

CHAPTER XII.

PRE-DETERMINATION IN NATURE.

THE natural prejudice of persons not acquainted with geology is that in the world all things continue as they were from the beginning. But a little observation and experience dispels this delusion, and perhaps replaces it with an opposite error. When our minds have been familiarized with the continuous processes by which vaporous nebulæ may be differentiated into distinct planets, and these may be slowly cooled from an incandescent state till their surfaces become resolved into areas of land and water; and still more, when we contemplate the grand procession of forms of life from the earliest animals and plants to man and his contemporaries, we become converts to the doctrine that all things are in a perpetual flux, and that every succeeding day sees them different from what they were the day before. In this state of mind the scientific student is apt to overlook the fact that there are many things which remain the same through all the ages, or which, once settled, admit of no change. I do not here refer to those fundamental properties of matter and forces and laws of nature which form the basis of uniformitarianism in geology, but to determinations and arrangements which might easily have been quite different from what they are, but which, once settled, seem to remain for ever.

We have already considered the great fact that the nuclei and ribs of the continental masses were laid down as foundations in the earliest periods, and have been built upon by determi-