EXCURSION TO THE TERTIARY BEDS OF THE
ISLE OF WIGHT.

EASTER, 1895.

Directors: R. S. HERRIES, M.A., F.G.S., AND H. W.
MONCKTON, F.L.S., F.G.S.*(Report by the DIRECTORS.)*

The object of this excursion was to enable the members of the Association to compare the magnificent sections through the Tertiary Beds at the east and west ends of the Isle of Wight with those on the mainland, visited at Easter, 1894.* This was the first time that the sections at both ends of the island had been visited by the Association in one excursion.

The headquarters were at Child's Hotel, Sandown, where the majority of the members assembled on the evening of April 11th.

Friday, April 12th.—On the first day of the excursion, the party, some sixty in number, starting at ten o'clock, walked along the shore towards the Culver Cliff, Mr. Monckton acting as director.

About a mile from Sandown the party halted at a breakwater, and the Director made some general observations on the physical geology of the Isle of Wight. He described the great anticline on the south and the corresponding syncline on the north—the axis in both cases running east and west. In illustration of his remarks, he pointed to the beds of the Lower Greensand on the opposite (south) side of Sandown Bay, which were seen to have a southerly dip, whereas the beds on the Culver Cliff side dipped north. The party had, in fact, walked over the top of the anticline, which was in this instance the lowest part of the coast. This fold was clearly caused by the same series of movements that affected the coast of Dorset, and the Isle of Wight was, the Director thought, probably at no very distant time connected by land with the Isle of Purbeck.

On the north side of the anticline the strata dipped at a higher angle than on the south, and, in consequence of the high dip, the beds from the Weald Clay to the Bembridge Marls inclusive would be seen during the day, whereas it took four days at Easter, 1894, to examine the beds from the Wealden at Swanage to the Headon at Hordle.

A short time was spent in collecting from the Wealden shales which in places were found to be crowded with Cyprids, while some thin bands of limestone furnished specimens of *Paludina* and *Cyrena*. After Mr. Leighton had given a short account of the Lower Greensand of the locality, the walk was resumed as far as the outcrop of the Upper Greensand, where the party ascended

**Proc. Geol. Assoc.*, vol. xiii (1894), p. 274

the cliff, and, crossing Culver Down, descended by a path into Whitecliff Bay. Mr. Monckton then made some general remarks on the magnificent section here seen. On the south side was the Chalk in a nearly vertical position, forming Culver Cliff, and succeeding it the whole of the Eocene Beds, and the Oligocene Beds up to and including the Bembridge Marls were exposed successively in the cliff within the confines of this small Bay. (See Fig. 1.) Proceeding northwards the party examined the Tertiary Beds in detail, the Director describing the principal points in each. The mottled Woolwich and Reading clay (Bed 2 of Fig. 1) was well shown, but no fossils were found in it; indeed, so far as Mr. Monckton knew, none but Ostracoda and plants have been found in this formation in the Isle of Wight. The basement bed of the London Clay yielded *Ditrupa plana* and several casts of bivalves. Nos. 3 and 4 of Fig. 1 represent the London Clay, and the Director pointed to the intercalation of grey and yellow sands between beds of undoubted London Clay as affording evidence in favour of the opinion of Mr. Starkie Gardner, that the grey sandy beds at Alum Bay (Nos. 7 to 13 of Fig. 2) should also be included in the London Clay. The Lower Bagshot at Whitecliff Bay (No. 5 of Fig. 1) is a sand with a well-marked layer of iron sandstone at the base, and with a pebble-bed nearly a foot thick at the top, separating it from Nos. 6, 7, and 8, which Mr. Starkie Gardner correlates with his Bournemouth Freshwater Series, taking the greenish clayey bed, with layers of *Cardita*, No. 9, as the base of the marine part of the Bracklesham Beds, the sub-divisions of which by Prof. Prestwich and the Rev. O. Fisher were explained by the Director (see *Quart. Journ. Geol. Soc.*, vol. xviii, p. 65). Many fossils were obtained from bed 9 and a quantity of *Nummulites levigatus* from bed 12. The waterworn condition of many of the fossils in bed 13 was remarked, and the party proceeded to collect from Nos. 14 and 16, the small Nummulite, *N. elegans* (variety *variolarius*), being found in great abundance. After luncheon the approximate position of the zone of *Nummulites elegans* (variety *Prestwichianus*) was pointed out in the lower part of bed 17, though owing to the overgrown and obscure condition of this part of the section this zone can seldom if ever be seen, except on the foreshore, where it was discovered by Mr. H. Keeping in 1886, and described by him in the *Geol. Mag.* Dec. 3, vol. iv, p. 70. This zone, which occurs also at Alum Bay and Highcliff, is a fairly satisfactory base for the Barton series, and it almost coincides with the disappearance of nummulites in the British area.

The conspicuous bed of sand, No. 20 of Fig. 1, was next examined, and the Director explained that it corresponded to the white sands north of the pier at Alum Bay (see Fig. 3), and to the Becton Bunny Beds and Long Mead End Beds of Hordle

FIG. 1.—SECTION AT WHITECLIFF BAY.—*W. Topley (after J. Prestwich).*

OF THE ISLE OF WIGHT.

The numbers of the beds in this section and the one above are those used by Professor Prestwich.

FIG. 2.—SECTION AT ALUM BAY.—*J. S. Gardner.*

(see the folding plate *Proc. Geol. Assoc.*, vol. xiii, 1894, p. 280). This bed has usually been called the Upper Bagshot, but that name must be used with caution, since the beds also called Upper Bagshot in the London basin are at the base of the Barton series instead of at the top. Messrs. Gardner, Keeping, and Monckton, therefore include these sands, as well as those on the same horizon at Alum Bay and Hordle, in the Barton series (see *Quart. Journ. Geol. Soc.*, vol. xlv, p. 578).

The Eocene ends here and the Oligocene begins with the Headon beds, of which the Upper and Lower divisions are freshwater and the Middle division marine. The latter contains two well-marked zones of fossils, the lower of which has been correlated by the Rev. O. Fisher (*Quart. Journ. Geol. Soc.*, vol. xviii, p. 67, note) with the Brockenhurst zone of the New Forest, whilst the upper is probably the representative of the well-known "Venus Bed" (Middle Headon) of Colwell Bay and Headon Hill. Many fossils were found here, including *Cytherea incrassata* (the *Venus* of old collectors), *Murex sex-dentatus*, *Natica*, *Voluta*, etc.

The Osborne series, which succeeds, consists of Mottled Clays of freshwater origin, and they are overlain by the Bembridge Limestone, and here a change takes place in the dip of the beds, which have hitherto been vertical or nearly so, for the Limestone appears in the cliff, dipping at an angle of about 45° , and then curves round into a nearly horizontal position, spreading out into reefs on the foreshore. Besides the characteristic freshwater shells, *Paludina*, *Limnæa*, and *Planorbis*, a search was made in the limestone for land shells, and several specimens of *Helix vectensis* were found. The oyster bed at the base of the Bembridge Marls was then noticed. During the afternoon tea was obtained at the Hotel, and eventually the party returned to Sandown by the cliff.

On *Saturday, April 13th*, the party left Sandown by train at 8.27 for Freshwater, under the direction of Mr. R. S. Herries, being joined at Newport by Mr. G. W. Colenutt, of Ryde, so well-known for his researches in the Oligocene Beds of the Isle of Wight. The route taken was by Totland Bay and over Headon Hill to Alum Bay, giving the members an opportunity of seeing the upper beds of Headon Hill. A fairly good exposure of the Bembridge Limestone was visited, and several specimens of the large *Bulimus ellipticus*, as well as *Helix vectensis* and *Limnæa* were obtained. Mr. Colenutt also drew attention to the curious concretionary bodies thought by Edwards to be turtles' eggs. Below the Bembridge limestone the broken slopes of the Osborne beds were seen, red and green marls, while below were two terraces of limestone, the higher of which, containing but few fossils, is classed with the Osborne Beds, and is separated from the one below by green marls of the Upper Headon series.

This lower terrace is the well-known *Limnæa*-limestone of the Upper Headon, which makes such a conspicuous feature in all views of Headon Hill. Resuming the walk, a fine section of plateau gravel was seen, but the talus quite obscured the Bembridge Limestone which is sometimes seen at this point. Before descending to the shore at Alum Bay, the Director called the attention of the members to the grand view of the Hampshire and Dorset coast, the scene of last Easter's operations. Right opposite to the Needles, which were conspicuous on the south side of the Bay, was the chalk headland of Ballard Point, with the Lower Cretaceous, Wealden, and Jurassic Beds of Swanage Bay and Durlston Head to the South, while the long low sweep of the Tertiary beds of Studland Bay and the Hampshire coast stretched away to the North and East, broken by Hengistbury Head, and ending in the shingle spit of Hurst Castle just opposite the spectators. In Alum Bay the Director pointed out the similarity to Whitecliff Bay, the verticality of the beds being due to the same causes, though here the vertical bedding only extends to the top of the Eocene, the beds in Headon Hill, though they have a considerable northerly dip, appearing almost horizontal, owing to the trend of the coast becoming nearly East and West, or parallel, to the direction of the strike. The party proceeded to the South side of the bay and began to examine the beds in detail, from the Woolwich and Reading upwards (see Fig. 2). The junction with the Chalk was well shown; the mottled clays which form the greater part of the Reading Beds, being separated from the chalk by a few feet of coarse sand, with an irregular layer of flints at the base.

Divisions 4, 5, and 6 of Fig. 2, consisting of two beds of dark brown clay, with a bed of yellow sand between them, represent the London Clay of the Geological Survey and others, but Mr. Starkie Gardner considers that Nos. 7 to 13, consisting for the most part of light yellow and grey sands, which have generally been classed with the Lower Bagshot, also belong to the London Clay, giving as his reason their similarity to the sands of No. 5, and to beds which have already been described as occurring in the London Clay at Whitecliff Bay. (*Proc. Geol. Assoc.*, vol vi, p. 83.) Then follows a series of sands, bright yellow, white, red, pink, and brown—the well-known coloured sands of Alum Bay—interrupted by two thick beds of clay, Nos. 20 and 24. The whole series, from Nos. 7 to 26, is called Lower Bagshot by the Survey, but Mr. Starkie Gardner confines the Lower Bagshot to Nos. 14 to 18, and in this series in bed 17 occurred the well-known Alum Bay leaf-bed, the position of which was pointed out by the Director, who said that it was probably lenticular and had now thinned out. There are several seams of pipe-clay on this horizon, but nothing was found in them except some stalk-like impressions. Mr. Gardner considers divisions 19 to 23 to be the

equivalent of the Bournemouth Freshwater Series, while, according to him, the Marine Bracklesham Beds include the beds from 24 to the *Nummulites Prestwichianus* zone, 47 feet above the base of bed 29 (see Fig. 3). The Survey adopts the same upper limit for the Bracklesham, but places the base at the top of bed 26, while Mr. Fisher did not take it below the base of bed 29.

The divisions adopted by the Survey have, it is true, a certain convenience on their side, for they confine the London Clay to the dark brown clays below the sandy series, and they keep all the coloured sands—which, except for leaves, are entirely unfossiliferous—in one division, viz., the Lower Bagshot; but when we come to compare the beds with those at Whitecliff Bay we are met by the suspicious circumstance, that whereas the total thickness from the base of the London Clay to the top of the Bracklesham is much the same, there is an extraordinary discrepancy in the thickness of the component beds, and the advantage of Mr. Gardner's arrangement becomes apparent, as will be seen from the following tables, in which the Survey measurement of the beds has in each case been adopted:—

SURVEY DIVISIONS.	ALUM BAY.	WHITECLIFF BAY.
	<i>Feet.</i>	<i>Feet.</i>
Bracklesham . . .	*155	†570
Lower Bagshot . . .	662	98
London Clay . . .	233	320
	<hr/> 1,050	<hr/> 988
MR. STARKIE GARDNER'S DIVISIONS.	ALUM BAY.	WHITECLIFF BAY.
	<i>Feet.</i>	<i>Feet.</i>
Bracklesham Marine . . .	*419	†447
Bournemouth Freshwater . . .	152	123
Lower Bagshot . . .	76	98
London Clay . . .	403	320
	<hr/> 1,050	<hr/> 988

Whichever grouping is adopted, the fact remains that the beds have undergone a great change of character between the east and west ends of the island, unfossiliferous sands being developed at Alum Bay in place of the great deposits of clay full of marine shells at Whitecliff Bay, but if Mr. Gardner is right, the other difficulty, viz., the variations in thickness of the beds, is at any rate got over.

At the base of Bed 24 Mr. St. Barbe drew attention to a

* Including 47 feet of Bed 29, Fig. 2.

† Including 80 feet of Bed 17, Fig. 1.

FIG. 3.—SECTION OF THE BARTON BEDS AT ALUM BAY.—Gardner, Keeping, and Monckton.

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dark clayey seam associated with lignite and full of leaf remains, which he had recently discovered. Some of the leaves seem to be almost perfect, but the clay breaks up so easily, that it was found almost impossible to preserve good specimens. The layers of lignite in bed 27 were noticed, and Mr. Leighton pointed out the rootlets piercing the under-clay as in the Coal Measures. Bed 28 is divided from the one above by a pebble-bed 6 inches thick, 47 feet above which is the base of the Barton, marked by the zone of *Nummulites Prestwichianus* (Fig. 3). Several layers of septaria were noticed in the Barton Clays, which extend as far as the pier. An adjournment was then made for luncheon, and on the way up to the Hotel a good exposure of the zone of *N. Prestwichianus* was pointed out on the North side of the chine, the occurrence of that fossil there having been lately noticed by Mr. St. Barbe.

After luncheon the party assembled on the spur on the north side of the chine, overlooking the gap caused by the digging away of the white sands, known as the Headon Hill Sands, for purposes of glass-making. These sands, the Director explained, were also known as Upper Bagshot. They were not, however, the equivalent of the Upper Bagshot of the London Basin, as Mr. Monckton had pointed out when speaking of the corresponding bed in Whitecliff Bay. They have been grouped by some observers with the beds above, but Messrs. Gardner, Keeping, and Monckton (*Quart. Journ. Geol. Soc.*, vol. xlv, p. 578) consider that they form part of the Upper Barton Series. Across the gap, resting on the white sands, with a gradually diminishing dip, a series of limestones alternating with marls was seen. These are the lower beds of the Lower Headon, and when the limestones were examined some of them were found to contain seeds of *Chara*, just as the similar beds at Warden Cliff do (Fig. 5). Professor Blake (*Proc. Geol. Assoc.*, vol. vii, p. 159) makes out that there is a considerable fault at this point, but the Directors were not able to agree with him, though a little farther on there is a slight dislocation of the beds in the upper part of the cliff, as shown in Prestwich's figure. (*Quart. Journ. Geol. Soc.*, vol. ii, p. 223.)

The party then proceeded slowly along the under-cliff of talus that forms the base of Headon Hill, collecting from the rich marine Middle Headon Beds or the fallen blocks of the fresh-water Upper Headon limestone as they went. The section of the hill from the *Limnæa* limestone downwards is sufficiently shown in Fig. 4, reproduced from Messrs. Keeping and Tawney's paper, but the state of the talus only allows an examination of the section at rare intervals. Among other fossils, there were obtained *Limnæa longiscata*, *Paludina lenta*, *Planorbis*, *Potamomya* and a crocodile tooth from the Upper Headon, and *Ostrea velata*, *Cytherea incrassata*, *Cyrena obovata*, *Cerithium concavum*, *C. ventricosum*,

BEMBRIDGE LIMESTONE ... 25 FT.
OSBORNE BEDS... 70 FT.
UPPER HEADON ... 49 FT. (TOTAL).

FIG. 4.—VERTICAL SECTION OF BEDS AT THE N.E. CORNER OF HEADON HILL. (Scale 8 ft. = 1 in.)—*Keeping and Tawney*.

FIG. 5.—VERTICAL SECTION OF LOWER HEADON (FRESHWATER) BEDS EXPOSED BETWEEN WESTON CHINE AND WARDEN CLIFF. (Scale 12 ft. = 1 in.)—*Keeping and Tawney*.

For full particulars of these sections see *Quart. Journ. Geol. Soc.*, vol. xxxvii, pp. 21 and 28, from which they are, by permission, reproduced.

C. pseudocinctum, *Buccinum labiatum*, *Melanopsis fusiformis*, *Neritina concava*, and *Natica* from the Middle Headon. When the party had arrived at a place commanding a view of Totland Bay, and Colwell Bay beyond, the Director called a halt and gave a short account of the controversy that arose on the publication of Professor Judd's paper in 1880. (*Quart. Journ. Geol. Soc.*, vol. xxxvi, p. 137.) He reminded the members that Professor Judd, mainly in order to account for certain palæontological differences between the Middle Headon Beds of Headon Hill and Colwell Bay, suggested that the bed known as the Venus Bed at Colwell Bay was possibly not of the same age as the bed at Headon Hill with which it has been correlated by other writers, but that it was considerably newer and the equivalent of the Brockenhurst zone of the New Forest, whilst the beds at Headon Hill represented the *Cerithium concavum* beds of the Paris Basin. The old view was supported by Messrs. Keeping and Tawney in a paper published in 1881,* and Mr. Herries thought that they had shown that from a stratigraphical point of view Professor Judd's theory was untenable, which fact had since been confirmed by the re-survey of the island. At the same time he admitted that the Colwell Bay Bed contains a more marine fauna than the Headon Hill Bed and thought that geologists owe Professor Judd a debt of gratitude for drawing attention to the difficulties of these sections, and by his action stirring up others to try and unravel the problems which he had set before them. The party then proceeded to Totland Bay, where they had tea at Mr. Gilmer's refreshment rooms and returned to Sandown by the 7 o'clock train.

On *Monday, April 15th*, the party left Sandown by train at 8.27 for Yarmouth, Mr. Herries again acting as director, assisted by Mr. Colenutt, who had again joined the party at Newport. They walked along the foreshore in an easterly direction, crossing over the Bembridge Marls, which unfortunately were almost covered by the rising tide. These beds, as the Director explained, lie in a syncline, passing under the Hamstead Beds and reappearing from under them some three miles to the N.E. Arrived at the "Black Band," a bed of carbonaceous clays, forming the base of the Hamstead Series, the party divided into two bodies, the smaller of which, leaving the shore at Bouldnor, followed Mr. Herries in a rapid walk to the top of Hamstead Hill. Here they examined several sections at the top of the Cliff, and, though unsuccessful in finding the bed of *Ostrea callifera*, which should occur immediately under the gravel, they found good exposures of the marine *Corbula*-beds, and the *Cerithium plicatum* beds below. *Corbula pisum*, *C. vectensis*, *Cerithium plicatum*, *Cyrena semistriata*, etc., were found in great abundance, and the party descended the slopes of the cliff, which

**Quart. Journ. Geol. Soc.*, vol. xxxvii, p. 85.

were fortunately tolerably dry and hard, to the shore. Here they examined a good exposure of the "White Band" in the cliff and collected the characteristic fossils, *Cerithium inornatum*, *Melania fasciata*, *Unio Gibbsii*, seeds, and fish remains. Returning, they met the remainder of the party, who, under the able guidance of Mr. Colenutt, had followed the shore at a more leisurely pace, and had collected bones and portions of the carapace of the turtles *Emys* and *Trionyx*, and bones and teeth of some of the mammals and crocodiles that lived in the late Oligocene period, among others *Hyopotamus bovinus*. Mr. Colenutt pointed out the conspicuous "White Band," where it crosses the foreshore, being forced up into a nearly vertical position by the heavy slips from above. This bed consists of alternations of green clays with white shelly marls, and is from 4 to 6 feet thick. The party then returned by the shore to Yarmouth with some difficulty owing to the rising tide.

After luncheon, Mr. Colenutt took the opportunity of exhibiting a number of specimens of *Clupea Vectensis*, the small fish from the Osborne Beds of King's Quay near Ryde, of which he was the discoverer and on which he wrote a paper in the *Geological Magazine*, Dec. 3, vol. v (1888), p. 358. The fish has been more particularly described by Mr. E. T. Newton (*Quart. Journ. Geol. Soc.*, vol. xlv, p. 112). Mr. Colenutt kindly distributed the specimens he had brought with him as well as some *Chara* seeds and other fossils washed out of the "White Band," amongst the members. A start was then made over the bridge and along the military road for Colwell Bay, a halt being called at Cliff End, where there is a good roadside section of the Bembridge Limestone. Scarcely a mile from Sconce Point, the limestone here contains the same fossils as were formerly found at that celebrated locality, and in a short time the more ardent collectors had obtained several specimens of *Bulinus* and *Achatina*, as well as the large *Helix globosus*. The Director pointed out the mottled clays of the Osborne Beds below, on the other side of the road, and the party then proceeded to Linstone Chine, where they descended into Colwell Bay. The Director took them back a little way towards Cliff End, in order to point out an exposure of the attenuated representative of the Upper Headon Limestone, here only 16 inches thick, as against 27 feet at Headon Hill. Just below is the zone of *Cerithium trizonatum*, from which a number of specimens of that fossil were collected. Some curious contortions in the strata were also pointed out (see *Proc. Geol. Assoc.*, vol. xii, p. 150, fig. 1). The party then proceeded leisurely along the shore southwards, collecting from the marine Middle Headon, which is particularly rich near Bramble Chine. The members were rewarded with *Cytherea incrassata*, *Buccinum labiatum*, *Neritina concava*, *Nerita aperta*, *Murex sexdentatus*, *Ostrea velata*, *Corbula cuspidata*, *Lucina inflata*, *Natica*, etc., etc.

The great Oyster Bank in the middle of the bay was pointed out, and How Ledge, a reef running out to sea, formed by the highest limestone of the Lower Headon. In this limestone is a series of small reversed faults, which were pointed out by the Director (see *Survey Memoir*, p. 242). Rounding Warden Point, where Warden Ledge, another reef, formed of a hard concretionary sandstone, runs out, the section (Fig. 5) was seen, and the lower limestones were searched for *Chara* seeds, a few of which were found. The party then went up at the Totland Bay Hotel, and again had tea at Mr. Gilmer's refreshment rooms. On the way to the station Mr. Leighton took them into the Brickyards at School Green, where another good section of Middle Headon was seen, after which the party returned to Sandown by the 7 o'clock train.

On *Tuesday, April 16th*, after forwarding their baggage to Ryde, the party took the 10.45 train to St. Helens. With Mr. Monckton as director, they walked to old St. Helens church tower, which stands on the shore on the North side of Brading Harbour. Here the Bembridge limestone is at the sea-level, and rises up into the cliff to the north, and the Director reminded the members that on Friday they had crossed over the great anticline of the Isle of Wight, and had entered on the syncline to the north. They were now almost on the centre of that syncline, and in the course of the day, between St. Helens and Ryde, they would see another small anticline, the Bembridge limestone now at their feet, and running out to sea, gradually rising and allowing the underlying Osborne Beds to form the cliff under Priory Woods and at Sea View. No Hamstead beds were to be seen in the cliff at St. Helens, but it was possible that there was an outlier on the top of the hill. The Bembridge Marls were well shown, and just above the Oyster bed at their base there is a band with some shells of marine origin, which, according to Edward Forbes, have not been noticed elsewhere. The members proceeded to search for these fossils, and specimens of *Arca Websteri* were found, as well as *Mytilus affinis*, *Natica*, *Melania muricata*, *Ostrea Vectensis*, etc. The Bembridge limestone was also found to be, as usual, full of fossils. The party then proceeded northwards to Sea View, and examined the Osborne Beds, which form a small local anticline. Here the usual mottled clays have been replaced by a series of sands (St. Helens Sands), which are underlain by a series of limestones, grits, and sandstones (Nettlestone Grits). The grits are particularly conspicuous at Horestone Point, where they are full of flint pebbles; they are brought up there by a small fault (*Survey Memoir*, p. 157). From Sea View the party proceeded to Ryde by the sea-wall, and, crossing over to the mainland by the 4 o'clock boat, the members dispersed to their various destinations.

The Directors wish to take this opportunity of thanking Mr.

G. W. Colenutt, of Ryde, Mr. H. St. Barbe, of Lymington, and Mr. J. Duce, for much valuable assistance both before and during the excursion, and also Mr. Clement Reid, of H.M. Geological Survey, who, by his practical advice based on intimate knowledge of the beds, and by his many useful suggestions, materially aided them in preparing the details of a somewhat difficult programme. It only remains to add that the weather throughout the excursion was perfect.

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EXCURSION TO CHARLTON (KENT).

SATURDAY, 20TH APRIL, 1895.

Director:—T. V. HOLMES, F.G.S.

(*Report by the DIRECTOR.*)

On arrival at Charlton, the party at once proceeded to the great pit a few yards east of the Railway Station which has been the scene of so many excursions of the Association, the earliest having taken place in August, 1860. This pit, from which so many thousands of tons of Chalk and Thanet Sand have been removed, has now ceased to be worked; the line of railway thence to the river has disappeared; and the entrance is now not from the Woolwich Road but by a road marked *private*, which turns eastward from a point about 50 yards south of the Charlton Railway Station. We visited it by kind permission of Mr. Ellis, the present proprietor.

On entering the pit, the Director explained the reason of the existence of the Lower Tertiary escarpment, in which this pit is one of many sections. The Chalk (he remarked) to which the overlying

JULY, 1895.]