Refreshment-rooms, not many minutes' walk from the Dorking Station, whence they had to start, at 8.23 p.m., for the return journey to town. Some surprise was very generally expressed at the fact that such a pretty walk over so instructive a line of country, accessible for a half-day excursion, had never before been traversed by the Association.

REFERENCES.

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EXCURSION TO TAPLOW AND BOWSEY HILL.

SATURDAY, JULY 16TH, 1892.

Director—J. H. BLAKE, F.G.S., H.M. Geological Survey.

(*Report by THE DIRECTOR.*)

THE party from London left Paddington at 9.20 a.m., and arrived at Taplow at 10.20, where they were met by the Director and other members of the Association. They then proceeded to the chalk-pit situated about one mile N.W. of the railway station, in the wooded sloping grounds of W. H. Grenfell, Esq., M.P., the object being to examine the phosphatic chalk there.

The Director explained that his colleague, Mr. A. Strahan, M.A., F.G.S., whom he regretted was unable to be present, had made a special investigation of the phosphatic chalk in this pit, and had carefully examined the ground in the vicinity with the object of tracing the extension of the phosphatic matter. Some shafts had been sunk, and in one in the hill-side, above and close to the pit, the following measurements were made, and the exact depths of the phosphatic bands below the base of the Tertiary strata obtained :—

		ft.	in.
READING BEDS.	{ Clay	7	0
	{ Green sand with green-coated flints . . .	2	6
UPPER CHALK.	{ White chalk	18	0
	{ Brownish white chalk	2	0
	{ Brown chalk [upper phosphatic band] . .	11	0
	{ Hard white chalk	12	0
	{ Soft brown chalk [lower phosphatic band] .	4	0

56 6

The existence of the phosphatic chalk, containing *Belemnitella quadrata*, at Taplow, was made known to the Geological Society of London by Mr. Strahan in a paper published in August, 1891; and from a more recent paper by the same author, published in *Natural Science* in the previous month (June, 1892), the Director read a few extracts, as follows :—

"An exactly similar rock [to this at Taplow] had been

extensively worked for some years in the north of France and Belgium, with the result of an enormous increase in the value of the land where it occurred. . . .

"From the accounts given of the Continental deposits, we learn that phosphatic beds are never continuous at any horizon in the Chalk for more than a short distance. Thus, in one of the latest papers on the subject, we are told that of all the deposits yet discovered, . . . every one has been proved to be lenticular in form. The greatest length of these lenticular beds rarely exceeds one kilometre (1,100 yards), and their breadth two or three hundred metres, while in thickness the phosphatic rock ranges from nothing at the edges of the lenticle to upwards of twenty metres in its central portions. This, then, is the probable explanation of the fact that even at Taplow the deposit has not been recognised beyond the pit and its immediate surroundings. It is, doubtless, of a lenticular form, and probably of no great extent. . . .

"The Belgian phosphate occurs at a higher zone in the Chalk than is known to exist in this country. The French deposits, on the other hand, though not strictly on one horizon, lie high up in the Upper Chalk of English geologists, and at or near the horizon of the Taplow Chalk. In our locality this horizon lies close beneath the Tertiary beds, but in other districts, and even in the immediate neighbourhood of Taplow, these strata rest upon other parts of the Upper Chalk, either higher or lower than that in which the phosphatic beds are situated. For the country generally, therefore, we require a surer guide than that afforded by the Tertiary boundary. . . .

"In the Chalk Rock, . . . we shall have a definite base-line from which to reckon upwards in a search for the zone where phosphatic chalk may be expected to occur. Some further assistance may be rendered by the existence of zones in the Upper Chalk, characterised by certain fossils. On the Continent this subdivision of the Upper Chalk has been carried out with some completeness, but in England the boundaries of these zones are too indefinite for use by the geological map-maker. So far, therefore, as maps are concerned, we shall have to depend on the Chalk Rock as our principal guide in estimating our position in the Upper Chalk. At Taplow, the phosphatic zone is believed to lie about 250 feet above the Chalk Rock. . . . MM. Renard and Cornet, in their exhaustive paper on the Continental phosphatic chalks, remark that the mode of occurrence of the granules points to their having been accumulated under the action of currents. . . . Animal-life occurs in the greatest abundance near shores; and to the reptiles and fishes of the littoral zone these authors attribute the concentration of phosphatic material, and the subsequent phosphatisation of the microscopic organisms with which it was mingled.

"The Taplow Chalk also is clearly a sediment such as might have been distributed by marine currents."

Mr. Grenfell then addressed the assembly, and a vote of thanks was unanimously accorded to him for kindly permitting the Association to visit the pit.

The members then walked northward, by the side of the river, through Mr. Grenfell's grounds to his private landing-stage, north of Boulter's lock, and embarking on the steam-launch *Fashion*, specially engaged for the party, proceeded through some of the most beautiful scenery of the Thames Valley, past Clivedon, Cookham, Great Marlow, and Medmenham, to Henley, where they alighted and partook of luncheon provided for them at the Royal Hotel.

They then resumed their trip by river to Wargrave, where disembarkation took place with the intention of ascending Bowsey Hill, to examine the Drift pebbly gravel, or shingle, on and near its summit, 467 feet above sea-level, and 358 feet above the Thames at Wargrave. Sufficient time, however, was not left to accomplish this, owing to a delay at one of the locks; a few of the party, nevertheless (including the President, with others, who made a laudable effort to gain the summit), accompanied the Director to the foot of the Tertiary outlier, consisting of London Clay and Reading Beds overlying Chalk. Here, the physical features and geological structure of the district were pointed out, particular attention being drawn to the situation of the capping of Drift pebbly gravel, consisting mostly of flint and quartz, and considered by many to be a Pre-Glacial marine shingle, and of the age of the Westleton Shingle in the East of England by Prof. Prestwich.

Hastening back to Wargrave the members continued their trip by river, past Shiplake and Sonning, to Caversham lock, where they disembarked. The London contingent walked thence to the railway station at Reading, and returned to town by the 8.15 p.m. train, reaching Paddington at 9 p.m.

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* Reprints of these papers, kindly sent to the Director by Mr. Strahan, were distributed to the members on the steam-launch.—J. H. B.