

EXCURSIONS TO THE FARNHAM GRAVEL PITS  
ON APRIL 23<sup>RD</sup>, AND TO THE BRICKFIELDS  
AND GRAVEL PITS AT DAWLEY, BETWEEN  
HAYES AND WEST DRAYTON, ON  
APRIL 30<sup>TH</sup>, 1904.

*Directors* : H. A. MANGLES, F.G.S., R. FANE DE SALIS, F.G.S.,  
AND H. W. MONCKTON, F.G.S.

*Excursion Secretary* : GEORGE W. YOUNG.

(*Report by H. W. MONCKTON.*)

The main object of these two excursions was to enable the members to compare the Drift Deposits of a plateau which now overlooks all the valleys around it, with those of a plain not much above the bottom of a modern valley.

The Drift at Farnham consists of gravel, and there is a bed of gravel overlain by brickearth at Dawley. In both places the gravel has yielded many flint implements.

On April 23<sup>rd</sup> the members assembled at Farnham Station, and proceeded by carriage, motor, or cycle to the extensive gravel pits at the north-eastern end of the plateau, a little south-east of Farnham. Some account of the sections will be found in the report of our excursion to Farnham on May 13<sup>th</sup>, 1893, and as that was a whole day excursion the members were able to see much more of the geology of the neighbourhood than time would allow of on the present occasion. I may, however, take this opportunity of recording the find of *Ammonites mammalatus* in bed 5 of the section at Wrecclesham given on page 76 of that report (*Proc. Geol. Assoc.*, vol. xiii). I found a specimen soon after our excursion in 1893. After an examination of the gravel pits the party followed the road past Waverley Abbey and Crooksbury Hill to Littleworth Cross, the residence of Mr. Mangles, where a collection of implements from the Farnham gravels was exhibited. The members then walked round Mr. Mangles's beautiful garden, and inspected his magnificent collection of Himalayan Rhododendrons, most of which were in full blossom. He has since received two awards of merit from the Royal Horticultural Society for them. The party was then entertained to tea by Miss Mangles, and afterwards returned to London by way of Tongham and Guildford.

A vote of thanks to the Directors and to Miss Mangles was proposed by Dr. A. E. Salter and carried unanimously.

On April 30<sup>th</sup> the party met at Hayes Station, and walked along the towing-path of the Grand Junction Canal to Dawley.

There some excellent sections in the Drift were inspected, and Mr. De Salis explained that it consisted of brickearth resting upon gravel. The ground is let to brickmakers, who first work off the brickearth and send the bricks by canal to London.

The bricks are made of a mixture of brickearth, ashes, and chalk. They are first sun-dried, and then stacked in kilns and burnt. The brickearth having been removed the gravel is then sold at so much an acre, and worked to within a foot of the water level.

The gravel is much more sandy on the east side of the Dawley Estate than on the west side, and both the sandy phase and the stoney phase of the deposit have a considerable commercial value. Where, however, the sand and stones are mixed the value is much reduced.

Numerous flint implements recently found from 12 ft. to 18 ft. below the surface were shown to the members by the workmen. One unusually fine specimen measured 10 in. in length, and weighed  $3\frac{1}{2}$  lbs.

A vote of thanks to the Directors was proposed by Prof. J. F. Blake and was carried unanimously.

The party then walked to West Drayton Station and returned to London.

The gravel-capped plateau south of Farnham which we visited on April 23rd is a long spur running out from the rather high ground of Alice Holt Forest. The top is fairly flat, and slopes from a level of about 380 ft. in the south-west to about 360 ft. in the north-east. There are deep valleys on both sides of the plateau. The Drift-covered area at Dawley is about 115 ft. above the sea, and it is part of a tolerably gradual slope extending from Hillingdon, where the level is 188 ft., down to the River Thames, some 30 ft. above sea level. There are slight features in this slope enabling one to divide it into terraces, but these terraces are not very well marked, and the covering of Drift is practically continuous. The thickness of the gravel is up to 25 ft. at Farnham, and from 12 to 15 ft. at Dawley. At both places it is better stratified at the bottom than at the top, and this is usually the case with the gravels of the district. The Dawley gravel is covered by a more or less continuous bed of brickearth, but there is no brickearth at Farnham.

At both places the gravel consists largely of subangular flints, and is thus easily distinguished from the Eocene pebble beds of the London District. It is indeed hard to match such subangular deposits in any of the older geological formations, and I have suggested that these gravels were possibly deposited as the result of earth-movements of elevation, whereas most of our geological deposits are due to long and continuous earth-movements of depression (see *Proc. Geol. Assoc.*, vol. xvi, p. 443). In any case

I feel convinced that the Drift at both places is the deposit of rivers, and as the gravel in both cases contains fragments from the Hythe Beds of the Lower Greensand, the drainage area of the rivers must have changed considerably since the date of deposit. Thus the Wey and its tributaries does not drain a Hythe Bed area until after it has passed the Farnham plateau, and the Thames does not drain such an area until it has passed Dawley. Moreover, Dawley is now north of the present course of the Thames, and the Hythe bed fragments have almost certainly been brought from the Wealden district a long way to the south of the river.

I was much interested by the remarks on the Thames Valley Drifts by Mr. Pocock at Grays last year (*Proc. Geol. Assoc.*, vol. xviii, p. 143), and I much appreciate his account of those deposits in the Summary of *Progress of the Geological Survey* for 1902, p. 199. I should like also to take this opportunity of congratulating the Survey on the excellent colour-printed map of the London District just issued.

When we were at Ipswich in 1902 I gave a summary of the events which seemed to have happened in that district in recent geological times, and I will now attempt to give a similar summary for the Farnham-Dawley district.

LOWER BARTON.—The yellow sands of the Fox Hills, Chobham Ridges, Easthampstead Plain, etc., are shown by their fossils to be of Lower Barton age. The shells are marine, and the valves of the bivalves are united and closed, and probably the sands were deposited in a wide bay of open sea not far from land.

MIDDLE AND UPPER BARTON.—Wanting.

OLIGOCENE.—Wanting.

MIOCENE.—The folding which gave rise to the anticline of the Weald, and the syncline of the London Basin, probably took place to a great extent in this period, though the movements continued into Pliocene times.

PLIOCENE.—Netley Heath on the North Downs is covered by a deposit of sand in which Mr. Stebbing has found casts of shells, and there seems every probability that the deposit is of the age of the Lenham Beds, *i.e.*, Older Pliocene (*Proc. Geol. Assoc.*, vol. xvi, p. 524). Netley Heath is now 650 feet above the sea, so that elevation of that part of our district to an extent of some 700 feet has apparently taken place since the early Pliocene.

It does not follow that the sea extended much to the north or west of Guildford during this period, and the western part of the syncline of the London Basin, and much of the present drainage area of the Thames may have become dry land at any time after the Lower Barton, and it is therefore possible that the rivers are older than the completion of the foldings. What

effect the earth movements may have had on the course of the rivers is consequently a question of some importance; possibly no very great effect, for the strata are so soft that in case of elevation of a tract of ground the water might cut its way fast enough to keep pace with the earth movement.

We thus see that part of the present drainage area of the Thames may have been land since pre-Pliocene times, and neither the area of the syncline of the Thames nor the anticline of the Weald appear to have been submerged since the early Pliocene. I propose to divide the land history of the district into eight stages.

#### THE LAND HISTORY OF THE DISTRICT.

Stage 1. The Sarsen Stones are probably the relics of the first land surface after the marine Lower Barton (*Proc. Geol. Assoc.*, vol. xviii, p. 184).

Stage 2. Completion of the elevation of the Weald in Pliocene Times.—The depression of the Rhine syncline extended to Norfolk, and the elevation of the Weald may have been accompanied by a depression of the London Basin, but, however that may be, it was not submerged. The deposition of the river gravel with large flints at Upper Hale and Cæsar's Camp, Aldershot, and on the North Downs at Newland's Corner, etc., belongs to this period.

This is also the probable date of the Pebble Gravel of the Chiltern Hills.—If I could be certain that the material of this Pebble Gravel came from the west I should suspect it to be the earliest gravel of the River Thames.

Stage 3. A slight elevation of the Thames syncline appears to have taken place, and considerable sheets of gravel were in consequence deposited. The gravel of Goring Heath, Cane End, etc., is Thames Gravel of this date, and on Bucklebury Common we find the corresponding gravel of the Kennet, and on Chobham Ridges, etc., the gravel of the Blackwater, with much Hythe Bed material and many Sarsen stones, relics of the older surface.

Stage 4. The Chalky Boulder Clay.—This deposit is newer than the gravel which underlies it at Finchley, etc., and which contains both northern or western material and Hythe Bed fragments, and it is older than the stratified sand and gravel which rests on it at Hornchurch at a level of a little above 100 ft. O.D. I consequently put it a little before the 100 ft. terrace of Mr. Pocock.

Stage 5. The Dawley Gravel and the 100 ft. terrace.—The Thames appears to have followed the line of the present Great Western Railway from Maidenhead in the direction of Dawley. I do not agree with Mr. Pocock in thinking that the river was ten miles wide at Southall, for the stratified gravel at the

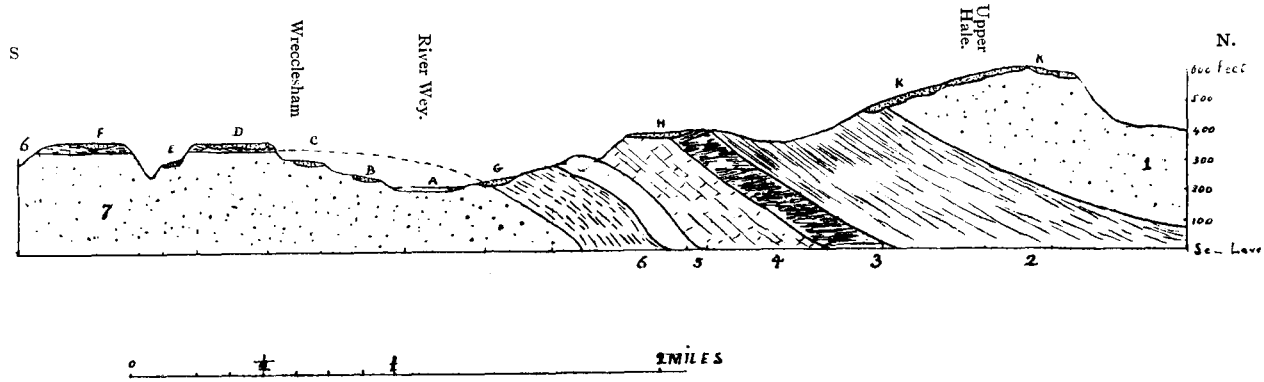


FIG. 20.—SECTION THROUGH UPPER HALE AND WRECCLESHAM A LITTLE WEST OF FARNHAM.—*H. W. Monckton.*

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| A. Alluvium of the River Wey. | B to H. Various patches of gravel. | K The high level gravel of Upper Hale and Cæsar's Camp, Aldershot. |
| 1. Bagshot Beds.              | 2. London Clay.                    | 3. Reading Beds.   |
|                               | 4. Chalk.                          | 5. Upper Greensand.  |
|                               | 6. Gault.                          | 7. Lower Greensand.  |

100 ft. level at Weybridge is not a Thames gravel, there being no northern stones in it. It is a gravel of the River Mole.

Stage 6. The gravel of the plain between Brentford and the River Coln about and a little over 50 ft. O.D.

Stage 7. The *Corbicula fluminalis* beds of Grays and Crayford.—The gravel between Sunbury and Shepperton, and the patches of brickearth near Shepperton, all about 40 ft. O.D., are probably newer than the Grays and Crayford shell-beds.

Stage 8. The alluvium of the River Thames.

It will be seen that I place the implementiferous gravel of Dawley after the Chalky Boulder Clay, and I think that this is probably correct, but I am far from certain where I ought to place the gravels with implements of Farnham and of the plateau at Sonning, near Reading. They come after my third series of deposits, and before my sixth series, and they may be equivalent to the Dawley Gravel, or they may come before the Chalky Boulder Clay. Possibly the form of the implements themselves may assist to solve this question.

#### REFERENCES.

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#### EXCURSION TO HENLEY-ON-THAMES.

SATURDAY, MAY 7TH, 1904.

*Director* : H. J. OSBORNE WHITE, F.G.S.

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

DESPITE the threatening aspect of the sky during the earlier part of the day, this excursion was fairly well attended; about twenty members and friends of the Association gathering at Henley Station shortly after one o'clock.

Passing through the town to Northfield End, the party took the footpath leading over No Man's Hill to Henley Park. From a spot near the large tumulus known as The Mount, the Director indicated the more prominent physiographical features of the