

tween the top of the Silurian and the base of the Carboniferous systems, are regarded as the deposits of a series of lakes or inland seas formed by the uprise of portions of the Silurian sea-floor. The length of time during which these lacustrine basins must have existed is shown, not only by the thickness of the deposits formed in them, but by the complete change which took place in the marine fauna between the Silurian and Carboniferous periods. The prolific fauna of the Wenlock and Ludlow rocks was driven away from Western Europe by the geographical revolutions which, among other changes, produced the lake-basins of the Old Red Sandstone. When a marine population—crinoids, corals, and shells—once more overspread that area, it was a completely different one. So thorough a change must have demanded a long interval of time.

Rocks.—As shown by the name of the type, red sandstone is the predominant rock. The color varies from a light brick-red to a deep chocolate-brown, and occasionally passes into green, yellow, or mottled tints. The sandstones are for the most part granular siliceous rocks, wherein the component grains of clear quartz are coated and held together by a crust of earthy ferric oxide. In no part of the geological record is the prevalence of this red material more marked than in the Old Red Sandstone. The conditions that led to the precipitation of this oxide in such quantity are not yet well understood.<sup>156</sup> Scattered pebbles of quartz or of various crystalline rocks are frequently noticeable among the sandstones, and this character affords a passage into con-

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<sup>156</sup> See postea, p. 1322. Mr. I. C. Russell in a memoir already cited, on the subaerial decay of rocks and the origin of the red color of certain formations, concludes that in the majority of cases the ferric oxide was deposited during the subaerial decay of the rocks from which the sediment was derived. Bull. U. S. Geol. Surv. No. 52, 1889.