

The factors II, IV, V, VI, VII, to which must also be added the specific gravity of the cement, VIII,) disclose all the peculiarities of the cement as far as they refer to its action as a constituent of soils, and if compared with the weight and character of the quartz-sand particles and their associates (undecomposed rocks,) as determined by I and III, will result in a perfect understanding of the physical state of the soil. These factors have to be noticed in a tabula arranged for the purpose; and each new analysis of soil, noticed in the form of these factors, will extend this tabula, and thus enlarge the knowledge of the chemist so far, that he may soon acquire the principles of a general and thoroughly practical classification of soils.

Though these factors give an entirely satisfactory account of the action of the different substances which constitute the bulk of soils, it is notwithstanding often desirable to know the exact quantity of humus which is present.

To determine the quantity of humus, about 150 grains of the soil are to be boiled for some time in dilute potash liquor, additions of water being made to it from time to time as evaporation takes place. By these means all the humus is dissolved, forming a dark brown liquor, which is to be filtered from the insoluble residue, and treated with dilute hydrochloric acid, until it becomes slightly acid. The humus is then precipitated, and must be collected upon a weighed filter, washed, dried at 266° F., and weighed; the resulting weight is that of the humus of the soil minus the weight of the ashes which are left after burning it. The average quantity of ammonia which humus can produce is one-seventh of its weight, and can be recognized by its smell either when the humus is heated by itself, or still better when heated with soda lime.

EXAMINATION OF THE DIRECTLY NOURISHING PROPERTIES OF SOILS.

We have already explained that the directly nourishing properties of soils depend on the presence and respective quantities of phosphoric acid, sulphuric acid, chlorine, silicic acid (silica in its soluble modification,) lime, magnesia, potash and soda, which are diffused through the bulk of soils in form of alkaline, or earthy salts. All of them are more or less easily soluble in water, and therefore uniformly diffused through the soil.

For the purpose of extracting them from soils, chemists are very apt to treat soils with water, and to think that the result of analysis of the so procured extract would represent that quantity of nourishing substances in soils, which will benefit the plants for the present. This is however not the case; we cannot imitate all the influences which nature during a whole season exercises upon these substances, by treating them for some hours with cold or hot water