

which may enable us in some measure to judge to what point this division of our subject is tending.

We may remark, in this as in former cases, that since we have here to consider the formation and progress of a *science*, we must treat as unimportant preludes to its history, the detached and casual observations of the effects of causes of change which we find in older writers. It is only when we come to systematic collections of information, such as may afford the means of drawing general conclusions; or to rigorous deductions from known laws of nature;—that we can recognize the separate existence of geological dynamics, as a path of scientific research.

The following may perhaps suffice, for the present, as a sketch of the subjects of which this science treats:—the aqueous causes of change, or those in which water adds to, takes from, or transfers, the materials of the land:—the igneous causes; volcanoes, and, closely connected with them, earthquakes, and the forces by which they are produced;—the calculations which determine, on physical principles, the effects of assumed mechanical causes acting upon large portions of the crust of the earth;—the effect of the forces, whatever they be, which produce the crystalline texture of rocks, their fissile structure, and the separation of materials, of which we see the results in metaliferous veins. Again, the estimation of the results of changes of temperature in the earth, whether operating by pressure, expansion, or in any other way;—the effects of assumed changes in the superficial condition, extent, and elevation, of terrestrial continents upon the climates of the earth;—the effect of assumed cosmical changes upon the temperature of this planet;—and researches of the same nature as these.

These researches are concerned with the causes of change in the inorganic world; but the subject requires no less that we should investigate the causes which may modify the forms and conditions of organic things; and in the large sense in which we have to use the phrase, we may include researches on such subjects also as parts of Geological Dynamics; although, in truth, this department of physiology has been cultivated, as it well deserves to be, independently of its bearing upon geological theories. The great problem which offers itself here, in reference to Geology, is, to examine the value of any hypotheses by which it may be attempted to explain the succession of different races of animals and plants in different strata; and though it may be difficult, in this inquiry, to arrive at any positive result, we