Scully Grove Quarry, Gloucestershire

[SO 657 187]

Introduction

The Scully Grove Quarry GCR site is located on the eastern limb of the Wigpool Syncline, 0.5 km west of Mitcheldean. This disused quarry [SO 657 187] provides an important but attenuated Lower Carboniferous succession that extends from the top of the Lower Dolomite, through to the base of the Drybrook Sandstone

(Figure 9.2). The section, which includes the Crease Limestone (C_1) and arguably the 'finest' exposure of the Whitehead Limestone (C_2S_1) in the Forest of Dean area (Welch and Trotter, 1961), was deposited in a shallow and mostly marginal marine environment on the South Wales–Mendip Shelf during Chadian and Arun-dian times. Regrettably, at the time of writing the lower part of this succession was badly overgrown. A detailed description of the site geology was presented by Sibly and Reynolds (1937), much of which has been reproduced in a later publication by Welch and Trotter (1961).

Description

The site includes an elongate N–S-trending strike section (*c.* 120 m long) of the Whitehead Limestone, and a section of the Lower Dolomite and Crease Limestone which is indifferently exposed in a disused NW–SW-trending tramway cutting (*c.* 80 m long) that connects with the quarry at its southern end. Across the site, beds dip consistently to the west at approximately 40°.

Poor exposure and the occurrence of dolomitized beds in both the Crease Limestone and the Lower Dolomite currently make it difficult to define the boundary between these two units. Details of the Lower Dolomite are scant, but a description of the upper part of this unit exposed close by (see Sibly and Reynolds, 1937) refers to the occurrence of finely crystalline dolomites with partially dolomitized crinoidal layers and a fauna consisting of spiriferoids, chonetoids and *Euomphalus.* The overlying Crease Limestone (*c.* 23 m thick) is an incompletely dolomitized crinoidal limestone, containing *Syringopora, Bellerophon, Psephodus,* a rich brachiopod fauna and variable amounts of oolitic material. The base and top of this unit are more pervasively dolomitized in the Mitcheldean area than its middle section (Sibly and Reynolds, 1937).

Above this, the Whitehead Limestone (*c.* 13 m thick) comprises a mixed and partially dolomi-tized sequence of massive to well-bedded 'algal' (oncoidal) limestones, oolitic and micritic limestones, vari-coloured clays, thin sandstones and calcareous grits, with a restricted marginal marine and lagoonal' biotic assemblage dominated by microbial oncoids containing *Garwoodia* '*Mitcheldeania*' sp. (see Wethered, 1886; Wood, 1941; Welch and Trotter, 1961), *Spongiostroma, Aphralysia,* spirorbids and ostracodes. Rare bivalves (*Lithodomus* cf. *lingualis*), nautiloids (*Cycloceras*), foraminifera and 'worm-casts' are reported from some layers (Sibly and Reynolds, 1937). The inclusion of terrigenous sand in a number of the limestone beds is a prelude to the deposition of the overlying Lower Drybrook Sandstone, which is no longer exposed in the quarry.

Interpretation

Lithostratigraphical correlations broadly equate the Lower Dolomite, Crease Limestone, Whitehead Limestone and Drybrook Sandstone of the Mitcheldean area respectively with the Black Rock Dolomite, Gully Oolite, Clifton Down Mudstone and the Cromhall Sandstone in the Cromhall, Avon Gorge and Mendips region to the south (George *et al.,* 1976; Green, 1992; Kellaway and Welch, 1993; and see (Figure 9.2)). Regional sequence thickness variations (northerly thinning) and faunal evidence indicate that the Forest of Dean succession may be punctuated by a number of stratigraphical breaks, both within and at the base of the Whitehead Limestone and at the base of the Crease Limestone (George *et al.,* 1976; Green, 1992). However, conclusive evidence for all of these discontinuities has yet to be

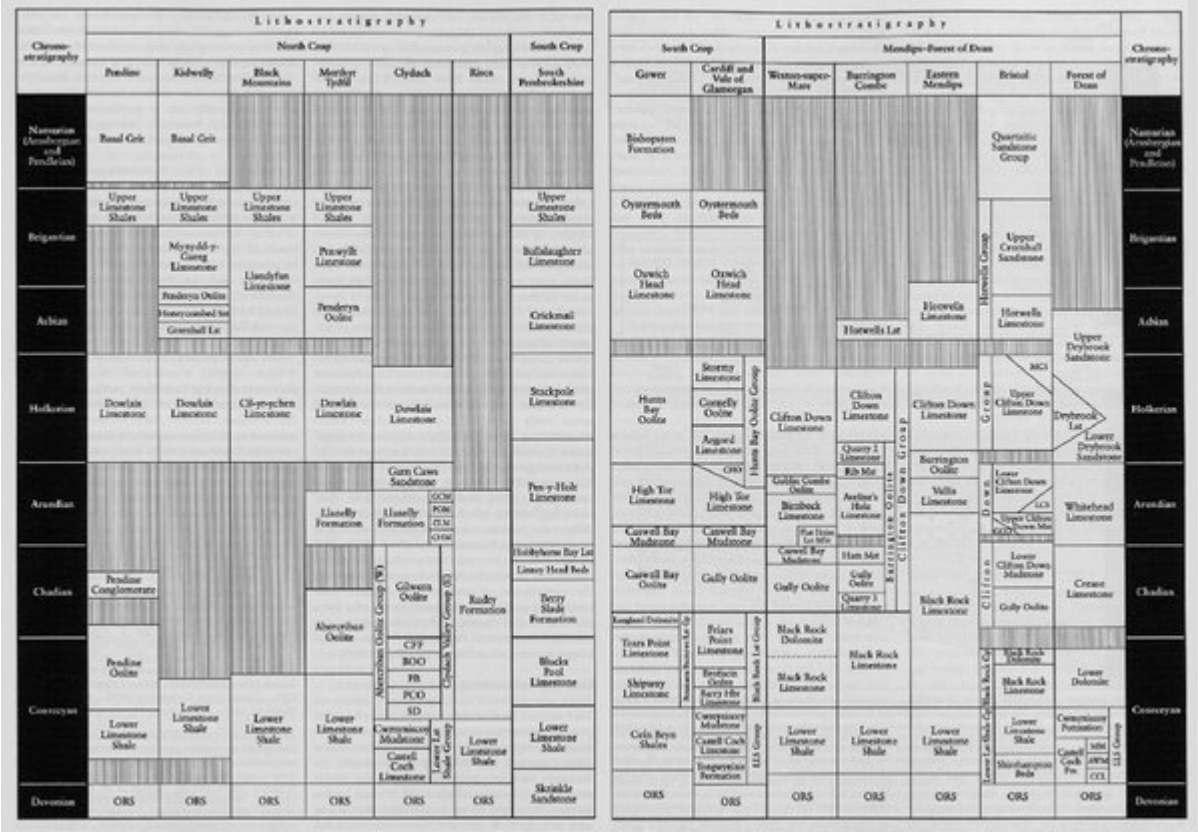
demonstrated because of the combined effects of dolomitization and poor exposure.

Despite the lack of modern sedimentological research on the Crease Limestone and Whitehead Limestone, an appreciation of the regional palaeogeography (see Green, 1992) allows a general palaeoenvironmental interpretation of the Scully Grove succession to be made. Coral and brachiopod evidence suggests that the Crease Limestone was formed in an open marine environment, but the restricted faunas, microbial ('algal') oncoids and lithologies of the Whitehead Limestone indicate that this unit was deposited as a 'lagoonal' (Sibly and Reynolds, 1937) and back-barrier facies to the peloidal grainstone barrier facies of the High Tor Limestone (Wilson *et al.,* 1988; and see (Figure 9.4)b). The general character of the succession, its reduced thickness and suspected stratigraphical breaks (Green, 1992), are a reflection of its proximal depositional setting on a slowly subsiding southward-dipping carbonate ramp on the southern margin of the Wales–Brabant Massif during early Carboniferous times.

Conclusions

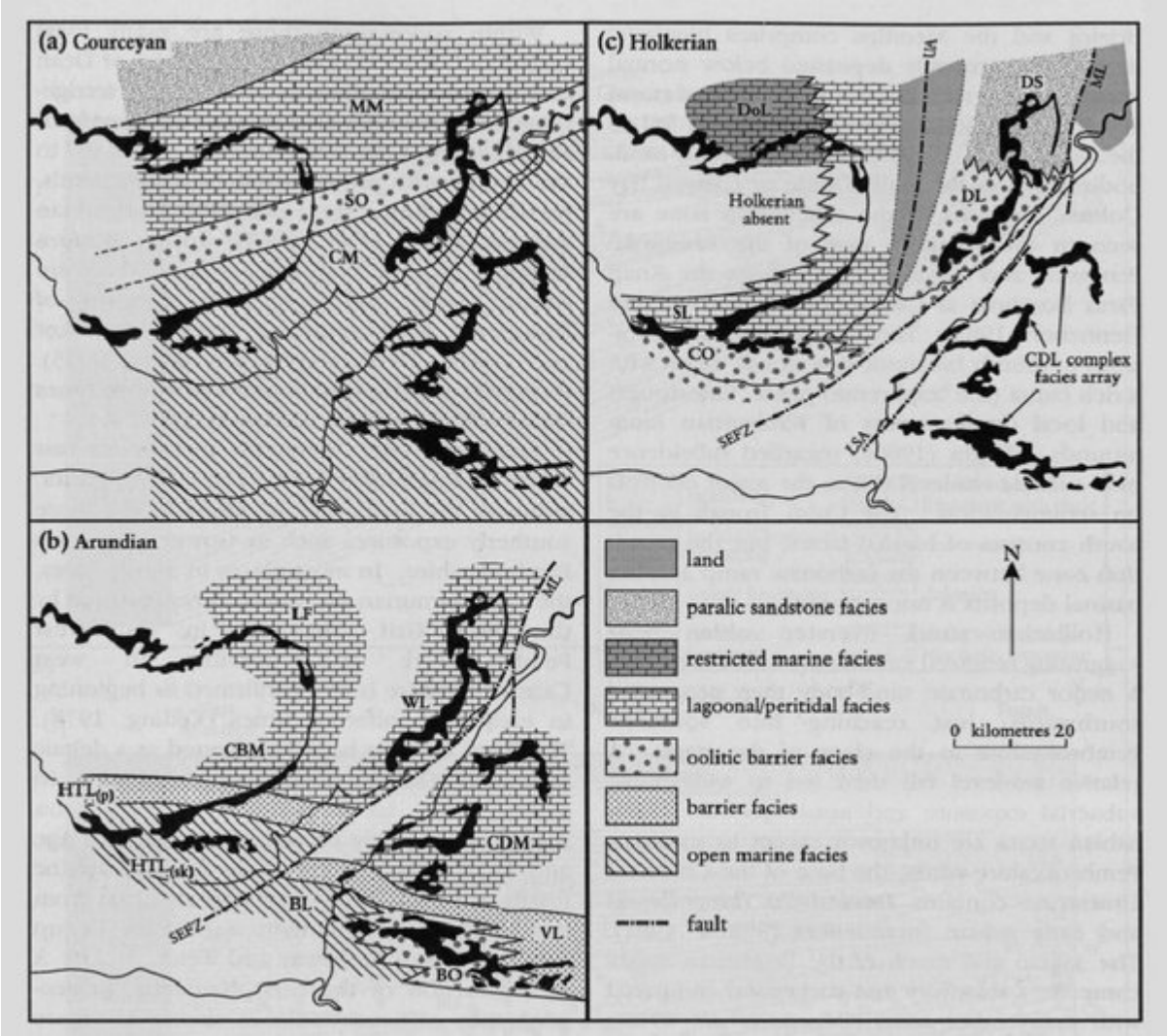
The site provides one the most important Chadian–Arundian sections In the Forest of Dean area. The succession, which is thin in comparison with equivalent sections to the south, represents a marginal marine and nearshore facies deposited close to the northern margin of the South Wales–Mendip Shelf during the early to middle part of the Dinantian. The Whitehead Limestone contains an outstanding biostromal development of 'algal nodules' (microbial oncoids) — arguably the finest example of its kind in the Carboniferous rocks of southern England.

References



(Figure 9.2) Simplified stratigraphical chart illustrating the most widely used lithostratigraphical terms for the Lower Carboniferous sequences in South Wales, the Forest of Dean, Bristol and the Mendips. (SD — Sychnant Dolomite; PCO — Pwil y Cwm Oolite; PB — Pantydarren Beds; BOO — Blaen Onnen Oolite; CFF — Coed Ffyddlwn Formation; CHM — Clydach Halt Member; CLM —Cheltenham Limestone Member; POM — Penllwyn Oolite Member; GCM — Gilwern Clay Member; LIS —Lower Limestone Shale; CHO — Cefnyrhendy Oolite; CCL — Castell Coch Limestone; AWM — Astridge Wood Member; MM — Mitcheldean Member; GCO — Goblin Combe Oolite; LCS — Lower Cromhall Sandstone; MCS — Middle Cromhall Sandstone.) Areas of vertical ruling indicate non-sequences. Not to scale. Based on information from and after Welch and Trotter (1961), Green and Welch (1965), Institute of Geological Sciences (1973, 1977c), George et al. (1976), Wright (1982b), Whittaker and Green (1983), Burchette (1987), Waters and Lawrence (1987), Barclay et al.

(1988), Scott (1988), Barclay (1989), Wilson et al. (1990) and Kellaway and Welch (1993).



(Figure 9.4) The Lower Carboniferous palaeogeography of south-east Wales and part of southern England illustrating the distribution of facies for the (a) Courceyan, (b) Arundian, and (c) and Holkerian stages. (MM — Mitcheldean Member; SO — Stowe Oolite; CM — Cwmyniscoy Mudstone; LF — Llanelly Formation; CBM — Caswell Bay Mudstone; HTL — High Tor Limestone (p — peloidal; sk — skeletal); BL — Birnbeck Limestone; BO — Burrington Oolite; VL — Vallis Limestone; CDM — Clifton Down Mudstone; WL — Whitehead Limestone; DL — Drybrook Limestone; DoL — Dowlais Limestone; SL — Stormy Limestone; DS — Drybrook Sandstone; CO — Cornelly Oolite; CDL — Clifton Down Limestone; UA — Usk Axis; ML — Malvern Line; SEFZ — Severn Estuary Fault Zone; LSA — Lower Severn Axis.) Based on Burchette (1987) and Wilson et al. (1988).