

a few examples for further discussion. Among Echinoderms the Crinoids are, for a long succession of periods, the only representatives of that class; next follow the Starfishes, and next the Sea-Urchins, the oldest of which belong to the type of *Cidaris* and *Echinus*, followed by Clypeastroids and Spatangoids. No satisfactory evidence of the existence of *Holothuriæ* has yet been found. Among Crustacea, a comparison of the splendid work of Barrande¹ upon the Silurian System of Bohemia, with the paper of Count Münster upon the Crustacea of Solenhofen,² and with the work of Desmarest upon fossil Crabs,³ will at once show that while Trilobites are the only Crustacea of the oldest palæozoic rocks, there is found in the jurassic period a carcinological fauna entirely composed of *Macrura*, to which *Brachyura* are added in the tertiary period. The formations intermediate between the older palæozoic rocks and the Jura contain the remains of other Entomostraca, and later of some *Macroura* also. In both classes the succession of their representatives, in different periods, agrees with their respective standing, as determined by the gradation of their structure.

Among plants, we find in the Carboniferous period prominently, Ferns and Lycopodiaceæ;⁴ in the Triassic period Equisetaceæ⁵ and Coniferæ prevail; in the Jurassic deposits, Cycadæ,⁶ and Monocotyledoneæ; while later only Dicotyledoneæ take the lead.⁷ The iconographic illustration of the vegetation of past ages has of late advanced beyond the attempts to represent the characteristic features of the animal world in different geological periods.⁸

Without attempting here to characterize this order of succession, this much follows already from the facts mentioned, that while the material world is ever the same through all ages in all its combinations, as far back as direct investigations can trace its existence, organized beings, on the contrary, transform these same materials into ever new forms and new combinations. The carbonate of lime of all ages is the same carbonate of lime in form as well as composition, as long as it is under the action of physical agents only. Let life be introduced upon earth,

¹ BARRANDE's Syst. Silur., q. n., p. 23.

² GR. G. V. MÜNSTER, Beiträge zur Petrefactenkunde, q. n., p. 98.

³ DESMAREST, see Brongniart and Desmarest's Hist. Nat. d. Tril. et Crust., q. n., p. 97.

⁴ See, above, p. 93.

⁵ SCHUMPER, (W. P.) et MOUGEOT, (A.) Monographie des Plantes Fossiles du Grès-bigarré de la chaîne des Vosges, Strassb. et Paris, 1840-43, 4to. fig.

⁶ BUCKLAND, (W.) On the Cycadeoidæ, a Family

of Plants found in the Oolite, etc., Trans. Geol. Soc. Lond. 2d ser. II., p. 395.

⁷ UNGER, (FR.) Chloris protogæa, Beiträge zur Flora der Vorwelt, Leipzig, 1841, 4to. fig. — HEER, (O.) Flora tertiaria Helvetiæ, Wintherthur, 1855, fol. fig.

⁸ Landscapes of the different geological periods are represented in UNGER, (FR.) Die Vorwelt in ihren verschiedenen Bildungsperioden, Wien, fol. (no date.) These landscapes are ideal representations of the vegetation of past ages.