FLINT

IMPLEMENTS IN THE DRIFT;

BEING AN

ACCOUNT OF THEIR DISCOVERY

ON THE

CONTINENT AND IN ENGLAND.

COMMUNICATED TO THE SOCIETY OF ANTIQUARIES

BY

JOHN EVANS, F.S.A., F.G.S.

LONDON:

PRINTED BY J. B. NICHOLS AND SONS, 25, PARLIAMENT STREET.

1860.

FROM

THE ARCHÆOLOGIA,

VOL. XXXVIII.

FLINT IMPLEMENTS IN THE DRIFT.

THE natural connection between Geology and Archæology has at various times been pointed out by more than one writer[a] on each subject; and it must, indeed, be apparent to all who consider that both sciences treat of time past as compared with time present. The one, indeed, merges by almost imperceptible degrees in the other; while the object of both is, from the examination of ancient remains, to recall into an ideal existence days long since passed away, to trace the conditions of a previous state of things, and, as it were, to repeople the earth with its former inhabitants.

The antiquary, as well as the geologist, has "from a few detached facts to fill up a living picture; so to identify himself with the past as to describe and follow, as though an eye-witness, the changes which have at various periods taken place upon the earth."[b] Geology is, in fact, but an elder brother of archæology, and it is therefore by no means surprising to find that the one may occasionally lend the other brotherly assistance; although it has been generally supposed that the last of the great geological changes took place at a period long antecedent to the appearance of man upon the earth, and that the modifications of the earth's surface of which he has been a witness have been—with the exception of those due directly to volcanic agency—but trifling and immaterial.

The subject of the present paper—the discovery of flint implements wrought by the hand of man, in what are certainly undisturbed beds of gravel, sand, and clay, both on the continent and in this country—tends to show that such an opinion is erroneous; and that in this region of the globe, at least, its surface has undergone far greater vicissitudes since man's creation than has hitherto been imagined. A discovery of this kind must of necessity be of great interest both to the geologist, as affording an approximate date for the formation

[a] See especially an article by the late Dr. Mantell in the Archæological Journal, vol. vii. p. 327.

[b] Prestwich, "The Ground beneath us," p. 6.

of these superficial beds of drift, and as exemplifying the changes which the *fauna* of this region has undergone since man appeared among its occupants; and also to the antiquary, as furnishing the earliest relics of the human race with which he can hope to become acquainted—relics of tribes of apparently so remote a period, that—

> Antiquity appears to have begun
> Long after their primeval race was run.

But beyond the limited circle of those peculiarly interested in geology or archæology, this discovery will claim the especial attention of all who, whether on ethnological, philological, or theological grounds, are interested in the great question of the antiquity of man upon the earth.

It is, however, mainly from the antiquarian point of view that I intend now to regard it, though, for the better elucidation of the circumstances under which these implements have been found, it will be necessary to enter into various geological details.

It is now some years since a distinguished French antiquary, M. Boucher de Perthes, in his work, entitled, "Antiquités Celtiques et Antédiluviennes,"[a] called attention to the discovery of flint implements fashioned by the hand of man in the pits worked for sand and gravel in the neighbourhood of Abbeville, in such positions, and at such a depth below the surface of the ground, as to force upon him the conclusion that they were found in the very spots in which they had been deposited at the period of the formation of the beds containing them. The announcement by M. Boucher de Perthes, of his having discovered these flint implements under such remarkable circumstances was, however, accompanied by an account of the finding of many other forms of flint of a much more questionable character, and by the enunciation of theories which by many may have been considered as founded upon too small a basis of ascertained facts. It is probably owing to this cause that, neither in France nor in this country, did the less disputable and now completely substantiated discoveries of M. de Perthes receive from men of science in former years the attention to which they were justly entitled.

The question whether man had or had not coexisted with the extinct pachydermatous and other mammals, whose bones are so frequently found in the more recent geological deposits, had indeed already more than once been brought under

[a] Paris, 8vo. vol. i. 1847, (printed in 1844-6,) vol. ii. 1857.

the notice of scientific inquirers by the discovery of flint flakes and implements and fragments of rude pottery, in conjunction with the remains of these animals in several ossiferous caverns both in England and on the continent.[a] Among the former may be mentioned Kent's Cavern near Torquay, and among the latter those of Bize, of Pondres, and Souvignargues, and those on the banks of the Meuse, near Liège, explored by Dr. Schmerling, where human bones were also found, apparently washed in at the same time as the bones of the extinct quadrupeds.[b] In some ossiferous caves in the Brazils similar discoveries had also been made by Dr. Lund and M. Claussen, and, from the condition and situation of the human remains, Dr. Lund concluded that they had belonged to an ancient tribe that was coeval with some of the extinct mammalia.

But it was always felt that there was a degree of uncertainty attaching to the evidence derived from the deposits in caverns, owing to the possibility of the relics of two or more entirely distinct periods becoming intermixed in such localities, either by the action of water or by the operations of the primitive human occupants of the caves, which prevented any judgment being firmly founded upon it.

Attention has however been lately again called to this question by the fact, that, in the excavations which have been carried on under the auspices of the Royal and Geological Societies in the cave at Brixham in Devonshire, worked flints, apparently arrow-heads and spear-heads, have been discovered in juxtaposition with the bones of the *Rhinoceros tichorhinus*, *Ursus spelæus*, *Hyæna spelæa*, and other extinct animals.[c] One flint implement in particular was met with immediately beneath a fine antler of a reindeer and a bone of the cave bear, which were imbedded in the superficial stalagmite in the middle of the cave.

In addition to this, investigations have been made by Dr. H. Falconer in the Grotta di Maccagnone near Palermo, where, imbedded in a calcareous breccia beneath the stalactitic covering of the roof, he observed "coprolites of the Hyæna, splinters of bone, teeth of ruminants and the genus *Equus*, together with comminuted fragments of shells, bits of carbon, specks of argillaceous matter resembling burnt clay, and fragments of shaped siliceous objects." These objects in flint closely resemble the obsidian knives from Mexico, and the flint knives or flakes so frequently found in all parts of the world; and it is to be remarked that, though they were in considerable abundance in the breccia, any amorphous fragments of

[a] See Lyell's Principles of Geology, ed. 1853, pp. 737, 738, &c.

[b] Mantell's Petrifactions and their Teachings, 1851, p. 481.

[c] Proceedings of Geological Society, June 22, 1859.

flint were comparatively rare, and no pebbles or blocks occurred either within or without the cave; so that there could be but little doubt of the flint flakes being of human workmanship.[a]

The question of the co-existence of man with the extinct animals of the Drift period being thus revived, Mr. Joseph Prestwich, F.R.S., a distinguished geologist, who for years has devoted his principal attention to the more recent geological formations, determined to proceed to Abbeville and investigate on the spot the discoveries of M. Boucher de Perthes, and invited me and several other Fellows of the Geological Society to accompany him. The others were unfortunately prevented from doing so; but at the end of April, 1859, I joined Mr. Prestwich at Abbeville, and with him inspected the collections of M. de Perthes (to whose courtesy and hospitality we were largely indebted), and also visited in his company several of the pits worked for gravel and sand in the neighbourhood of both Abbeville and Amiens, in which the flints in question were asserted to have been found.

Both these towns are situated upon the upper chalk, which is, however, overlaid, as is frequently the case, by beds of drift of a much later period. I need hardly say that *drift* is the term applied by geologists to those superficial deposits of sands, gravels, clays, and loams which we find to have been spread out over the older rocks in many districts by the driving action of currents of water, whether salt or fresh, or by the drifting action of ice. Though all belonging to a late geological period (the newer Pleiocene, or Pleistocene), these beds of drift are of various and distinct ages, and may be said to range from a point of time antecedent to the Glacial period, when nearly the whole of Britain was submerged beneath an ocean of arctic temperature, to the time when the surface of the earth received its present configuration, and even down to the present day; for the alluvium of existing rivers may be considered equivalent to the fresh-water drift of an earlier age.

The drift-beds occurring in different localities in the neighbourhood of Abbeville and Amiens, do not appear to have been all deposited at the same time, but to be of at least two distinct ages; the series on the lower level being distinguished by the occurrence within it of the bones and teeth of the *Elephas primigenius*, or Siberian mammoth, and of other extinct animals. These mammaliferous beds of sand, loam, and gravel extend over a considerable tract of country on the slopes of the valley of the Somme, and are worked in several localities for the repair of the roads and for building purposes.

[a] Quarterly Journal of the Geological Society, vol. xvi. p. 104.

The most notable places in the neighbourhood of Abbeville, where the gravel has been extensively excavated, are at the spot where is now the Champ de Mars, the pit near the Moulin Quignon, and that near the Porte St.Gilles; but the beds of gravel are spread over a large area, and are said to be continuous from the Moulin Quignon on the south-east of the town, and about ninety feet above the level of the river Somme, to the suburb of Menchecourt on the north-west of Abbeville, where the beds assume a much more arenaceous character, and where sand has been dug in immense quantities at a level but little more than twenty feet above that of the Somme.

At St. Roch, a suburb of Amiens, the deposit is also at a low level, like that at Menchecourt, and at both places large quantities of teeth and bones of the *Elephas primigenius*, *Rhinoceros tichorhinus*, and other extinct animals, have been found.

In another locality, on the opposite side of Amiens to St. Roch, at the pits near the seminary of St. Acheul, the drift occurs at a higher level, viz. about ninety feet above the river Somme at that part of its course, or about one hundred and sixty feet above the sea. The depth of the beds, which consist of brick earth, sand, and gravel, arranged in layers of variable thickness, but with some approach to stratification, is here from twenty to twenty-five feet.

The following section was taken by Mr. Prestwich,[a] showing the beds in their descending order :—

1. Brown brick-earth, loam, and clay, with an irregular bed of flint gravel near its base. No organic remains. . . . . 10 to 15 feet.

(Divisional plane between 1 and 2, very uneven and indented.)

2. Whitish marl and quartzose sand, with small chalk grit. Land and fresh-water shells (*Lymnæa*, *Succinea*, *Helix*, *Bithinia*, *Planorbis*, *Pupa*, *Pisidium*, and *Ancylus*, all of recent species,) are common; mammalian bones and teeth are occasionally found. . . 2 to 8 feet.
3. Coarse subangular gravel, white, with irregular ochreous and ferruginous seams, and with tertiary flint pebbles and sandstone blocks. Remains of shells similar to those last mentioned in patches of sand; teeth and bones of the elephant, and of a species of horse, ox, and deer, generally in the lower part of the bed. It reposes on an uneven surface of chalk. . . . . 6 to 12 feet.

[a] Proceedings of the Royal Society, May 26, 1859.

One of the pits occupies the site of a Gallo-Roman cemetery, which appears to have continued in use for some centuries: large stone coffins, and the iron cramps of those in wood, are of frequent occurrence, but personal ornaments are rarely met with. Roman coins are found from time to time, some as early as the reign of Claudius, and I purchased from one of the workmen a second-brass coin of Magnentius, with the letters AMB in the exergue, showing that it had been struck at AMBIANVM, the name given in late Roman times to the neighbouring town of Amiens, which by the Gauls was known as SAMAROBRIVA.

At the Moulin Quignon near Abbeville, which is near the summit of a hill of no great elevation, the beds of drift are more ochreous and more purely gravelly in their nature than at St. Acheul, and their thickness is about ten or twelve feet. In this case also they rest upon an irregular surface of chalk; and in the lower part of the beds, at but a slight distance above the chalk, occasionally accompanied by the bones and teeth of the Siberian mammoth and other animals, flints shaped by the hand of man are alleged to have been found. At Menchecourt, the beds of sand and loam attain a thickness of from twenty to thirty feet; and in a layer of flints at their base, among which are found shells, land and fresh water as well as marine, have also been discovered a number of mammalian remains, together with flints showing traces of the hand of man upon them.

The following is the section of the pit at Menchecourt, as taken by Mr. Prestwich:—

1. A mass of brown sandy clay, with angular fragments of flints and chalk rubble. No organic remains. Base very irregular and indented into bed No. 2. . . . . 2 to 12 feet.
2. A light-coloured sandy clay (*sable à plaquer* of the workmen), analogous to the loess, containing land shells (*Pupa, Helix, Clausilia,*) of recent species . . . . . 8 to 25 feet.
3. White sand (*sable aigre*) with one to two feet of subangular flint gravel at base. This bed abounds in land and fresh-water shells of recent species of the genera *Helix, Succinea, Cyclas, Pisidium, Valvata, Bithinia,* and *Planorbis,* together with the marine *Buccinum undatum, Cardium edule, Littorina rudis, Tellina solidula,* and *Purpura lapillus.* With them have also been found the *Cyrena consobrina,* and numerous mammalian remains. . . 2 to 6 feet.
4. Light-coloured sandy marl, in places very hard, with *Helix, Zonites, Succinea,* and *Pupa.* Not traversed. . . . . 3 feet.

The flint implements are said also to occur occasionally in the beds of sandy clay above the white sand, but the pit has of late years been but little worked, and in consequence the implements but rarely found. In the section of the Menchecourt beds given by M. Boucher de Perthes,[a] the place where two of the worked flints were found is shown at about thirty feet from the surface, and another was discovered at about fourteen feet; they are, however, said to have been most commonly met with in the lower beds. At the Moulin Quignon, the Porte St. Gilles, and at other places in the *arrondissement* of Abbeville, as for instance at Yonval, the gravel-pit at Mareuil, the sand-pit at Drucat and at St. Riquier, similar flint implements are stated by M. de Perthes[b] to have been found under similar circumstances; but these last-mentioned places I have not visited.

The whole of the drift which I have described is of fluviatile origin; and in the beds of sand and clay, land and fresh water shells of existing species are frequently found in abundance, though at Menchecourt, as has been already mentioned, they are mixed with others of marine origin, which gives more of an estuarine character to the deposit at that place.

I think that it is by no means impossible that these arenaceous beds at Menchecourt may eventually be proved to be rather subsequent in date to the higher and more gravelly beds at the Champ de Mars, and Moulin Quignon, on the opposite side of Abbeville; their elevation above the river Somme is not much more than from twenty to thirty feet so that under ordinary circumstances it might be considered by some, that they are due to its action under a state of things not very materially different from that at present existing, did not the mammalian remains, found at both Menchecourt and St. Roch, point to an entirely different *fauna* from that of the present day. In any case, as it is but reasonable to suppose the drift deposits on the higher slopes of the valley to be at least coeval with those at the bottom, even if not of greater antiquity, the mammalian remains of the lower deposits become of extreme importance, as a means of ascertaining the age of those at a higher level, from which precisely similar remains may be absent. This is, however, a purely geological question, into which I need not at present enter.

Mr. Prestwich, in the able Memoir upon this subject which he has communicated to the Royal Society, has gone so fully into the geological features of this part of the valley of the Somme, that any further details are needless, and I shall therefore content myself with this very general sketch of the position of the drift at Abbeville and Amiens, and refer those who desire further information to

[a] Ant. Celt. et Antédiluviennes, vol. i. p. 234.

[b] Ibid. vol. ii. p. 118.

the paper by Mr. Prestwich in the Philosophical Transactions. I will merely add, that he considers that the gravel at St. Acheul closely resembles that on some parts of the Sussex coast, while the beds at the Moulin Quignon are nearly analogous to those near the East Croydon Station, and in many parts of the valley of the Thames.

Of the animals now for the most part extinct, and most of which have hitherto been regarded as having ceased to exist before the appearance of man upon the earth, and the bones of which have been discovered in the drift at Menchecourt, the following may be mentioned on the authority of M. de Perthes' "Antiquités Celtiques et Antédiluviennes," and M. Buteux' "Esquisse Géologique du Département de la Somme :"—

Elephas primigenius (Siberian mammoth).
Rhinoceros tichorhinus.
Ursus spelæus.
Felis spelæa ?
Hyæna spelæa.
Cervus tarandus priscus.
Cervus Somonensis.
Bos primigenius.
Equus fossilis ?

The mammalian remains from St. Acheul, and other places where bones have been found in the drift of the valley of the Somme, represent the same group, though confined to a smaller number of different species in any one locality. At St. Roch the teeth of the hippopotamus have also been recently found. The remains of the same group of animals have been met with in the cave at Brixham, and in that called Kent's Cavern, near Torquay, to which I have already alluded, and are constantly brought to light in the superficial freshwater drift which abounds in many parts of this country. The rhinoceros and mammoth belong to the same species as those whose frozen bodies, still retaining their flesh, skin, and hair, have been discovered beneath the ice-bound soil of Siberia. Both species appear to have been adapted for a far colder climate than their present congeners.

Let us now turn our attention to the flint implements alleged to have been discovered in the drift in company with the remains of what has usually been regarded an older world; and consider, first, how far in material, form, and workmanship they agree with or differ from the stone weapons and implements so commonly found throughout Europe; and then enter upon an examination of the

evidence of the circumstances of their finding, and the means at our command for ascertaining their degree of antiquity.

That they really are implements fashioned by the hand of man, a single glance at a collection of them placed side by side, so as to show the analogy of form of the various specimens, would, I think, be sufficient to convince even the most sceptical. There is a uniformity of shape, a correctness of outline, and a sharpness about the cutting edges and points, which cannot be due to anything but design;[a] so that I need not stay to combat the opinion that might otherwise possibly have arisen that the weapon-like shapes of the flints were due to some natural configuration, or arose from some inherent tendency to a peculiar form of fracture. A glance at the Plates will suffice to satisfy upon this point those who have not had an opportunity of examining the implements themselves.

The material of which they have been formed, flint derived from the chalk, is the same as has been employed for the manufacture of cutting implements by uncivilized man in all ages, in countries where flint is to be found. Its hardness, and the readiness with which it may be fractured so as to present a cutting edge, have made it to be much in request among savage tribes for this purpose; and in some instances[b] flint appears to have been brought from a distance when not found upon the spot. There is therefore nothing to distinguish these implements from the drift, as far as material is concerned, from those which have been called celts, except, perhaps, that the flints have not been selected with such care, nor are they so free from flaws as those from which the ordinary flint weapons of the Stone period were fashioned. There is, however, this to be remarked, that the aboriginal tribes of the Stone period made use of other stones besides flint, such as greenstone, syenite, porphyry, clay-slate, jade, &c., whereas the weapons from the drift are, as far as has hitherto been ascertained, exclusively of flint. As to form, the implements from the drift may, for convenience sake, be classed under three heads, though there is so much variety among them that the classes, especially the second and third, may be said to blend or run one into the other. The classification I propose is as follows—

[a] Since the publication of the report of this Paper in the Athenæum, there has been some correspondence in that and other journals upon the question whether these implements were of human or natural origin, which called forth the following expression of opinion from Professor Ramsay, a thoroughly competent judge in such a matter: "For more than twenty years, like others of my craft, I have daily handled stones, whether fashioned by nature or art, and the flint hatchets of Amiens and Abbeville seem to me as clearly works of art as any Sheffield whittle."—(Athæneum, July 16, 1859.)

[b] See Wilson's Prehistoric Annals of Scotland, p. 121.

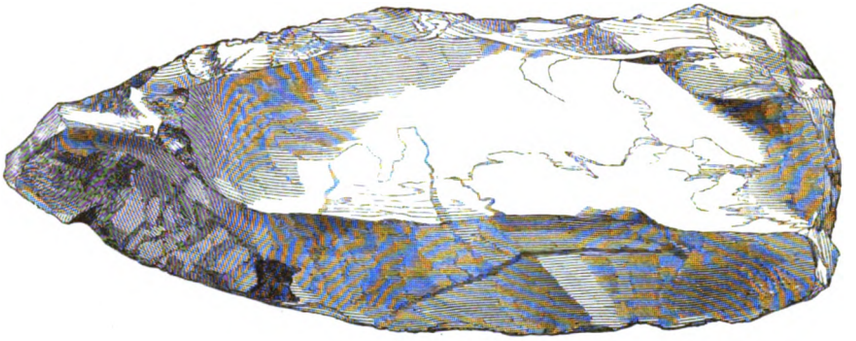
1. Flint flakes, apparently intended for arrow-heads or knives.
2. Pointed weapons, some probably lance or spear-heads.
3. Oval or almond-shaped implements, presenting a cutting edge all round.

In M. de Perthes' museum, and in the engravings of his "Antiquités Celtiques et Antédiluviennes," many other forms of what he considers to be implements may be seen, but upon them the traces of the hand of man are to my mind less certain in character. The flints resembling in form various animals, birds, and other objects, must I think be regarded as the effect of accidental concretion and of the peculiar colouring and fracture of flint, rather than as designedly fashioned. This is, however, a question into which I need not enter, as it in no way affects that now before us. Suffice it that there exists an abundance of implements found in the drift which are evidently the work of the hand of man, and that their formation cannot possibly be regarded as the effect of accident or the result of natural causes. When once their degree of antiquity has been satisfactorily proved, it will be a matter for further investigation whether there are not other traces to be found of the race of men who fashioned these implements, besides the implements themselves.

These objects I must now consider in the order proposed, with reference to their analogies and differences in form, when compared with those of what, for convenience sake, I will call the Stone period.

There is a considerable resemblance between the flint flakes apparently intended for arrow-heads and knives (the first of the classes into which I have divided the implements), and those which when found in this country, or on the continent, are regarded as belonging to a period but slightly prehistoric. The fact is, that wherever flint is used as a material from which implements are fashioned, many of the flakes or splinters arising from the chipping of the flint, are certain to present sharp points or cutting edges, which by a race of men living principally by the chase are equally certain to be regarded as fitting points for their darts or arrows, or as useful for cutting purposes: they are so readily formed, and are so well adapted for such uses without any further fashioning, that they have been employed in all ages just as struck from off the flint. The very simplicity of their form will, however, prevent those fabricated at the earliest period from being distinguishable from those made at the present day, provided no change has taken place in the surface of the flint by long exposure to some chemical influence. As also they are produced most frequently by a single blow, it is at all times difficult, among a mass of flints, to distinguish those flakes formed accidentally by natural causes, from those which have been made by the hand of man; an experienced eye will

indeed arrive at an approximately correct judgment, but from the causes I have mentioned, mere flakes of flint, however analogous to what we know to have been made by human art, can never be accepted as conclusive evidence of the work of man, unless found in sufficient quantities, or under such circumstances, as to prove design in their formation, by their number or position. Flint flakes apparently intended for arrow-heads and knives have been found in the sands and gravel near Abbeville, and some were dug out of the sand at Menchecourt, in the presence of Mr. Prestwich, quite at the bottom of the beds of sand. One from this locality is here engraved:—



Flint Flake from Menchecourt, Abbeville (full size).

Occasionally they are of larger size, and have been chipped into shape at the point, so as nearly to resemble the implements of the next class.

An argument may be derived in favour of the majority of these arrow-head-shaped flakes having been designedly made, not only from their similarity in form one to another, but also because the existence of more carefully fashioned flint implements almost necessarily implies the formation and use of these simpler weapons by the same race of men who were skilful enough to chip out the more difficult forms. But though probably the work of man, and though closely resembling the flakes of flint which have been considered as affording evidence of man's existence when found in ossiferous caverns, this class of implements is not of much importance in the present branch of our inquiry; because, granting them to be of human work and not the result of accident, there is little by which to distinguish them from similar implements of more recent date.

The case is different with the implements of the second class, those analogous in form to spear or lance heads. Of these there are two varieties, the one with a

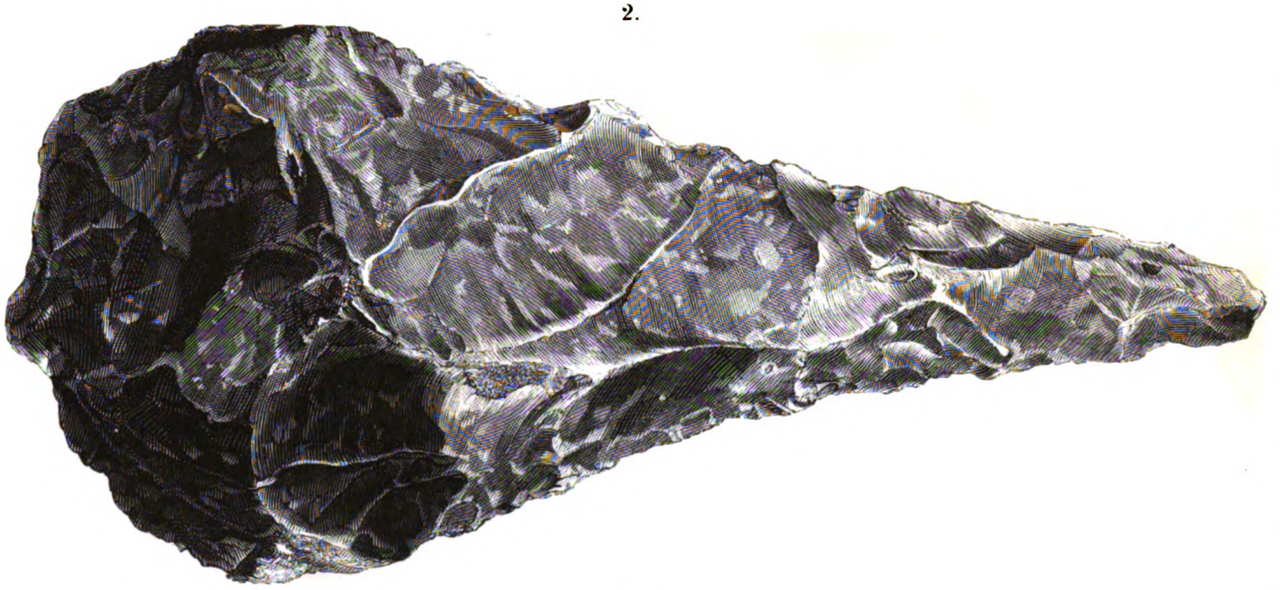
rounded cutting point, its general outline presenting a sort of parabolic curve, Pl. I. No. 1. The other acutely pointed, with the sides curved slightly inwards, Pl. I. No. 2. These have received from the workmen of St. Acheul the name of *langues de chat*, from their fancied resemblance in form to a cat's tongue. The sides of both kinds are brought to an edge by chipping, but are not so sharp as the point, and altogether these weapons seem better adapted for piercing than for cutting. In length, they vary from about four inches to eight or even nine inches. Both shapes are generally more convex on one side than the other, the convexity in some cases almost amounting to a ridge; they are usually truncated at the base, and not unfrequently at that end show a portion of the original surface of the flint; in some specimens the butt-end is left very thick, as if to add impetus to any blow given with the implement. The remarkable feature about them is, their being adapted only to cut or pierce at the pointed end; whereas in the ordinary form of stone hatchet or celt, the cutting edge is almost without exception at the broad end, while the more pointed end seems intended for insertion into the handle or socket, and the sides are generally rounded or flat, and not sharp.

These spear-shaped weapons from the drift are, on the contrary, not at all adapted for insertion into a socket, but are better calculated to be tied to a shaft or handle, with a stop or bracket behind their truncated end. Many of them, indeed, seem to have been intended for use without any handle at all, the rounded end of the flints from which they were formed having been left unchipped, and presenting a sort of natural handle. It is nearly useless to speculate on the purposes to which they were applied; but attached to poles they would prove formidable weapons for encounter with man or the larger animals, either in close conflict or thrown from a distance as darts. It has been suggested by M. de Perthes, that some of them may have been used merely as wedges for splitting wood, or, again, they may have been employed in grubbing for esculent roots, or tilling the ground, assuming that the race who formed them was sufficiently advanced in civilisation. This much I think may be said of them with certainty, that they are not analogous in form with any of the ordinary implements of the so-called Stone period.

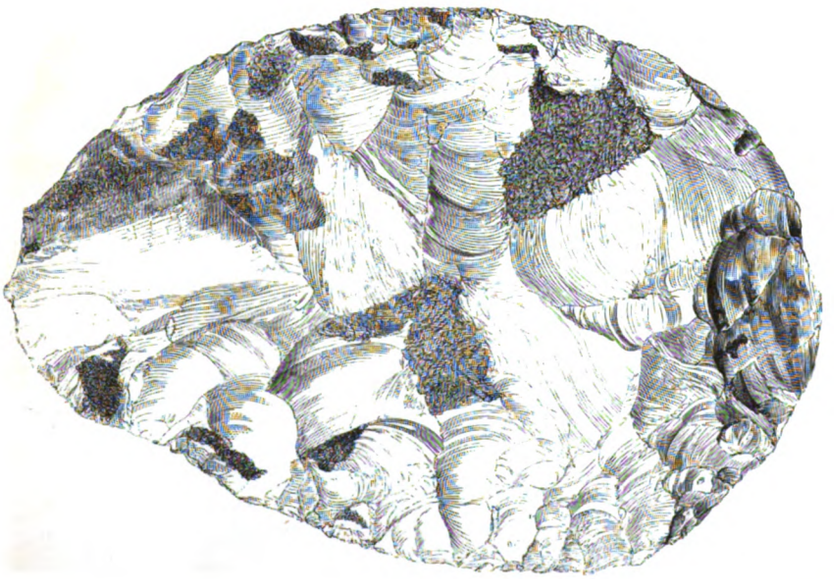
The same remark holds good with regard to the third class into which I have divided these implements, viz. those with a cutting edge all round, Plate II. No. 3. In general contour they are usually oval, with one end more sharply curved than the other, and occasionally coming to a sharp point, but there is a considerable variety in their form, arising probably from defects in the flints from which they were shaped; the ruling idea is, however, that of the oval, more or less pointed.

1.

2.



3.



FLINT IMPLEMENTS FROM THE VALLEY OF THE SOMME.

(*Full size.*)

They are generally almost equally convex on the two sides, and in length vary from two to eight or nine inches, though for the most part only about four or five inches long. The implements of this form appear to be most abundant in the neighbourhood of Abbeville, where that engraved was found; while those of the spear-shape prevail near Amiens, where both the specimens shown in the Plate were procured.

It is to be remarked that among the implements discovered in the cavern called Kent's Hole, near Torquay, were some identical in form with those of the oval type from Abbeville.

As before observed, in character they do not resemble any of the ordinary stone implements with which I am acquainted, though I believe some few of these also present a cutting edge all round,[a] but at the same time are much thinner, and more triangular than oval or almond-shaped in their form.

The implements most analogous in their oval form to those now under discussion, are some of those found in the mounds or barrows of the valley of the Mississippi, in several of which enormous numbers of lance heads and arrow heads have been discovered. In one of these mounds, within an earthwork on the north fork of Point Creek, there were found, arranged in an orderly manner in layers, some thousands of discs chipped out of hornstone, "some nearly round, others in the form of spear heads; they were of various sizes, but for the most part about six inches long by four wide, and three quarters of an inch or an inch in thickness." From the account given at p. 214, vol. i. of the Smithsonian Contributions to Knowledge, it would appear that these weapons were merely roughly blocked out, as if to be afterwards worked into more finished forms, of which many specimens are found: but in the rough-hewn implements shown by the woodcuts in the abovementioned work, there is a very close resemblance to some of the Abbeville forms, though the edges are more jagged.

As to the use which this class of flint implements from the drift was originally intended to fulfil, it is hard to speculate. The workmen who find them usually consider them to have been sling-stones, and such some of the smaller sizes may possibly have been, whether propelled from an ordinary sling or from the end of a cleft stick; many, however, seem to be too large for such a purpose, and were more probably intended for axes cutting at either end, with the handle securely bound round the middle of the stone, and if so there would be a reason why it might be desirable to have one end more pointed than the other, so that one instrument could be applied to two kinds of work. M. de Perthes has suggested, that

[a] Catalogue of the Museum of the Archæological Institute at Edinburgh, in 1856, p. 7.

they might also have been mounted as hatchets by insertion in a socket scooped out in a handle.

But all this is conjecture. In point of workmanship, I think it will be perceived that the weapons or implements now under consideration differ considerably from those of the so-called Stone period: of these latter, by far the greater number (with the exception of arrow heads) are more or less ground, and even polished; some with the utmost care all over, but nearly all ground sufficiently to ensure a clean cutting edge. The implements from the drift are, on the contrary, so far as has been hitherto observed, never ground, but their edges left in the rough state in which they have been chipped from the flint.

The manner in which they have been fashioned appears to have been by blows from a rounded pebble mounted as a hammer, administered directly upon the edge of the implements, so as to strike off flakes on either side. At all events I have by this means reproduced some of the forms in flint, and the edges of the implements thus made present precisely the same character of fracture as those from the drift.

In instances where (either from having been left accidentally unfinished, or from never having been intended to be ground,) the weapons of the Stone period have remained in their rough-hewn state, it will be observed that, with very few exceptions, they are chipped out with a greater nicety and accuracy, and with a nearer approach to an even surface, than those from the drift, and, rude as they may appear, point to a higher degree of civilisation than that of the race of men by whom these primitive weapons or implements were formed.

There is indeed a class of flint implements, which are stated to have been found in the peat deposits on the banks of the Somme, which in point of rudeness of workmanship appear to equal these more ancient forms from the beds of drift, though for the most part essentially different in shape; I have not, however, given sufficient attention to them to speak with confidence as to their precise character, and will not complicate the question by making further allusion to them.

I think that enough has been said to make it apparent to all who have made a study of the stone implements usually found (those of the so-called Stone period) that the spear-heads and sling stones, or axes, or by whatever name they are to be called, which are now brought under their notice, have but little in common with the types already well known; they will therefore be prepared to receive with less distrust the evidence I shall adduce, that they are found under circumstances which show that, in all probability, the race of men who fashioned them must have passed away long before this portion of the earth was occupied by the

primitive tribes by whom the more polished forms of stone weapons were fabricated, in what we have hitherto regarded as remote antiquity.

I come, therefore, to the important question, how is it proved that these implements are actually found in beds of really undisturbed clay, gravel, or sand, and have not been introduced or buried at some period subsequent to the formation of the inclosing beds? The evidence is of two kinds, direct and circumstantial; and this I will now examine, giving the direct evidence, as being the more valuable, precedence. We have then, in the first place, that of M. Boucher de Perthes, the original discoverer of this class of implements, who, through evil report and good report, has delivered his constant testimony to the fact of their being discovered, in nearly all cases, in undisturbed drift, and usually at a considerable depth below the surface. That some few may have been discovered in ground that has been moved, or near the surface, in no way militates against the fact that the majority of them have been found in undisturbed soil. It only shows, what might have been expected, that the soil containing these implements may have been moved without their having attracted sufficient attention for them to have been picked out from it, or, in cases where they have occasionally been found in other and more recent soils, that they had been at some time picked out from the gravel, sand, or clay, and afterwards thrown away. For M. Boucher de Perthes' detailed account of his discoveries, I must refer the reader to his work already cited.

Scattered through its pages are notices giving full particulars of the finding of numbers of the weapons, and in M. de Perthes' museum are innumerable specimens, with the nature of their matrix of soil and the depth at which they were found, (many of them under his own eyes,) marked upon them. *Procès-verbaux* of many of the discoveries were taken at the time, and some are printed in the volumes referred to.[a] Nothing could be stronger than M. de Perthes' verbal assurances to Mr. Prestwich and myself of the finding of these implements in undisturbed gravels and sands, and occasionally clay, sometimes at depths of from twenty feet to thirty feet below the surface, and usually in beds at but a slight distance above the chalk. The testimony of other French geologists and antiquaries may also be adduced both as to the geological character of the beds and the fact of the flint implements being incorporated in them. M. Douchet, M.D.,[b] of Amiens, appears to have been the first discoverer of them at St. Acheul, and he addressed a memoir to the French Institute, expressing his firm conviction upon the subject. The printed testimony of M. de Massy and others is also brought forward by M. Boucher de Perthes,[c] in the book above cited; but the most import-

[a] Antiquités Celtiques et Antédiluviennes, vol. i. p. 263. [b] Ibid. vol. ii. p. 430. [c] Ibid. vol. ii. p. 459.

ant evidence is that of Dr. Rigollot, who received the distinction of being elected a Corresponding Member of the Institute but shortly before his death in 1855. In his "Mémoire sur des Instruments en Silex trouvés à St. Acheul, près Amiens," published in 1855, he enters fully into the question of the nature of the drift and the part of the beds in which the worked flints are found, and states distinctly that, after the most careful examination, he came to the conclusion that these implements are at St. Acheul found exclusively in the true drift, which incloses the remains of the extinct mammals, and at a depth of ten feet and more from the surface.

Of the accuracy of all these concurrent statements the experience of Mr. Prestwich and myself fully convinced us, and we had, moreover, the opportunity of seeing one at least of the worked flints *in situ*, at the gravel-pit near St. Acheul. Mr. Prestwich, who had been there a day or two previously, had left instructions with the workmen that in case of their discovering one of these "*langues de chat*" imbedded in the gravel it was to be left untouched, and he was at once to be apprized. The announcement of such a discovery was accordingly telegraphed to us at Abbeville, and the following morning we proceeded to Amiens, where we were joined by MM. Dufour and Garnier, the President and Secretary of the Society of Antiquaries of Picardy, who accompanied us to the pit near St. Acheul. There, at a depth of eleven feet from the surface, and about four feet six inches from the bottom of the pit, in the bank or wall of gravel, was an implement of the second class that I have described, its narrower edge projecting, and itself for the greater part dovetailed into the gravel. It was lying in a horizontal position, and the gravel around it hard and compact, and in such a condition that it was quite impossible that the implement could have been inserted into it by the workmen for the sake of reward. The beds above it consisting of rudely stratified gravel, sand, and clay, presenting a vertical face, showed not the slightest traces of having been disturbed, with the exception of the twelve or eighteen inches of surface soil, and the lines of the division between the beds were entirely unbroken; so much so that their different characters can be recognised on a photograph of the section taken for Mr. Prestwich. Besides the *langue de chat* thus seen *in situ*, the workmen in the pit supplied us with a considerable number of these implements, as well as with some of the oval form, and gratefully received a trifling recompense in return. They shewed us the spots where they said several of them had been found (two of them that morning, at the depth of fifteen and nineteen feet respectively from the surface), and there appeared no reason to doubt their assertions. I may add, that since our return

Mr. Prestwich, in company with some other geologists, has revisited Amiens, and that one of the party, Mr. J. W. Flower, uncovered and exhumed with his own hands a most perfectly worked instrument of the lance-head form, at a depth of twenty feet from the surface. The party brought away, as the result of their one day's visit, upwards of thirty of the implements, which had been collected by the workmen.[a] From the manner in which these pits are worked, there is always a "head," or "face," of earth, which shows an excellent section of the soil; and any places where at any former time pits have been sunk or excavations made, (as, for instance, in the ancient cemetery of St. Acheul,) are, owing to the rough stratification of the beds, readily discovered. The workmen in the pits, both at Amiens and Abbeville, gave concurrent testimony of the usually undisturbed nature of the soil, and to the fact of the flint implements being generally found in the lower part of the beds, where also the fossil bones and teeth are principally discovered.

It may be observed that in the beds of brick-earth and sand overlying the gravel at St. Acheul are numerous freshwater shells, some of them of so fragile a character that they must have been destroyed had the soil at any time been moved.

The fossil bones are of comparatively rare occurrence in the gravel pits, but the number of the flint implements that has been found is almost beyond belief. Dr. Rigollot states that in the pits of St. Acheul, between August and December 1854, above four hundred specimens were obtained; and now, whenever the gravel is being extensively dug, hardly a day passes without one or two being found. This very abundance, for which however it is difficult to account, affords a secondary proof of the undisturbed nature of the drift; for how could such numbers of flint weapons have been introduced at any period subsequent to the formation of the drift, and yet leave no evident traces of the manner in which they were buried? They appear, too, to be detached and scattered through the mass of gravel, with no indications of their having been buried there with any design, but rather as if their positions were the result of the merest accident. Another remarkable piece of circumstantial evidence, is the discovery of implements and weapons of similar form under precisely similar circumstances, but by different persons, at Abbeville and Amiens, some thirty miles apart; though the discoveries are not limited to these two spots, but have also been subsequently made in various localities in that district, where there have been excavations in the drift. It is, however, only in

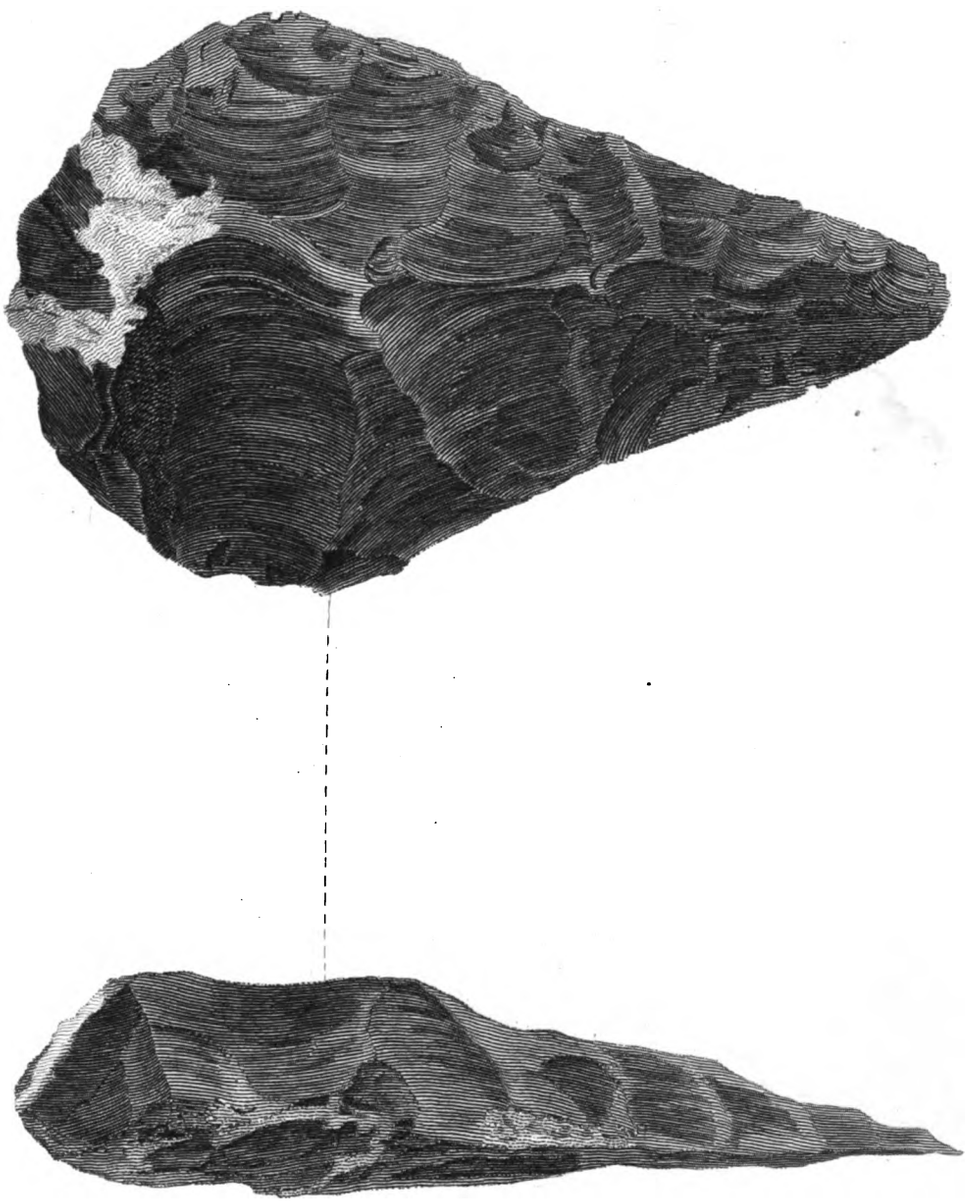
[a] See Letter in the Times, Nov. 18, 1859; and Quarterly Journal of the Geological Society, vol. xvi. p. 190.

such excavations that they have been found; which would not have been the case had their presence in the gravel been owing to their interment by human agency; for supposing it possible that some unknown race of men had been seized with a desire to bury their implements at a depth of from ten to twenty feet below the surface, they would hardly have selected for this purpose the hardest and most impracticable soil in their neighbourhood, a gravel so hard and compact as to require the use of a pickaxe to move it.

In the cultivated soil and made ground above, and at much less depth from the surface, ground and polished instruments, evidently belonging to the so-called Stone period, have indeed been found; but this again only tends to prove that the shaped flints discovered at a much greater depth belonged to some other race of men, and inasmuch as they certainly are not the work of a subsequent people, we have here again a testimony that they must be referred to some antecedent race, which had perished perhaps ages before the Celtic occupation of the country. The similarity in form between the flint implements from the drift, and those found in the cave-deposits that I have previously mentioned, is also a circumstance well worthy of observation.

Again, many of the implements have a coating of carbonate of lime forming an adherent incrustation upon them: this, as M. Douchet has already remarked, is for these weapons what the patina is for bronze coins and statues, a proof of their antiquity. The incrustation occurs on all the flints in certain beds of the gravel, and is probably owing to the percolation of water among them, charged with calcareous matter derived from the chalky sands above, which it has gradually deposited upon the flints and pebbles. It has probably been a work of time, commencing soon after the formation of the beds, and possibly is still going on. If, therefore, the flint implements had been introduced into these beds at a subsequent date to the other flints and pebbles which are found with them, we might expect them to be either free from incrustation, or at all events with less calcareous matter upon them; neither of these appears, however, to be the case, but all the flints in these particular layers, whether worked or not, are similarly incrusted. The presence of the coating upon them also proves that the weapons were really extracted by the workmen from the beds in which they state them to have been found, and that they are not derived from the upper beds or surface soil.

Another similar proof is found in the discolouration of the surface of the implements. It is well known that flints become coloured, often to a considerable depth from their surface, by the infiltration of colouring matter from the matrix in which they have been lying, or from some molecular change, due probably to



Flint Weapon found at Hoxne in Suffolk.

chemical action. If these implements had been deposited among the beds of gravel, sand, or clay at some later period than the other flints adjacent to them, it might be expected that some difference in colour would testify to their more recent introduction; but in all cases, as far as I was able to ascertain, these worked flints were discoloured in precisely the same way as the rough flints in the same positions. Among the more ochreous beds they are stained of a reddish brown tint to some depth below their surface; in the clay they have undergone some change of condition, and have become white and in appearance like porcelain; while those which have been imbedded in the calcareous sands have remained nearly unaltered in colour.

This evidence, like that of the calcareous coating, is of value in two ways, both as proving the length of time that the implements must have been imbedded in the matrix, and also as corroborating the assertions of the workmen with regard to their positions when found. Some few of the implements present a more or less rubbed and water-worn appearance; a more convincing proof than this, of these flint implements having been deposited where found by the drifting action of water, can hardly be conceived. Apart from this, the chain of evidence adduced must I think be sufficient to convince others, as I confess it did me, that the conclusions at which Mons. de Perthes had arrived upon this subject were correct, and that these worked flints were as much original component parts of the gravel, as any of the other stones of which it consists.[a]

But how much more fully was this conviction brought home to my mind, when on my return to England I found that discoveries of precisely similar weapons and implements had been made under precisely similar circumstances in this country, and placed on record upwards of sixty years ago.

In the 13th Volume of the Archæologia, p. 204, is an account of Flint Weapons discovered at Hoxne in Suffolk, communicated by John Frere, Esq., F.R.S. and F.S.A., read June 22, 1797, and illustrated by two Plates showing two of the

[a] Since the reading of this paper, Amiens and Abbeville have been visited by many geologists of note, and, among others, by Sir Charles Lyell, who, in his address to the Geological Section of the British Association, at their meeting in 1859 at Aberdeen, expressed himself as fully prepared to corroborate the observations of Mr. Prestwich. M. Gaudry, and M. Pouchet, of Rouen, on the part of the French Académie des Sciences, and the town of Rouen, have also made researches at Amiens, and have both been successful in discovering specimens of the implements in trenches made under their own personal superintendence.—(Comptes Rendus, tom. 49, No. 13, and Report of M. Pouchet.) See also the Address of Lord Wrottesley to the British Association, at Oxford, in 1860. Some few other facts that have come to my knowledge since this paper was read have been incorporated in the text.

weapons, which through the kindness of Mr. Lumley are here reproduced. Those engraved, as well as some other specimens, were presented to this Society, and are still preserved in our Museum. They are so identical in character with some of those from the valley of the Somme, that they might be supposed to have been made by the same hand. Mr. Frere remarks, that they are evidently weapons of war, fabricated and used by a people who had not the use of metals, and that, if not particularly objects of curiosity in themselves, they must be considered in that light from the situation in which they were found. He says, that they lay in great numbers at a depth of about twelve feet in a stratified soil, which was dug into for the purpose of raising clay for bricks, the strata being disposed horizontally, and presenting their edges to the abrupt termination of high ground.

The section is described by him as follows:—

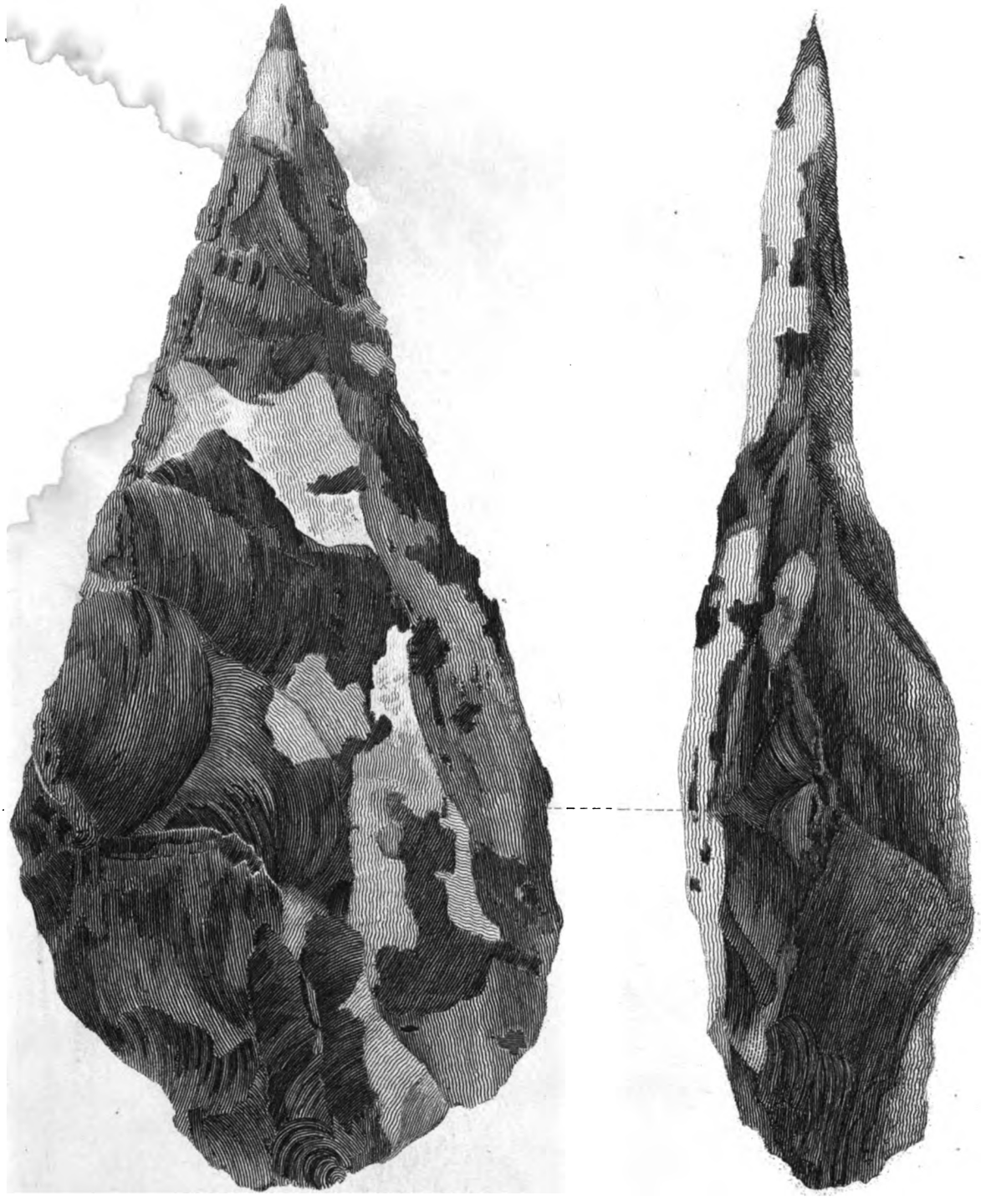
1. Vegetable earth	1½ feet.
2. Argill (brick-earth)	7½ feet.
3. Sand mixed with shells and other marine substances	1 foot.
4. A gravelly soil, in which the flints are found, generally at the rate of five or six in a square yard	2 feet.

The analogy between this section and some that might be adduced from the neighbourhood of Abbeville or Amiens is remarkable; and here also the weapons are stated to have been found in gravel underlying brick-earth.

To make the analogy more complete, "in the stratum of sand (No. 3) were found some extraordinary bones, particularly a jaw-bone of enormous size, with the teeth remaining in it," which was presented, together with a huge thigh-bone found in the same place, to Sir Ashton Lever.

I at once communicated so remarkable a confirmation of our views to Mr. Prestwich, who lost no time in proceeding to Hoxne, to which place I have also paid subsequent visits in his company. We found the brick-field there still in operation, but the section of course considerably altered since the time when Mr. Frere visited it. Where they were digging at the time when we saw the pit for the first time the section was as follows:—

1. Surface-soil and a few flints	2 ft.
2. Brick-earth, consisting of a light brown sandy clay, divided by an irregular layer of carbonaceous clay	12 ft.
3. Yellow sand and sub-angular gravel	6 in. to 1 ft.
4. Grey clay, in places peaty, and containing bones, wood, and fresh-water and land shells	2 to 4 ft.



Flint Weapon found at Hoxne in Suffolk.

5. Sub-angular flint gravel	2 ft.
6. Blue clay, containing fresh-water shells	10 ft.
7. Peaty clay, with much woody matter	6 ft.
8. Hard clay	1 ft.

The thickness of these latter beds we ascertained by boring, as the pit is not worked below the bed of clay No. 4. The shells are all of existing species of fresh-water and land mollusca, such as *Unio*, *Planorbis*, *Succinea*, *Bithinia*, *Valvata*, *Pisidium*, *Cyclas*, and *Helix*; and are not, as Mr. Frere had supposed, of marine origin.

An old workman in the pit at once recognised one of the French implements shown him, and said that many such were formerly found there in a bed of gravel, which, in the part of the pit formerly worked, attained occasionally a thickness of three to four feet. The large bones and flint weapons were found indiscriminately mixed up in this bed. Bones are still frequently met with in the bed of clay No. 4, and Mr. T. E. Amyot, of Diss, whose father was for many years Treasurer of this Society, has an *astragalus* of an elephant which was found here, it is believed in this bed, and also various other mammalian remains from this pit.

During the winter of 1858-59 the workmen had discovered two of the flint implements (to which they gave the appropriate name of fighting stones), one of which Mr. Prestwich recovered from a heap of stones in the pit. It is more of the oval than of the spear-head form. Since that time several other specimens have been discovered, principally in the bed of brick-earth No. 2. Numerous other weapons which have been exhumed at Hoxne in former years are preserved in various collections, but there is no record of the exact positions in which they were found. At Hoxne, however, as well as at Amiens, I have had ocular testimony on this point; for in the gravel thrown out from a trench dug under our own supervision, I myself found one of the implements of the spear-head type, from which however the point had been unfortunately broken by the workmen in digging.

It must have lain at a depth of about eight feet from the surface, and the section presented in the trench was as follows :—

Ochreous sand and gravel, overlying white sand, with gravelly patches and ochreous veins	4 ft. 9 in.
Fine gravel, about	1 ft. 3 in.

Light grey clay and sand	1 ft.
Irregular bed of coarse gravel in which the implement was found	1 ft.
Light grey clay, mottled brown, containing fresh-water shells (*Bithinia*)	2 ft. 4 in.
Boulder clay.	

This trench was sunk at the margin of the deposit, not far from where the beds appear to crop out on the side of the hill, the previous section being about eighty yards distant, and the surface of the ground at that point higher by some feet. It will be observed that the beds of sand, gravel, and clay containing freshwater shells and peaty matter there attain a thickness of about twenty-five feet greater than in the trench, and therefore that they dip in the opposite direction to the slope of the hill. The character of the deposit is evidently fluviatile or lacustrine, and the beds, more especially those of clay, seem to become thicker as we approach the middle of the lake or river. The configuration of the surface of the country when this deposit was formed, must, however, have been widely different from what it is at present, as the high ground surrounding the lake or forming the bank of the river, and from which the successive beds must have been washed down, has, as Mr. Frere long ago observed, now disappeared; for skirting one side of the brick-field, and at the base of the hill on the slope of which the beds of drift crop out, is a valley watered by a small brook, a tributary of the Waveney.

There can be no question that these beds of drift, like those of similar character at Abbeville and Amiens, are entirely undisturbed. At this spot they rest upon the boulder clay of geologists, and are consequently of more recent date, though probably more ancient than the great mass of superficial gravel of the district, by which they in turn seem to be overlaid.

Hoxne is not, however, the only place in England where flint implements have been found under such conditions, for another weapon of the spear-head form has been obligingly pointed out to me in the collection at the British Museum, by Mr. Franks, and is thus described in the Sloane Catalogue:—

"No. 246. A British weapon, found with elephant's tooth, opposite to black Mary's, near Grayes inn lane—*Conyers*. It is a large black flint, shaped into the figure of a spear's point. K.[a]" This implement is engraved in Plate II. and is

[a] This K. signifies that it formed a portion of Kemp's collection; a rude engraving of it illustrates a letter on the antiquities of London by Mr. Bagford dated 1715, printed in Hearne's edition of Leland's Collectanea, vol. i. p. lxiii. From his account it seems to have been found with a *skeleton* of an elephant in the presence of Mr. Conyers.

FLINT IMPLEMENT FOUND IN GRAY'S INN LANE, LONDON.

(*Full size.*)

precisely similar in all its characteristics to some weapons found at Hoxne and Amiens. It is not a little singular that it too should have been found in juxtaposition with a tooth and indeed other remains of an elephant.

It is satisfactory to find these instances of the discovery of flint implements of this class placed on record so long ago, as it places beyond all reasonable doubt the fact of their being really the work of man. They have been exhibited as weapons in our Museums for many years, and their artificial character has never been doubted, nor indeed could it ever have been called in question by an unprejudiced observer.

Other instances have occurred of such implements being found in England, but the exact circumstances of their discovery have still to be investigated from a geological point of view. In Mr. Bateman's[a] Catalogue of the Antiquities in his collection, No. 787 C, of objects found in 1850, is thus entered—"Eight instruments found near Long Low, Wetton, including one very large, and like some figured in the Archæologia, Vol. XIII. p. 204." Mr. Bateman informs me that these were found near the surface, a circumstance which in no way affects the question of their antiquity. In the collection of Mr. Warren of Ixworth are also two specimens of implements of the spear-head type (one of them broken), which were found at Icklingham, Suffolk, in the gravel dug in the valley of the Lark. I have visited the spot where they were found in company with Mr. Prestwich, but owing to the hurried nature of our visit further investigation is necessary before determining this to be a conclusive instance of the implements having been discovered in undisturbed drift. There appears, however, to be nothing in the character of the drift of that district, in which also we found traces of mammalian bones, to militate against such an hypothesis.

In France, similar implements, both of the simple and more elaborate forms, have been discovered by M. Gosse in the gravel-pits of La Motte Piquet near Paris, together with the remains of the mammoth and other animals; and I must not omit to record that this very spot had been pointed out by M. de Perthes, some years ago, as one in which such a discovery was more than probable.

I have no doubt that before many years have elapsed various other instances of the finding of similar implements, under similar circumstances with those from Hoxne and from the valley of the Somme, will have been placed on record, and that the existence of man upon the earth previously to the formation of these drift deposits will be regarded by all as a recognised fact.

[a] Bakewell, 1855. p. 59.

Who were the race of men by whom these implements were fashioned, and at what exact period they lived, will probably be always a matter for conjecture. Whether the existence of man upon the earth is to be carried back far beyond the limits of Egyptian or Chinese chronology, or whether the formation of these beds of drift, and the period when the mammoth and rhinoceros, the great cave bear and its tiger-like associate, roamed at large through this country, should be brought down nearer to our own days than has hitherto been supposed, are questions that will not admit of a hasty decision.

It must, however, I think be granted that we have now strong, I may almost say conclusive, evidence of the co-existence of man with these extinct mammalia. The mere fact that the flint implements have been found as component parts of a gravel also containing the bones or teeth of the mammoth or rhinoceros does not of course prove that the men who fashioned them lived at the same period as these animals. Their bones might, under certain circumstances, have been washed out of an older gravel, (as, for instance, by the action of a flooded river,) have then been brought into association with relics of human workmanship, and re-deposited in their company in a re-constructed gravel. But there does not appear to be any probability of this having been the case at Hoxne or in the valley of the Somme. The bones are many of them but little if at all worn, as they would have been under such circumstances; especially as the only alteration in structure that they have undergone is the loss of their gelatine; but, above all, there is the fact that in the lower beds of the sand-pits at Menchecourt, those in which the flint implements have been found, the skeleton of a rhinoceros [a] was discovered nearly entire; which could not possibly have been the case in a re-constructed drift. The bones of the hind leg of a rhinoceros, all in their proper positions, as if the ligaments had still been attached at the time of its becoming imbedded, were found in the same place.

I have already remarked on the possibility of the Menchecourt beds which contained these remains being rather more recent than those at a higher level; but under any circumstances the presence of the nearly perfect frames and limbs of the extinct mammalia in them is a matter of the highest significance in the present inquiry.

But there is another argument in favour of the co-existence of man with these extinct animals which must not be overlooked. If there had been but a single instance of the discovery of the flint implements in conjunction with the bones and teeth of the animals, the assumption that the implements and the mammalian

[a] See M. Ravin's Mémoire Géologique sur le Bassin d'Amiens, in the Mémoires de la Société d'Emulation d'Abbeville, 1838, p. 196.

remains were derived from different sources and belonged to two entirely distinct periods, would be difficult of disproof; but when we consider that the instances of such discoveries are already numerous, and have, moreover, taken place in such widely distant localities, that assumption is untenable.

We have at various places round Abbeville the flint implements found associated with the remains of the mammoth, rhinoceros, and other extinct animals; at St. Acheul, near Amiens, we have the like; in the pits of La Motte Piquet they are found with the remains of the mammoth, the *Cervus tarandus priscus*, the *Bos primigenius*, and probably the cave-lion; at Hoxne with the mammoth and other remains; and in Gray's Inn Lane with remains of an elephant. This constant association of the two classes of relics affords certainly strong presumptive evidence that the animals to which the bones belonged were living at the same period as the race of intelligent beings who fashioned the weapons of flint.

An argument has been raised against their having co-existed, upon the assumption that human bones have never been discovered in company with those of the extinct quadrupeds. But neither are they recorded to have been found in company with those implements which are acknowledged by nearly all to be of human workmanship.

It appears to me, moreover, very doubtful, in point of fact, whether human bones have not been really found associated with those of the extinct mammalia, more especially in cave-deposits. At all events it is a negative very difficult to prove. But, assuming the fact to be as stated, are there not reasons why it is probable that human remains should be of extremely rare occurrence, if not entirely absent, in such drifts as those of the valley of the Somme and at Hoxne? The mammalian remains found in them are probably mainly those of animals whose dead bodies had been reduced to skeletons, and were lying on the face of the earth before being carried off by the water, whether of an overwhelming cataclysm, or the torrent of a flooded river, and not simply those of animals drowned by its action. Whereas it may safely be assumed that the natural instincts of man would have led them to "bury their dead out of their sight," and thus place them beyond the reach of the currents of water.

It must also be borne in mind that there is no appearance of the drift at any of the places mentioned having been caused by anything like a general submergence of the country, or an universal deluge, as it does not extend over the highest points of ground; so that there is no reason for supposing the waters from which the drift was deposited to have caused any great loss of human life.

It is somewhat curious that we have already instances of the existence of

living creatures being proved to demonstration by other evidence than that of their actual remains (for those have never been discovered) in some of the chelonians, saurians, and batrachians of the new red-sandstone and other formations. Foot-prints of these animals, or ichnolites, are found in abundance, but the bones of the various species which have left these records of themselves "upon the rock for ever" have still to be found. Dr. Hitchcock enumerates no less than fifty-three species from the Jurassic, liassic, or triassic beds of the valley of the Connecticut, of which the existence has been determined by their foot-prints alone.

In the case of the *Pfahlbauten* lately discovered in the lakes of Switzerland and elsewhere, though implements of all kinds have been found in great abundance, yet human remains are of excessively rare occurrence. It is, however, almost beyond the bounds of probability to suppose that the flint implements from the drift, are relics of a race of men who in like manner placed their dwellings upon artificial islands, though in far more remote antiquity than those who constructed the *Pfahlbauten*.

The question of the contemporaneous existence of man with the mammoth and other animals of the same age is of great importance, as the best if not the only means of fixing some approximate date to these flint implements, though from the nature of all geological evidence, and the possibility of the same results upon the earth's surface being attained in a greater or less period of time according to the greater or less energy of the agent producing them, any estimate of their age will always be liable to objections. But if the co-existence of man with this now extinct *fauna* be proved, then the basis of induction is enormously extended for arriving at some estimate of the antiquity of man: for the condition and probable age of drift-beds containing the mammalian remains alone, and unassociated with human relics, will then fairly enter as elements into the calculation. It is, however, at present premature to say more upon this point.

I will only add that the presence, in the drift of the valley of the Somme, of the *Cyrena consobrina*, or *trigonula*, a bivalve no longer European, though still found in the waters of the Nile, and which is frequently associated with elephant remains in the drift of our valleys, is also of significance in considering the question of the age of these implement-bearing beds.

If we are compelled to leave the mammalian remains out of the question, it seems to me by no means easy, in the present state of our knowledge, to assign even an approximate age to these deposits. Ranging as they do all the way up the slopes of the valley of the Somme near Amiens and Abbeville, there is great difficulty in arriving at any exact conception of the conditions under which they were

formed, far more so of the period of their formation. The clays, the sands, and the gravels, all appear to be such as would be formed by the action of a river occasionally in rapid motion, and then again dammed up so as to form as it were a lake, or series of lakes.

But that this could not have been effected in the present configuration of the valley of the Somme, or of the country near Hoxne, is apparent. There must indeed have been a considerable difference in the land-surface at those places, at some former time, for it to have been possible for such deposits to have been formed; but what the configuration was at the time of their formation, and how long a period must have elapsed for it to have become changed into what it is at present, are questions for the geologist rather than the antiquary, and even he would require more facts than are at present at his command to speak with confidence on these points.

Thus much appears to be established beyond a doubt; that in a period of antiquity, remote beyond any of which we have hitherto found traces, this portion of the globe was peopled by man; and that mankind has here witnessed some of those geological changes by which these so-called diluvial beds were deposited. Whether they were the result of some violent rush of waters such as may have taken place when "the fountains of the great deep were broken up, and the windows of heaven were opened," or whether of a more gradual action, similar in character to some of those now in operation along the course of our brooks, streams, and rivers, may be matter of dispute. Under any circumstances this great fact remains indisputable, that at Amiens land which is now one hundred and sixty feet above the sea, and ninety feet above the Somme, has since the existence of man been submerged under fresh water, and an aqueous deposit from twenty to thirty feet in thickness, a portion of which at all events must have subsided from tranquil water, has been formed upon it; and this too has taken place in a country the level of which is now stationary, and the face of which has been but little altered since the days when the Gauls and the Romans constructed their sepulchres in the soil overlying the drift which contains these relics of a far earlier race of men.

How great was the lapse of time that separated the primeval race whose relics are here found fossilized, from the earliest occupants of the country to whom history or tradition can point, I will not stay longer to speculate upon. My present object is to induce those who have an opportunity of examining beds of drift in which mammalian remains have been found, to do so with a view of finding also flint implements in them "shaped by art and man's device."

That instruments so rude should frequently have escaped observation cannot be a matter of surprise, especially when we consider that those educated persons who have been in the habit of examining drift deposits have been more on the alert for organic remains than for relics of human workmanship; while the workmen whose attention these implements may for the moment have attracted have probably thrown them away again as unworthy of further notice. I may mention as an instance of this, that in a pit near Peterborough, where Mr. Prestwich showed one of the Abbeville specimens to the workmen, they assured him that they had frequently found them there, and had regarded them as sling-stones; but none had been retained, nor on visiting the spot have I been able to find any traces of them.

As to the localities in England where mammaliferous drift, of a character likely to contain these worked flints, exists, it would occupy too much time and space to attempt any list of them. Along the banks of the Thames, the eastern coast of England, the coast of western Sussex, the valleys of the Avon, Severn and Ouse, and of many other rivers, in fact in nearly every part of England, have remains of the *Elephas primigenius* and its contemporaries been found. Almost every one must be acquainted with some such locality: there let him search also for flint implements such as these I have described, and assist in determining the important question of their date. A new field is opened for antiquarian research, and those who work in it will doubtless find their labours amply repaid.

JOHN EVANS.

Nash Mills,
Hemel Hempsted.

FLINT

IMPLEMENTS IN THE DRIFT;

BEING AN

ACCOUNT OF FURTHER DISCOVERIES

ON

THE CONTINENT AND IN ENGLAND.

COMMUNICATED TO THE SOCIETY OF ANTIQUARIES

BY

JOHN EVANS, F.S.A., F.G.S.

LONDON:

PRINTED BY J. B. NICHOLS AND SONS, 25, PARLIAMENT STREET.

1862.

FURTHER DISCOVERIES

OF

FLINT INSTRUMENTS IN THE DRIFT.

It is now nearly two years since I had the honour of communicating to this Society an account of the discovery of flint implements fashioned by the hand of man, in undisturbed beds of gravel, sand, and clay, both on the Continent and in England.[a]

The discoveries to which I then called attention were mainly due to the intelligence and energy of M. Boucher de Perthes, who for many years had carried on researches in the more recent geological deposits of the valley of the Somme, in the neighbourhood of Abbeville; but the facts which he had there brought to light were also substantiated and illustrated by discoveries made by other antiquaries at other times, and in other places.

Among these, that recorded by Mr. Frere in the 13th volume of the Archæologia was the most remarkable, both as affording incontestible evidence of a discovery of this nature some sixty years ago, and as showing the manner in which it was regarded by an intelligent observer at that time, when but little advance had been made in the science of geology. Mr. Frere's suggestion, that "the situation in which the weapons were found may tempt us to refer them to a very remote period indeed," was fully borne out by the facts which I was able to adduce, and which were to my mind of a most striking character. They afforded, indeed, strong if not conclusive evidence of the existence of man at that remote period, when the Siberian mammoth roamed through our forests, the extinct rhinoceros and hippopotamus frequented our marshy jungles and broadly-flowing rivers, and the mighty tigers, bears, and hyænas of our caverns preyed upon herds of oxen and horses of species now extinct.

[a] Archæologia, Vol. XXXVIII. p. 280.

It was, of course, conceded that this period might possibly be brought down nearer to our own times than had hitherto been supposed probable; yet the whole tendency of the evidence was to establish a far greater antiquity of the human race than was consistent with our ordinary chronology, though to what extent its bounds were to be transcended remained an open question.

Under such circumstances, it was but natural that the announcement of these discoveries of relics of human workmanship in juxtaposition with the remains of extinct animals at a depth of fifteen or twenty feet from the surface in perfectly undisturbed soil, should not have immediately met with universal credence, but should by some have been received with doubt and mistrust.

There were sure to be many among those who could not do otherwise than accept the implements as of undoubted human workmanship, who would be inclined to suspect some flaw in the geological evidence; while among others who could not deny the force of that evidence, some would be disposed to regard the configuration of the flints as due to various natural causes, and not to human workmanship.

The closeness of the investigation to which these doubts gave rise has, however, served to dispel them, and at the present time there are, I think, but few among those who have paid any attention to the subject, who, however much they may be astonished at such a discovery, can do otherwise than accept it for true.

My object on the present occasion is not, however, again to enter into the general evidence of the case, either as to the human workmanship of the implements (for that is self-evident), nor into minute details of all the circumstances under which they have been found. Neither do I desire to bring forward any theory based upon the facts at present in our possession, as to the precise degree of antiquity to be assigned to these implements, nor to attempt to trace the succession of races of men in this part of the world during the vast period of time which must have elapsed since those who fashioned these flints perished from the face of the earth —a face, it is to be remembered, differing in several respects from that at present existing. I wish rather to give an account of the various fresh discoveries of these implements which have taken place both in France and in England during the last two years; and I do this in the hope that Fellows of this Society, who may during this or ensuing summers be travelling in the neighbourhood of the places which I shall hereafter mention, may for themselves investigate the circumstances under which the discoveries have been made, and possibly make farther researches in other places.

The principal localities in France mentioned in my former paper were Abbeville and its neighbourhood (the scene of M. de Perthes' original discoveries), and the gravel-pits of St. Acheul, near Amiens. In neither of these localities have any very important fresh discoveries taken place, either to throw much new light upon the subject, or to invalidate former observations, though the flint implements are still found from time to time in the various pits, and at St. Acheul in considerable numbers. Much additional evidence of the geological nature and age of the containing beds has, however, been collected by Mr. Prestwich and Sir Charles Lyell, which I hope will shortly be made public. Many have been the visitors, both English and foreign, to these spots, and among them men of the highest scientific eminence; yet not a single voice has been raised to controvert the accounts of the principal phenomena that have already been given; though there has been some difference of opinion as to the precise character and age of the drift beds of the valley of the Somme.

Several persons who have visited the pits at St. Acheul have either themselves extracted some of the implements from their matrix, or seen them dug out in their presence. Among the English who have been thus fortunate I may mention Mr. J. W. Flower, the late lamented Professor Henslow, Mr. Christy, Mr. James Wyatt, Mr. Rupert Jones, and Mr. Ferguson, of Amiens. Among the French,[a] M. Albert Gaudry, who has communicated an account of his investigations to the Institute, found no less than nine in excavations made under his own directions, and mostly at a depth of about fifteen feet from the surface, and in the same bed as that from which a tooth of the *Elephas primigenius* had lately been exhumed. Some of these implements were still imbedded in the undisturbed gravel when found.

M. Georges Pouchet,[b] who was deputed by the municipality of Rouen to examine into the evidence afforded by these pits, also saw one of the implements *in situ*, and in his report confirms the discoveries of M. Boucher de Perthes.

That distinguished antiquary the Abbé Cochet, honorary Fellow of this Society, is also to be mentioned among those who have visited the valley of the Somme, having been commissioned by the Préfet de la Seine Inférieure to report upon the flint implements there discovered in the drift. From this report[c]

[a] Comptes Rendus, 3rd October, 1859.

[b] Actes du Museum d'Histoire Naturelle de Rouen, 1860, p. 33.

[c] Archéogéologie. Hachettes Diluviennes du Bassin de la Somme. Rapport par M. l'Abbé Cochet, 1860. Gentleman's Mag. March, 1861.

it appears that he, too, saw one of the implements dug out of the gravel by a quarryman; and, moreover, removed, with his own hands, from the gravel in which it was imbedded, another that had been pointed out to him while *in situ*. He does not mention the exact depth from the surface at which it was lying; but from the context it would appear to have been from seventeen to twenty feet. As to the human workmanship of the implements and the undisturbed nature of the gravel his report is very decided. On the former point I quote his own words:—"Chose étrange, toutes ne sont qu' ébauchées; aucune n'est polie. Mais il est évident que sur tous ces instruments, si informes qu'ils soient, une main humaine a passé: nul homme de bonne foi ne saurait le méconnaître."

The places close to Abbeville best worthy of notice are the excavations for the fortifications at the Porte Marcadé, the pits at St. Gilles, at the Moulin Quignon, and Menchecourt, as well as those at Mautort and Drucat in the immediate neighbourhood. Near Amiens, the pits at St. Acheul, St. Roch, and Montiers ought to be visited. It is, however, necessary to be on the guard against counterfeit implements. But, besides these places, there are several in other parts of France where similar discoveries have been made in beds of a similar character.

In my last paper upon this subject, I alluded to the discovery, by M. Gosse of Geneva, of flint implements in the sand and gravel pits of La Motte Piquet, a little beyond the Champ de Mars at Paris, of which I will now give some further particulars. The pits in which his discoveries took place are two — that of M. Bernard, Avenue de la Motte Piquet, No. 61-63, and that of M. Étienne Bielle, Rue de Grenelle, No. 15. The beds of sand and gravel, which are very analogous in character with those at Menchecourt, near Abbeville, show no traces of having been disturbed. Their average thickness is about twenty feet; and in a bed at the base, from three to five feet in thickness, M. Gosse discovered the remains of extinct animals and a number of worked flints. The latter consisted of numerous flint flakes, of the same character as Plate IV. No. 1, 2, 3, and others considerably wider; and also one of the larger implements of the pointed spear-head form, like Plate IV. fig. 6, only less skilfully chipped. Among the bones were those of *Bos primigenius*, *Elephas primigenius*, a deer allied to the reindeer, and a large carnivorous animal, probably the cave-tiger I may add that the observations of M. Gosse have since been confirmed by M. E. Lartet, as well as by Mr. Mylne, F.S.A., F.G.S, and other English

[a] Comptes Rendus de l'Académie, 30th April, 1860.

and French geologists; and that this very place had been signalized some time ago by M. de Perthes as one in which it was probable such a discovery might be made.[a]

Near Creil, between Amiens and Paris, a flint implement has also been found under very similar circumstances. M. Peigné Delacourt exhibited to the French Society of Antiquaries (16th May, 1860), a *hachette* which had been found in the gravel-pit at Précy, near Creil, in the valley of the Oise, together with the tooth of an elephant.

I have myself visited the pits both in the Avenue de la Motte Piquet and at Précy, in company with Mr. Prestwich and Mr. Lubbock, but we did not succeed in finding any worked flints at either place. M. Lartet has found one of the same form as that engraved in Plate IV. No. 4 in the gravel-pits at Clichy, close to Paris, and there is every probability that they may be found in other places where pits are worked in the gravel of the valley of the Seine. Those at Charonne, the Rue Petite de Reuilly, Bicêtre, the Barrière d'Ivry, and near Joinville, may specially be mentioned.

Implements of the same class are said to have been found in the valley of the Seine, near Rouen;[b] for the Abbé Cochet reports that in the museum of that town are preserved two flint implements similar to those found at St. Acheul, which the curator M. Pottier assured him came from the sand-pits of Sotteville, in the environs of Rouen. There would, however, appear to be some mistake in this instance, as on visiting the Museum at Rouen I could not find these implements, and M. Pouchet was not aware of their existence. At the same time the pits at Sotteville are of precisely the character that renders it probable that flint implements may be discovered in them, and it would be time well bestowed for any antiquary or geologist to undertake further researches in the drift deposits of that part of the valley of the Seine.

Another very remarkable discovery of this nature is that made near Clermont[c] by Dr. Noulet, of Toulouse, in a valley leading into that of the Ariège. In a part of this valley is a deposit of sandy gravel underlying brick-earth, at a height of about 540 feet above the sea, and about 33 feet above the stream which now waters the valley. In this gravel have been found bones of the *Elephas primigenius*, *Rhinoceros tichorhinus*, *Felis spelæa*, *Cervus megaceros*, horse,

[a] Quart. Journ. Geol. Soc. vol. xvi. p. 479.

[b] Cochet, Rapport, p. 8.

[c] Sur un dépot alluvien renfermant des restes d'animaux eteints mêlés à des cailloux façonnés de main d'homme par le Dr. J. B. Noulet. Mémoires de l'Acad. des Sciences de Toulouse, v. ser. tom. iv. p. 265.

and ox. In the same bed, mixed with these remains, have also been found various pieces of quartzite, bearing, according to Dr. Noulet, unquestionable signs of human workmanship upon them. Unfortunately he does not, in the memoir he has written on this subject, give representations of the shapes into which they have been fashioned; but he describes them as follows:—"One has the form of a disc or quoit, with an irregular surface and outline; its two greatest diameters are $3\frac{5}{8}$ and 4 inches; the edge has been rendered unequally sharp by means of successive fractures." "Two others are flattened, and irregularly triangular. One of them is four inches in length, $2\frac{1}{2}$ inches wide and its greatest thickness one inch. It has been thus formed into shape by chipping it on only one of its faces. The second is much more important; both its faces have been modified to bring it to the shape it now presents. The sides and point (which is truncated) present a bevelled edge; but the base, which is cut obliquely, has been evidently polished even with care. This also is about four inches long, $2\frac{3}{4}$ inches wide, and $1\frac{1}{4}$ inch thick."[a]

If it be really the case that this is in part polished, and that this polish is not due to the natural fracture, it is certainly a singular fact in connection with the implements of the Drift period, which have hitherto always been not ground.

Dr. Noulet, however, has paid some attention to this class of antiquities, as he draws a distinction, on account of their rude workmanship, between these implements and the *haches gauloises ou celtiques*. He observes that they also are in this district frequently formed of quartzite, as flint does not occur.

Beside the chipped implements, round pebbles also occurred, which are considered by Dr. Noulet to have been used as hammers; and, though the account he gives of the whole discovery is not, to my mind, quite conclusive, it appears to be a proper case for further inquiry, which I hope it may receive from some English antiquary or geologist.

I now come to the discoveries which have taken place in England, in addition to those at Hoxne, Gray's Inn Lane, and Icklingham, which have already been recorded; but I must first say a few words with regard to these places. At Hoxne the implements are still, from time to time, discovered, principally in the brick earth overlying the gravel; but the most important addition made to our knowledge of that place results from the publication by Mr. Prestwich in the

[a] The reader may also refer, for an account of a very curious discovery somewhat of the same nature, to M. Lartet's "Researches Respecting the Co-existence of Man with the Great Fossil Mammals," in the Ann. des Sciences Naturelles, 4me série, tom. xv., of which a translation is given in the Natural History Review for January, 1862.

Philosophical Transactions (for 1860) of admirable sections of the brickfield and the district around it, with full details of the levels and the geological character of the deposit. I may also mention that at Athelington, between Hoxne and Framlingham, is a brickfield where there is much probability of implements being present, as, in geological character, it so closely resembles that at Hoxne.[a]

In the gravel-beds under some parts of London in which the implement that has so long been preserved in the British Museum was found I am not aware of any further discoveries having been made. The excavations now in progress for the subterranean railway and for the main drainage works will, however, probably expose sections of the mammaliferous drift, in which it will be well for those who have the opportunity to search for flint implements.

Neither has anything further been hitherto discovered at Icklingham, but the valley-drift of the whole district around that place is well worthy of close examination. I have visited the spot, in company with Mr. Prestwich, but, though we were satisfied of the *à priori* probability of the implements existing in the gravels of the valley of the Lark, our search was unsuccessful. One of the implements of the oval spearhead type (Plate IV. fig. 11) which was found there closely resembles some of the specimens from St. Acheul and elsewhere. It is in the possession of Mr. Joseph Warren, of Ixworth. But though these places, with the exception of Hoxne, have not contributed any additions to our store of facts, more than one very remarkable discovery of flint implements in the drift of other parts of the kingdom has taken place, the details of which I will now proceed to give.

In the autumn of last year Mr. Thomas Leech, who had been a student in the School of Mines at the Museum of Economic Geology in Jermyn Street, while examining the shingle at the base of the cliff between Herne Bay and the Reculvers for fossil remains, discovered a flint implement, which he at once recognised as analogous in form with those that had been found in the drift of the valley of the Somme. Subsequent visits to the spot enabled him to find several

[a] While upon this subject I may note, as another instance of these worked flints from the Drift having in former times been received as of undoubted human manufacture, that one of those discovered at Hoxne is engraved as a British weapon in Meyrick's Ancient Arms and Armour, vol. i. pl. xlvi. No. 1. It is thus described :—

"No 1 is of brown and black silex, and seems to have been fastened at the broad end to a handle, in the manner of some of the tomahawks of the Pacific Ocean, so that the blow might be given by a sharp point, which in this specimen was broken off. It was found with several others at Hoxne in Suffolk, twelve feet below the surface of the ground, and was once in the Leverian Museum."

more of the worked flints—six in all—which he has most liberally placed in the Museum in Jermyn Street.

Having been informed of this most curious discovery, Mr. Prestwich and I, accompanied by Mr. Leech, proceeded to the spot in February, 1861, and our lengthened search was rewarded by finding two more of the implements. I have since revisited the place in company with Mr. Wyatt, F.G.S., of Bedford, and my brother, and we again succeeded in the course of a visit of two days in finding three of the implements. The whole of them closely assimilate in form to other specimens obtained from the drift in various other localities, both in England and in France. There are implements of the spear-head type, with straight sides and a slightly rounded point, as well as some with the sharp point and the sides slightly curved inwards; there are others, both large and small, of the oval form, with a cutting edge nearly all round, and others again intermediate between this and the spearhead type, oval, yet cutting at one end only. One implement of the spearhead form, which I was so fortunate as to find on my last visit, is a magnificent specimen, seven inches in length, chipped out with great skill, showing perfect symmetry of shape, and such as to commend itself at once even to the most inexperienced eye as the work of human hands. A representation of it is given in Plate I. No. 1, from which it will be seen that it bears a strong resemblance in form to that found near Gray's Inn Lane engraved in the Archæologia, Vol. XXXVIII. Plate XVI., but is even more symmetrically finished. Another precisely similar, but broken at the point, was found by Mr. Leech. Implements of exactly the same type have also been found at St. Acheul, Hoxne, and elsewhere. This specimen of mine is, however, second in interest to one of those found by Mr. Leech, which presents some features of a novel character. It has already been observed in my former paper that the material from which all the implements hitherto discovered in the drift of this country and of the North of France have been formed, is the flint derived from the chalk, and that some of them seem to have been intended for use without the aid of a handle, the rounded ends of the flints out of which they have been chipped having been left untouched, so as to present a sort of natural handle. This is the case with the implement from Reculver to which I allude, but the rounded flint from which it was formed, though without doubt originally a chalk flint, was not derived immediately from the chalk, but had passed through an intermediate phase of existence before being selected by man as adapted for his use.

I need hardly say that the chalk is the latest deposit of the Secondary period, and that some of the earlier beds of the Tertiary period consist of sands and

1.

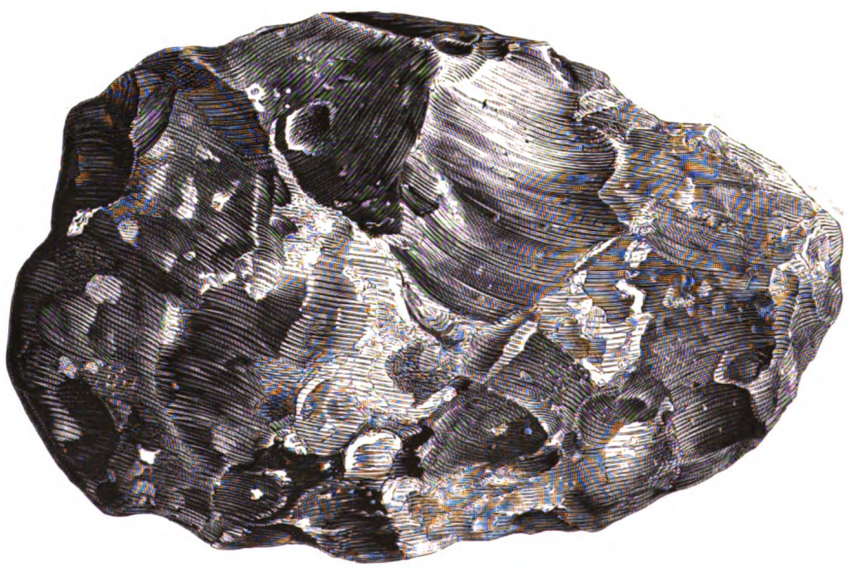
2.

FLINT IMPLEMENTS FROM RECULVER.

Full size.

1.

2.



FLINT IMPLEMENTS FROM RECULVER AND SWALECLIFFE.

(*Full size.*)

shingle formed by the denudation of a portion of the upper part of the chalk by the action of the Tertiary Ocean. These Lower Tertiary beds, which belong to what is known as the Woolwich and Reading series, crop out or come to the surface in the neighbourhood of Reculver, and the rounded pebbles derived from this ancient shingle are in consequence abundant in that part of Kent. By their smooth appearance and by the peculiar character of their surface, they can be readily distinguished from the rounded pebbles which form the beach shingle of a chalk district at the present day, so there is little danger of mistaking their identity.

It is from one of these rounded Tertiary pebbles that this implement found near Reculver has been formed, which thus has a special and local interest as showing that probably it was chipped out not far from the spot, and proving that for a certain class of implements a rounded butt or handle was preferred, for which either a chalk flint with a rounded end was selected, or, where a Tertiary pebble of large size could be found with equal readiness, it was taken as equally adapted for the purpose. An engraving of this implement is given in Plate I. No. 2, and of one of the round pointed form found at the same place by Mr. Prestwich in Plate II. No. 1. In all, there have been discovered on the shore between Herne Bay and Reculver eleven or twelve implements, the larger number of them at about three-quarters of a mile west of the old church at the Reculvers, and not far from the spot where a spout conducts the drainage of the field just to the east of the Bishopstone Coast Guard station down the face of the cliff.

It will be observed that all these implements have been found on the sea-shore, and not, as in other instances, in undisturbed beds of gravel, sand, or clay. It is, however, indisputable that they belong to the same class of tools or weapons as those which have been found in the drift of the valley of the Somme, as well as at Hoxne and elsewhere; so that it becomes an important question to determine in what manner to account for their presence on the shore at this point. Fortunately, this question admits of a comparatively easy solution. There can be no doubt whatever that they have been derived from the cliff, which is here constantly falling before the encroachments of the sea. For it is evident that they cannot have been long exposed to the action of the waves, or otherwise they would have lost their form entirely, and have become merely rounded pebbles—the same as those which constitute the shingle on the beach. In fact, some of the specimens already show a considerable amount of wear from this cause, though at the same time others are almost entirely uninjured. This proves that different specimens must have been exposed for different periods to the rolling action of the waves, and, as the only way in which the stones forming the shingle on this shore receive

any accession to their number is from the falling of the cliff, it follows that the implements now found must have been deposited on the shore by successive falls of the cliff; those which are fresh and unworn having been derived from quite recent slips of the land, while the different degrees of wear on other specimens testify to the shorter or longer periods they have been upon the beach. The implements are moreover found on the strip of shingly beach skirting the cliff, and not on the wide tract of sandy shore exposed at low water, so that they cannot be regarded as having been washed up from the bottom of the sea.

Let us now, therefore, turn our attention to the cliff from whence they must have been derived. In proceeding eastwards from Herne Bay towards the Reculvers we find, for the first part of our journey, the cliffs or rather the series of landslips skirting the shore formed of London clay, beneath which the Woolwich and Reading beds and the Thanet sands successively crop out. From the peculiar nature of these sandy beds, the cliffs of which they form the base are more abrupt and bold than those formed of clay, and by the time the ravine at Oldhaven Gap is passed, they become nearly vertical, and it is at once apparent that above these beds of the Lower Tertiary period there is a capping of drift, or possibly of two distinct drifts, but, in either case, of a much more recent geological age than the beds below. But, omitting the question whether the drift at the higher level is distinct from that at the lower level, I will confine my remarks to the latter, as being that with which we are principally concerned. In thickness these beds of drift vary from five or six feet to as much as eleven or twelve feet, and in some places they may be seen filling up depressions which have been worn in the surface of the Thanet sands—apparently channels hollowed out by the action of water.

The following is a section I took near the spout before mentioned (where the height of the cliff is fully fifty feet), and close to the spot where two or three of the implements were found :—

	ft.	in.
Surface soil and clay	2	0
Blue and grey clay, with angular and sub-angular flints, and many Tertiary pebbles	3	0
Reddish-yellow loam, with a few angular flints and Tertiary pebbles—traces of carbonaceous matter .	7	0
Gravel at base, in places coarse	0	6
	12	6

In the immediate neighbourhood this gravel at the base of the drift attains a thickness of three feet, and in other places there is a peaty seam at the base of the loam. The flints in the beds of clay retain their fractured surfaces nearly unaltered in colour; but in the gravelly beds they are usually stained of an ochreous tint. The Thanet sands, at the base of the cliff, contain no flints whatever, and those in the Lower Tertiary beds are all in the form of rounded pebbles.

If, therefore, as is to my mind undoubtedly the case, these implements have been derived from the cliff, it is evident that they must have come either from the beds of drift or from the surface soil; but the black lustre of the flint of some of the implements shows that they cannot have been exposed to air and light (as would have been the case had they been near the surface of the ground), while it is of exactly that description which is characteristic of the flints preserved in the clay; at the same time the ochreous staining of other specimens is such as is observed on flints in the gravel. We have, therefore, a concurrence of testimony to show that the resting place of these implements was here, as elsewhere, a bed of drift—a drift showing no traces of disturbance below the surface soil. With regard to the character of these beds, there is little doubt of their being of fresh-water origin, but at present no organic remains have been found deposited with them, and the nature of their position is such as to render a close inspection difficult in most places and impossible in many.

But, though at this particular spot the drift of this district has hitherto proved to be barren, yet in other parts, where beds of a similar character are spread over the Tertiary strata below, organic remains have been found. At Swalecliffe, about six miles west of the Reculvers, the cliff exposes a section of drift about thirteen feet in thickness, consisting of reddish clay with gravelly seams in its upper part, and grey and chocolate-coloured clay, occasionally with sandy and gravelly seams, in its lower part. In places these clays contain an abundance of land and marsh shells (*Succinea oblonga* and *Pupa marginata*). These shells are also found in the continuation of the same bed of drift which caps the cliff along Stud Hill Bay between Swalecliffe Coast Guard station and Hampton Point. At Swalecliffe, Mr. Prestwich, some years ago, also found some mammalian bones, but too fragmentary for them to be identified. He had, from the character of the deposit, thought the place so likely to be one in which flint implements might possibly be discovered, that he had last summer (before the discoveries of Mr. Leech at Reculvers) visited Swalecliffe in search of them, but had been unsuccessful.

Having, however, last February succeeded in discovering some of the flint implements near the Reculvers, he determined to pay another visit to Swalecliffe, in which I accompanied him, and which this time was more fortunate, for at the end of the Stud Hill Cliff, not far from the Swalecliffe Coast Guard station, I picked up a flint implement of the oval pointed form (engraved in Plate II. No. 2), which is stained of an ochreous colour, from having lain in the gravel. On a subsequent visit, at the beginning of April, I discovered in the drift capping the highest point of the cliff, and close to the farmhouse at Stud Hill, a portion of a tooth of the *Elephas primigenius*. Now I do not say that we have here another conclusive instance of relics of human workmanship being found in undisturbed soil in association with remains of the extinct mammalia: I would only call attention to the fact that we have here a cliff of London clay free from flints, but with a capping of gravelly drift at the summit; that the shingle at the base of this cliff is derived almost exclusively from the flints in this gravel; that in the drift at the summit of the cliff have been found the remains of the mammoth, and in the shingle at its base has been found a flint instrument stained in the same manner as almost all the other stones on the beach or in the drift.

If we attempt to form any estimate of the antiquity of the drift in this part of Kent, regarding it as an isolated instance, and not as merely one of a series of connected and analogous deposits, we meet with considerable difficulties. The encroachments of the sea, which even since Leland's time has gained nearly half a mile upon the land at the Reculvers, and now threatens to destroy the ancient church there, in spite of all the efforts made to preserve it,[a] have been such that it is impossible to determine what were the early relations of land and water in this district. It is, however, significant of an entirely different extent of land surface from that at present existing, to find that a deposit extending over a considerable tract of country, in some places capping cliffs fifty or sixty feet in height, and in others descending to nearly the sea-level, not only abuts on the sea without containing any marine remains, but, on the contrary, has all the characteristics of a fresh-water deposit, with its land and marsh shells and mammalian remains. I may add that in a drift deposit in the valley of the Stour, the ancient Wantsume, near Wear Farm, about two miles and a half from the Reculvers, marine shells have been found by Mr. Prestwich,[b] mixed with those of fresh-water species and mammalian bones. This drift is probably of a more recent period than that capping the cliffs, and is certainly not more ancient. It may

[a] See also Lyell's Principles of Geology, 9th edit. p. 312.

[b] Quart. Jour. Geol. Soc. vol. xi. p. 110.

afford some clue to an approximate date, as among the shells it contains is the *Cyrena consobrina*, or *Corbicula fluminalis*, now extinct in England, though still living in the waters of the Nile, a shell which was also found by Mr. Prestwich in the sand pits of Menchecourt, near Abbeville, where the flint implements were first discovered by M. de Perthes, and which is abundant in the gravel of the Thames valley at Grays, Erith, and other places.

I have already mentioned that on my second visit to Reculver, I was accompanied by Mr. James Wyatt, F.G.S., of Bedford. On his return to that town this gentleman was so fortunate as to ascertain the presence of flint implements in the drift of the valley of the Ouse. The discovery took place in a gravel pit at Biddenham, about two miles west of Bedford, and half a mile east of the bridge over the Ouse at Bromham. It was this very pit that some twelve months previously I had visited, in company with Mr. Wyatt, in search of flint implements in the gravel of the valley of the Ouse, though at that time unsuccessfully. Still the character of the deposit, and the nature of the organic remains found in it, were such as to justify a presumption that flint implements might also be present in it, as is now most satisfactorily proved to be the case. Those found by Mr. Wyatt, to whom I am indebted for many of the following particulars, were not seen by him *in situ*, but were lying among the stones thrown out from a deep trench the workmen had been sinking, so as to expose the entire depth of the gravel, and make it present a perpendicular face, from which the gravel is dislodged by undermining it. But though Mr. Wyatt did not see these implements in their original position, one of them was at once recognised by one of the workmen as having been dug out by him from the base of the gravel at a depth of thirteen feet from the surface; the peculiarity of its shape and appearance having induced him to pick it up and examine it, though he had afterwards thrown it back among the rest of the gravel. This is an oval pointed implement, about 6 inches in length, and $3\frac{3}{4}$ inches in breadth, truncated at the base, where a portion of the original surface of the flint is left unchipped, and, though but rudely fashioned, it presents unmistakeable signs of human workmanship. In form it approaches to Plate II., fig. 2, and may be matched by many specimens from the valley of the Somme, as well as by that found at Swalecliffe. It is stained of an ochreous colour, and on one side is partly incrusted with carbonate of lime, in the same manner as many other stones found in the lower part of the gravel at Biddenham. It is the same incrustration which occurs on many of the flints and some of the implements found at St. Acheul, near Amiens.[a] In my former paper on this subject

[a] Archæologia, Vol. XXXVIII. p 297.

I called attention to the value of the evidence afforded by this coating or *patina*. It is indeed unimpeachable, but becomes needless when, as in many instances, we have such good and direct testimony as to the position of the implements in the pit.

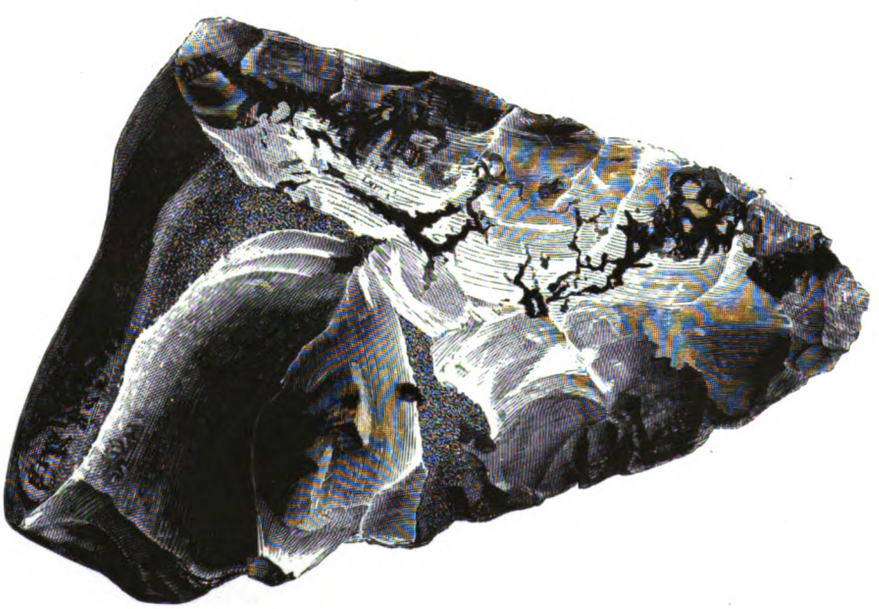
The other implement discovered by Mr. Wyatt at the same time is a beautiful specimen of the sharp-pointed spearhead type (see Plate III., No. 1), and bears a remarkable likeness to one of those found at Hoxne, in Suffolk, and engraved in the thirteenth volume of the Archæologia, Plate XV., though rather larger in size, and not quite so sharply pointed. This specimen also is partly stained by the ferruginous matter in the gravel. It is seven inches in length, and, though worked off to a wedge-like point, is very massive, weighing something over a pound and a half. The butt-end has been roughly chipped into form, but has some sharp projections left upon it, which would prove that it was not intended to be simply held in the hand when used, but that it was attached to a shaft or handle, or else that the hand was in some manner protected from its asperities.

On hearing of this discovery I again proceeded to Bedford, in company with Sir Charles Lyell and Mr. Prestwich; and, with Mr. Wyatt, we made a survey of the gravel-pits at Biddenham, and of the geological features of the neighbourhood. The development of drift gravel at this part of the valley of the Ouse is very extensive. The beds in which the pit near Biddenham is sunk form a capping to a low hill about two miles in length, and about three-quarters of a mile in width, which is nearly encircled by one of the windings of the river Ouse. The summit of this hill is probably about forty feet above the river, but at the point where the pit in question is worked about thirty feet. The thickness of the beds of drift at the spot where the implements were found is about fourteen feet. They consist of gravel, containing sub-angular flints and rolled pebbles, many of them derived from the oolitic limestone of the neighbourhood, and mixed with numerous pebbles of the older rocks, which have been derived from the Boulder Clay. The gravel in places alternates with seams of sand and sandy marl, containing land and freshwater shells, *Helix*, *Succinea*, *Bithinia*, *Lymnæus*, *Planorbis*, *Cyclas*, &c., characteristic of a fluviatile deposit.[a] At the base, where it rests on a platform of the oolitic rock, the gravel is interspersed with larger stones, among which the two flint implements were found. In the same position—at the base of the gravel—are frequently discovered the remains of the extinct mammalia, and this pit

[a] The *Hydrobia marginata*, a species which has not been found alive in this country, has since been added to this list by Mr. Wyatt. See Proc. Geol. Soc. Jan. 22, 1862.

1.

2.



FLINT IMPLEMENTS FROM THE VALLEY OF THE OUSE.

(*Full size*)

has furnished teeth and bones belonging to the *Elephas primigenius*, *Rhinoceros tichorhinus*, horse, ox, and deer. Other cuttings in the gravel nearer Bedford have furnished also tusks of the Hippopotamus. In fact, the gravel is replete with such remains; and, so great was the abundance of fossil bones taken out of a section of it at the time of the formation of the Leicester and Hitchin Railway, that they were positively carted away to manure the land. Some of the bones and teeth are rolled and fragmentary, but others are in perfect preservation, and the gravel presents no sign of having been reconstructed; so that there is no doubt that the relics of human skill were imbedded in it at the same time as these bones of animals with whom man must have co-existed.

Though we have in this instance considerably better data than there were in the Kentish case, we cannot attempt to fix the precise antiquity of this deposit. It must, however, have been formed subsequently to what is known as the Glacial period, as is testified by a portion of the constituent pebbles of the gravel having been derived from the Boulder Clay, which is found capping much of the high ground near Bedford. The beds at Hoxne are in like manner subsequent to the formation of the Boulder Clay; and, though we have here a sort of starting-point, yet the vicissitudes that the surface of this part of the earth has undergone since the time when the deep soil of the fields of our Midland Counties was being deposited from stranded icebergs have been such, that he would be a bold man indeed who would venture to assign a date in years, or even centuries, to the Boulder Clay deposit, or to any of the subsequent geological epochs characterised by the various drifts. But, though refraining from any attempt to assign a definite degree of antiquity to this fluviatile deposit at Bedford, I may call attention to the fact that at the period when these implements were entombed in the gravel, the limestone platform on which they rested must have formed the bed of a river, and must for the time have been the lowest part of the valley; that subsequently some thirteen or fourteen feet of gravel and sand accumulated upon this platform and above the implements, and that since this took place the wide valley in which the river Ouse now flows has been excavated to a depth of some thirty feet, in all probability by wearing away the hard limestone rock over which it flows.

How slight has been the alteration of the land and water level at this spot during the Historic period we are in some measure enabled to judge; for in this very gravel-pit, in the upper part of which many Roman remains have been found, was sunk a Roman well, lately cleared out by the Bedfordshire Archæological Society, in which there was at the time of our visit several feet of water. Now, as in

such permeable beds as those which here form the substratum, the water in the wells in the neighbourhood of a stream stands at a level but little higher than the stream, it is evident that, had there in the time of the Romans been any marked difference between the height of the river and that at which it at present flows, they would have found it not only needless but nearly impossible to have sunk this well to such a depth. In visiting the spot we were forcibly reminded of the pits at St. Acheul, where the graves of a Gallo-Roman cemetery have been sunk in the beds overlying the gravel which contains the relics of a far, far earlier people.

In the face of such a scene we cannot but contrast the antiquity of the two races of occupants, and even in spite of ourselves find that, when compared with the period when these primæval workers in flint dwelt in our land, the Roman occupation seems but of yesterday.[a]

Since this first discovery at Biddenham four or five more of the implements have been found there.[b] Among these was the symmetrically-chipped specimen, engraved in Plate III. No. 2, the truncated end of which is formed by the natural surface of the flint from which it was chipped. It would thus appear to have been intended for use without any shaft or handle, but simply as a hand-tool. Another specimen is engraved in Plate IV. No. 5. Implements have also been discovered in the gravel pits at Harrowden, Cardington, and Kempston, all within a few miles of Bedford, and under much the same circumstances as those at Biddenham.

There are still two other instances of the finding of flint implements to adduce, of one of which an account has been communicated to me by Mr. Richard Whitbourn, F.S.A., of Godalming, which shall be related in his own words:—"The flint implement which I have left with you was found by myself about twenty-five years ago, when searching in the gravel-pits in the Pease Marsh (between Godalming and Guildford), for fossil organic remains. It was imbedded in gravel, in a layer of sand about four or five feet from the surface, in apparently undisturbed ground. I have heard of remains of large animals having been discovered

[a] Letter of Mr. Flower to The Times, Nov. 18th, 1859.

[b] I have thought it better to notice these discoveries in the text, though they have been made since this paper was read. Further accounts of them will be found in Proceedings of the Geological Society, January 22nd, 1862, in the Notes of the Beds Arch. Soc. 1861, p. 145, and in the Reports of the United Arch. Socs. of York, &c., vol. xii. 1861. See also the paper by Mr. Prestwich, in the Quarterly Journal of the Geological Society, vol xvii. p. 362, where sections are given of the valleys of the Ouse and the Lark, and further geological details of the other places where implements have been found in the valley gravels.

in the same beds, but not in very close proximity to the spot where it was found." The implement, which is of rather peculiar form, is about four inches long and three and a half inches broad at the widest part. It is of somewhat the same character as that from Biddenham (Plate II. No. 2), but much rounder at the point and still more truncated. The natural coat of the flint originally covered the whole of the base of the implement, though a portion has been broken off, probably at the time when the seam of gravel in which it lay was first exposed in the pit. This discovery receives additional value from the gravel beds of the valley of the Wey, in which the implement was found, having been carefully examined and described by Mr. Godwin-Austen,[a] in a paper in the Quarterly Journal of the Geological Society. Without entering into the question of the origin of these beds, I may quote him as saying that remains of the *Elephas primigenius* and other animals are frequently found in this gravel, and that at Pease Marsh there are traces of an old land-surface, with branches of trees and the bones of these animals uninjured and lying together. I have myself examined the spot where this implement was found, in company with Mr. Whitbourn; but, though the drift presents many of the characteristics which indicate the probability of the presence of flint implements, we did not succeed in finding any other specimens.

An attentive and continued examination of the gravels of the valley of the Wey and its tributaries in the neighbourhood of Godalming and Guildford, as well as those of the valley of the Mole, near Dorking, would probably result in more of these implements being found.

The last instance of their discovery that I have to mention occurred in my own immediate neighbourhood, in Hertfordshire. Whilst walking a few weeks since, in company with our Secretary, Mr. Watson, from Nash Mills to Abbot's Langley, my attention was called, while passing though a field near Bedmont, to the number of pebbles of quartz, red sandstone, and others of the older rocks I saw upon its surface; as these pebbles characterise a gravel which, though occurring in many places in the neighbourhood, I had not before noticed at that spot. After parting with Mr. Watson, and on my way home, I examined the ground more attentively, but *not*, I must confess, in the expectation of finding any flint instruments there. On coming, however, to a part of the field where the subsoil of brick-earth seemed to have been but recently broken up, I saw to my great surprise a well-defined implement, of the pointed spearhead form, lying upon the surface. It has,

[a] Quart. Journ. Geol. Soc. vol. vii. p. 278.

unfortunately, lost its point, but has originally been remarkably similar in form to the spearhead discovered in Gray's Inn Lane, and others from Hoxne and the valley of the Somme. There can be no doubt whatever of this implement belonging to the same class as those usually found in beds of undisturbed drift at a considerable depth, yet in this case it was found upon the surface. The spot where it was lying is about 160 feet above the level of the river Gade at its nearest point, and is situate near the head of one of the transverse valleys which lead into the main valley of the Gade, between Boxmoor and Watford. The beds above the chalk at this place consist of brick earth and the gravelly drift I have already mentioned, containing a large number of flints and Tertiary pebbles, besides those of the older rocks before referred to.

There is not, however, any evidence at present to connect the implement with this drift. It appears to have been lying upon or near the surface of the ground for some time, and the flint of which it is composed is much whitened and altered in character superficially. Whether this has arisen from atmospheric influences, or whether it is due to the implement having been imbedded in the brick-earth, it is impossible to say; but a further examination of the spot, and other places in the neighbourhood where deposits of a similar character exist, may perhaps produce some further evidence, without which the present discovery is of little scientific value.[a] One of my objects in now mentioning it is to show the necessity of the search for this class of antiquities being carried on, if not by educated men, at least by men with educated eyes, for this implement was lying by the side of a public footpath, without having ever attracted the attention of any of the passers by, and would probably have remained there till now had it not accidentally caught my eye. Another cause why it should be referred to is, that it offers some inducement for the examination of all drift deposits, whether containing mammalian remains or not, though, as I have already said, there is no direct proof of any connexion between this implement and the drift deposits of the spot where it was found. There is, indeed, no reason why these implements should not occasionally be found on the old land surface wherever it exists in a state but little altered since the period of the deposit of the freshwater drift of the valleys, as well as among the drift; for it can only have been by accident that the implements became mixed with the *débris* carried down by the primæval rivers which deposited these beds of gravel, sand, and clay.

[a] Another implement of the round pointed form has been discovered (Nov. 1861) on the surface of the ground at the top of the hill on the east side of the Darent, about a mile E.S.E. of Horton Kirby, Kent, by Mr. Whitaker, F.G.S., of the Geological Survey.

I have now, I think, adduced all the known instances of the discovery in this country of the flint implements of the drift period, and will next say a few words with regard to the character of the implements themselves.

In my former paper on this subject, I divided them, for convenience' sake, into three classes. 1. Flakes. 2. Weapons with an acute or else rounded point. 3. Oval or almond-shaped implements, with a cutting edge all round. I observed, however, at the same time that there was so much variety in their forms that the classes, especially the second and third, might be said to blend or run the one into the other.

I see but little to alter in this proposed classification; but with a view of showing a greater number of the various forms, as well as of presenting, at a single glance, a comprehensive view of the general character of these implements, I have in Plate IV. engraved most of what may be regarded as the typical forms. They are drawn from actual specimens in the collections of Sir Charles Lyell, Mr. Prestwich, Mr. Wyatt, and myself, on a scale of six inches to the foot or half linear measure. Front and side views are given of each, and a description of their peculiarities and places of finding is appended.

Of the twenty specimens engraved, Nos. 1 to 4 belong to the first class—flakes; Nos. 5 to 17 to the second class—pointed implements; and Nos. 18 to 20, to the third class—oval implements.

The flakes appear to be most abundant among the lower deposits of the valley of the Somme, such as those at Menchecourt, near Abbeville, where several were dug out in the presence of Mr. Prestwich, and those of the Avenue de la Motte Piquet, at Paris. They vary considerably in size, in the relative proportions of length and breadth, and in the character of their point, which is sometimes sharp, as in figs. 1 and 2, and sometimes chisel-shaped, as in fig. 3. The principal characteristic is, that in all cases they have one side flat, or nearly so; and this follows of necessity from the manner in which they are formed; viz., by being struck off at a single blow from a block of flint, the surface of which had already been chipped into the proper shape to form the convex or faceted side of the flake. On some of the large and carefully formed flakes, such as No. 4, great pains have been taken to shape the surface of the flint; as their convex sides show seven or eight, or even more facets from whence smaller flakes had been struck off, in order to form a polygonal surface for the large flake. These large specimens appear to be almost peculiar to the lower drift deposits. Some of them present the appearance of having been chipped along the edges after they had been struck off from the parent flint; but whether by accident or design is not

certain. As far as my observation has extended, the flakes from the drift never present that subsequent rounding of the end at which the blow to dislodge them was struck, which is frequently found on the flakes of the so-called stone period.

As a guide to distinguish flakes artificially formed from those which are the result of natural causes of fracture, I may observe that in all flakes which have been detached by a single blow from a mass of flint, there is, on what may be called their flat side, a more or less bulbous or conical projection immediately below the spot where the blow was administered to strike it off from the mass. It is probable that this blow may in some rare cases have been the result of an accidental collision; but when we find, upon the other faces of the flake portions of cup-shaped depressions corresponding in form to the projections I have before mentioned, it becomes evident that these faces have been produced by previous flakes having been struck off, and that the flake is not merely the result of a single blow, but has received its form from at least three distinct blows, each administered in its proper place. The chances against this occurring accidentally are very great; but when in any spot we find several of these flakes, each bearing these marks of being the result of several successive blows, all conducing to form a symmetrical knife-like flake, it becomes a certainty that they have been the work of intelligent beings.

The second group (Plate IV. figs. 5 to 17) consists of implements more or less of a lancehead form, with acute or rounded points. It is difficult to draw any decided line of demarcation between the two characters of point, for, though the extremes are well marked—as, for instance, in figs. 6 and 11—yet there are others, such as figs. 5 and 12, which occupy an intermediate position. It must have been, indeed, to a considerable extent a matter of accident what character of point an implement would have, for, even supposing the workman who made them to have intended to produce one with a sharp point like fig. 6, yet the nature of the material is such that it would be extremely difficult to do so, and a more rounded point might be all that could be attained. It is, for instance, possible that fig. 5 was originally intended to have had a sharper point than it now presents.

Of what may be regarded as sharp-pointed implements, Nos. 6 to 9 may be taken as examples. They present considerable varieties, both in the manner in which their points are chipped and also in the formation of their butt-ends. The points are sometimes flatter on one face than the other, as in fig. 7, or alike on both sides, as in fig. 9; their surfaces convex like fig. 6, or chipped with a central

ridge like fig. 8. The edges are straight or only slightly curved, as in figs. 6 and 7, or else decidedly curved inwards, as in fig. 8, when the extremity is either made more rounded or brought to a bevelled point. The butt-ends are either chipped into a rounded form, occasionally sharp, as in fig. 6, but more often such as could have been held in the hand; or roughly truncated, as in fig. 7, in which case they would appear to have required a shaft or handle; or else they have been left with a sort of natural handle formed wholly or in part of the original surface of the flint, as in figs. 8 and 9. In some instances it is very remarkable how little the original shape of the flint has been altered in order to convert it into one of these pointed weapons. There is not only skill and design shown in the chipping, but judgment in the choice of the flint.

Fig. 10 is one of those roughly-chipped, pointed implements, of which many have been found of various forms. They seem to be either the result of fruitless attempts to imitate the more finished implements, or else to have been so hastily made, that more attention was paid to producing a point or a cutting edge than to symmetry of form. There is, however, no difficulty even with these, rude and barbarous as they are, in recognising the handiwork of man upon them.

The round-pointed implements (figs. 11 to 17) show many of the same peculiarities as those with the acute points. As a rule, their points are semi-elliptical in outline, though the sides are occasionally straight. They are usually almost equally convex on both faces. Their butt-ends are generally chipped more or less carefully into a rounded outline, not presenting so sharp an edge as at the point, (figs. 11 and 12), but are sometimes left truncated, like fig. 13. Other varieties have massive butts, roughly chipped out, or are formed with the rounded end of the nodule of flint left as a natural handle, as in fig. 16. Another form (fig. 17) has the outline nearly oval, and is chipped to an edge nearly all round, though slightly truncated at the base. These are commonly thin in proportion to their size, and approach nearly to those of the next class. Another form of the round-ended class is shown in fig. 14. These are usually thick and clumsy in shape, occasionally nearly oval, but generally truncated at one end, so as to give them a wedge-like character. On the edges of some of the pointed implements there is a flat place left, where the forefinger would come, supposing them to be held in the hand.

The third group (Plate IV. figs. 18 to 20) consists of oval or almond-shaped discs, with a cutting edge all round, or nearly so. Implements of this class vary considerably in size as well as in thickness; some of them show a portion of the crust of the flint on both sides, and appear to have been chipped from pieces of tabular flint selected for the purpose. I have a sharp-pointed

weapon of the spearhead form (Plate IV. figs. 6 and 7) from Hoxne, which has in the same manner been chipped out from a thin layer of flint. Occasionally these oval implements have a small flat place left on one of the edges, as on fig. 18, apparently by design. The outline is usually sharper at one end than the other, but occasionally they are equally rounded or equally sharp at both ends. Most commonly the two surfaces are almost equally convex, as in fig. 18, but sometimes one side is much flatter than the other, as in fig. 20. In some instances the outline is irregular in form, owing probably to there having been defects in the flint. Some of the thin discs are more carefully chipped out than is usually the case with these implements, and are, I think, peculiar to the beds at the lower level, such as those at Menchecourt. One of these is shown in fig. 19.

Such is a general outline of the principal forms that have been discovered; but the whole, with the exception of the flakes, are so connected together by intermediate links that it is only certain marked specimens, such, for instance, as figs. 6, 8, 15, and 19, which show very distinct characteristics. These variations in form are, no doubt, mainly due to the nature of the material.

I have already, in my former paper on this subject, made some remarks on the possible uses of the implements of the various groups, and will now only add that by far the greater number of the flakes seem better adapted to be used as knives than as arrowheads, and that it has been suggested by Mr. Prestwich that some of the round-pointed implements may have served as ice-chisels, such as are in use among the North American tribes, for there is reason to believe that at the time of the deposit of this fluviatile drift our climate was colder than it is at the present day.

Before leaving the subject it will be well to call attention to the manner in which the discoveries made in the drift spread over the open country, and those which have been made in caverns containing deposits of the same geological period and inclosing similar organic remains, mutually illustrate each other. The doubts which have been thrown upon the cavern evidence, bearing on the contemporaneity of man with the extinct mammals, are now in a great degree dispelled by similar discoveries having been made under circumstances which preclude the interference of those causes of error which come within the bounds of possibility in the case of caverns. The series of facts brought forward by careful investigators of the ossiferous caves in all countries have, therefore, a right to a new trial at the hands of scientific inquirers, in which probably the verdict that has already been pronounced against them will, on the admission of this fresh corroborative testimony, be set aside. It is beyond a question that

in Kent's Cavern, near Torquay, which has, however, been occupied at various times by man, even down to the Roman period, worked flints occurred "under the stratified unbroken floor of stalagmite,"[a] and that some of those engraved in McEnery's Cavern Researches closely resemble the implements from the drift.[b]

In the Brixham Cave, lately explored under the auspices of the Royal and Geological Societies, worked flints have also been found under the stalagmite, in one instance[c] associated with the bones of the entire hind leg of a cave bear, with every bone still in its proper position (even to the *patella* and *astragalus*), thus showing that the ligaments had been yet in existence when it entered the cavern in company with the worked flints, and that man was here in England contemporary with the cave bear, as the bones of the rhinoceros[d] at Menchecourt showed him, in like manner, to have co-existed with the extinct species of that animal.

But I find that it is still asked why are there no human *bones* found with these implements, as if man's works were not as certain evidence of his existence as any portion of his frame. Let us, however, see whether it is the case that no human bones have been found in true association with those of the extinct animals.

I think that those who will calmly and dispassionately read the account that Dr. Schmerling gives of his discoveries in the caverns of Engis,[e] will come to another conclusion. In these caves the greater portions of two human skulls, an incisor of another man, as well as two human vertebræ, and some of the bones of the extremities were found, together with worked flints, and associated with remains of the Elephant, the Rhinoceros, the Cave Bear, the Hyæna, the Horse, and ruminants. Indeed, one of the skulls was found at the bottom of the ossiferous deposit in the cavern in juxtaposition with the upper molar of the *Elephas primigenius*.

[a] McEnery's Cavern Researches, edited by E. Vivian, Esq., London, 1859, p. 20.

[b] The following extract from a note by Mr. Vivian at page 19 of his edition of McEnery's Cavern Researches is instructive:—

"In the exploration of Kent's Cavern by the Torquay Natural History Society, flints were found beneath the floor, in a portion of the cavern where the stalagmite could never have been broken up without quarrymen's tools. A paper which I wrote on this subject was read before the Geological Society, but was considered so heterodox that its insertion in the Transactions was delayed until the late lamented Dr. Buckland could again visit the cavern, which he was never able to accomplish."

In the abstract of this paper, in the Quarterly Journal of the Geological Society, all the information given is, that "the bones of various extinct species of animals were found in several situations."

[c] Geologist, vol. iv. p. 154.

[d] Archæologia, Vol. XXXVIII. p. 303.

[e] Schmerling, Recherches sur les Ossemens fossiles découverts dans les Cavernes de la Province de Liège. 1833, vol. i. pp. 30, 62; ii., 139, 177.

[f] Schmerling, op. cit. vol. ii. p 124.

The cavern of Engihoul[a] on the opposite side of the Meuse, furnished similar but not quite so decisive evidence, and there also portions of the bones of three individuals were found. In both cases the colour, the degree of decomposition, the rolled condition of their bones, their position in the caves, and even, to some extent, the relative proportion of the bones of different parts of the body to each other, were in no respect to be distinguished from those of the other fossil remains of extinct animals in the caverns of the district. In no case was any thing approaching to a perfect skeleton discovered, as would have been the case had the caves been used as places of interment. In nearly all the other caverns explored by Dr. Schmerling,[b] flint flakes were found mixed up with the bones of extinct animals, and evidently washed in at the same time.

But I must not enter further into the question of these cave deposits, as it would of necessity lead to a long digression from the immediate subject of this paper. I will only cite one other instance, similar to those already mentioned, which was quoted by Mr. Horner, the President of the Geological Society, in his anniversary address, delivered in February last. In a cavern, near Arcy, in the Département de l'Aube, are three distinct beds of drift, the two uppermost of which have, at some time, been disturbed or *remanié*, but the lowest of which is considered by M. de Vibraye, who has been exploring the cavern, to be "an undisturbed mass of materials washed into the cavern by the same force which spread the Pleistocene drift characterized by the remains of *Rhinoceros tichorhinus*, *Ursus spelæus*, and *Hyæna spelæa*." In this lowest bed, among a profusion of the remains of these extinct animals, one of the labourers, while M. de Vibraye was in the cavern, found a human jaw still containing two of its teeth. "I found this jaw," says M. de Vibraye, "while devoid of all preconceived ideas, and was even obliged to do violence to my individual convictions to admit the evidence. I can affirm that the homogeneous bed (in which it was found), the lowest bed in the cavern, was perfectly intact, and had in no respect changed its nature." Another tooth belonging to a different individual has also been discovered in the same cavern. Other recent discoveries, such as that in the cave of Aurignac described by M. Ed. Lartet,[c] and that made

[a] Schmerling, vol. i. pp. 33, 64.

[b] Schmerling, vol. ii. p. 178. Dans toutes les cavernes de nôtre province où j'ai trouvé des ossemens fossiles j'ai aussi rencontré une quantité plus ou moins considérable de fragmens de silex, dont la forme régulière a frappé, au premier abord, mon attention. La forme de ces silex est tellement régulière, qu'il est impossible de les confondre avec ceux que l'on rencontre dans la craie et dans le terrain tertiaire.

[c] Ann. des Sciences Nat. 4me serie, vol. xvi. Nat. Hist. Review, 1862, p. 53.

by Mr. W. Boyd Dawkins,* in a cavern near the well-known cave of Wookey Hole, afford corroborative testimony of the presence of man upon the earth at the period when these cave deposits accumulated, and when he was associated with a different mammalian fauna from that of the present day. I have but little doubt that ere long the remains of the men who formed these implements will be found in company with them in the drift of the valleys.

Another point of interest in relation to this inquiry is the discovery by M. Lartet of several bones of various animals of extinct species, bearing marks upon them where they have been chopped with axes of stone, and notches where they have been cut with flint knives, apparently in removing the flesh from the bones. This would prove not only the contemporaneity of these animals with man, but that they had also formed his food.

I am afraid that it will be thought that I have strayed too far from the province of the antiquary into that of the geologist, and no doubt the question of the degree of antiquity to be assigned to the implements found under the circumstances I have been describing, as well as all questions of the nature of the containing beds, are more of a geological than an archæological nature.

Still I am convinced that all antiquaries must of necessity take a deep interest in these the earliest relics of the human race with which we are acquainted, and I trust that by thus again calling the attention of this Society to these discoveries I may induce its members to co-operate with geologists in attempting to extend our sphere of knowledge, by the acquisition of a still more numerous array of facts, from which, at some future time, an approximately correct conclusion may be derived as to the early history of our race.

There is one point well worthy of observation, and which belongs rather to the antiquary than the geologist; and that is to determine whether the character of the implements discovered in one locality is in all respects the same as it is in those of some other place, or whether well-defined distinctions may be drawn between them. I cannot help thinking that there will eventually be some difference of character established between the implements found in the sandy deposits at the lower level and those in the more gravelly deposits at the higher level in the valley of the Somme, and if so, that these may form a basis of comparison for the implements discovered in other places. It appears to me *possible* that an abundance of flakes and knives, especially the more finished kind, like Plate IV. fig 4, and of the oval-shaped implements, with a cutting edge all

* Proc. Geol. Soc. Jan. 22, 1862.

round, chipped out with a considerable amount of skill and care, may prove to be the characteristics of the lower and more arenaceous beds of drift, such as are found at Menchecourt and Montiers; and if so, that we should find that there are two drift periods distinguishable by the position of their beds, and by the character of the implements they contain. I merely mention this as a suggestion, it may be of the vaguest kind, but still as showing the necessity of the co-operation of archæologists and geologists on this the neutral ground between the two sciences.

But, be that as it may, let not antiquaries neglect the new field that is opened for their researches.

The deposit in which the implements are likely to be found—the post-glacial drift—and more particularly the fresh-water pleistocene drift, containing elephant remains, occurs in nearly all parts of England. Any attempt to enumerate the localities where it is to be met with would involve a catalogue of places in almost every county in England, and more especially of places along the course of all of our largest rivers. It only needs diligent and careful observation to trace out fuller evidence of the existence and the method of living of man when he was the joint tenant of this country with the Mammoth, the Rhinoceros, the Hippopotamus, and the great carnivorous occupants of the caves at that remote period when the drift which lines the slopes of our great river valleys was formed; and ere long I am confident that this will have been done in many other places in England besides those which I have already enumerated.

JOHN EVANS.

JOHN EVANS, F.S.A. DEL.

Day & Son, L

Scale six inches to the foot.

FLINT IMPLEMENTS

J.W. LOWRY, SC.

to the Queen

FOUND IN THE DRIFT

or half linear measure

DESCRIPTION OF PLATE IV.

Group 1.—Flakes.

1. Simple flake, with triangular section.—Porte Marcadé, Abbeville.

2 Sharp-pointed flake, with several facets on its convex side.—Lower drift, Montiers, near Amiens.

3. Chisel-pointed flake of the same character.—*Ibid.*

4. Large carefully-fashioned flake, of the same character as that from Mautort, near Abbeville, engraved in the Phil. Trans., 1860, plate xii. fig. 2.—*Ibid.*

Group II.—Acute and Round-Pointed Implements.

5. Point rather rounded, sides straight, with a semi-elliptical butt; nearly equally convex on both sides, and with a flat place on one edge.—Biddenham, near Bedford.

6. Point sharp, sides straight, with semicircular butt; one surface rather more convex than the other, and slightly curved when viewed edgeways. Compare Archæologia, Vol. XIII., Plate XV.—Hoxne.—St. Acheul, near Amiens.

7. Point sharp, sides straight; one face more convex than the other; roughly truncated at base, whence it shows a portion of the original crust of the flint.—*Ibid.*

8. Point bevelled, sides curved inwards; chipped to a ridge on one face; butt formed of the natural surface of the flint.—*Ibid.*

9. Point slightly rounded, sides straight; equally convex on both faces; butt formed of the naturally rounded end of the flint. Compare Plate I, fig. 2, which has been chipped from a Tertiary pebble.—Reculver.—*Ibid.*

10. Point sharp, and slightly turned upwards, sides irregular; roughly chipped to a ridge, which is not central, on one face, giving a wedge-shaped section; slightly truncated at base.—*Ibid.*

11. Point and sides forming a semi-ellipse; butt chipped into a semicircle, its edge rather more obtuse than at the sides or point; almost equally convex on both faces.—*Ibid.*

12. Point similar to the last, but more acute; butt roughly chipped, and showing a portion of the original crust of the flint.—*Ibid.*

13. Point similar to the last, but sides irregular; butt-end roughly truncated.—Brick-earth, Warin's Pit, St. Acheul.

14. Wedge-shaped, with nearly semicircular end, rudely truncated, and roughly chipped out; equally convex on both faces, and showing part of the surface of the flint.—St. Acheul, near Amiens.

15. Sides straight, point rounded; rather more convex on one side than on the other; butt retaining the original form of the flint, but truncated.—*Ibid.*

16. Point similar to the last; butt formed of the rounded end of the flint; the chipping carried further along one side than the other, giving a wedge-shaped section near the butt end.—*Ibid.*

17. Point semi-elliptical; butt nearly semicircular, but slightly truncated; one face rather more convex than the other; thin in proportion to its size.—Champ de Mars, Abbeville.

GROUP III.—OVAL AND ALMOND-SHAPED IMPLEMENTS, WITH A CUTTING EDGE ALL ROUND OR NEARLY SO.

18. Equally convex on both faces, on each of which are portions of the white crust of the flint as well as on a flat part of one edge; symmetrical, but coarsely chipped out. This specimen approaches No. 11 in character, but differs in its proportions. Some other specimens are much thinner.- St. Acheul, near Amiens.

19. Equally convex on both faces, and very carefully chipped out; portions of the crust of the flint on one face.—Menchecourt, near Abbeville.

20. Irregularly oval, flatter on one face than the other; not so delicately chipped as the last.—Moulin Quignon, near Abbeville.