

Phosphoric acid exists in the soil in combination with iron, clay, lime or magnesia.

In the stalk of plants, in combination with lime and magnesia, it is always found in small, and in the grain or seed, always in large quantities. In animals it is found in the bones in large proportions. With bases, it forms a class of salts called phosphates. What is the *exact* quantity which should exist in a soil to give it the greatest degree of fertility, has not been ascertained. Whenever the analysis of soils shows a less quantity than (.05) five one hundredths of one per cent of iron and alumina as phosphates, (for in this, for valid reasons, I have always estimated it,) phosphates may be advantageously supplied. The only indication for their use is their absence or deficiency.

### SOURCES OF PHOSPHORIC ACID.

The chief sources of the supply of phosphoric acid are from bones and guano. Ashes, both leached and unleached, also contain them in large quantities, and to this much of their beneficial action may be frequently ascribed.

Bone dust contains about fifty per cent of phosphate of lime and magnesia. I mean, now, bone dust, such as is ground from bones, as they are used for manure without any especial washing. Besides this, they, by the decomposition of the animal matter in them, afford ammonia. In this manner, they have a two fold action on crops:—1st. By supplying them with ammonia;—2nd. By supplying phosphoric acid. They should be so prepared as to preserve both of these valuable constituents.

### MODE OF PREPARATION OF BONES.

There have been many different ways of preparing bones. The most common is that of ground or crushed bones, in which they are broken to a greater or less degree of fineness, and then applied to the soil. Another mode recommended by Mr. Pusey, of England, is to first grind them, then moisten with water, cover them over with a stratum of earth, and suffer them thus to remain for a week or ten days. In this way, the bones become converted into a soft pasty mass, which is to be thoroughly mixed with the earth which covers them and applied to the land. The outside of the heap should have a thick covering of gypsum, which will retain all of the ammonia generated during the decomposition of the animal matter in the bones.

Another mode has lately been advised and practised with success, viz: to dissolve the bones in sulphuric acid, diluted with water. In this way, the same quantity of bones will produce a much greater effect than when ground to the finest powder. To effect their solution, the bones should be first ground or broken with *rammers*, put into a wooden vessel, (a cider or hog trough will answer very well;) mixed with their weight of water, then with half their weight of the strong commercial oil of vitriol. The mass should be constantly stirred for two or three hours at first,