THE ANCESTRY OF THE MOUSTERIAN PALÆOLITHIC FLINT IMPLEMENTS.

BY J. REID MOIR, F.R.A.I.

It is generally recognised by students of prehistory that, with the close of Acheulean times, a new method of flint implement-making came into vogue. The Acheulean implements which are found in various ancient valley gravels and other deposits represent the culmination of the long-continued *coup de poing* or hand-axe industry, in which the well-known pointed and oval palæolithic implements were made. These specimens were produced by so modifying a nodule of flint, by the removal of flakes, that the implement, in its final form, represented the core or central portion of the original nodule.

The Acheulean specimens exhibit flaking over both their surfaces (Fig. 113x), while those made during the next cultural stage, the Mousterian, show flake-scars on one surface only. And whereas in the Acheulean epoch the implement was made by the modification of an actual nodule of flint, in the Mousterian phase all the implements, with the exception of the few Acheulean forms found in the oldest strata, were formed from a flake struck from a nodule of flint previously prepared by flaking for such detachment. It is clear, then, that at the close of Acheulean times we witness a marked change in the manner of making flint implements. This change, moreover, is of such a fundamental character that many prehistorians, realising its importance, conclude that the Mousterian implements were fashioned by a new race of people, who gradually "absorbed" the Acheulean tribesmen (see for instance, Comont's "Les hommes contemporains du Renne," pp. 97 and 131). If this was the case, as appears to the author to be in every way probable, it is clear that the newcomers adopted for a time some of the technique of the Acheuleans, as in the oldest Mousterian strata implements of this culture are found associated with typical Mousterian specimens. But it would seem that this adoption did not find favour, as in Upper Mousterian times the Acheulean hand-axe gets very rare, and finally disappears, never to return.

In an article published in *Science Progress* ("The Relationship of the most Ancient Flint Implements to the Later River Drift Palæoliths," No. 45, July, 1917, pp. 83—96), the author has given an account of how, in his opinion, the evolution of the palæolithic hand-axe exhibiting a rhomboidal section came about. But the Mousterian implements present a new problem, and their evolution must have proceeded on totally different lines from that of the normal palæoliths. There can, however, be no doubt that this evolution took place, and the author proposes, in the present paper, to put forward an explanation of it which appears to him to be in accord with reason and probability.

The Mousterians, as we have seen, practised a flake industry, and in the most ancient deposits of this epoch specimens have

Fig. 113. Top: Acheulean Implements; two views. Middle: Prepared Core of the Mousterian Period. The Flake-Implement (outlined in heavy line and marked A) is detached from the core by a blow given in the direction indicated by arrow. Bottom: Mousterian Flake-Implement; two views.

been collected which demonstrate clearly the manner in which the industry was carried on. A nodule of flint was first of all "dressed" by the removal of large flakes into a massive steep-sided disc-like form (flatter on one face than the other). After such preparation a skilful and more or less heavy blow was delivered upon one or other of the steep sides of this prepared core, and in such a manner that a large flake was removed from the flat face

Fig. 114. Upper: Chalky Boulder Clay Racloir; two views.
Lower: Chalky Boulder Clay Racloir; two views.

already mentioned (Fig. 113v). As the prepared core exhibited the flaking all over the flat face, it is clear that the detachment of flake would carry away some of this flaked surface, and the detached piece of flint would show on one side the truncated flake scars of the parent block from which it was struck (Fig. 113A), and on the other the plain fracture surface, with bulb of percussion, produced when the flake was removed (Fig. 113B). The piece of

flint would show also a faceted striking-platform, due to the fact that the area upon which the blow fell and which was removed simultaneously with the flake, formed part of the flaked core. But the presence of such faceted striking-platforms would depend solely upon the degree of elaboration of the core by the ancient workman.

These flake-implements, as they are called, after being trimmed into shape by secondary work round the edges (indicated by crosses

Fig. 115. Upper: Kentian Point; two views.
Lower: Mousterian Point; two views.

in Fig. 113A) were used by the Mousterian people for the various purposes of their daily life. Two other forms of implements predominate in the Mousterian culture. The first is the *racloir* or side-scraper (Fig. 118z), the second the point (Fig. 115z), and both these implements were fashioned from flakes removed from prepared cores of a similar nature to that described above. The *racloir* presents one cutting-edge, the point two, and it is supposed that the latter

is in reality simply a double racloir, the two cutting-edges of which have met and formed a point.

Now it is at present somewhat difficult to trace the evolution of the elaborate prepared core from which the Mousterians struck their flake implements. But it can be stated with certainty that flake implements of a primitive type occur in the detritus-bed below the Pliocene Red Crag, and in the Pleistocene and supposedly pre-Acheulean Middle Glacial gravel and Chalky Boulder clay.

If the reader will refer to the drawing of a Mousterian flake-implement (Fig. 113z) and compare its main characteristics with those of the specimens derived from the afore-mentioned deposits (Fig. 116), he will at once realise the truth of this statement. In all the text figures of these flake-implements the letter A appears upon the surface upon which the truncated flake scars of the parent block of flint are visible, while the letter B appears upon the plain bulbar surface produced when the flake was detached. It is true that in the sub-Crag detritus bed, the Middle Glacial Gravel and the Chalky Boulder Clay, the cores from which these flake-implements were struck have not yet been found, but we know that such cores must have been made, and further research will no doubt bring them to light. We have seen (see *Science Progress*, No. 45, July, 1917, pp. 83-96) that the most ancient flint implements were made from pieces of broken flint of tabular form presenting two naturally-produced flat striking-platforms. On these platforms flake-removing blows were delivered and the piece of flint fashioned to the required shape. We have seen also that as time went on knowledge was acquired of the manner in which to make a flat striking-platform by intentional flaking. And it seems easy to imagine that in the manufacture of the sub-Crag rostro-carinate, flakes would be removed showing the truncated remains of previously-struck flakes upon one of their surfaces, and that such flakes would be utilised as implements for scraping and other purposes.

The author has in fact many times produced such flakes when making flint implements himself, and their production is indeed inevitable. We may presume that the ancient flint workers, having recognised the use to which these "fortuitously" produced flake-implements could be put, gradually acquired the power to produce them at will, and thus the first prepared core came into existence. It will thus be seen that the Mousterian flake-implement had its birth in far-off Pliocene times.

The origin of the racloir and point is equally remote. As we have seen, both these implements were fashioned out of flakes struck from a prepared core, and that such cores are of great antiquity. But the actual form of the racloir and point is even more primitive. For both are nothing more than the highly-evolved descendants of the very ancient Kentian racloir and point. To make this clear the author has illustrated a Kentian and Moust-

Fig. 116. Top: Sub-Crag Flake-Implement; two views. Middle: Middle Glacial Flake-Implement; two views. Bottom: Chalky Boulder Clay Flake-Implement; two views.

erian racloir side by side, and also a Kentian and Mousterian point.*

Now in both cases the Kentian implements were made from naturally-broken pieces of flint, while the Mousterian specimens were fashioned from flakes struck from a prepared core. But this difference is of secondary importance in the present case. The salient fact is that we have four pieces of flint of more or less tabular form, which have been made into similar implements, and we want to know how they were made.

In the case of the Kentian racloir (Fig. 118y) blows were delivered upon the flattest side and near one of its margins, which resulted in the production of the necessary cutting-edge; in the case of the Mousterian racloir (Fig. 118y) blows were delivered upon the flat bulbar surface and near one of its margins, which also resulted in the production of a cutting edge.

The Kentian point (Fig. 115y) and the Mousterian point (Fig. 115z) with two cutting edges were made in a similar manner to the racloirs. In both cases blows were delivered near the two opposite margins of the flat surfaces, and the necessary cutting-edges produced. Thus it is clear that the Mousterian racloir and point are fundamentally primitive in their conception, and that their ancestral forms appear in the earliest implements of which we have any knowledge.

Moreover in the sub-Red Crag detritus-bed racloirs and points occur made from struck flakes, and these are still more marked and made more skilfully in the later Middle Glacial Gravel and Chalky Boulder Clay (Figs. 114, 117).

But it is necessary to point out that the flaking forming the cutting-edges of the Mousterian racloirs and points is of a different order from that exhibited by the more ancient examples of these implements. This difference is due to the angle at which Mousterian man delivered his blows on the margin of the flat surface, being different from that adopted by the more ancient workman. This, however, is a minor matter in the present enquiry, and several of the racloirs and points recovered from the Chalky Boulder Clay exhibit, moreover, edge-flaking very nearly approaching in appearance the typical Mousterian workmanship.

As was pointed out in the article in *Science Progress* already mentioned, the primitive Kentian plateau implements developed gradually into the rostro-carinate and finally into the normal palaeoliths. We now see it is probable that these Kentian specimens were, by a different method of evolution, transformed into the well-known implements of Mousterian times. And there is another aspect to this question which appears to be of importance. The sections of the Kentian implements and the sub-Crag rostro-carinates are more or less triangular, the flat base of the triangle having served as the striking-platform in the formation of the

* The Author is under the impression that attention has been called before by previous writers to the resemblance between the Kentian and Mousterian implements, but he cannot now find any references to this in the various books at his disposal.

Fig. 117. Sub-Crag Racloir; two views.
 Sub-Crag Point; two views.
 Middle Glacial Racloir; two views.
 Middle Glacial Point; two views.

desired implement (see *Science Progress*, No. 45, July, 1917, pp. 83-96) and the implements retaining an original striking-platform as their base, which the author proposes to describe as of "simple" section. But when the rostro-carinate developed into the palæolithic implement with two opposite cutting-edges (the original striking-platforms having been flaked away), a more or less rhomboidal section was produced, and this the author proposes to call a "complex" section.

Fig. 118. Upper: Kentian Racloir; two views.
Lower: Mousterian Point; two views.

Now if we examine a series of Chellian and Acheulean palæolithic implements it is at once clear that they all present complex sections. If, on the other hand, we examine a series of Mousterian, Aurignacian, Solutrian, Magdalenian and Neolithic specimens we see that with the exception of the Solutrian blade and the Neolithic axe and arrow-head nearly all the typical implements of these cultures exhibit simple sections. This is a very remarkable fact and one which has tempted the author to prepare a chart (Fig. 119) showing the various cultures (which are given in the order in which

they succeeded one another) from the primitive Kentian implements onwards, and indicating the type of section exhibited by the implements of these cultures. At the side of each cultural division is given a small drawing of the section of the principal implements, and it seems that the Kentian implements led on to the sub-Crag

		NEOLITHIC implements Axes and arrowheads of complex section Scrapers etc of simple section.	AXE. SCRAPER.
		MAGDALENIAN implements Scrapers etc of simple section.	SCRAPER.
		SOLUTRIAN implements. Blades of complex section Scrapers etc of simple section.	BLADE. SCRAPER.
ACHEULEAN HAND-AXE.	ACHEULEAN implements. Banded and oval palaeoliths elaborately flaked and of complex section. Implements getting smaller.	AURIGNACIAN implements. Planes and scrapers of simple section.	PLANE. SCRAPER.
CHELLEAN HAND-AXE.	CHELLEAN implements. Pointed and oval palaeoliths of complex section. Implements large and massive.	MOUSTERIAN implements. Racloirs, points and flake-implements of simple section. A few coup de poing of complex section.	RACLOIR. POINT. FLAKE-IMPLEMENT.
PRE-CHELLEAN HAND-AXE.	PRE-CHELLEAN implements. Earliest palaeoliths of complex section. Rostro-carinates still in use.	CHALKY BOULDER CLAY implements of marked Mousterian form. Racloirs, points and flake-implements of simple section. Rostro-carinates very rare.	RACLOIR. POINT. FLAKE-IMPLEMENT.
ROSTRO-CARINATE.	PRE-RED CRAG implements. First appearance of true rostro-carinates. Primitive racloirs, points and flake-implements. Implements of simple section.	MIDDLE GLACIAL GRAVEL implements of Mousterian form. Racloirs, points and flake-implements of simple section. Rostro-carinates getting smaller.	RACLOIR. POINT. FLAKE-IMPLEMENT.
RACLOIR. POINT.	KENT PLATEAU TYPE implements. Primitive racloirs and points of simple section. Points prophetic of succeeding rostro-carinates.		J.A.M. 1917.

Fig. 119. Chart showing probable evolution of the Acheulean, Mousterian, and Racloir Implements, with sectional drawings of the predominant types in each cultural phase.

culture, and it was then, so to speak, that the parting of the ways took place. In one case the sub-Crag rostro-carinates originating from the Kentian point developed into the normal palæoliths with complex sections. In the other the Kentian racloir and point

were preserved through the whole of the sub-Crag period, and developing in the Middle Glacial Gravel and Chalky Boulder Clay epochs, reached their consummation in the Mousterian implements which exhibit simple sections.

In the succeeding Aurignacian, Solutrian, Magdalenian, and Neolithic cultures implements of simple section are prevalent, and, as has been mentioned above, only a very few exhibit a section which can be described as complex. The author would like it to be clearly understood that this chart has been prepared solely with a view to show how in all probability the various types of flint implements have been evolved, and that no other significance, geological or otherwise, is at present to be placed upon it. But it seems of interest to realise that primitive implements of the Kent plateau type, which have long been recognised by many prehistorians as representing the earliest efforts of man to shape flints to his needs (see *Science Progress*, No. 43, January, 1917, pp. 431-440) should have provided apparently the basic forms out of which all other flint implements were gradually developed. But there is a strong under-current of inevitableness running through the whole origin and development of flint implements. The people of the Kent plateau being apparently without a knowledge of the manner in which to produce a flat striking-platform by intentional flaking, selected pieces of tabular-shaped flint which afforded naturally-produced flat surfaces upon which to deliver flake-removing blows. This fact, coupled with their wish to give cutting-edges to these pieces of tabular flint, could not fail to produce the racloir and point with which we are familiar. Such production being accomplished, the point on the one hand developed almost inevitably into the rostro-carinate implement, and this into the normal palæolith. On the other the primitive point and racloir developed gradually and inevitably into the Mousterian implements, and as we have seen, the vast majority of the implements of the post-Mousterian cultures preserve the simple primitive section allied to that of the Kentian specimens. The origin of the flake implement has been explained, and it was shown that this type of specimen dates back to a very remote period.

There does not appear to be any technical connection between the Acheulean and Mousterian cultures. The implements of the former epoch were made out of the actual flint nodule (the flakes removed in the flaking of the nodule being probably regarded as waste), while in the latter an elaborately-flaked core or nucleus (these must have taken almost as long to make as an Acheulean implement) was produced from a nodule of flint, and a flake-implement struck from it. Hundreds of these cores were found at the Mousterian "station" at Northfleet, in the Thames valley, and were evidently the waste material of the industry (Smith, R.A., "A Palæolithic Industry at Northfleet, Kent," *Archæologia*, Vol. LXII., pp. 515-532). Thus we see two fundamentally different cultures derived from the primitive Kentian implements, and of the two, that which preserved most of the ancient and simple characteristics

lasted till the end of the Stone Age, while the other and more complex growth disappeared in much earlier times.

NOTE.—The drawings illustrating the above article have been, for the sake of clearness, slightly “idealised,” but are based upon a large series of flint implements in the Museum at Ipswich and in the author’s own collection.

SURFACE IMPLEMENTS OF A LATE PALÆOLITHIC SITE.

BY MAJOR J. D. HILL.

Early in 1917, when near Abbeville for a few days, I carried out certain expeditions with the idea of searching the river gravels around that district. As any form of trenching was out of the question owing to the time at my disposal, I had to content myself with surface finds.

In this I was very successful, finding no fewer than 144 implements and some 300 odd worked flakes in 3 days. The patination

Fig. 120. Sketch-map shewing Site, Hallencourt, Dept. Somme, France.

of the implements, from this site, ranges from pure white to a yellow-white shade. The patination is non-lustrous and in most cases the implements are heavily stained with iron.

No implement was found with any trace of polish and all were unrolled. The site, which lies S.E. of the village of Hallencourt (Dept. Somme), was very restricted, extending about 200 square yards, outside of which no trace of implements or worked flakes