

from the north-east, which requires further investigation. The Directors regarded all as marginal ice-features, but some present thought that they could be explained by springs. As far as can be seen the channel eventually joins the great flat-based valley already referred to.

On the way to Aidbury the party walked along another type of channel, a ledge or step cut back into the hillside and running near the 700 foot contour north of Down Farm for several hundred yards. It hardly seems possible for this to have been cut by springs and the explanation offered was that it was gouged out by a marginal stream when the ice lay about 150 feet thick in the valley or hollow between Pitstone Hill and the main Chilterns.

EXCURSION TO SANDERSTEAD AND PURLEY.

SATURDAY, APRIL 30TH, 1921.

REPORT BY THE PRESIDENT, W. WHITAKER, F.R.S., *Director of the Excursion.*

THE object of the Excursion was to note the difference between Eocene and post-Pliocene Gravels, and to see a remarkable small section in the former.

Meeting at Sanderstead Station the party walked a little way northward, to a pit in River Gravel adjoining the eastern side of the railway (main line). This pit was being filled in, but, by the kindness of Mr. J. F. Carter, Borough Engineer of Croydon, its eastern end had been kept open for the Association. The section here seen was as follows, below soil :—

Brown loam, up to about five feet.

Gravel, chiefly of subangular flints, of varying thickness, up to perhaps ten feet, resting very irregularly on

Chalk with flints, small hummocks of which stood up in the gravel.

It is unusual hereabouts to find loam over the gravel, and the junction of the latter with the Chalk is not often seen.

A move was then made south-eastward, to Briton Hill, near the foot of which a small pit had been lately opened on the eastern side of the road. For notice of this interesting and unexpected section we are indebted to Mr. M. A. Ockenden, who correctly determined the beds shown and notified the occurrence to the leader of the Excursion early in January.

The level of the pit is about 360 feet above Ordnance Datum, and it is in the well-known pebble-beds of the Blackheath Series, the nearest occurrence of which is at Sanderstead Plantation,

about half a mile eastward, where their level is about 550 feet. It is true that at Croham Hurst, about two-thirds of a mile northward, they are at about 400 feet ; but that is in the direction of the general dip of the beds, so that they should be lower there than at Briton Hill.

It is clear then that we have here an outlier of the Blackheath Beds at a much lower level (by 150 or 200 feet) than one would have expected. How has this been brought about ? Several explanations suggest themselves ; faulting, channel-erosion, piping, or a mixture of any of them.

There is no evidence of faulting ; but the known irregularity of these beds supports the erosional view. On examining the section it was seen that there were small masses of reddish plastic clay, clearly belonging to the Reading Beds ; but an examination of the chief of these, by Mr. Stamp and others, led to the conclusion that it was more or less vertical and apparently succeeded by what might be Thanet Sand, and this leads to the conclusion that there is piping, as would be expected with such porous beds.

Many small trial-holes had been made eastward of the pit, some of which showed the pebble-beds, and some Chalk or clay-with-flints.

The difference between the two neighbouring gravels is very marked, this older bed consisting of flint pebbles only.

The walk was then extended a little westward, near Purley Beeches, to a small schoolroom in Lower Sanderstead, which, through the persuasive power of Mr. Ockenden, was put at the disposal of the party for tea.

After tea many of the party went on to the Brighton Road, half a mile south of Purley tram-terminus, where there is a large gravel-pit alongside the road, on its western side. This pit, now partly abandoned, had been greatly extended since the new Geological Survey was made, and showed an interesting section at its southern and newer end, where the gravel was seen to be overlain by a layer (up to two feet or more thick) of whitish, sandy marl, in which were several land-shells. One of the party had previously found some eight species (including a bivalve). The leader suggests that this was a tufaceous deposit, due to springs that had occurred at the side of the valley-bottom in times when the Chalk was far more saturated with water than is now the case.

The party therefore had the advantage of seeing three sections which were practically new, that is to say, had not been described.