WEEKEND EXCURSION TO HUMBERSIDE

DAY 1—GEOLOGY AND SCENERY TRAVERSE OF NORTH LINCOLNSHIRE (SOUTH HUMBERSIDE)

Leader: D N Robinson — Saturday 27 September 1986

The purpose of this excursion (the first part of a weekend) was to demonstrate features of the gology and scenery of North Lincolnshire (South Humberside) adjacent to the Humber bank by a traverse eastwards from the River Trent. This crossed three cuestas of Jurassic and Cretaceous strata and included some key glacial features. The route can be followed on OS 1:50,000 sheets 112 and 113, and the Geological Survey 1:50,000 sheets 80 drift (Kingston upon Hull) and 89 drift (Brigg).

After meeting at Normanby Hall Country Park north of Scunthorpe, we proceeded to the Burton on Trent Cliff. This 200ft feature overlooking the lower Trent extends from Burton Stather to Alkborough. Exposures are few and very difficult of access along the partly wooded slope, but we were fortunate in that a new storm water channel (SE 868187) was under construction down the face of the Cliff. Here beds dip east at 3°. The sequence is:

Blown Sand

Frodingham Ironstone (or ferruginous limestone with abundant gryphaea) which forms much of the dip slope, with considerable local use as building stone

Lower Lias—Scunthorpe Mudstones, with thin, hard limestones; makes up central and upper part of slope

Upper Penarth (Rhaetic) beds - brownish shale and clay (some brick red) to 27ft (8m) thick.

Lower Penarth (Rhaetic) Beds—grey/black shales, up to 36ft (11m) thick. The Penarth Beds form the lower part of the slope, part covered with blown sand and esturarine alluvium; only exposed in landslips.

Excavation of the storm water channel gave access to the Lower Lias clays and limestones, and in the latter we were able to find shiny brown limonite oolite grains (forerunners of ironstone deposition to follow).

We then moved to Alkborough where the Cliff is at 150ft (45m) and overlooks Trent Falls—the confluence of the Trent and Ouse. There is a fine viewpoint at the 13th century Julian Bower turf maze (SE 880217). A number of nearby houses and garden walls were of the gryphaea-rich ferruginous limestone.

The route east followed the dip slope of the Cliff across patches of Frodingham Ironstone via West Halton, and crossing the valley of the north-flowing Winterton Beck. To the south is the large gullet of a disused opencast ironstone quarry now a landfill site, with no access to any remaning exposure. The overburden is of Coleby Mudstones of the Middle Lias, and the lower part of the slope is covered by head deposits. The narrow 150ft scarp is capped with Lincolnshire Limestone. On the ridge crest the route joins the A1077 and proceeds east.

At the crossroads at SE 933204 the route crossed on to morainic topography—glacial sands and gravels with Skipsea Till—of the Winteringham-Horkstow terminal moraine. A few enclosed hollows may be kettle holes. At a disused sand and gravel quarry (950213) we were able to examine the coarse, mainly flint gravels, but also with sands and well defined patches of varved clays (indicating former pools within the moraine). The light scatter of erratic pebbles showed the usual assemblage of Scottish granites, porphyritic lavas and occasional schist, Carboniferous grits from North England, the fossiliferous Lias limestone and septarian nodules from the Jurassic of north-east Yorkshire, and more unusually Red Chalk (only transported a short distance from the north end of the Lincolnshire Wolds).

The route continued along the A1077, where it is liable to flooding along the Humber bank, across the Ancholme valley, floored with estuarine alluvium (Humber 'warp'). The first New Cut to improve drainage was in 1637, and the final system including catchwater drains was completed by Sir John Rennie in 1844. Lunch was taken at the Hope & Anchor inn by his sluice, with views of Read's Island just offshore.

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The major quarry visited was at South Ferriby, SE 990225 (by permission Rugby Portland Cement plc). The quarry has been excavated from the top of the 250ft (75m) Wold scarp, and to about that depth through chalk into clay to supply both to the cement works at Ferriby Sluice by overhead conveyor. Before excavation reached the clay, the supply was from the Humber warp of Winteringham Ings in the Ancholme valley adjacent to the works. The sequence exhibited in the quarry is:

Lower Chalk—Ferriby and Welton
Red Chalk
Upper Carstone
unconformity
Kimmeridge/Ampthill (Ancholme Group) Clays

As virtually all the Lower Cretaceous sequence is missing, the exposure in this quarry demonstrates the result of progressive truncation towards the Market Weighton block of Late Jurassic and Lower Cretaceous strata as pre-Albian uplift and erosion of the northern part of the East Midlands shelf proceeded. The clays at the bottom of the quarry contain the so-called Kimmeridge 'logs'—fossilised timber trunk sections c.1ft in diameter, about which little appears to be known. No examples were found on this occasion, but the clays did yield ammonities, particularly quite large near smooth outer sections of *Pictonia*, with some flattened bivalves (largely *Ostrea*), the occasional *Pinna*, as well as the disappointing cemented nodules, most of which proved barren.

From the village we took an unmetalled track to the Humber bank to examine the south Ferriby Cliff sections (SE 993218—997225). The Humber gap is of late Tertiary consequent drainage origin, possibly exploiting fault line weakness. Before the Last (Devensian) Glaciation (which penetrated the gap to the Winteringham-Horkstow line) the Humber flowed direct east, until diverted by the tills of Holderness.

The river cliff section examined has late Devensian (Skipsea) till and periglacial deposits resting on a planed surface of disturbed and contorted chalk. Pebbles and sand between the chalk and the till indicate the margin of an ice-dammed lake when the ice margin still lay to the east. The till is up to 25ft thick, and reddened by Flandrian weathering.

South-west of this section is a terrace of unstratified sandy chalk gravel over the till—probably solifluction of frost-shattered chalk from a dry valley in the chalk slope. Nearby is the unusual sight of raised saltmarsh on a beach of discoid chalk pebbles.

Leaving South Ferriby we travelled south on the B1204, on sand and gravel along the foot of the Wold scarp, and turned off along an unmetalled road to Horkstow Bridge (SE 973190). This unique 232ft (70m) chain suspension bridge with rusticated Yorkshire stone towers was designed by Sir John Rennie and built in 1835.

The Horkstow morainic 'ridge' restricted the Humber and warp was laid down in the embayment to the north. On the west side of the river are the remains of recently demolished brick kilns used to burn clay from the straightening and deepening of the river. A search of one of the sites showed vitrified bricks where the flue holes were situated, and bricks were found where one of the through holes was in the shape of the letter F; the brickmaker here in the 1880s and 1890s was John Frank.

Returning towards the main road we could see the parallel periglacial rills on the Wold scarp, with a closer view when ascending the scarp to a minor ridge-top road at 300ft (90m). This gave superb views of the Ancholme valley and to the west over the lower limestone cuesta to the Scunthorpe steel works; to the south of the simple Wold escarpment and in the distance the Wrawby-Brigg ridge; and from Saxby Wolds east down the dip slope to the refineries and factories of the Humber bank (Grimsby-Immingham).

Near Elsham the route passed disused chalk quarries and the water treatment works of Anglian Water's Trent-Witham-Ancholme transfer scheme on the old airfield. Descending gently and under the M180 we joined the A18 to pass through the high level Barnetby gap which was exploited by west flowing Weischel (late Devensian) meltwaters, and past the huge Melton Ross chalk quarry.

Turning off near the Humberside Airport, the last site visit was a small long disused quarry at Kirmington (TA 105117). This is a SSSI and one of the most important Quaternary sites in Eastern England. The complex sequence of glacial and interglacial deposits up to 90ft (27m) thick occupies the west end of the buried Kirmington 'fjord'. Estuarine clays and peat lie beneath 3–10ft (1–3m) of coarse marine shingle (strongly cryoturbated) of clatter-marked cobbles, capped by 6ft of Devensian till. Only the shingle and overlying till can be seen in two small trench exposures.

The marine shingle suggests an interglacial sea level of 70ft OD. Stratigraphical and geomorphological circumstances support an Ipswichian age for the shingle, but an earlier Hoxnian age has been suggested as it has yielded artifacts of Clactonian type. However, if the shingle is Penultimate rather than Last Interglacial—how has it managed to survive?

The party then travelled north, crossing the Humber Bridge for the second day in North Humberside.

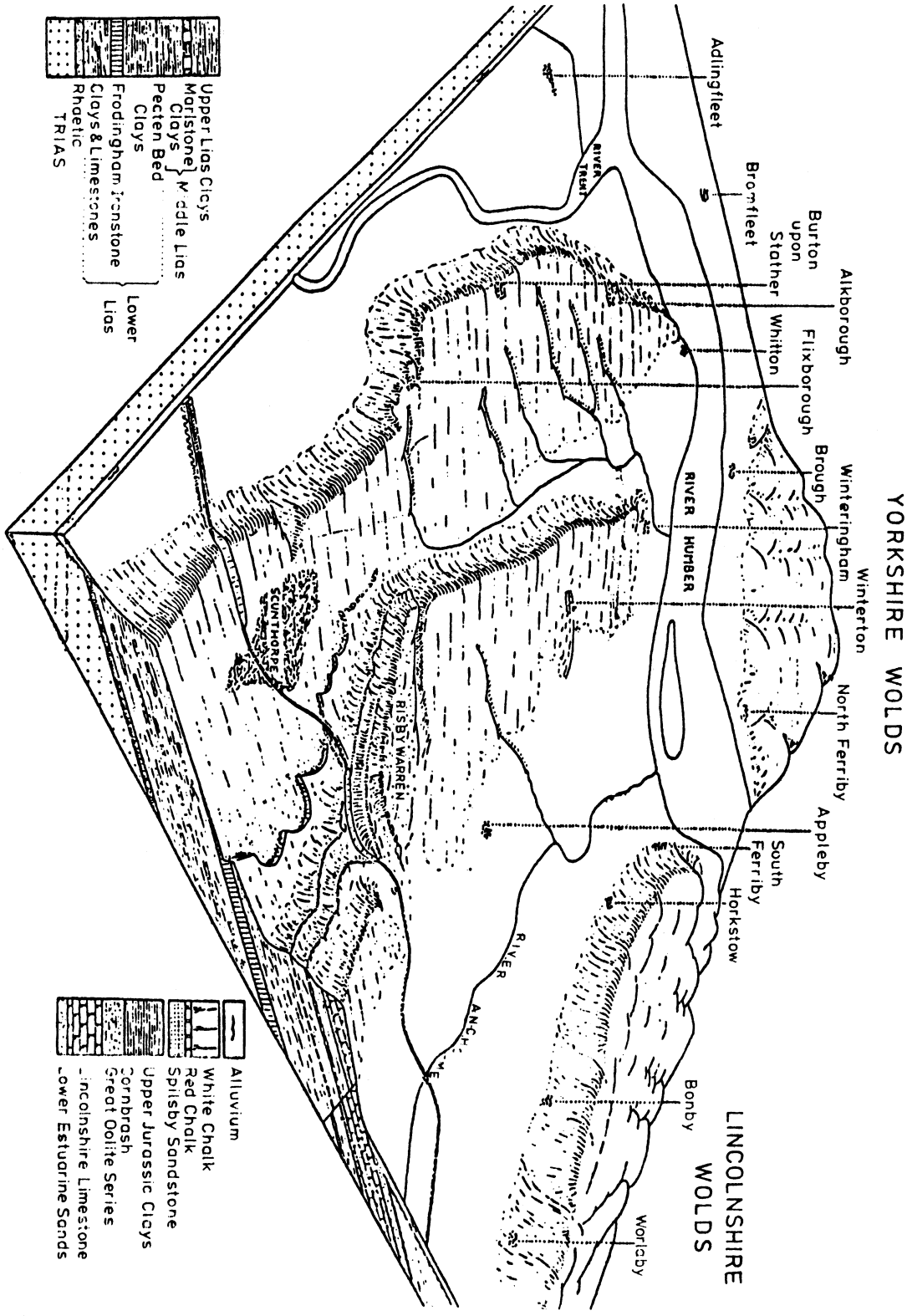

Fig. 1. The relationship between physical features and solid geology in north Lincolnshire.

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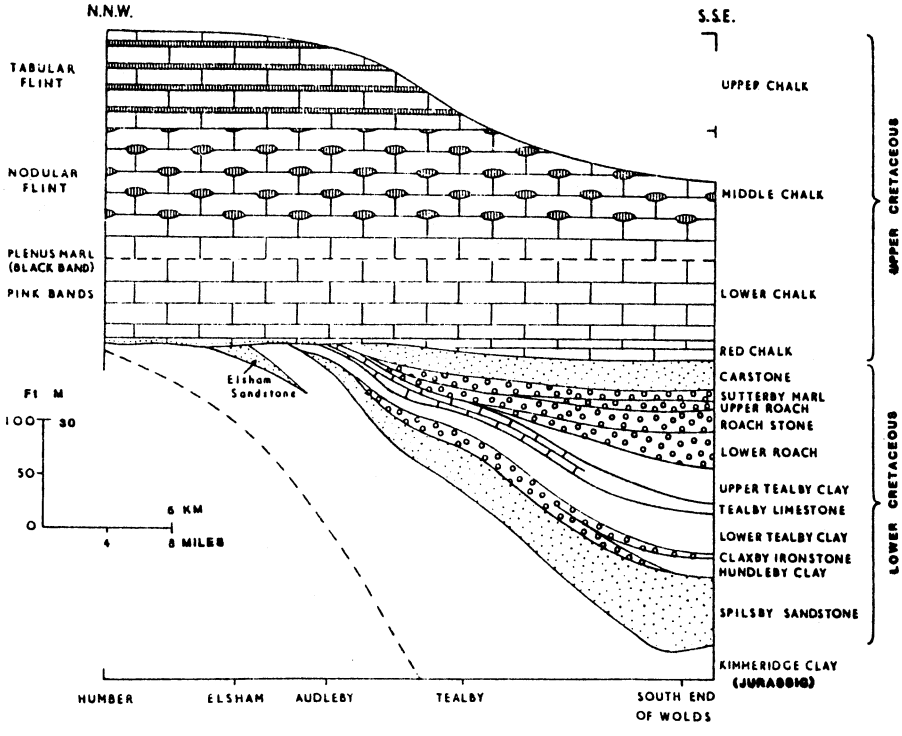

Fig. 2. Diagrammatic cross-section.

DAY 2—FLAMBOROUGH HEAD AND THE YORKSHIRE WOLDS

Leader: Rosalynde Grum B.A.

Our aim was to study the coastal geomorphology of Flamborough Head, and when driven inland by the rising tide, to examine the late Devensian ice marginal features of the Yorkshire Wolds. The party set out in good spirits thanks to the fine weather and an excellent (though rather early) breakfast at the Monarch Hotel, Bridlington.

Locality 1 Sewerby Beach G.R.202686

We examined the famous Ipswichian Cliff and raised beach with its associated glacial, aeolian and fluvioglacial deposits. These were still recognisable from the description in earlier guides in spite of the Drab Clay changing its name to the more distinguished title of Skipsea Till. The processes of weathering and erosion affecting the chalk and boulder clay cliffs were pointed out; then we turned our attention to the present day beach materials. After the leader had commented on the scarcity of macrofossils in the chalk the party found numerous fossil bivalves, sponges and trace fossils in the chalk boulders! A hunt for glacial erratics turned up a whole range of foreign and local rock types incluing a boulder of Norwegian larvikite nicely confirming the source of the ice sheet.

Locality 2 Flamborough Head G.R. 2570

Here the chalk has been fashioned into caves, arches, stacks and a blow hole by marine erosion along planes of weakness in the rock. At Selwicks Bay G.R. 255709 we climbed down to the beach to examine the faults, folds and joints of the east-west orientated Flamborough Head shatter zones which has controlled the development of the land forms. The incoming tide prevented us from walking behind the arches, slightly to the relief of the leader, who on a previous visit had witnessed a helicopter rescue exercise from this precise point. The party had to be content with photographing the landform from the end of the headland G.R. 258707.

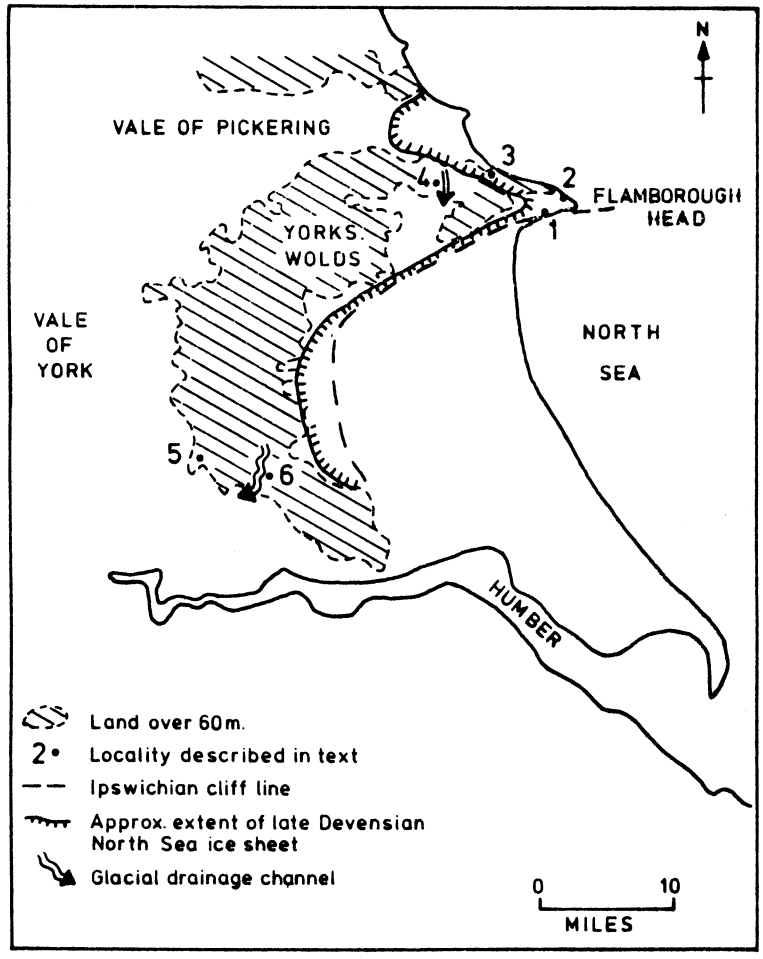

Fig. 3. Locality map.

The glacial deposits were examined where landsliding around the blow hole provided fresh sections. These were seen to be a mixture of till and fluvioglacial gravels.

From Flamborough Head the party travelled northwards along the B1229 towards Speeton. Several circular depressions were observed in the fields. Theories advanced as to the formation of these features ranged from solution hollows in the chalk to bomb craters from the war!

Locality 3 The Speeton Moraine

Before reaching Speeton the late Devensian terminal moraine showed up clearly on the skyline. A transect on foot from the church at G.R. 172747 towards the cliffs enabled us to observe the steep 'ice contact' slope on the north side.

Locality 4 The Hunmanby Overflow Channel G.R. 100766–107745

South of Hunmanby the overflow channel from a temporary lake, dammed between the ice front and the Wolds, overflowed southwards towards Rudston. The flat floor of the valley of the Gypsy Race stream near Rudston led earlier geomorphologists to postulate the existence of a glacial lake Rudston. The leader wondered if this has suffered the same fate as Kendal's lakes around the North York Moors which have now evaporated from the literature.

Heading homewards across the Wolds, the position of the late Devensian ice margin could be plotted by the presences or absence of till in the ploughed fields. The boundary occurred at a height of about 60 metres. The rather featureless shallow valleys on the till were in marked contrast to the very deeply incised 'ice free' valleys such as that of Millington Beck G.R. 844565 to 830510 (*Locality 5* on the map). From the road at 830535 there was a good view of the deeply incised edge of the Wolds and the flat floor of the Vale of York into which valleys drained.

Locality 6 Glacial drainage system near Market Weighton

From Middleton on the Wolds G.R. 947496 southwards to South Dalton Wold G.R. 940440 a shallow depression crossing the spurs of higher ground was identified as a subglacial drainage channel draining southwards andwestward into the Market Weighton spillway G.R. 940440 to 890425. The channel shows up clearly on the Market Weighton Geological Survey sheet. Members of the party argued that the channel was unlikely to date from the last glacial advance because of the absence of till in the surrounding fields.

The party followed the path of the glacial drainage to Market Weighton and then dispersed.

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