

fjords. In the basin of the Nith, and also in Ayrshire, numerous small volcanic vents and sheets of diabase, picrite, olivine-basalt, porphyrite and tuff are associated with the red sandstones, marking a volcanic district of Permian age. The vents rise through Coal-measures as well as more ancient rocks. Similar vents in Fifeshire, also piercing Coal-measures, have been referred to the same volcanic period. In Devonshire similar rocks mark the outpouring of lavas in the early part of the Permian period.²⁵⁰ But these volcanic phenomena were on a feeble scale. They are interesting as marking the close of the long continuance of volcanic activity during Palæozoic time. Neither in Britain nor throughout most of the Continent has evidence been found of renewed eruptions during the long lapse of the Mesozoic ages.²⁵¹

In central England, Staffordshire, and the districts of the Clent and Abberley Hills, the Permian system contains some remarkable brecciated conglomerates which attain a thickness of 400 feet. They have been shown by Ramsay²⁵² to consist in large measure of volcanic rocks, grits, slates, and limestones, which can be identified with rocks on the borders of Wales. Some of their blocks are three feet in diameter and show distinct striation. These Permian drift-beds, according to Ramsay, cannot be distinguished by any essential character from modern glacial drifts, and he had no doubt that they were ice-borne, and, consequently, that there was a glacial period during the accumulation of the Lower Permian deposits of the centre of England.

Like red rocks in general, the Lower Permian beds are almost barren of organic remains. Such as occur are indicative chiefly of terrestrial surfaces. Plant remains occasionally appear, such as *Ullmannia* (supposed to be of marine growth), *Lepidodendron dilatatum*, *Calamites*, *Sternbergia*, *Dadoxylon*, and fragments of coniferous wood. The cranium of a labyrinthodont (*Dasyceps*) has been obtained from the Lower Permian rocks at Kenilworth. Footprints, referred to members of the same extinct order, have been observed abundantly on the surfaces of the sandstones of Dumfriesshire, and also in the vale of the Eden.

²⁵⁰ Geol. Mag. 1866, p. 243; Quart. Journ. Geol. Soc. 1892, Presid. Address, p. 147, and authorities cited.

²⁵¹ Op. cit. p. 162.

²⁵² Q. J. Geol. Soc. xi. p. 181.