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1885.

ORDINARY MEETING, April 7, 1884.

H. Cadman Jones, Esq., M.A., in the Chair.

The Minutes of the last Meeting were read and confirmed, and the following Elections were announced :—

Associates :—Rev. C. Beeby, M.A., Birmingham ; Rev. Canon W. Daunt, M.A., Cork ; Rev. J. Iverach, M.A., Aberdeen ; Rev. W. H. Platt, D.D., LL.D., United States ; R. J. Wicksteed, B.A., LL.D., B.C.L., Canada.

Hon. Local Secretary.—Professor F. T. Bell, D.Sci. Belleville, Ontario.

Also the presentation of the following works for the Library :—

"Proceedings of the Royal Society."	*From the Same.*
"Earthquake Movements."	*From the Tokio University.*
"Graptolytes." By J. Postlethwaite, Esq.	*From the Same.*
'The Pharaohs and their People." By Miss Berkley.	,,

The following paper was then read by the Author :—

THE PREHISTORIC FACTORY OF FLINT IMPLEMENTS AT SPIENNES. By the Rev. J. Magens Mello, M.A., F.G.S., Member of the Scientific Society of Brussels, Local Secretary for Derbyshire of the Society of Antiquaries, &c.

IT is now a generally recognised fact that what has been called the "Stone Age" in this and in the adjoining countries of North-Western Europe was a lengthened period which was characterised by two well-marked periods,—one, the first, in which the implements used by early man were extremely rude, consisting chiefly of flints and other stones roughly chipped into forms more or less serviceable, which may have been used as axes, scrapers, knives, and hammers. During the earliest stages of the period these were rough in the extreme; a few flakes struck off here and there from a larger stone were considered sufficient to adapt it for various purposes. There was no attempt whatever at finish. Implements of this type have been met with in the gravels of certain rivers, and amongst the oldest deposits in bone caves. At a later date the implements were somewhat more carefully fashioned, and amongst the relics of early man found in caves in this and other countries, tools and weapons of stone

have been found which exhibit far more differentiation in their forms than those I have mentioned, and were frequently carefully and somewhat elaborately chipped into shape. These two classes of implements merge gradually into one another, and together form what is known as the Palæolithic stage of human culture in this part of the world. This stage, however, presents us with no instances of the highly-elaborated implements, many of which were carefully polished, and some of which even survive in the forms produced in other materials at a later period. That age in which polished implements were used is the Neolithic, sometimes called the Prehistoric, and is, as I shall have occasion to notice further on, sharply cut off from the preceding Palæolithic age; we not only find no fusing of the implements, such as is the case with regard to the ruder and the more highly-finished implements of this latter, but it is also divided from it by a great change in the fauna; whereas during the Palæolithic age such animals as the mammoth, the rhinoceros, the reindeer, the hyæna, and others which, like these, are either extinct or no longer to be found in these countries, were the contemporaries of man, these had totally disappeared before the incoming of the Neolithic race, and the fauna which now prevails in Europe first made its appearance.

Having thus sketched out the main features of the two ages of the Stone period, I purpose in this paper to give an account of one of the great manufacturing centres of the Neolithic age.

The prehistoric factory of flint implements at Spiennes, in Belgium, although long known to Archæologists, and described in the report to the "Société des Sciences, &c." of Hainaut, made some years since by MM. A. Briart, F. Cornet, and A. Houzeau de Lehaie, has not, so far as I am aware, been noticed in detail in any generally accessible publications in this country; and, having had an opportunity of visiting the locality, and through the kindness of my friend the Marquis de Wavrin, of obtaining a large number of characteristic specimens, it has occurred to me that a short account of these, accompanied by illustrations of typical forms, may prove interesting to any who care to investigate the history of early man in Europe, and who would wish to compare the implements of this locality with those met with elsewhere.

It is well known that the Prehistoric or Neolithic inhabitants of North West Europe did not depend solely upon isolated labour for the supply of such stone weapons and tools as were needed by them, each individual making his own

when required, but that large manufacturing centres were established, in suitable localities, from which immense quantities of implements were issued, to be dispersed in the ordinary course of that trade which is known from various sources to have been carried on by the wandering tribes of those early days; the implements derived from these factories can be traced over wide districts.

In this country we had the well-known prehistoric manufactory of Cisbury, where are still to be seen the old pits and galleries from which the flints of the Chalk were obtained, and in which pits are found not only numerous remains of the implements themselves, in various stages of completion, from the rough nucleus to the finished axe-head, but also of the tools used in extracting the flints.

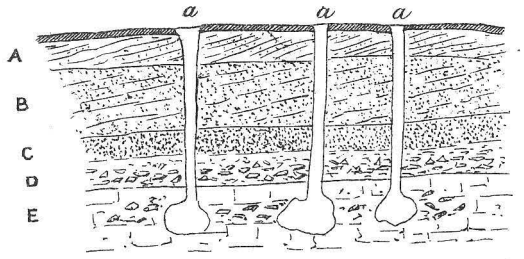
In France a considerable number of such factories are known,—for instance, the celebrated one at Pressigny-le-Grand, others also at Civray, Biard, and Charroux in Poitou, and one in the Commune of Chauvigny (Loire-et-Cher), called "le Champ des Diorières. Turning now to Spiennes, we find above that village, a tiny hamlet of labourers' cottages, built on either side of the little river Trouille, plateaux now occupied by cultivated fields, but which were formerly the site of one of the most important Neolithic factories with which we are acquainted. The table-land is cut through on both sides of the river to the south of the village by the railway, which has thus enabled us to obtain good sections of the various beds forming the elevated ground. These are found to consist of brick-earth below the surface *detritus*, and under this is sandy loam, locally called "ergeron," which, in its turn, reposes on other sandy beds, and on a deposit of angular and subangular flints, together with chalk *débris*, the chalk rock itself forming the basement of the whole series.

In the lower portions of these beds remains of the Pleistocene age occur, such as the mammoth, the woolly rhinoceros, the cave bear, the lion, the Irish elk, the urus, and the horse, and with these have been found flint implements of the well-known St. Acheul or river-gravel type. Through these various deposits, pits similar in many respects to those of Cisbury have been dug by the Neolithic men; in several places these pits not only penetrate the chalk, but from them workings have been driven in order to follow the line of flint nodules, to obtain which was evidently the object of these excavations. Sections of some of these pits have been exposed along the line of the railway-cutting, and here and there openings may be seen which communicate with the old galleries, whilst on the surface of the plateau itself the situa-

tion of the mouths of these ancient pits may here and there be traced. The old hollows are now filled up with quantities of *débris*, masses of chalk-rock, broken and worked flints, together with earth and sand, and mingled with these materials have been found the bones of a considerable number of animals formerly inhabiting the neighbourhood, such as the deer, elk, goat, short-horned ox, badger, polecat, otter, dog, cat, brown bear, hedgehog, hare, and rabbit, besides a few human bones and fragments of coarse pottery bearing no traces of having been thrown on a wheel of any kind. Many of the antlers of the deer have evidently been made use of as hammers or picks.

But it is not in these old workings alone that implements are obtained; lying upon the surface, or turned up in the course of agricultural operations, as well as in the thick talus of *débris* along the edge of the plateau between Spiennes and the railway, large numbers of worked flints have at different times been found. These implements are all made of the local grey-coloured chalk flint, and are met with in every stage of manufacture. Many of the specimens are most carefully chipped into shape; yet, well made as they are, none of them present the wonderfully-elaborated forms and the delicacy of the Neolithic weapons of the Danish tumuli, and they probably belonged to an earlier stage of the Prehistoric period, and were made by a less highly cultured people. Another point to be observed is that polished implements are very rarely met with at Spiennes; and it has been surmised, with much probability, that the makers of these implements were not in the habit of polishing them, that they sold or bartered them in the rough form, and that the buyer would, if he pleased, spend his time in putting on that polish characteristic of the Prehistoric or Neolithic age, but which was, perhaps, after all, a matter of "individual luxury."

With regard to the forms of the Spiennes implements we find a considerable variety of both small and large. There are, first, the large nuclei from which were struck flakes, to be fashioned by more delicate chipping into knives, scrapers, and arrow-heads. Many of the long narrow flakes, as well as the broader flat ones so common wherever implements occur in any quantity, are picked up on the surface of the fields. The nuclei themselves are often elaborated into "hâches" or axes, often called "celts," of various shapes. Some of the nuclei (figs. 1 and 2) are somewhat boat-shaped, with flakes struck off more or less at right angles to the keel, whilst others are longitudinally flaked. Smaller nuclei (fig. 3) are found pyramidally fractured; and some of these latter, as well as



Rough Diagram of the Spiennes Beds. Cf. A. Briart, etc., "Rapport."

A Brick earth.
B Sandy loam "ergeron."
C Sandy beds.
D Deposit of angular and subangular flints.
E Chalk.
a, *a*, *a*, "Prehistoric" pits.

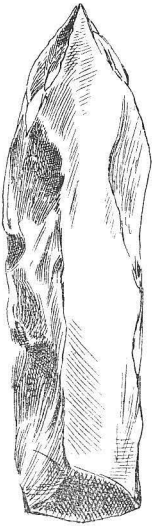
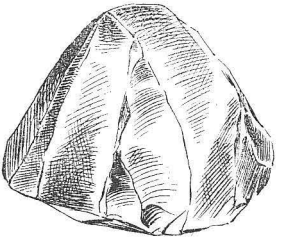


Fig. 1.—½



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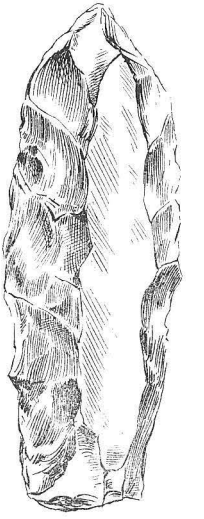


Fig. 2.—½.

Fig 4.—⅓.

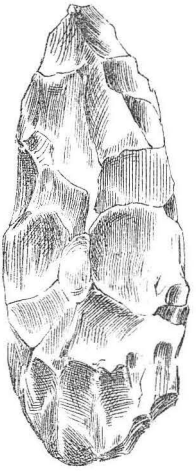
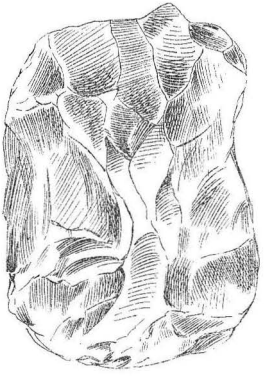


Fig. 5.—⅓.



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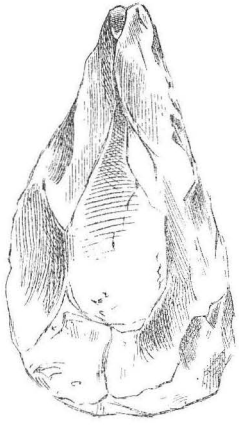
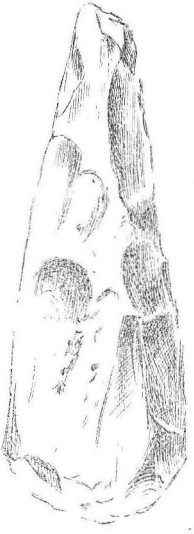


Fig. 7.—½.



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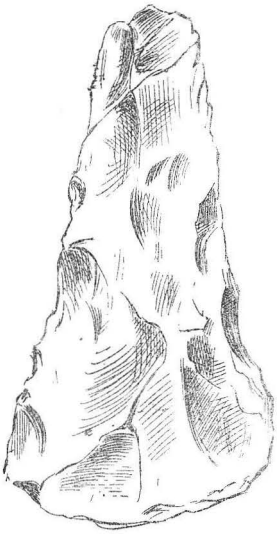
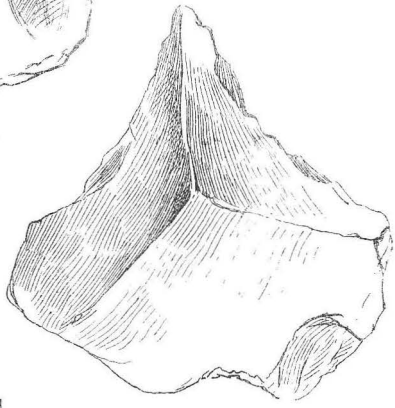


Fig. 9.—½.

Fig. 10.—½.



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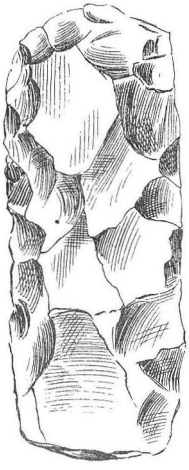

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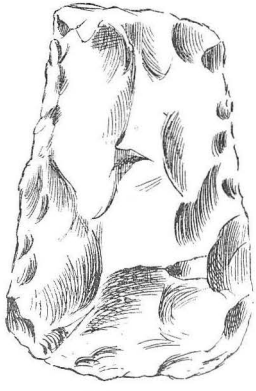

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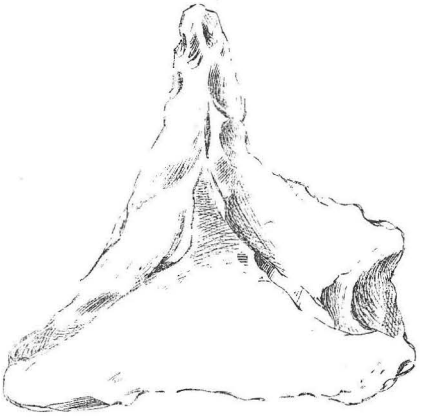

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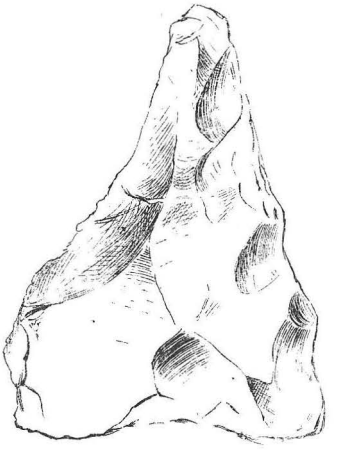

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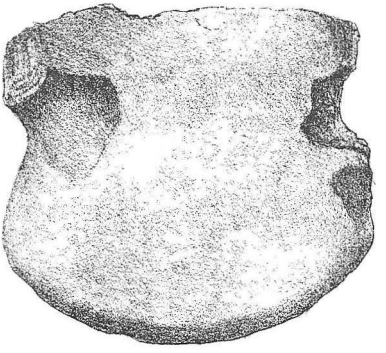

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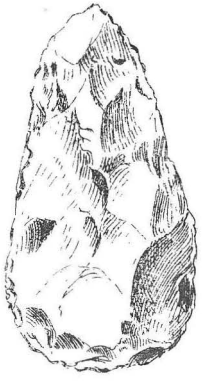

Fig. 16.—½.

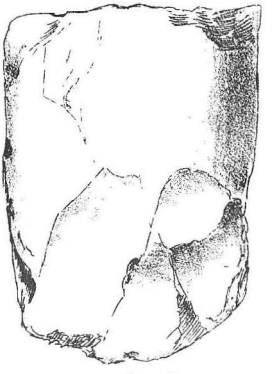

Fig. 17.—½.

large and small rounded masses, were evidently used as hammers, and still bear marks of rough service on their bruised faces; many of the larger elongated forms served the purpose of hammers likewise, as is shown by their crushed and battered sides. The large flints were worked into "hâches," which are often more or less oval or almond-shaped, either end of which might have been used (figs. 4, 5, 11, 16), whilst there are a few which bear a remarkable resemblance to the river-gravel forms, broad at one end and pointed at the other (fig. 7), and it has been questioned whether these Neolithic implements may not have had the narrow extremity in use, as appears to have been the case with the earlier weapons; the general rule, however, apparently being that the implements of this sort were, during the Neolithic age, sharpened at their broad end, whilst, in the Palæolithic, the point of the implement was used. The forms of the axe-like tools or weapons present us with several varieties, some (as fig. 8) being long and narrow, others (as figs. 9, 12) are broadened at the base, and are very similar to some of the Danish axes from the shell mounds. Large and small scrapers are plentiful, presenting, however, no special features, but long lance-head-like flakes (fig. 10) occur, some of which are not only carefully chipped on every side, but have been found also partially polished. These, however, appear to have been made from an already-polished celt, which was, probably, considered too precious to waste. Such smaller implements, fashioned out of broken polished ones, are not uncommon, and specimens are tolerably abundant in the ancient camp of Hastedon, near Namur, where barbed arrow-heads are also occasionally obtained, and are "characteristic of this stage of human culture" (Dupont). The polished celts or "hâches" found at Spiennes are very similar to those met with elsewhere. Fig. 18 represents a somewhat curious short form, notched at the sides in order to afford a firm hold for the ligature binding it to a shaft. Fig. 17 is a broken portion of a larger implement which has been partly polished, or, perhaps, has been chipped subsequently to its first use as a polished axe.

Another form of implement is found at Spiennes which is peculiar, namely, a rather large and flat triangular flake, which has been worked to a point at one of its angles. It was most likely used as a boring-tool.

These are the chief implements which appear to have been made in this primitive factory. That it must have been long established, during a tolerably settled period, is shown by the enormous number of tools and weapons still found on

its site; and there is also no trace of anything like protective works, such as are seen around the camps of other parts of Belgium, as, for instance, that of Hastedon, previously referred to.

The Spiennes flints are easily recognised when met with elsewhere, the grey colour of the flint contrasting with the yellowish stone of other localities, is one feature; and the surface-found implements are also incrusted with a white "patine," which is very generally discoloured with ferruginous stains along the angles of their faces,—stains probably contracted through the friction of the iron of ploughs, and of other agricultural tools used in the fields.

Far and wide over Belgium we frequently come across these Spiennes flints; in the Ardennes, in Flanders, as well as in many places nearer to the ancient factory itself, implements are found which must have been brought thence.

An interesting question arises in connexion with the Prehistoric implements. We have noticed already how, in lower portions of the series of beds in which they are found, the tools of Palæolithic man, the contemporary of the extinct Pleistocene fauna occur. Is M. Dupont right in supposing that there has been a direct derivation the one from the other, and are these Neolithic forms but the more advanced efforts of the same race of men, and not, as seems to be generally thought the case, the workmanship of a totally distinct people? There is certainly a strange similarity in form between some of the Spiennes surface flints and those of the St. Acheul type which underlie them; whilst, upon the other hand, we have to face the almost total change in the fauna,—a change as distinctly shown in the Spiennes beds as elsewhere, and which must have involved a great change in climate, and probably also in the physical conditions of the country, through all of which, if the view under consideration is to be accepted, the hunters and fishermen of the Palæolithic age must have continued to flourish and make progress until at length they developed into the somewhat more settled race of Neolithic times, possessed of domestic cattle, and having various industries and arts previously unknown or unpractised by their ancestors; then, side by side with these are we to consider the cave men, of whom there are such abundant traces in Belgium, as well as elsewhere, to have been contemporaries of these dwellers in the valleys, but possibly of a different race? and is their apparently sudden extinction to be attributed, as M. Dupont suggests, to the attacks of the hardier valley tribes, by whom they were exterminated? Here, again, we have to face the difficulty

which arises from the fact that in the caves we find no gradual passage of the Pleistocene into the Prehistoric fauna, but a sharp line drawn, the few caves which yield traces of the presence of Neolithic man showing that marked and abrupt alteration in the fauna to which I have referred; if the development of human civilisation in north-western Europe, of which alone I am speaking, has been a continued and gradual progress of a tribe or tribes of men, more or less closely connected together, and unmarked by anything like a great ethnographical break, ought we not to find an equally gradual change in the fauna? Can such a gradual change be shown to exist? Is it not rather a generally noticeable fact that the disappearance of the Pleistocene forms and the incoming of their successors is, as I have already pointed out, apparently marked by a sort of hiatus, which is as yet not very well accounted for, but which may perhaps with some reason be attributed, at any rate in part, to changes in the climate, closely connected with changes which have taken place in the physical geography of this part of the earth?

What light, if any, do such discoveries as those which we have been describing throw upon the question of the antiquity and primitive condition of the human race? As to man's origin and first appearance on earth science can as yet tell us little or nothing,—can record nothing after all but guesses, more or less plausible. All these discoveries of implements, whether in this or the neighbouring countries of north-western Europe, only give us a glimpse of the early condition of man in this particular quarter of the globe; and, however, far back in time we may be carried, we must not shut our eyes to the fact that we must go yet further back would we reach the age when the men of the river valleys and caves made their first appearance in the world, for no one, I suppose, would now hold the opinion that this race, which once inhabited Europe, originated in the localities in which their relics are now found: doubtless they were immigrants from some more distant region, only arriving in Europe after a long period of wandering; like their successors, may we not reasonably think that they formed one of, perhaps, the very earliest of those successive waves of migration, the more recent of which are recorded in traditions and history, migrations westwards from the cradle of the race in the East?

Whether there ever was a direct point of contact between Palæolithic and Neolithic man at any given place or time we cannot as yet say. At present all the discoveries made appear

to bear witness to that great break in time between the two already alluded to; to use a geological expression, no well-defined passage-beds are known, and Neolithic man appears as a new and strange race coming in after the disappearance, account for it as we may, of his Palæolithic forerunners. The Abbé Hamard, in his recently-published "Age de la Pierre, &c.," suggests that the Neolithic race formed the first incoming of the Aryans in Europe. This view, however, is altogether in opposition to that which has been advocated by Professor Boyd Dawkins and other authorities who consider the Neolithic population to have been a Non-Aryan race allied to the dark-skinned dolicho-cephalic Basques and other cognate peoples yet existing, whilst the Aryan race would be represented by the brachycephalic Celts.

Another very interesting question is whether these early men of Europe were always in the condition in which they appear to have been when living in this part of the world. If we may look upon them as offshoots from the parent stem of humanity, had their ancestors no higher civilisation than that of which they appear to have been possessors? Were the stone axes and knives the typical implements of the race when it originated, or were these wanderers reduced by isolation and privation to the state of barbarism in which they seem to have lived? Who shall say? It is a difficult matter also to determine whence the Neolithic stage of human progress originated. Polished implements are said to be very seldom met with in Asia Minor, and the makers of this type of implement do not seem to have entered Europe by this route. The same also is said of Egypt. The fact is, we know as yet far too little of the Prehistoric antiquities of the East, and more especially of that part of the Asiatic continent, which seems, as far as is at present known, to have been the cradle of mankind, and our discoveries in Europe, valuable in themselves as they are, really throw very little light upon the original condition of the human race; and it is quite possible that those facts of Prehistoric archæology which hold good for this quarter of the globe, may not prove equally true for all other parts of the world. At the same time it must be admitted that implements of stone of various sorts do appear to have been in use amongst men in all lands where man has lived, and that in all probability the general history of the race has been one of general progress in civilisation, but a progress broken from time to time through various causes by relapses or falls into a more or less barbarous state.

The CHAIRMAN (Mr. H. Cadman Jones).—I am sure I have the permission of all present to return the thanks of this meeting to Mr. Mello for his interesting paper. (Applause.) It opens up a class of deeply interesting subjects on which, however, in spite of all Mr. Mello has done, I am afraid we must await still further information before we can arrive at any practical conclusion. I have now to ask any who have remarks to make upon the paper to address the meeting.

Mr. S. R. PATTISON, F.G.S.—I think we ought not to allow the valuable conclusions put before us by Mr. Mello to pass without due acknowledgment of the masterful way in which they have been presented to us. The paper is one which is well worth dwelling upon, for it is extraordinarily complete, both in its facts and suggestions, and leaves very little to be done, except to study it. What the fruits of that study may be, we are hardly now in a position to estimate. As our Chairman has said, we have hardly sufficient facts, either in this paper or from other authorities, to enable us to furnish anything like a general theory. Of course, such a collection as we have on the table before us puts an end to any objections that have been made to the validity of flint implements. Whatever may be said as to particular attempts made by quarrymen, or even by *savans*, to impose upon their neighbours, it is impossible to maintain any such hypothesis here. We see before us implements of a manufacture quite as obvious in their character as if we had been in the factory and had actually seen them in the process of formation. Their variety is as remarkable as the state in which they are individually presented to us. It is clear that they were formed for the purpose of administering to various human wants, and that those who used them did not obtain them merely for the purpose of satisfying any immediate or urgent requirements, such as those of the chase or of war, but that they were evidently used in a state of society which was then fixed and settled, and which exhibited that variety of wants which arises out of an aggregation of men and their families in one particular locality. But although this collection puts an end to any doubt as to the genuineness of the implements, it fails to introduce any new fact in relation to the great mystery which surrounds the origin of palæolithic implements. It does not inform us by whom they were used, or when. They are said to underlie the later or neolithic implements, and at the same time to be unconnected with them; therefore, a dark mystery remains for the investigation of ourselves and others in the present and in future ages. It does not appear at all probable that this dark mystery will be very easily solved, for there have been a great many researches made into the subject, and very little progress in arriving at conclusions respecting it. Mr. Mello, in his very able remarks, has shown that we cannot say there was anything like a transition from the palæolithic implements into the later forms. The implements which surround the palæolithic fauna are quite different from those which surround the newer forms of the neolithic period. There is a vast difference between the implements of the mammoth age and those of the higher reindeer period. Those who study these two successions of life will be convinced that some

considerable period must have elapsed before the great change thus noted took place. Yet that time, although considerable, need not be indefinitely great, nor even so large as it is sometimes assumed to be, in order to account for the break Mr. Mello supposes. We find that the palæolithic period comes to a sudden stop as far as we at present know, and that these palæolithic implements also come to a sudden end. This break, accompanied by the physical changes which are evident, must have required time; but I do not know that it required a very great amount of time. It would, however, be a time that could be measured by centuries. I do not assume it to have required anything like a thousand years. It may certainly, have involved such a period; but it does not necessarily require it. There is also another point which these implements bring before us. It may be considered pretty well established that the newer implements belong to the beginning of an age which practically comes down to historic time. The implements of this class before us are neolithic, and are similar to those found in the British islands and other localities. They may, from this point of view, be said to connect themselves in some measure with the known monuments of history,—I will not say with quite modern history; but still, with history that may be termed modern, as compared with geological periods. We do, therefore, attain an advance of knowledge by the discovery of such implements as these, especially when they are found on so extensive a scale, and are brought before us in so admirable a way. We cannot be too loud in expressing the obligations of this Institute, and of all who are concerned in the elucidation of so interesting a subject, to Mr. Mello for the able manner in which he has been good enough to place his conclusions before us. (Applause.)

Mr. E. Charlesworth, F.G.S. (a Visitor).—I feel very grateful for the invitation to be here this evening, as it has enabled me to hear the very able paper read by Mr. Mello. My own studies have been directed, not so much to the evidences of human handiwork in the early history of mankind on this planet, as to the faunas which have accompanied these implements; but, at the same time, I think it impossible to study the ancient fauna of the globe, as evidenced in what are called pleistocene times, without feeling the deepest interest in the great question so ably brought before us to-night. One of the lessons, and a very important one, we ought to draw from the history of this subject, and the connexion between these human evidences and the mammoth, is, that nothing which has been brought before the scientific and intellectual world, which for a time may seem to be utterly incredible, is therefore to be scouted as utterly false. Mr. Frere, a gentleman who lived in the county of Norfolk, nearly a hundred years ago, laid a paper before the Royal Society, in which he stated that he had found at Holme, or Hoxne—a village not far from Thetford,—unquestionable human implements in association with the remains of the mammoth, and clearly proving that that animal and man were contemporaneous. The Royal Society paid Mr. Frere the compliment of publishing his paper; but the learned world of that day discarded and altogether scouted his conclusion as utterly unworthy of further investigation. For

nearly half a century that paper remained in the volume of the *Transactions of the Royal Society* without being thought worthy of scientific discussion. But after the lapse of something like forty or fifty years light suddenly broke in upon the truth of that theory, of which the research made by Mr. Frere, who had long gone to his rest, was the forerunner ; for the evidence he had furnished was confirmed by M. Boucher de Perthes and other workers in the deposits of the pleistocene period. There are one or two points on which I should like to question Mr. Mello. In the first place, I would ask him to explain, if he can, the uses of these implements. Mr. Mello has referred to the beautiful finish of some of those that have been brought from Denmark. I may state that I was one of the pioneers in the formation of the Anthropological Society, and was present at one of its meetings a few years ago. On that occasion every article of furniture in the room was covered with a magnificent collection of flints from Denmark, and what most astonished me was that some of the implements, which were six, seven, and eight inches in length, were most beautifully, symmetrically, and even exquisitely finished ; but at the same time so slender in their make that I should have thought that to have put them to any use requiring considerable mechanical effort would have had the effect of demolishing them ; that is to say, that to have speared an animal with any one of them would have broken it to pieces at once. This has always been to me a great difficulty ; and the same remark will apply to some of the arrow-heads. I have had great practice in what may be termed flint-chipping, though I never attempted to make implements or flake knives ; but, being familiar with the peculiar brittleness of flint, it is to me a great puzzle to realise how these long slender implements could have been used either in war or in the chase, without being broken : that is one question on which I hope Mr. Mello will be able to satisfy my curiosity. Another question is this:—How is it that the early, or palæolithic, implements found in the gravel beds have their edges sharp and little worn, while the gravel itself, consisting of flints derived from the chalk, is generally presented to us in the form of boulders and pebbles, and not in the form of the original flint as seen in the chalk? In fact, we see it only in the form of rolled pebbles, or shingle, such as we find on the sea beach. But when we come upon these flint implements, instead of finding that they have been rolled into pebbles, we see them with their edges clear and sharp, and with no evidence of bouldering. I do not mean to say that no such thing has ever been seen as a bouldered implement in the flint gravels ; but the implements generally are such as I have described. I remember having gone with Mr. Fitch, of Norwich, to Brandon, and although we did not obtain any on that visit, Mr. Fitch had previously procured from Brandon, at different times, a magnificent series of flint implements ; not one of which presented any signs of bouldering. How, I ask, is this to be explained? There is another point as to which Mr. Mello, will, perhaps, say a word ; I allude to the question of forgeries. When it was first discovered that there really was some evidence of man having been contemporaneous with the mammoth, I was so unfortunate as to fall in with that quite

too clever individual, commonly known as Flint Jack, and I may add that I "paid the piper" for my acquaintance with him,—and pretty smartly too. (Laughter.) I did not suffer much in pocket myself, but he certainly did astonish my rather weak nerves, by showing me a number of fish-hooks, combs, and knives, which he said he had picked up on the Yorkshire wolds. (Laughter.) I communicated with a gentleman whose name I have no doubt is well known to many here,—Mr. Mayer, of Liverpool,—telling him what had been discovered in Yorkshire, at a place not far from Whitby, and that a large collection was to be had for £50. Mr. Mayer was so excited by the intelligence that he started off at once for Yorkshire, paid the £50, and brought away a batch of "Flint Jack's" work, in which I do not say there was nothing genuine, although probably about four-fifths were forgeries. This is one reason why I have felt a little distaste for the collection and study of these implements. Perhaps Mr. Mello will tell us whether he is able, under all the circumstances, to say whether what is put before him is a genuine article or a forgery. (Applause.)

Rev. F. S. Cook, D.D.—Perhaps Mr. Mello will be kind enough to state the depth of the shafts at Spiennes, and whether they are sinkings of a well-like character, or are merely large, wide pits; because, if they are of well-like formation, one would naturally inquire with what implements the wells were sunk.

Mr. W. P. James.—I merely wish to say, on behalf of those of the outside public who desire to know something about these mysterious questions on the borderland between geology and archæology, that there are certain points on which we should like to have a little more light thrown than has been the case up to the present time. I may allude for instance to the use of the word "prehistoric." Prehistoric, as far as the ordinary interpretation of the word goes, means previous to history; but then we find that the historic records themselves vary in date, and thus we become confused in our chronology. I would remark, by way of illustration, that "prehistoric," in regard to Egypt, would mean a very different thing from "prehistoric" in regard to Gaul or Britain. Before the beginning of history in Egypt would mean about 3,000 or 2,500 years before Christ; whereas, in reference to Britain, it would mean only 300 years before Christ. I do not think that those who use the word "prehistoric" fully realise its extreme vagueness. We are, of course, most intimately connected with our own island. Let us take it as an example. The first time it is mentioned for certain is in the *Travels of Pytheas*, a Greek, whose book was long deemed fictitious, but is now known to be genuine. That traveller landed in Britain 300 years before Christ, and described what he saw. It appears that there were Celts here at that date; and we cannot go further back by means of our records, or by an appeal to material monuments, such as those of Egypt. The glory of Egypt had all passed away before the historic period had begun in Britain; in other words, all the Celtic flints may be of later date than the papyrus rolls of the early dynasties. I do not pretend to understand this subject in its

technical aspect; but I believe there is a general feeling among the unscientific public that conclusions are drawn with very great freedom with regard to flint implements, and especially with reference to the pushing back through them of man's existence on the face of the earth. When the word "prehistoric" is used, it is assumed that it denotes great antiquity; whereas it may refer to a stage in one nation contemporaneous with the historic period of another, and in reality quite modern. I am rather sorry that, in his very able paper, the author has used such extreme caution in his inferences and conclusions with regard to the points of contact between archæology and geology, because it is in them that the main interest on the part of the public lies. As to the implements themselves, we cannot, without some amount of training, appreciate their various stages of elaboration; but we are greatly interested in knowing at what point we may join these things on to historic facts, so as in some degree to approximate chronologically the prehistoric to the historic period of human existence in Great Britain and Gaul. Are we to suppose that our prehistoric ancestors lived on the very verge of European civilisation of which the western parts of France and Great Britain were the outlying provinces; and that the Esquimaux of the present day are to be considered as in a similar state because they still use these flint implements? This subject is apt to be discussed with an indefiniteness and vagueness that seems hardly ever to lead, or to be likely to lead, to any useful conclusion. If Mr. Mello is able to dispel some of this vagueness, there are many in this room who would be much obliged to him. (Hear, hear.)

Mr. J. RENDALL.—I simply rise to ask a question. I should like to know how it is that, among the large number of these implements which are produced here and elsewhere, so few present any indication of the way in which they have been used? Nothing would appear to be more natural than that an uncivilised race, not possessing or knowing the use of metals, should convert flints into such implements as they might require for the various purposes of life. But when we look at the flints on this table, and at those which have so often been produced before, and bear in mind that they are all specially selected specimens, we cannot fail to notice how few there are of the entire number on which any apparent marks of fitness for their intended use are visible? Their adaptation to the purposes of arrows has been already mentioned, and we all know that such things, when projected with more or less force, would be of use, though they may not exhibit much inherent strength. But with regard to the other flints now on this table there is scarcely one, as it seems to me, which a savage, having sense enough to make it, would not presumably have fashioned into a more useful shape. There is only one which exhibits what I should have thought every one would have displayed. I allude to that which is marked "No. 18" in the illustrations at the end of the paper. This has a handle by which it might be fastened to a shaft. If a man had chipped a flint for use as a chisel, would he not have either made dents in it, or otherwise so shaped it, that it might be fastened to a handle? There are one or two of these flints that might have been used without handles,—those for

instance which the lecturer has described as borers. There are some that might have been employed as scrapers; but most of the flints, if put in a hole for use as chisels or for any other purpose, would soon slip out. They seem to me, for the most part, nearly useless in the shape they bear. I would ask Mr. Mello if he can suggest any way in which the greater part of them could be fixed? If they were to be used for warfare, or as a defence against wild animals, how is it that they are not so shaped as to make them likely to prove useful?

Mr. S. R. Pattison, F.G.S.—May I be allowed to state, with regard to some of these implements (pointing out the objects referred to), that I have seen hundreds of similar tools in the Valley of the Connecticut where they have long been in use for hoeing corn. They are attached by thongs of leather to handles which are not very stout, but are rather long, and allow a little elasticity, and with such implements maize or any other crop may be hoed. They would make very good garden implements—quite as good as our own hoe. In this shape the hoe has long been made and used by the Indians, and is so used still. Numbers of the hoe-heads are left scattered about the ground. They are not considered of any value, and are not removed from place to place, but are left, when done with, in the fields. I might go through the entire list and vindicate their several uses; but that would take up too much time. I may say with regard to another point which has been mentioned, that in the cromlechs found in Brittany there are one or two drawings on the inside of the inner granite stones of the great graves, which show the handles actually attached, sometimes by putting the implement into a split piece of wood and tying it on. I think that this has happened in the case of some of these tools.

Mr. R. J. Hammond.—I should like to know whether Mr. Mello is of opinion that the tribes who made these implements were ascending, or retrograding in the scale of civilisation? Some say the proofs we have are in favour of the supposition that they were ascending? Is it impossible, if they were going backward, that some of the remains showing their previous advance would be found? Have indications been discovered that they had been in a higher stage of civilisation?

Mr. J. M. Mello, F.G.S.—I am afraid I shall not be able to reply to all the questions that have been put to me; but there are some I will endeavour to answer as plainly and concisely as possible. One speaker asked: What is the thickness of the various sections in which the pits at Spiennes occur? They vary from about 3 feet to 30 feet. There is one typical section given by M. Briart, who says that these pits are vertical, narrow, and circular in section, and from rather over half a mètre in diameter, up to very nearly a yard; that they are often slightly enlarged towards the surface and also at their base in the chalk. All of them are filled up, as I have said, by blocks; and any one who cares to look at the drawings given of one or two of them in M. Briart's pamphlet will see that some of these pits were very large in extent, and quite funnel shaped at their mouths, while at the base they run underground in the form of regular galleries,

sometimes in two directions; they vary, however, very much in form. Mr. Charlesworth has asked a question as to the highly elaborated Danish implements. It certainly has been a puzzle to define what use could be made of some of the more delicate spear-heads: I have some, but have not brought them here to show you. They are so delicate in form that a very small amount of violence would suffice to break them; but at the same time they might, when fitted as spears, be used as very formidable weapons against naked flesh. I cannot say, however, that they were ever used in battle against naked savages; it is of course doubtful whether in such a climate as ours they would have had to encounter only naked flesh. I would suggest whether it is not possible that some of the highly elaborated implements may have been intended simply for ornamental or state purposes, and perhaps, for interment with the dead. I believe that some of the more elaborate New Zealand weapons of the present day are merely state implements—I allude to some of the finely-edged tools found in that country; but of this I am not quite certain. With regard to what has been said about "Flint Jack" and the forgery of flint implements, I may say that I have also had experience of what "Flint Jack" could do in this way. I saw a good deal of that individual a few years before his death, and he made a large number of implements for me. I remember that on one occasion I gave him a soda-water bottle, which he broke up and made into some very beautiful arrow-heads and other implements. He also manufactured, out of some of the iron slag of the district, some forgeries which any one not acquainted with the appearance of the genuine articles would have said must have come from the obsidian district of Mexico. No one, however, who is practically acquainted with the true implements is likely to be taken in by forgeries, however skilfully manipulated. The forger cannot give what is called the patin, which is the white surface produced on the flint by age and exposure. These implements from Spiennes could not have been forged, because no forger could produce the white surface they possess. If you were to break one you would find that the white film is a mere coating. Very small and thin implements might, however, be forged by chipping off the patin from highly weathered flints, in which the process has gone some depth. In some cases this extends to nearly half an inch, so that it would not be difficult to get a piece large enough to make a small arrow-head. A large implement could not, however, be obtained in this way. I have one or two forgeries of implements from St. Acheul: they were made by some of the most celebrated forgers of that district, but it is found that in the old flints there is a high gloss which cannot be found on the recently fractured specimens, the latter being of a dull appearance and not at all glossy. There are, however, some kinds of flint out of which implements might be forged so as to deceive connoisseurs, the grey flints from which they could be made being dull even after having been for a long time exposed to the air. But as a rule, the forgery has a totally different surface from that presented by the genuine implement, and the signs of weather-staining, such as are seen in the implements on the table, cannot be produced by forgers. Another question

put by Mr. Charlesworth, as to how it is that the river-gravel types do not appear to have been more rolled and worn than they really are; I am hardly able to answer. Some of these Brandon implements have the appearance of having been rolled; the specimen in my hand exhibits a good deal of wear and tear: but a great many of them—especially one which I have from St. Acheul—are very sharp at the edges. But we must remember that the gravels must have been rolled about for ages before the implements were dropped among them. I cannot say whether the ancient savages and hunters who used these tools and weapons had canoes. Perhaps, and more probably, they walked over the surface of the rivers when frozen, and some of the implements they may have dropped would have fallen through when a thaw came, and so have become mingled with the gravel, where they may not have been subjected to the same amount of rolling as the bulk of the stones forming the river-beds. I think I heard some one speak of drawing a distinction between the mammoth age and the reindeer period. I ought to remind that speaker that the neolithic period was not the reindeer period, and that the reindeer was contemporaneous with the mammoth. In the French caverns there are remains of what is called the reindeer period, which is sometimes spoken of by Mortillet and others, who, in allusion to the contents of some caves in the Dordogne, refer to the mammoth and reindeer periods; but both are palæolithic as regards man. The reindeer is a pleistocene animal, and there are two stages, at least, of the palæolithic age; but the reindeer became extinct in North-Western Europe before neolithic man made his appearance, as is shown by the fact that we never find reindeer remains along with neolithic implements. Among the characteristic animals of this period we have the rabbit, the short-horned ox (*bos longifrons*), the sheep, and other creatures that are never found with the mammoth, rhinoceros, reindeer, or any other of the pleistocene fauna. I have been asked by another speaker for a definition of the word "prehistoric." This is, of course, a term which may be used in a vague way. When it is employed by Sir John Lubbock in the title of his work on *Prehistoric Times*, it is intended to embrace the whole of the two periods, pleistocene and neolithic. In fact, it may be said to embrace, in his mode of applying it, the whole of that period of human existence which preceded the records of history. But I have used the word simply as a synonym for "neolithic." When I speak of "prehistoric times," or of "prehistoric implements," I make a distinction between the palæolithic implements and those of the neolithic age, as the palæolithic implements are never polished; while what I call "prehistoric" or "neolithic" implements are polished—not always, but in many cases. I forget who it was originated this restricted use of the word "prehistoric" as embracing the neolithic age, and also the bronze age by which it was followed; but Professor Boyd Dawkins employs it in this limited sense. Professor Dawkins likewise thinks that the pleistocene and palæolithic men, who were the contemporaries of the mammoth and other of the extinct fauna, were possibly the ancestors of the present race of Esquimaux; that the Esquimaux were

the descendants of the palæolithic men, who were driven, little by little, to the north. These are the principal questions that have been put to me; but there is one other to which I would refer. I was asked whether I could suggest how implements were used. We meet with some in the Swiss lake dwellings, which used to be fastened to a fragment of deer horn. The hollow part of the antler was made to hold the implement, and it was sometimes bound to a wooden holder. Others would be bound by a leathern thong, or by a fibre similar to that which the savages of Australia and other places use to fasten their weapons to the holders. Some of the scrapers found in the Swiss lake dwellings were inserted into horn holders, one portion being pointed and unbroken, and the other, which was intended for use, chipped and jagged. Some spear-shaped forms were probably fastened in another way. Sir John Lubbock, in *Prehistoric Times*, figures a spear-head which is, I think, now in use among the Australian tribes. It is bound to a long spear-handle. Also, in the Swiss lake dwellings, we find implements simply mounted in a horn or bone holder. They were just driven in and used, I suppose, as scrapers, though probably a good many of them were like a schoolboy's knife, and used for more purposes than one. (Applause.)

The meeting was then adjourned.