

ORDINARY MEETING.

FRIDAY, MARCH 7TH, 1884.

HENRY HICKS, Esq., M.D., F.G.S., President, in the Chair.

The donations to the Library since the last meeting were announced, and the thanks of the Association returned to the donors.

The following addresses were then given :—

‘On the Implementiferous Gravels of North-East London,’ by J. E. GREENHILL.

‘On the Implementiferous Valley-gravels near London,’ by Prof. T. RUPERT JONES, F.R.S., F.G.S.

THE IMPLEMENTIFEROUS GRAVELS OF NORTH-EAST LONDON.

BY J. E. GREENHILL.

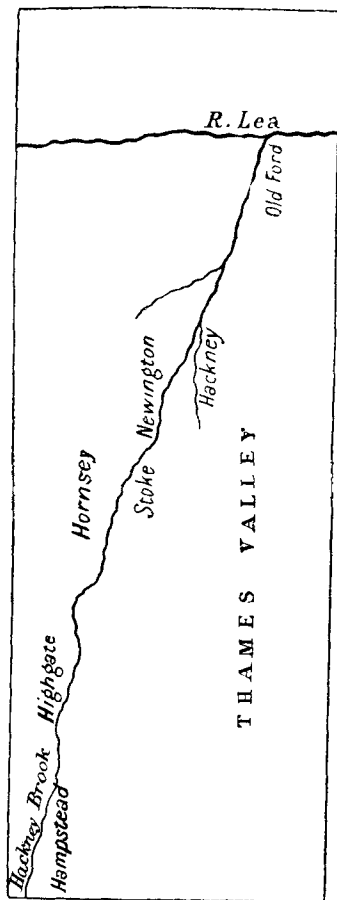
The Paleolithic Gravels of the North-east of London are now well known to the geologist and archæologist through the numerous papers by Mr. Worthington G. Smith published in ‘Nature,’ and perhaps, in some degree, through the collection of implements which I have been enabled to form from these gravels, and which has attracted students from many parts of the globe. The neighbourhood of Hackney is peculiarly situated in the wide part of the valley of the Thames, towards its mouth, and on the northern slope. It is bounded on the east by the river Lea, near its junction with the Thames, and in times prior to the main drainage it was intersected by the Hackney Brook. As classification is an important point in any collection, I was anxious to adopt some method of tabulating the numerous implements which rewarded my daily examination of these gravels, and eventually followed what at first sight appeared the natural course, *i.e.*, those found in the valley of the Hackney Brook were so named, those found in the Lea Valley were thus designated, and those found away from these two valleys were classified as Thames Valley Implements. This arrangement also coincides with the order in time in which these valleys were formed, the Hackney Brook being the most recent, then that of the Lea, and the oldest that of the Thames. The only part of this

statement as to the sequence of these valleys which calls for proof is, that the Hackney Brook is the most recent, and of this I hope to offer overwhelming evidence later on. Beautiful, simple, and natural as this classification appears, however, it is open to very serious objection, as it seems to imply that while undoubtedly the implements found in districts wide of the Lea and Hackney Brook belonged to the Thames Gravels, it might also lead the reader to conclude that those found in the gravels of the Hackney Brook might possibly belong to the period when this valley was formed. Such was my own opinion in the first instance, and this opinion was shared by others; but as the eagerness to form a collection was moderated by a growing desire to know more of the geological teachings of these deposits, another, and, I think, a truer view, began to present itself, dimly at first, but becoming clearer and clearer after every careful examination; and this view I propose to place before you for your approval, dissent, or modification, my anxiety being less to establish any theory of my own than to arrive at a true knowledge of the comparative age of these three valleys and their implements.

In the scheme for the main drainage of London, 1853-57, the engineers utilised the natural watercourses. One of these was the Hackney Brook, at that time little more than an open sewer. Mr. Lovegrove, the Surveyor of the Hackney District, in his report on this scheme, presented to the Hackney District Board of Works in 1857, in reference to the northern high-level area, of which Hackney formed a very important part, says, "The general contour of this area is determined by the route of several natural watercourses, having a general direction from north to south, and discharging into the Thames; also by a natural watercourse north of this area, running due east, through the Hackney-Brook Valley into the river Lea. . . . The northern high-level area includes a part of Hampstead, Highgate, Islington, Hornsey, and Hackney. It differs from the others in this respect: it is mainly determined by a natural valley bearing from Highgate to Old Ford in an easterly direction. The watercourse (called the Hackney Brook) discharges into the river Lea about three miles and a half northward from its junction with the river Thames." It will be seen by this statement that the Hackney Brook lies entirely in the Thames Valley, rising in the high ground of Hampstead and Highgate. It flows in an almost easterly direction, and after a

course of from six to eight miles empties itself into the Lea. Up to the present I have found no authority for carrying its source beyond this point, and a careful investigation of this district strengthens the idea that the Hackney Brook has been formed by some denuding agency since the Thames has excavated its present valley; in short, that this brook is, geologically, of comparatively recent formation.

Fig. 1.—MAP OF THE COURSE OF THE HACKNEY BROOK.



The brook then having been utilized in the High-Level Sewer, the improved drainage offered every inducement for the mapping out of this district into streets, along which thousands of houses have sprung up. The excavations in these gravels which have been made by the builders, have not only enabled us to obtain the treasures which they have held so long, but have also assisted us to form an idea as to the conditions under which they were deposited, of which I have given some account in a paper entitled 'Prehistoric Hackney,' Part I.

In May, 1881, I found near Stoke Newington Common, and almost close to the bed of the Hackney Brook, two long, pointed implements, rivalling the workmanship of the Danish Neolithic tools, which have been the admiration of many anthropologists, and instrumental in convincing many who had hitherto been un-

able to perceive anything but accident in the production of these forms. These two proved the forerunners of some 200 or 300 implements, besides thousands of flakes which fell mainly into the

possession of Mr. Worthington Smith and myself. All these implements and flakes found at a particular level were quite unabraded, many of them lustreless, and in fact presenting the appearance of having just left the hand of the workman. Numbers of flakes which had been struck from the same stone frequently occurred, and in some instances could be replaced, indicating an undisturbed palæolithic "floor." Below this interesting "floor," containing the unabraded implements, occasional abraded and lustrous tools were found, belonging apparently to an earlier and older "floor." This floor was first exposed over a large area, close to and on the eastern slope of the valley, then over a smaller area on the west, and afterwards in a few sections in the very bed of the brook. The depth at which it occurred varied from 4 to 12 feet, and generally at a level of 70 feet above Ordnance datum. Up to this time, (1882), I still thought it possible that Palæolithic Man had lived on the slopes of this brook, and had left to us evidences of his occupation which it had sealed up by its subsequent deposits.

In 1883, a road (Ayrsoe Street) in Stoke Newington, to the west of the Hackney Brook, without the area of its valley, and 100 feet above Ordnance datum, was laid out for building purposes. Excavations were made here to obtain the necessary sand and ballast required by the builder. These were sometimes carried to a depth of thirty feet, and while making a sketch of one of these pits, I urged the man who, up to this time, knew nothing of palæolithic implements, to search the ballast in the bottom of the pit carefully. The result was the finding of three fine, unabraded implements and numerous flakes. A continuance of the search was rewarded by the discovery of seven others, besides an abundance of flakes, all in the same unabraded condition. A comparison of them with those found near Stoke Newington Common, suggested that some of these might have been made by the same hand, so strong a resemblance was there between them. In no place without the valley of the Hackney Brook had I previously found unabraded implements and flakes in any number. There was no resisting the suggestion that this was possibly the same "floor" as that exposed near Stoke Newington Common, occurring at the same height above Ordnance datum, *i.e.*, 70ft., and containing implements and flakes exactly similar in character. If this was so, however, what had deposited this thirty feet of sand and clay above them? The Hackney Brook? Scarcely. What then? Alas for

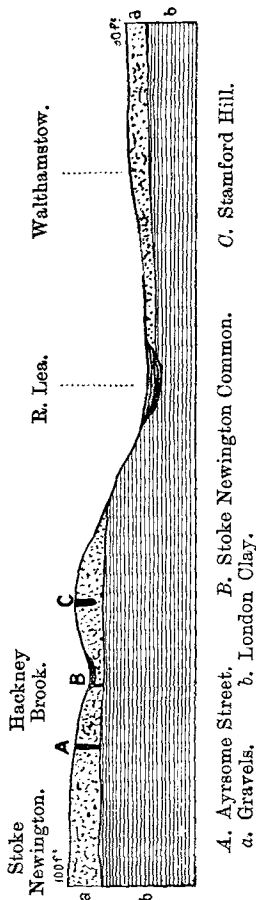
the beautiful, simple, and apparently natural theory with which I had started, it was all swept away by this discovery.

To say that I welcomed it in the first instance, would not be to state the truth; but as my mind threw off its early impression to make room for the new and fuller truth, as many difficulties, which I had experienced under my first ideas, gradually vanished in the more recent conception, a feeling of pleasure possessed me like to that which a benighted traveller experiences at the first gleam of distant light, and I wondered that I had not perceived it before.

Granting that the "floor" at Ayrsome Street is possibly the same as that at Stoke Newington, and the improbability of the superincumbent strata having been deposited by the Hackney Brook, there seems to me but one other hypothesis, *i.e.*, that this thirty feet of stratified sand and clay was laid down by the Thames, and while the "floor" is comparatively recent, yet since Palæolithic Man chipped these symmetrical forms in flint vast geological changes have taken place.

There are other evidences, however, that the Hackney Brook was formed subsequent to the Palæolithic age. There have been a great number of excavations in this valley, yet in none of those strata which were evidently formed by the Hackney Brook could the typical *Cyrena* (*Corbicula*) *fluminalis* be found, although *Bythinia*, *Pisidium*, and many other recent species, occurred in abundance. The same may be said of the Mammalia, all of them belonging to recent species.

Fig. 2.—SECTION ACROSS THE VALLEYS OF THE HACKNEY BROOK AND THE LEA.



Let us now return to the section in Ayrsome Street. This section, made in gravel at an elevation of 100ft. above Ordnance

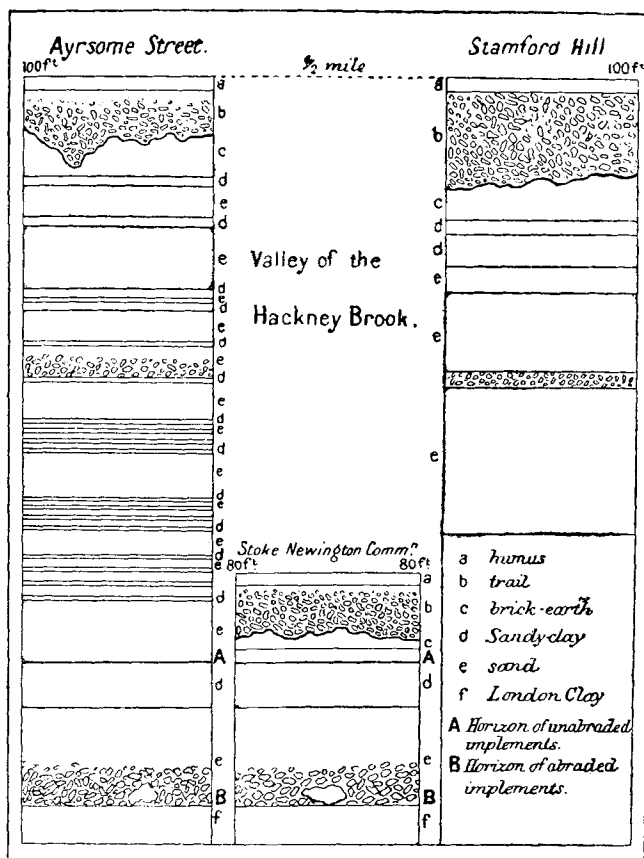
datum, occurs about 300 yards west of the edge of the valley of the Hackney Brook, and 20ft. above the lowest level of the valley. Had the beds of sand and gravel exposed in this section, and showing the clearest evidence of stratification, been laid down by the Hackney Brook, the lines of stratification would have exhibited some inclination towards its valley, *i.e.*, to the East; but this is not the case, the only inclination at all discernible being towards the South, *i.e.*, towards the Thames Valley.

There is still one other point to which I should like to refer. It is not probable that the bed of the Hackney Brook ever varied much from its recent position. Its source, if I am correct, was at Hampstead, at an elevation of 300ft., its length not more than eight miles, and its height on forming a junction with the Lea 20ft. above Ordnance datum, giving a mean fall of 35ft. per mile, or one foot in every 151. This rapid fall would produce a stream torrential in character, which, in time of heavy rainfall, would sweep every obstacle before it, and excavate a channel in as near as possible a line from its source to its mouth. The force of the waters, even in recent times, may be judged from the following facts. Shortly before the brook was absorbed in the main drainage scheme, after a heavy rainfall, a woman was crossing the bridge in Hackney with a perambulator containing a child. Alarmed, possibly, by the swiftness of the waters, she accidentally overturned the perambulator, throwing the child into the stream. So rapid was the current, that, although the water was not more than from two to three feet deep, and there were several persons by to render assistance, the child was swept away, and its lifeless body was found some distance down the stream. It is in the memory of many of the present inhabitants of Hackney that, after a heavy rainfall, dogs, attempting to swim across the stream, would be carried downward by the torrent and eventually drawn beneath its waters, howling piteously for help. A stream of such a character would never have wandered much from its course, and it is highly improbable that it ever approached nearer to the section in Ayrsome Street than the present line of its valley.

If I have now made out a fair case to show that the "floor" at Ayrsome Street and Stoke Newington Common are part of one and the same palæolithic "floor," and also that it is highly improbable, if not impossible, that the Hackney Brook had anything

whatever to do with the deposits in Ayrsome Street, it follows that this most recent palæolithic "floor" dates far back in geological time, long before the Hackney Brook ever existed.

Fig. 3.—VERTICAL SECTIONS OF THE IMPLEMENTIFEROUS GRAVELS OF HACKNEY.



A careful examination of the section in Ayrsome Street will enable us to form some idea of the changes that have taken place and the time demanded by such changes. Above this "floor," twenty distinct lines of stratification, *i.e.*, twenty beds of clay and sand, may be readily distinguished, varying from three inches to three feet in thickness. It is not my purpose in the present paper to enter into

any minute discussion as to the manner in which these beds were deposited, or the conditions which prevailed during that period ; but such changes do not usually take place in the space of a few years. Since that period some denuding agency first hollowed out this valley, which subsequently formed a watercourse only after heavy rain, and afterwards, as its channel was deepened, assumed more the character of a stream.

The subsequent history of this neighbourhood depended largely upon this denudation, for without it there would have been no "natural watercourse," no suitable plots for building operations, and, probably, no discovery of a recent palæolithic "floor."

Since the time when this valley was excavated, however, it has been covered with an average thickness of five feet of brick-earth. This, again, would require a considerable time in which to be formed.

There remains yet one other point. Lying unconformably on the top of this brick-earth is an unstratified deposit, consisting of a hard, tenacious clay, filled with stones which have undergone severe weathering, and containing occasional Palæolithic implements retaining, frequently, little of their former shape. A comparison of this deposit with others which owe their origin to ice leaves no doubt in my mind that this is to be traced to a similar cause, and that it corresponds with the "warp" or trail of the Rev. O. Fisher. Thus summarizing : since the deposit of the last palæolithic "floor," 20 feet of sand and clay have been deposited above it ; that deposit has afterwards been excavated to the depth of 20 feet ; a bed of brick-earth has been formed on top of this excavation, and covered with a deposit of warp or trail ; and, lastly, since the cold conditions that must then have prevailed, the climate has moderated to its present state.

If these are the teachings of so insignificant a stream as our former brook, what must be the grand lessons to be learnt from a careful study of the valleys of our larger rivers ? The science of Geology scarcely numbers a hundred years, yet, probably, it has done more than any other to enlarge our views of time, and to cause us to remember that with the Great Architect of the Universe "a thousand years is but as yesterday."
