

imagine circumstances such as might entirely disturb the equilibrium which the powers of diffusion of different species have produced;— might give to some the opportunity of invading and conquering the domain of others; and in the end, the means of entirely suppressing them, and establishing themselves in their place.

That this extirpation of certain species, which, as we have seen, happens in a few cases under common circumstances, might happen upon a greater scale, if the range of external changes were to be much enlarged, cannot be doubted. The extent, therefore, to which natural causes may account for the extinction of species, will depend upon the amount of change which we suppose in the physical conditions of the earth. It must be a task of extreme difficulty to estimate the effect upon the organic world, even if the physical circumstances were given. To determine the physical condition to which a given state of the earth would give rise, I have already noted as another very difficult problem. Yet these two problems must be solved, in order to enable us to judge of the sufficiency of any hypothesis of the extinction of species; and in the mean time, for the mode in which new species come into the places of those which are extinguished, we have (as we have seen) no hypothesis which physiology can, for a moment, sanction.

Sect. 7.—The Imbedding of Organic Remains.

THERE is still one portion of the Dynamics of Geology, a branch of great and manifest importance, which I have to notice, but upon which I need only speak very briefly. The mode in which the spoils of existing plants and animals are imbedded in the deposits now forming, is a subject which has naturally attracted the attention of geologists. During the controversy which took place in Italy respecting the fossils of the Sub-Apennine hills, Vitaliano Donati,¹⁵ in 1750, undertook an examination of the Adriatic, and found that deposits containing shells and corals, extremely resembling the strata of the hills, were there in the act of formation. But without dwelling on other observations of like kind, I may state that Mr. Lyell has treated this subject, and all the topics connected with it, in a very full and satisfactory manner. He has explained,¹⁶ by an excellent collection of illustrative facts, how deposits of various substance and contents are formed; how plants and animals become fossil in peat, in blown sand, in volcanic matter, in

¹⁵ Lyell, B. I. c. iii. p. 67. (4th ed.)

¹⁶ B. III. c. xiii. xiv. xv. xvi. xvii.