

## An arenaceous member in the Mercia Mudstone Group (Triassic) west of Taunton, Somerset

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An arenaceous member was noticed in the Mercia Mudstone Group to the west and south-west of Taunton by Buckland (1836), Ussher (1906, 1908), and Edmonds and Williams (1985). It gives rise to a generally westward-facing scarp feature by means of which its outcrop (Fig. 1) has been traced by one of us (A.R.) between scattered, mostly small, exposures.

The main part of the outcrop extends for more than 5km between Hele and the M5 motorway, and includes the principal section through the arenaceous member, at Lipe Hill (5, Fig. 1: ST 1872 2150). This section (Fig. 2) was given its first, and only, description by Ussher (1906, p. 24); some 13m of beds comprising the arenaceous member (10.5m; 2 to 6 in Fig. 2) and contiguous beds in the Mercia Mudstone Group succession (1 and 7 in Fig. 2) are exposed in a cutting where a minor road traverses a steep west-facing scarp formed by resistant sandstone beds which dip gently eastwards.

In the Lipe Hill section, the arenaceous member rests upon an irregular surface eroded into red blocky mudstones with thin grey-green bands. A basal conglomerate (2) comprises white, grey, and some red mudstone intraclasts set, with plant fragments, in a dark grey silty matrix. Above a similar conglomerate at the base of unit 3, the lower part of the member (3 and 4) is largely argillaceous.

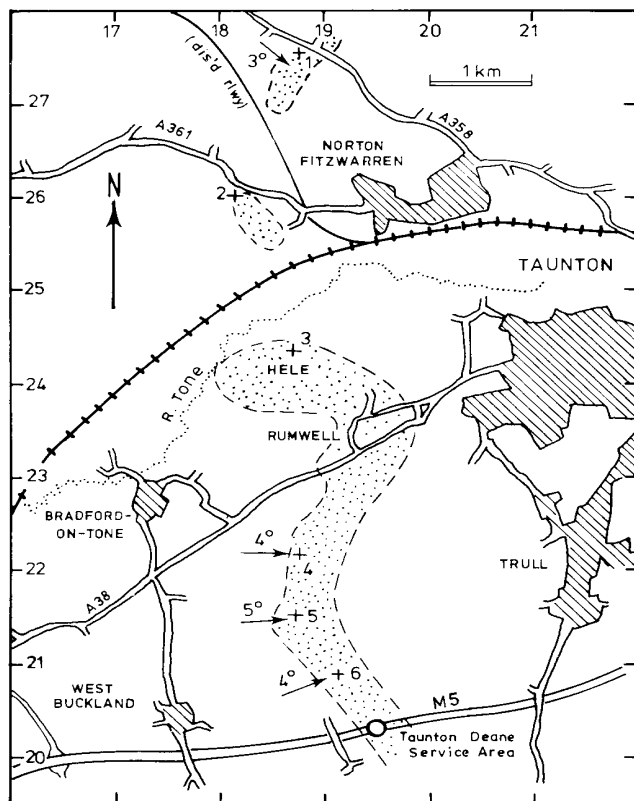


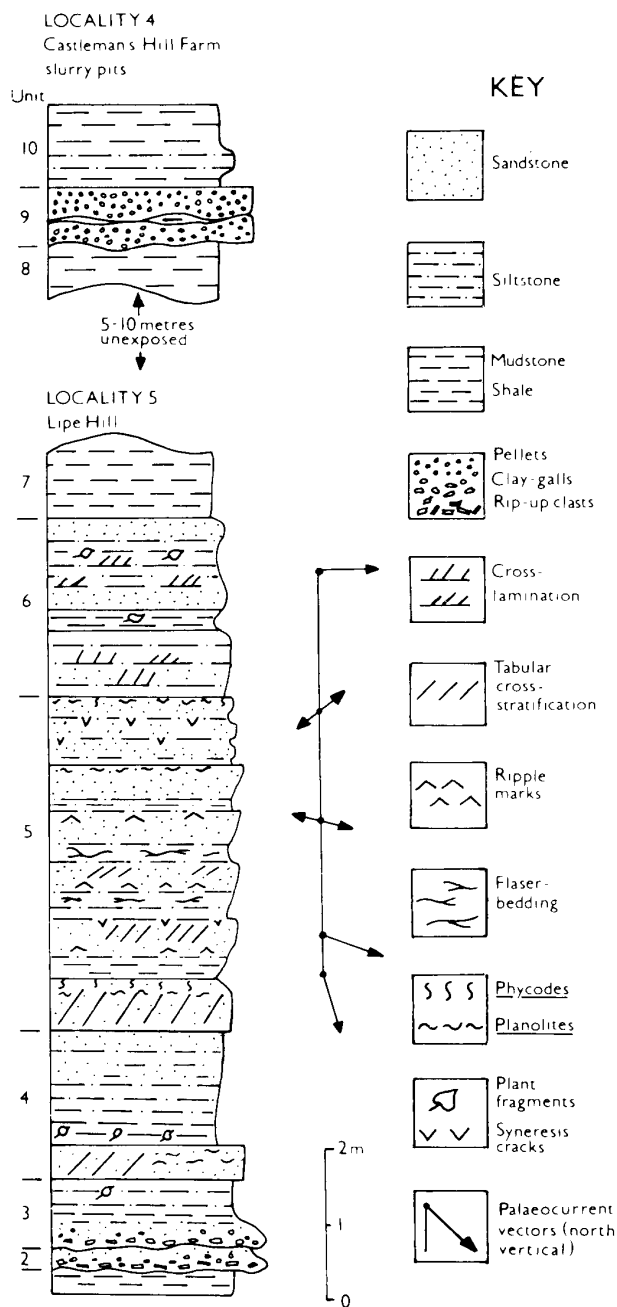
Figure 1. Outcrops of the arenaceous member (stippled) in the Mercia Mudstone Group west of Taunton.

The principal arenaceous beds (5) form the middle part of the member and constitute nearly half its thickness; they are succeeded by a less arenaceous unit (6). Fine-grained lithologies in the member are predominantly grey, and the sandstones are grey or brown in colour. A passage upwards from grey to red silty mudstones is seen in beds (7) overlying the member.

Plant remains, commonly current-oriented, occur at several levels in the Lipe Hill succession (Fig. 2). Small burrows representing infaunal feeding traces of *Planolites* and *Phycodes* type occur commonly, especially at sandstone - mudstone interfaces, and vertical tubes 10 to 20mm in diameter, of *Skolithos* and *Cylindrichnus* type, occur in the dominantly arenaceous unit 5. Specimens of the conchostracan *Euestheria*, ranging in size from 1 to 5mm, and including complete carapaces, occur in blue-grey mudstones and siltstones in units 3, 4 and 6. Palynological preparations from units 3, 5 and 6 (British Geological Survey preparations MPA 24796, 24797 and 24798 respectively; examined by G.W.) all contain light yellow, poorly preserved miospores associated with remains of a possible green alga (*Plaesiodyctyon mosellanum* Wille 1970), a chlorophyceae alga (*Botryococcus*) and vascular tissues of land plants. The miospores are largely bisaccate gymnosperm pollen, including representatives of the genera *Alisporites*, *Cuneatisporites*, *Parvisaccites*, *Platysaccus*, *Triadispora* and *Vesicaspora*. Each preparation contains *Ovalipollis pseudoalatus* (Thiergart) Schuurman 1976, *Ellipsovelatisporites plicatus* Klaus 1960 and, less commonly, *Camerospirites secatus* Leschik emend. Scheuring 1978, *Duplicisporites* spp., *Porcellispora longdonensis* (Clarke) Scheuring emend. Morbey 1975 and *Vallasporites ignacii* Leschik sensu Scheuring 1970. Additionally, MPA 24796 contains *Brodipora striata* Clarke 1965 and *Enzonalaspores vigens* Leschik sensu Scheuring 1970, which are also present, with the taeniate bisaccate *Lunatisporites acutus* Leschik emend. Scheuring 1970 and a few trilete spores, including *Cyathidites minor* Couper 1953, in MPA 24798.

The highest bed of the member is also visible 640m north of Lipe Hill in a track (4, Fig. 1: ST 1880 2220) at Castleman's Hill Farm. Here, about 1m of thinly bedded grey mudstones and siltstones and grey-brown sandstones with tracefossils of *Planolites* and *Phycodes* type are exposed. Grey-black mudstones, grey pelletal mudstones, and siltstones (8 to 10 in Fig. 2), some 5 to 10m higher in the Mercia Mudstone Group succession, were observed nearby in the farm slurry pit (ST 1881 2225). A palynological preparation (MPA 27478) from unit 9 at this locality is dominated by dark woody plant debris but contains two distinct palynomorph associations. One, with *Alisporites* sp., *Ovalipollis pseudoalatus* and indeterminate bisaccate pollen, is comparable with those from Lipe Hill. The second comprises mostly black, opaque, vestigial and indeterminate bisaccates that are regarded as reworked from older Triassic beds, or even from deposits of Permian age. Reworked Late Permian palynomorphs have been recorded from the upper part of the Mercia Mudstone Group at St Audrie's Bay, west Somerset (Warrington 1979).

Around Castleman's Hill and Lipe Hill the arenaceous member gives rise to a steep west-facing scarp. This is traceable southeastwards to Cutsey Hill (6, Fig. 1: ST 1912 2089), where a similar thickness of beds occurs but only about



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2m of laminated siltstones and sandstones with tracefossils of *Planolites* or *Phycodes* type are exposed in a road cutting, and to the Taunton Deane motorway service area (Fig. 1: ST 1950 2032). Farther south the scarp feature is difficult to follow and the outcrop has not been defined. Northwards from Castleman's Hill the scarp becomes less prominent towards Rumwell where it turns westwards and passes to the south of Hele, reaching the River Tone north of Hele Hill. Around Hele, and exposed in an old pit (3, Fig. 1: ST 1873 2432) Edmonds and Williams (1985) recorded interbedded grey-green marls, siltstones and sandstones. North of the River Tone the outcrop is traced discontinuously. A low hill between the Taunton - Exeter railway line and the A 361 road west of Norton Fitzwarren may correspond to the feature traced to Hele; blue blocky mudstones are exposed at the north end of this hill

(2, Fig. 1: ST 1820 2607) but no sandstones are visible. Farther north, sandstones overlie red and grey-green marls on the prominent feature of Knowle Hill (Edmonds and Williams 1985), and up to 1.5m of sandstones with grey shale interbeds and tracefossils of *Planolites* and *Phycodes* type are exposed (1, Fig. 1: ST 1882 2752) in Norton Manor Camp grounds (40 Commando Regiment). A palynological preparation (MPA 27479) from this locality contains largely indeterminate bisaccate pollen associated with *Plaesiodyctyon mosellanum* and some *Botryococcus*: *Ovalipollis pseudoalatus* is present in the assemblage which, though less rich, is similar in character to those from Lipe Hill.

Ussher (1906, p. 24) and Edmonds and Williams (1985, p. 40) suggested that the arenaceous beds in the Mercia Mudstone Group at, respectively, Lipe Hill and Hele were probably correlatives of those at North Curry, to the east of Taunton. The lithological and palaeontological characters documented here from the arenaceous member west of Taunton are analogous to those reported from the North Curry Sandstone Member in its type area between 6 and 14km east of Taunton (Warrington and Williams 1984), and a comparable late Carnian (Julian or Tuvalian) age is indicated by the palynomorph assemblages from Lipe Hill. The arenaceous member west of Taunton is, therefore, considered the representative there of the North Curry Sandstone Member. The latter is considered analogous to the Late Triassic Schilfsandstein of Germany (Wurster 1964); it is interpreted as comprising thicker, more arenaceous sequences formed in delta distributaries or fluvial channels, and thinner, more argillaceous, laterally equivalent interdistributary or overbank sequences (Warrington and Williams 1984). A comparable relationship is evident in the outcrop of the arenaceous member west of Taunton. There, the thick scarp-forming succession in the Castleman's Hill - Lipe Hill - Cutsey Hill area includes a substantial proportion of cross-bedded sandstones that accumulated in a distributary channel environment, and is flanked, to the north and south, by thinner interdistributary or overbank successions that are less arenaceous and give rise to a weaker topographic feature. The eastward or east-south-east direction of transport determined from tabular crossstratification, ripple marks, current parting lineation and oriented plant debris in units 5 and 6 at Lipe Hill (Fig. 2) - is consistent with that recorded on the North Curry outcrop (Warrington and Williams 1984, p. 86).

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