

the farm. Bones had long been a very favourite manure, and were generally valued very highly; but in regard to them they had to consider several things. First as to the fineness of the bone. It was well known, but perhaps it was not so well known as it ought to be, that rough bones, bones which were called half-inch bones, and crushed bones in bits varying from half-an-inch to an inch in length, were a very unprofitable form of application. He was recently at a farm where a handful of bones about an inch long were picked up, and which he was told by the farmer had been applied to the land by his father nineteen years ago, and there they were in a tolerably good state of preservation, showing that it was possible to put on that excellent manure in such a form as to make it not an economical manure. It was quite evident then that the finer the bones were ground the more their surface was increased, and that would teach them that it would be much better to have them amply ground down. They were now beginning to understand that better, and to employ bone manure finely ground down. There was a practical difficulty in making fresh bone into a very fine powder. Even when very finely ground it contained a greasy substance on account of the oil that was in its composition, which kept it from rapid decay; therefore bones were a form of manure which they would not put on when an immediate result was required, but it was an excellent manure if they wanted an ultimate result. If they wished to improve grass, then they would put it on the crops preceding, or even the crops preceding that. A heavy manuring of bones might be applied to a turnip crop; then after that they could have a barley crop, and then a grass crop would greatly benefit by the bones applied to the turnip crop. There were two methods in which bones were manufactured for manuring purposes. First, the bones were subjected to a steaming process, and there was this fact, that the process took out a considerable quantity of the oily matter, which enabled the phosphoric acid to be quicker in its action, and also enabled the bones to be more quickly acted upon by the plants. It put the bones into a more friable condition, so that the grinding bones by the steaming process, and the getting of them into a fine powder, was a matter for them still to consider. The more thoroughly they spread the powder, the more would the roots be benefited by the application. Another well-known method of overcoming the slowness of bones as a manure was to dissolve them, and that applied not only to bones but to every other phosphatic manure. There was one disadvantage which dissolving had in regard to bone, namely, that it destroyed the animal or the germ life which takes possession of the bone. The ordinary fermenting germs were readily destroyed, and they had no living fermentation in dissolved bones. What was known by dissolved bones was a manure which did not necessarily contain absolute bone. It was a name for all kinds of phosphatic manure which contained some bone or ammoniacal substance, and resembled the composition of what bone dissolved should be. They would see that there were plenty of ways of getting phosphates, and there were other and cheaper sources of albuminoid ammonia which might be added to it. It was quite probable that any imitation of dissolved bones was likely to be just as efficacious as the genuine dissolved bones. Having once put bones into sulphuric acid it was made not an organic substance but a chemical substance, and its special characteristic was gone; whilst phosphoric acid dissolved in that way would spread itself through the soil, and there was not the same fear of loss of phosphoric acid as of nitrates; in fact, it precipitates in the soil. Phosphoric acid was not easily washed out of heavy soils, but there were soils which did not so retain it. It would be a waste to apply dissolved bones to sandy soils, or soils more approaching sandy soils.

It was not, however, uncommon to have not only bones, which were an excellent application to a sandy soil, but also other phosphatic manures, reduced to an exceedingly fine powder and applied to the soil without being dissolved. There had been experiments made where, in some instances, insoluble phosphate had become useful for a crop, but these are few, and the general experience was that the dissolved phosphate was a better manure. There were some soils which were favourable for the application of undissolved phosphates, and those were soils rich in organic matters. It was extraordinary to find what results might be produced by perfectly insoluble phosphates put upon land rich in organic matter. The number of phosphates were very numerous, and farmers should be very careful in the phosphates they used for experimental purposes. Some phosphates go to a chalky powder, while others are ever of a gritty nature; but the more perfectly they were reduced to a powder the more certain was their action. Many of the discrepancies that had arisen in experiments with these manures had been due to the different forms in which they had been employed. It had been recommended and had been found beneficial to employ undissolved phosphates as a constituent of the manure heap. In choosing between soluble and insoluble, if they used the insoluble phosphate they did not put upon the land a large amount of sulphuric acid, for in all dissolved manures they were bound to apply a certain amount of sulphuric acid, but whether it did the land any harm or not was a question not yet solved. Some said sulphuric acid reduced the humus of the soil, bringing down the condition of the land and reducing its store of wealth. Potassic manures were limited to three varieties, and their application was not so important as the application of the other two forms. It frequently occurred that farmers declared that potash was of no use to them. But sometimes it occurred quite otherwise. He had seen cases where potash had made a marked increase in the crop; therefore it was for the farmer to know when to use it. There was something for the farmer to learn in another respect, and that was the time to apply it. Sometimes potash did harm by reducing the crop, but that must be due to the time at which it was applied. The land did not permit potash to go away rapidly, or to be lost by drainage; therefore there was no need for putting potash upon the land exactly at the time it was required by the crop. Dr. Aitken concluded by showing the doses required by land, and recommending that a committee be appointed for the purpose of organizing a series of experiments.

HOOPS

Mr Guai, of La Baie du Febvre, asks for information about growing hops. I wrote, some years ago, an article (v. p. 47 of Journal for 1879) on hop-growing in this publication, which ends with these words: "I should recommend no one to meddle with hop growing without passing at least one season in, or near, a hop garden; it is not a thing to be learned by study at home."

In England, it costs \$150 an acre to start a plantation; the annual expenses are very heavy, hops devour dung by the hundred loads; there is no return for the first two years; it is a purely speculative crop, some years it pays well, other years there is nothing (*absolutely nothing*) to pick.

If, after this, Mr. Guai desires to know more about the crop, I will try to oblige him in a future number.

Jenner Fast.