

**A simplified study of the Geology
of the Humberside region and
some examples of its impact on
the region's Social and Economic
History.**



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A simplified study of the Geology of the Humberside region and some examples of its impact on the region's social and economic history.

On both the north and south banks of the Humber estuary surface soils and drift deposits¹ overlay bands of sedimentary rocks.² These strata³ vary in thickness. In Barton, for example, the surface glacial till or boulder clay⁴ is underlain by a relatively narrow band of 'Ferriby chalk'⁵ laid down during the lower Cretaceous geological period some 150 million years ago. The Humber estuary separates similar strata on the north Humber bank from that on the south bank. The 'Ferriby chalk' strata is in turn underlain by a 50 meter thick layer of upper Jurassic rock, created initially some 160 million years ago and identified as the 'Ancholme clay group'. It is this rock which underlies the alluvial and glacial drift deposits of the Humber estuary bed (see Fig. 1).

Passing down through the earth's mantle below Barton other strata follow. Eventually beyond 1000 meters down the 500 meter thick strata 'Westphalian (Coal Measures)' is underlain by millstone grit,

1

Accumulations of earth and rocks deposited by the action of ice or water.

2

Strata of rocks originally formed of sediment.

3

Successive bands of rock.

4

Unconsolidated material bulldozed and rent by an advancing glacier and deposited when the ice retreated.

5

Terminology used here is taken from the British Geological Survey maps, in particular for this study Sheet 80, 1:50000 Series (Drift Edition) Kingston upon Hull, and Sheet 81, Patrington.

both strata of the Carboniferous geological period and initially formed some 300 – 350 million years ago.

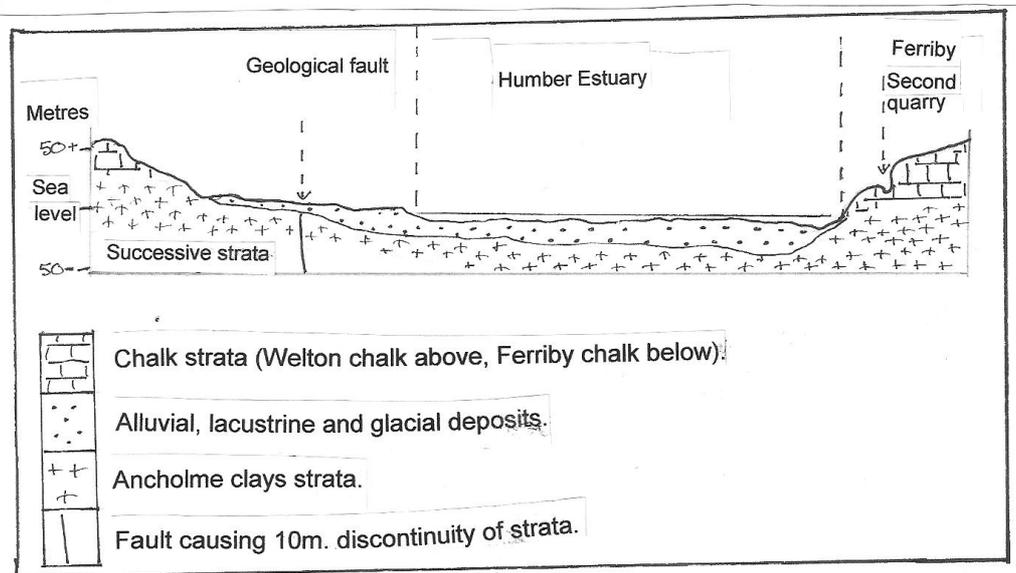


Fig. 1 Simplified geological cross-section drawn from Welton Wold on the left (north-west) to South Ferriby Wold on the right (south-east), Humber Estuary in the centre. Vertical scale exaggerated.

Tectonic movements in the Earth's crust eons ago resulted in these strata being tilted at an angle of three to five degrees from the horizontal and dipping from west to east. Across what was to become northern England this produced a mountain range of alpine proportions which was subsequently eroded to reveal the coal and millstone grit rocks of the residual Pennine mountain range and the escarpments of Humberside which so define the region's landscape today. The scarp slopes are in effect the eroded 'face' of the tilted strata, rather like waves erode a cliff face so the 'face' has been eroded back but over geological rather than historic time (see Fig. 2). In the South Humberside area these scarp slopes are particularly apparent to the road traveler entering South Ferriby from Barton (A1077), when descending any of the lanes leading to the Low

Villages from Middlegate Lane,⁶ when leaving the A1077 for West Halton⁷ and when travelling along Doncaster Road, Scunthorpe towards Berkeley Roundabout.⁸

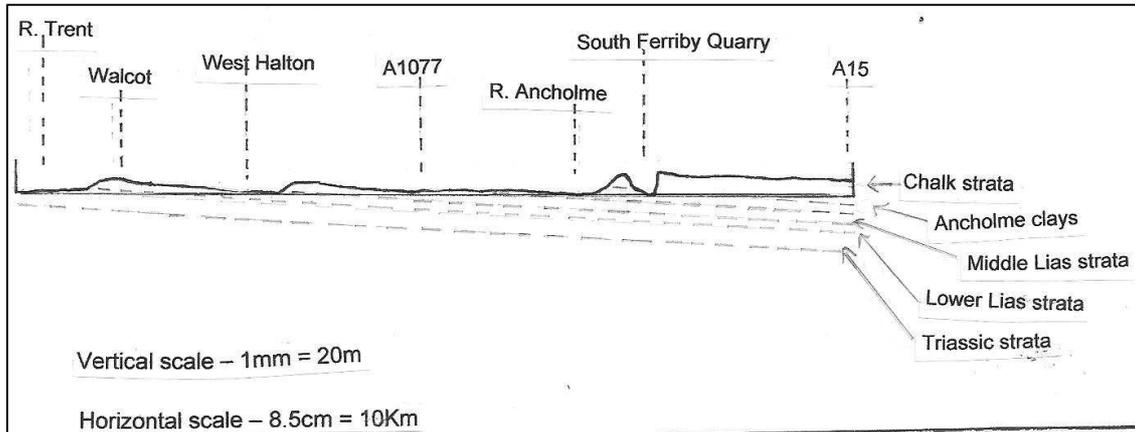


Fig. 2 Simplified surface cross-section (exaggerated vertical scale) from the A15 in the east (right) to Alkborough in the west (left) and passing through South Ferriby's large modern chalk and clay quarry.

During the past two million years the Humberside landscape was further reformed by the advance and retreat of successive Ice Ages, this known geologically as the Quaternary period. The pre-Ice Age ancestor of the present Humber estuary may well have been the valley of a river flowing west to east and on across the 'North German Plain' – later to become the German or North Sea. This river would in turn have been a tributary of a once great river which flowed north-

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The 'Ferriby chalk' scarp face.

7

The upper Lias strata scarp face ('Coleby Mudstones with Marlstone Rock').

8

The lower Lias strata scarp face ('Scunthorpe Mudstones with Frodingham Ironstone and limestones').

east to south-west from present-day Scandinavia and into which the ancestors of the present-day rivers Thames and Rhine also flowed.

The upper section of this 'River Humber' may well have flowed only intermittently as the base rock was porous chalk. Nevertheless, water tables would have been at pre-civilization levels. Furthermore, across the Quaternary era during early post-glacial periods permafrost in the porous base rock ('Ferriby chalk') may have resulted in the surface erosion by melt-waters – a possible explanation for the dry valleys and intersecting spurs producing the present day undulating landscape of the dip slopes of escarpments rather than a more level landscape that might otherwise have been expected.

The successive see-sawing of the Ice Ages with warm inter-glacial periods across the Quaternary Period helped form the landscape we see today. The Humber valley may well have been much changed by early glacial episodes but drift boulder clay from such times is thought to be little in evidence as it was overlain by deposits from the most recent glaciation.

The final Ice Age – known geologically as the Devensian – was preceded by the Ipswichian interglacial of 130000 to 110000 years ago. The then sea level was two meters plus higher than today thus inundating any glacial deposition of the preceding Ice Age up to a point on the estuary side above the historic sea level. Thus present day areas such as Holderness, the Hull valley and the Lincolnshire 'Marsh' from Barton parish to East Halton and beyond would have been under shallow sea water and the then coastline closely defined by the present day five meter contour (see Fig. 3). The mouth of the 'River Humber' would have been where the Humber Bridge now spans the Estuary.

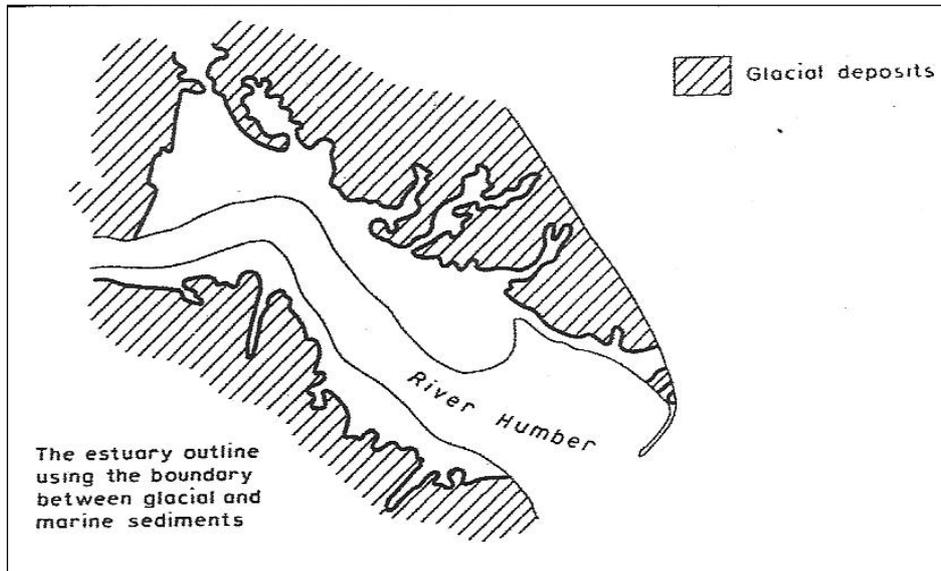


Fig. 3 Map showing the lower and mid-Humberside region. Shaded area shows where till is the principal subsoil, blank areas where alluvium forms the subsoil (taken from Jones 1988, 36).

Thus, at the local level, on the north bank Priory Road runs parallel to the ancient cliff-line which cut into the lower dip slope of the Yorkshire Wolds while Willerby High Road, Boothferry High Road and Hull Road, Hessle cross it east to west. At these points the ancient coastline has no visual impact today but on Harland Way, Cottingham (near Harland Rise and the High School) a noticeable change in gradient defines it while in Hessle the building of the South Orbital Road in the 1970s revealed the ancient coastline to the west of Hessle Haven.

On the south bank the five meter contour runs east – west rather than north – south (see Fig. 3). On Fleetgate, Barton just south of the Newport junction a barely perceptible change in gradient defines the pre-Devensian coastline. The feature is repeated half way along Pasture Road whilst in Barrow parish the motte and bailey castle site of Drogo de Brevere, first Norman Lord of Holderness, sits on the old coastline.

The advance of the final Ice Age (Devensian) between 80000 and 12000 years ago rolled over and much eroded this ancient cliff-line, as is evidenced by the expansive deposits of glacial till above the five meter contour. Much of Barton town, for example, stands on boulder clay which inland of the town eventually gives way to the thin soils of the upper chalk dip slope. East of Barton the boulder clay drift soil band widens east and west of Barrow Mere and characterizes the soils of most of Barrow and Goxhill parishes. On level or very gently sloping land adjacent to the Humber clay bank this drift material is further overlain by post-glacial estuarine alluvium.⁹

Virtually all of the City of Hull and the south Humber bank from Barton Cliff, through the Waterside area, Barrow Haven and New Holland stand on estuarine alluvium soils. All of this area is protected from periodic inundation by the sea defenses of the City of Hull and on the south bank the reinforced clay banks – these monitored and strengthened when need be according to the Humber Flood Risk Management Strategy overseen by the Environment Agency.¹⁰ In terms of drift geology the lower Ancholme valley is also identical to that of the lower Hull valley

The history of the man-made clay bank sea defenses on both sides of the Humber would be central to an understanding of the agricultural, industrial and residential history of the region were such evidence extant. Unfortunately for the north bank evidence is patchy,

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This being silt carried in the tidal waters and deposited in wafer-thin deposits in the shallow margins as the tide turned.

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The H.F.R.M.S. summary consultation document 'Planning for Rising Tides' was published in Sept. 2005, periodic follow ups to interested parties are supplied via the news-sheet 'Humber Tides News'. Following the devastating floods of December 5th, 2013 the whole H.F.R.M.S. under review.

for the south bank more so. For Myton berewick¹¹ some medieval charters make it clear that some form of embanking existed to hold back the Humber tides, and there was at least a trading station at Wyk (later to become the core of the 'Old Town') by the early-13th century protected by some form of sea defense. Because Wyk and Myton lay at the eastern extent of Hessle parish bodies of the dead had to be carried along the Humber bank some four miles to the parish church. Change came in 1301 when Archbishop Corbridge of York ordered that a graveyard be consecrated at the chapel-of-ease at Wyk while in 1303 Edward I ordered that roads be built linking the recently acquired royal town with older, spring line settlements on the fringe of the flood plain. As a result the original roads to Anlaby, Hessle, Beverley and Holderness were constructed, in places on considerable causeways to raise them above the surrounding wetland (Gillett and MacMahon 1989, 7).

It can only be speculated as to how these early local sea defenses were funded, exactly what form they took and who did the work. It seems likely that the manor had most to gain from such capital expenditure, the parish church having little to gain from improving this distant area of sparse population. Surviving evidence for Romney Marsh (a similar geophysical area on the south coast) for c. 1250 shows that the sea defenses were built and maintained by 'levies of labour', the levies presumably imposed by the manorial court (Tate 1969, 26). Despite the early sea defenses of the north bank severe periodic inundations still occurred. In 1253, for example, floodwaters reached Cottingham village and it was later recorded that much of the land in Myton belonging to Meaux Abbey had 'collapsed into the

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A sub-manor. This being broadly the area west of the 'Old Town' of Hull and, which was in medieval times part of Hessle parish.

Humber and was never recovered' (Gillett and MacMahon 1989, 3).¹² Presumably the sea defense then had to be re-built. It was not only the forces of nature that might imperil the medieval sea defenses; in 1315 following disputes over pasture rights in Myton manor one Loretta and fellow vandals from Swanland deliberately broke the sea bank causing flooding in Myton and Hull (Gillett and MacMahon 1989, 8).

One correlation between physical geography and the region's industrial history is the brick and roof tile-making industry. Here post-glacial alluvial clays deposited by tidal action across the warplands provided a suitable raw material for this manufacturing process. Hull's medieval town defenses were built of brick between the 1320s and the end of the century, this being probably the first area of large scale post-Roman brick production in England (see Calvert 1978, 75 - 80, Gillett and McMahon 1989, chap. 3 and Bryant and Land 2007, 2). At the northern end of the alluvial deposits Beverley was also a significant area for medieval brick-making. There are 13th and 14th century references to a 'tillery' in Myton berewick just west of the Old Town and somewhat later references to brick-making north of the town walls near the Charterhouse foundation in Sculcoates parish. Medieval bricks were often known as 'building tiles' (or 'walling tiles') being larger in surface area than modern bricks but much thinner. John Leland, Henry VIII's chaplain and 'Royal Antiquary', when visiting Hull in 1539 considered that most of the houses were, even then, built of brick.

Large-scale brick and tile manufacture developed along the warplands of Barton parish in the 19th century utilizing the same type of raw material as had been used in Hull (see Bryant's detailed study

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Tate 1969, pp.26/8 gives an interesting account of the evolution of late medieval and early modern specific local rates to fund the maintenance of sea defences.

Bryant and Land 2007, 1-58). Across the centuries river transport was relied on to move this bulky product, each 19th century brick and tile works having a jetty (or jetties) crossing the foreshore from which to load the keels and sloops (for a readable and interesting first-hand account of the workings of these brick and tile yards, including the procedures for loading and unloading the boats see Newton 2001, chapters 3 to 9).

Bryant notes that it was the upper layers of floodplain clay in Barton parish that were best suited to the production of roof tiles, the clay below a depth of six feet containing too much sand but was nevertheless suited to the production of common bricks (Bryant and Land 2007, 1). Obviously the 'brick clay' layers were deposited much earlier and it could be that the sand content was derived from the erosion of post-glacial sand and gravel deposits around the Estuary.

At one point on the Estuary this process continues. At Redcliff, west of North Ferriby on the north bank and at Ferriby Cliff¹³ between Leggott's chalk quarry and South Ferriby Hall are two similar physical features (see Fig. 9). Both are low cliffs of unconsolidated sandy material at the mercy of undercutting and cliff-face retreat following spring tides. Ferriby Cliff has been much eroded in modern times from the effect of a powerful tidal current sweeping round from the channel south of Reed's Island. Carey shows (Carey 2009, 60 and inside cover and c. 2000, 76) the extent of cliff retreat across the last 350 years including that of Cadwell Closes and Cadwell Furlong, once a Romano-British occupation site (see Fig. 4). On the north bank between the 1930s and 1963 three remarkable early boats were discovered in the estuarine mud east of Redcliff. These discoveries point to a considerable prehistoric trade along, and across, the

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Locally this phrase can mean a more specific point along this feature.

Humber¹⁴ and were dated in the 1990s to between 2030 and 1680 cal BC by the technique of ‘accelerator mass spectrometry’.



Fig. 4 View west from the top of Ferriby Second quarry (see later) embankment. The grassy strip is at the top of Ferriby cliff. In the centre, middle distance, is Cadwell, the site of a Romano-British port settlement and eroded in modern times by the sweep of the south channel (of the Humber) on the ebb tide. The cultivated field is formed from ‘post -lacustrine’ deposits. Sluice Road (see later) and the modern cement works (see later) are in the centre, distant. In the 1990s the foundations of a Roman road were discovered in the tidal shore-line north of the cement works.

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Valuable information on the ‘Ferriby boats’ can be gained from literature and exhibits at the Hull and East Riding Museum, High St., Hull.



Fig. 5 View north from rising land between Leggott's and Ferriby Second quarry and showing North Ferriby cliff (Redcliff) and Melton's modern chalk quarry in the centre, distant.

Glaciologists believe that during the Devensian (last) Ice Age an ice sheet ploughing its way across the then frozen interglacial sea-bed, to the east of the previously defined Ipswichian coastline, halted its advance at the point where the 'Cliffs' now stand (see Fig. 5). Possibly then Redcliff and Ferriby Cliff, laying at a north-north-west to south-south-east axis, could be remnants of material deposited as a terminal moraine, subsequently eroded by post glacial tidal waters. The geological map (Sheet 80) however identifies the drift material on both banks at this point as 'Sand and gravel (including post-lacustrine levee sand)'. West of the face of the Ice Sheet and escarpments a vast lake, 'Lake Humber', built up across the Vales of Trent and York in the early post-glacial era (c. 12000 years ago). As the ice face began to retreat (see later) the lake drained through the Humber gap, the 'post-lacustrine levee sand' being presumably associated with this process.



Fig. 6 Section of South Ferriby cliff immediately east of Ferriby Second quarry embankment (centre with remnants of landing stage in the foreshore). Note; the Ipswichian wave cut platform immediately above the high-tide mark, ½m. layer of calcreted chalk and flint gravel immediately above the wave cut platform, thin layer of ‘laminated clay’ 1m. above the base with the Devensian till above (description taken from Gaunt, Fletcher and Wood 1992, various pages).



Fig. 7 Section of South Ferriby cliff west of Ferriby Second quarry embankment.



Fig. 8 (Part of Fig. 7). Notice the undercutting by spring-tide wave erosion, the ‘intrusions’ of chalk shale and the nesting sites of sand martins in the upper layer of the till. The same feature is common to the same layer in cliffs along the Holderness coast.



Fig. 9 View east towards Ferriby Second quarry from the track (far left and forming part of the old Ferriby 'low road') above Ferriby Hall. At 20 meters above sea level the track appears to be sited on top of the Ipswichian cliff line.

The fact that the Estuary bisected the 'Ferriby chalk' escarpment has meant that the side of the Humber valley immediately east of the 'Cliffs' has been an ideal location for chalk quarrying. By driving a level-floored cutting into the valley side an increasingly deep wall of chalk could be revealed and quarried back. Furthermore, by constructing wooden piled jetties into the Humber foreshore and on a level with the quarry floor it was possible to transport the bulky quarried material from the quarry to the waiting keels and sloops for transit by water.

Chalk has been put to various uses in relatively recent times;

- When ground down at whiting works it formed the basic material for lime mortar and lime-wash;
- Used as hard-core foundations for walls, roads, dock construction and sea defenses;
- Cut to blocks and weathered before being used as building stone (see Tyszka, Miller and Bryant 1991, 169). Alternatively chalk clunch blocks of similar width were set into a thick mortar to produce 'rough coursed' walling;
- Crushed to spread on arable land to make the soil less acidic;
- More recently in the manufacture of cement.

The vast disused chalk quarry at the northern end of the Humber Bridge now forms much of the Humber Bridge Country Park (see Fig. 10). It has been a source of lime for centuries. The surviving 19th century tower mill (now without its original, unique, five sails) was built to turn the grindstones that crushed the quarried chalk. In earlier centuries the same job was usually done by hand tools

or by a post-mill. In the late-12th century Meaux Cistercian Abbey, sited in the River Hull valley and east of Beverley, was granted a quarry in Hessle from which stone was taken to construct the conventual buildings.¹⁵ Presumably it was this site that provided much of the raw material for the lime mortar which bonded the bricks of Hull (see above) from the 14th century onwards - it is thought to have taken approximately four and a half million bricks, or 'walling tiles', to build the town's defenses.

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Unless prepared in a certain way chalk is a poor quality building stone (weathers quickly). It may have been that the chalk from Hessle was used for foundations or as rubble in-fill for columns and walls. Maybe, however, it was prepared and used in the form of ashlar blocks for wall building. A good account of the use of chalk ashlar blocks in building is given in Tyszka, Miller and Bryant (eds.) 1991, 168-169.

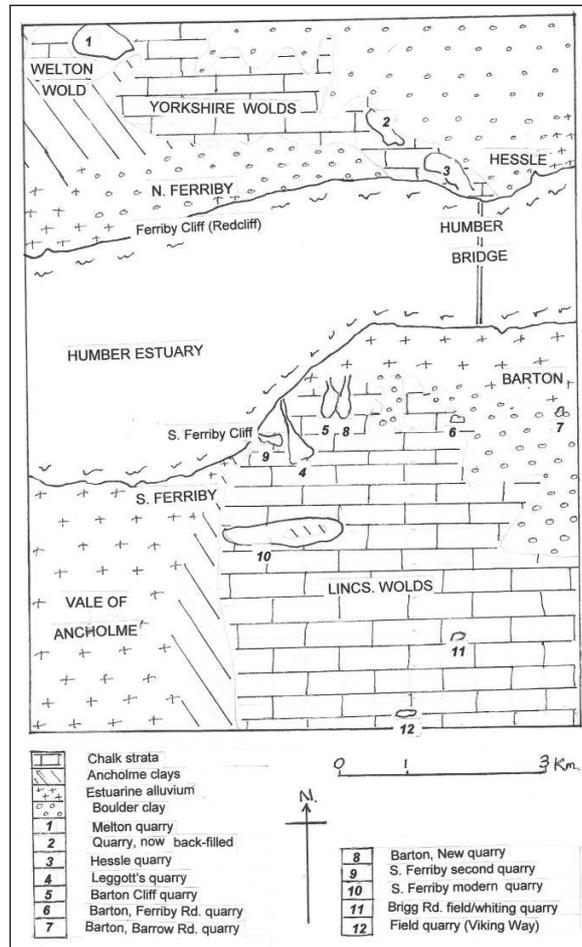


Fig. 10 Sketch map of the central Humber region showing the location of chalk quarries mentioned in the text.

On the south bank of the Humber a series of chalk quarries were developed in the 19th and early-20th centuries (see Fig. 10). The First Series O.S. one inch to one mile map published in 1824 (Sheet 86) shows that quarrying had already begun in the Humber valley side between Barton and South Ferriby at Ferriby Quarry (later to be more commonly known as Leggott's Quarry) and Barton Cliff Quarry. The former already (1824) included two jetties into the Humber channel south of Ferriby Sand or Old Warp¹⁶ and

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The vast mudflat from which, at its western end, Read's Island was soon to evolve.

two buildings on the level land at the mouth of the quarry and above Ferriby Cliff. Ferriby Low Road was already (1824) diverted around the top of the quarry and was probably at this point little more than a footpath. The quarry was sited on the northern part of land that before Parliamentary Enclosure, 1801-1804 (see Russell 1982, 131-134), had been part of North Field (open field) and which afterwards was divided into 12 similar sized rectangular fields between Barton Road and the Humber bank, all of which had been allocated to Sir H. Nelthorpe of Ferriby Hall.¹⁷ This quarry was presumably a capitalistic venture by the lord of the manor.¹⁸

Initially Ferriby Quarry was referred to as 'The Pit', or sometimes 'Stone Quarry' (see Footnote 17), and Carey notes that 'job opportunities resulting from the work on the Ancholme and its Sluice in the 1800s followed by brick making and quarrying led to a doubling of the population (of South Ferriby) by 1841' (Carey 2009, 4). In the village a few two-up, two-down terraces were built in the 1830s and 1840s to house workers and their families. Carey's study of the drawings of Charlotte Nelthorpe done in 1843/44 shows two views of the 'Pit' (Carey 2009, 56 and 57 and see Fig. 11).

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Sir H. Nelthorpe was allocated over twice as much land as all other allocations combined (see Russell 1982, 134).

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This unlike the now thickly wooded small quarry on the south side of the A1077 at Ferriby Hill (chalk scarp slope) which, in the 19th century, seems to have been a parish facility. In the 'Memoirs' of Richard Cook it is recorded that the confusingly named 'Stone Pit' was 'let by the parish vestry' (Lyons and Craven 1977, 45).

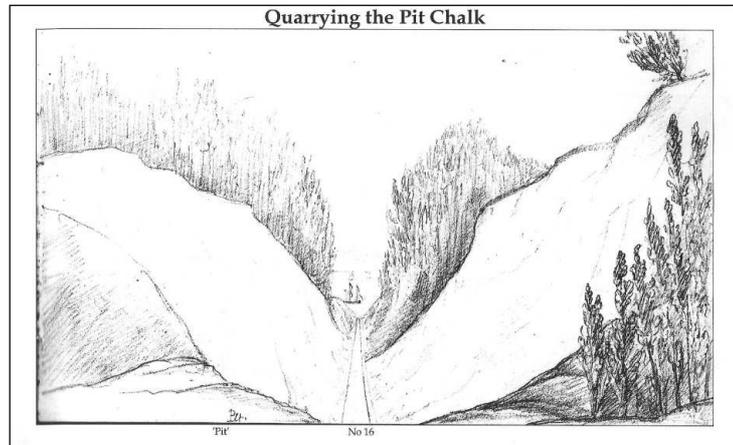


Fig. 11 One of Charlotte Nelthorpe’s drawings of the ‘Pit’; extract from ‘The Drawing Book of Charlotte Nelthorpe, 1843 – 1844’ (as reproduced in Carey 2009, 56 and by kind permission of the private owner).

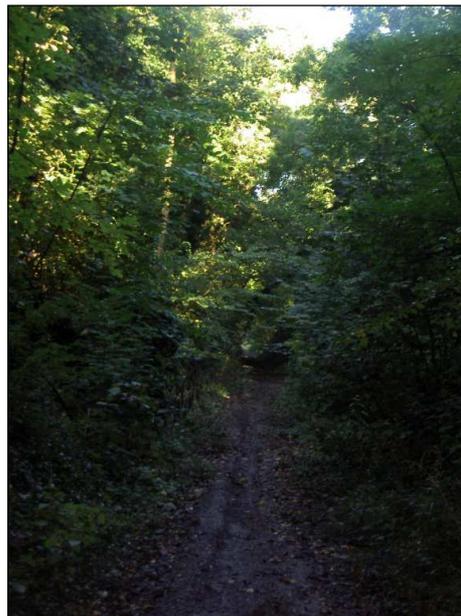


Fig. 12 The same view today as shown in Fig. 11.

Even by 1827 General Loft recorded in his ‘Lincolnshire Notes’ that ‘There is one of the deepest and largest Chalk Pits eastward of the village that I almost ever saw out of which are annually taken many thousand Tons for laying along the Coast of the Humber to protect the Parishes from the Incursions of the Waters’

(quoted by Carey 2009, 57) This provides an interesting commentary on the Estuary flood-defenses of the time – were these banks of unconsolidated chalk blocks (surely an unreliable sea-defense), were the blocks laid coursed in some way or were the banks, once formed, turf covered? It surely seems likely that chalk from Hessle Cliff Quarry was put to similar use on the north bank as by the 1820s it was already of considerable extent and the most extensive chalk quarry in the Humberside region.¹⁹

Carey's analysis of the 19th century census enumerator returns for South Ferriby show that by 1851 ten percent of the village's working population was employed in quarrying, this percentage exceeded only by farm workers and domestic servants. In his 'Memoirs' Richard Cook noted that as a child (born 1832) his father worked in the 'Pit' and his family lived on site in one of two semi-detached workers' houses (see Fig. 16). If his recollections are accurate, the quarrymen worked for 13 hours a day, six days a week with half an hour for breakfast and an hour for dinner. He recalls 'several Ferriby men worked in the Pit all their lives 'and had never travelled ten miles from home' (Lyons and Craven 1977, 12). Nineteenth century quarrying was very much 'pick and shovel' work.

The 1887 First Series 25" O.S. map shows that by then the main quarrying operations were at the south, south-east end of the much extended quarry with a tramway linking the chalk-face to the jetties (see also Carey 1999, photo of tramway and rail-carts p. 67 and on p. 68 a photo of workers near the chalk-face, both early-20th century). By 1910 the Second Edition 6" O.S. map shows

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Newton gives some interesting information re chalk quarry cargoes between 1897 and 1905 (Newton 2001, 87). It also shows that from some of the quarried material flint was extracted on site.

that the quarry had penetrated a third of a mile into the hillside, virtually to its current extent. On both sides of the central tramway spoil heaps from earlier excavations were already covered with maturing woodland. From the evidence of the 1945 6" O.S. map the jetties appear to have gone but in fact the quarry did not close for another 18 years! It is not clear when the early-19th century workers' housing, referred to above, was demolished.

A very detailed, interesting and readable account of work in Leggott's Quarry and how the chalk was treated on site and loaded into the river craft between the 1930s and the cessation of quarrying in 1963 is given in the late Ron Newton's book, chapters 11 and 12 (Newton 2001, 89-115 and see Fig. 13). Ferriby (Leggott's) Quarry's 135+ years as a working quarry were finally at an end.

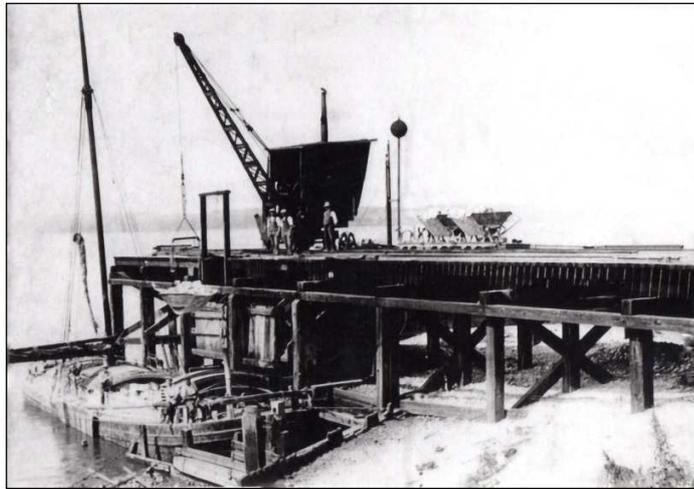


Fig. 13 A vessel being loaded with chalk at Leggott's quarry jetty (catalogued as South Ferriby cliff, 1 and shown courtesy of Brian Peeps of Barton and the Keel and Sloop Preservation Society).



Fig. 14 The north-easterly view from the top of the embankment which led to the loading jetty at ‘Leggott’s’ Quarry. In the distance the foreshore and rising land between Hessele and North Ferriby.



Fig. 15 Remnants of ‘Leggott’s’ Quarry’s loading jetty and the ‘cliff’ profile of the embankment. Part of the eroded till cliff and showing below the embankment of chalk clunch.



Fig. 16 Site, centre left, where the pair of worker's housing once stood. The wooded fringe of Leggott's quarry can be seen on the left.

By 1910 (Second Edition O.S. 6 inch map) Barton Cliff Quarry had been extended southwards by one sixth of a mile, up to a point just north of Westfield Road. In 1856 it was stated that 'Great quantities of Chalk Stone are annually sent from Mr. Graburn's quarry (Barton Cliff) which was opened about 1790.²⁰ Ball (1856, 21, 'part second') records that 'From forty to fifty thousand tons have been shipped per annum, affording employment to forty men. Many tons of this stone are yearly converted into Whiting at the mills (see later) in the town'. The height of the chalk-face at this point may be judged by the fact that Westfield Road follows the 40metre contour on modern maps while South Cliff Farm at the mouth of the Quarry stands on the ten meter contour. The 1910 1:10560 (six inch) O.S. map shows that a tramway had been built

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Probably a bit later in fact, as Graburn didn't gain ownership of the land until Enclosure in 1796. The Enclosure Award records the building of four jetties between the Haven and the parish boundary with South Ferriby (Russell 1968, various), at considerable cost. Was at least one of these an attempt to 'kick-start', at the public expense, a quarrying industry, presumably allied to the creation of better sea defences?

from the south-west corner of the Quarry, through the South Cliff Farm site to jetties beyond the Humber bank. Taken over by G. and T. Earle Ltd. in 1912 to provide chalk for the nearby Adamant Cement works the Barton Cliff Quarry was closed in 1915. The 1945 6 inch O.S. shows that by then the tramway and jetties had gone but the embankment which had carried the tramway from South Cliff Farm to the jetties remained. In the early-21st century this area north of the Farm has been reformed to create one of the Humber's areas of 'managed retreat' to reduce the potential flood-risk.²¹

Immediately east of Barton Cliff Quarry is the also now disused 'New Quarry'. The 1887 O.S. 25 inch Map shows that quarrying had begun there by that time. By the end of the 19th century a tramway led north- north-west from the Quarry to a jetty at 'New Cliff' (near the present day 'Pebble Beach' car park). The final 200 yards of the present day track leading to the small car park sit on the original tramway embankment. Apparently chalk was loaded here to be used as foundation stone for the extension of Alexandra Dock, East Hull. The 1906 25 inch O.S. map shows that by then the Quarry had been further extended southwards and the tramway had been re-routed alongside part of Far Ings Road and in a curving line across to the Adamant Cement Works, constructed 1890. As the re-routed tramway passed immediately west of the industrial site to a foreshore jetty it seems likely that some quarried chalk was still being transported for traditional purposes as well as being used in the cement making process.

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This involved re-routing the sea defence bank beyond two previous fields and breaching the original bank. Gradually saltmarsh vegetation develops on the previously arable land.



Fig. 17 View into disused ‘New Quarry’ from the public right of way immediately to its east. Brough, (the Romano-British town of Petuaria) is sunlit in the distance.

The Cement works closed in the 1920s²² and the 1945 6 inch O.S. map shows that although New Quarry had been extended south as far as Westfield Road it was by then disused. Newton recalled that between 1937 and the late-1940s New Quarry floor was used as a training ground by the local branch of the Territorial Army. Since then the access channel has become overgrown and the Quarry has evolved into an unofficial nature reserve which may be viewed (where breaks in the self-sown hawthorn permit) from the public right of way which runs down the hillside immediately east of the Quarry (see Fig. 17).²³

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An interesting information board exists on site and for further information see the *South Humber Bank Wildlife and Heritage Partnership, Winter Newsletter 2010*.

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The information on New Quarry and some facts about other quarries have been obtained from the database of North Lincolnshire Council’s Historic Environment Record, based

The development of the second South Ferriby chalk Quarry (variously known as 'Ferriby Second' or 'Walkers') one field west of Leggott's Quarry was clearly a 20th century venture. The 1906 Revised O.S. 6 inch map shows fields but no quarry between the fox covert north of Ferriby Low Road and Leggott's Quarry. The 1948 Provisional 6 inch O.S. map shows the Quarry almost at its present extent with the vast spoil heap above the foreshore and through which the quarried chalk was taken, presumably to some sort of elevated loading area.²⁴ On the beach and extending to the low water mark there appears to be an L-shaped building, more likely to have been a loading stage (see Fig. 18). An undated photograph (see Carey 1999, 68) shows the access track into the 'Second Quarry' and part of the embankment at a time when it was (presumably) in production. Unfortunately it doesn't show the foreshore structures parts of which are still visible at low tide – these include the skeletal remains of the hull of a sunken sailing ship.²⁵

in Scunthorpe. This provides an invaluable starting point for any 'on the ground' historical research within the Unitary Authority.

24

It is possible to still define in the undergrowth the channel through the spoil-heap which carried the tramway.

25

For details of the 'Mary Maria' see Historic Environment Record, SMR number 21496-MLS21496.



Fig. 18 A barge being loaded with chalk, thought to be at the jetty at Ferriby Second quarry (catalogued as S. Ferriby Cliff, 5 and shown courtesy of Brian Peeps of Barton and the Keel and Sloop Preservation Society).

The 1972 1:10000 O.S. map shows this Quarry to have then been at its present extent plus the embankment but with no jetties or landing stage. Presumably the Quarry was disused by this time but the map shows no evidence of the maturing trees that have now colonized the site. Today this Quarry is administered by Humberside Police.

In the preamble to *White's Trade Directory of 1882* it was recorded that '35000 tons of chalkstone are sent annually from Barton Cliff' (only slightly less than Ball's earlier figure, see above). There is no doubt that the bulk of this 'chalkstone' from both Barton Cliff quarry and Leggott's quarry was transported to build, or reinforce the banks along the Humber and sections of the banks of the River Trent (Clapson 2005, Ch. 9 gives details of 19th century vessels and cargos). It seems that the chalk clunch was dumped from the sloops (not keels) or barges in a loose linear embankment which would then be washed by the flow tides which in turn would deposit silt which would gradually seal the gaps between the chalk blocks (see Fig. 22). Later in the 20th century cut blocks of 'slag' from the Scunthorpe steel works were more commonly used, sealed with mortar to provide a more immediately effective sea defense.

In the context of 20th century sea defenses an there was an interesting development in the late 1930s. Dutch experience and expertise in this field were brought to the Humber, the workmen and their families housed in temporary accommodation near the Humber bank just west of South Ferriby Sluice (no surviving evidence).²⁶ The strategy, tried and tested in their homeland, was to tightly tie-up bundles of long, straight, narrow branches (presumably willow and see Fig. 19) and then to tie many bundles together to form a floating 'mat' (see Fig. 20). Once in place (presumably on the upper foreshore) stone from transporting barges was transferred to the 'mats' so that they sank, thus contributing to a wide sea-defense (see Fig. 21). The writer does not know which sections of bank were so enhanced.



Fig. 19 Picture supplied by 'Mrs. Bets', taken when her father (second left) was working on the Humber bank.

26

I am indebted to Mrs. Bets of Sleidrecht, Netherlands for the following evidence and for Figs. 19, 20 and 21.



Fig. 20 Picture supplied by 'Mrs. Bets', somewhere along the south Humber bank.

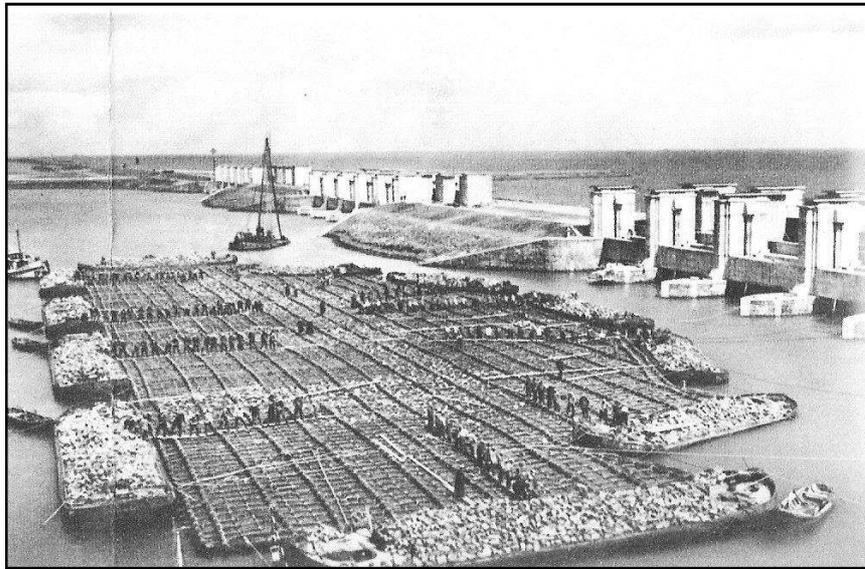
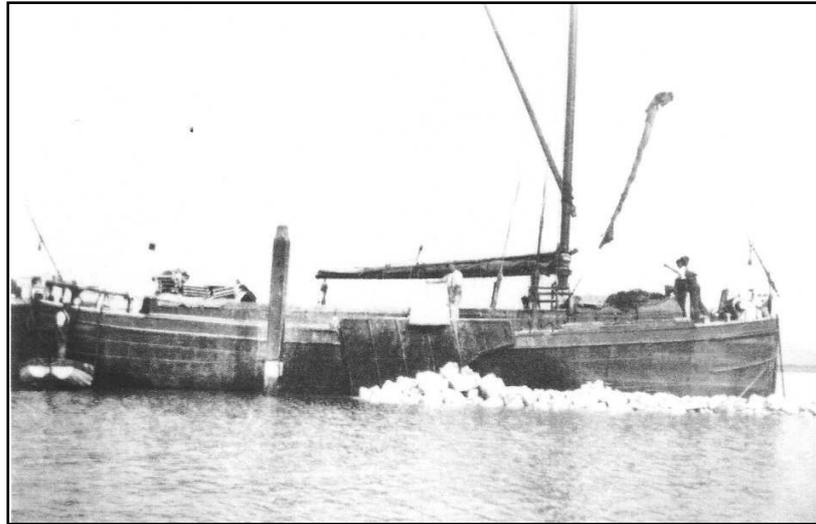


Fig. 21 Picture supplied by 'Mrs. Bets', same work but on a larger scale in the Netherlands, and after the 1953 floods.



**Fig. 22 Here is seen a sloop unloading chalk stone to create a linear sea defence at Trent Falls. The hopper was filled from the hold and then winched up, pivoted to the side and tipped, the board being used to direct the tipping. The narrow chimney near the stern was the flue for the fire in the crew's quarters.
Catalogued by B. Peeps as 87762 Sloop and shown courtesy of Dr. J. Ball.**

The vast working quarry off Middlegate in South Ferriby parish is where chalk and clay are quarried, processed and then transported by overhead conveyor belt to the large cement works immediately west of Ferriby Sluice. The Second Edition 6 inch O.S. map, 1908, shows post-Enclosure field boundaries and no quarry on the site except for a small field quarry at the north-west corner of the present site. No cement works then existed in the parish.

The initial large-scale cement works was completed in 1938 (see photographs in Carey 1999, 69/71 and see Fig. 23). By the time of the 1948 Provisional 6 inch O.S. map the quarry was of similar north-south width as today but only extended some 200 yards into the scarp slope side – this area today taken up mostly by a huge spoil-heap which has become an unofficial nature reserve (see Fig. 24). One building is shown near the quarry exit but no overhead conveyor belt. By the time of the 1972, 1:10000 O.S.

map quarrying had eaten 600 yards into the scarp slope and the conveyor belt was in place (see Fig. 26).²⁷ Today the quarry extends from west to east for a distance of approximately one mile (see Fig. 25)! The track off Middlegate and immediately south of the quarry affords fine views of the scene, especially when quarrying is in progress, plus, on a clear day, fine views of the Humberside region.



Fig. 23 View across S. Ferriby Sluice to the Cement works, 1950s (catalogued as S. Ferriby Sluice, 34 and shown courtesy of Brian Peeps of Barton and the Keel and Sloop Preservation Society).

27

Apparently the conveyor belt was preceded by a system of hoppers attached to a continuous loop, much like the 'aerial flights' of the North East Coalfield which carried waste from the post-war mines to the nearby beaches before the mines were closed in the 1980s. In her letter 'Mrs. Bets' mentions seeing these as a child (see footnote 26).



Fig. 24 View of the western end of the large working quarry above South Ferriby showing the deposits of overburden as the quarry expanded. Also shows the crushing plant from which a continuous conveyor belt carries the crushed chalk to the cement works.



Fig.25 View towards the eastern end of the modern quarry showing the terracing arrangement whereby chalk is extracted and along some of which vehicles travel carrying chalk from the quarry face to the crusher. In the distance, storm clouds over Hull.



Fig. 26 View west from Middlegate lane showing the covered, continuous conveyor belt by which crushed chalk is carried to the cement works. Initially, presumably, chalk was transported to the works by lorry then for a period (1950s?) an aerial flight much like those built in the North-East coalfield to dispose of waste on the beaches) was constructed to transport the chalk from quarry to works by a series of skips.

With quarrying on this scale, and as a result of cutting into the scarp face, at the eastern section of the quarry the full depth of the Ferriby chalk strata has been removed to reveal a dark, claylike (in colour) lower strata (Ancholme clays, see above, and Fig. 2). This is also quarried and used in the cement making process.²⁸

Another large-scale 20th century chalk quarry allied to a cement works is that at 'Melton Bottom', north-west of North Ferriby and very visible from south Humberside (see Figs. 5 and 10). The 1910 OS 1:2500 map shows the area now comprising the quarry was

28

There are various types of cement but basically it is made from calcium carbonate (chalk) mixed with a small percentage of clay and then heated to produce quicklime. Added to this 'clinker' are small amounts of gypsum and sometimes other minor constituents.

still then post-Enclosure fields. The 1929 OS 1:10560 map (revised 1926) shows that in the intervening 16 years a quarter mile long quarry had been excavated with two associated tramways and 'cement works'. The 1956 OS 1:10560 map shows Melton Bottom quarry to have been extended to about 1000 yards in length. Today the quarry is approximately three-quarters of a mile long and extends north from the Bow (linear) Plantation and as far west as Crossall Hill Lane with, on its west, another plantation in which is a smaller, long disused 'Stone pit'.

Today there are four disused chalk quarries in Barton-on-Humber, three are beside Ferriby Road and were developed to provide lime and whiting.²⁹ For most of their working life they were outside the town's built-up area. The fourth quarry was opposite the cemetery on Barrow Road and now 'contains' a modern housing estate. This is one of four 'pits' shown on Barton's post-Enclosure map although the Award allocated eight plots of land to the Surveyors of Highways 'from which chalk and gravel could be dug for road repairs'³⁰ (see Russell 1968, 19/20). This became the 'town quarry', meaning that it was used by the vestry and later the Urban District Council as a source of chalk clunch for road building/repairs, foundations and the like. Prior to the building of the housing estate a large, post-war bungalow and grounds covered the quarry floor. No mature vegetation had colonized the disused quarry.

29

The Enclosure Award for Barton refers to 'Stone Pits' beside Ferriby Road by the 1790s (Russell 1968, 17).

30

The other three shown are; the surviving quarry on Gravel Pit Lane, one west of Brigg Road opposite Kingsforth House and one beside Caistor Road, now filled in but with the rectangular grassy patch still fenced off from the surrounding fields.

The development of the Ferriby Road quarries was allied to the local whiting industry which successive 19th century trade directories describe as one of Barton's principal industries. Much of the following information has come from a study of those Directories and from discussions with Mr. Read of Ferriby Road to whom I am much indebted. Quarry 6 on Fig. 9 identifies the middle one, and largest, of the three quarries which stand as neighbours on the north side of Ferriby Road. This road climbs from Holydyke, traditionally the edge of the built-up area in south-west Barton, up the side of the chalk escarpment bisected by the Humber (see Fig. 1).

The upper of the three quarries, and the second largest, was possibly the first to be dug.³¹ *White's Trade Directory, 1826*, identifies two lime burners on Ferriby Road, one certainly living in the windmill house, the tower mill being near this quarry's entrance. Lime (quicklime) was produced by heating chalk-stone in a furnace thus reducing the chalk to a powder. Early in the 19th century the fuel for the furnace was more likely to have been wood than coal. The lime was either sold to farmers to spread on fields, or parts of fields, where the arable land had become too acidic, sold to bricklayers as the main constituent of lime mortar, or sold to undertakers for use in coffins and graves.

By 1826 there were four 'manufactories' of whiting in Barton ('Paris and common'). Chalk was the raw material from which whiting was manufactured, this then used in the production of distemper ('whitewash') and allied products.³² One of the four manufacturers was 'R.S. Graburn of Brigg Road'. He was a large landowner in

31

Today this disused quarry is obscured from view from Ferriby Road by mature trees.

32

'Paris' whiting was a fine grade of whiting used for polishing and as a pigment.

the parish who had had built a number of post-Enclosure out-of-town farmsteads, including Chapel Farm near which a section of the Brigg Road was traditionally known as 'whiting-mill bottom' (see Fig. 27). A small nearby quarry survives today (no. 11, Fig. 9) but it is not known whether a furnace once stood there. By 1826 Graburn had also started to develop Barton Cliff quarry (no. 5, Fig. 10 and see above).



Fig. 27 View north from junction of Brigg Road and Saxby Road, showing small disused chalk quarry and 'Chapel Farm-House' in the distance.

In the 1840s the two lime burners on Ferriby Road were still recorded along with two 'whiting and Paris whiting manufacturers', both based off Waterside Road. The coming of the railway later in the decade was to keep the industry firmly based in the Waterside area. Presumably the area was attractive to the industry before this as sloops and keels sailing up the Haven could provide the necessary transport facilities. By 1849 the family that was to develop the largest quarry on Ferriby Road was being listed as 'farmer of Ferriby Road'.

Kelly's Trade Directory, 1861 described whiting manufacture as one of the 'chief trades' of Victorian Barton suggesting that the two Waterside businesses had expanded. On Ferriby Road one quarry was recorded with the father of the farming family described as 'agent'. However, by 1872 (*White's Directory*) this man was described as 'whiting manufacturer and chalk quarry owner' (see Fig. 28). So by the 1870s the large quarry on Ferriby Road was being fully developed and Barton's third whiting mill existed in a large, three storey property called Victoria Mill at the northern end of Castledyke West (then called Back Lane), a building which had previously been a tannery.³³ Presumably the chalk was taken from quarry to whiting works by horse and cart while much of the finished product was transported by rail, the station being just across Waterside Road. A principal customer up to the demolition of Victoria Mill was the firm of Thomas Hassall of Manchester, manufacturers of 'Drysalteries, Chemicals, Whiting, Cement, Plaster, Minerals, Moss Litter etc.'³⁴.

33

The building was demolished in 1953 when the present junction with Waterside Road was created.

34

Wording taken from a postcard of the Manchester factory dated 1943, and loaned by Mr. Read.



Fig. 28 The largest of the three chalk quarries beside Ferriby Road, Barton, the scene today. Centre right can just be seen an arch made of two whale jaw-bones.

The process at Victoria Mills began with the crushing of the raw chalk into a powder followed by ‘sluicing’ in water-filled settling tanks. After the water was drained the residue was left to dry, then dug out and compressed into large ‘tiles’ which were stacked vertically on top of an open-air kiln. Once dried by the rising heat the ‘tiles’ were crushed to a powder in an auger and the resulting ‘whiting’ then bagged. Coal to fuel the kilns was brought in by rail and the bagged whiting similarly conveyed to customers by rail.

Both of the other whiting works in Barton were west of Waterside Road; Bank Mills where the caravan park now stands, the other

where the haulage company warehouses are now located.³⁵ The details of successive owners and businesses are recorded in successive Trade Directories, from which evidence it seems that by

35

This whiting works was owned by Sissons paint making firm based in Hull. They had a substantial landing stage built into the Haven bank near their works.

1937 only Victoria Mills remained in production.³⁶ A similar situation existed across the Humber in Hessle, *Bulmer's History and Directory of East Yorkshire*, 1892, recording that 'at Hessle Cliffe the chalk is extensively quarried (see no 3, Fig. 10) for the manufacture of whiting, which is carried on in the parish'.³⁷

'Chalk stone' was also quarried to provide hardcore for road repairs, surfacing for farm tracks and as a base for fold-yards or Dutch-barns. Field quarries such as the one near the southern most point of Barton parish (no. 12, Fig. 10) were generally excavated for this type of purpose.

Disused chalk quarries develop, over time, into an excellent environment for calcareous flora (and other types on backfilled overburden) and for local fauna, if relatively undisturbed. Furthermore, armed with some Knowledge of when the quarry was exploited it is possible to draw some conclusions as to ecological succession. Taking Leggott's quarry as an example it is clear that it was excavated from north to south and that the initial overburden and cut chalk were used to create the loading embankment (see Fig. 15).³⁸

In the early to mid 19th century, as the quarry was excavated deeper into the Humber valley side so overburden and waste material were dumped either side of the quarry's central access

36

A more detailed examination of Barton's whiting industry from the evidence in Trade Directories and Mr Read's body of evidence on Victoria Mills and the large quarry on Ferriby Road, must await another publication.

37

Point gained from the website of Hessle Local History Society.

38

I am grateful to Andrew Robinson (landscape gardener) for assisting with the ecological survey and for discussing associated issues.

valley on the floor of which was laid a rail-track(s) along which trucks transported chalk from the retreating cliff-face to the loading jetty. At the north end the spoil heaps either side of the central cut have remained relatively undisturbed the longest. Here self-sown, mature woodland of ash, sycamore and elm³⁹ dominates and in summer a dense leaf canopy prohibits a diverse woodland floor flora.

By the third quarter of the 19th century the expanding quarry had broken the traditional route of Ferriby Low Road (Westfield and Cliff Roads today). In this area the spoil heaps are dominated by self-sown beech woodland, including some lofty examples of young mature trees (see Fig. 29). Again, and for the same reason, the ground flora is sparse except for patches of bracken.



39

The elm is in the form of sturdy suckers growing from the roots of once 'mighty elms' – these, presumably victims of Dutch elm disease c. 1970s.

Fig. 29 A section of beech woodland in Leggott's quarry.

It appears that by the early 20th century the excavated face of the quarry was broadened to east and west. Whether this was a reflection of increasing demand, increasing mechanization or some other combination of factors, is not clear. Thus a broad, sweeping face of chalk at the southern end of the quarry continued to be worked until the quarry closed in the 1960s. The central valley carrying the railway was periodically extended to keep pace with the retreating rock-face.

On each side of this southern end of the quarry are large spoil heaps that appear to have been created with level surfaces, so forming two side plateau roughly half the height of the present rock-face. Unlike the earlier random mounds of spoil these raised levels must have been created deliberately, to what end is uncertain. On these 'plateau' and on the quarry floor below the rock-face the ecological progression has not reached the young or mature woodland stage. Although hawthorn, dog rose and buddleia have colonized parts there remain large areas of chalky open ground being colonized by low growing plants such as; cranesbill, dwarf thistle, willow herb, teasel, bellflower, wild orchid, daisy, wild strawberry, cowslip and violet.

In places across this southern quarry floor are patches of waterlogged soil, colonized by sedge and willow. This may be a result of compaction resulting from the mechanized excavation process up to the 1960s. However, and more intriguingly, it maybe that quarrying had reached down to the strata of 'Ancholme clay' (see p. 1 and Fig. 2) as is currently the case at the modern Middlegate quarry, South Ferriby (for a possible explanation and for detailed recollections of the working quarry see Newton, ch. 11. Also see Fig. 25).

As for the chalk face, now undisturbed for 50 years except for the action of ground water and frost on the prominent vertical rock fractures, on narrow ledges the micro-ecology is of ground plants beginning to colonize thin soils created from moss accumulations – much of the rock-face receiving no direct sunlight. At the base of the cliff-face scree slopes of chalk dislodged by frost action have more advanced colonies of ground cover plants.



Fig. 30 Part of the chalk cliff-face at Leggott's quarry showing the scree slopes and a patch of waterlogged quarry floor foreground left.

The last (Devensian) glaciation created the unusual present day shape of the Humber Estuary. Commonly termed a 'dog-leg' outline, the Estuary flows west to east from Trent Falls to Goxhill Haven on the south bank and Saltend on the north, and then turns in a south-easterly direction to beyond Humberstone and Spurn Point. As already noted the pre-Devensian Estuary almost certainly flowed west-to-east for its full length. About 12,000 years ago the ice sheet which had advanced as far as the Ferriby Cliffs (which had plugged back Lake Humber) and the upper dip slope of the Lincolnshire Wolds was in slow retreat along a front running north-west to south-east. This blocked the melt-waters flowing

east from Lake Humber, diverting them in a south-easterly direction and creating the present day 'dog-leg' of the lower Estuary. This configuration was reinforced by low ridges of till deposited by the retreating ice sheet running north-west to south-east from the Hull valley to Paull on the north bank of the 'dog-leg'. Hardly perceptible in the modern landscape these low ridges provided an overland route by which the 12th – 16th century Cistercian monks of Meaux Abbey could journey to Paull from where their ferry enabled communication and trade with the Augustinian canons of Thornton Abbey. Previously, the settlements of Sutton and Preston had evolved on these ridges.

The recent geological history of the valleys of the rivers Hull and Ancholme are similar.⁴⁰ The course of the River Ancholme was eroded out of lacustrine sediments laid down during the late-Devensian glaciations which 'shaped the flat substrate of the Ancholme valley and are responsible for its low gradient and sluggish drainage regime' (Van de Noort and Ellis 1998, 98).⁴¹ These lake-bed deposits overlaid the upper Jurassic rock (in particular the thin strata referred to on the B.G.S. sheet 80 as 'Kellaways Beds', and see page 1). As the climate gradually warmed successive populations of natural vegetation colonized the valley sides and the gently sloping dip slope beyond. This in turn was gradually drowned as a rising sea level in the Humber

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Some of the following has been gleaned from Jones 1988.

41

Although the 'Ferribys' are often said to be the limit of Devensian ice sheet advance Gaunt etc. claim that it 'intruded westwards into the Humber Gap as far as the Brough and Winterton areas' (Gaunt, Fletcher and Wood 1992, 118). This would explain the lacustrine deposits of the Ancholme vale.

valley which, washed south across low lying land and blocked the river's exit. The resulting flooding from both the Estuary and the river led to accumulations of peat as the forest vegetation decomposed. In more modern millennia alluvium was deposited when the now sluggish, meandering river flooded across the floodplain. The process was mirrored across the floodplain of the River Hull (on the lower part of which sits the city) although here the bedrock was Upper Cretaceous chalk (see page 1). Some references tell of the discovery of preserved tree trunks and root systems in the estuarine clays when Albert and Alexandra Docks (the former built by the Hull Dock Co. between 1863 and 1869, the latter by the Hull-Barnsley Railway in the early 1880s) were being excavated. The anaerobic conditions would have slowed the decay of these organic remains. 'Tommy' Sheppard, the first curator of Hull Museum, visited the same theme (Sheppard 1911, Introduction) when he wrote of the 'denizens' of the post-glacial valley forests; wild boar, beaver, bison, wolf and red deer – an environment later to be smothered by estuarine silts. This, he states, created the bed of peat 25 feet below Hull.

Fig. 3 shows the extent of the marine sediments deposited once the post-glacial sea level had reached its near modern level and before any man-made sea defenses or reclamation had taken place. For the Hull valley June Sheppard confirms the two-part story of alluvium accumulation across the river's floodplain with salt marsh across the southern section (deposited by tidal action in the Estuary and across which the City of Hull now stands) and peat marshland, or carrs to the north – that is deposited by the freshwater river in flood (see Fig. 31). The watery nature of the Hull valley was increased by the natural drainage channels of Holderness. These flowed west and south (away from the sea)⁴²

42

For example, Summergangs Dike an east-bank tributary of the lower River Hull.

as the retreating ice sheet of the last Ice Age deposited greater and greater thicknesses of till.

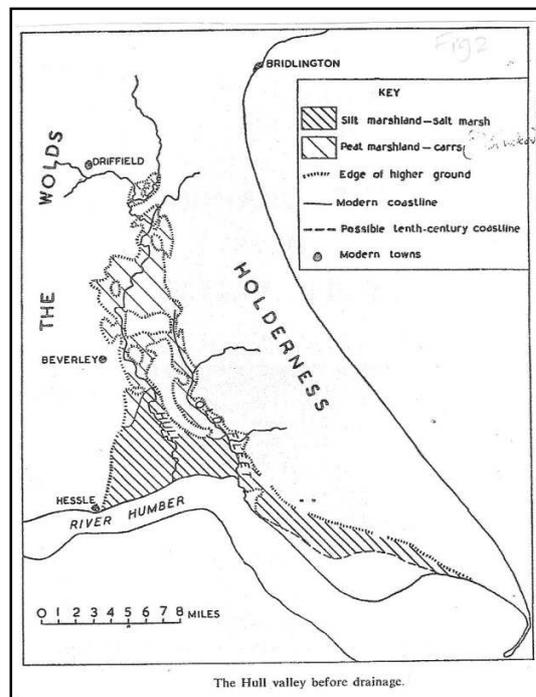


Fig. 31 Map and key showing the two areas of alluvial subsoil; ‘salt-marsh’ and ‘carr’ (taken from Sheppard 1958, 1).

Sheet 80 of the B.G.S. shows that for the Ancholme valley the ‘estuarine alluvium’ extends as far south as Worlaby Carrs as well as across Winteringham Marsh, the warplands of the parishes of Barton, Barrow and Goxhill (Goxhill Marsh) and on the north bank the south-east corner of Wallingfen known as Ellerker Sands. It is these drift deposits that have provided the raw material for Humber-side brick and tile manufacture through the ages, pantile manufacture surviving at Barton, Sandtoft and Broomfleet.

To return to a study of the Rivers Hull and Ancholme. Throughout the Middle Ages the main economic purpose of both rivers was as

Traditionally this formed the parish boundary between Sutton on Hull and Swine to its north and Drypool, Marfleet and Preston its south.

transport arteries rather than as a main drainage channels. Until challenged by royal jurors in the 14th century the Archbishop of York claimed authority over the transport of goods along the lower River Hull by virtue of being lord of the manor of Beverley. Even before Edward I purchased the site of 'Wyk' from Meaux Abbey the embryonic port of Hull had a flourishing trade in the export of wool to Flanders and the import of wine from Bordeaux.⁴³ During the 13th century the Cistercian monks of Meaux Abbey canalized a number of drains leading to the River Hull to facilitate transport to and from the Hull valley.⁴⁴ Similarly the main channel of the River Ancholme since prehistoric times has been a transport artery inland to the historic bridging point at Brigg, and beyond. It seems surely likely that some embanking either side of these channels (to enhance the natural levees) was undertaken from early times to facilitate a scoured channel.

The 17th century saw a greater determination to tame these extensive marshes by creating more efficient drainage systems. In 1636 a group of 'Adventurers'⁴⁵ appointed by the local Commissioners of Sewers⁴⁶, and with Royal assent, embarked on

43

In 1297/'98 4636 'sacks' of wool were exported from Hull, probably about a sixth of the national total (see Gillett and MacMahon 1989, 6).

44

See Sheppard 1958, 3 and Fig. 29.

45

In effect, local gentry and landowners.

46

The 1532 Statute of Sewers had created Commissioners of Sewers for the main marshland areas of England and Wales. They were appointed by the Crown and enforced their authority through Courts of Sewers.

a major drainage scheme for the Ancholme valley. Straight channels were dug between the meanders of the natural river to form a canalized channel leading to a new sluice at the western edge of South Ferriby parish – almost a kilometer west of the site of the medieval ‘port’ standing near the mouth of the natural river.⁴⁷ Various side drainage channels were also dug each with a primitive sluice where they entered the main channel. This was a large-scale and expensive capital project prompted by a previous scheme in the Isle of Axholme and intended to create extensive good quality meadow,⁴⁸ or even arable land. However, the project did not succeed, partly because of damage during the Civil Wars caused by those who objected to the loss of traditional wetland common land.

During the later 1600s a more enduring drainage scheme was funded in the Hull valley, particularly in the parish of Wawne, by the building of windmills to raise the water from newly cut drainage channels into the further embanked river. Also in sections of the River Hull itself the river-bed was deepened and clogging weed dredged out. By the 17th century the salt-marsh of the lower Hull valley was better drained than the carr-land of the middle and upper reaches, John Leland⁴⁹ noted in the 1530s that it was ‘very fruitful of medow and pasture’. This was partly a result of considerable embanking along the Humber foreshore although there were still occasional disastrous floods such as that in 1646 when all of Drypool parish was inundated.

47

Site is still discernable today in the pasture field east of Marsh Lane.

48

Suitable for hay-making, or pasture land throughout the year.

49

Royal Antiquarian and chaplain to Henry VIII.

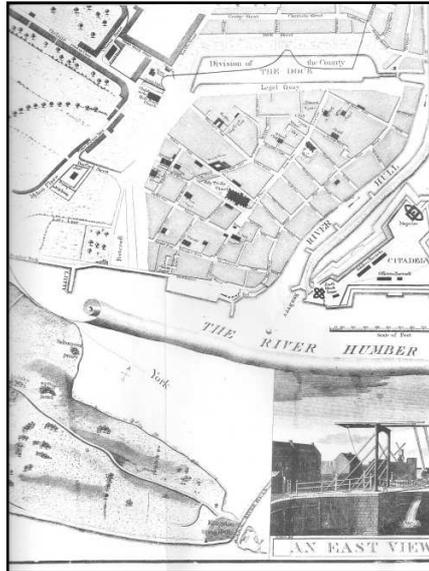


Fig. 32 Part of Hargrave's map 1791, A4, showing Myton and New Dock).

The construction of the Holderness Main Drain to the east of the River Hull in the 1760s and the Beverley and Barmston Drain to the west between 1798 and the early 1800s effectively drained much of the carr-land. However the original plan to continue the drains directly to the Humber was thwarted by Hull Corporation's insistence that all waters should drain to the River Hull to maintain the force of the river which, on the ebb tide, scoured the 'Old Harbour' (see Fig. 32). Even after the opening of the New (later Queen's) Dock⁵⁰ in 1778 ships still had to pass up and down the lower section of the River Hull (the 'Old Harbour'). The riverside staithe remained in use for berthing ships and barges well into the 20th century. It was only the building of Humber Dock in 1809, Junction Dock in 1829 (later called Prince's Dock) and a lock directly linking Humber Dock with the Estuary as well as channels linking each of the three docks that lessened the need to keep the 'Old Harbour' channel scoured. This in turn allowed the

50

Hull's first constructed dock and at that time said to be the largest in Britain.

Holderness Lowland Drain to be constructed with an outflow to Humber in the parish of Marfleet.

In the 1760s repairs were made to the long ruined 'Adventurer's' drainage scheme in the Ancholme valley. The canalized river was deepened and widened and a parallel channel dug just east of the main channel with a sea lock at its head to allow barges to bypass the Sluice.⁵¹ In 1804 the present day East Drain was constructed as a main drainage channel, similarly the West Drain in 1824. In 1840 the present day Sluice was completed with a lock capable of accommodating 60 ton keels (see Fig. 34). The Navigation channel was therefore no longer needed and the 1876 O.S. map shows it had by then been in-filled. These developments enabled a brick and tile making industry to grow along the canalized river banks, exploiting the estuarine alluvium as its raw material and transporting its finished products out in keels and sloops (see Figs. 33 and 34).



51

Shown on the post Enclosure map for 1804, see Russell 1982, 133 (although there may be some confusion with East Drain, also constructed in 1804). Also on the First Series O.S. map 1" to 1 mile, 1820s.

Fig. 33 View west showing in the foreground land where clay was dug by hand for the local tile works. Beyond the east bank of East Drain and, beyond the Ancholme, the modern cement works. Also visible is the final section of the covered conveyor belt delivering crushed chalk from the modern chalk quarry.

Despite the many similarities between the late geological history of the Hull and Ancholme valleys as well as their histories of trade and drainage and reclamation one fundamental difference is clear. In the case of the Ancholme early canalization was chosen as the means of taming the wild, whereas the River Hull, while retaining its core meanders, was repeatedly embanked. This procedure, along with the construction of the Tidal Barrier, continued into the 20th century. Of course another difference was that at the mouth of the River Hull the early-medieval trading post at Wyk increased in status after becoming a royal borough in 1297. It continued to evolve into a major port and city with large docks accessed directly from a deep-water, north bank channel in the Humber.



Fig. 34 South Ferriby Sluice. Viewed from the south and showing some of the Ancholme bank moorings and the lock on the right-hand side of the Sluice.



Fig. 35 River Hull tidal barrier. The crossing tower of Holy Trinity church showing centre left and, on the left, part of the counter weight of the footbridge over the lower River Hull. Recently a second footbridge over the River Hull has been constructed just north of Myton Bridge.

No comparable developments occurred at the mouth of the Ancholme valley. By the early-19th century a hamlet had evolved clustered around the Sluice. Ribbon development along Sluice Road linking it to the ancient village site nestling at the foot of the scarp slope was a product of the 20th century. At the same time as Hull's urban evolution was beginning to break the bonds of the 14th century town walls (1724) William Stukeley was travelling through South Ferriby from Winteringham. Having crossed the ruined Sluice he encountered 'several clayey lakes...impassable in Winter' and the village itself 'a sorry ragged place'

Conclusion

The landscape of the Humberside region has been created by a relatively simple geology. With the characteristic features of escarpments, lowland vales and areas of undulating post-glacial deposition the amateur geologist can broadly explain the landform for most locations. Such explanations must always include consideration of the impact of the Ice Ages on the region, particularly the last Ice Age, and its impact on the Humber Estuary created in inter-glacial and post-glacial times. The landscape determined early settlement patterns and the river-basins and the

Estuary determined early transport networks. Until relatively modern times agricultural practice was determined by the natural local environment and landscape. Although the regional geology was manipulated by man from early times it was in the 19th century that large scale industry exploited the local geology, *White's Lincolnshire Directory, 1882* noted in its preamble that 'the hills (around Barton) abound in fine chalk limestone, of which the best whiting is made; the lower grounds have excellent clay for bricks, tiles and coarse earthenware'. Apart from one business in Barton still making clay roof-tiles these industries have all but gone, the disused quarries and ponds given over to leisure pursuits and, thankfully, to Nature. Intensive agriculture, urban development and large scale cement manufacture continue to rely on the region's landscape and geology.

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