REFERENCES.

Geological Survey Map, Sheet 13.
New Ordnance Survey Map, Sheet 268.

-
1816. BUCKLAND, REV. PROF.—“Plastic Clay near Reading.” *Trans. Geol. Soc.*, vol. iv, p. 277.
1872. WHITAKER, W.—“The Geology of the London Basin.” *Mem. Geol. Survey*, vol. iv.
1875. JONES, T. R., and KING, C. C.—“On some newly-exposed sections of the Woolwich and Reading Beds at Reading.” *Quart. Journ. Geol. Soc.*, vol. xxxi, p. 451.
1876. HUDLESTON, W. H.—“Excursion to Reading.” “Record of Excursions,” p. 269.
1885. BLAKE, J. H., and STEVENS, DR. JOSEPH.—“Excursion to Reading.” *Proc. Geol. Assoc.*, vol. ix, pp. 209—212.
1888. BLAKE, J. H.—“Excursion to Reading.” *Proc. Geol. Assoc.*, vol. x, p. 493.
1893. MONCKTON, H. W.—“Boulders, etc., from Glacial Drift in Gravels South of the Thames.” *Quart. Journ. Geol. Soc.*, vol. xlix, p. 308.
-

EXCURSION TO HITCHIN.

SATURDAY, 20TH JUNE, 1896.

Directors: WILLIAM HILL, F.G.S., AND HORACE W.

MONCKTON, F.L.S., F.G.S.

Excursion Secretary: A. C. YOUNG.

(*Report by THE DIRECTORS.*)

THE members assembled at Hitchin Station at about half-past two in the afternoon, and, starting under the direction of Mr. Hill, they walked northwards along the side of the Great Northern Railway for some distance, and then turned to the right, along a tram line, to Messrs. Ransom's Lime Works, near Grove Mill.

Here a good section in Chalk was seen, and Mr. Hill briefly explained its features, and pointed out the zone of *Belemnitella plena*, the upper limit of the Lower Chalk, and the overlying Melbourn Rock, a small part of which is seen at the top of the pit. A search for fossils followed, but was not very successful.

The party then returned to Hitchin Station, and visited the large chalk quarry, so well known to travellers by the Great Northern Railway, and a part of which was figured in the *Quarterly Journal of the Geological Society* for 1866.* Mr. Hill

* Vol. xxii, p. 566.

said that the horizon was the base of the Middle Chalk, so that the chalk seen at the level of the railway forms practically a continuous section with that at Grove Mill.

The chalk is overlain by Drift consisting of sand, chalk rubble, and gravel well stratified, though the stratification is very irregular in places. Mr. Hill pointed out a place where clay with ice-scratched stones occurs, and drew attention to a very coarse gravel with boulders of a great variety of rocks at the bottom of the Drift. This Drift is of Glacial age, and possibly the clayey bed represents the Boulder Clay.

Leaving the railway at the Benslow Bridge, the party walked over Highbury Hill to the high ground east of the town of Hitchin, which is covered by a sheet of Glacial Gravel. The surface is not very level, and is in places a little above, and in others a little below, the 300 feet contour line. From a commanding position on this high ground Mr. Hill pointed out the main features of the district, and drew attention more especially to the situation of the brickfield, where a freshwater formation occurs, which was to be visited later on.

Turning into a pit in the Glacial Drift it was seen to be composed of an upper bed of a clayey character, reminding one somewhat of the clay bed seen at Hendon on April 25th last, and marked bed *b* in Figs. 2 and 3 on pages 328, 329 *ante*, and of a lower bed of stratified sand and gravel, with much current bedding in places. This gravel belongs to the Glacial Drift, and Mr. Monckton remarked that when one considers how extensive the Glacial Gravels are in the midland and eastern counties of England, it is strange that the highest authorities should be unable to agree whether they are of marine or of freshwater origin.

The gravel is composed very largely of flint. There are a good many pebbles of white chalk, and also boulders of all sorts of rock. On a former occasion Mr. Monckton found a pebble of carboniferous limestone with *Spirifera trigonalis* in this pit, and a pebble of red chalk in an adjoining pit.

From the gravel pit the party walked to Mr. W. Jeeves' brickfield, where a good section was pointed out by Mr. Hill. The level of the surface of the ground is about 235 feet above ordnance datum, and the following beds (in descending order) were exposed.

1. BRICK-EARTH of a reddish-brown colour with a few stones scattered through it. 20 ft.
2. THE FRESHWATER BED. Soft calcareous loam of a light colour, from brown to almost white, which has been found in other parts of the brickfield to pass down into a dark grey or almost black deposit, fairly evenly stratified.
3. GRAVEL, composed of flint, chalk pebbles, and a great variety of rocks all more or less rolled and waterworn. The gravel is well stratified, and often current-bedded.

Numerous flint implements have been found in the brick-earth, bed 1 of the above section, and also mammalian remains, which have yet to be determined.

The following is a list of fossils from the Freshwater Bed.

MAMMALIA.

In possession of Mr. W. Ransom, Hitchin.

Ursus.
Cervus elaphus.
Rhinoceros.

MOLLUSCA.

Identified by the President, E. T. Newton, F.R.S. Those with a star (*) have since been added by Mr. A. S. Kennard.

Bythinia tentaculata.
Limnæa auricularia.
Limnæa peregra.
Planorbis carinatus.
Planorbis complanatus, Linn. (= *marginatus*, Drap.).
 * *Planorbis spirorbis.*
Valvata cristata.
Valvata piscinalis.
 * *Velletia (Ancylus) lacustris.*
Anodonta cygnæa (?).
Sphærium corneum.

OSTRACODA.

Identified by Professor T. Rupert Jones, F.R.S., and recorded by him : †

Candona candida.
Cypris Browniana.
Cypris incongruens.
Cypris reptans.

PLANTÆ.

Chara (stems and fruits).

Mr. Hill stated that an elephant's tooth was found a year or two ago in the gravel beneath the Freshwater Bed. The gravel contains numerous boulders with fossils from various formations, and the following were found by members of the Association on the present occasion :

† *Geol. Mag.*, dec. III, vol. iv, p. 459 (Sept. 1887).

Derived fossils from Gravel which underlies Freshwater Deposit—

<i>Cardinia concinna</i> (= <i>C. lanceolata</i>)	Lias.
<i>Pleuromya costata</i>	Lower Lias.
<i>Pleuromya crassa</i>	Lower Lias.
<i>Serpula tetragona</i> ?	Cornbrash.
<i>Gryphaea bilobata</i> ?	Kellaway's Rock.

Referring to the Geological Survey Map, Sheet 46 N.E. Drift Edition, Mr. Monckton observed that the Drift was divided into eight divisions, two of which, the "clay with flints" and the "loam" associated with it, did not occur near the locality visited, and consequently did not call for attention just then. The other divisions were, beginning with the newest:

1. Alluvium.	4. Glacial Loam.
2. Loam.	5. Glacial Boulder Clay.
3. River Gravel.	6. Glacial Gravel.

According to the map, the brick-earth before them was classed with the loam of Glacial age (No. 4 of the above list), and he supposed therefore that if the Boulder Clay had been present, it would have come in between the Freshwater Bed and the underlying gravel.

Unfortunately the Boulder Clay is not present in the brick-field, though it has been mapped about a mile away, near Great Wymondley, at a level of about 270 feet O.D. The level of the brick-earth ranges from about 290 feet O.D. on Hitchin Hill, to about 235 feet O.D. at the Folly. The nearest patches of River Gravel mapped are along the course of the River Purwell, at levels of about 183 to 190 feet O.D.

In the absence of definite evidence, Mr. Monckton thought it was still an open question whether the Brick-earth and Freshwater Bed ought not to be classed with the "Loam" No. 2 of the list given above, instead of with the Glacial Loam. He reminded the members of a somewhat similar bed at Mundesley, which was visited by the Association on April 1st, 1893.* That bed was at one time supposed to be intercalated in the Boulder Clay, but it is now held to be an alluvial deposit newer than the Glacial Beds.†

The celebrated Freshwater Deposit at Hoxne also bears some resemblance to the Hitchin bed. In it many flint implements have been found, and it was at one time classed with the Glacial Series, but it is described by Messrs. Whitaker and Dalton as post-glacial.‡

A bed of brick-earth with freshwater shells, at Rickinghall

* See *Proc. Geol. Assoc.*, vol. xiii, p. 59.

† C. Reid, "Geology of the Country Round Cromer" 1882, *Mem. Geol. Survey*, p. 118.

‡ See Lyell, *Antiquity of Man*, 4th Edition, 1873, p. 219, and Whitaker and Dalton "The Country round Halesworth and Harleston," 1887, *Mem. Geol. Survey*, p. 27.

Superior, has been described by Mr. F. J. Bennett, F.G.S., as occurring below Boulder Clay,* and it is pretty obvious that the classification of the numerous beds of brick-earth and loam in the east of England is by no means free from difficulties.†

Some time was spent collecting from the Freshwater Deposit, but the shells, though very abundant, were found to be most fragile.

Leaving the section, the party walked into Hitchin, other sections in the brickfields being pointed out by Mr. Hill in passing, and from the gravel of one of these two other forms of derived fossils were obtained, namely, *Sternbergia*, a Coal Measure plant, and *Avicula inaequalis*, from the Kellaways Rock.

An excellent tea was provided at the Sun Hotel, and after full justice had been done to it the President proposed a vote of thanks to Mr. Hill, and to the gentlemen who had assisted him in arranging the excursion. It was carried unanimously, and Mr. Monckton observed that, curious to say, the Association had not visited Hitchin before; but after the successful afternoon which all present seemed to have enjoyed, he thought it would not be long before the visit was repeated.

Mr. A. E. Salter said it was interesting to note, in connection with the drift deposits seen near Hitchin, that the town is situated at the northern entrance of one of the few gaps which penetrate the chalk hills to the north and north-west of London. South of this gap gravel deposits are found at heights varying from 460 to 300 ft. O.D., the constituents of which increase in complexity as the height decreases, till in the lower ones undoubted glacial materials are found.‡

NOTE.—Mr. Salter writes that he was struck by the apparent absence of older rocks like schists, granite, etc., which have been found farther down the gap, *i.e.*, at Finchley. He found, moreover, only one doubtful liver-coloured quartzite. I am inclined to think that the apparent absence or scarcity of igneous rocks in these gravels is largely due to the fact that those rocks decay easily. A short time ago I took a boulder about 6 ins. in diameter from the side of a gravel pit a little north of Hitchin, and on throwing it down it broke up into small fragments. It appeared to have been granite.

H. W. M., 1st July, 1896.

REFERENCES.

Geological Survey Map, Sheet 46, N.E.
Geological Survey Index Map, Sheet 12.

1886. W. HILL and A. J. JUKES-BROWNE.—“The Melbourn Rock,” etc., *Quart. Journ. Geol. Soc.*, vol. xlii, p. 216.
1887. H. B. WOODWARD.—“Geology of England and Wales,” 2nd edition.

* “Geology of Country round Diss, etc.,” 1884, *Mem. Geol. Survey*, p. 12.

† See H. B. Woodward, “Geology of Country round Norwich,” 1881, *Mem. Geol. Survey*, p. 110.

‡ For further details on this subject see Mr. Salter’s paper, this vol., *ante*, p. 389.