Irchester Old Lodge Pit and Irchester Country Park, Northamptonshire

[SP 914 649], [SP 915 657]

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Introduction

Irchester Old Lodge Pit, near Wellingborough, Northamptonshire, exposed a Bathonian section extending from the top of the Northampton Sand Formation (worked for ironstone; (Figure 4.17)) up into the Blisworth Clay Formation, and was one of the few complete Blisworth Limestone Formation sections in Northamptonshire (see (Figure 4.14)). It included the Rutland Formation, displaying rhythmic depositional units, each with a capping rootlet bed; in the Wellingborough Member, laminated algal limestones are also of special interest. The Blisworth Limestone Formation at the site is characterized by a variety of carbonate limestone lithofacies, some richly fossiliferous; the Sharpi Beds at its base are of regional correlative significance. Cross-bedded calcarenites in the succession displayed interesting sedimentary structures. The quarry has been recorded by Torrens (1967), and in unpublished theses by Ferguson (1972), Pittham (1970), Bradshaw (1978) and Cripps (1986). The quarry is now entirely backfilled and restored to agriculture but comparable sections exhibiting most of the succession can be seen in Irchester Country Park, immediately to the north [SP 915 657] (Sutherland and Hudson, 1982).

Description

The following composite description of the Irchester Old Lodge Pit section is based on Torrens (1967), Bradshaw (1978) and Cripps (1986). Bed numbers in the Blisworth Limestone Formation are those of Torrens (1967).

	Thickness (m)
Blisworth Clay Formation	
Clay, dark-blue, with a basal ironstone nodule bed	2.0
Blisworth Limestone Formation	
26: Limestone, argillaceous, shell-detrital, micritic, rubbly; locally with rootlets; *Aphanoptyxis bladonensis* Arkell common in places	0.40
25: Marl, passing down into soft marly limestone; abundant *Praeexogyra hebridica* (Forbes)	0.23
19–24: Limestone, white, shell-detrital, ooidal in part, with marly bands; ripple cross-laminated in upper part	0.9–1.6
18: Limestone, white, shelly, with abundant *Epithyris* and *Stiphrothyris*	0.23
16–17: Limestone, detrital, shelly; marl parting at base; *Anisocardia, Modiolus*	0.53
14–15: Limestone; cross-bedded, ooidal calcarenite; *Nucleolites* and *Hemicidaris* in lower part; sharp, undulating base with overhang	1.3
10–13: Limestone, laterally very variable; comprising shelly, bioturbated, micritic and finely shell-detrital limestones with marly limestone beds; diverse fauna including brachiopods (*Epithyris*), bivalves (*Anisocardia, Bakevellia, Modiolus, Praeexogyra*), and echinoids (*Clypeus, Nucleolites*)	0.8–2.2
9: Limestone, hard, massive, forming prominent overhang; many bivalves including *Astarte, Pseudolimea, P. hebridica, Vaugonia;* basal erosion surface	0.6

Sharpi Beds	
1–8: Interbedded bluish-grey-weathering, calcareous mudstone, marl and argillaceous, shell-detrital, micritic limestone; common *Kallirhynchia sharpi* Muir-Wood; also *Modiolus imbricatus* J. Sowerby and *P. hebridica*	2.4–2.8
Rutland Formation	
6b: Clay, dark-green, silty, carbonaceous, with rootlets; convoluted basal contact	0.5
6a: Clay, pale-green-weathering, silty; passing down into varicoloured, finely laminated silt and clay	0.2
5: Clay, green, with rootlet bed at top	1.6
4: Sandstone, fine grained, calcite-cemented, quartzose, bioturbated, with trace fossils (*Rhizocorallium, Planolites*); passing down into irregularly laminated sand and silty clay	1.2
Wellingborough Member	
3: Limestone, fine- to coarse-grained, sandy, shell-detrital, wavy and ripple cross-laminated, interbedded with contorted, very finely laminated, peloidal, micritic and finely detrital limestone (algal laminite of Bradshaw, 1978); limestones commonly channelled by coarse-grained, large-scale, trough cross-bedded, shell-fragmental limestone with foresets picked out by clasts of algal laminite	1.0
2: Mudstone, silty; with beds of current-rippled, laminated, fine-grained, shell-detrital, quartzose sandstones with groove casts	1.7
Stamford Member	
Clay, sandy, very carbonaceous, with abundant rootlets and well-preserved leaf fragments; greenish clay and sand with rootlets at top	4.0

Interpretation

The substantial non-sequence beneath the Rutland Formation indicates a period when either the area was emergent or during which erosion removed any deposits above the Northampton Sand Formation. The basal sandy clays of the Stamford Member, in which there is an abundance of plant debris and rootlets, have been interpreted as the swamp deposits associated with coastal-plain lakes, which later coalesced as a marine transgression raised the sea level (Bradshaw, 1978). However, freshwater conditions were maintained by a high input of water from the London Landmass. The remainder of the formation in the East Midlands comprises a succession of rhythmic, depositional, regressive units, each of which was initiated by a marine transgression and terminated by coastal progradation, the latter associated with a rootlet bed, indicating salt-marsh conditions. In the Irchester area, only the Wellingborough (beds 2–5) and Cranford (beds 6a-6b) rhythms are represented. The diverse marine fauna of the former indicates the increasingly open marine conditions in which, to the south-west, in Oxfordshire, the coeval Taynton Limestone Formation was formed. At Irchester Old Lodge Pit, marine limestones (Bed 3) in the Wellingborough Rhythm represent the Wellingborough Member at more-or-less its eastern limit. The clays at the top of the Cranford Rhythm have been interpreted as a widespread storm deposit.

The deposition of the Blisworth Limestone Formation represents a resumption of carbonate deposition as a more extensive marine transgression restricted the input of terrigenous sediment and introduced a more diverse, fully marine fauna. The fossils are dominantly epifaunal and restricted to the micritic and finely detrital limestones and marls, which were laid down in relatively quiet waters. The contortion of the algal, laminated micrites is thought to have been the result of the injection of bioclastic sand caused by compaction or by sudden dewatering of the sediment. The coarser, cross-bedded calcarenites (beds 14–15, 19–24) are poorly fossiliferous and represent mobile sand-banks, formed in

more turbulent, current-dominated conditions. The Blisworth Clay Formation indicates a return to the deposition of wholly terrigenous fine-grained sediment in quiet, low-energy waters.

The Rutland Formation yields no age-diagnostic fossils, but correlation with the Cotswolds succession, based on regionally persistent rhythmic units (Wyatt, 1996a,b), indicates that it ranges from the Lower Bathonian Zigzag Zone up to the Middle Bathonian Progracilis Zone. However, gaps in the sequence at Irchester Old Lodge Pit are indicated by the absence of the Ketton, Clipsham, Casterton and Finedon rhythms (Bradshaw, 1978).

The Sharpi Beds at the base of the Blisworth Limestone Formation are assigned to the Morrisi Zone by correlation with the Excavata Bed of the White Limestone Formation in Oxfordshire (see Ardley Cuttings and Quarries GCR site report, this volume); the occurrence of *Aphanoptyxis excavata* Barker in the Sharpi Beds of Roade Railway Cutting (see GCR report, this volume), near Northampton, corroborates this interpretation. The remainder of the Blisworth Limestone Formation (the Irchester Member of Cripps, 1986) correlates with the Ardley Member of the White Limestone Formation in Oxfordshire and probably belongs to the Retrocostatum Zone, with the Bremeri Zone unrepresented. The presence of *Aphanoptyxis bladonensis* Arkell in the uppermost rootleted bed of the Blisworth Limestone Formation in Irchester Old Lodge Pit supports this dating; this bed is probably coeval with the Bladonensis Bed in Oxfordshire, which caps the Ardley Member there. The overlying Blisworth Clay Formation, formerly considered to be equivalent to the Forest Marble Formation of Oxfordshire, is now known to incorporate beds coeval with the Bladon Member of the White Limestone Formation and so the lower part of the Blisworth Clay Formation probably belongs to the Retrocostatum Zone.

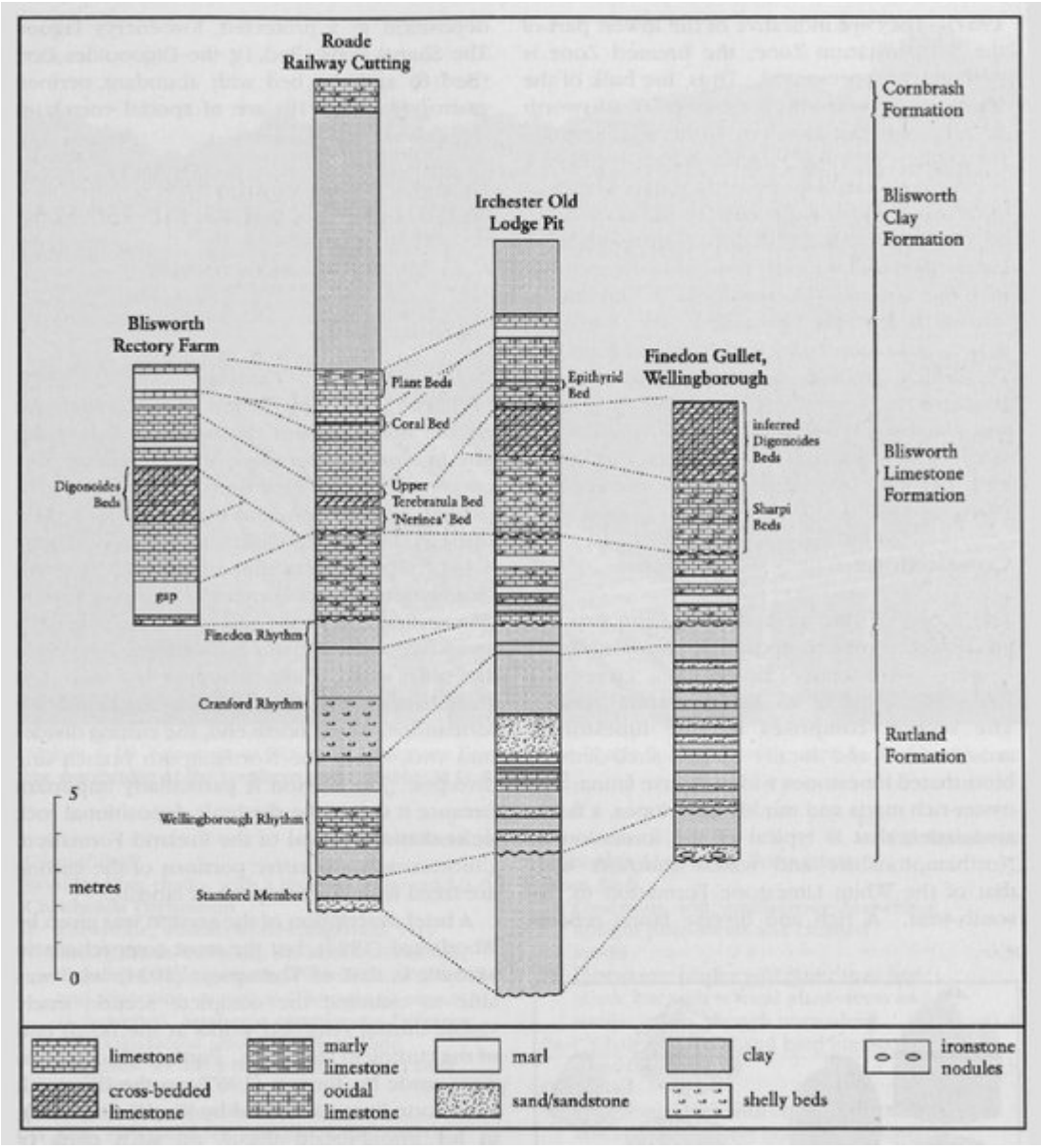
In the absence of the diagnostic brachiopod, the Digonoides Beds have not been recognized at this site. However, beds 14 and 15 of the recorded section are lithologically comparable to the Digonoides Beds elsewhere, including those in nearby New Lodge Pit [SP 907 650], and so may tentatively be assigned to the unit. If so, some 8 m of beds have been cut out in the latter pit, where the Digonoides Beds rest directly on the Sharpi Beds.

Conclusions

Irchester Old Lodge Pit exhibited an almost complete Bathonian succession (Zigzag to Retrocostatum zones), lacking only the upper part of the Blisworth Clay Formation and the Lower Cornbrash. It included the Rutland Formation, characterized by rhythmic depositional units capped by rootlet beds, of which the Wellingborough Rhythm contained marine limestones (Wellingborough Member) at more-or-less their easterly limit. Non-sequences are indicated by the absence of rhythmic units known elsewhere in the East Midlands. The Blisworth Limestone Formation commences with the Sharpi Beds, but no strata yielding *D. digonoides* are known at this site. However, the presence of a lithological correlative of the Digonoides Beds may be inferred. Of particular interest is the record of *Aphanoptyxis bladonensis* in the topmost rootleted limestone bed of the formation, which may be correlated with the Bladonensis Bed of Oxfordshire, where it caps the Ardley Member of the White Limestone Formation. The pit also displayed a variety of cross-bedding and associated structures in the calcarenite units.

References

(Figure 4.17) Irchester Old Lodge Pit; general view of former ironstone pit showing bared bed of ironstone (Northampton Sand Formation) and overburden of Grantham, Rutland and Blisworth Limestone formations. (Photo: British Geological Survey, No. A8194, 1945.))



(Figure 4.14) Correlation of GCR sites between Blisworth and Wellingborough (Blisworth Rectory Farm, Roade Railway Cutting, Irchester Old Lodge Pit and Finedon Gullet).)