THE JURASSIC ROCKS BETWEEN ANCASTER AND LINCOLN

Leader: A.M. Honeyman — Sunday, 8th June, 1969

The purpose of the excursion was to examine the Jurassic succession exposed in quarries in the vicinity of Ancaster and northwards towards Lincoln. The stratigraphical divisions are as follows:-

GREAT OOLITE SERIES	GREAT OOLITE LIMESTONE UPPER ESTUARINE SERIES		Feet 5+ 25 - 30
INFERIOR OOLITE SERIES	LINCOLNSHIRE LIMESTONE	Lincoln area / Ancaster area Ancaster Rag	8 - 18
		Hibaldstow Beds = Ancaster Beds	
		(coral bed) Ancaster Freestone	15 - 20
		Crossi Bed (absent at Ancaster)	12 - 0
		Cementstones	12 - 20
		Silver Beds - Little Ponton Beds)	
		Blue Beds)	10 - 20
	LOWER ESTUARINE SERIES NORTHAMPTON IRONSTONE		0 - 7 6 - 12
LIAS	UPPER LIAS	Upper Lias clays and shales	100
	MIDDLE LIAS	Marlstone Rock-bed (South of Leadenham)	0 - 15
		thin ironstone beds at Lincoln	
		Middle Lias Clays	35 - 60
	LOWER LIAS	Upper Clays of Lower Lias	50+

For further detail of the various divisions the reader is referred to the relevant chapters in Sylvester-Bradley and Ford (1968) and to the excellent review by Kent (1966) of the Lincolnshire Limestone.

The excessively wet weather which had made a quagmire of much of the countryside during May had at last given way to a dry sunny spell. On the journey from Nottingham via Grantham to Ancaster, advantage was taken of the exceptionally good visibility to make a few brief stops to view the main topographical features and their relationship to the geology, in particular the prominent escarpment formed by the Marlstone Rock-bed in the vicinity of Grantham.

In the area just south of Ancaster quarries were visited as follows:-

Gregory's Quarry (SK 992410), about 2 miles south of Ancaster, is the only quarry in this area at present working the Lincolnshire Limestone as a building stone. The stone is quarried after removal of an overburden of clays belonging to the lower part of the Upper Estuarine Series. Members first examined the Ancaster Beds and noted the contrast between the massive oolitic freestones, the true Ancaster stone, and the overlying strongly cross-bedded shelly limestones known as the Ancaster Rag, here about 8 feet thick. Formerly the Rag was not used, being removed and dumped on spoil heaps, but it is now sold for building purposes although less valuable than the freestone. In places the blue colour of the unweathered stone was observed and an additional colour effect was given by the patchy pink staining of the upper layers of the limestone. This was seen to be due to the presence of irregular nodular lumps of haematitic ironstone, which overlie the limestone and mark the base of the clays of the Upper Estuarine Series. Much of the detail of the clay succession was obscured by sludge and slipped material. Fossils found were mainly bivalves, Liostrea hebridica being abundant.

The party then walked to the nearby Thompson's Quarry (SK 992409) now disused and much overgrown, to examine the highest beds of the Upper Estuarines and basal beds of the Great Oolite Limestone. Near the top of the clays is a prominent hard band with Liostrea hebridica. The few feet of rubbly limestones and marls exposed along the top of the quarry belong to the Great Oolite Limestone; these are highly fossiliferous but collecting in situ involved finding and retaining a foothold on the steep quarry face. Fallen blocks in the floor of the quarry provided a less hazardous means of collecting. The commonest fossils are bivalves, e.g. Liostrea, Modiolus and Pholadomya, and the brachiopods Epithyris and Kallirhynchia sharpi, the latter being diagnostic of the base of the Great Oolite Limestone.

The next locality visited was Copper Hill Quarry (SK 979427), about half a mile south of Ancaster, which exposes a succession from the Cementstones to the Ancaster Rag. The upper level of the quarry was examined first and the coach delivered the party directly on to its most striking feature, namely the hard, almost white and slightly undulating erosion surface which marks the top of the Ancaster Freestone. Quarrying operations are facilitated by the hardness of this surface and it has been laid bare over a considerable area by the scraping off of the overlying Ancaster Rag. The Rag here is seen to a thickness of about 15 feet; it is strongly cross-bedded and contains much shell debris and spines of the echinoid Cidaris. In the southwest corner of the quarry fossils were collected from the hardened top of the freestones; these included Liostrea, Plagiostoma, small terebratuloid brachiopods and Cidaris spines. The beds beneath this level were then examined in the lower part of the quarry; the 5 feet of thinly bedded pale coloured limestones seen at the base presumably belong to the Cementstone division of the Lower Lincolnshire Limestone. These are succeeded abruptly by the oolitic Ancaster Freestones, here too thinly bedded and closely jointed to be used as a building stone. The Crossi Bed (named from the spinose rhynchonelloid Acanthothyris crossi), which occurs at the top of the Cementstones in other areas, is missing at Ancaster probably as a result of local erosion. The coral bed mentioned in the table above is seen only in the Castle Quarry (SK 987434), which was not visited on this excursion.

From the roadside near the entrance to Copper Hill Quarry, a good view was obtained northwards across the broad valley of the Ancaster Gap, now without any through drainage. The origin of the gap as a pre-glacial west to east course of the Trent River, and its abandonment at some time during the complex glacial history of the region, were briefly outlined.

Lunch was taken at the Railway Inn, Ancaster, recently renovated inside and providing amenities and comfort hardly hinted at by its rather drab exterior. Our feet were clean on this occasion; excursion leaders are apprehensive of the reaction of landlords to the advance of forty or so pairs of muddy boots over carpets and polished floors.

A pleasant after-lunch drive a few miles northwards along Ermine Street brought us to the Leadenham Stone Quarry (SK 962522) in which the Lower Lincolnshire Limestone is worked for limestone aggregate. Here, in the early 1920's, the Northampton Ironstone was extracted by open cast working, but little can now be seen of the beds beneath the Lincolnshire Limestone. At the western end of the quarry a cutting through the woods marks the route by which ironstone was transported some quarter of a mile to the railway at Leadenham. In the cutting, the base of the limestone was seen above 6 feet of sands and clays of the Lower Estuarine Series. The ironstone is not exposed, but blocks showing the characteristic box structure were found at the western end of the cutting. At this spot, the party enjoyed superb views along the Lincoln Cliff to Lincoln Cathedral and westwards over Leadenham to Newark and the Trent Valley, the course of which northwards to the Humber was clearly indicated by the line of distant power stations.

In the main quarry the sequence in the Lower Lincolnshire Limestone was examined, in ascending succession Blue Beds, Silver Beds and Cementstones. The Blue Beds (so called from the colour of the fresh unweathered stone) are brown weathering ferruginous limestones, contrasting with the paler oolitic Silver Beds. The Cementstones, light coloured fine-grained limestones with scattered ooliths and marly partings are well exposed in the present working faces in the higher level of the quarry. A varied fauna is present, but fossils have to be sought for assiduously and it is not easy to make an extensive collection during a brief visit. Bivalves are the commonest fossils, Gervillella acuta in the Silver Beds, Pholadomya and Pinna cuneata in the Cementstones, the latter occurring in bands and in their life attitude, pointed umbones downwards. Gastropods also occur, the commonest being high-spired nerineids.

The excursion continued northwards towards Lincoln to see the Liassic rocks exposed in the well known brick pits at Waddington and Bracebridge, both still actively worked by the Lincoln Brick Company. The Waddington Station Pit (SK 967652) displays the upper part of the Lower Lias (Prodactylioceras davoei Zone), here consisting of stiff dark clays with bands of septarian nodules. In the clays the fossils are usually crushed and difficult to collect but the large tip of discarded nodules near the entrance to the pit provided good hunting for ammonites. Species of Androgynoceras are the commonest; Liparaceras, Oistoceras and the zonal fossil P.davoei also occur. Belemnite guards are common and phragmocones may be found in an excellent state of preservation. The tip heap also contains lumps of shelly limestone crowded with bivalves, e.g. Liostrea, Oxytoma and Plagiostoma.

The highest beds now visible at Waddington belong to the Middle Lias, which is more fully exposed in the Bracebridge Pit (SK 971672) on the southern outskirts of Lincoln. This vast pit is now being used as a refuse dump, but fortunately it is still being extended and deepened at its northern end. In recent years clays for brick-making have been dug intermittently from three different levels which conveniently correspond approximately to Lower, Middle and Upper Lias. Time permitted only a rapid examination of these divisions. In the lowest level clays with Androgynoceras, similar to those at Waddington, were seen. The Middle Lias may be recognised by the presence of thin beds of brown ironstone which provide a striking colour contrast with the blue-grey clays and shales. It was noted that the Middle Lias hereabouts reveals no sign of the Marlstone Rock-bed, which is present south of Leadenham. Small crushed amaltheid ammonites were found in the clays. Howarth (1958) showed that almost the whole of the Middle Lias at Bracebridge is in the Amaltheus margaritatus Zone, the higher Pleuroceras spinatum Zone (which further south includes the Marlstone) possibly being present but no more than a foot or so thick. A final scramble up the steep slope at the top of the quarry was required to reach the lowest beds of the Upper Lias, which here consist mostly of very fissile paper shales. The parting planes of these shales are crowded with tiny crystals of selenite showing radiating habit. The commonest ammonite at this horizon is Tiltoniceras acutum.

The party then rejoined the coach and returned to Nottingham via Newark. The excursion was attended by 43 members and on their behalf the leader wishes to thank Mr. Lee of Quarry Farm, Ancaster, The Castle Lime Company, Messrs. C.A.E.C. Howard and the Lincoln Brick Company for permission to visit the various localities.

A.M.H.

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