

the growth of the latter, no one thing is so valuable, as a general rule, as that of *bones boiled to a powder in strong lye*. To this the addition of gypsum and common salt will be of great service. The phosphate of lime contained in bones is an indispensable ingredient in forming the seeds of the wheat plant. The gluten in this grain contains sulphur, which the sulphate of lime (gypsum,) will furnish. The plant also needs potash, soda, magnesia, and chlorine; all of which the common salt, and ashes leached to obtain lye, will supply. The liquid excretions as well as the dung of animals abound in elements most useful in forming wheat. But an excess of manure will be ruinous to the crop. And why this is so, let us now consider. Suppose, for an experiment, one should make 2000 lbs. of ripe wheat, including both straw and grain, into a heap of manure for feeding a second crop of wheat plants. Let this manure be spread over the ground eight or ten inches deep, so that the plants would have to organize their tissues, seed, &c., from the appropriate elements contained in the manure. Could a large yield of good seeds be thus grown? We think not. Why not? Every thing the kernels of wheat need, as well as all that the stems and leaves require, would be present in great abundance. The difficulty is this: Nature designs that this plant shall derive from the atmosphere, through the medium of its roots and leaves, a large portion of the carbon, nitrogen, oxygen, and hydrogen, used in organizing its seed. Hence, to feed wheat plants with an excess of these elements in rotting manure, is to inflict a *surfeit and disease* upon the same. All organized beings, whether vegetable or animal, may be injured, more or less, by having an excess of nutritious matter thrown into their circulating systems. Wheat can endure this surfeit far less than corn, oats, or barley. There is a *natural limit* beyond which we cannot force any plant or animal, by the use of its most appropriate food. But in regard to wheat culture, we are far behind the maximum of product consistent with the highest profit. Something can be gained on most farms, by the droppings of domestic animals, applied directly to wheat fallows. They are not generally too rich for a dose of barn-yard manure; especially if it be well rotted, and contain an admixture of gypsum, salt, ashes, and lime. Don't spare the clover seed, the plaster, nor the leached ashes, where you wish to enrich your soil.

From the Farmer's Gazette.

BONES.

Of all the extraneous animal manures in use, bone-dust has, perhaps, been of the greatest importance to the farmer. Its use has extended the growth of green crops under circumstances, and in places where it otherwise could not have been attempted. The improvement of waste lands was often retarded, from the want

of a sufficient supply of manure; but this difficulty was obviated by the introduction of bone manure. We can point to several districts where this circumstance has effected a very great change, not only in the general character of the husbandry of these districts, but it has enabled farmers to rear and feed cattle and sheep of the more valuable breeds, thus competing successfully with the farmers in other and older improved districts. A long experience of this manure has only tended to impress upon our mind, that whether as an auxiliary to, or as a substitute for farm-yard manure, it is at once the best and most permanently useful of any manure we are as yet acquainted with.

Bones are generally boiled before being broken for the farmer, in order to extract the fatty matter contained in them, and although this may at first sight appear to lessen their value, yet it has been proved that so far from being prejudicial, this previous boiling actually increases their value to the farmer, the boiled bones raising by far the best crops. The manner in which bones act in promoting vegetable growth, has been the source of much discussion among scientific men, some ascribing their fertilizing qualities to their inorganic constituents, whilst others attribute their effects to the organic matter contained in them. A ton of bones, according to Johnston, contains

Animal matter,	lbs.
Phosphates of lime, &c.,	746
Carbonate of lime, &c.,	1245
	249
	2240

By Liebig, and after him by certain other writers, the action of bones is attributed to the phosphates contained in them, and this opinion is founded, among other things, upon the circumstance that bones have been found to exercise very little influence on vegetation, when the soil already contained a large amount of phosphate of lime; and we find that Mr. Hannam, in his Prize Report on the Effects of Special Manures, inserted in vol. 1, new series, of the "Journal of Agriculture," has drawn the conclusion from certain experiments made with burnt and unburnt bones, that "the inorganic constituents are the chief fertilizing agents in bones" (page 169); and again, "that the fertilizing properties of bones depend mainly on the inorganic matters contained in them" (page 171). That the inorganic constituents of bones do exercise a very great influence on plants cannot for a moment be doubted, when we consider the very important part which these constituents of bones occupy in certain vegetables; but it must also be borne in mind, that one-third of their composition is animal matter, containing from eight to ten times more ammonia than cow-dung, and judging from the well-known influence which ammonia exercises on vegetation, we cannot conceive that its presence is altogether useless, at the same time we cannot agree

with the opinion advanced by some writers, that this animal matter is the sole or chief cause of the beneficial action of bones; for we think it impossible that the remaining two-thirds of their weight, being inorganic matter, should have no fertilizing influence. We rather think that the very superior action of bones is attributable to the large amount of both organic and inorganic matter contained in them, their effects being combined so as to produce results which neither the one part nor the other, taken singly, would produce. That bones should not act with full effect on soils previously containing a large amount of phosphate of lime, can be easily understood; for such soils were already supplied with abundance of this constituent of plants, and therefore a similar addition would not be productive of any good, simply because such an addition was not required, but this circumstance is by no means a convincing proof that the fertilizing properties of bones are attributable solely to the phosphates which they contain.

Bone-dust is used chiefly as a manure for raising turnips. When used alone, 16 bushels to the statute acre are a sufficient quantity; indeed a larger allowance than this does not produce a corresponding increase in the weight of the crop. We have used, annually, large quantities of bone-dust by itself, and applied at the rate of 16 bushels to the acre; but we consider that half this quantity of bones, along with a quantity of well prepared manure, equal to half a dunging, gives more satisfactory results than when the bones are applied alone. Bone-dust is sown either broadcast on the land when ready for drilling, or in shallow drills covered in the usual way, or by means of machines which deposit the manure either in a continuous line on the top of the drills, or at short intervals where the seed is also placed. It may also be put in by ordinary hand-dibbles, the seed being placed in the holes on the top of the manure; but in this case, as well as when applied by the drop-drill, the crop must be consumed by sheep folded on the ground, so that the whole of the land may be manured, in order to render it fit for the succeeding crops. It is of importance that the seed be placed in contact with the manure, so that a rapid braird may be insured; and the turnip seed is not injured by thus coming in contact with it. When sown in the bottom of a drill, however shallow it may be made, or when the manure is sown on the land before drilling, then the seed does not come uniformly into immediate contact with the manure, as it ought to do; and the braird is comparatively slow and unequal. All experienced turnip growers are aware of the importance of a rapid and equal braird, and therefore they will direct their attention to the effecting of this as far as possible in the application of the manure.

Bone-dust may be mixed with dry and