were conducted over the cement factory by the foreman, Mr. Usborne, who described the process of the cement manufacture. A vote of thanks was accorded the Manager and Mr. Usborne for their kindness.

Messrs. Hilton & Anderson's pits at Halling, in the zones of *Rhynchonella cuvieri*, *Actinocamax plenus*, and *Holaster subglobosus* were next examined.

The next pits visited were those of Messrs. Lee & Co., at Holborough, the finest exposures of chalk on the west side of the Medway. The *Actinocamax plenus*-marls here form a very conspicuous feature in the upper part of the lower pits. A large number of typical fossils were at the disposal of the members.

After tea at the Bull Hotel, Snodland, a cordial vote of thanks to the Director was proposed by Mr. Sherborn, and carried unanimously.

REFERENCES.

Geological Survey Map, Sheet 6.

Ordnance Survey Map, New Series, Sheet 272. 1s.

1872. WHITAKER, W.—"Geology of London Basin." *Mem. Geol. Survey*, vol. iv.

1887. WOODWARD, H. B.—"Geology of England and Wales."

EXCURSION TO ORPINGTON,

SATURDAY, SEPTEMBER 22ND, 1900

Director: T. V. HOLMES, F.G.S.

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

(*Report by THE DIRECTOR.*)

THE object of this excursion was to see the Tertiary sections now exposed, between Chiselhurst and Orpington, on the S.E.R. main line, which is being widened.

The party, numbering more than forty, assembled at Orpington Station and proceeded northward towards Chiselhurst. A few yards south of the station bare Chalk is visible, but at the northern end of it a fine clear section of Thanet Sand, capped by a few feet of greenish-looking Woolwich Beds, appeared. Unfortunately it was impossible to examine the Woolwich Beds otherwise than by means of such fragments as had fallen down. Before leaving the precincts of the station, the Director called attention to the slight anticlinal and synclinal folds between Orpington and the cutting south of Grove Park. Between Orpington and Chiselhurst there is a slight synclinal fold. Then at Chiselhurst a slight anticline causes the appearance of the Chalk and Thanet Sand there. At the southern end of the Sundridge tunnel the dip is northerly, and, at the northern end, southerly, the tunnel

being consequently through a synclinal fold. On July 22nd it was evident that a slight anticlinal fold existed between the mouth of the tunnel, where the dip was southerly, and the beds northward of the bridge crossing the line a few yards away, which had a steady north-westerly dip towards Grove Park Station.

Proceeding northward, the party noticed Thanet Sand on the more westerly side of the line, where it is being widened, to a point a little beyond the spot at which the footpath crosses the railway. Thence, little worth noting could be seen until the north-western corner of Clay Wood was reached, and there a small siding showed the shell beds of the Woolwich Series to a thickness of 6 feet. The shells were mainly *Cyrenas*. Between this point and Town Court Farm there was a sectionless interval. But in the cutting which begins a few yards south of Towncourt Wood, London Clay appeared, containing many of the calcareous concretions known as "race." London Clay was also seen in the cutting on the north-western border of Towncourt Wood. There being no sections thence to Chiselhurst, the party separated at the northern end of the cutting.

The President kindly assisted in the elucidation of doubtful points, and distributed proofs of p. 135, vol. i, of his Memoir on "The Geology of London and of part of the Thames Valley," (1889), in which the results of visits to the Orpington Cutting many years ago are given. As the Memoir in question, though valuable, is by no means portable, and as the sections between Orpington and Chiselhurst may retain their clearness, and possibly develop rather than deteriorate during the next few months, it may be useful to give here all that refers to the scene of our Excursion :

"The cutting on the South Eastern (Lewisham and Tunbridge) Railway at Orpington Station must have given a fine section when clear. When I saw it first the greater part was unfinished, and when again, in 1870, the sides were overgrown ; however the following succession could be made out :

Sand of the Oldhaven Beds, at the highest part.

Woolwich Beds	$\left\{ \begin{array}{l} \text{Clay.} \\ \text{Shelly clay, with peaty earth at bottom.} \\ \text{Clay.} \\ \text{Pebbly green sand.} \end{array} \right.$

Thanet Sand, cut into from the end near the Station up to as far as the footpath across the line.

"The lines of growth on the sides of the cutting show distinct and even bedding, dipping at a small angle along the line N.W.

"Mr. E. Nash has published the following details of the beds shown in part of this cutting,* and he tells me that his notes were taken at about 300 or 400 feet from the Orpington end, that is to

*"Pre-Adamite London," pp. 30, 31, 8vo, London, 1879.

say, south-west of the highest part, and beyond the on-coming of the Oldhaven Beds.

		Feet.
Woolwich Beds.	{ Vegetable clay earth }	[? about 11.]
	{ Yellow clay }	
	{ Yellowish earth, with traces of broken shells }	
	{ Yellow earth, gradually getting blue and of a deeper colour downward; charged with fragments of shells, increasing in quantity with the depth... }	
	{ Layers of perfect shells, compacted into a hard bed }	about 3
	{ Very black soft earth, with some fragments of shells... .. }	[? about 4]
	{ Dark pebbles and sand }	2
	{ Hard green sand, with dark stripe at bottom }	[? over 4]
Light-coloured clean [? Thanet] sand, not bottomed."		

ORDINARY MEETING.

FRIDAY, JUNE 1ST, 1900.

W. WHITAKER, B.A., F.R.S., President, in the Chair.

Sir Henry H. Howorth, K.C.I.E., M.P., etc., Geoffrey A. Longden, and John B. Miles, B.Sc., were elected members of the Association.

An interesting address on "Our Older Sea-margins" was delivered by Sir Archibald Geikie, D.C.L., F.R.S., etc. The coast terraces of North-Western Europe, and more especially those of the east and west coasts of Scotland were described and illustrated by means of the lantern. After discussing the various theories of their origin he pointed out the importance of obtaining more accurate measurements of the heights of the terraces with the view of determining any inequalities in their levels, and he suggested this research as one in which valuable services might be rendered to geology by any competent observer who had time and enthusiasm to devote to it.

ORDINARY MEETING.

FRIDAY, JULY 6TH, 1900.

W. WHITAKER, B.A., F.R.S., President, in the Chair.

F. P. Mennell was elected a member of the Association.

The following paper was read :

"Notes on the Geology of the English Lake District," by J. E. Marr, M.A., F.R.S., F.G.S., illustrated by lantern slides.

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