

ORGANIC MATTER.

This is animal and vegetable matter considered, without reference to its inorganic constituents, and is composed of the remains of plants or animals which existed on the soil. It is called *organic*, because it has at one time entered into a form capable of performing the functions of life and has become a part of those things which are called organs, whose duty it is to perform processes, without which there cannot exist that system of vital functions which we call Life.

At one time very great importance was attached to vegetable matter in soils, many teaching that it was the indispensable thing to fertility, and that lands were productive in proportion as they contained a greater or less quantity of it. This has been shown by numerous examinations not to be the case, for the productiveness of soils bears no relation to the quantity of organic matter which they contain.

Its use is now restricted to giving the necessary degree of porosity to stiff compact soils, and by its decomposition to render rain water or dew better solvents of the mineral constituents of a soil. Every grain of sand contains some, sometimes all of the necessary constituents of crops, which are however of no use until they become dissolved into a state capable of being taken up by plants. Whatever will effect this is of service in a soil. Vegetable matter contains a large proportion of carbon, (charcoal,) which an exposure to the air is changed into carbonic acid. Water impregnated with this substance, has the property of powerfully dissolving all the minerals found in a soil, and by this means rendering it more productive. Its quantity varies greatly in different soils. In some I have found less than one per cent. and in others, "the Black Gum Swamp Soils" of Worcester and Somerset as much as sixty-two per cent. Secondly,

SILICA, OF SILICOUS EARTH OR SAND,

Exists abundantly in all soils. Though having none of the sensible properties of an acid, it nevertheless belongs to this class of bodies, and combines with bases to form salts. It very rarely exists in a pure form in the earth, being almost always in union with some other substance, and forming a class of bodies called *silicates*. With alumina and the per oxide of iron, it forms our red and yellow clays, it most generally is associated with lime, magnesia, potash or soda. The "grains of sand" in soils are composed of pure sand, (silicic acid) in combination with some of the above substances. In pure water these combinations are quite insoluble, but water charged with carbonic acid, dissolves them in a sensible degree. When in the *nascent* state, that is, when first set free from its combinations, water dissolves pure silicic acid very readily.

Besides its determining the mechanical properties of soils and when in a very fine state of division acting as a substitute for