

EXCURSION TO STAMFORD, COLLYWESTON, AND
KETTON.

SATURDAY, JUNE 16TH, 1906.

Director : BEEBY THOMPSON, F.C.S., F.G.S.

Excursion Secretary : W. P. D. STEBBING.

(*Report by THE DIRECTOR.*)

A PARTY of seven left London by the 8.45 a.m. train from King's Cross (G. N. R.), and reached Stamford a little after 11 a.m., where they were met by the Director. After a short delay, they drove along the road on the southern side of the Welland valley, towards Easton and Collyweston.

Stamford town is mostly on the Lincolnshire Oolite formation, but portions are on the Northampton Sand, and the bed of the river reaches to the Upper Lias Clay. After a rather steep ascent from Stamford, and when nearing Wothorpe with its ruins of an old Burghley mansion, attention was called to exposures of the ferruginous beds of the Northampton Sand by the roadside. These beds are near the base of the Northampton Sand, and are probably about 100 ft. higher than the same beds on the same side of the Welland Valley, at Stamford. This difference of level is due to a "fault" between Wothorpe and Stamford, running approximately east and west, which "fault" has been traced for several miles in an easterly direction from the Welland valley. (See Geological Survey Map, Sheet No. 64).

From this point, Wothorpe, and the rapidly rising ground between here and Easton-on-the-Hill, good views of Stamford and the Welland valley were obtained.

COLLYWESTON SLATES.—The Collyweston slate quarries commence soon after passing Easton, and extend for about a mile on each side of the road, right up to the village of Collyweston.

One sees numerous, comparatively small, walled-off patches of ground and little else from the road, as the actual quarry is mostly underground, and useless material is stacked underground to keep up the roof of previously excavated portions.

One quarry only was particularly examined, that on the east side of the road nearest to Collyweston. Before proceeding to inspect the workings, the Director gave a description of the geological position of the Collyweston Slates and the method of working them about as follows:—The Collyweston Slate is a fine-grained, calcareo-arenaceous rock, occurring at or near the base of the Lincolnshire Oolite formation, the Lincolnshire Oolite itself being a strictly local limestone deposit occurring between

the Lower Estuarine beds of the Inferior Oolite, and the Upper Estuarine beds of the Great Oolite. The Collyweston quarries have been worked in a similar manner to the present method of working for upwards of 400 years, that is to say by "foxing"—working underground in "foxholes"—though there have been and are now, some open workings. The quarrying is done in the winter, up to January, both to avoid trouble with water in the workings, and to take advantage of the frosts and thaws of the early part of the year to split the stone; the dressing is done in the summer in the open, with a mere wind-screen of wattled straw.

There is only one bed of stone yielding slates, but it varies in thickness from 6 in. to, in rare cases, 3 ft., or its place may be entirely occupied by sand. The blocks of stone on being brought to the surface are spread out on the ground to be frosted, and they must not be allowed to get dry internally before the frost acts on them, and so, if necessary, they are regularly watered up to about the end of March. The stones are split by the freezing of water along the bedding planes, and of course if there is no water left to be frozen there will be no splitting effect, besides which the evaporated water leaves behind a deposit of carbonate of lime which helps to bind the layers together. Spoilt slates are stocked and sold for road metal. The cleaving of the stones by the workmen after they have been split by frost is easy, though requiring skill. Dressing and trimming follow the splitting, and the slates are stacked in different sizes.

After securing a few fossils, including several specimens of the characteristic winged gasteropod *Pterocera Bentleyi*, most of the party, including two ladies, descended to the underground workings by means of a ladder,* and walked along the headings. The slate is undercut and overcut to facilitate extraction without injury, and the waste material piled up in the excavated area to keep up the roof.

After leaving Collyweston the party drove down the steep incline to and across the Welland Valley to Ketton, where a little time was spent in inspecting the interesting various-styled "Barnack Rag" Church.

KETTON FREESTONE.—The chief freestone quarry at Ketton now is Molesworth's, just west of the village, and this was examined under the guidance of Mr. Molesworth and his foreman. The section where most fully shown includes just a little Great Oolite limestone; below this the whole of the Upper Estuarine beds, and then the Lincolnshire Oolite limestone.

Only a few feet near the top of the Lincolnshire limestone is worked for building stone, and considering the large amount of

* The usual entrance by an incline had been walled up "to keep out the weather," as the workmen said. The depth of the workings is from 15 to 25 ft.

overburden to be removed to get at it, it seems a wonder it can pay to get, until one examines the stone and sees what a beautifully perfect oolitic freestone it is. It is sawn easily without sand or water, but hardens considerably on exposure. It weathers well, and is found to possess great strength and durability.

The Upper Estuarine Clays here consist of two or three beds, and small faults, and various contortions due to slipping are observed. The clay is dug by steam navvies, and carted away to tips, which tips already form miniature mountains. These clays can be made into very good bricks, as indeed they are at Stamford, but owing to the absence of railway facilities it is not found to pay in competition with the huge brickworks near to Peterborough.

The top of the Lincolnshire Limestone at the Ketton quarries is more than 100 ft. below the bottom of the same formation at Collyweston, two miles away, and as the thickness of the formation itself is probably 70 ft., there is a difference of level of some 170 ft. or more; moreover, the Collyweston beds, which are the highest in position, lie in the direction in which there should be a dip down, consequently a very considerable fault is indicated. The whole neighbourhood, indeed, is very much faulted.

After leaving Molesworth's Freestone quarries, a short inspection was made of the immense area of broken ground where were the old quarries which made Ketton Freestone famous. No attempt has been made to level it down.

Re-entering the conveyance, the party then drove through Tinwell to Stamford, and visited two sections to the north of the town.

THE STAMFORD LIME WORKS.—Just to the north of Stamford, on the road to Little Casterton, is a large limestone quarry in the Lincolnshire Oolite, where the stone is dug and burnt for lime. This is the quarry which Sharp (see references) describes so fully under the name "Tinkler's Quarry." The section of 30 to 40 ft. gives a good idea of the main mass of the Lincolnshire limestone, that is to say, it is a somewhat argillaceous or marly limestone (marlstone), containing many fossils. There is reason to believe that the entire thickness here would be about 70 ft. The stone has been worked for building and interior ornamental purposes under the name of "Stamford Stone," and a particularly hard, fossiliferous, crystalline bed which will take a good polish has been used as a marble, for chimney-pieces, etc., under the name of "Stamford Marble." At the present time the stone is only quarried for lime burning, some of which lime is further ground for agricultural use.

STAMFORD BRICK WORKS.—These brickworks are situated near to but at a higher level than the lime works last described,

and so form a continued upwards section with little loss. These works, which were visited by kind permission of the proprietors, Messrs. Towers and Williamson, are those described by Sharp (see References) as Torkington's brick-pit. The entire section at the present time consists of the Upper Estuarine beds, and is a just about complete one, the complete one being about 28 ft. From the clays are made fire-bricks, paving slabs, white or buff building bricks and tiles, and occasionally terra-cotta.

The clay appears to be worked in three tiers about as below :

	Approx. ft. in.
(1) Sandy layers, coarse shaly clay, and grey clay, with numerous shells, also plants and wood	9 0
(2) Variegated, dark blue, chocolate-coloured, purple, and yellow clay, with abundant carbonaceous matter	12 0
(3) Grey sandy clay, with exceedingly numerous fine, vertical plant marking. Red joints and streaks in the lower part	6 0
(4) Rich Ironstone, with a layer of gypsum on top	0 9

No. 2 is the best brick clay.

No. 4 is evidently a bog iron ore, as there is much wood in it, and the layer of gypsum on top points the same way. The party were able to see in one part of the quarry, in the top portion of the ironstone, part of a tree trunk about 6 ft. long and 3 ft. in circumference, mostly converted into ironstone, but here and there showing structure.

There was not time available to see the Great Oolite limestone quarries farther up the hill.

The party drove back through the town to the George Hotel, where a meat tea had been provided. A vote of thanks was accorded to the Director, and the party left for London about six o'clock.

REFERENCES.

- Ordnance Map, 1-inch, Sheet 157.
 Geological Survey Map, No. 64.
 1873. SHARP, SAMUEL.—"The Oolites of Northamptonshire." *Quart. Journ. Geol. Soc.*, pp. 225-302.
 1875. JUDD, PROF. "The Geology of Rutland." *Mem. Geol. Survey*.
 1894. WOODWARD, HORACE B.—"The Jurassic Rocks of Britain," vol. iv, *Mem. Geol. Survey*.