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# Wood Lee Common, Maltby

[SK 532 915]

## Highlights

Wood Lee Common, Maltby (not shown in (Figure 4.2)), is the most accessible and amongst the best localities for the study of the structure and fabric of typical bryozoan patch-reefs in the Wetherby Member of the Cadeby Formation. The reef-rock is completely dolomitized and comprises an untidy assemblage of sack-like masses of dense bryozoan-rich rock with associated bivalve, gastropod and brachiopod fossils.

## Introduction

The late Permian marine patch-reefs at Wood Lee Common form scattered natural upstanding tor-like crags in south-westwards-sloping scrubby grassland on the south-western fringe of Maltby; most of the 'tors' are only a few metres high and less than 30 m across. No other strata are exposed and so there is no information on the nature of contacts or on reef dimensions; it is not even clear whether there is one reef or several. The outstanding feature of the exposures is that differential weathering has revealed that the reefs comprise a large number of stacked sack-like bodies up to 2.5 m across, each with a complex framework of straggling bryozoans.

The craggy exposures on Wood Lee Common were mentioned by Sedgwick (1829) and illustrated photographically by Eden *et al.* (1957, pl. 4) and Smith (1981b, figs 6, 14 and 17); the detailed ecology and make-up of reefs like those at Wood Lee Common was discussed fully by Smith (1981b).

## Description

Wood Lee Common lies on the south-west side of the A634 Maltby–Blyth road and is shown in detail in (Figure 4.27). Rock exposures cover only a small proportion of the common and are unevenly scattered both in geographical position and at different levels on the slope. All exposures are of rock in the lower and middle part of the Wetherby Member of the Cadeby Formation, the base of which trends NNW to SSE across the middle of the slope. All the reef-rock is of dolomite.

Examination of the reef exposures reveals little of the shape or size of the reef body or bodies, but shows that the 'tors' are almost wholly composed of dense masses ('saccoliths') of bryozoan boundstone (framestone) piled apparently haphazardly beside and on top of each other. Most of the saccoliths are roughly horizontally elongated, locally giving the rock a crudely thick-bedded aspect (Figure 4.28). They range from less than 1 m across to up to 2.5 m across and 1 m thick. Many of the saccoliths are in tight mutual contact, forming a coarse mosaic, but others are partly or wholly separated by irregular pockets and lenses of fine-grained shelly detritus; shell remains in the detritus are mainly of small bivalves (*Bakevellia*, *Liebea*, *Permophorus*, *Schizodus*) and small gastropods, but also locally include fragments of ramose bryozoans (probably mainly *Acanthocladia*) and of the small pedunculate brachiopod *Dielasma*.

Close inspection of the rock face shows that the saccoliths comprise 5–?25% of a twig-like framework of branching *Acanthocladia* colonies (with some possible *Thamniscus*) spread unevenly throughout a dense, fine-grained dolomite matrix. Thin sections (Smith, 1981b, figs 14 and 17) reveal that the matrix is of patchily turbid dolomite microspar and dolomicrite and that the rock has undergone a complex history of diagenesis and cavity-fill. Early cementation is suggested by a general lack of crushing of the skeletal remains, and this may have been initiated by the formation of fibrous isopachous fringes (0.05–0.25 mm thick) that coat and line most of the bryozoan frame elements and also many other organic remains.

An additional feature of interest in the reefy 'tors' of Wood Lee Common is the presence of well-developed honeycomb weathering on some faces, and the more restricted occurrence of narrow linenfold-like vertical dissolutional fluting.

## Interpretation

Patch-reefs in the Wetherby Member of the Cadeby Formation in Yorkshire are featured in five GCR sites and display different features in each; those at Wood Lee Common are special in that, in addition to being freely and readily accessible, they display *par excellence* the saccolithic structure that typifies the mainly bryozoan reefs in the lower part of the member (Smith, 1981b). Three of the four other reef GCR sites, Newsome Bridge Quarry, South Elmsall Quarry and Ashfield Brick-clay Pit, may have bryozoan saccolithic cores but, if so, this structure has subsequently almost been obliterated by diagenesis; reefs at the fifth site, Cadeby Quarry, have a rather different structure and biota from the other three. Additional places where a pronounced saccolithic reef structure in bryozoan reefs may be seen include an old quarry [SE 488 176] on the northern fringes of Wentbridge and the many exposures in Hooton Pagnell village [SE 48 08] where reef/grainstone contacts and relationships are also well exposed (Smith, 1981b, fig. 4); others were noted by Edwards *et al.* (1947) at Aberford [SE 43 37] and Boston Spa [SE 42 45]. Upstanding crags of reef limestone, not unlike those at Maltby, have been reported at Minney Moor [SK 519 989], Conisbrough by Mitchell (1932a) and near South Anston [SK 525 838], east of Sheffield, by Eden *et al.* (1957).

The distribution and general characteristics of patch-reefs in the Wetherby Member have been investigated by Smith (1974b, 1981b, 1989) and are summarized in the account on South Elmsall Quarry. They lie at all levels in the Wetherby Member between the top of the Bakevellia Bed (commonly 1–3 m above the base) and the Hampole Discontinuity, and range from scattered to abundant in an 8–12 km wide belt that coincides roughly with the outcrop between Brearton (SE 322 610, near Harrogate) and Barlborough ([SK 47 77], near Sheffield). Most simple reefs are a few metres thick and 10–25 m across (although some exceed 100 m), but closely-spaced reefs locally merged to form complexes more than 20 m thick and 120 m across.

Although Mitchell (1932a) was the first to apply the word 'reef' to unbedded or 'brecciated' bryozoan rock in the Wetherby Member, it is clear that Kirkby (1861, p. 315) recognized that the 'polyzoan beds' probably formed part of a sessile, organic community built up by and around ramose cryptostome bryozoans such as *Acanthocladia*. By their growth, the bryozoans gave rise to a variety of minor sub-environments that were occupied by, and sheltered, a more varied range of invertebrates than inhabited the surrounding more uniform grainstones; such forms include encrusting foraminifera and pedunculate small brachiopods. The roles played by the various organisms in the life and construction of the reefs were discussed by Smith (1981b), together with a preliminary analysis of reef diagenesis. It was concluded, partly from the contributory evidence of the surrounding grainstones, that the reefs were formed entirely subaqueously on an open marine shelf under a few metres of water of slightly above-normal salinity.

Because no margins are exposed, it is not possible to determine whether one large reef is present at Wood Lee Common or several smaller ones. If only one reef is present, however, it would be at least 150 m across, and more than 20 m thick, which is very large for a single reef; it seems more likely therefore, and taking the several separate and linked reefs at Hooton Pagnell as a guide, that a number of reefs is present rather than one large one.

## Future research

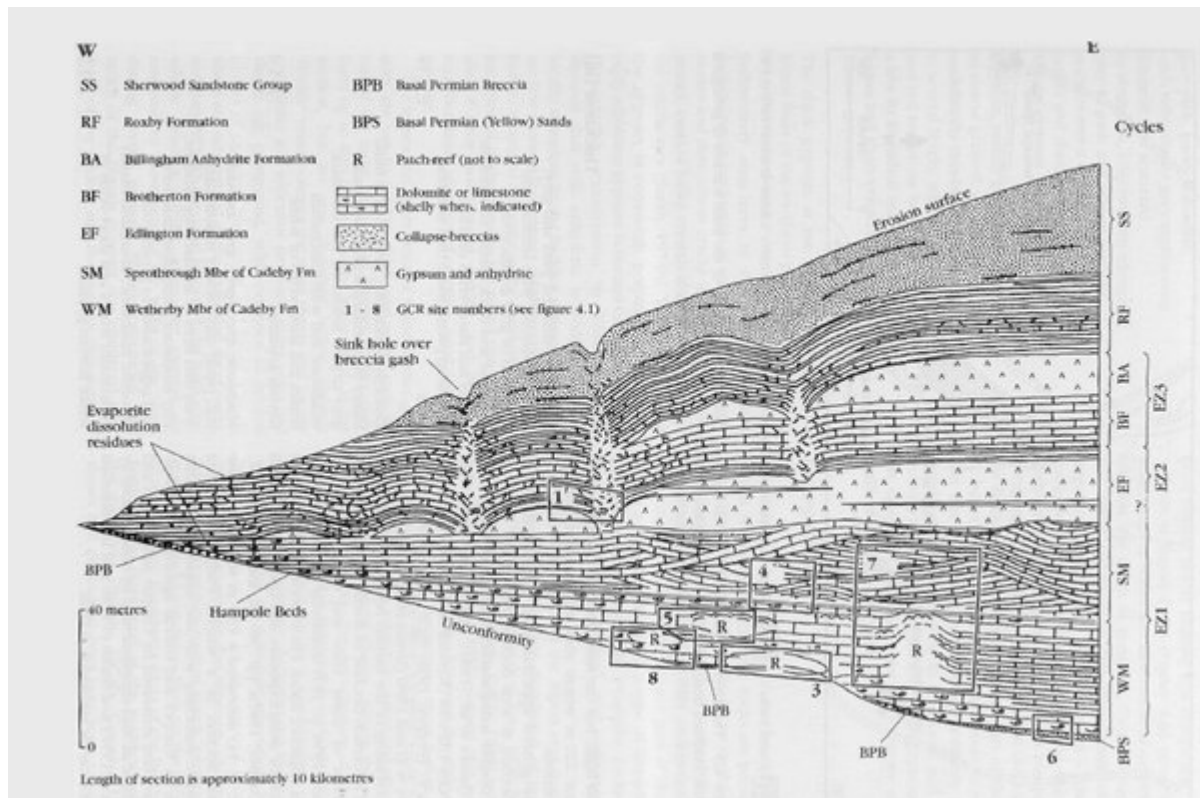
The main features of the patch-reefs in the Wetherby Member of the Cadeby Formation are now reasonably well documented and understood, but there remains much scope for detailed research on both the ecology and diagenesis of the reefs; the Maltby reefs are particularly well suited for this purpose.

## Conclusions

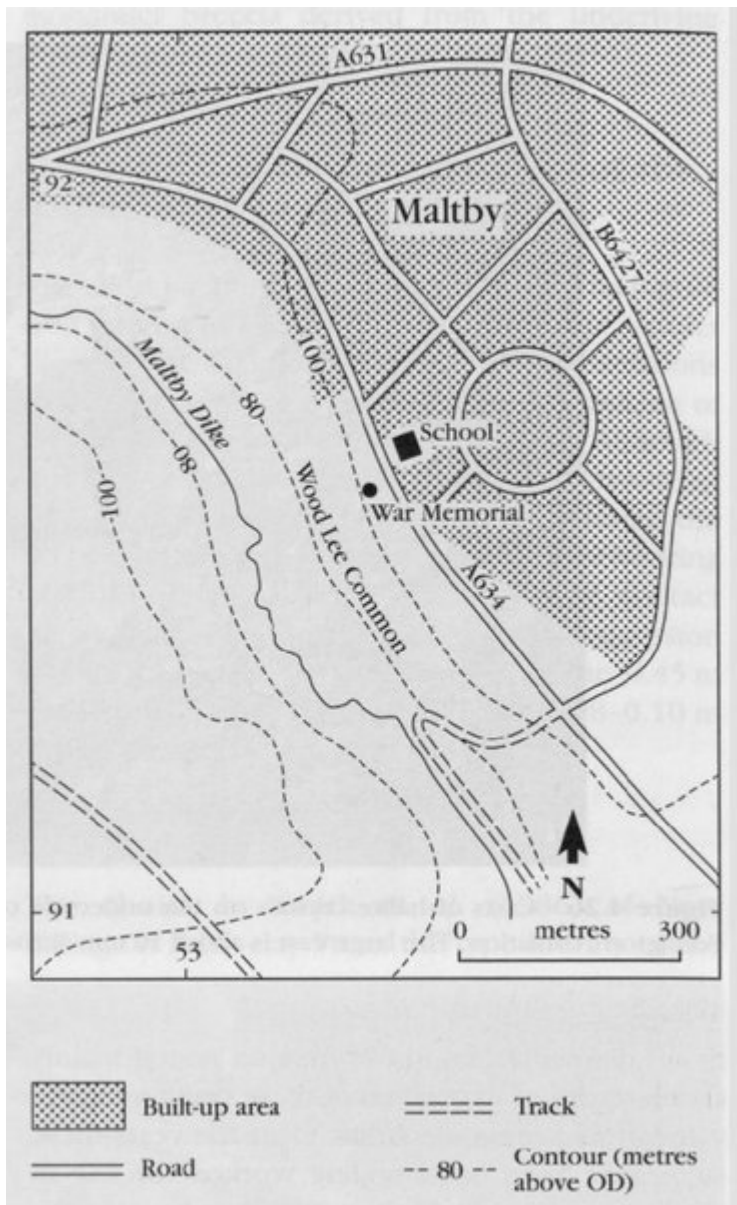
This site is one of the best localities for the study of bryozoan patch-reefs in the Cadeby Formation. Such reefs are seen in several localities in Yorkshire, notably Cadeby, Newsome Bridge and South Elmsall Quarries. The exposures at Wood Lee Common allow easy access, and as natural outcrops, have undergone differential weathering which has highlighted the internal structure of the reef. The exposures reveal that the reefs are mainly composed of dense masses of bryozoan-rich rock known as 'saccoliths', which are elongate structures that are piled one on another so as to impart a bedded appearance to the rock. The saccoliths are separated by irregular patches of shelly debris.

Although the number of reefs and their relationship to surrounding strata is not known at site, this locality is significant in that its well-developed weathering allows details of the reef to be studied which cannot readily be seen in the fresher quarry faces of most other patch-reef sites.

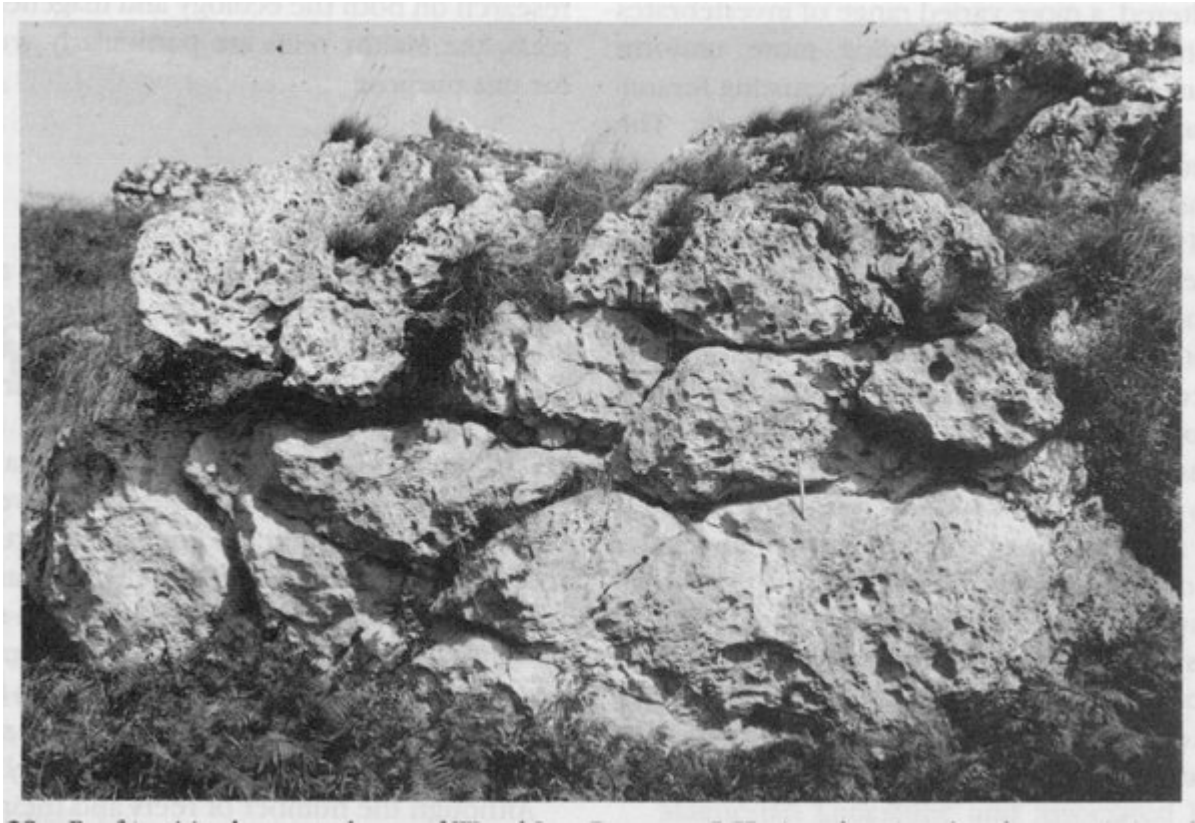
## References



(Figure 4.2) Approximate stratigraphical position of marine Permian GCR sites in the Yorkshire Province of north-east England (diagrammatic). Some sites cannot be shown on this line of section and have been omitted.



(Figure 4.27) Wood Lee Common GCR site, Maltby, South Yorkshire. Most of the reef tors are in the central and northern parts of the designated area.



*(Figure 4.28) Reef 'tor' in the central part of Wood Lee Common GCR site, showing the characteristic subdivision into 'saccoliths'. Hammer (centre-right): 0.33 m. (Photo: D.B. Smith.)*