# Cliff Farm Pit, East Riding

[SE 942 009]

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## Introduction

The GCR site known as 'Cliff Farm Pit' exposes the upper part of the Lincolnshire Limestone Formation, and overlaps with and continues upward the succession exposed at Manton Stone Quarry (see GCR site report, this volume), sited *c.* 1.2 km farther north (Figure 4.45). According to the lithostratigraphical classification of Gaunt *et al.* (1992), the section at Cliff Farm Pit exposes the upper division of the Kirton Cementstone Member (the 'Kirton Shale' or 'Kirton Cement Shale' of many authors). The section displays one of the thickest and most extensive exposures of this unit, with its well-known coral 'patch reefs', within the type area. The upper part of the section comprises the Hibaldstow Limestone Member.

## Description

The following description is based largely on files held by English Nature but the lithostratigraphical classification follows Gaunt *et al.* (1992).

The GCR site covers the western face and north-western corner of the pit where *c.* 4 m of mudstone forming the uppermost part of the Kirton Cementstone Member is exposed (Figure 4.46). Here, the top of the underlying Scawby Limestone (see Manton Stone Quarry GCR site report, this volume) forms the floor of the pit. The mudstone is well laminated, dark-grey to black, weathering brown, becoming buff-coloured towards the top and grading into marly limestone.

A thin limestone occurs near the base of the face, and is underlain by occasional coralline knolls of patch reef type. These were described by Ashton (1980) as crudely alternating marls and limestones, many of which are biostromes comprising the bivalves *Ctenostreon, Lithophaga* and *Lopha,* the gastropod *Symmetrocapulus rugosa* (J Sowerby) and the barnacle *Eolepas,* concentrated on a thamnasteroid (coral) stabilized mat of disarticulated *Plagiostoma* valves. The brachiopods *Acanthothiris crossi* (Walker) and *Parvirhynchia kirtonensis* Muir-Wood (Figure 4.47) may occur in association with this fauna as well as in the mudstone, where the other, often abundant but poorly preserved, fauna may include the bivalves *Camptonectes, Pseudotrapezium, Pteroperna* and *Trigonia hemisphaerica* Lycett.

The basal bed of the overlying Hibaldstow Limestone Member is a *c.* 0.6 m thick, hard, prominent, pale-coloured, shelly, argillaceous, ooidal calcarenite. As well as the brachiopod *Acanthothiris crossi,* it has yielded cerithiid gastropods and the bivalve '*Lucina*' *bellona* d'Orbigny; the base may be burrowed with *Thalassinoides.* The overlying beds (up to *c.* 2 m thick) are poorly fossiliferous, white, weathering buff, ooidal grainstones.

Since the site was originally designated, quarrying in an adjoining area has exposed *c.* 4 m of the underlying beds. These comprise the Scawby Limestone, with its basal oncoidal mudstone (also seen at Manton Stone Quarry, see GCR site report, this volume), which is here developed as a tabular-bedded, chalky-white calcilutite with bivalves, corals and gastropods.

## Interpretation

Following the nomenclature of Richardson (1940) and Kent (1941), the mudstone exposed at Cliff Farm Pit has been called the 'Kirton Cement Shale' or 'Kirton Shale' (of member status) by most authors. It has been an important local resource for the manufacture of cement and, in the past, has been exploited in numerous quarries around Kirton in Lindsey; more recently, it has been replaced for this purpose by mudstones of the Lias Group. Although, following their 1:10 000 scale geological survey of the Humberside area, Gaunt *et al.* (1992) chose to include it as an unnamed unit

within the Kirton Cementstone Member, usage of the term 'Kirton Shale' or 'Kirton Cement Shale' is bound to continue. Its type locality is at Cleatham Quarry [SE 940 014], just 350 m to the north, where the section has been described by Richardson (1940). Unlike the underlying beds, it extends southwards into the Lincoln area (see Metheringham and Greetwell Quarry GCR site reports, this volume).

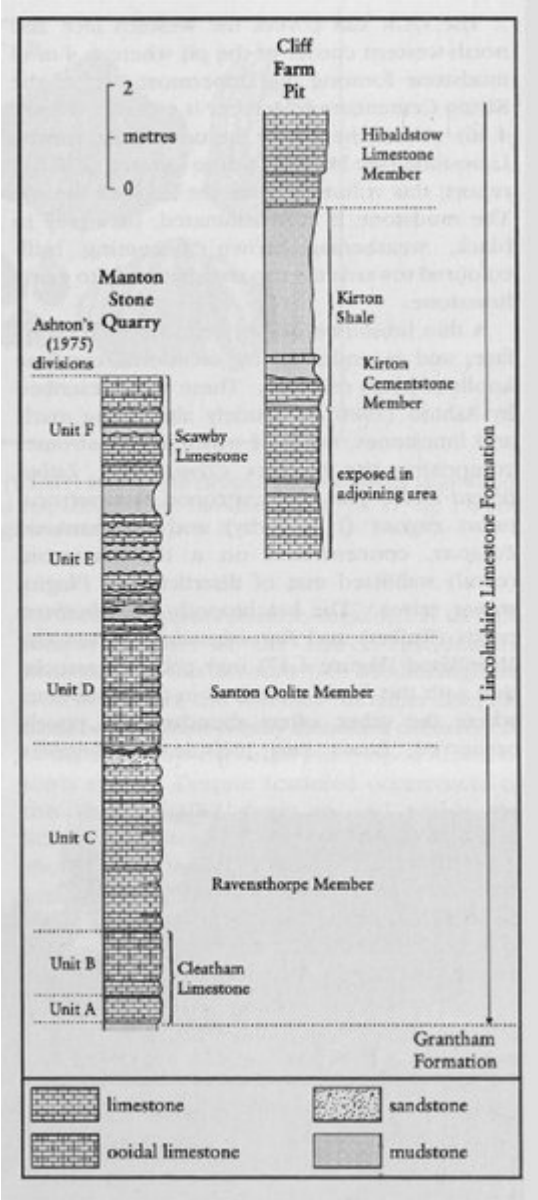
The overlying Hibaldstow Limestone Member is based on the Hibaldstow Beds of Ussher *et al.* (1890) herein taken to represent the Upper Lincolnshire Limestone dominated by high-energy oolites. However, Ashton (1980) believed that, unlike the lower part of the Lincolnshire Limestone Formation, there was no significant difference between the middle and upper parts of the formation in the Humberside area and those of the Lincoln and more southerly areas. He therefore chose to apply his new 'southern' nomenclature to the beds above the Kirton Cementstone Member (*sensu* Gaunt *et al.,* 1992). In Ashton's (1980) terminology, the highest beds exposed at Cliff Farm Pit belong to his Metheringham Member, regarded at its type locality as part of the Lower Lincolnshire Limestone of this account (see Metheringham GCR site report, this volume). In either case, the basal bed contains locally abundant occurrences of the spiny rhynchonellid brachiopod *Acanthothiris crossi.* Despite scattered occurrences of this rhynchonellid down to and within the Scawby Limestone, it has proved useful hereabouts to use this fossil as an index taxon for the bed in which it is abundant. Gaunt *et al.* (1992) chose to call it, informally, the 'Crossi Bed' but Ashton (1980) referred to it as the 'Upper Crossi Bed' following Kent (1966) who had differentiated it from a lower level of abundance beneath the Kirton Shale. Ashton (1977, 1979) concluded that although the first appearance or acme occurrence of *Acanthothiris crossi* could not be considered a synchronous event for correlation purposes, the general occurrence of this taxon in large numbers does provide a useful marker for the middle part of the Lincolnshire Limestone Formation (see also Castle Bytham GCR site report, this volume).

Within the Kirton Shale as a whole, the reef-like masses or coral knolls, many of which were produced by micritic cementation around colonies of corals or large bivalves, appear to occur randomly at various stratigraphical levels. The quarrymen referred to them as 'false formations' because they generally dip contrary to the limestone strata above and below. They may be stacked directly above each other and become progressively smaller and more pod-like; in this latter state, they have been called 'crog-balls' (Richardson, 1940), which may overlap one another with little or no intervening mudstone. In this way, small conical knolls up to 2 m in diameter and 1.5 m in height have been built up; elsewhere, these have been mistaken for burial mounds (Gaunt *et al.,* 1992).

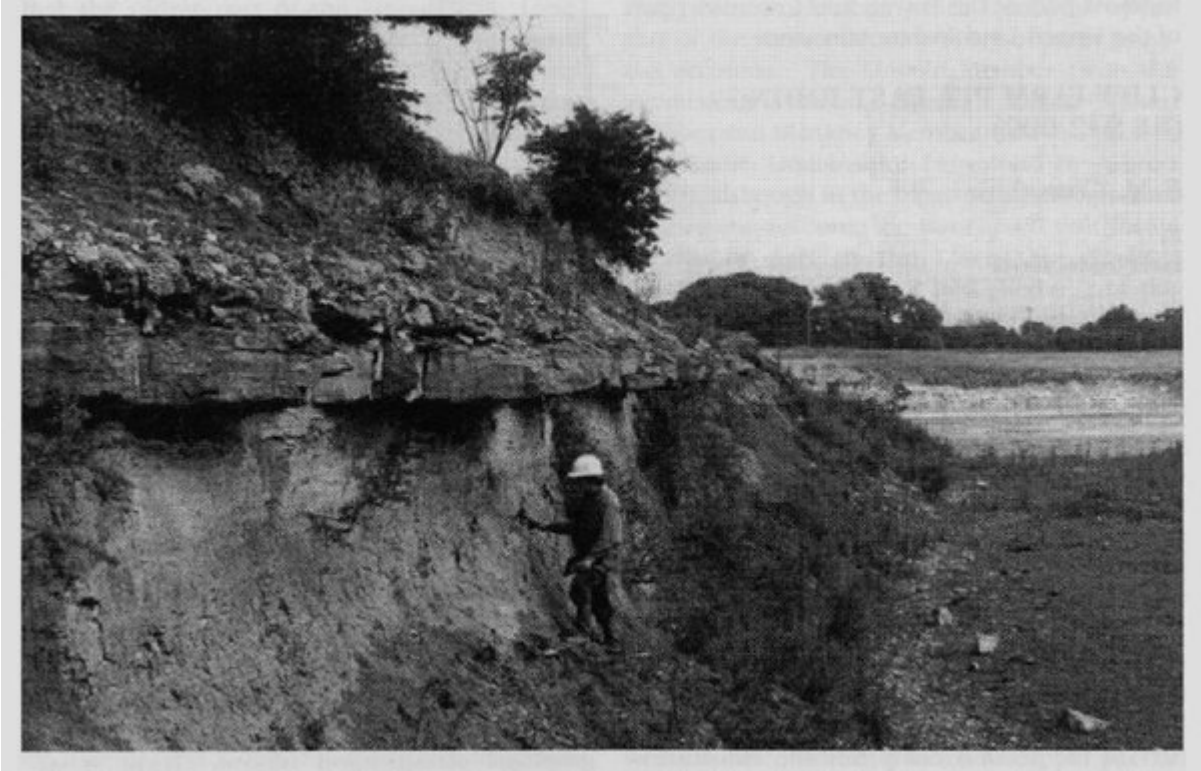
## Conclusions

Cliff Farm Pit provides an important section through the economically important but diminishing reserves of the mudstone widely known as the 'Kirton Shale' or 'Kirton Cement Shale'. This stratum is unique amongst the stratigraphical divisions of the Lincolnshire Limestone Formation in not being predominantly limestone. The presence of coralline knolls is of particular interest. The succession overlaps with that exposed at Manton Stone Quarry (see GCR site report, this volume) to give a nearly complete section through the Lincolnshire Limestone Formation, which, at least in the lower part, is differently developed hereabouts compared with the area to the south of Lincoln.

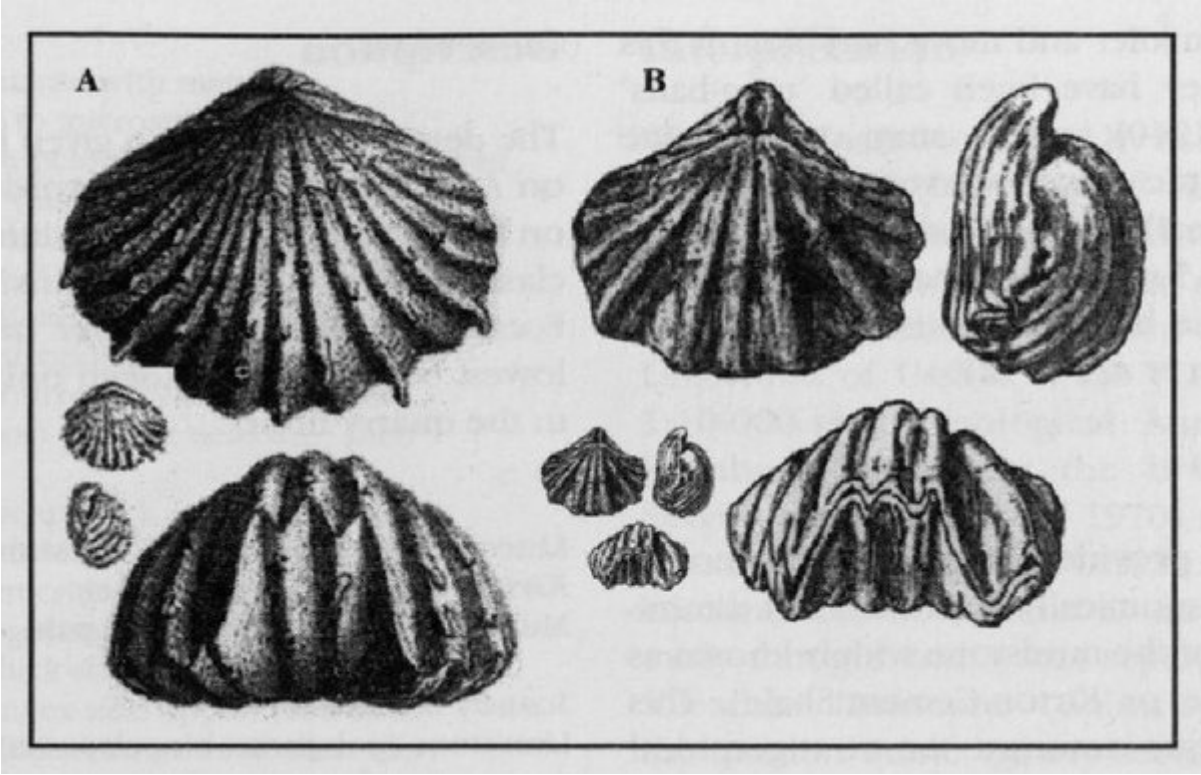
**References**




*(Figure 4.45) Graphic sections of the Lincolnshire Limestone Formation at Cliff Farm Pit and Manton Stone Quarry. (Based partly on Ashton, 1975, fig. 3; lithostratigraphy based on Gaunt et al., 1992.))*



*(Figure 4.46) Kirton Shale overlain by Hibaldstow Limestone Member at Cliff Farm Pit. (Photo: M.G. Sumbler.))*




*(Figure 4.47) The brachiopods (A) Acanthothiris crossi (Walker) and (B) Parvirhynchia kirtonensis Muir-Wood; both shown at natural size and enlarged. (Reproduced respectively from Davidson, 1878, pl. 27, fig. 17; and Muir-Wood, 1939, fig. 42, 3A-C (courtesy of The Geologists' Association)).)*