For a short distance the road runs along the Ermyn Street, and affords a fine view of Epsom Downs and racecourse. Soon after passing Headley Court, Clay Lane pit (No. 189) was reached. This is an interesting exposure close under the Tertiary beds of the Headley outlier, and shows about 30 ft. of massively bedded chalk, all belonging to the *Marsupites*-zone. It lies on the 500 ft. contour line, and is just two miles south of Bishop's Pit. This gives a rise of 100 ft. per mile, equal to a general dip of 1 degree, but as the dip in Bishop's Pit is more than double that there is probably a local syncline here, which would also account for the preservation of the Tertiary beds. The chalk is white and soft, but scattered flints occur in greater numbers than is usual in this zone. Only a short time could be allowed for collecting, but it sufficed for finding several plates of *Marsupites*. A full list of fossils is given in the paper already alluded to.

One-third of a mile farther on is the well-known roadside section at Oyster Hill, where the Woolwich and Reading beds contain an abundance of *Ostræa bellovacina*, but time did not permit of more than a passing glance. Tea was taken at the Clermont Inn, Tot Hill, and at its conclusion Mr. Monckton gave a short but interesting description of the Tertiary beds in this neighbourhood, after which the shortest route was taken to Leatherhead, whence the party returned to town by the 8.7 p.m. train.

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EXCURSION TO BOXFORD AND WINTERBOURNE (BERKS).

SATURDAY, MAY 12TH, 1906.

Directors: H. J. OSBORNE WHITE and LL. TREACHER.

Excursion Secretary: G. E. DIBLEY.

(*Report by* H. J. OSBORNE WHITE.)

ON arriving at Newbury, a little before 11 a.m., a party of nineteen walked through the town to the parish church, where Mr. Frank Comyns gave them an outline of the history of the building, and drew their attention to the more interesting features

of the interior, including the memorial brasses to "Jack of Newbury" and his wife. From the top of the tower—reached by a narrow and gloomy newel-stair—a pleasant view over the irregular red roofs of the town and the wooded Vale of the Kennet was obtained. Here Mr. Comyns indicated the sites of those two indecisive battles of the Civil War which have been so often described by Mr. Walter Money.

The party then returned to the station and resumed their journey to Boxford, where they were joined by several other members and friends of the Association who had travelled by motor-car and bicycle.

Crossing the Lambourn, the party walked eastward along the Winterbourne Road to a small pit, in the *Uintacrinus*-chalk, on the northern slope of Hour Hill. It was explained that the Chalk there exposed formed part of an outlier of certain relatively high beds of the formation, which were well developed to the south of the River Kennet, and had once, doubtless, a wide range in the area to the north of that stream, but had been almost entirely removed from the tract occupied by the Berkshire Downs before the deposition of the oldest local Eocene sediments.

The outlier in question consisted of ordinary, and of more or less distinctly phosphatic, chalks belonging to the zones of *Marsupites* and *Actinocamax quadratus*, exposures of which, and of some abnormal beds of *Micraster cor-anguinum*-age to be seen near Boxford, were described by the Directors in a paper recently read before the Geological Society. The chalk in the pit being poorly fossiliferous, and in a carious condition, some difficulty had been experienced in determining its age. Remains of the name-fossil, *Kingenia lima*, and a few other forms, however, had been found; and it was probable that the greater part, if not the whole, of the *Marsupites*-band was present in higher portions of Hour Hill, beneath the thin capping of Reading Beds and Plateau Gravel.

The members then examined the section, and succeeded in finding one of the larger free brachial ossicles of *Uintacrinus*, an Asteroid ossicle, and a few chips of oyster-shell.

The next stop was made at Iremonger's Cottages, where the outcrop of a very hard chalk, containing angular green concretions and hollow casts of sponge spicules, is indicated in a belt of rubbly soil near the boundary of the Reading Beds. The Directors confessed that they were doubtful as to the horizon of this chalk. Hard bands of similar appearance occurred at the bottom of the *Act. quadratus*-zone, and in the upper part of the *M. cor-anguinum*-zone in the neighbourhood; and while the position of this rock-band with reference to the base of the Reading Beds was the same as that of a *quadratus* rock-band a few hundred yards to the north-east, the character of the

microscopic organic remains in the associated softer chalk had suggested that the beds outcropping here belonged to the lower zone. Mr. A. C. Young, however, immediately threw a light on the matter by discovering, in one of the surface-blocks of hard chalk, a fairly well-preserved and distinctly-granulated guard of *Actinocamax granulatus*—a fossil which sometimes abounds in the limestone at the base of the *quadratus*-zone in other parts of the outlier, but becomes scarce and disappears a few feet below it.

Continuing their walk eastward, the party soon reached the road-side pit opened in the thick spread of Plateau Gravel which forms the even summit of Basford Hill (465 ft. O.D.). The sides of this large excavation present good sections, 8 to 10 ft. deep, of well-stratified and cross-bedded gravel, consisting of pebbly and subangular flints, worn pieces of sarsen, small quartz pebbles, and bits of ironstone. Mr. White said, among other things, that he believed the gravel to be a fluvialite deposit of early Pleistocene age, and the work of considerable streams flowing from the Berkshire Downs country, to the north and north-west. It appeared to belong to the same drift-stage as the more extensive deposits of Greenham and Silchester Commons, on the farther side of the Kennet Valley. The flint pebbles which bulked so largely in this deposit were doubtless derived from Eocene strata—possibly of Lower Bagshot age—formerly existing in the vicinity. A worked flint, of a common Eolithic pattern,* had been obtained from the face of the pit by the speaker.

While most of the members were lunching in the shade of the bushes in the older part of the pit, Mr. P. A. B. Martin searched the gravel for implements, and succeeded in finding three or four flints which, he thought, showed clear signs of human workmanship.

In Winterbourne Wood, at a spot about one-third of a mile to the east of the above pit, a small patch of gravel, near the level of that on Basford Hill, forms a sort of shelf on the southern slope of the Borough Hill ridge. The drift, which is exposed to a depth of 6 or 7 ft. in some diggings among the fir-trees near the keeper's cottage, is distinctly stratified and very pebbly. Here Mr. Martin obtained, from undisturbed gravel, a worn flint nodule, one end of which had been subjected to regular, parallel chipping. Mr. Treacher (who is somewhat exacting in these matters) was disposed to accept the flaking as artificial. The deposit will probably repay a closer inspection.

Near the eastern edge of Winterbourne Wood, and on the north side of the road, a section of red-brown, laminated, ferruginous sand and sandstone, belonging to the Reading Beds,

* An implement of the type referred to is figured by Mr. T. Russell Larkby in his account of an "Excursion to Chelsfield and Well Hill," *Proc. Geol. Assoc.*, vol. xix (1905), part 5, p. 241, Fig. 9, No. E 287.

overlain by a thick wash of flint-pebbles and bits of sarsen, was seen. Attention was directed to a little lens of very coarse quartz-grit which occurs in the sands at the north-eastern corner of the pit. This grit, Mr. White remarked, was much like that which formed the matrix of the Lower Eocene gravels recently observed in South Bucks.* It was not unlikely that the small quartz-pebbles present in the drifts of the Kennet Basin had been derived largely from the Reading Beds.

Leaving the road at Winterbourne Church, the party walked across the fields (permission to do so having been kindly granted by Mr. G. Baylis, of Wyfield Manor) to an unpromising-looking excavation for chalk, near Lower Farm. This showed about 12 feet of flintless, white to greyish, phosphatic chalk, with numerous brown concretions and remains of *Ostrea* and *Inoceramus*, traversed by two thin courses of hard, nodular limestone, dipping gently to the south-west. Having listened to a short account of the results of the Directors' examination of the section, and to the reasons for believing that the higher of two hard bands marked the junction of the zones of *Marsupites* and *Act. quadratus*, the members spread out along the face of the working in search of zonal evidences.

Owing to the circumstance that very few of the party were equipped with hammers of the weight and shape needed for the effective working of this tough chalk, the yield of fossils, other than oysters, was rather slow. However, before the time for leaving the pit had arrived many of the Directors' statements had been verified; the fossils obtained including a plate of *Marsupites* and teeth of *Corax* from the lower beds; sponge-casts from the hard bands; and one perfect and some fragmentary tests of depressed forms of *Echinocorys scutatus*, an *Offaster pillula*, and several damaged guards of *Act. granulatus*, from the upper beds. A very small example of *Act. granulatus*, at first mistaken for *Act. verus*, was found by the President.

The party then retraced their steps along the Winterbourne-Boxford road as far as Mud Hall (or Hole) Cottages, where they struck into the bridle path leading to Wyfield Farm. At a good view-point near the foot of Borough Hill, Mr. Comyns recited what little was known concerning the supposed "camp" on the summit of that mound-like elevation, and contrasted its features with those of the larger and better-defined earthworks of Bussock and Grimsbury to the east, and of Walbury to the south-west. One of the Directors followed with a description of the curious behaviour of the Chalk-zone outcrops on the adjoining slopes, illustrating his remarks with a large-scale map and sections.

On the way down to Boxford an overgrown pit in slightly phosphatic chalk, and a belt of rubbly ground where *Act.*

* *Vide infra*, p. 370.

granulatus may easily be found after rain, were noticed in passing.

The last section to be visited was in an old roadside quarry north of Boxford School. This shows between 30 and 40 ft. of *M. cor-anguinum*-chalk, presenting some unusual features. It was pointed out that the ordinary flinty chalk, with many remains of *Cidaris*, at the base of the section, passes up into a hard, yellow limestone with green concretions and irregular borings; the latter being overlain by a thin seam of grey marl, succeeded by coarse-grained white chalk with few flints, and yellowish, glauconitic, hard and soft chalks, in which phosphatised micro-organisms are common, and flints very scarce. In these last beds, which are not easily got at, Mr. Treacher had found a valve of the elegant and, in this country, exceedingly rare, *Exogyra sigmoidea*, Reuss. The strata are inclined at an angle of about 25° , in a direction a little east of south, and to the flexing responsible for this high dip the Directors were much disposed to ascribe the preservation of the local outlier of newer Chalk-zones from early Eocene erosion.

The tea-hour being close at hand, and the energies of many of the members at a low ebb, little fossil-collecting was attempted, and a movement was soon made towards the "Bell Inn."

After tea, a cordial vote of thanks—proposed by the President and seconded by Mr. Dibley—was awarded Mr. Comyns and the Directors. The recipients having briefly replied, the party broke up; those who were returning by rail employing the minutes that remained before the departure of their train in gathering marsh-marigolds by the Lambourn, or in purchasing postcard-views of places more or less remote from the scene of the excursion.

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