

PLEISTOCENE DEPOSITS IN LINCOLNSHIRE

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The relatively soft deposits of the Pleistocene seldom command the attention of geologists in the same way as the hard stuff, of say, the Silurian. This excursion was an attempt to redress the balance and to demonstrate the form and content of boulder clay and outwash gravels. The excursion started at Tattershall and then moved to Low Toynton, lunched at Tetford and crossed the glaciated landscape of east Lincolnshire to Huttoft Bank. However, for Pleistocene chronological convenience, reference is first made to the Low Toynton exposure.

The Penultimate Glaciation (Saale) lasted about 60,000 years. At its maximum, all Lincolnshire, except the highest parts of the Wolds, was covered by ice, which streamed south over the Wolds and through the Bain gap in the chalk scarp incorporating much chalk and flint. The resulting deposition was the intensely chalky Calcethorpe Till which plastered the Lower Cretaceous platform to the south and south-west of the Wolds, and extends south beyond Horncastle. This is rarely seen at the surface, but the River Waring, a left bank tributary of the Bain, re-excavated its valley in this Till and near Low Toynton (TF 268710) has created a minor gorge feature exposing small cliffs of the Till. These were adequate to demonstrate the hard creamy-white nature of the deposit with numerous broken flints.

During the Last Glaciation (Weischel), from 75,000 to 25,000 BP, the ice covered eastern Lincolnshire up to the Wolds. The main advance of the ice reached its peak about 70,000 BP and plugged both the Humber and Wash gaps. This ice originated from Scotland, northern England and Scandinavia. The plugging of the gaps caused the impounding of a vast lake in the Fens, central Lincolnshire and lower Trent valley, its surface at about 100 feet O.D. The main drainage of the Wolds, a tundra island surrounded by ice and water, was by the Bain and Lymn systems. The Bain created a vast delta of flinty gravels, patches of fine gravel and sand and small patches of clays (accumulating in delta pools) which spread south from Horncastle across Kirkby Moor towards and beyond Tattershall and Coningsby into what is now Wildmore Fen. Remains of mammals such as mammoth, deer and woolly rhinoceros trapped on the island are found in considerable quantities in the delta gravels near Coningsby and Tattershall. One of the pits of the Castle Gravel Co., Tattershall (TF 208566) has organic lenses dated at c. 45,000 BP, with an assemblage of insects and molluscs associated with an apparently treeless landscape. Excavations here are also down to the Kimmeridge Clay which provided an easy collecting ground including good ammonite fragments preserved in nodules. The attitude of the gravels was examined and a number of mammal bones and antlers were collected.

When the Weischel ice eventually melted, it left behind east of the Wolds a thick accumulation of reddish-brown and purplish-brown clay mixed with gravel and boulders - the Marsh Tills. It was spread in an uneven sheet some 80 feet thick over the underlying chalk platform up to the edge of the Wolds and is the foundation upon which the Marshland subsequently developed.

At the opening of the Post-Glacial period the level of east Lincolnshire stood much higher than it is now and the floor of the adjoining portion of the North Sea was dry land. The forest growing on the Boulder Clay was largely of pine and birch (with some oak later), a combination which reflects the cold conditions existing in Britain about 9500 BP. At the beginning of the Neolithic period the level of the land began to sink slowly. This resulted in a slowing down of rivers and streams and a consequent decline in the efficiency of the natural drainage. At the same time the climate became more warm and moist. These two influences together led to the growth of peat bogs which smothered the roots of the trees and caused the forests to perish. Analysis of the pollen content of the peat shows that the woodland then was made up largely of alder with some oak and lime and an occasional pine

or birch. The peat dates from somewhere between 7000 and 4000 BP. This peat enclosing the stumps and trunks of trees which it filled forms the Submerged Forest. Subsequent deposits are 6-8 feet of buttery saltmarsh clay, freshwater clay and a thin layer of peat of Iron Age date, followed by layers of mud and silt which form the flat Outmarsh.

There was an offshore barrier of low morainic hills extending from Holderness to Norfolk which afforded some protection to the developing coast as the sea level rose in post-Roman times. The final breaching and destruction of the offshore barrier in the stormy 12th and 13th centuries resulted in the establishment of the dune system of the Lincolnshire coast. In the centuries since then, along the coast between Mablethorpe and Skegness, the waves have relentlessly worn away the fringe of the Outmarsh and cut back its margin to its present position. There are few historical records of damage at Huttoft which suggests that erosion has not been serious there. The survival of the Sea Bank (erroneously called 'Roman' - it is a piecemeal medieval construction) in that area and the substantial parish church (albeit with a brick 18th century chancel) support this conclusion. The coastline is still sinking relative to sea level, very slowly at about a foot a century.

The present beach form consists of a series of sand ridges at a slight angle to the coast with southward trending runnels between. It is in these runnels that the upper Marsh Till, Submerged Forest and Peat are from time to time exposed, as at Huttoft Bank (TF 542786). This exposure submits them to wave erosion. Within the last 30 or 40 years there have been an increasing number of artificial sea defences constructed along the coast and these have resulted in increased scour on the beach and thus the removal of the more spectacular remains of the Submerged Forest. Usually it can best be seen at low Spring Tides but even so the size of stumps seen in the 1920s and 1930s are seldom evident. On the occasion of the E.M.G.S. excursion sufficient of the deposits were exposed to allow examination.

Erosion of the Boulder Clay in particular has released the gravel, stones and boulders embedded in it. These are now spread over the foreshore as a beach deposit. A collection and study of the stones can be most rewarding as they show an almost infinite variety and give a clear indication of the origin and line of travel of the ice from Scotland, the northern Pennines, the north-east coast of England and from Scandinavia. Despite increasingly adverse weather conditions an interesting assemblage of erratic material was collected by members including Scottish granites and metamorphics, Carboniferous sandstones, Jurassic limestone, the Scandinavian rhomb porphyry and occasional worked flints.

References

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