

are, however, some meteorites, of which the 'Pallas Iron' may be taken as the type, consisting of a mixture of iron and olivine; and, if these were melted artificially, there can be no doubt, that, the iron being so much more dense would almost immediately sink to the bottom, and the olivine would rise to the top, like the slag in an iron-furnace. This at first sight appears to be strongly opposed to the supposition of igneous fusion; but the author contended that, since the force which would tend to separate the iron and olivine would vary with the force of gravitation, whilst the resistance to separation would be chiefly cohesion almost independent of it, if the fusion had taken place where the force of gravitation was very small, the iron and olivine might have remained fused and mixed together long enough to allow of slow crystallization. Hence he argued that such meteorites furnish us with physical evidence of having been formed where the force of gravitation was much smaller than on our globe, either near the surface of a very small planetary body, or towards the centre of a larger, which has since been broken into fragments.

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NOTICES OF RECENT DISCOVERIES.

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DISCOVERY OF A CRANIUM OF *ELEPHAS PRIMIGENIUS* AT ILFORD IN ESSEX.

OF all fossils that are found, few at the present time excite more interest than the remains of the great extinct Pachyderms, such as the 'Mammoth' (*Elephas primigenius*), the Tichorhine Rhinoceros, and others. Not only have these animals been met with in a frozen state in Siberia, and have there been disinterred with all their soft parts preserved, but their remains are distributed in the superficial gravels, sands, and peat-deposits throughout Europe, Asia, and North America. They are still more important as 'time-marks,' from the fact that they occur both in this country and in France associated with flint implements,—the earliest indications of pre-historic man. Since British Geologists have more carefully examined the latest alluvial deposits of our lakes, rivers, and estuaries, numerous new or long-neglected localities where remains of the Mammoth occur, usually with many other Mammals, have of late been indicated. Among these we may mention Fisherton, near Salisbury, where flint implements also have been found with them by Dr. H. P. Blackmore, in high-level gravel; and these implements were described by Mr. John Evans, F.S.A., F.G.S., in the Quart. Journ. Geol. Soc. vol. xx. p. 188;—the Valley of the Ouse, near Bedford, where also they are associated with flint implements (see a paper by Mr. James Wyatt, *Op. cit.* p. 183),—Lexden, near Colchester, in peat beneath brick-earth (the Rev. O. Fisher, F.G.S., *Op. cit.* vol. xix. p. 393). They have been found also in the Hyæna-den near Wells, Somersetshire, by Mr. W. B. Dawkins, F.G.S. (*Op. cit.* vol. xix. p. 260); in a brick-pit at Churchbridge, Oldbury, near Birmingham (GEOLOGICAL MAGAZINE, No. 1, p. 46); in one of the sand-banks of the Bridgewater Level, and along the coast, in a submerged forest, at St. Audries, Somersetshire (Quart. Journ. Geol. Soc. vol. xx p. 120); in gravel

between Thame and Oxford; at Swathling, near Southampton; at Ilford and Ballingdon, in Essex; at Bridlington, in Yorkshire; at Leighton Buzzard, in Bedfordshire; in brick-earth, beneath gravel, near Newport, Isle of Wight; in a turbarry at Holyhead Harbour; at Crayford, Erith, and Aylesford, in Kent; in an excavation in the Old Kent Road: they have been dredged up by fishermen off Dungeness, Kent, and off Hasboro' on the Norfolk coast; they are also met with at Bracklesham Bay, near Selsey, and in the Forest-bed at Mundesley, Bacton, and Cromer, in Norfolk.\* In all these localities detached remains of the Mammoth have been found, consisting of the more solid portions of the skeleton, such as the lower jaw, and the upper and lower molars, the tusks, the vertebræ, and the leg-bones. Many such examples are to be seen in the extensive collection of Elephant-remains in the British Museum.

But though more or less fragmentary relics are thus met with, it is only within the past month that a nearly perfect cranium, with the tusks, has been for the first time obtained in this country.

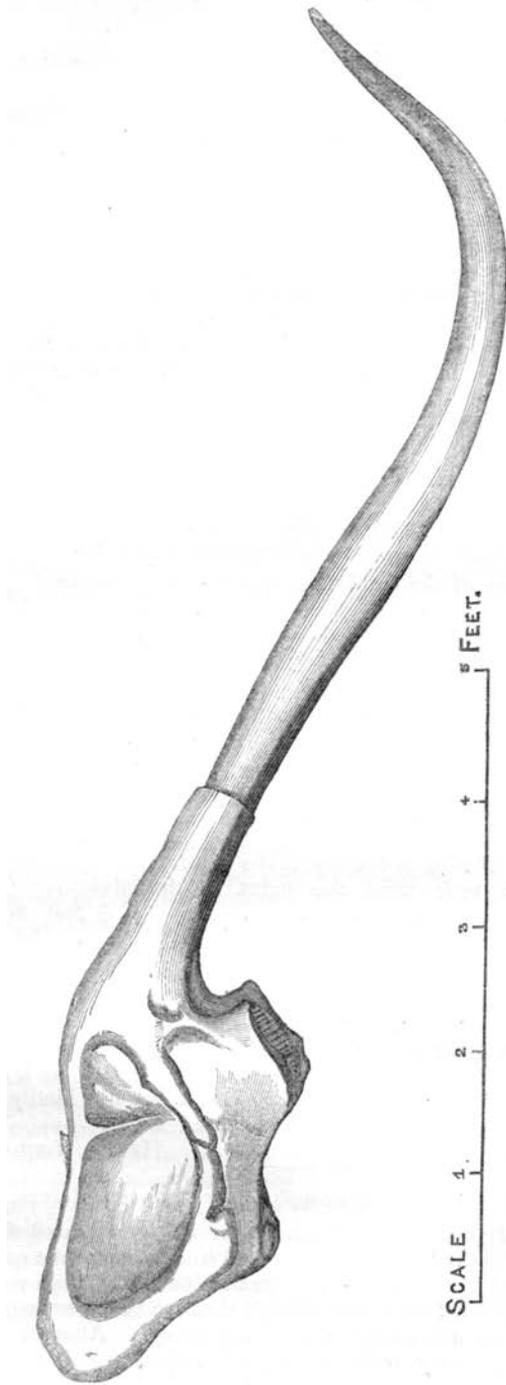
The 'Athenæum' of the 15th October, in referring to the discovery, remarks—'No such perfect skull of the true Mammoth has ever been found in England, nor anything comparable with this important example, so far as we are aware, except it may be the fine fossil Elephant in the Chichester Museum, a specimen of which we have heard, but have not seen.' My colleague, Mr. W. H. Coxe of the Department of Antiquities, having lately visited Chichester, obligingly informs me that this specimen was obtained from near Selsey, and consists of—one tusk 9 feet in length, a detached molar, the upper molars *in situ*, with remains of the cranium much broken; also portions of the pelvis, scapula, and femur, *probably* belonging to the same individual. The remains are labelled *Elephas antiquus* † (an older species); and, as we have no positive evidence to the contrary, we may still consider our Ilford specimen unique.

The Museum authorities are indebted to Antonio Brady, Esq., for the first information of this discovery, and to William Hill, Esq., the proprietor of the Uphall Brickfield, who very liberally allowed them to take possession of it. I had, in company with Mr. W. Davies, of the Geological Department, the opportunity of seeing it *in situ*; and it was entirely owing to his skill and judgment that it was removed from the matrix entire and brought away in safety. The specimen was discovered by the workmen at 15 feet beneath the surface, associated with remains of *Bos primigenius* (?), *Rhinoceros tichorhinus*, and numerous shells of *Cyrena fluminalis* and *Anodon*.

It is evident that the skull belonged to an aged individual, by its having cut its last pair of molars, and by these having been considerably worn. Of the upper molars 18 laminæ remain, 11 of which have been used; several of the front laminæ have been worn entirely away. The entire right tusk had been detached, with a portion of the socket, before it was finally enveloped in the sands and brick-

\* See scattered notices in the 'Geologist' and other periodicals.

† See GEOLOGICAL MAGAZINE, No. 3, p. 140.



Side-view of the Cranium of 'Mammoth' (*Elephas primigenius*). From the Brick-earth at Ilford, Essex.

earth; for it was found upon the same level in the pit, but nearly 20 feet from the cranium to which it belongs.

The cranium itself is nearly entire, the upper portion only of the left side having received an injury from the stroke of a pick or spade when the workmen first came near it.

The tusks measure 8 feet 8 inches from the point to the insertion into the socket (on the outside curve); the length concealed within the socket being more than 18 inches. The flexure of the tusks is very remarkable; but it is impossible in a single representation to convey anything more than a very faint conception of their actual contour. An examination, however, of the specimens from Eschscholtz Bay, upon the top of the wall-case in the VIth Room of the Geological Gallery, may help to elucidate this remarkable feature in the Mammoth.

It will take some months to saturate the entire cranium in gelatine, and much careful work to repair all the tiny loose fragments and complete the development of the specimen.

The measurements we have taken are as follows :—

From the top of the cranium to the end of the socket of the tusk . . . . .	4 feet.
From the frontal bone to the occipital . . . . .	18 inches.
Breadth at the orbital bones . . . . .	23 inches.
Breadth at the condyles, upper end of the zygomatic arch . . . . .	22 inches.
Length of the zygomatic arch . . . . .	10 inches.
Length of the socket of tusk . . . . .	18 inches.
From the occipital condyles to the front of the palate . . . . .	21 inches.
Length of the grinding surface of the upper molars . . . . .	6½ inches.
From the occipital to the top of the cranium . . . . .	20 inches.
Length of tusk from the point to the alveolus (outer curve) . . . . .	8 feet 8 inches.
Circumference at 1 foot from the socket . . . . .	26 inches.
Length of the detached tusk (including 1 foot 10 inches which would have been enclosed in the bony socket) . . . . .	10 feet 6 inches.

A tusk belonging to a very young Elephant was found in the same pit by one of the men; it measures 9 inches in length, and is perfect!

Mr. Prestwich, who visited the spot with me, has kindly added a Note upon the geological position of these remains.

BRITISH MUSEUM.

HENRY WOODWARD.

#### THE BRICK-EARTH WITH ELEPHANT REMAINS AT ILFORD.

THE brick pits of Ilford have been long celebrated for their Mammalian remains. The one best known is about a quarter of a mile beyond Ilford, on the left-hand side of the high-road from London to Ipswich. It was in this pit that the nearly entire skeleton of an Elephant was found half a century ago. Another pit, now closed, was formerly worked on the left-hand side near the top

of the lane leading to Barking. The pit in which the skull of the Mammoth has now been found is situated on the right-hand side, a short distance farther down the same lane. The ground forms a low terrace, bordering the small river Roding, on the one side, and on the other it slopes gradually down to the Thames. The height of the surface of the ground at the pit is about 28 feet above the Thames. (T. H. W. M.)

The lower part of the section at this pit consists of marl and light yellow sands, interstratified with a few thin seams of gravel, the whole resting on London clay. Land and fresh-water Shells are common in places, and include several species of *Unio*, *Anodon*, *Limnea*, *Helix*, &c.; but the species which particularly abound in this pit are *Cyrena fluminalis* and *Helix nemoralis*, the latter often showing its colour-bands. The Mammalian remains are dispersed chiefly in the sand and thin patches of gravel lying on the bottom marl. They are generally very friable, and often very ferruginous. Fine fragments of the antlers of the large variety of *Cervus elophus* have often been found, together with numerous molars of the narrow-tooth variety of *Elephas primigenius*, and bones and teeth of *Rhinoceros*, *Bos*, *Equus*, &c. Last year the tusk of an Elephant, 4 ft. 11 in. long, was found within a few yards of where the skull has since been discovered.

This series of fossiliferous sands, clays, and gravels belongs to the Quaternary low - level valley-gravels of the Thames Valley, and is of late Post-pliocene age. It is here overlain by a variable and irregular bed of non-fossiliferous brown clay, mixed with more or less gravel, and not stratified. This is the character the 'Loess' puts on at this spot, where it is formed of reconstructed London Clay and of gravel derived partly from the Boulder-clay. Farther on to the eastward of Ilford the Loess assumes its finer and better known aspect, and is largely worked as a brick-earth. There a few Shells (chiefly *Succinea*) are found in it, here none.

I do not go into fuller details, as I shall have occasion to give these various sections when treating of the Quaternary beds of the Thames Valley. I trust, however, that the above short notice will suffice to show the geological position of the fine specimen so successfully secured for the British Museum. JOSEPH PRESTWICH.

10, KENT TERRACE, N.W.: Oct. 18, 1864.

Surface-soil, 1 ft. 6 in.

Clay with rolled pebbles and patches of 'race,' 6 ft. 9 in.

Banded, ferruginous, finely-laminated sand, with occasional thin partings of clay and patches of white sand, with rolled pebbles, shells of *Unio*, *Anodon*, and *Cyrena*, and Mammalian Remains. It also contains seams of brick-earth much valued for making white bricks ('facings') of the best quality. A band of this occurs at 7 feet, marked \* in section; and resting on this the remains of *Elephas primigenius* were found. Thickness, 11 ft.

White sand, with angular chalk-flints, occurs at 20 ft. from the surface, but is not worked.

Section at the Uphall Brickfield, Ilford, Essex.

