EXCURSION TO VIRGINIA WATER AND WOKING.

SATURDAY, MAY 3RD, 1919.

REPORT BY C. N. BROMEHEAD, F.G.S., *Director of the Excursion.*

(PLATE 8A.)

A SMALL party met at Virginia Water Station and walked to the cross-roads at the northern corner of Lynegrove Park. Here the director gave some account of the disused valley of the Bourne: the diversion of this stream by the lateral encroachment of the Thames was studied on a former occasion; copies of the report¹ of that excursion were handed round and the map given there helped to make his remarks clear. Looking south-east the party saw the old valley, now dry, in front of them, leading towards Addlestone, the flat bottom filled with peaty alluvium and gravels of Taplow age. The right bank of the valley was formed by hills of Bagshot and Blacklesham Beds; of the original left bank an isolated fragment remained as St. Ann's Hill, while further down the valley was another relic, Woburn Hill. Owing to the encroachment of the Thames the stream which once flowed in this "dead" valley found a new exit into the main valley between Virginia Water Station and St. Ann's Hill. Its course here, locally of a more or less gorge-like character, could be seen a short distance to the north of, and at a considerably lower level than the point where the members were standing.

By permission of Mr. Godfrey Isaacs, the private road leading to Hersham Farm was followed opposite Lynegrove House; the hill was capped by a patch of the Boyn Gravel of the Bourne, and a small pit dug in it was visited. Here a more extensive view of the drainage features was obtained and the composition of the gravel noticed. The chief constituents are resinous chert in subangular fragments, spongy chert, ironstone and small quartz pebbles, all from the Greensand formation, round flint-pebbles from the Tertiaries, and a few partly worn flints from the Chalk; the presence of clay (of Bracklesham age) beneath the gravel was detected, but there was no good exposure.

The walk was then continued through Hersham Woods, and thence by road to Stanner's Hill Farm; the scenery was typical of the Bagshot Sands and Blacklesham Clays. By permission of the tenant the large "gravel" pit behind the farm at Stanner's Hill was visited. The director explained that the "gravel" was the great pebble-bed forming the base of the Barton Series. The pit showed a face of about 12 feet consisting of beds of pebbles interstratified with sandy layers and apparently dipping southwest at about 20° (see Plate 8, fig. A). The pebbles are mostly of flint and range up to four inches in

length, but chert from the Lower Greensand is by no means rare and small pebbles of white vein-quartz are fairly abundant.

There is a two-fold interest attaching to the composition of this pebble-bed : in the first place it is noticeable that Lower Greensand chert, found at this horizon, has never been detected in any of the pebble-beds lower down in the sequence, such as those in the Bracklesham, Bagshot Sands (visible at and near Virginia Water Station, and described in the report on the previous excursion to that locality¹), or Reading Beds. It is clear, therefore, that the Lower Greensand was not being denuded in earlier Tertiary times, but was uncovered at the beginning of the Barton epoch. Presumably the material came from the Weald ; thus we have a fixed date in the process of denudation of the Wealden anticline. In the second place the presence of white vein-quartz pebbles may throw some light on the vexed question of the drifts on the northern side of the London Basin. It has been argued that, because the pebble-beds in the Reading Series do not contain vein-quartz, the quartz found in certain gravels must have been brought into the district in Pliocene times. These drifts must, however, be derived to a large extent from the destruction of Tertiary pebble-beds higher in the sequence than those which still occupy large areas in that district. The Barton Beds have completely disappeared on the north side of the Thames, but there is little reason to doubt that they once extended as far as the Chiltern Hills. Another possible source for the little white quartz pebbles found in the gravels is therefore indicated.

On leaving the large pit the path across the Common to Stanyards was taken ; beside it a shallow excavation showed the base of the pebble bed lying on the green clays of the middle Bracklesham. The pebbles are kneaded into the clay, which consists to a large extent of glauconite and really is green, of a brilliant pistachio tint. The upper part of the Bracklesham, which at other localities is seen to be a loam or sand, is here absent. On the excursion to St. George's Hill (*above*, p. 127) the Bagshot Sands were seen overlain by the lilac clays of the lower division of the Bracklesham, but above that the next bed visible was the sands of the Barton series. Here two of the missing members could be seen, the green clays of the middle Bracklesham and the pebble-bed at the base of the Barton ; so that any members who attended both excursions saw a fairly complete sequence. The upper Bracklesham Sands were absent at Stanners Hill, but present, though not usually visible, at St. George's Hill. The Barton Sands, well seen at the latter locality, occurred overlying the pebble-bed within half-a-mile of the Stanners Hill pit, but time did not allow of their being examined. The distribution of the various members of the Series would be found fully described in the Survey Memoir.²

On reaching Woking Common some of the party headed direct for tea, but the more energetic visited a pit in Bagshot Sands. The face is about 10 feet in height and shows the usual current-bedding and seams of pipe-clay. Another feature noticeable here is the tendency for iron to segregate a foot or two below the surface. Over much of this area the iron thus forms a hard "pan," which renders the soil "sour" and to some extent impervious. Before such ground can be cultivated this pan must be broken up and preferably dug out altogether.

The party reunited for tea at Woking and returned to London by train. Mr. A. H. Williams acted as Excursion Secretary.

REFERENCES.

- Maps, iin. Ordnance, Small Series, Sheets 269, 285.
 iin. Ordnance, Large Series, Sheet 115.
 iin. Geological, Old Series, Sheet 8.
1. 1913. BROMEHEAD, C. N.—"Report of Excursion to Virginia Water and Chertsey," *Proc. Geol. Assoc.*, vol. xxiv., pp. 331-334.
 2. 1915. DEWEY, H. and C. N. BROMEHEAD.—"Geology of Windsor and Chertsey" (*Mem. Geol. Surv.*). Price 2/6.

Photo, T. W. Reader.

A.—THE BARTON PEBBLE BED, STANNER'S HILL, WOKING.

Photo, E. R. Martin.

B.—“PINE-RAFT” AT BROOK, ISLE OF WIGHT.

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