
Abercriban Quarries, Powys

[SO 064 123]; [SO 064 127]

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Introduction

These quarries on the slope east of the Taf Fechan Reservoir, 5 km north of Merthyr Tydfil (Figure 5.30), provide sections typical of the Grey Grits Formation of the Upper Old Red Sandstone. The formation ranges from Late Devonian to early Carboniferous in age, and marks the regional change from continental, mainly fluvial, red-bed deposition of Late Devonian times to the shallow marine carbonate shelf environment of the early Carboniferous. The more northerly quarry [SO 0635 1272] shows a complete section of the formation, along with its contacts with the underlying Plateau Beds Formation and overlying Lower Limestone Shale Group. The more southerly quarry [SO 0635 1225] exposes about 8 m of the formation. The quarries are important in providing exposures revealing the nature of the basal and upper boundaries of the formation; in providing sedimentological evidence for the depositional environments of the Grey Grits Formation; and for allowing comparison of the Upper Old Red Sandstone of the north crop of the South Wales Coalfield with the thicker successions of Pembrokeshire. A third quarry [SO 066 124], also known as 'Abercriban Quarry', is higher in the succession and entirely in the overlying Carboniferous Limestone (the type locality of the Abercriban Oolite; Barclay *et al.*, 1988).

Description

The more northerly quarry [SO 0635 1272] (Figure 5.31) is the best-known Grey Grits Formation locality and is referred to variously as 'Abercriban Grit Quarry' (Robertson, 1932), 'Abercriban Quarry' (Hall *et al.*, 1973; Taylor and Thomas, 1975; Barclay *et al.*, 1988) and 'Abercriban grit quarry' (Lovell, 1978a,b). It exposes the junction of the Grey Grits Formation with the overlying Lower Limestone Shale Group and with the underlying Plateau Beds Formation (Taylor and Thomas, 1975; Lovell, 1978b; Barclay *et al.*, 1988), thus providing a complete (11 m) section of the formation. Following descriptions by Robertson (1932) and Hall *et al.* (1973) and a brief mention by Taylor and Thomas (1975), Lovell (1978a,b) provided the most detailed description and sedimentological analysis. Barclay *et al.* (1988) and Almond *et al.* (1993) gave summary descriptions.

The quarry has a north-south face about 120 m long and about 12 m high. The beds are almost horizontal.

The Plateau Beds Formation forms the lowest 1.5 m exposed in the quarry and comprise thinly bedded, greyish green and red-brown siltstones with small, rounded quartz pebbles and granules. Lingulids have been recovered from the red-brown siltstones (Hall *et al.*, 1973).

The main lithologies of the Grey Grits Formation here are pale greenish grey to white, quartzitic, lithologically uniform, fine- to medium-grained sandstones (mainly quartz arenites), with lesser amounts of siltstone and mudstone forming thin interbeds. Conglomerates are mainly absent, with only a few quartz pebble lenses at some levels. Some intraformational mudstone and siltstone clasts line cross-bedding foresets locally and also occur at the bases of sandbodies. There are some parallel-laminated bodies, but the sandstones are mainly cross-bedded, with trough and planar types. The beds are mainly tabular, with sharp bases, but only a little scouring of the underlying beds. Cross-bedding is usually of medium scale, but some co-sets are up to 1 m thick. The palaeocurrent grand vector-mean for the formation is to the south-east, but both SSE and NNE palaeocurrents have been recorded in beds at different, discrete levels. The best example of this is seen at the northern end of the quarry where a 1.15 m-thick bed (3.85 m above the base of the formation) shows ENE-directed cross-bedding and is overlain by a bed with SE-directed cross-beds. The intervening erosion surface can be traced through most of the quarry (Lovell, 1978a, b) .

No body fossils have been recovered from the formation here, although Taylor and Thomas (1975) recorded a calcareous brachiopod fragment near the base of the formation nearby. Trace fossils are rare, except for some simple, *Skolithos*-like, vertical burrows at some levels, and a few slightly sinuous simple burrows (epichnial casts) on one surface near the base of the formation. Elsewhere, a thin basal intraformational conglomerate has yielded fish fragments and the bivalve *Sanguinolites* sp. (Hall *et al.*, 1973; Taylor and Thomas, 1974; Lovell, 1978a,b).

The basal bed of the Casten Coch Limestone Formation, which is the basal formation of the Lower Limestone Shale Group, overlies an erosion surface that truncates the Grey Grits Formation. A green, 0.9 m-thick siltstone bed at the north end of the quarry is absent to the south. The Lower Limestone Shale Group begins with a thin (0.2 m) lag conglomerate containing quartz pebbles, some altered acid-lava pebbles (including jasper), intraformational clasts and some phosphatized clasts. Fish teeth and spiriferid brachiopods have been recovered (Lovell, 1978a).

Interpretation

There were formerly differing interpretations of the relationship of the Grey Grits Formation and the underlying Plateau Beds Formation. Robertson (1932) thought that the two formations interfinger, but Allen (1965b) suggested that there is evidence of uplift and erosion between the two formations. Taylor and Thomas (1975) confirmed Allen's interpretation, noting that the Grey Grits form a wedge resting unconformably on various levels of the Plateau Beds throughout their outcrop, depending on the amount of pre-Grey Grits erosion. The nature of the boundary between the Grey Grits Formation and the overlying Lower Limestone Shale Group has also been the subject of different interpretation. Allen (1965b) and Hall *et al.* (1973) suggested a transitional contact. Taylor and Thomas (1975) noted a lack of discordance and no apparent break between the formations, and lent support to the suggestion of Cantrill (in Strahan *et al.*, 1904) that the Grey Grits represent commencement of Carboniferous sedimentation in the region. However, the widespread lag conglomerate at the base of the Lower Limestone Shale Group indicates at least a disconformity, with erosion having preceded deposition of the conglomerate (Burchette, 1981; Lovell, 1978a,b; Barclay *et al.*, 1988). The truncation of the topmost siltstone bed of the Grey Grits at the main Abercriban quarry (see above) confirms this interpretation.

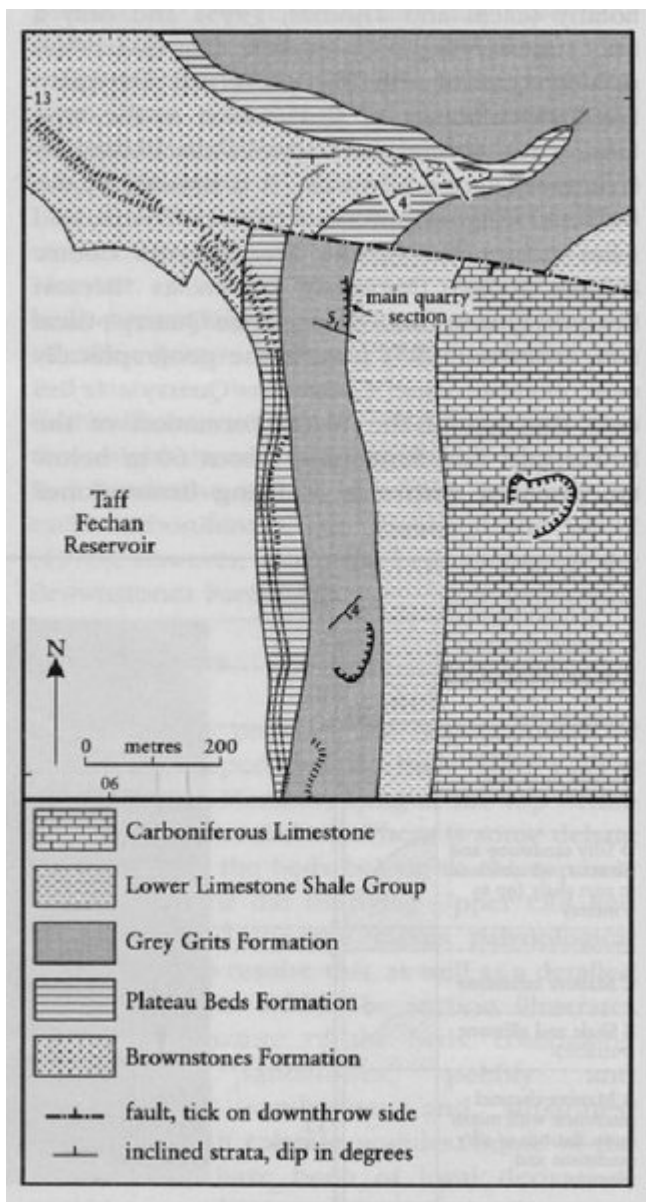
The depositional environment of the Grey Grits has been interpreted variously as shallow marine to fluvial. Allen (1965b) proposed a dominantly fluvial origin. Regionally, Taylor and Thomas (1975) noted the presence of conglomerate layers at the bases of sandbodies resting on erosion surfaces, and small channels cut in calcareous sandstones and infilled with discoidal pebbles. They suggested depositional environments that varied from fluvial to marginal marine. Lovell (1978a,b) supported Allen's (1965b) fluvial interpretation, proposing deposition in shallow, sandy braided streams. It is possible, however, that the fluvial channels were tidally influenced (B.P.J. Williams, pers. comm.).

The exact age of the Grey Grits remains unknown, but a Late Devonian to Early Carboniferous age is likely (Lovell, 1978a,b). The underlying Plateau Beds are thought to be late Frasnian to early Famennian in age and the base of the Lower Limestone Shale Group here appears to be of Early Carboniferous (Tournaisian (Tn) 2a) age (Lovell, 1978a,b).

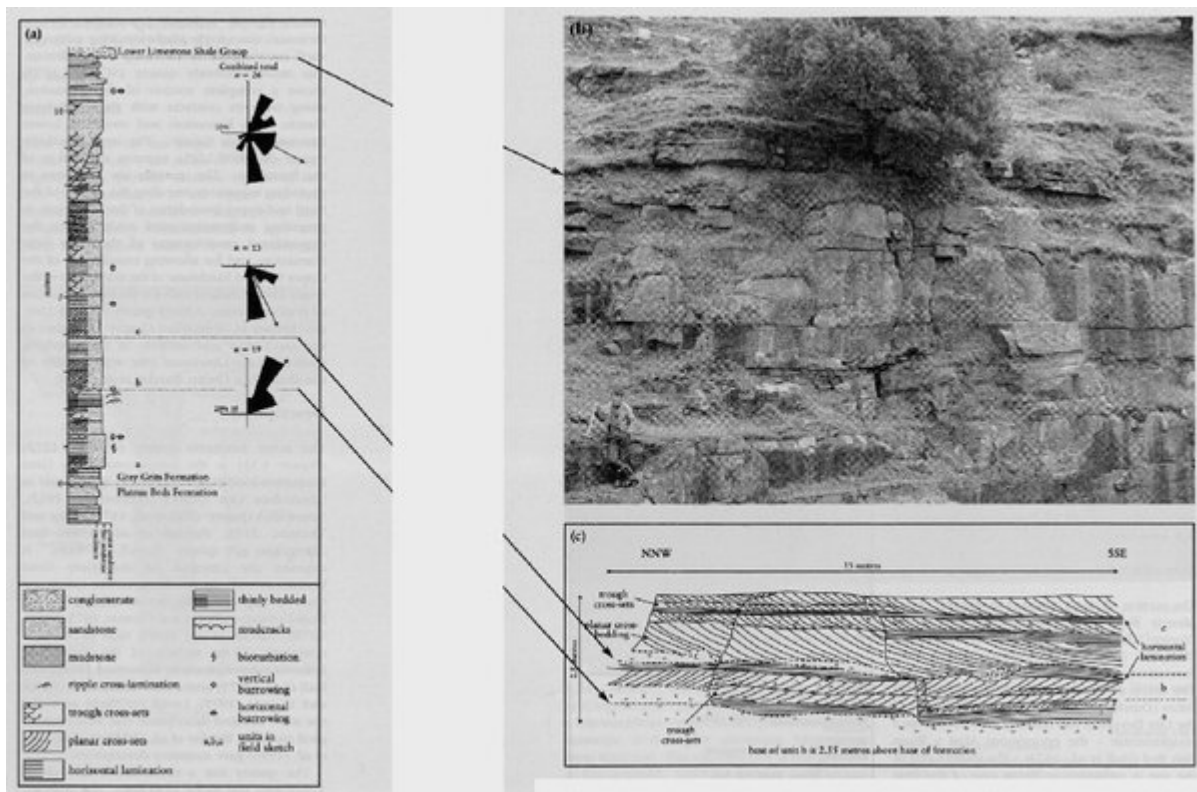
Conclusions

The larger of the two quarries in the Grey Grits Formation [SO 0635 1272] provides a complete section through the formation, exposing its upper and lower boundaries. The quarry is thus important in providing evidence of the nature of these boundaries. It is also important in the detailed sedimentological evidence it provides for a fluvial, shallow braided stream origin for the Grey Grits Formation, thereby putting the formation into the regional context of Late Devonian to Early Carboniferous sedimentation when compared with, for example, the broadly coeval Skinlde Sandstones Group of Pembrokeshire.

[References](#)



(Figure 5.30) Geological map of Abercriban Quarries and vicinity. After British Geological Survey 1:10 560 Sheet SO 01SE (1980).



(Figure 5.31) Northern Abercriban quarry (a) composite log from the north and south ends of the quarry showing palaeocurrent directions. After Lovell (1978a,b). Northern Abercriban quarry (b) — view of part of the northern Abercriban quarry showing the basal beds of the Lower Limestone Shale Group and the upper part of Grey Grits Formation; (c) sketch section of lower part of quarry (after Lovell, 1978a,b). (Photo: BGS No. A11993, reproduced with the permission of the Director, British Geological Survey, © NERC.)