EXCURSION TO REDHILL AND NUTFIELD.

SATURDAY, 23RD JUNE, 1894.

Directors: C. J. A. MEYER, F.G.S., AND H. W. MONCKTON, F.L.S.,
F.G.S.*(Report by the DIRECTORS.)*

The party reached Redhill Station soon after 3 o'clock in the afternoon, and at once proceeded to a working for fullers' earth about a quarter of a mile east of the station.

The fullers' earth is a hydrous aluminous silicate which does not become plastic with water, but crumbles down into mud. It is used in the process of fulling to absorb the oil with which the wool has been treated in a previous part of the manufacture. The fullers' earth at Redhill occurs in the Lower Greensand. It is also found in the same formation in Bedfordshire, and some fullers' earth works near Woburn Sands in that county were visited by the Association in 1892.* Beds of fullers' earth occur in the Lower Oolites, and the Midford Fullers' Earth Works in that formation were visited by the Association at Whitsuntide, 1893.† Fullers' earth is also found in Saxony, where it is the result of decomposition of diabase and gabbro,‡ and on the north-western side of the Ochil Hills in Scotland, where it is found among the volcanic rocks interbedded with the Lower Old Red Sandstone.

The works at Redhill, which were the first examined, are probably an extension of those at Copyhold Farm, described by Mr. Topley.§ They show a long north and south face of the earth some fifteen feet or more deep, with *débris* of stone beds at the surface. A large block of Barytes was found, and afforded specimens to those who cared for such.

Two other workings were then visited, one north and the other south of the high road from Redhill to Nutfield. In both the earth was seen to be overlain by beds of soft sandstone, with fossils, for the most part badly preserved. Dr. Hinde pointed out that the cherty beds in this pit were largely made up of sponge-spicules.

According to the Geological Survey map, the fullers' earth and also the overlying sandstones are part of the Sandgate Beds of the Lower Greensand, but this conclusion is not accepted by all observers. The subdivision of that formation into Folkestone,

* *Proc. Geol. Assoc.*, vol. xii, p. 395

† See *ante*, p. 126.

‡ Geikie, *Text Book of Geology*, 2nd edit, p. 164.

§ *Geol. of the Weald*, p. 133.

Sandgate and Hythe were first proposed by the late Mr. Frederic Drew. According to Mr. H. B. Woodward,* these names were given in 1861. According to Messrs. A. J. Jukes-Browne and Topley,† 1863 was the date; while in the obituary notice of Mr. Drew in *The Quarterly Journal of the Geological Society*,‡ it is given as 1864. In any case the mapping of these subdivisions of the Lower Greensand in the Redhill country appears to have been the work of Mr. Drew, and as he left the Geological Survey in 1862, the work must have been done before that date.

Meanwhile the attention of Mr. C. J. A. Meÿer, whom we were all delighted to welcome as our Director on this occasion, had been drawn to this formation, and in December, 1868, he read before this Association a paper on the Lower Greensand of Godalming. This paper was in the next year issued as a separate publication and should be obtained by all interested in the Lower Greensand. In it Mr. Meÿer expressed views very much at variance with those of Mr. Drew and the Geological Survey, and when Mr. Topley prepared the notes left by Mr. Drew for publication in the Survey Memoir (which was published in 1875), he refrained from any discussion of the question at issue, and contented himself with the adoption of Mr. Drew's opinions, giving at the same time a full statement of the subsequent opinion of Mr. Meÿer.

During the last two or three years the attention of our Association has been frequently drawn to the Lower Greensand. In 1891, on the occasion of a visit to Guildford and Shalford,§ the correlation of the various beds of that formation was much discussed, and in 1892 the discussion was renewed on the excursion to Wotton,|| whilst of seven numbers of our Proceedings issued in 1893 and 1894 no less than five contain papers or reports of excursions in which the Lower Greensand is dealt with,¶ and in June of this year one of our members has actually carried the discussion on that formation into another place.**

The third working, visited on the 23rd June, was on the east of the grounds of Patteson Court, and about half-a-mile west of Redhill Station. From it an excellent view of the Chalk escarpment is obtained, and Mr. Monckton gave a short account of the general geology of the district, beginning with the highest beds, that is the mass of pebbles mapped as Oldhaven Beds, which are found some 700 feet and more above the sea, on the hills between Merstham and Caterham. He drew attention to the value of the well section at the Caterham waterworks as affording

* *Geology of England and Wales*, 2nd edit., pp. 368-370, 371.

† *Congrès Géol. Internat.*, 1888, Appendix B, p. 66.

‡ *Quart. Journ. Geol. Soc.*, vol. xlviii, Proc. p. 49.

§ *Proc. Geol. Assoc.*, vol. xii, p. 97.

|| *Ibid.* p. 403.

¶ *Proc. Geol. Assoc.*, vol. xiii, pp. 4, 40, 76, 142, 188.

** *Abstract of Proc. Geol. Soc.*, No. 628.

evidence of the thickness of the Upper Cretaceous Beds in the district.*

The party then walked to Nutfield, passing some pits in the fullers' earth east of Patteson Court, which are now almost dis-used, but have afforded many fossils and where good sections may still be seen. At Nutfield a road-cutting and a sand-pit in the lane down the escarpment due south of the church were carefully examined. This lane is rather more than a quarter of a mile east of the lane section (now much overgrown) described on page 132 of Mr. Topley's Weald Memoir.

Mr. Mejer stated: That in the sections just visited they had seen the fullers' earth underlying and interstratified with layers of sandstone of the Lower Greensand. In this lane section they saw what appeared to be the beds next below the principal fullers' earth bed, consisting of thin layers of sandstone with traces of impure fullers' earth passing down within a few feet into sand without sandstone, then into a grit-bed with minute pebbles, more or less false-bedded, and then, more or less abruptly, into a reddish, somewhat massive, clayey sand showing little trace of stratification, and apparently of considerable thickness.

As explained on a former occasion,† Mr. Mejer considered that the sandstone beds enclosing the fullers' earth probably represented the Folkestone stone-beds; that the grit-bed represented the base of the Folkestone beds, and that the reddish somewhat massive clayey sand beneath the grit-bed represented the Sandgate beds of the Coast Section; that the fullers' earth where found elsewhere *in* the Lower Greensand seemed to be on, or nearly on, the same horizon as at Nutfield. And, though not stated as admitting of proof, it was suggested by Mr. Mejer in conversation that the fullers' earth found in the Lower Greensand might have been derived from the destruction of older beds of fullers' earth (Oolitic), or might possibly have resulted from contemporary volcanic action in the form of dust showers. To this last suggestion, an objection was raised on the ground that no traces of volcanic activity during the Upper Mesozoic era were known in Northern Europe.

Mr. Leighton said he was an iconoclast as to the divisions of the Lower Greensand in this part of Surrey, since he held that the separation of Hythe, Sandgate, and Folkestone Beds was impossible here, as to the two former. The divisions in this typical area rested only upon lithological characters, and since those characters varied from place to place as one proceeded round the outcrop, and since no definite horizon had as yet been absolutely made out, he could not consider this division referred to of any more than local value. If that local classification was

* Whitaker, *Trans. Croydon Microsc. Club*, 1886, p. 48. *Geol. of London*, 1889, vol. p. 42. Woodward, *Geol. England and Wales*, 2nd edit., Appx. 1, p. 612.

† *Proc. Geol. Assoc.*, vol. vi, p. 373.

to be carried to any distance it must be upon palæontological evidence. He understood that the Geological Survey had relied upon a line of springs which was taken as marking the outcrop of the clayey Sandgate Beds, and from that the Nutfield Fullers' Earth was mapped as Sandgate. He hoped, however, soon to bring forward evidence that the Pebble Beds associated with the Bargate Stone of Godalming could be traced into the Nutfield country, where they were found below the Fullers' Earth. It should be remembered that the Geological Survey placed the Pebble Beds at the top of the Hythe, while Mr. Mejer placed them at the bottom of the Folkestone division, so that there was the whole of the Sandgates in dispute between them. If the country was to be mapped by the springs Mr. Leighton would prefer Mr. Mejer's classification, because near Godalming the springs occurred below the Pebble Beds, and because the Pebble Beds appeared about Abinger to be intimately associated with the Folkestone Beds. He was not prepared, however, to place the Fullers' Earth in the Folkestones at present (with Mr. Mejer), but would prefer to call the interesting beds with which it was associated the Nutfield Beds. As to the coloured sands below the Pebble Beds in the Nutfield district Mr. Leighton agreed that they were the same as those which were found on Redhill Common, but he did not see why Mr. Mejer considered them to be of Sandgate age any more than the cherty sandstone beds of Leith Hill, which also occurred below the Pebble Beds (and were sometimes improperly called Kentish Rag), although claimed by everybody as Hythe.

The bulk of the party now returned to Redhill by another route, passing one or two sections of a less important character on the way.

REFERENCES.

Geological Survey Map, Sheet 8 (Drift Edition).
New Ordnance Survey Map, Sheet 286.

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1841. MANTELL, G. A.—"Geology of the County of Surrey." *Brayley and Britton's History of Surrey*, vol. i, p. 146.
1845. FITTON, W. H.—"On Sections below the Chalk." *Quart. Journ. Geol. Soc.*, vol. i, p. 181.
1866. MEYER, C. J. A.—*Geol. Mag.*
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1875. TOPLEY, W.—"The Geology of the Weald." *Mem. Geol. Survey*.
See also the papers quoted in foot-notes on the preceding pages.