

Chalk. The Directors pointed out in descending order (1) the zone of *Echinoconus subrotundus*, equivalent to the zone of *Terebratulina gracilis*, which does not seem to occur here; (2) the zone of *Rhynchonella cuvieri*, called by the quarrymen "Burr Chalk," and equivalent to the Melbourn Rock; (3) the zone of *Belemnitella plena*, a very distinct narrow band round the quarry, and forming the top of the Lower Chalk; and (4) the zone of *Holaster subglobosus*. The distinction between zones 1 and 2 was very easily seen on one side of the pit. The marked difference in character between the massive, thickly-bedded Middle Chalk, and the more thinly-bedded and marly Lower Chalk was well seen.

REFERENCES.

Geological Survey Map, Sheet 8, Drift Edition, price 8s. 6d.
Ordnance Survey Map, (New Series), Sheet 286, price 1s.

1862. WHITAKER, W.—"On the Western End of the London Basin, etc." *Quart. Journ. Geol. Soc.*, vol. xviii, p. 258.
1872. ————"The Geology of the London Basin." *Mem. Geol. Survey*, vol. iv.
1884. DALTON, W. H.—"Excursion to Epsom and Dorking." "Record of Excursions," p. 86.
1895. MONCKTON, H. W., and STEBBING, W. P. D.—"Excursion to Betchworth and Headley." *Proc. Geol. Assoc.*, vol. xiv, p. 124.
1897. STEBBING, W. P. D.—"On Boulders of Granite from the Middle Chalk of Betchworth." *Quart. Journ. Geol. Soc.*, vol. liii, p. 213.
1898. WHITAKER, W., and STEBBING, W. P. D.—"Excursion to Kingswood and Walton-on-the-Hill." *Proc. Geol. Assoc.*, vol. xv, p. 456.

EXCURSION TO THE THAME DISTRICT.

SATURDAY, MAY 6TH, 1899.

Director: A. M. DAVIES, B.Sc., F.G.S.

Excursion Secretary: W. P. D. STEBBING, F.G.S.

(*Report by THE DIRECTOR.*)

A SMALL party assembled at Thame Station shortly before noon, and at once drove along the Towersey road into the adjoining county of Bucks., where the first turning to the left soon brought them to a small quarry (p. 39*). Here the Director, after briefly calling attention to the Chiltern escarpment with the conspicuous Whiteleaf Cross showing the Chalk, and the Gault plain at the base, remarked that the small stone-pits in the Portland of this district were worked mainly in the winter, and that consequently none of those they would see that day would show exactly the sections described in his paper. In this case the two lowest beds were now hidden, and the nodular chert at the top was but indifferently exposed. The blocks of Portland limestone

* This and subsequent references are to the Director's paper in this volume of PROCEEDINGS, *ante*.

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stacked near the entrance were full of the characteristic fossils—*Trigonia gibbosa*, *Cardium dissimile*, *Pecten lamellosus*—and the members soon collected a number of *Paludina*, almost all under-sized, from the Purbeck marl, Bed 7.

The party then drove to the pit near King's Cross (pp. 40, 41). Here the creamy limestones were found exposed to a depth of 7 ft., and, among other fossils, Mr. Young had the good fortune to obtain a *Perisphinctes* (*Amm.*) *boloniensis* of portable size. The greater share of attention in this pit, however, was claimed by the uppermost clayey and marly beds, regarded by the Director as probably Middle or Upper Purbeck. This view was subjected to a severe fire or criticism, and counter propositions that the clay was Wealden, Gault, Boulder-Clay, or an artificial deposit in an old cutting, were quickly raised. After much discussion, the general conclusion arrived at was that part of the topmost marly portion might perhaps be artificial, that the rest was of freshwater origin, newer than the Purbecks of the district, and certainly not Gault nor Boulder-Clay. These conclusions were not inconsistent with those of the Director.* It should be mentioned that fragments of carbonaceous material were found in the black clay, and several unmistakable *Unios* in the sandy bed (No. 5), but these were too fragile for preservation.

The party then walked down the hill to the Dad Brook, along the line of section (Fig. 2, p. 23, and Map, p. 54). The outcrops of limestone and sand were seen by the roadside, and lydite-pebbles were found at the junction of the sands with the underlying clay. Among these pebbles Mr. Leighton found a phosphatised fragment of an Ammonite—a find of interest (cf. p. 25). At Cuddington creamy limestones were seen to crop out in the roadside.

The party drove next to Long Crendon. On the way the Director pointed out the line of the proposed new railway from Prince's Risboro' to Grendon Underwood, which may yield some valuable exposures near Haddenham. The first section examined at Long Crendon was that by the southern windmill (p. 22), visited previously by the Association in 1893. The present visit was opportune, as the owner has decided not to work it any more. Already the creamy limestones for which it was worked are hidden, and the pale grey clay (Bed 3, p. 22) could only just be seen at one point. The rest of the section was still in such good condition as to cause general regret that no photographer was at hand. Mr. Parker, however, produced some photographs of the section taken a few years ago.

* I am glad to take this opportunity of making a correction, the need for which was pointed out to me at this point, in the section given on p. 40. Beds 7, 8, and 9 are properly one bed, the transition from one to the other being quite gradual. They were marked as such in my field note-book.—A.M.D.

Mr. Leighton drew attention to Bed 8 of the section (p. 22) as closely corresponding to the basement-bed of the Gault at Folkestone and elsewhere; a hunt was made in it for fossils, and a shark's tooth was found by Miss Foley.

The sections on the steep descent of the road to Thame were next examined (p. 21). After the lower beds of the limestone sequence had been examined the outcrop of the same beds in the roadway was observed, and some of the members maintained that the dip shown by these beds would carry them below the sands seen in the next exposure down the hill. The Director said that this was not the case, as he had assured himself at more than one point that the sands passed beneath the limestones. He dismissed the suggestion that the sands were Lower Greensand by the assertion that they were "too green," the *absence* of glauconite being in this district a characteristic of the "Lower Greensand." He maintained that the lydite-bed here seen with 10 ft. of sand visible below was on the same horizon as the lydite-bed which they had seen immediately above the Hartwell Clay at Dadbrook Hill. A hasty visit to the brick-field at the foot of the hill tended to confirm this view in so far as the clay there was seen not to resemble Hartwell Clay, at any rate lithologically, being rather shaley, and not sandy at all. The same was the case at Thame, the Director said, where he had that morning seen the base of the sand exposed in a drainage cutting, and had been told by the engineer that the clay beneath the sand was very stiff.

REFERENCES.

- Geological Survey Map (1 inch scale), Sheet 13 (price 8s. 6d.) and 45 S.E. (price 3s.).
 Geological Survey Index Map, Sheets 11 and 12. Price 2s. 6d. each.
 Ordnance Survey Map, New Series, Sheet 237, Thame. Price 1s.
1836. W. H. FITTON.—"Strata below the Chalk." *Trans. Geol. Soc.*, ser. 2, vol. iv, p. 163.
 1864. A. H. GREEN.—"Geology of the Country round Banbury. etc." (Sheet 45). *Mem. Geol. Survey*.
 1880. J. F. BLAKE.—"Portland Rocks of England." *Quart. Journ. Geol. Soc.*, vol. xxxvi, p. 189.
 1893. ———.—"Excursion to Brill." *Proc. Geol. Assoc.*, vol. xiii, p. 71.
 1895. H. B. WOODWARD.—"Jurassic Rocks of Britain." Vol. v, pp. 220, 221, 279, *Mem. Geol. Survey*.
 1899. A. M. DAVIES.—"Contributions to the Geology of the Thame Valley." *Proc. Geol. Assoc.*, vol. xvi, p. 15.
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