Oakshaw Ford, Cumbria

[NY 513 763]–[NY 507 758]

Introduction

Situated on the banks of the River Black Lyne approximately 2.5 km to the west of Bewcastle [NY 5130 7630]–[NY 5068 7582], the Oakshaw Ford GCR site exposes the uppermost unit of the Middle Border Group and the lower part of the Upper Border Group. The site is the type locality for the Oakshaw Sandstone, Oakshaw Coal, Oakshaw Limestone, Oakshaw 'ruff and Clattering Band (Day, 1970). The Clattering Band is important in local and regional lithostratigraphy, biostratigraphy and chronostratigraphy; it defines the base of the Upper Border Group (Day, 1970), and has been correlated with the base of the Asbian Stage (George *et al.,* 1976).

Description

The section at Oakshaw Ford lies within what Day (1970) called the 'Oakshaw Coal Basin', a gentle syncline oriented NNE and bounded to the south-east and south-west by the Goat Island-Lyne Thrust and the Dappleymore Fault, and to the north by the outcrop of the Clattering Band. Strata exposed in the banks of the river dip 5°–10° towards the south, and the oldest unit within the site, the Oakshaw Sandstone, is exposed beneath the road bridge at its eastern end (see (Figure 3.15)). This 40 m-thick unit forms the top of the Middle Border Group, and in its upper part comprises a moderately poorly sorted sandstone with closely packed and interlocking fine grains of quartz, some quartzite, cherry silica, intergranular muscovite and a range of heavy minerals (Harrison in Day, 1970). Downstream of this sandstone, the river cuts through a thin shale and is successively followed by the Clattering Band (1.7 m), about 6 m of shale with thin shaly limestones and unexposed strata, the Oakshaw Coal (0.6 m) and the Oakshaw Limestone (7 m). The river then cuts back and runs along-strike before once again exposing a section through the Oakshaw Coal, Oakshaw Limestone and Oakshaw Tuft which is exposed towards the western, downstream limit of the site (see (Figure 3.15)).

The Clattering Band is made up of approximately 170 cm of fossiliferous calcareous shale and shaly limestone. The fossils were briefly described by Garwood (1931), and from this locality Day (1970) recorded a diverse fauna of corals (*Siphonodendron martini* and *Lithostrotion portlocki* in growth position), bryozoans, brachiopods (*Echinoconchus punctatus, Punctospirifer scabricosta* and *Stenoscisma isorhyncha*), gastropods, bivalves, ostracodes (*Bairdia submucronata, Cavellina longula, Paraparchites inornatus* and *Glyptopleura*) and the trilobite *Weberides* (now *Paladin*).

The Oakshaw Coal thins rapidly to the west of the ford and grades laterally Into coaly and carbonaceous fireclay. Although' it is of poor quality, with a high ash content, it was worked for household fuel until as recently as 1949 (Day, 1970). Coals of this age in the Northumberland Trough represent the oldest worked thick coals In the European Carboniferous succession.

A thin shale separates the Oakshaw Coal from the overlying Oakshaw Limestone (see (Figure 3.15)). The latter unit comprises bedded limestone with shaly partings and hard laminated calcareous shales (Day, 1970). These pass upward Into the Oakshaw Tuff which reaches its maximum exposed thickness of approximately 90 cm within this site, but also thins rapidly and is absent from the same interval less than 2 km to the south-west (Day, 1970). Although the tuff may appear weathered, green-looking and clayey at outcrop, thin-sections reveal sub-rounded and closely packed lithic particles of mugearite-trachyte with flow-banded feldspar laths, porphyritic and felsitic lava, devitrified glass and crystal fragments of quartz and feldspar (Day, 1970).

Interpretation

The rocks exposed at the Oakshaw Ford site, especially the Clattering Band and the Oakshaw Tuff are important in local lithostratigraphy (the former unit defining the base of the Upper Border Group) and in regional correlations of Lower

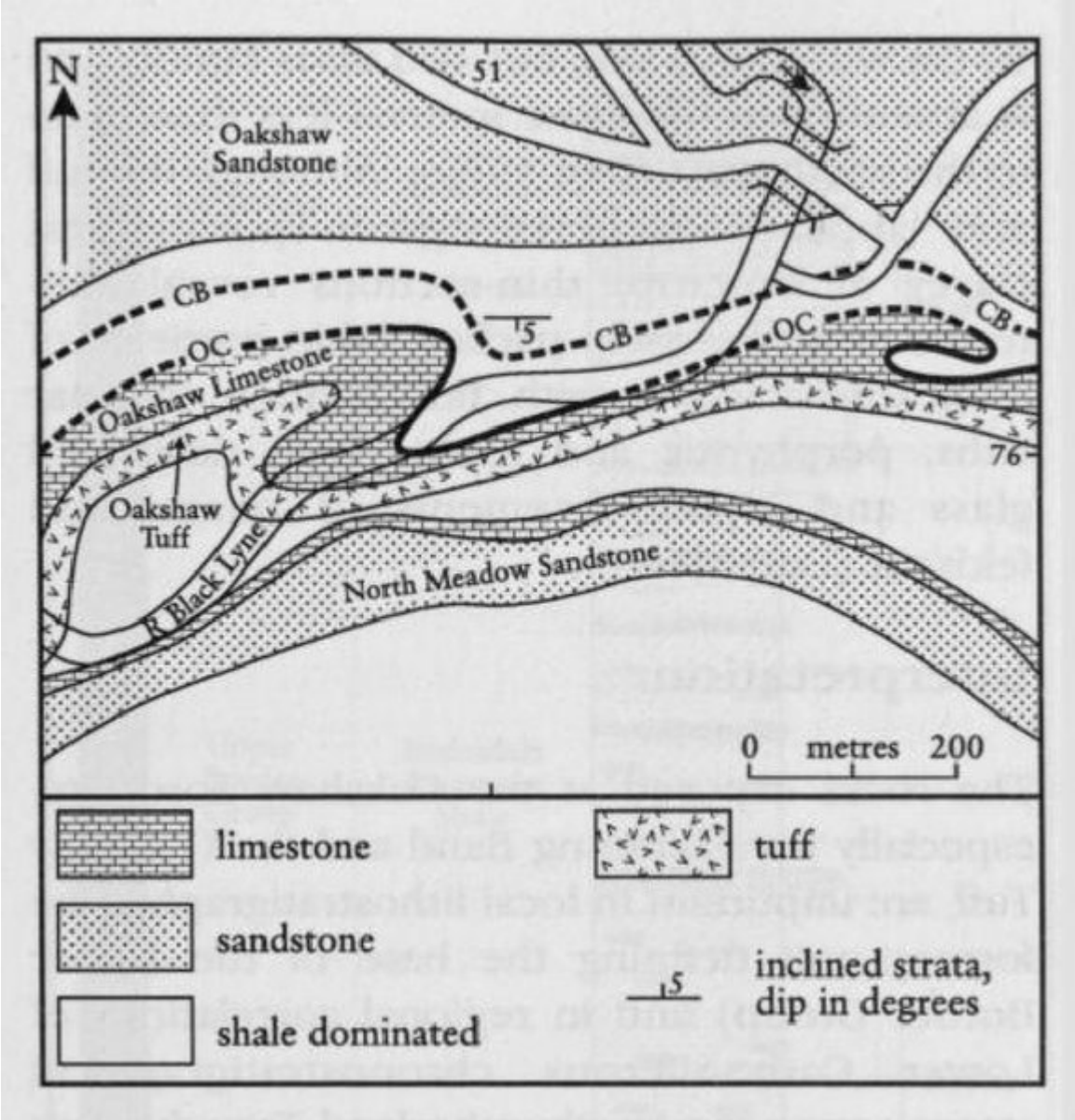
Carboniferous chronostratigraphical stages across the Northumberland Trough. Day (1970) originally established the correlation of the Clattering Band with a horizon within the Glencartholm Volcanic Beds in the Archerbeck Borehole, a view later supported by George *et al.* (1976) who, on the basis of foraminiferal evidence, took this horizon to mark the base of the Asbian Stage. Based on its position in the sequence, Day (1970) interpreted the Oakshaw Tuff as the attenuated lateral equivalent of the Glencartholm Volcanic Beds of the River Esk to the west. The lithic fragments of the tuff do not correspond to any of the local contemporaneous volcanic rocks of the area, but the occurrence of similar fragments in the Glencartholm Volcanic Beds of the Archerbeck Borehole (Day, 1970) appear to support their correlations. Of the macrofossils identified by Day (1970) in the Clattering Band at Oakshaw Ford, *Siphonodendron martini, Lithostrotion portlocki* and *Punctospirifer scabricosta* are also consistent with an Asbian age, according to the stratigraphical ranges of taxa indicated by Riley (1993). However, the presence of *Echinoconchus punctatus* and *Stenoscisma isorhyncha* (if identified correctly), conflict with this, as both are (according to Riley, 1993) of Arundian age.

Day (1970) noted a number of difficulties in the lithostratigraphical correlation of Upper Border Group strata over relatively short distances. Although little detailed sedimentological work has been carried out on these beds, Leeder *et al.* (1989) indicated that the Upper Border Group sedimentation in the Bewcastle area was tectonically controlled, and this may account for apparent rapid lateral facies changes and concomitant lithostratigraphical correlation problems noted by Day (1970). Palaeocurrent data show that the dominant flow direction was towards the south-west, with multistorey sand-bodies built by graben-fed, axial fluvial channels, separated by interbedded floodplain, back-swamp and bay facies comprising mudrocks, siltstones, some coal and discontinuous limestones (Leeder *et al.,* 1989). This interpretation accords well with the sequence exposed at the Oakshaw Ford site.

Conclusions

The Oakshaw Ford GCR site provides the critical reference section for the Clattering Band, the Oakshaw Sandstone, the Oakshaw Coal, the Oakshaw Limestone and the Oakshaw Tuff The Clattering Band defines the base of the Upper Border Group, the base of which is thus also defined at this site. The Clattering Band and the Oakshaw Tuff are of considerable importance in understanding the lithostratigraphy of the Bewcastle succession and are critical for the correlation of Asbian successions within the Northumberland Trough.

References



(Figure 3.15) Simplified geological map of the Oakshaw Ford GCR site illustrating the respective positions of the principal lithostratigraphical marker horizons either side of the Middle Border Group-Upper Border Group boundary as referred to in the text (OC — Oakshaw Coal; CB — Clattering Band). Based on information on [British] Geological Survey maps of the Bewcastle district (Institute of Geological Sciences, 1969a,b).