obtained, remains of the Elephant and Rhinoceros had been frequently found. Some specimens of these were seen in the quarry, and many are now deposited in the Museum. Although the weather was not all that could be desired, the party had been highly interested, and, after a repast at Aylesford, returned from that station to London.

EXCURSION TO LEITH HILL AND DORKING.

SATURDAY, JULY 24TH, 1880.

Directors :—REV. A. IRVING, B.A., B.Sc., F.G.S., and A. C. MAYBURY, D.Sc., M.R.C.S., F.G.S.

(*Report by DR. MAYBURY*).

The Members of the Association left Victoria Station, by the 1 p.m. train, for the last short excursion of the season, the object being to traverse the district from Ockley to Dorking. Prof. Rupert Jones, F.R.S., President of the Association, a pleasing and valuable accession, joined the ranks at Dorking.

The Members of the Geologists' Association have often visited districts similar, stratigraphically and physically, to the one in question, so that the following memoranda must be taken as indicating the *chief* points which were brought out by the Directors. On leaving the train at Ockley—where Mr. H. Hawkings, F.G.S., of the Geological Survey, who has recently been engaged in mapping the superficial deposits of the district joined the party—the brickyards near the station were inspected. The Weald Clay, here exposed, had its usual characters—stiff, blue, and weathering red from the peroxidation of its iron. In it were intercalated Weald Sands, forming a local lenticular mass; they are very finely laminated, and are interstratified here and there with thin bands of clay. The existence of the clay beneath the Weald Sands was indicated by the occurrence of water at the base of the section. The strike of the rocks is here E. and W., and the dip is to the N., at an angle of 2° or 3°. In passing, from this the first pit, in an easterly direction, to the second, Weald Clay of older date was passed over, so that one stood here on the clay which underlies the sandstone in the first section. No fossils, with the exception of some carbonized wood, have been found here, though in the

brick fields at Holmwood Cyprides are abundant, thus proving the fresh water character of the deposit.

The line of march was then through the village of Ockley to Stone Street, where a turn was made to the north along the Causeway. After proceeding for some time on the low-lying, level, Weald Clay, the party gradually got on to higher ground and rocks of later date, viz., the Atherfield Clay (the lowest member of the marine Lower Greensand) and the Hythe Beds which immediately follow.

Having attained the summit of Leith Hill, from an elevation of some 970 feet, a magnificent view of the surrounding country rewarded the exertions of the geologists. The Hythe Beds of Leith Hill are composed of sands and sandstone, without any calcareous matter, with occasional intercalated siliceous bands. The prevailing colour is red, studded with green particles of glauconite. It is in the absence of calcareous matter that these beds differ from those of the same age in the Godalming area, where the Bargate-stone is most typically developed, consisting of a calcareous sandstone equivalent to the uppermost portion of the Hythe Beds.

On looking southward one sees an abrupt escarpment for about 200 feet, when the slope becomes more gradual, and extends far out into the Weald, so that we have formed, roughly speaking, a parabolic curve. The incoming of the clay is revealed by the occurrence of a line of springs, where the sandstone rests on the Atherfield Clay, and the appearance of fields and oaks indicates the same as the diminution in the slope of the ground.

Leith Hill and the surrounding district, interesting for many reasons, teach us some points in physical geology worthy of note. The area may be regarded as a plateau, sloping gradually to the north, which slope corresponds with the dip of the beds, viz., about 2° or 3° , and this inclination is well seen in a section due east from the Tower. It forms an extensive tract, corresponding in general characters with the Bagshot district, and clad with heather, furze, and fir trees. The ground has been sculptured by subaerial denudation, and valleys have been produced whose general direction is at right angles to the strike of the beds, *i.e.* to the axis of disturbance of the Wealden deposits. The valleys are probably in the direction of the original Secondary fissures, which were produced when elevation took place. Denudation has deepened these

fissures to different extents. In some cases (*a*) not cutting through the Hythe Beds, (*b*) in others exposing the Atherfield Clay, and (*c*) in yet others making the Weald Clay visible. Hence, in the first case, the valleys are dry, in the two latter cases wet or damp. In some instances the denudation has been stopped by a band of harder rock in the Hythe Beds, so that we have a small waterfall comparable with what obtains in the Isle of Wight, where a hard ferruginous band in the Lower Greensand resists the action of running water, and gives rise to the Chines.

On the homeward journey through Cold Harbour, Hythe Beds, Atherfield Clay and Weald Clay were passed over, for though travelling in the direction of the dip, and therefore getting on to rocks of later date, denudation had, in two or three cases, caused lower beds to crop up at the surface.

On nearing Dorking a line of fault, running east and west, was crossed. The *upthrow* is to the extent of 100 feet, and is on the south of the fissure, the Weald Clay (from which later deposits have been removed) being brought into juxtaposition with the Hythe Beds. Further evidence of this fault may be had in the fact that on the road to Guildford, beyond the Rookery, and near Wotton, sandstone is at a greater elevation than the Bargate-stone, though the latter is on a higher *geological* horizon. The occurrence of this fault has had much to do with the altitude of the Leith Hill area, and has an important bearing on the question of water supply, because that portion of the rain which percolates through the Hythe Beds of the area, in addition to leaking out at the junction of the sands and clays, will, probably, to a great extent be borne to a lower level through the fissure, so that in sinking a well between it and London there would be an absence of the water which fell as rain on Leith Hill.

After, at the White Horse Inn, bringing into play the "recuperative energies of the constitution," the Members took train from Dorking, having spent a very pleasant day under favourable conditions.