

CHAPTER II.

OF SOILS AND THE CAUSES OF THEIR EXHAUSTION.

The circumstances attending the formation of soils from the debris of rocks and mineral substances, form an instructive and useful study for the farmer, and it was for the purpose of aiding in this research that I treated the subject very fully in my first report. It was presented in chapter IV, under the title of *Chemical and Physical Geology in its relations to Agriculture*. It was shown that the solid rock is incessantly acted upon by atmospheric agencies, becoming more or less rapidly disintegrated, according to the character of the rock, until it is reduced to an earthy friable mass.

The first plants which grow in this mass, find within it the phosphates and other essential inorganic constituents, but the carbon hydrogen and nitrogen forming the principal portion of their substance, was derived wholly from the atmosphere.

When successive generations of these plants decay, portions of their remains are left in and upon the earth in which they lived. This addition of organic matter practically completes the transformation of the *earthy mass* into what we denominate a soil.

The soils upon which plants continued to grow during many thousands of years before they were cleared and cultivated by man, were being constantly enriched by decayed organic matter. Trees and other deep rooted plants abstracted from far into the subsoil a large portion of their inorganic constituents, which were left at and near the surface as they decayed.

Notwithstanding these large accumulations of stored up wealth, we find that man, in his improvidence, can exhaust them in a few generations by vicious systems of agriculture. The causes of this, and the remedies, will be again considered under the proper heads in the present report.

It being necessary in examining into the cause of the exhaustion of soils that we should know what we have taken from them in crops, I gave in the last report tables of the mineral constituents of plants which constitute the principal