Old Red Sandstone
(Silurian—Carboniferous), an introduction

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Outcrop of Devonian rocks in the region. (P948960)

Rocks of the continental red-bed facies known as the Old Red Sandstone have their most extensive and complete development in the part of the region west of the River Severn (P948960). Here, the rocks are exposed around the Forest of Dean coalfield in major, north-south-trending asymmetric folds. East and south of the River Severn the Old Red Sandstone is restricted in occurrence to the partly faulted Sharpness—Thornbury inlier, a narrow outcrop around the periphery of the Coalpit Heath syncline, and to the cores of anticlines around Bristol and in the Mendips.

Table 2 shows the main features of the Old Red Sandstone stratigraphy of the district. The position of the Silurian/Devonian boundary within the Old Red Sandstone is unknown, although a thin, but widespread, composite air-fall tuff sequence, recently recognised in the upper part of the Raglan Marl (or its equivalents), may provide an acceptable horizon for regional correlation and be useful as a reference point for the boundary. The standard Devonian stages relate to a marine succession and are defined in terms of European ammonoid and graptolite zones, supplemented by conodont faunas. The continental Old Red Sandstone, on the other hand, has classically been related to series defined in terms of zones based on fish faunas. Knowledge of the palynology of the red beds is not, as yet, sufficient to provide firm stratigraphical conclusions applicable to the district. The correlation between the marine and continental chronostratigraphical schemes is only approximate. Furthermore, in the region even correlations within the Old Red Sandstone must be treated with caution due to the sporadic and often only local development of the vertebrate faunas.

Sedimentation of continental facies deposits continued without significant break from the Silurian to
about the end of early Devonian times (i.e. the end of the Emsian age or near the end of the Breconian epoch) in an area known as the Anglo-Welsh Platform, which approximated to the area formerly occupied by the Silurian shelf sea. Open sea at this time lay at about the southern limits of the region. Although evidence from current directions throughout the lower Old Red Sandstone suggests derivation of the thick terrigenous sedimentary succession from an uplifted, eroding area to the north and north-west (known as St George’s Land), the first evidence within the region of this comes from the pebble content of conglomerates of mid-Breconian age near the top of the lower Old Red Sandstone.

Earth movements, uplift and concomitant erosion followed during middle Devonian times. Deposition of continental red-beds resumed across the district in late Devonian times. The southern seas encroached northwards at this time, but although the earliest marine incursion into the south Midlands may have extended into the eastern part of the region, it was not until Carboniferous times that the region was once more wholly under the sea. The contact between the lower and upper Old Red Sandstone strata takes the form of a disconformity and, even where great thicknesses of sedimentary rock can be proved to have been removed in the interval, the junction is typically nonangular.

Jawless, armoured ostracoderms are dominant in the Lower Old Red Sandstone fish faunas. In ascending order, zones are based on species of Hemicyclaspis, Traquairaspis, Pteraspis and finally, at the top of the Dittonian, Althaspis. Rocks of Breconian age contain only rare vertebrates. By late Devonian times these primitive faunas had been completely replaced by more advanced ganoid fish of which Holoptychius and Bothriolepis are the best known. Plant remains occur throughout the Old Red Sandstone, but are of too limited occurrence to be of critical stratigraphical value.

The sedimentology, including conditions of deposition, has been studied in much detail in this and adjacent regions over the last twenty years (for references see Allen and Williams, 1979[1]). Cuttings along the M50 motorway (immediately north of the district) have provided relatively continuous exposure, hitherto lacking, through the greater part of the Lower Old Red Sandstone (Allen and Dineley, 1976[2]). In broad terms, the Lower Old Red Sandstone consists of a progressively upward-coarsening sequence of clastic sedimentary rocks with marine influence in the lowest part, whereas the Upper Old Red Sandstone is an upward-fining sequence exhibiting a marine influence at the top.

**Stratigraphy**

**Lower Old Red Sandstone**

**Upper Old Red Sandstone**
West of River Severn

Sharpness–Thornbury

Bristol

Bath

Mendip Hills

References


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