

CHAPTER XV.

ON THE FORMATION OF SECONDARY LIMESTONE AND SANDSTONE,
AND ON THE PROGRESSIVE DEVELOPMENT OF ORGANIC LIFE.

On the Decomposition of Chalk.—Whether formed by Animal Secretion, or by Eruptions of Water holding calcareous Earth in Suspension or Solution.—Mud Volcanoes.—Animal Bodies suddenly encased in Chalk indicate the Time required to form a Stratum of a given Thickness.—Oolite and Encrinal Limestone partly formed by Animal Secretion.—Formation of Sandstone.—Repeated Appearance of Dry Land during the Epoch when the Secondary Strata were deposited.—Progressive Development of Organic Life in the Secondary and Tertiary Epochs.—Disappearance of enormous Reptiles and chambered Shells from the Seas of Northern Latitudes.—Probability of the Ichthyosaurus existing, as a living Species, in the present Seas.

HAVING travelled with the reader, over the secondary strata, from the lowest new red sandstone, to the upper chalk, he may not be disinclined to pause awhile, and look back upon the ground which he has already passed, comprising a series of calcareous, sandy, and argillaceous beds, whose aggregate thickness may not be less than ten thousand feet. It is scarcely possible, in observing these beds, and the bones and shells of extraordinary animals which they contain, not to feel some desire to ascertain the causes by which they were thus entombed, and to enquire in what manner, or by what agents, the different beds were deposited or consolidated. Such researches form rational and legitimate subjects for the meditation of the geologist, though he may frequently have to lament the imperfection of his present knowledge, and the mystery in which many of the processes of nature are still involved.

One of the most ancient geological enquiries relates to the formation of limestone rocks and strata. *Whence was the calcareous matter derived?* Some limestone rocks are composed chiefly of shells, or other calcareous remains of marine animals, and in such instances we can have little hesitation in ascribing their formation to animal secretion, similar to what is taking place in the numerous coral reefs in the Pacific ocean. There are other beds, however, such as chalk, to which a similar formation cannot be ascribed; for though they contain numerous organic fossils, these do not bear the proportion of one to one hundred millions, when compared to the whole mass, and the chalk does not appear to have undergone any chemical change, from heat or other causes, that could have obliterated the traces of organic existence. In no formation are the most delicate organic textures of animals better preserved. In Mr. Mantell's splendid collection of chalk fossils at Lewes, there are specimens of fish, in which the body is entire and the air-bladder is uncompressed—and