

the action be on such as are less hard, or lie beneath a covering of moist earth, and are continually exposed to the action of water! The natural crumbling of a naked rock thus gradually covers it with loose materials, in which the seeds find lodgement and germinate, and which eventually form a soil. The soil so produced partakes necessarily of the chemical character and composition of the rock on which it rests, and to the crumbling to which it owes its origin. If the rock be a sand stone, the soil is sandy; if a claystone, the soil is more or less stiff clay, and if the rock consists of any peculiar mixture of those three substances a similar mixture is observed in the earthy matter into which it has decomposed.

Such observations led the geologist, after comparing the rocks of different localities with one another, to compare the soils in various districts with the rocks beneath them. The result has been that in almost every country the soils are recognized as having a close resemblance to the rocks on which they rest, similar, in fact, to that which the earth derived from the crumbling of a rock before our eyes bears to the rock mass of which it recently formed a part. The conclusion, therefore, is irresistible, that soils, generally speaking, have been formed by the disintegration of solid rocks—that there was a time when the rock surface was without any covering of earth—and that the accumulation of soil has been the result of slow natural decomposition of the solid crust of the globe.

The cause of the diversity of soils in different localities, therefore, is no longer in doubt. If the rocks in two districts differ, the soils of the same are likely to differ also, and in a like degree.

But some may ask why the soil in some countries is of a uniform character, that is, containing the same general proportions of sand and clay, and general fertility over thousands of square miles, while in others it varies from field to field. A chief cause of this is to be found in the way in which the different rock-formations are observed to lie, upon or by the side of each other.

Geologists divide rocks into two classes, the stratified and unstratified. The former are observed to be lying against each other in separate layers or beds, the unstratified rocks form more or less solid masses of material in which no lines of demarkation are discernible. In the accompanying diagram S.L. represents an unstratified rock mass. Birdseye, Trenton, on the right to Corniferous and Hamilton on the left are stratified deposits lying over against each other. From S.L. a certain kind of soil will be formed, from Birdseye another, from Medina another, these rocks being different from each other.

Let it not be supposed that we intend to convey the impression that all soils partake of the nature of the rocks which lie beneath them. Such is not our intention, for there may from various causes be a greater diversity among the soils of a district than even a large number of rock formations would indicate. Such is the case in Ontario for instance, the greater variations here having resulted from the work of glaciers during the Great Ice Age. The diagram, however, serves the purpose of illustrating the extent of uniform soil area, which one might expect from a study of the rock formations the world over.

A further fact, and one equally im