburned stone and other impurities, and is then used as before described. "Milk of lime" is made by adding water to this powder until a liquid is formed. The stones all sink to the bottom, and the upper liquid is pure lime and water, and is fit for use.

To show the amount of potash obtained in the making of beetroot sugar: In the season of the years 1865-6, France produced 275,000 tons of raw sugar from beets, 100,000 pipes of from 100 to 120 gallons each of strong spirit distilled partly from the root and partly from the molasses, and 20,000 *tons of potash* were made from the refuse after distillation. The potash alone was worth two millions of dollars from that season's work. VECTIS.

Manure—Bones, and Bone Dust.

For accelerating the growth of grass and green crops bone manure is of great value. Within the last 20 years, this manure has excited great attention throughout the length and breadth of Great Britain, and is now in almost universal use for raising turnips in all the greater turnip-growing parts of that country. Of late years it has been looked upon with favour amongst the better class of Canadian farmers.

Long before the advantages to be derived from the use of well-crushed bones were generally known, many persons were aware of their fertilizing properties. At first they were reduced to ashes by fire, but in this process there was great waste, for the oil and nutritive matter were considerably diminished by calcination.

Bones contain more than 53 per cent. of phosphate of lime, some phosphate of magnesia, carbonate of soda, and over 7 per cent. of nitrogen. To the quantity of phosphates contained is due their principal value, for these salts are largely removed by feeding cattle and the exhaustion of successive crops. Another way of reducing bones to powder has been to partially break them with a hammer, and then decompose them by the effect of urine at the bottom of the farm yard. Mills may be now obtained at a reasonable price, in which to reduce the bones directly to powder, and by this plan much waste may be avoided.

When bone dust is used for the turnip crop it is usually sown in the drills with the seed, or it may be spread to advantage, especially with ashes, along the drills when the young turnip puts forth its virgin leaves.

With regard to the durability of this manure, it has been asserted that on a field, part of which was boned forty years ago, the crops were on that portion, during fifteen or sixteen years, visibly better than on the remainder, although the land was all of the same quality, and the part not boned was manured with barn-yard dung. In another case reported to the committee of the Doncaster Agricultural Association, about three acres of light sandy land were dressed in 1814 with 150 bushels of bones per acre, since which time the land is said to have never forgotten it, but is nearly as good again as the other part, farmed precisely in the same way, with the exception of the one application of bones.

Upon the lighter and more calcareous soils the benefits of bone dust are more marked and more permanent.

This manure should be laid upon grass as early in the spring as the land becomes dry.

That bone manure has little or no effect upon wet land is generelly conceded. It has been affirmed that broken bones have a mechanical effect in loosening heavy soils, but I think that a less costly application, say chip manure, would be equally beneficial. Upon thin sandy land, a liberal application of bone manure will be of great advantage, not only to the immediately succeeding crop, but in the improvement of the land for many future years, and in the efficiency, in the succeeding courses, of a smaller quantity to insure a crop.

For general use, particularly upon the turnips, manufactured bones, that is, bones boiled and ground, are most easily handled by the farmer; but farmers, at least in England, have found themselves imposed upon by adulteration on the part of the manufacturers, or more often by the deprivation by manufacture of the gelatin and oil which bones in their natural state contain.

There is yet another way in which to make this article at home. Even as flesh, if buried in the ground, will not bring its fertilizing powers to bear upon the earth until decomposition has set in, so it is necessary that bones should have begun to ferment before they become available for the use of the soil. To attain this fermentation, the formation of a compost of bones with earth and other substances will be found quite practicable. Mix twenty bushels of bones with four or five of barn-yard muck, cover the heap well, and the mixture will soon become decayed and pulverized. In this you will have the *bona fide* bone manure, with all its gelatin, phosphate, and nitrogen contained. This practice has been recommended by several very intelligent farmers, and I have it from a farmer near Guelph that its effects upon the turnip crop have been very decided.

Bones have the advantage of being easily procurable in our cities, and are compact for carriage. One hundred bushels will be found equivalent to thirty waggon loads of barn-yard manure. They may be collected and drawn home in the winter time, and can be preserved for a long time if kept dry. Moreover, they have one advantage over barn-yard manure, in that they carry no weeds to the field. They are most suitable to turnip culture, and a successful crop of these will indirectly benefit the farm in succeeding years. We have numerous instances of turnips with ordinary manure laid under them being destroyed by the fly, while those sowed with bone dust have escaped the ravages of this pest.

In conclusion, I would only add the following summary of the rules for the application of bone manure, as recommended by the members of the Doncaster Agricultural Association. These are as follows:—

That on dry sands, limestone, chalk, and light loams, bones are a very highly valuable manure.

That they may be applied to grass with great good effect.

That on arable lands they may be laid on fallow for turnips, or used for any of the subsequent crops.

That the best method of using them, when broadcast, is previously to mix them up in a compost with earth, dung or other manures, and let them lie to ferment.

That if used alone, they may either be drilled with the seed or sown broadcast.

That bones which have undergone the process of fermentation are decidedly superior, in their immediate effects, to those which have not.

That the quantity should be about twenty bushels of dust, or forty bushels of large, increasing the quantity if the land be impoverished, and also if the bones have been manufactured.

That upon clays and heavy loams it does not yet appear that bones will answer.

Farmers, do not waste bones, but collect all you can.

C. E. W.

Ancaster.