

classed as a clayey soil of a higher degree of stiffness. A class of soils containing 50 per cent. of cement and up to 75 per cent. embraces the different kinds of stiff, loamy soils.

As to the character of the cement contained in the above samples of soil, it may be said that its proportion of sand, clay and humus is a good one and well adapted for this class of soils. In regard to its lime and magnesia, however, a more particular examination showed the quantity of the former to be deficient in a very extraordinary degree, whilst that of the latter, though predominant over the quantity of lime, was also somewhat deficient, and a *slight* increase, therefore, could also act beneficially on the mechanical texture of these soils. This state of things is in accordance with the particular origin of these soils as derived from the degradation of mica slate, a rock the component parts of which show exactly the above *relations*. As to the directly nourishing properties of the above soils, the analyses showed as follows.

Phosphoric acid, more than 120 lbs. per acre, (equal to about 11 bushels of bones. A sufficiency.

Sulphuric acid, less than 1 bushel of plaster of Paris contains. A deficiency.

Chlorine, more than 1 bushel of common salt contains, and less than 2 bushels for No. 2. A deficiency.

Potash, 0.32 per cent. An abundance in both soils.

*The mechanical texture* of the above soils will therefore be improved by the application of air-slacked lime, or still better by that of water-slacked lime, at the rate of 70-80 bushels for No. 2, and 60-70 bushels for No. 9. Water-slacked lime will soon become converted into air-slacked lime, and in this latter form will take part in the constitution of the cement, by which process the present natural stiffness of the cement will be diminished, and consequently the soil rendered more porous, dryer and warmer. Water-slacked lime, however, before being converted into air-slacked lime, exercises an important and beneficial influence on these kinds of soils, besides, which cannot be ascribed to slacked lime, at least not to the same extent, and for this reason the application of water-slacked lime will be preferable. This influence consists in the powerful solvent action of water-slacked lime on volcanic rocks, (silicates,) and also on clay, a product of the degradation of the former, by which means those constituents of soils change their composition in such a manner, that considerable quantities of silicate of potash are set free in it. In this soluble form silicate of potash is fit to be assimilated by plants, among the nutriments of which it takes the very first rank. Woodsboro limestone or any weak magnesian lime will best answer for these soils.

The directly nourishing properties of the above soils will be im-