FIELD EXCURSION TO EXAMINE THE DEEP WATER MUD-MOUND COMPLEX AT DOVEDALE

Leader: Paul H Bridges

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Introduction

A number of carbonate mud-mound complexes formed in the deep water to the SW of the developing Derbyshire Platform in late Tournaisian—early Viséan times. The largest of these is located at Dovedale in the Peak District where it occupies an outcrop of approximately 4 × 1.5 km. The rocks are quite well exposed in the valley of the southward flowing Dove. The field party, comprising members of East Midlands Geological Society and the North Staffordshire Geologists' Association, set off to examine features recording the growth of the complex and evidence relating to the origin of the mounds (Fig. 1).

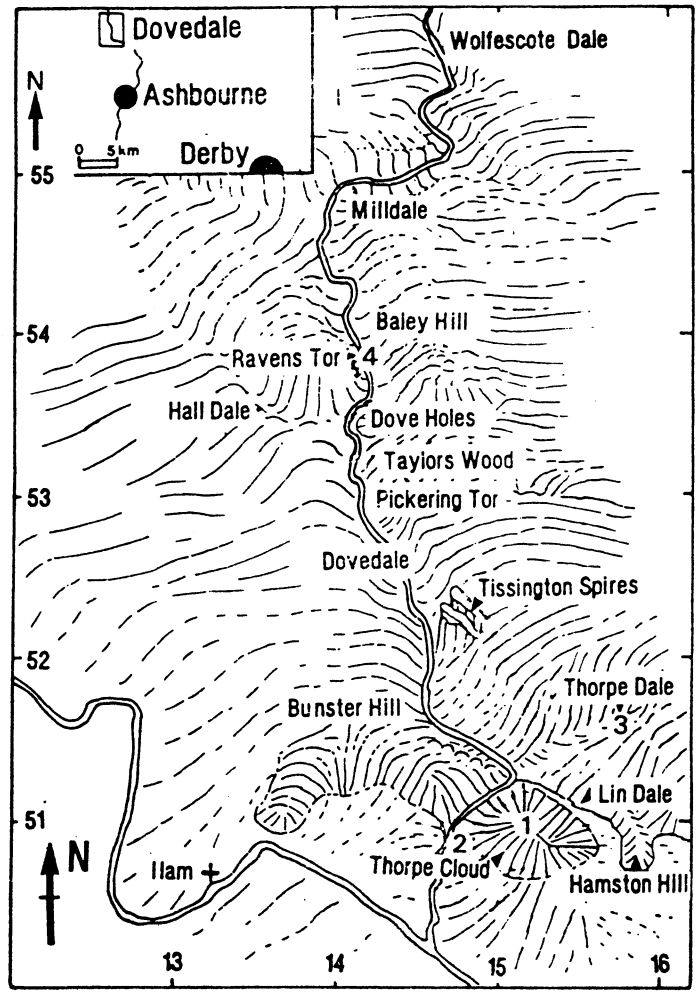

Fig. 1. Map of Dovedale showing the location of the principal sites (1–4) visited during the field excursion.

Mercian Geologist, 1988,
Vol. 11, no. 3, pp. 201–203.

1. The party alighted from the coach at the short-stay car park at Thorpe (SK 155 505) and ascended the moderately inclined SE facing slope of Thorpe Cloud. At the top the party examined the mound core facies which locally displays a hummocky lamination. In photomicrographs members of the field party could see that the lamination is sometimes crinkled indicating a cryptalgal origin. The lamination is composed of poorly-defined, small peloids, micrite and comminuted skeletal debris. It was suggested that these peloids were precipitated around bacteria in a similar way to Recent peloids which have been described from the fills of borings in the reefs of Belize. The absence of micritization of shells and the burrows of soft-bodied infauna supports this view. Thus micro-organisms, bacteria and algae, are regarded as having had an important role in the accretion of the sediment in the mounds. Other organisms including sponges, bryozoans, crinoids, echinoids, foraminifera, ostracodes and algae (releasing calcispheres) also colonized the mound complex (Fig. 2) (Bridges & Chapman, in press).

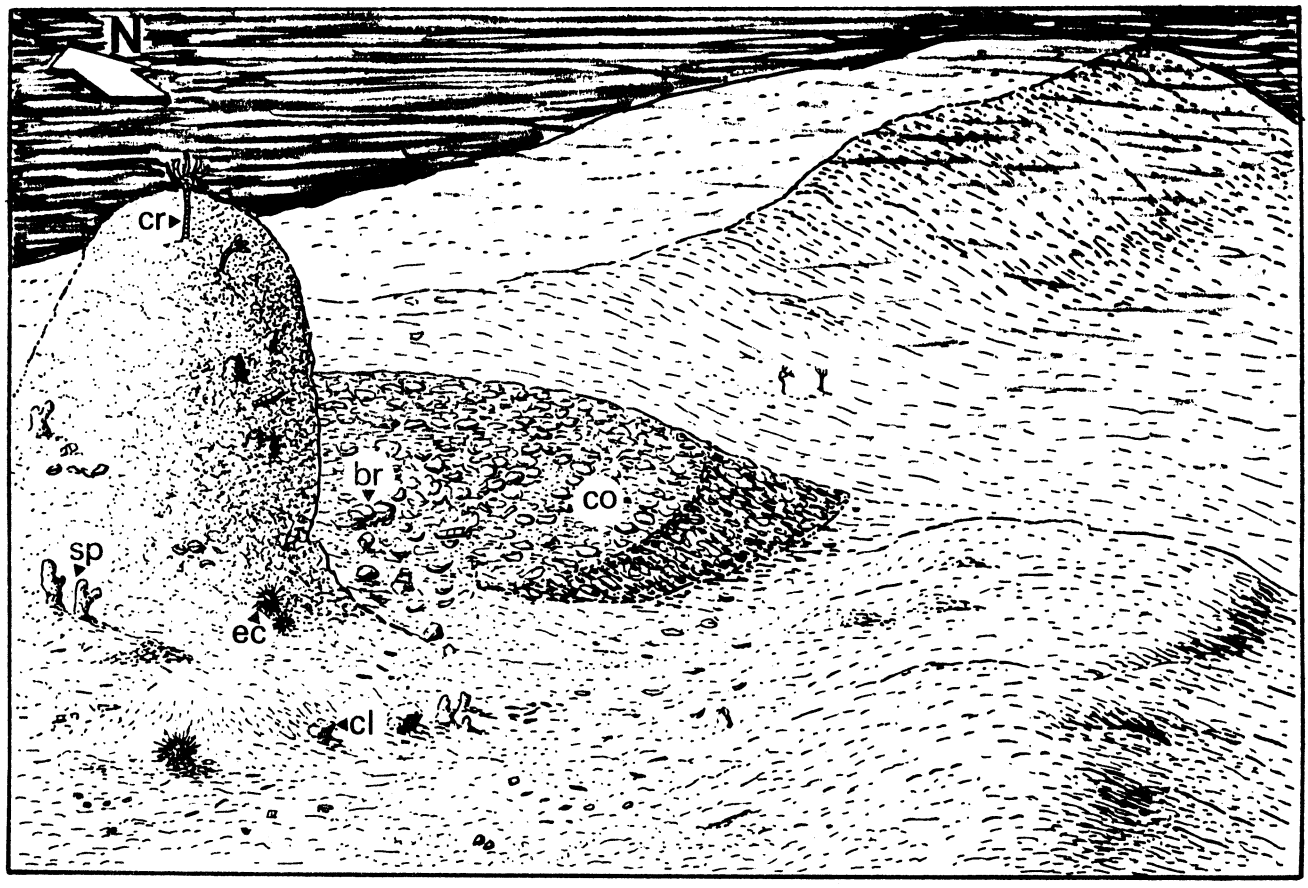

Fig. 2. Reconstruction of the mound surface at the top of Thorpe Cloud. The surface was consolidated and gelatinous with heterotrophic bacteria and cyanobacteria which induced precipitation of calcium carbonate. Macrofauna included sponges (sp), echinoids (ec), crinoids (cr) and brachiopods (br). cl-clasts; co-coquina.

2. The party descended the SW spur of Thorpe Cloud and examined fissure fills near the base (SK 1478 5103). Two kinds of fill were identified. Firstly there is a series of narrow sigmoidal cracks filled by crinoid debris which formed at an early stage when the sediment was consolidated. Secondly there are wider fissures filled with lithoclasts of cemented mound core sediment, crinoids and haematitic carbonate mud, which formed during a later stage of diagenesis.

3. The party then followed a path along the eastern side of the river Dove to the stepping stones (SK 1515 5135) and ascended a dry valley herein named Thorpe Dale to a point where two walls intersect (SK 1543 5166). Mound and intermound facies intercalate and provide evidence of a submarine valley which formerly extended to the SW between Thorpe Cloud and Bunster Hill. Thus the mound at Thorpe Cloud had been separate from the rest of the complex.

4. After lunch the party followed the main valley path past Tissington Spires and Pickering Tor. By mid-afternoon the party reached the foot of Baley Hill on the northern margin of the complex. The party gained a good view across the river Dove to Ravens Tor where the unbedded mound core facies can be seen passing laterally into moderately inclined (10–20°) mound flank facies. Photomicrographs illustrated the micritized lithoclasts and crinoid debris which are characteristic of the flanks. These sediments pass laterally into the intermound facies which varies from fine-grained, dark and bituminous to coarse-grained and generally light coloured. The coarse intermound sediments contain dasycladacean algae, coarse peloids and lithoclasts in clear contrast to the mound core facies. Comparisons with the Waulsortian mud-mounds of Dinant in Belgium, where Lees *et al.* (1985) have proposed bathymetric phases, suggest water depths of between 120 and 280 m. Finally, the party continued along the path of Milldale and rejoined the coach at Shining Tor (SK 1460 5510).

References

Bridges, P.H. & Chapman, A.J., 1988. The anatomy of a deep water mud-mound complex to the SW of the Dinantian platform in Derbyshire, UK. *Sedimentology*, 35, (in press).

Lees, A., Hallet, V. & Hibo, D., 1985. Facies variations in Waulsortian build-ups, Part 1: A model from Belgium. *Geol. J.* 20, 133–158.

Paul H Bridges,
Derbyshire College of Higher Education
Kedleston Road,
Derby, DE3 1GB.