wonderful accumulation of beach that separates the river Alde, or Ore, from the sea for many miles.

After a good dinner in the Keep of Orford Castle the party drove back to Ipswich, partly by another route, and the Londoners bid farewell to their friends of the Ipswich Scientific Society, to one of whom, Mr. Henry Miller, they were so much indebted for the excellent arrangements that he had made.

REFERENCES.

The Maps and Memoirs of the Geological Survey relating to the district having been published, and of late years, there is no need to refer to other works, except to note that a general "Sketch of the Geology of Suffolk" has been given by Dr. J. E. TAYLOR, in 'White's Gazetteer of the County,' 1884, and that the various divisions of the Crag are described in great detail in the important papers by Prof. PRESTWICH ('Quart. Journ. Geol. Soc.,' Vol. xxvii, pp. 115, 325, 452).

The Geological Survey Works are as follows :—

For Southwold.

Map—Quarter-sheet 49, N.

'The Geology of Southwold and of the Suffolk Coast from Dunwich to Covehithe,' pp. vi, 87, with a coloured folding plate of the cliff-sections. By W. WHITAKER. 1887. Price 2s. 6d.

For Ipswich, &c.

Maps—Quarter-sheets 48, N.E. (Ipswich and Felixstow), 49, S. (Aldborough), and 50, S.E. (Orford and Chillesford).

'The Geology of the County around Ipswich, Hadleigh and Felixstow,' pp. vii, 156. By W. WHITAKER. 1885. Price 2s.

'The Geology of the County around Aldborough . . . Orford,' etc., pp. vi, 56. By W. H. DALTON. 1886. Price 1s.

EXCURSION TO HIGHAM.

SATURDAY, JUNE 22ND, 1889.

Director : F. C. J. SPURRELL.

(*Report by THE DIRECTOR.*)

On leaving Higham Station, where the junction of Chalk and Thanet Sand, covered by Brickearth, was seen, the party proceeded to Higham Churchyard, where the Director described the geology of the marshland of the Thames. He also pointed out the sites of the extensive Roman potteries of the neighbourhood. Passing by the little inn still known as the Old Ferry House, the party traversed the marsh northward over the causeway or bridge, as

such places were called in early times, to the site of a block-house whose foundations of bricks and mortar, etc., on piles, lie now three feet below the Salting surface, and which is nearly washed away. The block-house may have been, as is probable, erected at the time of the two block-houses at Gravesend and Tilbury, in Henry VIII.'s time; but it is certain that it was renovated or rebuilt by Elizabeth at the time of the Armada. The causeway abuts on the shore opposite East Tilbury, and was in mediæval times the line of crossing the Thames from the whole district of East Anglia and the North. During the Roman occupation and earlier, the marsh was inhabited by the Romans and the Britons who worked on the potteries. It is likely that this spot is the one spoken of by Diodorus as being the place where Plantius first crossed the Thames in A.D. 43, where that river "disembogues itself into the ocean, and becomes an estuary at high tide," the tide such as is now seen at London being, 1,800 years ago, some twenty-five miles or so lower down the river, as shown by evidence detailed on the spot, and already printed in the 'Proceedings' of the Association.*

Referring to the history of the embankments of the river, the spot was described as presenting every variety from the most ancient to the most modern on the Thames. From the most ancient, when no protection against the tide was needed beyond a hard causeway across the marsh, to those constructed at various times, when carelessness or the inroads of the sea and storms broke down the walls, and to the latest endeavour to face the river with an even and regular bank. The Director furnished the party with a plan of the ancient walls of the district, and in this was made an effort to show the relative ages of different sections of the walls. All the walls on the river were of later date than those in the lower reaches. All began by the protection of property on the earth-land foot, and extended piecemeal into the marsh and swamps, so by degrees pushing forward the frontage by a junction of the intervals between salient points. This process being frequently interrupted has produced in some places great irregularity in outline, without, however, preventing the diligent observer from perceiving that the process above-mentioned has in all cases been followed. The popular idea that the present tide-walls at the

* *Vide supra*, 'Proc. Geol. Assoc.,' Vol. xi, p. 210, *et seq.*

water edge were all the result of one effort is the result of ignorance, since there are other obsolete walls which preceded them further inland, and the existing walls are not uniform, presenting irregularities in direction, in form, and construction, which precludes any belief in their singleness of design. In the Roman period they were not formed, nor wanted, above Tilbury. In early Saxon times, even if wanted, they were not constructed, except perhaps in a few instances of small area; and in later Saxon times the evidence of documents such as we have, is against enclosure. Even in 1300 A.D. in an Inquisition on the property of Cooling (near Higham) there is mentioned "300 acres of Saltings pasture" with "15 acres of meadow on the Saltings," each worth 6d. an acre, an excellent evidence of the proportion as to area of enclosed to salt marsh; and of the slight inducement to embank, if the value did not increase, as we see was the case. At Cooling, also, it should be noted that the difference between salt and enclosed marsh is much more marked in value than higher up the river. Therefore it was clear that the embankments were the result of individual enterprise; and that in anything like their present regularity, they are of very modern date. The party proceeded to Cliffe, under the ancient cliffs, whence the name is derived, and having spent the whole afternoon on the marshland, returned to town from Cliffe Station.

REFERENCES.

Geological Survey Map, No. 1, S.E.

WHITAKER, W.—'Geological Survey Memoir,' Vol. iv.

SPURRELL, F. C. J.—'Archæological Journal,' xlii, 269; "Embankments of the Estuary of the Thames."

EXCURSION TO TOTTERNHOE AND IVINGHOE.

SATURDAY, 29TH JUNE, 1889.

(In conjunction with the Hertfordshire Natural History Society.)

Director : JOHN HOPKINSON, F.L.S., F.G.S.

(*Report by THE DIRECTOR.*)

The Chalk Rock, the top bed of the Middle Chalk, having been seen at Boxmoor on the 18th of May, this Excursion was arranged to enable Members of the two societies to examine another hard and fossiliferous bed in the Chalk—the Totternhoe Stone—which