EXCURSION TO SALISBURY AND THE VALE OF WARDOUR.

EASTER (APRIL 9TH—14TH), 1903.

Directors : Dr. H. P. BLACKMORE, M.D., F.G.S., and Rev.
W. R. ANDREWS, F.G.S.

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

(*Reported by* the Rev. W. R. ANDREWS and W. P. D. STEBBING with Notes
by the PRESIDENT and W. H. HUDESTON.)

OLD SARUM AND STONEHENGE. April 10th.

(*Reported by* W. P. D. STEBBING.)

Arriving at Salisbury on the Thursday the party put up at the County Hotel, the headquarters during this visit to the district after an absence of 22 years. The first day of this excursion, under the directorship of Dr. Blackmore, was devoted to the district northwards of Salisbury, including Stonehenge and the historic locality of Fisherton.

Leaving the hotel in brakes the party immediately drove to Old Sarum, where a halt was made while the director pointed out the position of the ancient city situated on the end of a chalk spur, the highest part of which is probably in the Marsupite zone, and isolated by extensive trenches and banks. Entering the outer ward by the main entrance and then ascending into the citadel, still retaining remains of its Norman masonry fortifications, the director gave an outline of its history from the time when it was a British hill fort, and pointed out while walking round the bank of this inner mound, the position of the various parts of the medieval town. From this vantage point the director also called attention to the different points of the high ground around, and indicated the zones of the chalk forming them.

Descending towards the Avon the party halted at a chalk pit at the northern foot of Old Sarum and by the side of the road.

The director pointed out that the chalk here belonged to the lower Uintacrinus bed of the Marsupite zone, a fact abundantly proved by specimens found by the party. The rubble chalk above was not, the director said, rain wash, but a result of the extensive defensive work on the slopes of the camp.

That this zone, as at Margate, was almost free from flints

though on the geological map the whole upper chalk is marked as "soft with flints."

Rather lower down and nearer the river another chalk pit by some tumuli, and a little north of the Manor House, was visited. The chalk here had fairly horizontal flint bands throughout from top to bottom of the pit. There was no *Uintacrinus* as it is in the upper part of the *Micraster cor-anguinum* zone. The director mentioned that *Pecten Britanicus* had been found in this pit. It yielded to the party several fossils and a paramoudra.

Returning to the carriages the way lay across the Avon and up the valley. At Woodford another pit was visited in the *M. cor-anguinum* zone, and also probably the top of the *M. cor-testudinarium* zone, which is brought up towards Amesbury by a slight dip to the south. The chalk in this section was rather hard and nodular and had flints throughout. It was unique in the district in containing a considerable quantity of common salt.

From the hill above this pit a good view was obtained of the valley of the Avon, and of three well-marked terraces on the hillside to the north of the village. Some discussion was raised as to their origin, the director favouring the view of their formation by the river, or its representatives in Pleistocene times. An interesting feature also pointed out was an isolated hill surrounded by a valley, now dry, containing a deposit of brick-earth, laid down evidently by the river, before its present valley was so deep, with the help of streams from the chalk plateau.

On arriving at Stonehenge the director gave a most interesting account. A date for its erection of about 2,000 B.C. has now been assigned. This fresh view as to its age has been brought about, partly by the recent excavations for raising the leaning stone at the back of the altar stone, during which rude flint implements and sarsen stone mauls of neolithic age were found, and partly through recent astronomical observations and data. The director described the stones, their number and petrology, and started an interesting discussion as to the original home of the small blue stones, a kind of diabase, and as to the locality whence the builders of Stonehenge obtained them. The president reviewed the evidence, and added arguments of his own.

Afterwards some time was spent in and around the stones, fragments of diabase, unearthed by the excavations, being obtained by some of the party, one sanguine member informing us that some day they would be worth their weight in gold. A curiosity in sarsens, one containing pebbles, was also hailed with joy. This happened to be the broken cap stone of the trilithon that fell at the beginning of 1901.

The President (Mr. H. W. Monckton) remarked that the larger stones appeared to be sarsens of a normal kind, and he felt inclined to agree with those who thought that they came from

the Bagshot Beds. Some of them were of a rather exceptional character, thus in one there were layers of flint pebbles and other signs of stratification, and one or two other stones were clearly stratified. Now signs of stratification are not common in sarsens.

As to the blue stones, it appeared to be the opinion of the best authorities that they might have come from the West of England, but there was a considerable difference of opinion as to the way in which they were brought to Stonehenge.

The theories on the subject might be divided into three classes: 1st, that the stones were brought by man from the west of England or from some other distant place; 2nd, that they are boulders from the Glacial Drift which it is assumed once extended over this area (W. Gowland and Prof. J. W. Judd, "Recent Excavations at Stonehenge, *Archæologia*," vol. lvi, p. 81 of Sep. copy); 3rd, that they were brought up the Avon on rafts from an erratic-strewn plain now destroyed by, or sunk beneath the sea lying off the present mouth of the Avon (C. Reid, "Geology of Salisbury," *Mem. Geol. Survey*, 1903, p. 69).

The speaker thought that on the whole the evidence was somewhat in favour of the first of these alternatives. It was objected to it (and the objection applied equally to the third proposition) that the blue stones are proved by excavations to have been chipped to their present size and shape at Stonehenge, and that, had they been brought from any distance, the chipping would have been done before the bearers started. It was, however, possible that the stones had been transported at one time and chipped at a much later time by a different people. The great objection to the second proposition is that so far "no trace of erratics has yet been met with in this area." C. Reid, *op. cit.*, p. 69.

From Stonehenge the party drove into the Devizes road to return to Salisbury. The first stop was at a chalk pit on Camp Down about 450 feet O.D. in the M. cor-anguinum zone. The surface of the ground here has a thin capping of gravel mapped as Plateau gravel, and a small pipe in the chalk was filled with gravel consisting mainly of flint. In the memoir to sheet 298 it is suggested that these isolated patches may be reconstructed Eocene outliers.

Continuing on to Bemerton the higher-level gravels on the new building estate near the cemetery were visited. Some little time was spent in examining these unstratified dark red deposits mapped as valley gravels. The director said that he had obtained a very few Palæolithic implements from the deposit. Patches of red brickearth occurred in the excavations, and abundant sarsen stones, many of a very hard and cherty nature. Rubble chalk, remaining in the form of pinnacles, was seen in several places under the gravel.

The last stop of the day was at Harding's Chalk Pit at

Highfield, Fisherton. This section is in the lower part of the Marsupites zone, and contains *Uintacrinus*. The chalk here is very soft and pure with few flints, is capped with three to five feet of dark red unstratified gravel, and traversed by long, deep and narrow pipes.

Just below this last section occurs the famous Fisherton brickearth pit, where a few minutes were spent. The deposit is very little worked now, and is rather overgrown, the cream-coloured hand-made bricks hardly paying to make. A complete section, therefore, cannot be made out, but a good many feet of brickearth with a light-coloured fine marl below were available for collecting the abundant mollusca. The deposit is banked up against the chalk and the director explained that the finer beds of the section were probably laid down in a quiet eddy of the river which at one time ran at the foot of the cliff; while the origin of the beds containing the coarser materials might be explained by a talus deposit at the foot of the chalk cliff fed by the subaerial denudation of the surface above.

This section closed the day's excursion, from this point the party driving back to the hotel.

TEFFONT EWYAS AND CHILMARK.

APRIL 11TH.

Director : REV. W. R. ANDREWS, F.G.S.

(*Report by THE DIRECTOR.*)

The members assembled at Salisbury Railway Station at 10 a.m. and took the train to Dinton.

The general outline of the Geology of the Vale of Wardour was briefly pointed out, and with the aid of the excellent new Survey Map (Sheet 298), which was in the hands of most of the party, a good appreciation of the chief features of the district was soon arrived at.

The Vale of Wardour was described as bounded on the north and south by the Chalk Downs, and that within these two ranges of Downs, two other hill-ranges, viz., of "Upper Green Sand," which constitutes one of the most picturesque features of the landscape; that emerging from beneath the escarpments of these sand hills on either side of the Vale, the "Gault and Lower Green Sand" were continuous on both sides, and might be seen in the more gently sloping ground; while in the centre of the Vale, rising from beneath the Lower Cretaceous Series, were the Upper Formation of the Jurassic Beds, viz., the Purbeck, the Portland, and the Kimmeridge Clay.

The flexures which these strata have undergone, and the

present geological structure of the Vale were explained as follows : that the various members of the Jurassic System and the Wealden

were in this district tilted towards the south-east, previous to the Lower Green Sand being deposited on their upturned edges. Thus there is an unconformity, with overlap between the Jurassic and the Cretaceous Beds. In the small diagrammatic map, p. 151, a marked black line has been drawn between these two systems, and serves to emphasise the position of this geological break. And in the 1-inch Survey Map the same peculiarity may be observed by noticing the position of the thin band of Lower Green Sand resting successively on each member of the Jurassic Series in a descending order, as we pass from the eastern end of the Vale to the western end. After the deposition of all the Cretaceous Beds, and their elevation to dry land, a very important earth movement commenced, and an anticlinal was formed, which running east and west through the Vale, caused all the strata to dip away from the central line towards the north and south.

It is worth notice that the drainage of the Vale of Wardour is effected by a river which flows out of its eastern end, and that the lateral streams flow into the Vale to join this river, none of them flowing outward through gaps in the Chalk.

FIG. 5.—SECTION ACROSS THE ANTICLINE OF THE VALE OF WARDOUR.

Hor. Scale, 2 inches to a mile. Vert. Scale, 1,200 feet to an inch.

	Feet.		Feet.
10. Upper Chalk	...	5. Lower Greensand	30
9. Middle Chalk	...	4. Middle Purbeck	...
8. Lower Chalk	...	3. Lower Purbeck	65
7. Upper Greensand	...	2. Portland Beds	120
6. Gault...	...	1. Kimmeridge Clay	...
	...		150

FIG. 6.

escarpment as in the cases of the Weald and the Vale of Pewsey. The explanation of the difference is probably that the Wardour anticline was, in the first place, abruptly truncated by the basal plain of the Eocene deposits, and that subsequently, when the existing drainage system was established, the anticline did not become part of the dominant watershed of southern England. The courses of the Avon and the Stour show that these rivers established themselves on a plain which sloped southward across the anticlines of the Vales of Warminster, Wardour, and Broad Chalk, these flexures only influencing the courses of the tributary streams so far as to give them an easterly direction.

The members walked to Teffont Ewyas Lodge, through the Manor House Gardens, by the courtesy of C. E. Maudeslay, Esq., and then by a lane and field path to the Portland Quarries in the Chilmark Valley.

Commencing with the uppermost section on the eastern, or Teffont side of the Chilmark Valley, which shows 17 ft. 7 in. of the Lower Purbecks resting on the Portlands, the dividing line, which here consists of a thin seam of clay, 3 in. to 6 in. thick, was first pointed out, and the reasons given for placing the division at that horizon, viz., that below the band of clay was a thick stratum of buff-coloured oolitic stone, which contains cast of Portlandian fossils, *Cerithium portlandicum*, etc., whilst above the band of clay is a travertine rock with some few casts of fossils, not very distinguishable, but which are recognised as *Cyrena rugosa*.

The junction between the two formations was carefully examined, and the utilisation of the Clay band as a base line for the Purbeck beds met with general approval.

Having fixed on the base of the Purbeck beds, the 17 ft. above the dividing line were next investigated. Beneath the surface soil 3 ft. 8 in. of thin calcareous bands were pointed out, which present a curved, undulating aspect, and overlie the old land surface, or so-called "Dirt Bed," which proved of great interest. The director indicated the position where a fossil-coniferous tree, four or five feet high, had stood upright in the old earth surface some few years ago, till thrown down and removed to the office of the proprietor near. Especial attention was called to the rare geological phenomenon which they had before them, as it was very seldom that any old earth surface was preserved. Some members climbed up to investigate the bed more closely, and at the base of the hollow, where the tree had stood, found several fragments of fossil wood, which were probably some of the roots of the tree. It was evident that considerable erosion had taken place at this horizon, as the under surface of the bed was water-worn into hollows, and many rolled pebbles from the underlying bed were mixed up with the dark material of the "Dirt Bed." Mr. W. Whitaker selected some

of the darker pebbles, which his experience led him to think might contain phosphates, and which he reserved for analysis.

Tufaceous limestone immediately succeeds, 6ft. thick, then a band of calcareous oolitic grit, 1ft. 6in., containing two bands of flint, the upper of which is oolitic, and then, again, tufaceous limestone 4ft. thick down to the dividing band of clay.

Interesting specimens of the fossil wood, the rolled pebbles, oolitic flint, and botryoidal limestone were reserved by some members for future investigation.

The highest Portland rock, on the Teffont or eastern side of the Chilmark Valley, which has been called the "Upper Building Stone," or "Upper Cyrena Bed," was next described as a fine buff-coloured oolitic stone, 18ft. thick, much valued for carved work, and formerly used largely for the building of Old Sarum Cathedral in the eleventh century. Especial attention was called to this bed of rock, for although it is a thick bed here on the eastern side of the Chilmark Valley, it is but slightly represented on the western side, and is absent in the old quarries of Chicks Grove and of Wockley, unless its equivalent there may be a thin band of fossil stone about one foot thick, and the distance between the two sections is less than two miles.

The junction between the "Upper Building Stone" and the succeeding "Chalky" Series is obscured by rubbish.

Descending to a lower level in the quarries, the "Chalky" Series was next examined, and showed a section of 24 feet of soft white rock, with both horizontal and vertical bands of flint in the upper 14 feet, at first sight looking very like an ordinary Upper Chalk quarry, but Portland fossils were soon found, and it was explained that the white "Chalky" rock consisted of minute particles of calcite, probably derived from the destruction of shells, and that when a thin section is examined under a microscope, it is found to be quite different from chalk—had not a similar origin. At the base of the "Chalky" Series comes in a most interesting band of rock, about 12 feet thick, and divided into three or four beds, the upper of which is a soft rock about 2 feet thick, called the "White Bed," the lower consist of hard shelly limestone, often 10 feet thick, and called the "Rag" stone.

This band of rocks, coming as it does between two thoroughly marine series, and containing a very different fauna, indicates some important physical change, and probably one that caused an alteration of the debouchure of the river or rivers which here drained into the Portlandian Sea.

Mr. W. H. Hudleston, than whom no one is better acquainted with these beds, and whom we were all glad to see, very kindly described them as being of exceptional interest, and containing fossils in an admirable state of preserva-

tion, which he illustrated by means of specimens he had brought with him, showing the contrast between *Cerithium Portlandicum*, which occurs plentifully in the "Upper Building Stone," and *Cerithium Concavum*, which occurs plentifully, often standing out in beautiful relief, in these beds. Other Gasteropoda peculiar to these beds, were shown and admired.

At or about the horizon of these "Rag" beds the celebrated "Star Flint," silicified coral, has been found north-west of Tisbury, but it does not occur in the Chilmark Quarries.

The Chief "Building Stone" or "Freestone," which is largely quarried on both sides of the Chilmark Valley, was next noticed, consisting of about 18 feet of a more or less glauconitic sandy limestone, a very excellent and durable stone, used for many centuries, and of which, from these quarries, the present Salisbury Cathedral was built in the thirteenth century, as well as many other important buildings. Much stone has been extracted from long galleries, extending a considerable distance into the hill side, one of which was explored, and lighted by means of magnesium wire.

Below the base of the "Building Stones" there is no section visible, but the thickness of the "Basement" Beds of the Lower Portlands has been estimated at 38 feet, from a well sinking passing down to the Kimmeridge Clay, and going through chiefly sands and clays.

Although these 38 feet of "Basement" Bed cannot be seen in the Chilmark Vale, Prof. Blake reports in a section on the roadside between Tisbury and Wardour some strata of sand and rubbly calcareous rock containing an interesting fauna, and lying between the base of the Freestones and the Kimmeridge Clay.

The members returned to Teffont by a different route, crossing the Middle Purbecks and Upper Purbecks to the north-east of the Chilmark Valley, they investigated the pebbly base of the thin band of Lower Green Sand, and some of the quartz and Lydianite pebbles were collected. Then ascending the slope across the Gault, had the opportunity of seeing a small section of the Malm Stone which forms the basal part of the Upper Green Sand.

Arriving at the village of Teffont, the Director distributed some specimens of the *Archæoniscus Brodiei*, which he had brought there, it being inconvenient for a large party to visit the best locality for that fossil in a small quarry in a railway cutting west of Dinton.

The section in the Lower and Middle Purbeck Beds on the higher ground west of the church and village of Teffont Ewyas was next visited. A long excavation has been in progress for many years, and the so-called "lias" stone burned for lime. Much of the excavation is now obscured, but one very good complete section from a little below the *Archæoniscus* Bed down

to the base of the 3rd "Lias" Bed was well seen. The "Cinder" Bed was pointed out, and described as a most valuable horizon from its wide extension and distinctly marine character, coming amongst purely freshwater strata. The fossils occurring in the "Cinder" Bed including *Ostrea distorta*, *Trigonia gibbosa*, *T. densinoda*, and *Hemicidaris purbeckensis*. The various beds below the "Cinder" Bed were each in turn indicated, and their interesting fossils, viz., remains of small crocodiles, turtles, fishes, insects, Estheriæ, Ostracods, and plants.

Alluding to the three-fold division of the Purbeck formation by Prof. Forbes, according to the range of certain species of Cyprides, the base of the Middle Purbecks was considered to be a brown and black shaley clay, about 10 ft. below the "Cinder" Bed, because there *Cypridea fasciculosa*, the characteristic Cyprid of the Middle Purbecks, first made its appearance, although the characteristic Cyprid of the Lower Purbecks, viz., *Cypris purbeckensis*, had not entirely died out.

APRIL 12TH.

On the morning of this day a fair number of the party walked across the downs to the south of Salisbury to visit some exposures of the chalk rock about Coombe Bissett and Homington in the Ebble valley.

In the afternoon the party met at the Blackmore Museum. Dr. Blackmore conducted the party round the building, especially commenting on the fine series of Eolithic and Palæolithic implements. An exhibit that roused a good deal of interest consisted of a series of Palæolithic implements from Knowl Hill in Savernake Forest with polished or varnished looking streaks across them, due probably to silica deposited by running water.

TISBURY, WOCKLEY, LADY DOWN, AND RIDGE.

APRIL 13TH.

Director: REV. W. R. ANDREWS.

(*Report by* THE DIRECTOR.)

THE members went by rail to Tisbury, and walked by field paths to Wockley Quarry, where there is an exposure of about 28 feet of the Lower Purbeck lying on the lower portion (without flints) of the Portland Chalky Series. It was pointed out that at Wockley there was a great difference in the passage from the Portland to the Purbeck Beds, as contrasted with the section at Chilmark only two miles distant; that a considerable thickness of the uppermost Portland Beds were here not represented, viz., 14 feet of the "Chalky-series-with-flints," and 18 feet of the "Upper Building Stone." Two theories were put forward to

account for the absence of these beds—the one that there was an unconformity here, due to the beds having been raised and removed by denudation; the other that there was no unconformity, but a gradual passage from the Portland to the Purbeck Beds, the absence of the 30 feet of Portland Beds being accounted for by the thinning out of the beds in the distance between the two quarries. This latter was considered the more likely by the Director, both from the absence of marked signs of erosion, and from the great variation in the thickness of beds even at moderate distances.

The actual junction was next closely examined, and attention was drawn to the bed, indicated below, 2 feet 3 inches thick, which consists of two parts, a chalky limestone full of the shells of

FIG. 7.—SECTION OF QUARRY AT WOCKLEY.*

contains estuarine fossils. This closer view of the junction confirms the broader view as to there being no unconformity here, but a complete passage, and that the difference between the two sections at Chilmark and Wockley may be attributed to causes which locally produced a deposit of the beds in the one case and not in the other.† In the “fissile” stone several specimens of *Ophiopsis* and Cyprides were found.

The overlying Purbecks were next examined. The brown and dark clay, 4 inches, proved to be largely a re-arranged soil, as fragments of exogenous wood were found. The “Confused Beds” reminded those who had seen the coast sections in Dorset

Pecten lamellosus in the lower half, firmly welded to a fissile lime-stone containing Cyprides in the upper half. Such a block from this horizon, either at Chicksgrove or Wockley, was deposited in the Museum of Practical Geology many years ago, where it can now be seen, and it is remarkable as showing an abrupt lithological transition, but the palaeontological transition is not so marked, for the Cyprides in the upper half of the block, viz., the fissile stone, have been found to be estuarine forms. Hence the passage from the purely marine Portland Beds to the freshwater Purbeck Beds above, is bridged over by a stratum which contains

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† See Mr. A. J. Jukes Browne's paper on the Purbeck beds of the Vale of Wardour in the *Geological Magazine*, June 1903, pp. 252-254.

of the "Broken Beds" of that locality; and it was suggested by Mr. Whitaker, that the cause of the confusion was due to infiltration of surface water, which had removed the calcareous matter, and that consequently the less soluble layer of yellow ferruginous stone above had fallen in and produced the strikingly disturbed condition of this bed.

In higher beds oolitic limestones, crowded with the characteristic Cyprid *Cypris purbeckensis* of the Lower Purbecks was especially noted.

By the kind invitation of Mr. Bracher the party visited Place Farm, as they walked from Wockley quarry to Lady Down, and were much interested in the fine old house, gateway, and ecclesiastical barn, all of which had once belonged to Shaftesbury Abbey.

The quarry on the top of Lady Down showed an excellent section of about 15 feet, chiefly in the Middle Purbecks, extending from the base of the "Lias" Bed, No. 1, up to the horizon of the *Archæoniscus* Bed, some specimens of which were found, thus clearly marking the upper limit. It was pointed out how the thicknesses of the beds here above the "Cinder Bed" differed from what they were near Teffont, as an illustration of the rapid thickening and thinning of these freshwater strata; e.g., a shelly limestone which was almost thinning out near Teffont, here was 3 feet thick, while, on the other hand, the white fissile limestone above, which was 16 inches near Teffont, was here only 4 inches thick. In consequence of such variations it is sometimes difficult to corroborate two quarries a mile or two apart, unless a definite horizon, such as the "*Archæoniscus*" Bed, or the "Cinder" Bed could be identified. From the top of Lady Down, 500 feet, the best general view of the Vale of Wardour, looking westward, was obtained. In the interval between snow storms, the sun came out, the distance was very clear, and a beautiful prospect was obtained. The chalk downs on each side are hidden by the two ranges of Upper Green Sand, rising up to 700 feet, presenting steep escarpments facing each other, and cut back until the extremely hard beds of Chert near the top are reached, and consequently terminating somewhat abruptly. At the base of these Green Sand Hills comes a depression, due to the soft Gault, and then in the centre of the vale at the lower level are the relatively rounded hills of the Purbeck and Portland Beds and Kimeridge Clay.

A visit was next made to a Lower Purbeck Quarry near the hamlet of Ridge, which though somewhat obscured by talus, still showed about 15 feet of limestone with much curious oolitic structure, and in one of the higher beds many angular hollows left by the solution of salt crystals.

The Director here remarked, that now they had seen, by putting together the various small sections, a fairly continuous sequence from the base of the Purbecks up to the top of the

Middle Purbecks, amounting to between 80 and 90 feet, but that, unfortunately, it was not possible for them to see the Upper Purbecks, as this division, consisting chiefly of marls, clay, and sands, and containing no useful beds of stone, was seldom exposed; and that the section in the first railway cutting west of Dinton Station was now completely grassed over and hidden.

A pleasant walk was continued to the hamlet of Ridge, where narrow lanes climb the Upper Green Sand escarpment, and in their banks were seen small sections of buff-coloured sands, with, at one horizon, a thick persistent layer of the shells of *Exogyra conica* and *Ostrea vesiculosa*. A white porous siliceous limestone, of small specific gravity, "Sponge Rock," was noted at the top of the escarpment, and at Knap Farm, just above the Gault pit, a small section of Malmstone was examined.

The Gault pit below was much obscured; still, it was possible to see that here the dark grey micaceous clay was very thick—about 40 ft.—and that it was traversed about 20 ft. from the top by a layer of brown and grey sandy rock.

It was pointed out that the clay pit was in the zone of *Ammonites interruptus*, while the Malmstone and buff-coloured sands, forming the escarpment above, were in the Zone of *Ammonites costatus*, but the glauconitic sands and Chert Beds, which form the Zone of *Pecten asper*, are not well exposed near Ridge.

After dinner the President proposed a vote of thanks to Mr. Andrews, saying that they had been most fortunate to have as their Director one who was so intimately acquainted with the Vale of Wardour and its geology.

ALDERBURY.

Director: Dr. H. P. BLACKMORE.

APRIL 14TH.

(Reported by THE DIRECTOR.)

This day's excursion was devoted to the geology of the district to the south-east of Salisbury. Leaving the hotel the party walked through the town and then by the Southampton Road to the first section visited, a chalk pit in the *Bel. mucronata* zone at Shute End.

Pipes in this pit were filled with Reading Beds, and with a coating of greenish loamy sand from the hill to the east.

The Reading Beds above the river here are in a state of rather unstable equilibrium, the director related an instance of a man

building a house on the slope, and then, through the insufficiency in depth of the foundations and its weight, found it slowly slipping down the hill.

A short distance up the hill on the main road the party visited a shallow gravel pit, showing sandy gravel, stiff blue clay, and masses of iron-hardened sand, identified by the director as Bagshot Beds, but he would not commit himself to what division of that formation it belongs. The new geological map also does not commit itself.

Continuing on, a very fine section in Plateau gravel, level 320 ft. O.D., at the back of the Alderbury Post Office, was entered. The director, in describing the section, said that the gravel did not slope towards the river, and was perhaps part of the ancient Solent River system. The materials composing the gravel were flints of all sizes, some comparatively little rolled, tertiary pebbles and greensand. Beds of sand occur towards the lower part of the section, and along part of one side of the pit was seen a peculiar layer of white clay containing no lime, as one would rather have expected from its colour. The director said that many Eolithic flint implements had been found here, and spent some time adjudicating on the many artificially or otherwise shaped pieces of flint brought up to him.

The following note on this gravel is by Mr. H. W. Monckton :

The section (at Ivy Church) shows some 18 feet of gravel, roughly but distinctly stratified. There is a little loamy clay in places, probably derived from the Bagshot beds, but on the whole the material is coarse. The gravel is very ferruginous, and in places it is cemented into a hard conglomerate.

The gravel consists of: (1) black sub-angular fragments of flint from the chalk; (2) brown sub-angular flints, probably from older gravels; (3) flint pebbles from the Eocene pebble beds; (4) Sarsens, probably from the Bagshot beds; (5) fragments and pebbles from the Upper Greensand; (6) blocks of ferruginous sandstone from the Bagshot beds.

This gravel is almost certainly a river gravel, and the abundance of Upper Greensand fragments seems to suggest a river flowing from the direction of the Vale of Wardour, an early edition of the River Nadder in fact. This was pointed out by Mr. Whitaker during our visit to the pit.

This gravel caps a hill, rests on the Bagshot beds, and looking at its situation I feel little doubt that the many bits of sarsen in it came from that formation rather than from the Reading beds, and this evidence serves to strengthen my opinion that the sarsens of Stonehenge are from the Bagshot beds too.

I could find nothing like the blue stones of Stonehenge in the gravel here, or in any of the gravels around Salisbury, and I feel the greatest doubt whether they can have been derived from drift of this neighbourhood. Not only do they appear to be absent

from the gravels, but none seem to have been found as gateposts or corner stones anywhere about the district.

A path to the north thence took the party to the famous Clarendon railway cutting in the London Clay—where the late F. E. Edwards obtained a large number of new species, many of them still unnamed, now to be seen in the collection called after his name at the Natural History Museum.

The section is very much grown over now, but with the short time allowed for collecting a good many small specimens of typical species were found.

From this point a large brickfield in the London Clay was visited; it is unfossiliferous except for sharks' teeth, which we were told are carefully removed by the men, as they are liable to cut their hands severely when brick making.

Passing into the Clarendon Park Woods, some time was spent, partly for rest and refreshment, in a chalk pit in the *Bel. mucronata* zone. During the stop here the President proposed a hearty vote of thanks to the director, to which he replied. Leaving this spot, a short stay was made by the side of a field in order to inspect a Sarsen, about 6 ft. long, well sand-polished in places, before visiting the scanty remains, now in a wood, of the old palace of Clarendon, where the famous statutes of that name were drawn up and signed in the reign of Henry II.

Everything must have an end, and so, our day's arrangements being officially finished here, from this point broke up the Easter excursion of 1903.

NOTE.

The chalk zones are best observed in the following quarries:

Shute End, Alderbury, Clarendon Wood	<i>Belemnitella mucronata</i> -zone.
Britford, East and West Hainham	<i>Actinocamax quadrata</i> -zone.
Bishop Down, Ford Hill	<i>Marsupites</i> -zone.
Devizes Road (Harding's Pit), Old Sarum	<i>Urtacrinus</i> -zone.
Stratford, Quidhampton	<i>Micraster coranguinum</i> -zone.
Hornington, Coombe Bissett	Chalk Rock.

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EXCURSION TO THE LOAMPIT, LEWISHAM, CROFTON PARK, AND THE HORNIMAN MUSEUM.

APRIL 25TH, 1903.

Directors: W. WHITAKER, B.A., F.R.S., AND A. E. SALTER,
B.Sc., F.G.S.

(*Report by* MR. SALTER.)

A LARGE party assembled at St. John’s Station, S.E. & C.R., at 2.30 p.m. From the end of the platform the faulted junction of the Thanet Sands against the Upper Chalk was pointed out. By means of well sections, etc., further east, it has been ascertained that the maximum amount of difference of level between the disturbed strata is about 100 feet.

Some large blocks which had been obtained in digging a deep sewer at Malpas Road were shown. They were full of shells, chiefly *Cyrena cordata* and *Cyrena cuneiformis*.

On reaching the old loampit, a section was seen showing unevenly denuded Thanet Sand covered by Drift gravel, and in some places with a little of the Woolwich Beds left between.

The contents of this gravel point to its southern derivation, and it is probably connected with the old Ravensbourne.

Proceeding to Algernon Road, the section in Messrs. Jerrard’s stone-yard was examined. Here the Woolwich Beds rest on the Thanet Sand. The shell beds are well developed, and consist of