

want of a little care and attention this necessary element, which they will at some future time have to replace at much cost and labor by the application of bone-dust, Columbian or Mexican guano.

In the soils described as approaching in their character to white oak soils, I have found a deficiency of phosphate of lime, except in those places where the soil is generally wet. This should be supplied by means of bone-dust, Columbian or Mexican guano. The soils in the middle part of the valley have it in more abundance. There may be, and doubtless are, many fields where this is deficient, but it is impossible to mention all of these particular locations. Any farmer before applying these manures, should have his soil examined for this constituent, and if the means be placed at my disposal, this shall in all instances be speedily done. It is certainly not prudent to be spending hundreds of dollars in the purchase of a manure containing a single valuable constituent, which, if already existing in the soil, will be so much money thrown away. This substance, phosphoric acid, can now be so accurately and speedily determined as to its quantity, that no one should hesitate in having it determined, though he should have to pay for this out of his own pocket.

The soils of all this valley are deficient in sulphuric acid and chlorine; the former is supplied most cheaply by plaster, the latter by common salt. If in any place plaster has refused to act, and disappointed the expectations of the farmer, it has been because there was some other defect in the soil, either mechanical or as to some necessary mineral constituent. For directions as to the quantity to be used, the time of application, the crops to which these should be used, I refer to the article on manures in the preceding part of this Report.

*Mountain Slope Soils.*—These embrace all of those soils lying on the eastern of the South, or the western slopes of the Catoc-tin Mountain. In these soils we have two very certain guides as to the knowledge of their composition, as to those elements which form the mass or body of the soil, and give to it its physical texture and mechanical constitution. They are not formed from the same rock as that from which the soils in the middle part of the valley were formed, but from one in which there was a large preponderance of epidote. I give here the average result of many specimens of this mineral in the rocks composing this soil from different localities; each one separately is not given because the extremes show the composition to be nearly the same, so far as practical recommendations to improve the texture of the soil is concerned. It is composed as follows, of: