EXCURSION TO CRAYFORD AND DARTFORD HEATH.

SATURDAY, MAY 11TH, 1907.


Excursion Secretary: A. C. Young, F.C.S.,

(Report by The Directors.)

The party, 49 in number, met at Crayford Station at 3 p.m., and walked towards the great gravel pit at Wansant on the northern edge of Dartford Heath. Near the railway the Chalk was noted, overlain by re-sorted Thanet Sand, and higher up the hillside the Thanet Sand was seen in situ just below the working floor of the pit. A small patch of Tertiary pebbles, resting on the Thanet, appears to be the remnant of a drift derived as "run of the hill," from the high ground west of the Heath.

The Directors made the following remarks on the position and constituents of the Dartford Heath drifts.

Dartford Heath lies near the foot of the northern dip-slope of the Chalk, and in the angle between the rivers Cray and Darent, which unite before entering the Thames. The Heath is thus well within the basin of the Thames, and is distant only two miles from the present course of that river. The drift deposits, which include sands, gravels, and brick-earths, rest at from 85 to 100 ft. O.D. on Thanet Sand or, where this has been entirely removed by denudation, upon the Chalk.

Wansant pit shows no brick-earth, but false-bedded sands and gravels upwards of 40 ft. thick, resting on Thanet Sand at 90 ft. O.D. The top layer of gravel—"Dartford Heath gravel"—of commerce—consists chiefly of sub-angular flints in a stiff clayey matrix, and rests on a more or less uneven surface of the false-bedded sands. The deposits appear to be fluviatile drifts lying at the same level as the Swanscombe and Galley Hill gravel spreads; contemporaneous and, originally, continuous with them, but now separated from them by the subsequent erosion of the Darent valley. Dartford Heath thus belongs to the highest terrace that can be definitely associated with the drainage system of the present Thames.

The Thames, Darent, and Cray have all contributed material to this deposit, and the influence of the Thames is very strongly shown by the presence of many erratics, which may be traced to the glacial gravels, boulder-clays, and high level gravels of the Upper Thames Valley, and thence into the Midlands and West of England. Excluding the flints, which form the bulk of the gravels, the rocks fall into two groups.

(A) Rocks brought down by the Thames: these include the
Excursion to Crayford and Dartford Heath.

Spotted and liver-coloured "Bunter" quartzites; Crinoidal chert (Carboniferous); "Rhauxella" chert (Oolitic); Radiolarian and reticulated cherts (Bunter); "Tourmaline" grits (West of England); Hertfordshire "pudding-stone"; large Sarsens; pink granites; quartz mica schist; vein quartz; and various weathered igneous rocks and altered sedimentary rocks.

Note.—Mr. J. Vincent Elsdon, B.Sc., F.G.S., writes as follows on some sections of pebbles from Wansant, submitted to him:

"Dr. Salter and I have looked at the specimens, which are sediments more or less altered. The tourmaline grits and the radiolarian cherts may have come originally from the S.-W. of England. The so-called radiolarian cherts are a little uncertain, as such rocks often are.

(1) Fine-grained sandstone, infiltrated with veins of quartz full of tourmaline needles—the so-called "tourmaline grit." Possibly a metamorphosed sediment near an igneous contact.

(2) A silicified sedimentary rock, chiefly made up of areas filled with a fine-grained quartz mosaic, separated by irregular patches of amorphous, possibly argillaceous, material. The structure is only visible under crossed Nicols.

(3) Silicified sedimentary rock, showing structure somewhat resembling some radiolarian cherts (see 5). Sedimentary origin.

(4) Apparently an altered sediment, consisting of alternating laminae of silica and amorphous matter. Pronounced by Dr. Salter to be probably a pebble from the Bunter.

(5) Reticulated chert, recognised by Dr. Salter as similar to some in which Dr. Hinde recognised radiolarian structures. These consist of ovoid patches of paler tint, some of which may be noticed in the specimen. Possibly a pebble of Bunter origin.

(B) Rocks brought down by the Darent: Chert (L.G.S.); Lydian stone; micaceous and ferruginous sandstones, grits, Carstone, and decalcified "Kentish Rag" (Lower Greensand); Tertiary ironstone concretions and shelly conglomerates (Woolwich and Blackheath Beds); vein quartz and pale quartzites. With reference to these last, it may be noted that ovoid 'grey quartzites occur in the Tertiary Beds at Worm's Heath, whence the Darent probably derived some of its Tertiary material.

Many of the rocks under (B) may have been in part brought by the Thames, since the Lower Greensand chert occurs in high level drifts of the Upper Thames basin.

In addition to the casts, in flint, of Chalk fossils, the gravel contains many fossiliferous pebbles. Mr. E. T. Newton identified the following species in pebbles collected by the Directors:

*Rhauxella perforata, Cerithium sp., Protocardium sp., Corbula, Pecten sp., Serpula tetragona, Astarte sp.; these all occur in "Rhauxella chert." (Middle Oolites).

Crinoid ossicles, *Productus near punctatus* (Carboniferous).

*Productus* sp. (spined), *Modiola* sp., *Bellerophon* (?), *Goniaticles* (?), *Cyrtoceras* (?), and a Euomphaloid Gastropod in quartzose rock of Carboniferous Limestone age.

*Chonetes laguessiana* (Carboniferous Limestone) and *Ammonites* [*Cardioceras*] *cordatus* (Oxford Clay or Coral Rag).

The most interesting Chalk fossil was a cast, in flint, of the head of *Bourgueticrinus*, showing casts of the internal cavities and tubes.

* The fossils marked thus were found by members of the party in Wansant pit.
With reference to Pleistocene fossils from Dartford Heath little can be said. Some leg bones of mammoth were obtained about two years ago in Wansant, but no shells are known to occur. The corresponding gravels at Dartford Brent and Swanscombe have yielded an abundant fauna, among which may be noted the human remains found at Galley Hill in 1888. Implements are also rare in the Dartford Heath drifts, and those which occur are generally much abraded and apparently have been derived from the older "Plateau" drifts.

The history of the Dartford Heath deposits may be briefly stated. The gravels and sands were laid down near the junction of the Darent and Thames when these rivers flowed nearly 90 ft. above their present level. The gravel consists partly of Cretaceous and Wealden material and partly of erratics which have travelled down the Thames from older deposits in the upper Thames Valley. During a period of erosion brought about probably by slow earth movements, the rivers cut through their old deposits and sub-aerial denudation removed the sides of the ancient valley. Much of the material was re-deposited at a lower level, forming the well known gravels and brick-earths of Crayford.

Mr. E. T. Newton made some remarks on the fossiliferous pebbles. The party then searched the pit for rocks and fossils. Some interesting specimens were obtained, notably the fragment of *Cardioceras*, also "Rhaxella Chert" and one specimen of *Chonetes laguessiana* beautifully preserved in Carboniferous chert. A "borer" of the "Plateau" type was found by Mr. M. C. Heys, and a few other slightly worked and abraded flints were picked up.

Since the excursion the Directors have found several specimens of pure white *Rhaxella* Chert.

Along the edge of the pit the Directors indicated some V-shaped trenches full of disturbed gravel in which calcined flints and bones occur; close by, but unfortunately destroyed just before the visit of the Association, was a "hearth" in which they obtained coarse pottery, charcoal and "pot-boilers." Several trenches and "hearths" have been discovered as the working-face of the pit has been cut back. Some fragments of pottery and bones recently obtained were sent up by the proprietor of the pit, but unfortunately the bearer failed to notice the party in time. Mr. A. S. Kennard, who examined the specimens later in the afternoon, identified the pottery as of "Early Iron" or possibly "Bronze" age. It is therefore probably of the same period as certain gold ornaments found in the adjacent pit.

Leaving Wansant pit, the party entered Messrs. T. and F. Martin's pit where, in a railway cutting, the Drift was seen resting on a fairly level surface of Thanet Sand. The western end of the cutting showed the drift trailed down over a hill-slope of Thanet Sand.
EXCURSION TO CRAYFORD AND DARTFORD HEATH. 125

On the southern face of this pit was seen the V-shaped trench (7 ft. wide and 5 ft. deep) from which nine gold armlets were recently obtained. Since the first discovery of gold ornaments in 1906, the trench has been cut back some 20 yards, and it still runs an unknown distance towards the open Heath. Mr. C. H. Reed, of the British Museum, kindly informs the Directors that the armlets are “certainly of Bronze Age—between, say 500-1,000 B.C.”

The party now walked across the Heath, passing a pond held up by brickearth and noting a line of mounds which may have been thrown up in 1779-80, when a military camp of 8,000 men was formed on the Heath. Some of the mounds look like burial tumps, but Mr. Spurrell, who opened several of them, found nothing in them. The occurrence of neolithic implements in their neighbourhood and the proximity of the “hearths” and “gold ornament trenches” suggest a connection between at least some of the mounds and the prehistoric settlement which existed on the Heath.

In Dartford Heath Brickyard thinly-bedded brickearth, waved and slightly contorted, rests directly on Thanet Sand at about 95 O.D. In Wood’s pit (across the road) some 6 ft. of brickearth has been removed over a large area, leaving about 10 ft. of gravels and strongly false-bedded sands, which are separated from the underlying Thanet Sand by a bed of hard ferruginous sand. The brickearth also formerly lay to a great thickness in a trough-shaped hollow beside the pit. Two palaeoliths from this pit were exhibited; Mr. A. S. Kennard pronounced one of the “Rockshelter” type; the other was perhaps derived from an older drift.

On the way into Dartford two pits were omitted as time ran short. The last pit visited (100 ft. O.D.) showed the drift resting on a “bull-head” containing huge chalk-flints. The base of the drift here consists of Tertiary pebbles.

A curious “pipe” in the drift was hastily examined, and the President having moved a vote of thanks to the Directors, the walk into Dartford was resumed. Tea was obtained at the “Bull” and the party left by the 7.32 p.m. train.

The Directors wish to express their thanks to Mr. E. T. Newton for identifying the “derived” fossils and for his note on the Arngrove stone; to Mr. J. Vincent Elsdon and Dr. A. E. Salter for their notes on the rock sections; and to Messrs. D. T. Corke, T. and F. Martin, and Wood for permission to conduct the Association through their gravel pits.

REFERENCES.

1895. Ordnance Survey Map, 6-in., Kent, Sheet ix, N.W.


