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# Sproxton Quarry, Leicestershire

[SK 864 253]

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## Introduction

Sproxton Quarry, in Leicestershire, approximately 12 km south-west of Grantham in adjoining Lincolnshire, is an abandoned and partially flooded ironstone quarry (Figure 4.37) that provides one of the more complete sections through the Northampton Sand, Grantham and lower part of the Lincolnshire Limestone formations (Figure 4.38). It was excavated to work the Northampton Sand Formation, which was formerly in demand as an iron ore, albeit of rather low grade (see Hollingworth and Taylor, 1951). The iron ore was worked from long, linear faces, the considerable overburden (up to 20 m or more in thickness) was dumped alongside, and the land restored as working progressed. The remaining face, much of which is precipitous, is some 400 m long and up to about 12 m high. The quarry is one of several former ironstone workings at Sproxton, one of which was described by Richardson (1939b).

## Description

Whilst the section described by Richardson (1939b) may have been some distance from the current one, it is nonetheless representative, and is depicted in (Figure 4.38). The complete section that has been revealed at Sproxton Quarry is Lincolnshire Limestone Formation (seen to c. 17 m) overlying Grantham Formation (3.8 m) overlying Northampton Sand Formation (seen to 5.2 m).

Only the uppermost part of the Northampton Sand Formation is currently visible, forming a narrow platform just above water level at the north-western end of the site; to the south-east, it dips beneath the water. Richardson (1939b) reported that the total thickness of the Northampton Sand Formation (which rests on the mudstones of the Lias Group) was 7.0 m, of which some 4.9 m were visible in the 1960s (Sylvester-Bradley, 1968). When fresh at depth, the formation is dominated by sandy, berthierine-oid-bearing limestone, but at outcrop it oxidizes to a rust-brown sandstone with an extensive development of limonite, which forms concentric shells around cores of less weathered material. The weathering processes tend to destroy any fossils, although poor moulds of bivalves and brachiopods may be found.

The outcrop of the succeeding Grantham Formation is concealed by rubble from the overlying Lincolnshire Limestone Formation, although small exposures may become visible in places from time to time. The Grantham Formation, 3.8 m thick, comprises non-marine and paralic sediments that often exhibit cyclicity. The lower part is dominated by sands, and the upper part by mudstones, the lowest bed of which (Bed 14 of Richardson, 1939b) is a variegated, unfossiliferous, seatearth-like clay. The succeeding beds 12 and 13 are dark shales with silty laminae, which belong to the Stainby Member of Kent (1975), who recorded sections in quarries [SK 867 248]; [SK 873 248] just to the south of the GCR site. In contrast to the rest of the Grantham Formation, the Stainby Member, developed throughout much of mid Lincolnshire, is of marine origin, and often contains abundant bivalves such as *Aviculopecten*, *Modiolus* and *Pholadomya*. The uppermost bed (Bed 11) of the Grantham Formation comprises sands and interbedded clays.

Richardson (1939b) reported only 6 m of Lincolnshire Limestone Formation (Figure 4.38) but Ashton (1980) recorded a more complete section, amounting to at least 17 m and spanning almost the whole of the Lower Lincolnshire Limestone (including his Middle Lincolnshire Limestone). The lowermost c. 2 m (beds 8–10, i.e. Richardson's (1939b) 'Blue Beds') comprise the Sproxton Member of Ashton (1980), which is dominated by grey, fine-grained sandy, micritic limestones. The succeeding c. 12 m of strata were assigned to the Greetwell Member by Ashton (1980). The member is dominated by peloidal and ooidal packstones within which, according to Ashton (1980), a succession of four sedimentary rhythms can be recognized (in ascending order, the Market Overton, Thistle-ton, South Witham and Woolfox beds). The top of each 'rhythm' is defined by an eroded surface, succeeded by well-sorted, ooidal grainstones. The topmost 'rhythm', the Woolfox Beds, includes white to buff wackestones and beds of marly clay, better seen in the nearby South Main Quarry

[SK 865 247] (Sumbler, in manuscript).

The highest part of the Lincolnshire Limestone Formation seen at Sproxton Quarry, and exposed at the south-eastern end of the site, belongs to Ashton's (1980) Lincoln Member, which comprises several sedimentary rhythms, each commencing with ooidal grainstones that pass up into lower-energy packstones and wackestones (see Castle Bytham GCR site report, this volume).

At the northern end of the section, there is an additional feature of geological interest. The entire Lincolnshire Limestone Formation is cut out by a Mid Pleistocene pre-glacial valley now filled with till and partially cemented boulder gravel; the Lincolnshire Limestone Formation is cambered into this valley and the underlying Northampton Sand Formation exhibits a valley-bulge structure.

## Interpretation

The seatearth-like clay (Bed 14) at the base of the mudstone-dominated upper part of the Grantham Formation was probably laid down in a marsh environment. Its base is highly carbonaceous; this may represent an incipient coal seam developed from the vegetation that grew on the hardened and ganister-like top of Bed 15, which shows abundant vertical roots. The uppermost bed (Bed 11) of the Grantham Formation was included with the Lincolnshire Limestone Formation by Richardson (1939b).

Within the Lincolnshire Limestone Formation, the beds of Ashton's (1980) Sproxton Member, of which Sproxton Quarry is the type locality, probably equate with the Collyweston Slate of the Stamford district (see Collyweston GCR site report, this volume). A 0.3 m-thick, dark-grey shaly clay at the top of the succession has been noted in several other sections in the Sproxton area, and as far north as Copper Hill (see GCR site report, this volume). Ashton (1980) designated Sproxton Quarry as a primary reference section for his Greetwell Member because the succession hereabouts differs from that in the member's type area (see Greetwell Quarry GCR site report, this volume). An impression of the ammonite *Graphoceras* (*Ludwigella*) from the basal bed of this member (Bed 7 of Richardson, 1939b; (Figure 4.38)) is consistent with the Lower Bajocian Discites Zone to which the member in its type area belongs (Ashton, 1977). The Woolfox Beds, which constitute the top part of the Greetwell Member, are reminiscent of the correlative Leadenham Member of central Lincolnshire.

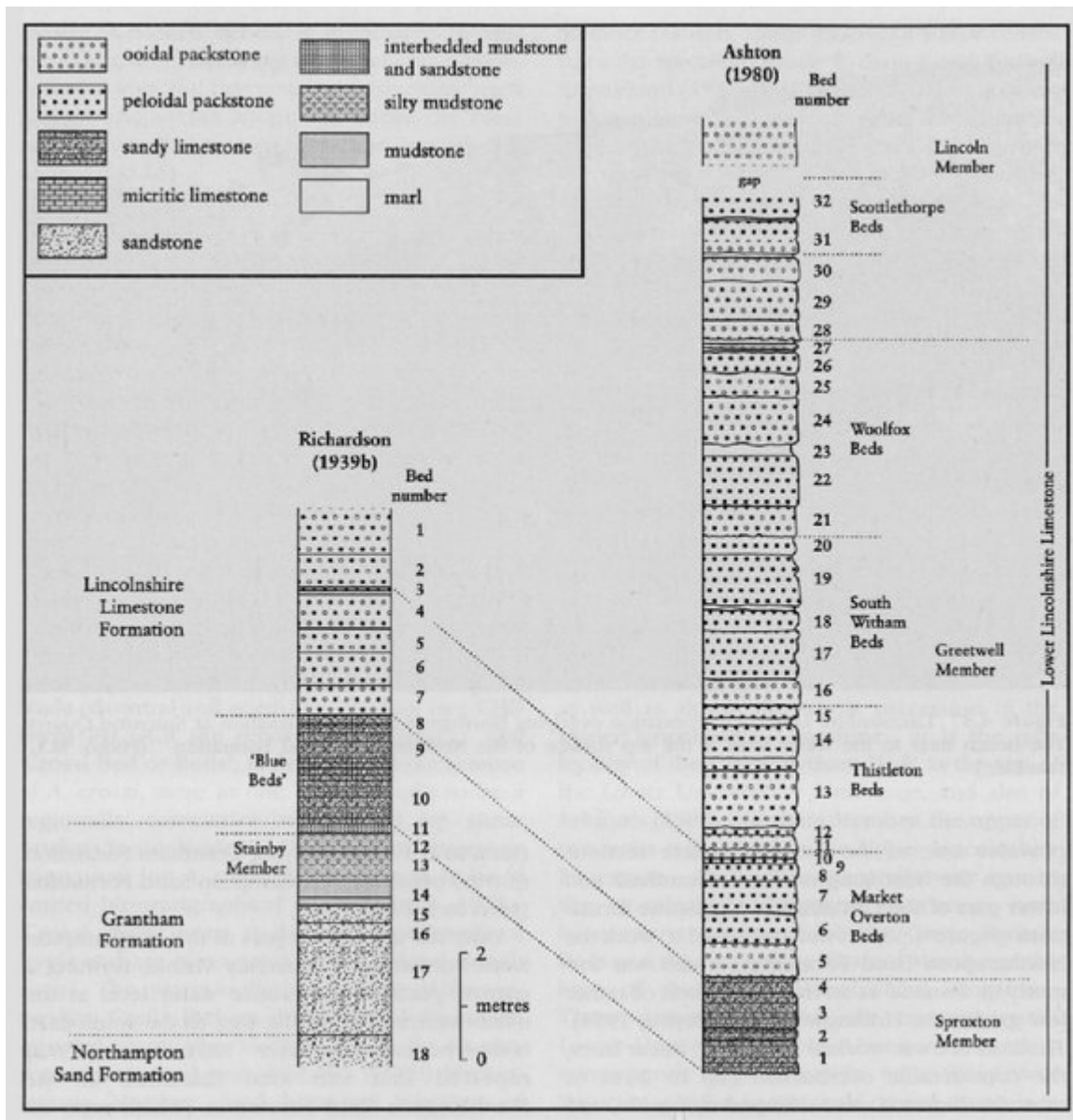
## Conclusions

Sproxton Quarry exposes a fine section from the upper part of the Northampton Sand Formation, through to the middle part of the Lincolnshire Limestone Formation. It is a primary reference section for the underlying Grantham Formation. The section exposes much of the lower part of the Lincolnshire Limestone Formation; it is the type locality for its basal Sproxton Member, and a key reference section for the overlying Greetwell Member.

## [References](#)



*(Figure 4.37) Lincolnshire Limestone Formation overlying Northampton Sand Formation at Sproxton Quarry. The bench near to the water level is the top surface of the Northampton Sand Formation. (Photo: M.G. Sumbler.)*



(Figure 4.38) Graphic sections of the Aalenian–Bajocian succession at Sproxton Quarry. (After Richardson, 1939b, fig. 40; and Ashton, 1980, fig. 6.)