NOTES ON THE DRIFFIELD AND MARKET WRIGHTON RAILWAY.

BY REV. E. MAULE COLE, M.A.

The construction of a new railway, however small, affords opportunity for fresh geological sections. In the present instance the line is only $13\frac{1}{2}$ miles long, and presents no new features, but it is interesting in some respects, especially at its western end, where it shows the position of the chalk as regards the underlying beds.

It was pointed out long ago by Phillips that a sub-cretaceous anticlinal existed somewhere about Garrowby, stretching east and west, which seemed to cut off the Oolitic rocks in North Yorkshire from those southwards about Market Weighton, but whether these rocks were removed by denudation previous to the deposition of the chalk, or thinned out against an old submarine shore-line was doubtful. The question is by no means settled yet, but the facts are these : the Lower Calcareous Grit and Oxford Clay of the Middle Oolites make their last appearance from the north at Hanging Grimston, near Acklam. The estuarine sandstones of the Lower Oolites share the same fate, except for a small patch at Kirby Underdale and Grimthorpe. These latter come on again south of Market Weighton. Between Hanging Grimston and Sancton the rocks, which underlie the chalk, are composed of Lower Lias, so that a vast gap appears. The mass of rocks, which constitute the moorland of North-East Yorkshire, consisting of estuarine sandstones, with their intercalated marine limestones, notably the Scarborough, Millepore and Dogger beds, which attain at the Peak a thickness of 600 feet, are wanting, as well as the Upper and Middle Lias. A well, sunk 300 feet, at Huggate, revealed the fact that these beds were absent far within the present western contour of the Wolds. It is, therefore, clearly established that the non-appearance of these rocks is, at all events, not due simply to the overlapping of the chalk.

I am inclined to think, though I speak with hesitation, that the anticlinal above-mentioned is not improbably connected with the ancient anticlinal from the west, noticeable at Harrogate, and that the Liassic beds of North Yorkshire were deposited in a separate area

from those of South-East Yorkshire, whilst the lower Oolitic rocks were partly so cut off. The reasons for this opinion I have already stated in some notes on the Hull and Barnsley Railway, contributed at the time of its construction to this Society, and which need not be repeated.

To come to the present railway : commencing at the Driffield end, the line of rails for the first $3\frac{1}{2}$ miles is laid on a slight embankment, crossing the mouth of the valleys from Aldro, Wayrham, Burdale, Sledmere, and Huggate, which here united debouch upon the plain of Holderness. Two cuttings, in the first mile, are in clean water-washed chalk gravel, consisting of small flat pieces of chalk with rounded edges, such as is commonly found in the valley bottoms. From $3\frac{1}{2}$ to $4\frac{1}{2}$ miles there is a cutting in Boulder Clay, showing in the deepest part, 15 feet, the following section :—

				Ft.	In.
Boulder Clay	...	...	...	7	0
Chalk Gravel	..	...	...	2	0
Upper Chalk, without flints		...	...	6	0

From this cutting a large boulder of Whin Sill was extracted. There are several others in the immediate vicinity.

In the next cutting, half a mile distant, close to Bainton, also 15 feet deep, six feet of Boulder Clay was exposed, but no chalk gravel. The surface of the underlying chalk was remarkably uneven, having been worn into numerous pockets or pipes, probably by the action of rain charged with carbonic acid.

A capping of Boulder Clay was found as far as $6\frac{1}{2}$ miles, extending to near the village of Middleton. At this place there is an extensive deposit of fine sand, flinty gravel with foreign admixture, and rounded boulders of chalk, which has every appearance of an ancient sea-beach, accumulated in a bight, at an elevation of from 150 feet to 175 feet above sea-level.

A little beyond Middleton the first deep cutting, in Middle Chalk with flints, occurs, reaching at Lair Hill a depth of 32 feet. The prevailing fossil was a large thick-ribbed inoceramus, (*I. Cuvieri*); large rounded balls of flint were also common. Human remains were found at several places in this cutting, as also in the two previous

ones, and on the top of Lair Hill the section exposed an unusual depth of surface soil, with several trenches 5 feet deep, in which were found horns and bones of deer.

The chief cutting, 67 feet, is at Enthorpe, distant 10 miles from Driffeld. Here a magnificent section of the Middle Chalk is obtained. I counted no less than 39 beds of tabular flints in a depth of about 100 feet, allowing for the dip, most of which were persistent and very marked. The beds of chalk were, as a rule, massive, not slaty, and I identify the zone as that called the "barren zone" of Blake, only it must be quite twice the thickness which he gives. Very few fossils were found. A workman told me that he had hit upon a number of small shells adhering to the under surface of a large flint, but the specimen had not been preserved. An interesting section of a tumulus was exposed on the top of the hill, showing the encircling ditch, 5 feet deep, and 20 yards in diameter, so filled up with earthy matter that its existence would not have been suspected. The mound itself was scarcely visible, having been ploughed down. A whole cluster of tumuli, numbering from 16 to 20, may be seen at this point, which seems to have been a favourite burying place for the early Britons.

Here too the railway cuts through an ancient entrenchment, running north and south for miles each way. A section of the partially filled ditch shows that it must have been seven or eight feet deep, between two ramparts. This entrenchment forms the boundary line of several parishes, e.g., Warter and North Dalton, Lund and Goodmanham; but it is not always a boundary. Hence I conclude that this, and similar entrenchments, which are frequent on the Wolds, were more ancient than parishes, and were utilized, but not constructed, for marking their boundaries. It is noticeable that every parish between York and Bridlington is bounded by an old road, passing through Wetwang, which follows a line of entrenchments, still preserved on both sides of the monument erected to the late Sir Tatton Sykes.

Another peculiar feature was observed at the Enthorpe cutting, not far from the tumulus first mentioned, but on the opposite (south) side. A large hollow in the chalk rock was exposed, some 25 yards

long, with a varying depth of bottom, from 4 feet to 12 feet, consisting of numerous pockets. This was filled in all round the edge of the pockets with black material, clayey soil, and flints partially cemented, having a yellow tinge; streaks of stratified chalk gravel and flints, were visible, in places, running across the face, and the whole was covered with two or more feet of rain-wash.

At the next cutting but one from Enthorpe, distant about $\frac{3}{4}$ mile, the grey chalk put in its appearance in a slight cutting, 5 feet, on the right hand side. Here a dark-coloured band of marly matter, one foot thick, in the form of an arc of a circle, depressed in the centre to the line of rails, and extending for over 30 yards, was visible, followed by grey chalk, 3 feet, and a second concentric band of grey marl one foot thick. It is probable that this represents the zone of *Belemnitella plena*, which divides the middle from the lower chalk. The same upper bed was represented in the next cutting on the left, only darker in colour, and contorted. The lower marl was absent.

The railway next crosses a slight valley. On the left a well was sunk in the bottom, cutting through Red Chalk some way down; whilst, on the right, 50 yards distant, there is a slight cutting in Red Chalk, evidently the Hunstanton limestone, showing a fault of some 60 or 70 feet. Mr. G. W. Lamplugh tells me that he noticed a yellow band below this red chalk, which may be taken to represent the 6 inch bed of Neocomian to be seen at Acklam Brow, and which I described in my paper on the Red Chalk, communicated in 1878, in a section at Warter Brickyard, as one foot of "orange-coloured clay," between the Red Chalk and Lias.

From this point to Market Weighton the beds consist of Lower Lias; all else is absent.

The next cutting, opposite to Mr. Leighton's house at Goodmanham, presents a curious section, which I give in detail:—

					Ft.	In.
Surface Soil	...	...	...	...	1	0
Lias Rubble	..	...	...	...	3	0
Fine Reddish Sand	...	...	..	...	0	6
Lias Rubble	...	...	...	...	0	9

	Ft.	In.
Fine White and Pink Sand	0	4
Chalk Wash, with numerous Flints, Fragments of Red Chalk, and Pyrites	1	0

The four lower beds are distinctly stratified, and are due to the action of water, perhaps percolating under an ice-covering; the Lias Rubble on the top may be due to a subsequent slip. The common *Gryphæa incurva* was ubiquitous, and marks the zone as that of *A. Bucklandi*.

In the last cutting, 23 feet, before reaching the road from Goodmanham to Market Weighton, the following section, again allowing for the dip to the N.E., was obtained :—

	Ft.	In.
Limestone and Blue Clay, with <i>Gryphæa incurva</i>	6	0
Light-coloured Clays and Limestone : a spring at base	8	0
Blue Clay, thinning west... ..	3	0
Grey Limestone	1	0
Dark Blue Clay	2	6
Grey Limestone	2	0
Dark Blue Clay, almost black, seleniferous full of young of <i>Lima gigantea</i>	8	0

On the south side these beds were much contorted, probably from slipping, but possibly from glacial pressure, but not on the north side.

Fossils from these beds are in the possession of Mr. Parkinson, of Market Weighton, and may certainly be referred to the *A. angulatus* zone, but whether the lowest bed above-mentioned may be correlated with the upper beds of the *A. planorbis* zone, as I am inclined to think, must be determined by better authorities; at all events the oyster beds and *Pleuromya* limestones were not reached.

On this elevation, traversed at the base by a road known as Humber Street, leading from Londesborough to Brough, and supposed to be Roman, a quantity of Roman pottery was disinterred from the surface soil, consisting of three kinds, viz., fragments of Samian ware; thin, smooth, light-grey pottery, such as found by Mr. T. Boynton

at Ulrome, and coarse black pottery, with particles of chalk in it. Some beads, ornaments of jet, iron spear-heads, and Roman coins were also found. The whole of the above are in the possession of Mr. Parkinson of Market Weighton, who has taken much interest in collecting them.

On the whole the cuttings are decidedly interesting, though they do not add much to our previous geological knowledge.

ON A BOULDER WITH CUP AND RING MARKINGS AT HORSFORTH.

BY WILLIAM CHEETHAM, ESQ.

The Boulder was found a year ago about six inches beneath the surface of the ground, when levelling for Lawn Tennis near Ashfield House, Horsforth, six miles north-west from Leeds, in the valley of the Aire, and about 400 yards north of the Calverley Station.

The Geological Map shows the place to be on the line of the outcrop of Halifax Soft Bed Coal. The Boulder is composed of Millstone Grit, from the rough rock, the uppermost of the series, which here must be 100 to 120 feet below the surface of the ground. Consequently, to some extent, it is a travelled boulder, 5 feet by 4 feet, about 2 feet thick. As to how it got to its position: a suggestion has been made that it might have been brought by glacial action. But there is no need to carry the enquiry far, either as regards distance or time, in connection with the numerous boulders which have been met with in the neighbourhood. During the last forty years I have had great numbers of grit and ganister removed from the land, the latter were easily accounted for; they were from under the Hard Bed Coal, which crops out a little higher up in the valley, and the grits were generally not much rounded, showing that they had travelled, but only a short distance; indeed we have the Rough Rock *in situ* about half a mile westward, and faulted so as to be at a considerably higher elevation. Looking at the valley here as being about 400 yards wide at the lower and 4000 to 5000 yards wide at the upper part, rising some 600 feet, the wonder is not how these blocks of stone got where they have been found, but where the enormous mass of material that once filled the valley has gone to.