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Excursion to Hastings

W. J. Lewis Abbott

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THE OBJECT of the Association is to facilitate the study of Geology and its allied Sciences.

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MEETINGS are held at University College, Gower Street, W.C., on the first Friday in each month from November to July inclusive. Two visitors may be introduced by each Member. The chair is taken at 8 p.m. (7.30 p.m. at the Annual Meeting).

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G. W. YOUNG, F.G.S.,

34, Glenthorne Road,

Hammersmith, W.

*With the author's
kind regards*

Don de M^r M. BOULE *Abbott*

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EXCURSION TO HASTINGS.

SATURDAY, JUNE 22ND, 1907.

Director: W. J. LEWIS ABBOTT, F.G.S., F.R.A.I.

Excursion Secretary: A. C. YOUNG.

(Report by THE DIRECTOR.)

THE members from London who had started from Cannon Street Station by the 9.16 train were met at St. Leonard's Station by those who had come from various parts of the country, and by the Director, and proceeded at once to 8, Grand Parade, where

refreshments were provided by Mrs. Lewis Abbott. Here also the Director had arranged very large collections, more than sufficient for a day's study had the weather turned out unsuitable for outdoor observation. The first contained specimens of the various rocks of the Wealden Series, from the milk-white sand-rock composed of transparent quartz grains, at the base of the Ashdown, through all the varieties and bandings of yellows, browns, and brilliant carmines. These sandstones in themselves offer an object of interesting study, showing every description of false-bedding, faulting, and zonal banding, and change of colours from dark browns to brilliant carmines, and even blood reds. The clays are quite as variable, from the white pipe-clays of the Ashdown Series, to the brilliant, mottled Fairlight Clays, where blues and yellows, greys and purples, vie with each other, specimens of the bright mottled-reds, purples and yellows from the Weald Clay found around Pevensey and from Tunbridge being included. The various conditions under which the Entomostraca are preserved were also shown, from the ordinary paper shales, through the iron-stone of the Wadhurst Clay, where the tiny shells are milk-white, and show up upon the dark iron. The tuberculated ones are also well shown in the ferruginous sandstones and in a phosphatized band where the shells are shiny black. The various groups of Mollusca were also pointed out, and a method explained of developing the shells out of the hard limestones by hydrochloric acid. Teeth and bones of many of the vertebrates were also on view, some indicating dinosaurs of great size. Mr. Bailey, of Battle, exhibited a recently-discovered jaw of *Pholidosaurus*, practically new to this country, from the Purbeck of Darvell Beach Quarry, visited last year by the Association.* Examples of the mode of preservation of the vegetation, from the silicified *Endogenites* through the massive lignites to the delicate fern impressions, also called for attention. The curious rock structures known as cat's brains, and pseudo-breccias proved of great interest, and examples were also on view of the so-called Wealden flint, and a series to illustrate how the silica segregated out; in the early stages giving rise to the so-called "Hastings granite" ending in a cherty flint.

Another large collection had been arranged to illustrate all the known processes of flint-working as evinced from the features they presented and the conditions under which flint fractured, from the simple cone of percussion to the delicate herring-bone flaking; all the various kinds of "hammers" and "flakers," and a nomenclature of the subject was submitted. All the various processes of nature, the various kinds of thermal fissure, "perletic fissure," "globular fissure," "asphaltic fissure," "starchy fissure," and "prismatic fissure," and examples of the marvellous possibilities of nature of simulating man's works.

* See *Proc. Geol. Assoc.*, vol. xix, p. 450.

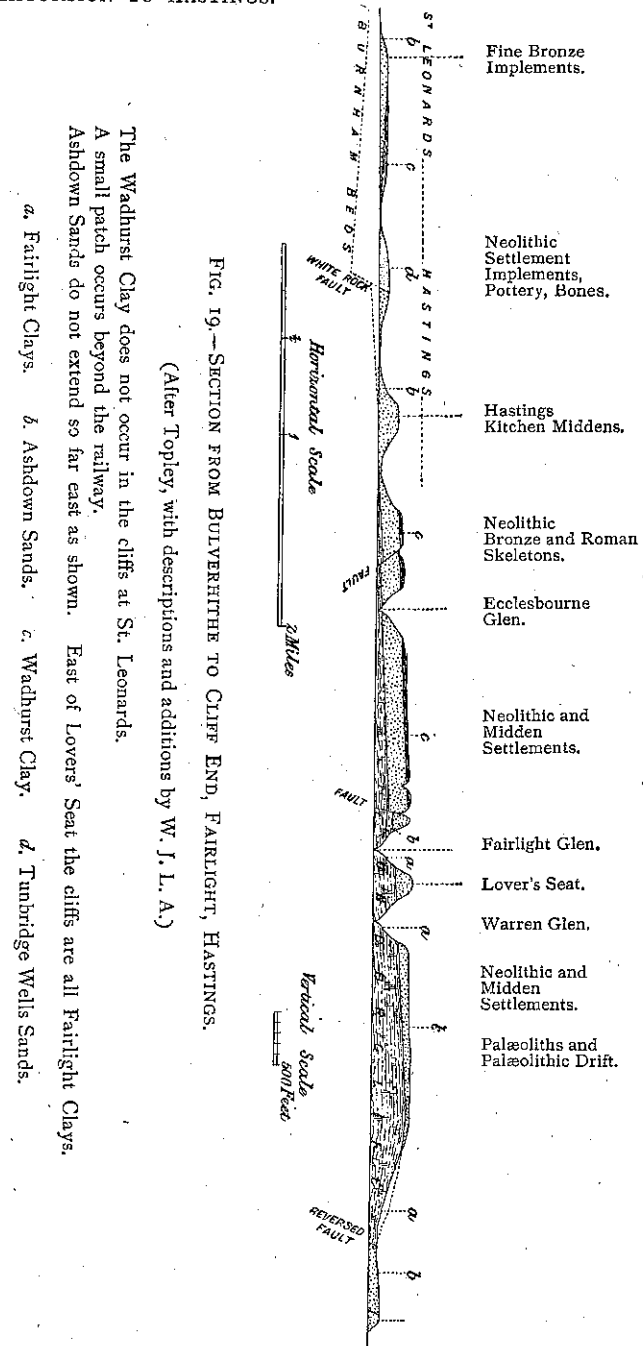


FIG. 19.—SECTION FROM BULVERHITHE TO CLIFF END, FAIRLIGHT, HASTINGS.

(After Topley, with descriptions and additions by W. J. L. A.)

The Wadhurst Clay does not occur in the cliffs at St. Leonards.

A small patch occurs beyond the railway.

Ashdown Sands do not extend so far east as shown. East of Lovers' Seat the cliffs are all Fairlight Clays.

a. Fairlight Clays. b. Ashdown Sands. c. Wadhurst Clay. d. Tunbridge Wells Sands.

Also a large series of "implements" of the various kinds of workings, and in various degrees of alteration, patination, etc., which had been manufactured by the Director. The other series illustrated the various implements from the newly discovered site, and the remarkable erratics found associated with them. These latter included volcanic and metamorphic rocks and numerous varieties of purple, red, brown and grey quartzites, Lydites, veined and mottled quartz, chalcedony, ferruginous ironstone and cherts. Some of the latter are spiculiferous and probably radiolarian. Dr. Salter is of the opinion that most of these were similar to those found in the Bunter of Budleigh Salterton. Quartzites and quartzes similar to some of them were shown that had been taken *in situ* from Wealden beds, and the questions which await answers are: (a) have these large pebbles been derived from the Wealden beds? (b) have they come from the west, and if so, how? (c) were they brought from the east, and if so, when? (d) or were they taken there by man? Some of the stones are faceted and very much striated. Some of the cherts are of oolitic origin, and some of the quartzites and the ironstone look like products of the Lower Greensand, but until the rocks have been made an object of special study one cannot say.

The Director called attention to the section (Fig. 19), which although not quite correct would serve the purpose of enabling the members to grasp the main features of the solid geology of the district. It would be evident that Hastings and St. Leonards stood upon a truncated dip slope, the truncation being formed by the cliffs, which were cut through seven times by streams representing a complete sequence from a small chine or glen, such as at St. Leonard's Gardens, to a main county artery such as the river that flowed through the park. Nowhere in a similar space could so many phases of river capture be studied. The amount of undulation of surface was very great, some of it was due to folds and anticlines, but it was largely due to denudation, and the way some of these deep valleys had cut back until there was only a knife edge between the next valley with hardly any ground at the back, proved a puzzle to every geologist. Stretching from Fairlight, near the coast, *via* Brightling, there was a high ridge known by those names, rising to 570 ft., from which most of the streams flowed. One, however, antedated the present surface features and cut down the ridge some 200 feet in crossing it; it now forms the beautiful valley in which the Alexandra Park is situated. The Director was inclined to hold that this valley antedated the anticline as we now know it, and that the Brede Valley had been brought about by earth movements associated with a "drift" with the palæolithic implements then before them. There could be no doubt that the Fairlight-Brightling ridge with

its extension from the west, once extended obliquely over the Channel into France, and formed the watershed of the west and north rivers.

Near Fairlight a river passed over what is now the ridge in a southward direction. This old valley occurs now as a deep indentation in the cliff falling to about 250 ft. O.D., and, allowing 25 ft. fall per mile would have reached the level of the south river some ten or twelve miles south of the present coast line. A number of downthrows now occurred, the magnitude of which has apparently escaped attention. They threw down the high lands in the east, possibly sufficiently to be largely instrumental in the destruction of the old watershed and thus initiate the separation of England and France. From this newly-created lowland on the east a strike stream originated bisecting this old dip stream not far from the present coast, and this with the cutting back of the coast has left this relic of the old river valley, which to-day contains a sprinkling of a drift composed of highly coloured flints and almost as many quartzites, etc., as already described. A very large proportion of the flints were worked into various kinds of implements before the flint was altered to a warm orange brown. Upon the other side of the Brede Valley upon the next ridge to the north of Fairlight these dark brown implements also occur, as do the quartzites, which would point to this old river having crossed the present Brede also, and that the lower reaches of the Brede were also initiated by this and some other downthrows which had taken place here since the time the old Park river crossed the ridge. Many of the implements are of River-drift types; many are very bold work. The majority, however, are of French cave types. That these implements were not of Neolithic age and had acquired their stains where they were found was evident from the fact that many show signs of hard wear, and that there was upon the same spot in Neolithic times a settlement where implements of every known southern Neolithic type were found, barbed arrow-heads, adzes, axes, scrapers, knives, hammer-stones, pot-boilers, missiles, cores, etc. These are not iron-stained in the least, and are in the same state as they are in the other Neolithic stations close by. There was further another set which were made in Neolithic times out of the old brown Palæolithic implements and flakes, which leaves no possible doubt of the age of the old brown implements, even if their types did not help us.

The party then drove to Fairlight, stoppages *en route* being made to study the various points raised by the Director's address. A quarry in milk-white sandstone at the base of the Ashdown Series was visited near Fairlight Church, and a walk was then taken across the fields to the cliffs, passing into the old valley, where the sequence of events were again pointed out, and a half-hour's hunt over the fields rewarded the members with a goodly number of implements, flakes, etc., of all the various

ages as well as specimens of quartzites and other erratics. The cliffs were next descended to the foreshore, where the magnificent display of the Fairlight Clays was much admired. After some amount of examination a discussion was initiated by the President upon the correlation of the coast beds with those inland, all agreeing that they were more nearly identical than is usually realised. Large cliff falls had recently cleared the cliff face so that the remarkable cross-bedding and overlapping was very pronounced. The members had the opportunity of witnessing a heavy and considerable fall of the cliff face.

The attractions of the structure of the rocks of the section impeded a very rapid progress, and in order to get back in time for the train the party had to ascend from the shore at Fairlight glen, the climbing up of which made them realise the amount of excavation that had been performed. A walk back *via* Barley Lane enabled the members to get a further grasp of the features. Tea was partaken of at the Queen's Road Restaurant. The President, proposing a vote of thanks to the Director in eulogistic terms, stated that he had again laid out a bigger programme than they were able to get through, so that there was yet more for them to come and see. A vote of thanks had already been proposed to Mrs. Lewis Abbott. The Director in reply thanked them for the vote of thanks, and also for the kind attention which they had given him all day. The members returned to London by the 7.15 train.

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