Collyweston, Northamptonshire

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Introduction

Collyweston, in Northamptonshire, is renowned for a local development of fissile sandstone or sandy limestone, known as 'Collyweston Slate', within the basal beds of the Lincolnshire Limestone Formation. It has been exploited hereabouts since Roman times, but its extraction is now confined to Collyweston village itself, the type locality. Traditionally, quarrying took place only during December and January when the rock could be laid out to allow the winter frosts to split it along its natural cleavage (Figure 4.28). When first exploited, it was dug from opencast workings but subsequently (until 1964), it was mined from faces up to about 10 m long in underground tunnels or galleries running from the bottom of an open, *c.* 2.5 m^2 shaft. The slates are renowned for their durability, and have a pleasing colour (Arkell, 1947c). They tend to be larger and thinner than Stonesfield or Cotswold slates (other sources of Jurassic roofing material; see Stonesfield and Huntsman's Quarry GCR site reports, this volume), and a roof made from them is therefore relatively less heavy (Clifton-Taylor and Ireson, 1994). They can be seen on many local buildings (e.g. in the villages of Collyweston and Easton-on-the-Hill) as well as farther afield (e.g. on old college buildings in Cambridge, including the 1965 re-slating of the Master's Lodge of Trinity College; Purcell, 1967). In the 17th century, they were used widely in the town of Stamford, in place of thatch, in order to lessen the risk of the spread of fire. By the early 20th century, the industry was in decline partly for economic reasons but also because of a number of mild winters that prevented the frosting process. The main Collyweston Quarry — known as 'The Deeps' — is now a nature reserve leased to the Wildlife Trust for Northamptonshire by Burghley Estates (Johnson, 1994) but a section is still visible in an old shaft, known as 'Spall's Mine', which constitutes the GCR site. A new quarry, opened at Collyweston about 10 years ago by Bullimores Sand & Gravel Ltd, now provides a more accessible source of the slate. Although most of the production is used as aggregate and roadstone, about 0.01% goes into roofing which is still carried out by a few craftsmen (Anonymous, 1994).

Description

The following section is based on Ashton and Hudson (1979).

	Thickness (m)
Lincolnshire Limestone Formation	
6: Limestone, ooidal and peloidal, bioclastic	1.7
5: Limestone, sandy, peloidal; concretions in lower part	1.75
4: Limestone, bioclastic, ooidal; peloidal in basal part; basal erosion surface scouring down into underlying bed	0.8–0.9
3: Limestone, hard, brown, sandy, peloidal, forming roof of mine; pockets of shell debris and carbonaceous fragments; interburrowed junction at base	1.0–1.15
2: *Collyweston Slate:* Sandstone, fine- and very fine-grained, trough cross-bedded, calcareous; troughs broad (1–3 m) and shallow (up to 0.25 m); fossils, particularly bivalves (including *Gervillella, Meleagrinella, Pinna* and pectinids), quite common mainly in layers paralleling lamination within troughs	up to 0.5

1: Sandstone, soft, friable, yellow, fine grained, calcareous, weathering to loose sand with trough cross-beds containing large concretions (2.0 m x 0.20 m) in lower part, and pale and dark (carbonaceous) parallel laminae in upper part; some burrows	seen to 0.7

According to Ashton and Hudson (1979), beds 4–6 are rather poorly exposed in the shaft; the above description has been deduced from their graphic log. Woodward (1894), in a generalized section for Collyweston, described these upper beds as 0.9 m of sand with concretionary nodules and 'thin irregular slabs in undulating layers' overlain by 3.0–3.7 m of marly and 'oolitic' limestones with occasional sandy beds.

The fauna of the Collyweston Slate is abundant with bedding planes covered with fossils. Bivalves include *Astarte, Camptonectes, Ceratomya, Ctenostreon, Cucullaea, Entolium, Eopecten, Gervillella, Goniomya, Homomya, Isognomon, Lucina, Meleagrinella, Modiolus, Neocrassina, Oxytoma, Parallelodon, Pholadomya, Pinna* (the 'crow's beak' of the slate-workers), *Placunopsis, Pleuromya, Propeamussium, Protocardia, Pteroperna, Trigonia* and *Vaugonia,* of which *Gervillella acuta* (J. Sowerby) and *Trigonia compta* (Lycett) are particularly common. Gastropods include the rather rare *Phyllochilus bentleyi* (Morris and Lycett), known locally as the 'water-spider' (Woodward, 1894; Richardson, 1939b; Sylvester-Bradley, 1968; (Figure 4.29)). The belemnite *Belemnopsis bessina* (d'Orbigny) is also recorded, together with worm-tracks, burrows, fish and plant remains (Judd, 1875). An extensive species list is given in Woodward (1894). However, the fauna lacks the insects, crustaceans, reptiles and mammals that are found amongst the otherwise similar fauna of the slates at Stonesfield (see GCR site report, this volume) (Brodie, 1850).

Interpretation

The lithostratigraphical position and age of the Collyweston Slate have been the subjects of discussion but there now seems to be general agreement about both. The lower part of the Lincolnshire Limestone Formation becomes progressively more sandy and shows a downward passage into the Grantham Formation. The Collyweston Slate occurs in this lithological transition (called the 'Collyweston facies' by Ashton and Hudson, 1979) where there are indurated sandy layers and concretionary masses within a variable sequence of alternating sand and sandy limestone. The more massive and fissile of these concretionary masses are the Collyweston Slate which hereabouts varies from less than 0.1 m up to about 1 m in thickness (Purcell, 1967). The current view is that the Collyweston Slate belongs in the basal division of the Lincolnshire Limestone Formation (near the southern limit of that formation) as a lateral facies variation within the Sproxton Member of Ashton (1980) or the Blue Beds of Richardson (1939b). According to Ashton and Hudson (1979), the yellow sands of Bed 1 are elsewhere seen to pass laterally into typical, well-cemented Collyweston Slate; they therefore belong to the 'Collyweston facies' of the Lincolnshire Limestone Formation rather than the underlying Grantham Formation. Elsewhere, interdigitation of the respective facies of these two formations has been recorded (Ashton and Hudson, 1979). Throughout the 'Collyweston facies', the degree of cementation varies with friable quartz sand passing into hard, calcareous sandstones and sandy peloidal limestones. Selective decalcification has also affected the lithologies. Differential cementation produces a spectacular range of concretions including those known locally as 'potlids' (Ashton and Hudson, 1979).

Although molluscs are otherwise well represented in the fauna, ammonites, as in many parts of the Lincolnshire Limestone Formation, have not been recorded. Age dating in terms of the standard ammonite-based chronostratigraphy is therefore speculative. Above the Collyweston Slate, the Greetwell Member of Ashton (1980) (the Little Ponton Beds of Kent (1941)), which overlies the Sproxton Member (Blue Beds) in south Lincolnshire, has yielded an ammonite fauna indicative of the Lower Bajocian Discites Zone. The nearest ammonite fauna from below occurs, beneath the largely non-marine Grantham Formation, in the Northampton Ironstone, where the basal Aalenian Opalinum Zone is indicated. However, farther afield, in the Cotswolds (see Chapter 3), the Harford Member of the Birdlip Limestone Formation (Inferior Oolite Group) is of a similar facies to the Grantham Formation, and a correlation between the two suggests itself. The Harford Member is assigned to the uppermost Aalenian Concavum Zone (see Harford Cutting and Jackdaw Quarry GCR site reports, this volume). On this basis, the Collyweston Slate could therefore be of very latest Aalenian age or, more likely, of earliest Bajocian (Discites Zone) age. The fossil content suggests a shallow marine environment, and the

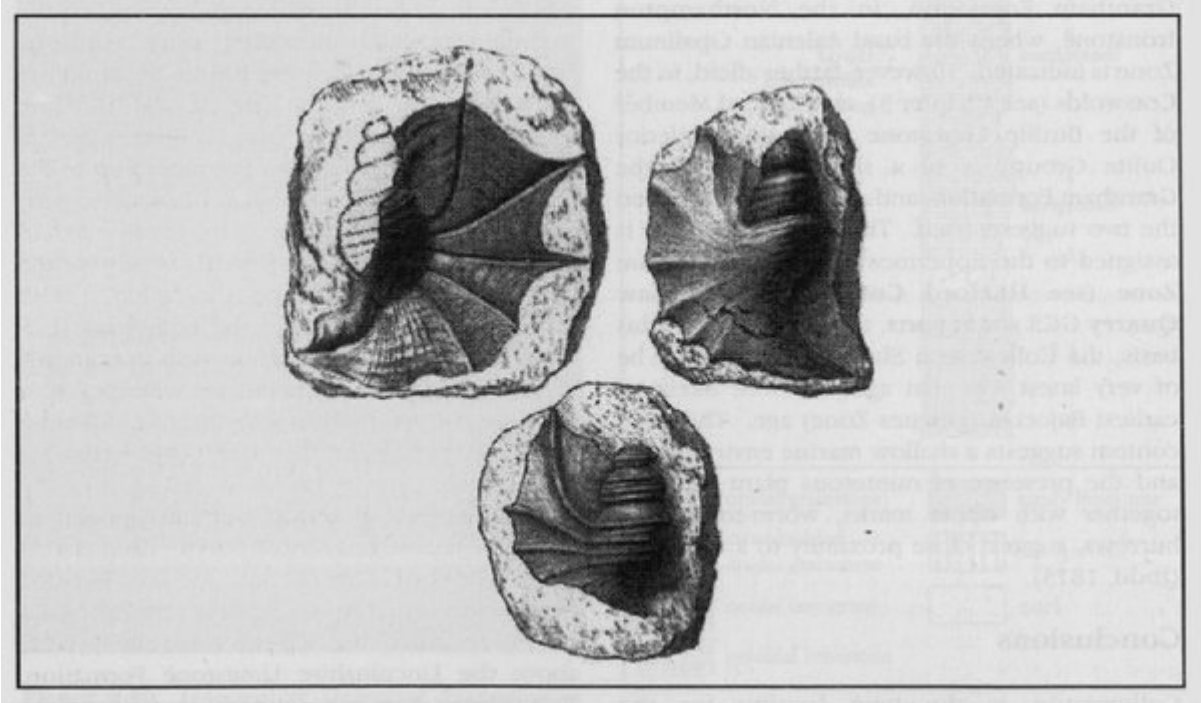
presence of numerous plant remains, together with ripple marks, worm-tracks and burrows, suggest close proximity to a shoreline (Judd, 1875).

Conclusions

Collyweston is the type locality for the Collyweston Slate, and the only site where this unusual facies of the basal Lincolnshire Limestone Formation occurs and is still worked. The range of lithologies within the 'Collyweston facies' is as much a function of diagenesis as original depositional environment although its stratigraphical relationships and diverse array of sedimentary structures testify to a complex palaeoenvironment. In recent years, planning authorities, conservation officers, English Heritage, the National Trust, and discerning individuals are keeping alive the demand for natural stone as a roofing material of which the Collyweston Slate is a fine example. The site also has historical interest as it gives some insight into the traditional methods of slate extraction.

References

(Figure 4.28) Collyweston Slate workings showing slates stacked before trimming and slabs laid out for 'frosting'. (Photo: British Geological Survey, No. A8333, 1949.))



(Figure 4.29) The gastropod Phyllochilus bentleyi (Morris and Lycett) which is known locally as the Collyweston 'water-spider'. (Reproduced from Morris and Lycett (1851–1855, pl. 3, figs 15, 15a,16) courtesy of the Palaeontographical Society.) All natural size.)