
Wollaston Ridge Quarry, Staffordshire

[SO 883 848]

Introduction

Wollaston Ridge is a topographical feature that reflects the presence of the Kidderminster Formation, the local representative of the former 'Bunter Pebble Beds', resting unconformably on the Permian Bridgnorth Sandstone. The locality (known as 'Wollaston Quarry' in the GCR unit records) shows the unconformity and also the contrasting aeolian and fluvial sedimentary characteristics of the Bridgnorth Sandstone and Kidderminster formations respectively. An important feature is the occurrence of eroded, cemented clasts of Bridgnorth Sandstone within the Kidderminster Formation. This site gives important evidence on the Early Triassic landscape and sedimentation.

Although exposure at Wollaston Ridge Quarry was excellent, the site has rarely been mentioned in the literature. Brief descriptions were given by Whitehead and Pocock (1947, p. 111), Wills (1948) and Shotton (1956).

Description

Wollaston Ridge Quarry is situated in the garden of a private residence, 'Sand Ridge'. Although formerly well exposed, at the time of writing much of the quarry face was covered by ivy that obscured the unconformity between the Bridgnorth Sandstone and the Kidderminster Formation. The faces of the quarry are vertical and reach a height of approximately 8 m. In earlier times, without the obscuring vegetation, the unconformity was clearly seen (Figure 3.53).

The lower part of the sequence exposed in Wollaston Ridge Quarry comprises some 8 m of the Bridgnorth Sandstone (Permian). These sediments consist predominantly of reddish, fine- to medium-grained sandstones. Excellent examples of large-scale dune trough cross-bedding, and dunes climbing the backs of other dunes are to be seen.

The boundary between the Bridgnorth Sandstone and the overlying Kidderminster Formation is marked by an irregular, well-defined unconformity, best seen at the southern end of the exposure. The surface of the unconformity is an erosion surface with steep-sided gullies, indicating that the Bridgnorth Sandstone had been lithified prior to erosion and the deposition of the Kidderminster Formation.

The Kidderminster Formation is a conglomerate facies that contains clasts of the Bridgnorth Sandstone, as well as quartz, quartzite, haematite-rich mudstones, Silurian limestones (Wills, 1948), and calcareous sandstones. Clasts range up to cobble size, some 200 mm across. A calcareous sandstone pebble, presumably derived with minimal abrasion directly from the Bridgnorth Sandstone, was found (Shotton, 1956) to consist of quartz and feldspar, with the high degree of rounding and sorting, and red coloration typical of desert sediments. The conglomerates are stratified horizontally, and may be interbedded with finer-grained arenaceous rocks. Within the conglomerates are thin sandstones resting on erosion surfaces. Breccias are also common throughout the Kidderminster Formation and typically contain clasts of local origin.

Interpretation

The Lower Permian and Triassic sediments exposed in Wollaston Ridge Quarry represent two very different palaeoenvironments, separated by a time interval of unknown, but lengthy, duration. The large-scale dune trough cross-bedding of the Permian Bridgnorth Sandstone is characteristic of sediments deposited under aeolian conditions.

The boundary between the Bridgnorth Sandstone Formation and the Kidderminster Formation is an unconformity, and represents a considerable period of non-deposition and high levels of erosion, corresponding to the time of uplift of the Welsh massif. The Kidderminster Formation is fluvial in origin. The conglomerates and frequent occurrence of scour and erosion surfaces are typical of high-energy conditions. Detailed analysis of lithofacies indicates that these sediments are

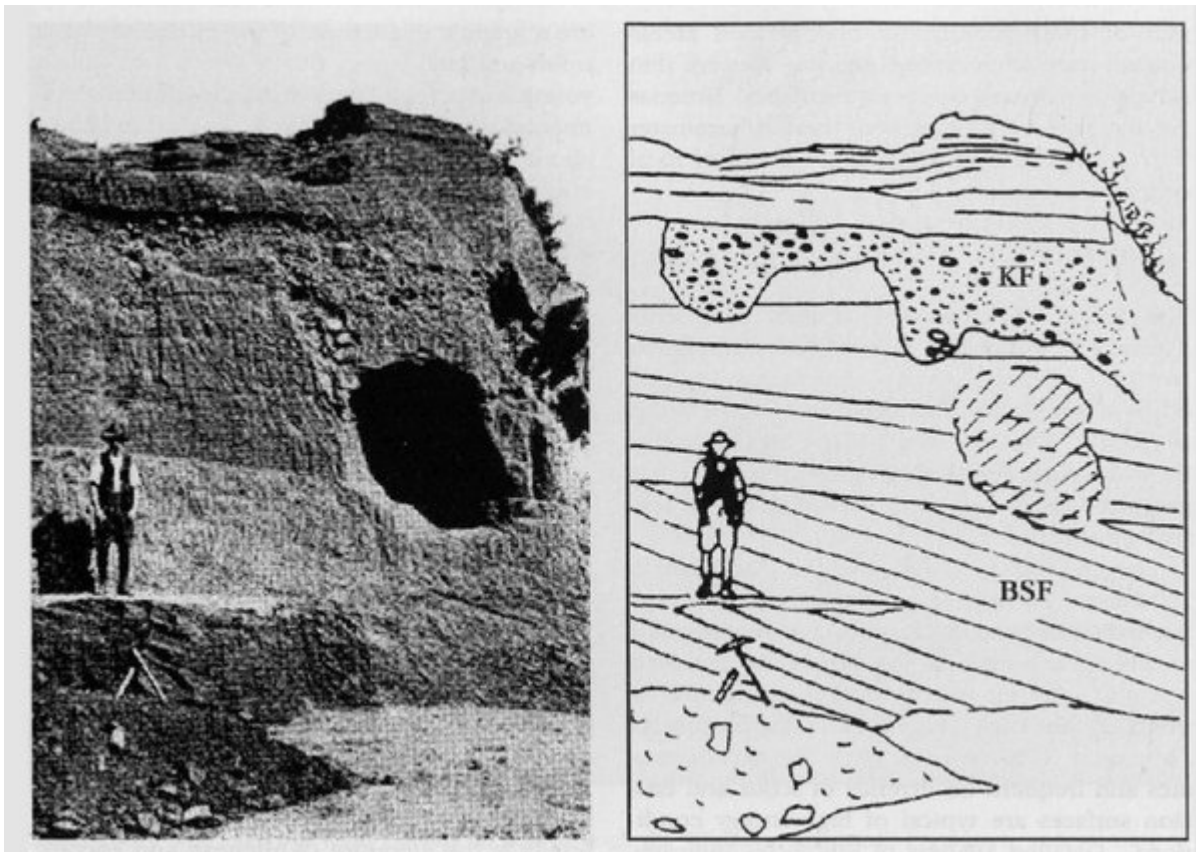
characteristic of two palaeoenvironments. The breccias were sourced from the local area and have been interpreted as fan gravels deposited at the mouths of wadis. The associated conglomerates are composed of material with a southerly provenance, in the Armorican Massif (northern France) or southern England. These sediments were transported northwards in a large braided river system (see (Figure 3.50)).

The age of the Kidderminster Formation cannot be established directly, but, like the corresponding Cannock Chase Formation, and equivalent pebble-rich units elsewhere in the Midlands, it is generally considered to be earliest Triassic (Warrington *et al.*, 1980, p. 38).

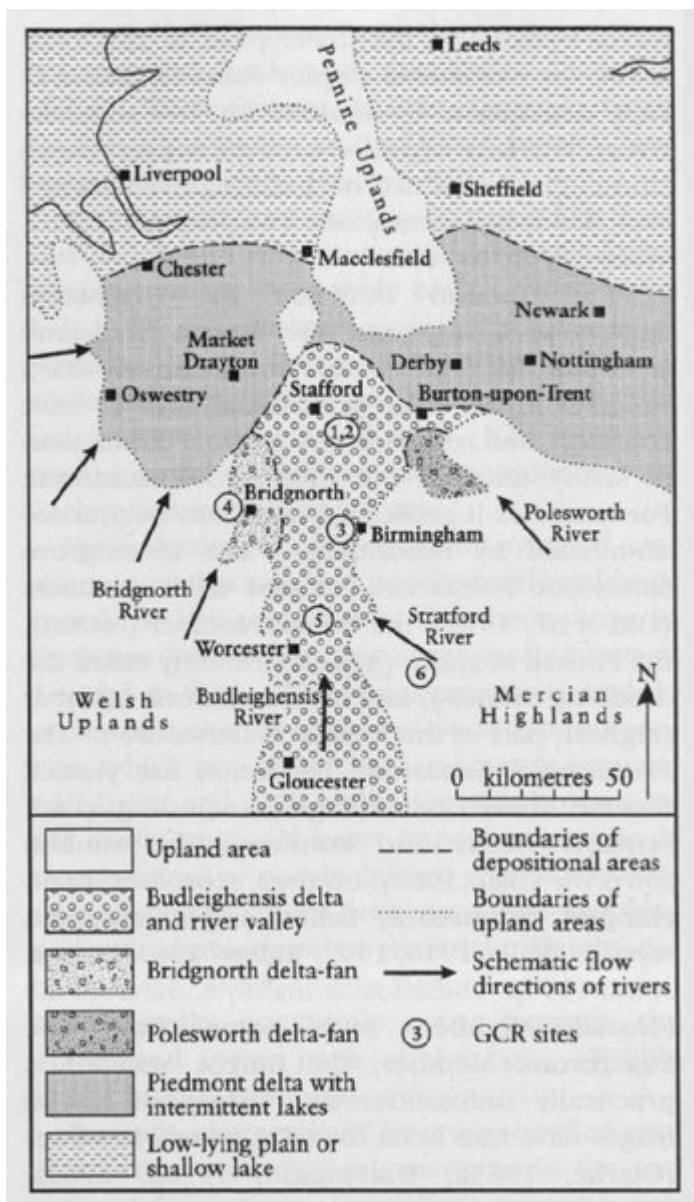
Conclusions

Wollaston Ridge Quarry exposes an important suite of sedimentary rocks. The Permian Bridgnorth Sandstone and the overlying Triassic Kidderminster Formation represent a change in palaeoenvironments from continental aeolian to fluvial. The unconformable contact, and the reworking of Bridgnorth Sandstone into the conglomerates of the Kidderminster Formation, are a graphic illustration of the effects of major uplift and high-energy fluvial systems eroding a young landscape. The site offers important sedimentological and palaeogeographical evidence about the Early Triassic Epoch in the English Midlands.

References



(Figure 3.53) The Kidderminster Formation (KF) resting unconformably upon Bridgnorth Sandstone Formation (BSF) in Wollaston Ridge Quarry; (a) as seen in the 1930s, (b) an interpretive sketch. (After Whitehead and Pocock, 1947.)



(Figure 3.50) Early Triassic palaeogeography of Central England, showing postulated major river systems, based on palaeocurrent measurements and studies of clast provenance. 1, Hulme Quarry; 2, Brockton Quarry; 3, Wollaston Ridge; 4, Claverley Road Cutting; 5, Burcot; 6, Shrewley (After Wills, 1948.)