Thrapston, Northamptonshire

[TL 000 776]

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Introduction

The quarry at Thrapston, also known as 'L.M.S. Railway Station Quarry', 'Thrapston Railway Station Quarry', 'Midland Railway Pit' and 'Excelsior Limestone Company's Pit', at Thrapston, Northamptonshire, formerly exposed a section ranging from the upper part of the Blisworth Limestone Formation to the basal part of the Kellaways Formation and thus included one of the few complete sections of the Cornbrash and Blisworth Clay formations in Northamptonshire; it is regarded as the type section of the latter (Figure 4.23). Sadly, the quarry is now largely infilled and remaining exposures (1998) are restricted to the Blisworth Clay and Cornbrash formations. Both the Blisworth Limestone and Cornbrash formations are very fossiliferous; the latter has yielded stratigraphically age-diagnostic ammonites. The Blisworth Limestone Formation is characterized by a locally rootleted horizon at the top. The Bathonian–Callovian stage boundary separates the Lower and Upper Cornbrash, and the site is therefore included in both the Bathonian and Callovian GCR blocks. The section was first described by Woodward (1894), at a time when an additional 2 m of the Blisworth Limestone Formation was visible at the base, although Vine (1893) had earlier described an important bryozoan fauna from this locality. Blake (1905), Douglas and Arkell (1932) and Page (1988) recorded the section in their researches on the Cornbrash Formation, and it was also noted by Taylor (1963), Torrens (1968b), Pittham (1970) and Cripps (1986).

Description

The following section is based on Douglas and Arkell (1932), Torrens (1968b), Cripps (1986) and Page (1988). Bed numbers are those of Douglas and Arkell.

	Thickness (m)
Kellaways Formation	
Kellaways Clay Member(Cayton Clay Formation of Page, 1989)	
7: Clay, blue	up to 1.2
Cornbrash Formation	
Upper Cornbrash	
5: Limestone, reddish-brown, soft, marly, fossiliferous with brachiopods, including *Microthyridina lagenalis* Douglas and Arkell *non* Schlotheim (abundant) and *Rhynchonelloidea cerealis* S.S. Buckman; bivalves (particularly myoids, pectinids and *Lopha marshii* (J. Sowerby)); echinoids (*Nucleolites*)*;* ammonites (*Macrocephalites*)*;* vertebrate remains; capped by layer of oysters (Bed 6) with *Lopha marshii* and *Liostrea undosa* (Phillips)	0.55
4: Limestone, hard, flaggy, calcarenite (*Thrapston Flags* of Douglas and Arkell); less fossiliferous than overlying bed but yielding bivalves, *Microthyridina sublagenalis* (Davidson) and *Macrocephalites*	0.9
3: Marl, impersistent; *M. sublagenalis,* occasional *Lopha marshii*	0–0.08

2: Pebble bed with clasts of assorted Cornbrash lithologies ranging from 'fresh' internal moulds of bivalves to rounded pebbles, many of which heavily bored and encrusted with serpulids, oysters, bryozoa and foraminifera (*Nubeculinella*); bivalves (including myoids (*Goniomya, Pholadomya, Pleuromya*), *Chlamys, Lopha, Modiolus, Plagiostoma, Protocardia,* trigoniids); gastropods; echinoids (*Holectypus, Nucleolites*); ammonite nuclei	0.15–0.3
Lower Cornbrash	
1: Limestone, grey, hard, shelly to white and chalky, shell-detrital, micritic; irregular thickness; ammonites (*Clydoniceras* including *C. thrapstonense* (Arkell)); brachiopods (*Cererithyris intermedia* (J. Sowerby), *Kallirhynchia yaxleyensis* (Davidson) and *Obovothyris grandobovata* S.S. Buckman); bivalves (*Ceratomya, Entolium, Meleagrinella echinata* (Wm Smith), *Modiolus, Pholadomya, Pleuromya, Pseudolimea, Pseudotrapezium, Protocardia,* trigoniids and other pectinids); also echinoids (*Holectypus, Nucleolites, Pygurus*); sharp base	0–0.13
Blisworth Clay Formation	
Clay, purplish, varicoloured, lithologically uniform, very poorly fossiliferous; layer of brown limonitic ironstone nodules at base	2.5
Blisworth Limestone Formation	
Limestone, finely shell-detrital, ooidal, shelly, micritic, with sporadic marl beds; bivalves predominant including *Anisocardia, Ceratomya concentrica* (J. de C. Sowerby), *Eocallista antiopa* (Thevenin), *Eomiodon angulatus* (Morris and Lycett), *Homomya gibbosa* (J. Sowerby), *Modiolus imbricatus* J. Sowerby, *Praeexogyra hebridica* (Forbes), *Pseudolimea duplicata* (J. de C. Sowerby) and *Pseudotrapezium cordiiforme* (Deshayes); also *Nucleolites*	*c.* 4.5

Interpretation

The shelly limestones of the Blisworth I.imestone Formation, at the base of the section, are thought to have been deposited in a marine, shallow-water, protected, carbonate lagoon in which a stable substrate favoured a flourishing, dominantly bivalve fauna. The sporadic marl beds indicate occasional influxes of clastic muddy sediment, derived presumably from the London Landmass to the east. The rootlets recorded in the uppermost 0.25 m of the formation indicate that a phase of emergence followed deposition of the Blisworth Limestone Formation, during which saltmarsh vegetation colonized the soft, exposed substrate. The occurrence of rootlets is of particular significance because they have been observed at this level at several localities in the East Midlands, reflecting the wide geographical extent of this emergent episode.

The succeeding marine transgression initiated deposition of the overlying, wholly clastic, argillaceous Blisworth Clay Formation. Its lithological uniformity suggests a persistently stable depositional environment. The bright, varied colours of the clay are presumed to be a consequence of varying states of oxidation of iron compounds and may be pedogenic; they are usually regarded as being indicative of a fluviatile origin and their deposition would seem to require an enclosed basin or lagoon into which open marine waters did not penetrate, except during the initial marine transgression (Taylor, 1963). This interpretation is substantiated by the investigations of Fenton (1980) who identified essentially non-marine palynofloras throughout the Blisworth Clay Formation at both Thrapston and nearby Irchester Old Lodge Pit (see GCR site report, this volume). This contrasts with the succession farther north at Oundle [TL 0335 8855] and Paston [TF 1902

0216] where diverse marine assemblages of Late Bathonian age were found in the basal beds. There, however, the formation is clearly regressive, for It is rootleted at the top. Thrapston offers one of the best exposures of the Blisworth Clay Formation in its most typical development and, following Cripps (1986, who named it the 'Thrapston Clay'), is taken as the formation's type section. Blisworth Rectory Farm (see GCR site report, this volume) itself is unsuitable as a type locality as it lies in the transition zone close to the limit of the facies. In addition, Sharp's (1870) original usage of the term at Blisworth Rectory Farm related to oyster-rich clays that may in part belong to the Blisworth Limestone Formation (Cripps, 1986).

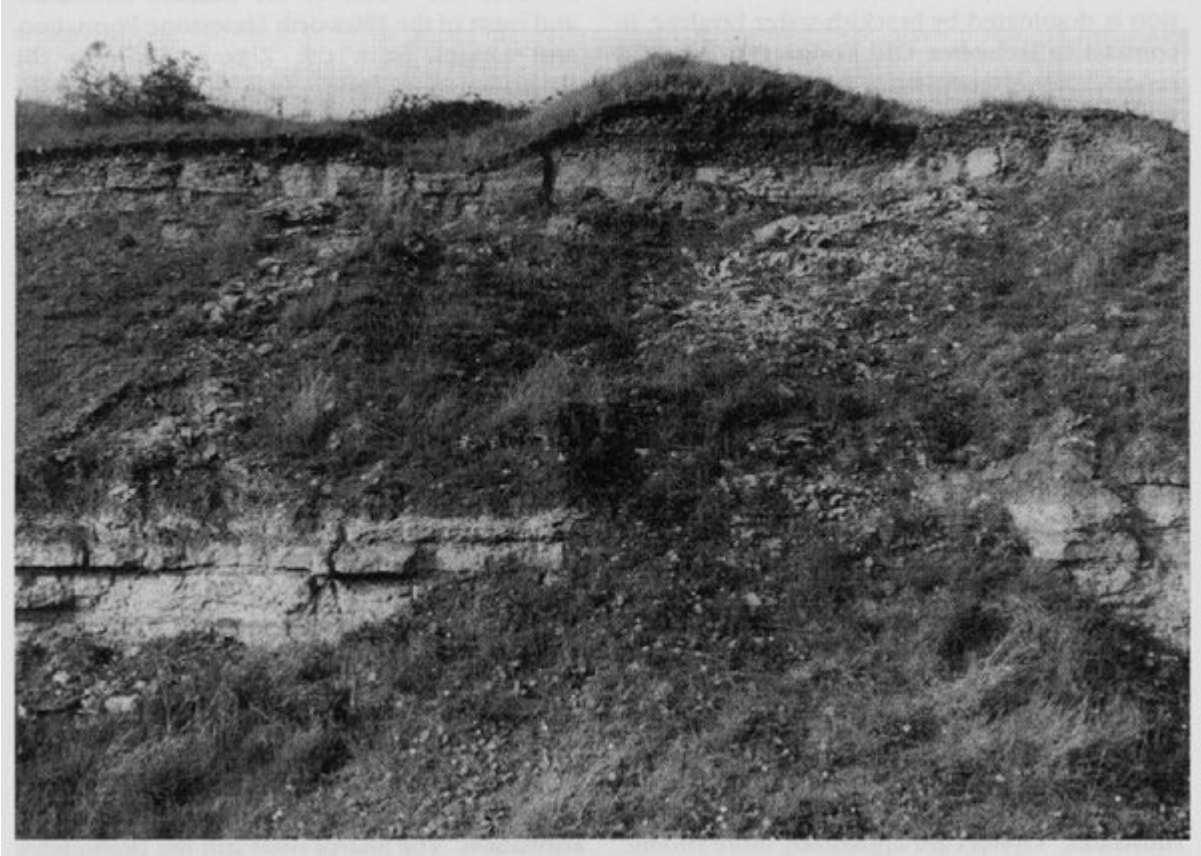
Deposition of the succeeding Lower Cornbrash followed a further major marine transgression. Its lithology is indicative of a shallow marine, carbonate shelf-environment in which current activity was relatively subdued. The fauna is typical of stabilized carbonate sands and is dominated by epifaunal and deep-burrowing organisms. In the quarry at Thrapston, the Lower Cornbrash is of variable thickness and only 0.13 m at most, probably because of pre-Upper Cornbrash erosion, a conclusion supported by the presence of a conglomeratic bed at the base of the Upper Cornbrash containing pebbles and fossils reworked from the Lower Cornbrash that are encrusted by serpulids, bryozoa and small oysters, and bored by bivalves.

The occurrence of the ammonite *Clydoniceras thrapstonense* in the Lower Cornbrash, together with the diagnostic brachiopods *Cererithyris intermedia* and *Obovothyris grandobovata,* serve to confirm that it belongs to the Upper Bathonian Discus Zone and Subzone. Rare *C. discus,* found anomalously in the basal pebble bed of the Upper Cornbrash, must be reworked from the Lower Cornbrash, to judge by their heavy encrustation. The ammonite nuclei with which they occur most closely resemble *Macrocephalites terebratus* (Phillips) transient p of Callomon *et al.* (1989) which indicates the Lower Callovian Herveyi Zone, Tere-bratus Subzone; this subzone is also indicated by *Macrocephalites* ex gr. *terebratus* (Phillips) in Bed 4. The presence in old collections of *Macrocephalites kamptus* transient y of Callomon *et al.* (1989) in a matrix typical of Bed 5 indicates that this bed belongs to the Kamptus Subzone, and the base of Bed 5 has been nominated by Page (1989) as an international reference section for the base of the subzone.

Conclusions

The section at Thrapston exposed a succession ranging from the upper part of the Upper Bathonian Blisworth Limestone Formation to the basal part of the Lower Callovian Kellaways Formation, including the Blisworth Clay and Cornbrash formations. The locality is particularly important for its exposure of the Cornbrash Formation, which has yielded an abundant and characteristic fauna, including age-diagnostic ammonites, and within which lies the Bathonian–Callovian stage boundary. The latter is highlighted by an erosional surface associated with a pebble-bed containing reworked, heavily encrusted and bored material derived from the Bathonian Lower Cornbrash; sediments of the Lower Callovian Herveyi Zone, Keppleri Subzone have been removed by the erosion. The section has been nominated as international reference section for the base of the Kamptus Subzone (Herveyi Zone) (Page, 1989). It is also an important reference section for the brachiopod biozones of the Upper Cornbrash, in an area once famous for its Cornbrash Formation fossils (cf. Blake, 1905). The type section of the underlying Blisworth Clay Formation exhibited the strikingly varicoloured but otherwise characteristically uniform lithology of this wholly non-marine formation in Northamptonshire, and the Blisworth Limestone Formation below features a locally developed rootlet bed at the top, demonstrating a transient emergent episode.

References



(Figure 4.23) The quarry at Thrapston showing the Cornbrash Formation overlying the grass-covered Blisworth Clay Formation with Blisworth Limestone Formation below. (Photo: British Geological Survey, No. A8361, 1949.))