

to fertility, but because these substances are not in a condition, as to solubility, for of being absorbed by the plant.

If then this variety of soil be not productive, if it does not fully compensate for the labor bestowed on it, we must use such means and appliances as will set free the substances which it contains. If there be defect in its texture, then the same means must be used; fortunately there is one that serves both purposes here. The soils of this valley can, in every instance, as far as I have examined them, be materially improved by the addition of water-slacked lime, with the exception hereinafter mentioned.

The following is the report of an analysis made of a specimen taken from the farm of Dr. Marlow, on the Merrie land tract.

I give several of these reports merely that persons may see the manner in which they are made and the principles on which the practical recommendations are based.

*Analysis of two samples of "Soil," marked No. 2 and No. 9, from near Petersville, Frederick Co., Md., for Thos. J. Marlow.*

The samples of soil left at this office represent volcanic soils, viz: such as owe their origin and formation to volcanic rocks, upon which they directly lie. Mica slate is the rock of the products of degradation of which the above soils are chiefly composed; and the proportionately small quantity of the rock which, in the form of broken fragments, still remained undecomposed in the field, as well as the stiffness and most extensive depth of the soil, indicates that this process of degradation has here most perfectly and thoroughly taken place.

In regard to the mechanical texture of soils, it may generally be said that the bulk of soils consists on one side of quartz sand and the fragments of undecomposed rocks, and on the other of a compound consisting of certain portions of sand, clay, lime, magnesia and humus, forming a kind of "cement," which envelops and joins the quartz sand particles, and is itself again loosened by them. Of course, on the respective quantities of these two fundamental constituents of soil, its mechanical texture must depend, and consequently its water-retaining power, its consistency in the wet and dry state, its capacity to dry up more or less quickly, and its consequent contraction of volume, which gives rise to clefts and fissures tearing the roots; its capacity to absorb the atmospheric ingredients, to absorb heat and to retain heat, &c.

As to the proportion of "quartz sand and undecomposed rocks" to the "cement" in the above soils, it was found to be for No. 2, as 20 to 80, and for No. 9 as 25 to 75. Their degree of stiffness is, therefore, in ratio to the quantity of cement these proportions exhibit, viz: as 80 to 75, and if we term the soil No. 9 containing 75 per cent. of cement a clayey soil, the other, viz: No. 2, must be