

PART III.



DYNAMICAL GEOLOGY.

DYNAMICAL GEOLOGY, as explained on page 14, treats of the causes of events in the earth's geological progress. These events include: I. Those concerned in the production and modification of the earth's rock structure, and in the development of its form and features. II. The changes in the earth's climates. III. The changes through geological time in the earth's vegetable and animal life. The explanations beyond relate mainly to the first of these classes of subjects. The succession in climates and in vegetable and animal life is considered only historically, under Historical Geology.

The chief of the agencies directly concerned in geological work are the Atmosphere, the Waters, Heat, Chemical Force, and Life, each acting through or under general physical laws.

The *atmosphere* and the *waters*, by means of which most rocks have been made, valleys excavated, mountains shaped, and a great amount of chemical work carried on, are the most prominent of the earth's *exterior* agencies. Life, in its geological work, is another of the exterior agencies. Heat has both an exterior and an interior source, with corresponding effects. As exhibited in igneous ejections and volcanoes it is an interior agent both in source of material and of force; but the distribution of ejected material has taken place in part by means of the exterior agencies, water and air. The agencies that have made continents, oceanic depressions, and mountain ranges are largely interior in the origin of their forces and in their work.

There are three chief sources of energy for these agencies:—

1. THE EARTH'S ROTATION ON ITS AXIS, and ITS REVOLUTION AROUND THE SUN. (1) The *rotation* determining the earth's spheroidal shape, the length and alternations of its day, its zones of climate, and the system of movements in physical agencies; (2) the *revolution*, causing, in case of collision with any foreign body (as a meteorite), a manifestation of force in the production of heat and in violent mechanical effects.

2. THE SUN: which, through its heat, light, and attraction, is the origin of movements in the air, oceans, and rivers; the origin of chemical activity and growth in the kingdoms of life, and of much chemical work in