

EXCURSION TO GRAYS.

MARCH 21ST, 1903.

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THE party met at the railway station at Grays on the afternoon of March 21st, 1903, and walked to the top of one of the chalk quarries, where recent excavations have exposed a good section of the Thanet Sand overlaid by river gravel. The bed of green-coated flints at the base of the Thanet Sand was well seen all round the head of the quarry. It was about six inches thick, and had a somewhat wavy surface. The river gravel at the top is an outlier of the high terrace gravel of the Thames valley, which rests on a platform about 100 feet above ordnance datum. In one place a good instance of the effect of subterranean erosion was observed. A deep hollow or "pipe" had been excavated in the chalk by the solvent action of carbonated water percolating from the surface. Into this hollow the Thanet Sand had subsided, carrying with it the river gravel. Several small faults were caused

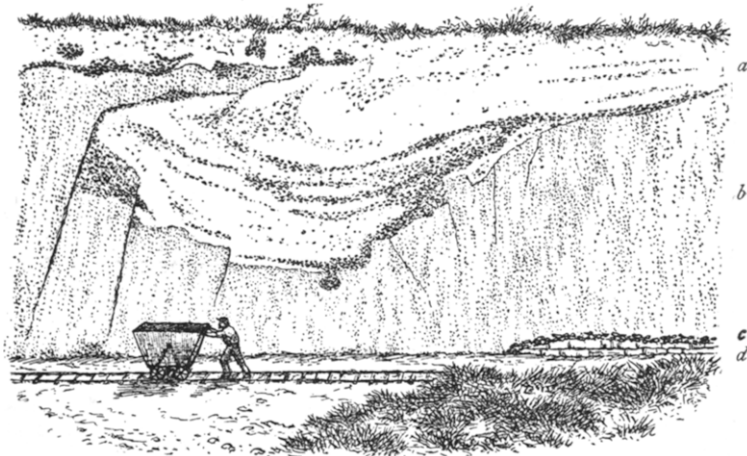


FIG. 4.—SECTION SEEN AT THE TOP OF A CHALK QUARRY AT GRAYS, SHOWING THE SUBSIDENCE OF THE THANET SAND AND RIVER-GRAVEL DUE TO SUBTERRANEAN EROSION OF THE CHALK.

- (a) River-gravel mixed with loam.
- (b) Thanet sand.
- (c) Bed of green-coated flints.
- (d) Chalk.

in the process, and the hollow was filled up by a mixture of gravel and loam which had been washed in from the top. After noticing another section close by, where the river gravel had been deposited in a pre-existing hollow in the Thanet Sand, the party visited one of the tramway cuttings which lead from the quarries to the river. The finely laminated brick earth and sand deposited against the old chalk cliff was well exposed, and a thin bed of gravel was seen resting upon it. This gravel belongs to the lower terrace of the Thames valley, forming a thick deposit about twenty feet above ordnance datum near the river, and extending upwards here and there in a thinner bed over the more ancient brick earth. Good specimens of palæoliths were found in the brick earth by Mr. A. S. Kennard. Afterwards the party crossed the chalk hill to the north side, along which the gravel of the middle terrace extends. One pit was noticed in passing, but it was much overgrown, and there was not time to visit others which show better sections. It was pointed out that the middle terrace gravel rests on a platform about fifty feet above ordnance datum, and covers a large area on the north side of the Thames. In this neighbourhood it passes to the north of the Grays chalk hill, and no gravel at a corresponding level appears to exist in the present river valley between Purfleet and Grays. Hence it would appear that the Thames flowed in a more northerly channel during its formation, a conclusion first suggested by Mr. T. V. Holmes (*Essex Naturalist*, vol. vii). The main mass of the Thames Valley brick earth (with which that at Grays is approximately contemporaneous) rests on the middle terrace gravel. Hence it is intermediate in age between the gravels of the middle and lower terraces. The Cretaceous and Lower Tertiary strata in this part dip gently to the north, and within a short distance are lost to view under the London clay.

Crossing the bridge over the railway cutting at Purfleet a good view was obtained of a pillar of chalk capped by Thanet Sand, which has been isolated by quarrying operations, and now forms a picturesque feature in the old quarries.

REFERENCES.

- MAPS. The London Sheet and Sheet I.S.W. of the Geological Survey include Purfleet and Grays. (3s. each.)
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