

thaspis, have been found, together with crustaceans of the genera *Stylonurus*, *Pterygotus*, *Prearcturus*, and obscure traces of plants. The upper yellow and red sandstones contain none of the cephalaspid fishes, which are there replaced by *Pterichthys* and *Holoptychius*, associated with distinct impressions of land-plants. In some of the higher parts of the Old Red Sandstone of South Wales and Shropshire, *Serpula* and *Conularia* occur, but these are exceptional cases, and point to the advent of the Carboniferous marine fauna, which doubtless existed outside the British area before it spread over the site of the Old Red Sandstone basins (see p. 1329).

It is in Scotland¹⁶⁶ that the Old Red Sandstone shows the most complete and varied development, alike in physical structure and in organic contents. Throughout that country the system is found to consist of two well-marked groups of strata, separated from each other by a strong unconformability and a complete break in the succession of organic remains. Each subdivision occurs in distinct basins of deposit. The most important basin of the Lower Old Red Sandstone occupies the central valley, between the base of the Highland mountains and the Uplands of the southern counties (Lake Caledonia). On the northeast, it presents a series of noble cliff-sections along the coast-line from Stonehaven to the mouth of the Tay. On the southwest it ranges by the island of Arran and the south of Cantyre across St. George's Channel into Ireland, where it runs almost to the western seaboard, flanked on the north, as in Scotland, by hills of crystalline rocks, and on the south chiefly by a Silurian belt. In this basin abundant volcanic action manifested itself across the whole breadth of Scotland and in the north of Ireland. Another distinct and still larger basin (Lake Orcadie) of the lower subdivision lies on the north side of the Highlands, but only a portion of it emerges above the sea in the north of Scotland. Skirting the slopes of the mountains along the Moray Firth and the east of Ross and Sutherland, it stretches through Caithness and the Orkney Islands as far as the south of the Shetland group, and may possibly have been at one time continued as far as the Sognefjord and Dalsfjord in Norway, where red conglomerates

¹⁶⁶ See Agassiz, "Poissons du Vieux Grès Rouge," Hugh Miller's "Old Red Sandstone" and "Footprints of the Creator"; J. Anderson's "Dura Den"; *Explanations Geol. Surv. Scotland*, sheets 14, 15, 23, 24, 32, 33, 34; author's memoir cited on previous page, and papers referred to in subsequent notes.