

by what paleontological characters, are discussed in this chapter, pp. 429, 447, and 453.

The relation of the Caradoc Sandstone to the Upper and Lower Silurian, as inferred from recent investigations (p. 437), the vast thickness of the Llandeilo or Lower Silurian in Wales (p. 442), the *Obolus* or Ungulite grit of St. Petersburg and its fossils (p. 443), the Silurian strata of the United States and their British equivalents (p. 444), and those of Canada, the discoveries of M. Barrande respecting the metamorphosis of Silurian and Cambrian trilobites (pp. 441, 450), are among the subjects enlarged upon more fully than in former editions, or now treated of for the first time.

The Cambrian beds below the Llandeilo, and their fossils, are likewise described as they exist in Wales, Ireland, Bohemia, Sweden, the United States, and Canada, and some of their peculiar organic remains are figured, p. 447 to p. 453.

Lastly, at the conclusion of the chapter, some remarks are offered respecting the absence of the remains of fish and other vertebrata from the deposits below the Upper Silurian, p. 453, in elucidation of which topic a Table has been drawn up of the dates of the successive discovery of different classes of Fossil Vertebrata in rocks of higher and higher antiquity, showing the gradual progress made in the course of the last century and a half in tracing back each class to more and more ancient rocks. The bearing of the positive and negative facts thus set forth on the doctrine of progressive development is then discussed, and the grounds of the supposed scarcity both of vertebrate and invertebrate air-breathers in the most ancient formation considered, p. 456.

CHAP. XXVIII.—With the assistance of an able mineralogist, M. Delesse, I have revised and enlarged the glossary of the more abundant volcanic rocks, p. 472, and the table of analyses of simple minerals, p. 475.

CHAP. XXIX.—In consequence of a geological excursion to Madeira and the Canary Islands, which I made in the winter of 1853–4, I have been enabled to make larger additions of original matter to this chapter than to any other in the work. The account of Teneriffe and Madeira, pp. 510, 518, is wholly new. Formerly I gave an abstract of Von Buch's description of the island of Palma, one of the Canaries, but I have now treated of it more fully from my own observations, regarding Palma as a good type of that class of volcanic mountains which have been called by Von Buch "craters of elevation," pp. 494–508. Many illustrations, chiefly from the pencil of my companion and fellow-laborer, Mr. Hartung, have been introduced. In reference to the above-mentioned subjects, citations are made from Dana on the Sandwich Islands, p. 489, and from Junghuhn's Java, p. 492.

CHAP. XXXV.—XXXVII.—The theory of the origin of the metamorphic rocks and certain views recently put forward by some geologists respecting cleavage and foliation have made it desirable to recast