interesting and temporary section was open to the west of the town, the Excursion Committee decided in favour of another half-day excursion to Reading. The party numbered about 26, and the excursion may, therefore, be looked upon as a decided success. These details are mentioned, as long-distance, half-day excursions are still somewhat in the nature of experiment.

HORACE W. MONCKTON, *Sec. (Excursions).*]

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EXCURSION TO AYOT GREEN AND HATFIELD HYDE.

SATURDAY, MAY 14TH, 1898.

Directors: JOHN HOPKINSON, F.G.S., ASSOC. INST. C.E., AND
A. E. SALTER, B.SC., F.G.S.

Excursion Secretary: W. P. D. STEBBING, F.G.S.

(*Report by the DIRECTORS.*)

THE party left King's Cross at 1.20 p.m., and by 2.30 the Directors were discoursing in Ayot Brickfield on the strata there exposed. It was pointed out that Ayot Green is situated on high ground (380 ft. to 406 ft. O.D.) between the valley of the Lea and that of its affluent the Mimram. The Lea rises near Houghton Regis, a little above 400 ft. O.D., on the Luton Gap, and flows through the town of Luton before it enters Hertfordshire; the Mimram makes its first appearance as a pond at Whitwell near St. Paul's Walden, scarcely 300 ft. O.D., flows by Welwyn and under the Digsell Viaduct of the Great Northern Railway, and
JULY, 1898.]

joins the Lea at Hertford. About eight miles due north of Ayot Green, the Chalk Downs are breached by the Hitchin Gap at 305 ft. O.D., and it was remarked that the next lowest gap on the west was that at Goring, 160 ft. O.D., while to the east, one existed north of Bishop's Stortford at 230 ft. O.D. The position of these gaps is regarded by Mr. Salter as of great importance in all questions relating to the origin of the drift deposits in the Thames Basin.

The geological structure of the district was next described. It was pointed out that the Ayot Brickfield is situated on one of the many Tertiary outliers, resting on the Chalk, which fringe the Thames Basin both on the north and on the south. In most cases, if not in all, they are capped by beds of gravel, to the presence of which their preservation may chiefly be ascribed. The outliers at Penn and Coleshill between High Wycombe and Amersham, Tyler's Hill or Cowcroft near Chesham, Bennett's End, Hemel Hempstead, and Bernard Heath, St. Albans, on the north-west of the London Basin, may be cited as similar examples, while Well Hill is an example of such an outlier occurring on the south. Mr. Hopkinson drew attention to the remarkably straight line formed by the outliers on the north by means of a strip of paper twelve times as long as it was wide, on which he had drawn nearly all the outliers which extend from Wargrave, beyond Maidenhead, on the south-west, to Albury, near Bishop's Stortford, on the north-east, a distance of fifty miles. They are almost exactly in the line of strike of the Chalk, and he referred to the theory that they mark a slight deflection of the dip of the underlying strata, though, as they now form the highest land, it was strange if this line of Tertiary beds owed its preservation from denudation at an early period, as was supposed, to having lain in a hollow in the Chalk. At any rate, the existing outliers are probably fragments of a once more-continuous band, owing their individual preservation at a later period and to the present time to the greater resistance to sub-aërial denudation offered by the gravel by which they are mostly capped, than that of the Chalk by which they are surrounded.

Some of these outliers are of the Woolwich and Reading Beds only; others have also upon these beds the London Clay, sometimes only its Basement Bed. Here the Reading Beds consist of sands with numerous clayey partings. The Chalk below is piped, and the Tertiary Beds above have been irregularly let down, giving them quite a contorted appearance on the north side of the brickfield, while on the south they are overlain by the London Clay, and although not here seen, we may infer that this clay has so far prevented the percolation of water into the Chalk that pipes are absent and the Reading Beds are but little disturbed.

In the Basement Bed of the London Clay, teeth of *Lamna* and casts of bivalves are to be obtained, but the bed of flint-pebbles in which these occur was nearly all covered up by *débris*. The best time to find fossils is in winter when the clay is being dug out. This is the lowest layer of the Basement Bed. There is another thin layer of flint-pebbles near the top in which oyster-shells are occasionally found.

Covering the Tertiary Beds were seen Drift gravels, which in one part are remarkably similar in composition to typical Westleton Shingle, and at this point Boulder Clay rests upon them, containing erratics of a simpler character than does the Boulder Clay at Hatfield Hyde.

In Griggs' Wood, a little to the north and on rather higher ground, the highest in the immediate neighbourhood, a characteristic section of Westleton Shingle was seen, and the simple character of its constituents and their similarity to those found at South Mimms, High Barnet, etc., were pointed out.

After a pretty walk of three miles through Sherrard's Park Wood, the large excavation by the side of the Great Northern Railway at Hatfield Hyde was reached. Here about 42 ft. of Glacial deposits are exposed, consisting of the following :

(a) A thick bed (12 ft.) of Boulder Clay containing much chalk in its lower part and *débris* from the Midlands, e.g., *Gryphææ*, *Belemnites*, and Triassic and other pebbles.

(b) About 15 ft. of sands, with patches of gravel containing similar *débris*.

(c) A lower bed of Boulder Clay 1 ft. thick, similar in character to (a).

(d) Ochreous flint-gravel and sands with Triassic quartzites (about 15 ft.).

(e) Chalk, disintegrated.

This interesting section, which has not before been visited by the Association, had been brought to the notice of the Directors by the Rev. H. G. O. Kendall, M.A., who, assisted by the local branch of the Selborne Society, had thoroughly investigated the pit. Specimens which had been carefully collected from the various layers were displayed for inspection. One specimen, of polished Carboniferous Limestone, finely striated and showing sections of Crinoid stems, was especially interesting. The pit is situated at about 290 feet O.D., a mile north of the Lea, and just before it takes a bend from south-east to east.

An enjoyable walk through the woods which fringe the north-west corner of Hatfield Park, in the course of which the Lea was crossed at the point where it is expanded into an ornamental sheet of water, followed by tea at the Red Lion, Hatfield, brought a most successful excursion to a close.

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EXCURSION TO PENN AND COLESHILL, BUCKS.

SATURDAY, MAY 21ST, 1898.

Director : W. P. D. STEBBING, F.G.S.

Excursion Secretary : MISS M. C. FOLEY, B.Sc.

(*Report by the DIRECTOR.*)

ON arrival at Loudwater at 3 p.m., the Director led the party up the hill S.W. of Loudwater to some sections mapped “Glacial Drift.” These openings, at about 350 ft. above O.D., show about 7 ft. of clayey gravel made up of sub-angular flints, flint-pebbles from the Eocene pebble-beds, and a few boulders of quartz and quartzite. One particularly large quartz boulder seen, measured about 2 ft. × 14 in. × 12 in.

Returning past the station, the party next visited a pit in a bed of sand and gravel which rests on the Chalk on the slope of the hill to the N.E. of Loudwater. This pit, also mapped “Glacial Drift,” and at about the same height as the former, shows stratified sand and gravel, occurring irregularly. The gravel consists mostly of water-worn material of all sizes; large pebbles of quartz and quartzite are common, and pebbles of black chert occur. The sand in places is clayey, with thin seams of clay. At the eastern end of the pit, a pinnacle of chalk, surrounded by black clay with un-rolled flints, protrudes into the sand; it has a curious effect, but Mr. Monckton thought that it was merely part of the side of a swallow-hole.

Thence the members walked to Tyler's Green, passing, S. of Penn, the junction of the Chalk and the Reading Beds, which was not seen, though evidence of the presence of clay was shown by several small ponds.

Penn is one of the line of Tertiary outliers that runs nearly in a north-easterly direction from Greenmore to Bennington. These
 JULY, 1898.]