
The Permian red beds of the English Midlands

Introduction

A series of basins opened up from Lancashire to Warwickshire in latest Carboniferous times (Figure 1.5), and were filled by presumed Early Permian red-bed continental sediments. Most of the basins were actively subsiding during early Permian times as a result of intermittent movement along boundary faults, and this is shown by non-sequences and unconformities in the sedimentary successions.

Each basin shows a distinctive sequence. In the Warwickshire Basin, the base of the Permian System is placed at the base of the Kenilworth Sandstone Formation on the basis of rare occurrences of a fossil amphibian, *Dasyceps*, the pelycosaur reptiles *Sphenacodon* and *Haptodus* (Paton, 1974, 1975), and the conifer *Lebachia* (= *Walchia*), all of which appear to be more Permian than Carboniferous in aspect. By analogy, the base of the Permian succession in the Worcester, West Shropshire, Staffordshire–Worcestershire, and South Staffordshire basins, where fossils are absent, is drawn where the Haffield, Abberley, Enville, Clent, and Nechells breccias unconformably overlie mainly Upper Carboniferous sediments (Smith *et al.*, 1974). In all cases, these breccias, ranging in thickness from 50 m to more than 200 m, are accumulations of debris transported from the Welsh and Mercian highlands to the west and east respectively. Clasts of Precambrian and Palaeozoic rock types were deposited from braided streams on top of alluvial fans and in wadis at the edges of the subsiding basins, while sandstones, siltstones, and, more rarely, mudstones were transported farther downstream and accumulated in basin centres.

In the West Shropshire and Staffordshire–Worcestershire basins, the basal breccia units are succeeded, above an unconformity, by up to 650 m of aeolian sandstone, the Bridgnorth Sandstone Formation. This formation displays desert dune features including large dune sets, hierarchical bounding surfaces marking deflation processes on several different scales, and typical dune-sand petrography. It is interpreted as a desert sand that accumulated in large-scale transverse dune bedforms bearing superimposed smaller-scale transverse dunes (Mader and Yardley, 1985). The Bridgnorth Sandstone Formation may be laterally equivalent to the Collyhurst Sandstone of the East Irish Sea Basin and the Penrith Sandstone of the Vale of Eden Basin (see above). In the South Staffordshire Basin, different clastic units, the Quartzite Breccia, Barr Beacon Beds, and Hopwas Breccia, overlie the basal breccias unconformably, and apparently represent a later phase of debris accumulation, as residual lags formed by reworking of older alluvial fan sediments on a mature desert pavement.

Three GCR sites have been selected to represent the Permian red beds of the English Midlands: Sling Common in the South Staffordshire Basin for the basal Clent Breccia; Osebury Rock in the Worcester Basin for the basal Haffield Breccia overlain by the Bridgnorth Sandstone; and Kinver Edge in the South Staffordshire Coalfield Basin for the Bridgnorth Sandstone.

[Sling Common, Hereford and Worcester](#)

[Osebury Rock, Hereford and Worcester](#)

[Kinver Edge, Staffordshire](#)

[References](#)



(Figure 1.5) The principal Permo-Triassic sedimentary basins and syndepositional normal faults in England. Intensity of stippling indicates sediment thicknesses. Abbreviations: CB, Cheshire Basin; CF, Clopton Fault system; DB, Dorset Basin; EMF, East Malvern Fault; IF, Inkberrow Fault; KB, Knowle Basin; LBB, Lyme Bay Basin; NB, Needwood Basin; PeB, Pewsey Basin; SB, Stafford Basin; SoB, Solway Basin; WaB, Wardour Basin; WB, Worcester Basin; WRRF, Wem-Red Rock Fault system.