

forests and plains in pursuit of the fur-bearing animals of the country. It is a reproach to our civilization, a reproach to the British nation, that this one spot of all her dominions, boastfully termed her oldest colony, is still so far behind in the onward march of progress, and the condition of her people so analogous to that of the hunter state of existence. It is nothing new, it is simply the history of all countries which have neglected or ignored agricultural pursuits, at least where such pursuits are possible. If we believe them possible here, and I, for one, have no doubt on my mind about the matter, we should then make every effort in our power to carry out without delay such measures as would be most likely to conduce towards so desirable an end. But as my main object is to enquire into what are really the chief characteristics of our soils, and what they may be capable of producing, I will proceed at once to the consideration of this important question.

ORIGIN AND COMPOSITION OF SOILS.

The term soil is applied to all those loose materials which cover the surface of the globe, such as sand, gravel, clay, mud, peat, &c. Soils vary exceedingly, according to the preponderance or otherwise of any one of the above materials. In fact, there is a regular gradation from pure sand or clay, exclusively mineral soils, to peat bog, which is almost entirely composed of vegetable matter. A thorough knowledge of their various characters, and the manner of treating them, appears to me essentially necessary to the successful raising of crops. Different soils require entirely different treatment, and there can be no doubt that skilled and scientific cultivation enables the farmer to obtain the best possible results from good soils, and even greatly to enhance the productiveness of those of a comparatively poor nature. But, before going more deeply into this part of the subject, I must ask you to follow me, while I make a few general observations relative to the derivation and composition of soils. The doing so necessarily involves some rather dry geological details, which will, I trust, not be altogether without interest to you.

STRUCTURE OF THE EARTH.

Although the greatest diameter of our globe measured at the equator is 7,926 miles, it is estimated from various well-authenticated sources, that the solid portion, or crust as it is termed, is not more than 50 miles in thickness. Without entering into all the theories upon which this conclusion is based, I shall just mention a few of the more prominent. The presence of active volcanoes and hot springs on various parts of the earth's surface, from which frequent ejections of molten matter and boiling water take place, point beyond doubt to an internal source of heat. The seismic movements, or earthquake throes, which have convulsed the earth from time to time, and are still of not infrequent occurrence—for we have read of many fearful

shocks experienced within the last few years—are another proof. They are caused from expansion by heat of some viscous, gaseous, or fluid matter, contained in the bowels of the earth. When we add to these the well-ascertained facts that the temperature is found to increase rapidly as we penetrate into the earth's surface, so that a point must be reached where the heat would be so great that all known rock or mineral substances must be converted into fluid or semi-fluid matter. The question of the character of the great internal body of the earth can no longer be one of mere speculation. Allowing an average rise of temperature of 1° Far. for every 90 feet vertical depth, this point would be reached at about 50 miles below the surface.

SOLID CRUST.

It will be apparent, then, that the solid crust of the earth is in reality a mere shell, as it were, and in proportion to the size of the globe represents about the thickness of an orange peel to the size of the fruit itself. Such is the well-founded theory of the structure of the globe we inhabit. At present, however, we are more particularly concerned in the character and constituents of the crust only, as it is from this our soils are principally derived and obtain their distinctive characteristics. Nevertheless, some of the richest known soils appertain to purely volcanic regions, as on the sides and slopes of active volcanoes—such as Vesuvius and Etna. These soils may be considered as direct products from the deep-seated internal fires themselves. Their fertility is proverbial, and, notwithstanding the danger attending their cultivation, the Neapolitan and Sicilian peasants will brave all in order to reap the rich harvest of grapes which these vine-clad natural hot-beds so luxuriantly yield. But by far the greater portion of the loose materials covering the earth's surface are derived directly from the solid rock crust upon which they rest. This fundamental pavement or floor, extends alike around the globe—beneath the waters of the great seas and oceans, as well as the dry lands. Broken, shattered, contorted or twisted into a series of great folds and flexures, often abruptly lifted up into huge elevated masses or depressed into profound abysses, it gives rise to all those natural features of towering mountain ranges, rolling ridges, wide-spreading prairies, plains, valleys, ravines, gulches, submarine banks, plateaux, or profound and fathomless ocean depths.

ATMOSPHERIC ACTION.

The interminable action of the atmosphere both chemical and mechanical, in breaking up or wearing down this rock crust, pulverizing and disseminating its particles broadcast over the surface, and depositing the same on all the lower depressions, are the chief agencies through which our earths and soils have been accumulated. At one period of the earth's history immense ice sheets and gigantic glaciers, or

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