

crops cultivated in Maryland. The last table on page 57 gives the number of pounds of inorganic constituents or ashes abstracted by a fair yield of each of these crops. The preceding tables give the proportions of each substance composing the ashes.

If any one will multiply these figures by the number of years he may estimate each of these crops to have been cultivated in the older settled parts of our State, he will be able to account for the diminished productive capacity of much of our soils. In some districts the ground still continues to produce fair crops with improvident farming, because of the large amount of plant food it originally contained; whilst in others, some one or more of these essentials have been so far exhausted as seriously to impoverish the land.

In endeavoring to supply amendments to the soil judiciously and economically, we should ascertain which of the substances have been more or less exhausted, so as to avoid the cost of adding such as are abundant in the soil.

The first point to be referred to is the original composition of the mineral matters in the rocks and minerals from which the soil was derived. These were stated on pages 14 to 19 in the first report.

In generalizing them, we may enumerate the following as their principal constituents:

Quartz, alumina, lime, magnesia, potash, soda and oxides of iron. The quartz occurs uncombined in the soil in the form of sand and gravel, and also as silica, chemically combined, with all the above named bases.

These combinations called silicates, although entirely insoluble in pure water, are very slowly acted on when the water contains carbonic acid, by which alkaline silicates are dissolved in minute proportion, and are taken up by the roots of plants. It was wisely so directed, for if they had been as soluble as ordinary salts, the whole surface of the earth would have been exhausted long since.

Unless the surface consists of *pure* siliceous sand, it invariably contains some proportion or other of these silicates, which are essential to vegetable growth.

Our loamy and clay soils contain them in larger proportion, but yet a system of culture may be so exhausting as to remove them faster than they become soluble. This has been too much the case in Maryland.

It is not only the loss of mineral matters that lessens the fertility of our lands, but by means of incessant cropping with either grain or tobacco, the humus and other vegetable matters have been very much exhausted in many parts of the State. With these we submit to a direct loss of carbonic acid so essential to be absorbed by the roots of the plant. Be-