

frequent occurrence in Scotland. Above these lower limestones comes a thick mass of strata containing many valuable coal-seams and ironstones (Lower or Edge Coals). Some of these strata are full of terrestrial plants (*Lepidodendron*, *Sigillaria*, *Stigmaria*, *Sphenopteris*, *Alethopteris*); others, particularly the ironstones, and the shales associated with the limestones and ironstones, contain marine shells, such as *Lingula*, *Discina*, *Leda*, *Myalina*, *Euomphalus*. Numerous remains of fishes have been obtained, more especially from some of the ironstones and coals (*Gyracanthus formosus* and other fin-spines, *Megalichthys Hibberti*, *Rhizodus Hibberti*, with species of *Elonichthys*, *Acanthodes*, *Ctenoptychius*, etc.). Remains of labyrinthodonts have also been found in this group of strata, and have been detected even down in the Burdie House limestone. The highest division of the Scottish Carboniferous Limestone series consists of a group of sandstones and shales, with a few coal-seams, and three, sometimes more, bands of marine limestone. Although these limestones are each only about 2 or 3 feet thick, they have a wonderful persistence throughout the coal-fields of central Scotland. As already mentioned (p. 860), they can be traced over an area of at least 1000 square miles, and they probably extended originally over a considerably greater region. The Hurlet limestone, with its underlying coal, can also be followed across a similar extent of country. Hence it is evident that, during certain epochs of the Carboniferous period, a singular uniformity of conditions prevailed over a large region of deposit in the centre of Scotland.

A distinguishing feature of the Carboniferous Limestone series of Scotland is the abundance of its intercalated volcanic rocks of the puy type. They are well developed in the basin of the Forth and in North Ayrshire. The lavas and tuffs are interbedded among the ordinary sedimentary strata, and the tuffs are sometimes full of plants or of marine shells, crinoids, etc.²¹⁰

The difference between the lithological characters of the Carboniferous Limestone series, in its typical development as a great marine formation, and in its arenaceous and argillaceous prolongation into the north of England and Scotland, has long been a familiar example of the nature and application of the evidence furnished by strata as to former

²¹⁰ See the papers cited already, p. 1371.