SOME FEATURES OF THE HEATH AND FEN OF SOUTH LINCOLNSHIRE

Leader: D.N. Robinson — Sunday, 11 June, 1978

The purpose of the excursion was to demonstrate certain glacial and post-glacial features of South Lincolnshire, with particular reference to Fenland deposits and the sequence of drainage and land reclamation in historic times.

The excursion started at the Glebe Quarry, Colsterworth (SK 898242), by permission of the Church Commissioners. This is a worked out but unrestored ironstone quarry (last worked 1943) with a 10 acre water-filled gullet and 30 acres of hill and dale. There is an exposure with the sequence of Lincolnshire Limestone, Lower Estuarine Beds (ferruginous sands, sandy clay and dark grey shale - a lagoonal series with slow and interrupted deposition in a wide coastal zone of mud flats and sands) and Northampton Ironstone (rich brown sandy rock with prismatic 'boxes' of hard brown and black ferric oxide; deposited in shallow seas swept by sand laden currents in which ferruginous sands and siliceous ironstone accumulated; fossils rare or absent). The main exposure is at the western end of the gullet but the Lower Estuarine Beds are largely obscured.

The central section of the quarry face exposes a sand and gravel filled pre-glacial valley, part of a system formerly draining the Lincolnshire Limestone. Infilling occurred by spring melt from local snowfields under periglacial conditions. Advance of the Wolstonian ice sheet covered the feature with deposits of chalky boulder clay, much of which has been removed on development of the present drainage system.

Tomling Hole Sinks (SK 967259), was visited by permission of Mr. F.B. Wakerley, Burton Coggles; here there is a blind valley in boulder clay. It has a 20-30 ft incised inner valley within the broad trough, with impressive miniature meanders leading to a series of a dozen sink holes. The largest are 5-6 ft deep. During late autumn the stream slowly advances down the valley, overtopping successive swallets towards the blind end. In rare conditions and for periods of a day or so there is a lakelet 400 yds long, 30 yds wide and up to 30 ft deep. From April the boulder clay dries out and cracks so as to absorb rainfall without leaving a surplus for run-off. The valley and funnel-shaped sinks were examined.

Sink holes are generally towards the thinning edges of boulder clay cover of the Lincolnshire Limestone, but a number in the Burton Coggles area are also fault-guided. It is suggested that fissures in the limestone below the clay cover were opened by periglacial action, exploited by meltwater run-off in late and post-glacial times.

The route proceeded via Burton Coggles to Corby Glen, crossing the southward-flowing R. Glen incised (probably initiated, like the Eden, as an ice-edge drainage channel) into Lincolnshire Limestone. It then crossed Cornbrash and a small tributary of R. Eden which has been dammed to form the lake in Grimsthorpe Park, part of Capability Brown's landscaping of 1772. Much of the Park is on a boulder clay capped spur between the valleys of the Glen and Eden. The road round the north end of the Park provided good views of Grimsthorpe Castle, the main part of which was "an extempore building set up of a sudden by Charles Brandon, Duke of Suffolk" to entertain Henry VIII in 1541. The great north front was designed by Sir John Vanbrugh in 1722.

From Grimsthorpe through Edenham to Toft, the route crossed lightly incised meanders of the R. Eden three times before turning east to cross the gravel and boulder clay capped ridge of Kellaways and Oxford Clay which separates the valley from the Fen edge and gave good views across Thurlby Fen. In the Fen edge villages the mixture of limestone and brick buildings was noted.

The route followed the Fen edge to Langtoft, with Oxford Clay to the west and Fen-edge gravels to the east. Just south of Thurlby and one field from the road to the east is the line of the Roman Car Dyke, a catchwater drain. At Kent's Bridge the A15 crosses the R. Glen there having turned to flow north-east.

During the Ipswichian Interglacial sea level reached a maximum height of 70 ft OD, that is flooding the Fenland basin up to the clay edge in this area. The Fen-edge gravels, widening southwards from 1-5 mls. and some 10-20 ft. thick, are relatively coarse and composed of rounded pebbles of flint, Jurassic limestones and Bunter pebbles derived from the former boulder clay cover to the west. They were laid down in relatively quiet shallow water conditions, with long extensions (like the one to Crowland) marking the position of stronger seaward currents. Near the top of the gravel is a driftwood horizon - a foot or more of pebbly sand full of blackened and broken fragments of wood.

There are extensive workings in the Fen-edge gravels east of Baston and Langtoft with an opportunity to view the ARC Eastern pit at TF 140140, which has been worked down to the underlying Oxford clay.

Towards the end of the Bronze Age (1000-800 BC) land sinking ceased and rose by about 2 ft. which put the inner Fenland basin beyond reach of the tides. Here the upper peat accumulated in a broad zone up to 5 mls wide over the next 1000 years or so to a depth of 3-5 ft, but this has shrunk since reclamation and drainage. In Deeping Fen the peat is only about a foot thick and mostly mixed with clay due to deep ploughing.

At the Baston Fen Nature Reserve (Lincolnshire and South Humberside Trust for Nature Conservation) the party was met by Mr. E.J. Redshaw, the voluntary Reserve Warden. The 90 acres of permanent grass between the R. Glen (which flows between high banks and above level of surrounding land) and the Counter Drain, was formerly a wash or flood reservoir for the R. Glen and is still occasionally used for that purpose in the winter. The R. Glen is about 10-12 ft OD and the Counter Drain 4-5 ft OD compared with a land level of 3-4 ft OD. Borrow pits along the Glen bank are permanently flooded and a shallow mere has been excavated in the peat.

In the 8th century the fens were described as a "hideous area of huge bigness ... oft-time clouded with mist and dark vapours, having within it divers islands and woods as also crooked and winding rivers." Camden in the 16th century recorded that "Deeping or 'deep meadow' is the deepest of all the fenny country, and the receptacle of many waters." Around Crowland the land "is so moory that you may run a pole into the ground to the depth of 30 ft and nothing is to be seen on either side but beds of rushes ...." For most of this period the 30,000 acres of this fen were held in common by the towns of Deeping, Spalding, Pinchbeck, Thurlby, Bourne and Crowland.

The main drainage of Deeping Fen was achieved between 1632 and 1637 by Adventurers including Sir Philibert Vernatti, after whom the Vernatt's Drain takes its name. All new drains were cut by hand - by Dutch workers and Scottish and Irish prisoners of war. But, despite windmills, the fen still flooded with water. Various improvements were made through the 18th century, including two large scoop wheels or 'Dutch Engines' for lifting water into the Vernatt's Drain.

Finally, in 1801, an Act of Parliament was passed for draining, dividing and allotting Deeping Fen. It was the works resulting from this Act which created the present pattern of drainings, roads and farms. Even so, the improvement was not permanent as pumping was still by windmill, of which there were 50. Steam power was required and the two steam engines, driving scoop wheels, commenced work at Pode Hole in 1827.

The level of Deeping Fen today is less than 5 ft above sea level, and in normal times the water in the R. Welland and R. Glen is as much as 10 ft higher. Maintenance of their banks is therefore of vital importance in the drainage system. In fact the whole of Deeping Fen has to be pump drained; there is no natural gravity discharge. In 1665 the peatlands were about 6 ft higher than the siltlands and have shrunk about 12 ft in the last 300 years due to drainage and agriculture.

Pode Hole Pumping Station is the key to the drainage of Deeping Fen. Here drainage waters from the North and South Drove Drains accumulate in the basin, and the water level is normally 1-2 ft *below* sea level. The water is raised nearly 14 ft by pumps into the Vernatt's Drain where it flows by gravity to the tidal outlet at Surfleet Seas End. The Deeping St. Nicholas Pumps, which came into service in July 1965, are capable of pumping over 283,000 gallons of water a minute and were made by Gwynnes Pumps Ltd. of Lincoln.

The route proceeded alongside the Counter Drain to Pode Hole and then through the Spalding suburb of Little London on to Cradge Bank which follows the foot of the Welland Bank to Four Mile Bar, where the road ascends onto the bank. Here good views were obtained of the R. Welland and the Washlands between the Welland and the New River at Brotherhouse Bar. These washlands were deliberately created as natural flood reservoirs. In winter they would freeze and made Cowbit and Crowland Washes famous for fenland skating. They were also much used for fishing and wildfowling. One method of wildfowling was the use of a huge punt gun, mounted either on a punt in water or on a sled on skate runners on ice. Traditionally the washes were under grass, but the Brotherhouse electric pumping station was built in 1969 to improve the drainage of the upper Welland washes and enabled them to be brought under cultivation.

By a bend in the bank a pond, known as a Gull, indicated the site of a former breach in the bank. Flood water pouring out of the Welland, which flows at about 15 ft above sea level in times of flood, burst through the bank and cascaded into Deeping Fen 10 ft below. The gull would have been caused by the resulting scour.

The Roman coastline of what is now the Fens consisted of a series of silt and saltmarsh 'islands' in an arc from Wainfleet to Holbeach on which were saltmaking sites. With the post-Roman lowering of land level, the sea flooded further into the Wash throwing up a bank of silt against the islands to create the 'Townlands' on which Anglo-Saxon and Danes could settle (including Gedney - 'Gydda's island'). From this base a series of intakes were made - of the Fen inland and of saltmarsh to the seaward - thus developing very elongated parishes.

The route crossed Great Postland to Gedney Hill and then followed 14 miles through the parish of Gedney: via Leedsgate (Les Gates) and crossing the old Fen Dyke, Ravens Dyke and Gedney Fen, via Gedney Broadgate to Gedney on the silt bank and crossing the Hargate (now followed by the A17); via Gedney Dyke and past two clear saltern mounds (the debris of medieval salt making) and crossing the Common Fen Dyke (the coastline in 1307) at Black Barn; across Gedney Marsh (reclaimed by 1700) to Gedney Drove End, crossing the reclamation of 1793 to Boatmere Haven, with reclamations of 1865 to south and 1875 to north.

The inlet of Boatmere Haven had been closed off by a reclamation bank in 1977/78 but leaving a strip of saltmarsh still to the seaward. The party were able to walk onto the sea bank to obtain a clear view of the bunded reservoir of just over 1 hectare constructed to east of the R. Nene on Westmark Sand. From the vantage point of the sea bank it was possible to point out sedimentation processes in the inner Wash and discuss the problems of reclamation, barrage and bunded reservoir construction.

References

CENTRAL WATER PLANNING UNIT — 1976. *The Wash Water Storage Scheme.* Report on the Feasibility Study (HMSO).

FORD, T.D. — 1966. A further note on sink holes in Lincolnshire. *East Mid. Geographer*, vol.4, no.2, pp.113-114.

HALLAM, H.E. — 1965. *Settlement and Society: a study of the early agrarian history of South Lincolnshire.* (Cambridge)

HINDLEY, R. — 1965. Sink holes in the Lincolnshire Limestone between Grantham and Stamford. *East Mid. Geographer*, vol.3, no.8, pp.454-460.

KENT, P.E. — 1939. Notes on the river systems and glacial retreat stages in South Lincolnshire. *Proc. Geol. Assoc.* vol.50, pp.164-167.

LINCOLNSHIRE AND SOUTH HUMBERSIDE TRUST FOR NATURE CONSERVATION — 1971. Fenland Tour (leaflet).

MILES, W.D. — 1965. *A history of Deeping Fen and Pode Hole Pumping Station.* (Spalding)

PRENTICE, J.E. — 1959. The sub-surface geology of the Lincolnshire Fenland. *Lincs. Nats. Union XII*, pp.136-139.

SIMMONS, B.B. — 1977. Ancient Coastlines around the Wash, *South Lincolnshire Archaeology*, vol.1, pp.6-9.

SMITH, A.E. — 1973. *Nature Reserves Handbook* (Lincolnshire and South Humberside Trust for Nature Conservation).

SMITH, G.I. — 1937. *Lincolnshire (Parts of Holland).* Land and Utilisation Survey Report. (London)

SWINNERTON, H.H. & KENT, P.E. — 1976. *The Geology of Lincolnshire*, 2nd Edition. (Lincolnshire Naturalists' Union)

WATER RESOURCES BOARD — 1970. *The Wash: Estuary Storage.* Report on the Desk Study. (HMSO)

WYATT, R.J. — 1971. New evidence for drift-filled valleys in north-east Leicestershire and south Lincolnshire. *Bull. Geol. Surv. GB* No.37, pp.29-55.

WYATT, R.J., HORTON, A. & KENNA, R.J. — 1971. Drift-filled channels on the Leicestershire-Lincolnshire border. *Bull. Geol. Surv. GB* No.37, pp.57-79.

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