
Edgehill Sand Quarry, Gloucestershire

[SO 661 168]

Introduction

The Edgehill Sand Quarry GCR site is located on the steeply dipping eastern limb of the Wigpool Syncline, 0.5 km to the south-west of Plump Hill in the Forest of Dean. This disused quarry [SO 661 168] contains a stratigraphically important section of the Drybrook Sandstone and the Edgehills Sandstone. The site has been the focus of some detailed palynological research by Sullivan (1964b) and Spinner (1984), the results of which were re-evaluated by Cleal (1986) following the discovery of stratigraphically significant plant fossils. Although various ages have been suggested for different parts of the sequence, the balance of evidence would appear to favour a middle to late Viséan (Holkerian–Asbian) age for this section.

Description

The currently exposed sequence includes approximately 40 m (1986) of vari-coloured sandstones and conglomerates with subordinate developments of finer siliciclastic deposits (Figure 9.36). While the lower part of the section is ascribed to the Drybrook Sandstone (Sibly, 1912), the higher beds form part of the Edgehills Sandstone (Sullivan, 1964b). A thin coal (the Edgehills Coal) occurs close to the top of the Edgehills Sandstone. Uncertainty regarding the position of the Drybrook Sandstone–Edgehills Sandstone boundary (see below) makes it difficult to determine the exposed thickness values for these two units. The succession dips steeply (c. 60°) to the west (Figure 9.36).

Sullivan (1964b) recorded a somewhat greater total sequence thickness than the 40 m indicated by Cleal (1986). This difference is attributed to the difficulty in establishing the true thickness of the exposed succession, for when Sullivan's work was undertaken only two small quarries were present at the site, but when Cleal's work was undertaken the two quarries had been enlarged to form the single quarry face that is seen today (Cleal, 1986).

The Drybrook Sandstone is dominated by massively bedded, red, white and speckled and bioturbated medium-grained sandstones (some poorly consolidated and locally conglomeratic) with sparse siltstone bands and mudstone lenses. Near the base, a thin 'coaly shale' layer once generated a rich miospore assemblage including *Lycospora uber*, *Punctatisporites platyrugosus*, *Schultzospora ocellata*, *Convolutispora mellita*, *Leiotriletes tumidus*, *Waltzispora planiangularata*, *Vallatisporites ciliaris* and *Cribrosporites cribellatus* (Sullivan, 1964b). An S₂ Zone (Holkerian) age for this assemblage was suggested by Sullivan (1964b) thus confirming the earlier held view (Sibly, 1918) of an S₂ Zone age for the Drybrook Sandstone based on the discovery of *Davidsonina carbonaria* in the Drybrook Limestone. A slightly younger TC miospore zone (Asbian) age for this assemblage was later suggested by Neves *et al.* (1972). Subsequently, the discovery of the TC Zone megaspores *Carbaneuletes circularis* and *Didymosporites scotti* by Spinner (1984), from the same horizon as Sullivan's, apparently confirmed an Asbian age for this part of the sequence. Regrettably these lower beds of the Drybrook Sandstone are no longer exposed at the site.

The Edgehills Sandstone, by contrast, consists of coarser purple and grey sandstones (some pebbly) and conglomerates. At its top, a finer mudstone–siltstone interval (3 m) includes the Edgehills Coal (15–25 cm) from which Sullivan (1964b) recorded a 'Westphalian A' miospore assemblage that included *Granulatisporites cf. microgranifer*, *Lycospora pusilla*, *Savitrissporites nux*, *Dictyotriletes sagenoformis*, *Knoxisporites stephanephorus*, *Cirratiradites saturni*, *Apiculatisporis variocorneus*, *Crassispora kosankei*, *Florinites* spp., *Raistrickia* spp., *Fabasporites pallidus* and *Calamospora mutabilis*. The discovery of further 'Westphalian A' megaspores, including *Cystosporites varius*, *Triangulatisporites regalis* and *Tuberculatisporites apiculatus*, from the same horizon (Spinner, 1984) appeared to support Sullivan's view of the age of these beds. However, Cleal (1986) recorded a drifted plant macrofossil assemblage from a purplish-grey mudstone immediately below the Edgehills Coal that included the horsetail *Archaeocalamites radiatus*, the lycopods *Tomiodendron variabilis* and *Lepidostrobus lanceolatum*, and possible pteridosperm stem fragments which he regarded as Viséan age.

The Drybrook Sandstone–Edgehills Sandstone boundary was originally defined by Sullivan (1964b) at the base of the 'first ... thick conglomerate band ... above the massively bedded sandstones'. However, the absence of this boundary from Sullivan's log and the subsequent re-shaping of the quarry make this boundary difficult to place in the section as it is currently exposed. Careful consideration of Sullivan's log indicates that it may lie either 14 m or 24 m below the level of the Edgehills Coal (as seen in the quarry at present) although Cleal (1986) placed the boundary higher in the section, some 3–5 m below the Edgehills Coal.

Interpretation

Miospore evidence from the lower of the two assemblages described by Sullivan (1964b) indicates a Viséan (Holkerian–Asbian) age for this part of the Drybrook Sandstone succession. However, the occurrence of Westphalian A spore assemblages in the Edgehills Coal (Sullivan, 1964b; Spinner, 1984), in a part of the sequence formerly assigned to the Drybrook Sandstone, led Sullivan (1964b) to conclude that a significant unconformity existed within the sequence, and this unconformity was used to mark the local base to the overlying Edgehills Sandstone succession. Later, following the discovery of plant macrofossils immediately below the Edgehills Coal, Cleal (1986) was able to challenge Sullivan's view. Considering the time ranges of the plant taxa he recorded and re-evaluating the palynological evidence, Cleal (1986) concluded that the Edgehills Sandstone was also of Viséan (and probably Asbian) age, and not of lower Westphalian age as previously thought. He also noted that the character of the plant horizon bore a striking resemblance to the classic Drybrook Sandstone flora of Puddlebrook Quarry (Lele and Walton, 1962), from which NM Zone (Asbian) miospore assemblages were subsequently recorded (Rowe, 1988; Cleal and Thomas, 1995). Following this argument, a major stratigraphical break in the sequence at Edgehill Sand Quarry now seems unlikely. Thus the Edgehills Sandstone may simply represent a distinctive lithofacies that developed locally towards the top of the Drybrook Sandstone over broadly the same time period.

While a braid stream origin is suggested for much of the Drybrook Sandstone, littoral strand plain deposits comprising 'planar or sheet sandstones with a trace fauna' and supratidal mudflat and swamp deposits (carbonaceous mudrocks and thin coal horizons) are also recognized in the unit (Jones, 1984). Although each of these environments may be represented at Edgehill Sand Quarry, their precise definition within the section has yet to be demonstrated.

Regional assessments of the Drybrook Sandstone and its lateral equivalent east of the River Severn, the Cromhall Sandstone, indicate that these units formed part of a marine-influenced fluvial complex (Attamt, 1984) that extended south towards the Bristol district during middle and late 'Viséan times; a complex that developed in response to a period of contemporary earth movements (uplift) along the line of the Malvern Axis (see Dixon in Smith, 1930; Jones, 1984; Wilson *et al.*, 1988; Kellaway and Welch, 1993).

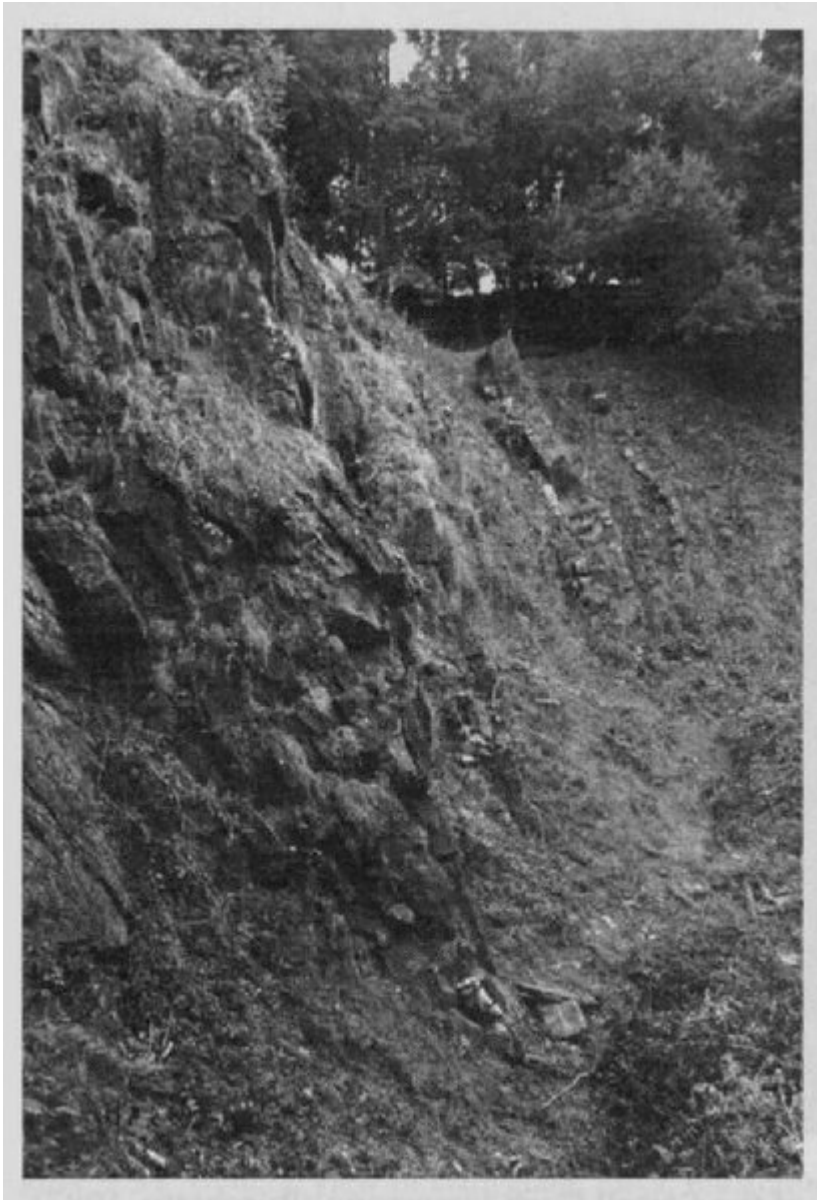
Conclusions

This locality provides one of the most important and easily accessible sections of the Drybrook Sandstone and Edgehills Sandstone in the Forest of Dean area. The rocks most probably represent a combination of ancient river, coastline and swamp deposits formed in middle to late Viséan times as a result of localized uplift along an ancient fault line (the Malvern Axis). Uncertainty regarding the precise age of parts of the sequence make this one of the most stratigraphically contentious sites of Lower Carboniferous age in southern England.

[References](#)



(Figure 9.37) Comparative sections of Dinantian strata exposed at the Avon Gorge and Burrington Combe GCR sites. After Kellaway and Welch (1993) and including non-sequence information from Ramsbottom (1973) and George et al. (1976). Biostratigraphical information is from Vaughan (1905, 1906), Reynolds and Vaughan (1911) and Reynolds (1921). Horizons a, R and y are based on Vaughan (1905).



(Figure 9.36) Thick-bedded sandstones and finer siliciclastics of the Drybook Sandstone at Edgehill Sand Quarry, Gloucestershire. The upper part of the section seen in the background (top right) includes part of Sullivan's (1964b) Edgehills Sandstone and the Edgehills Coal (see text for further details, and Cleal, 1986). (Photo: P.J. Cossey.)