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# The Mousterian: A Study of a Paleolithic Tool Industry

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# ILLINOIS WESLEYAN UNIVERSITY

THE MOUSTERIAN:  
A STUDY OF-A  
PALEOLITHIC TOOL INDUSTRY

By

Loenoard A. Zalucha

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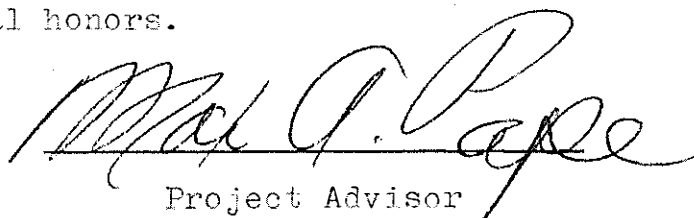
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A handwritten signature in cursive script, reading "Max A. Pope", written over a horizontal line.

Project Advisor

A handwritten signature in cursive script, reading "Jerry Stone", written over a horizontal line.

Dr. Jerry Stone

## TABLE OF CONTENTS

Illustrations.....	ii
Introduction.....	1
I. Tool Traditions.....	3
II. Tool Industries and Culture.....	8
III. The Environment.....	11
IV. The Evolution of Paleolithic Culture.....	15
V. The Clactonian and Levalloisian.....	22
VI. "Classical" Mousterian and its Variants.....	27
VII. Paleontological Finds and Flint Industries.....	44
Appendix A.....	46
Appendix B.....	47

## ILLUSTRATIONS

A Clactonian 'C' Side-scraper.....	23
A Levalloisian Tortoise-core.....	26
Mousterian Industries.....	30
Micoquian and Acheulian Tools.....	34
Mousterian denticule and Pontinian Artifacts....	36
Tool Types of the Aterian.....	38
Examples of Audi Blades, Cordiform Coups-de-poing, and Bone Artifacts..	42
Methods of Flaking Stone.....	48

## Introduction

This paper is designed to be a study of a Paleolithic flint industry: the Mousterian of Neanderthal man. It is a detailed analysis of the types and styles of flintwork which this early man produced. It will detail tool types, chipping techniques, regional varieties, and outside influences. It will explore the extent to which Neanderthal man worked in bone and how the Mousterian flint forms are mirrored in this other medium. It will show how the Mousterian developed and how it was influenced by earlier and contemporary industries. It will demonstrate how the Mousterian affected and influenced later industries. It will, in short, be a study of the basis material culture of one of the most important and enigmatic forms of man which ever developed. Through this study the reader will hopefully arrive at a greater understanding of what Neanderthal man was like: how he lived, subsisted, and grappled with his environment; how he faced the world, how he exploited it. The silent chips of flint will thus, as all things cultural must, illuminate and make more understandable the men who produced them.

But to merely describe a set of clearly Mousterian artifacts or even to also describe the influences of other industries is not enough to give an adequate understanding of this subject, for the types of tools vary with the sub-groups of Neanderthal man himself and so we will be forced to dwell upon these groups in order to better understand our industry. Thus a brief discussion of human paleontology will not be out of place in

this discussion of flint work.

The most detailed analysis of the preceding areas would be meaningless, however, if all the artifacts were not related to one another in regard to the various tool traditions, so an investigation of this topic will also be found in this paper.

In short, then, what seems to be a relatively simple task becomes a very complicated affair when everything is taken into account. The author hopes that he will be able to present a comprehensive view of this subject and give the reader a genuine understanding of a most complex subject.

## I.

### Tool Traditions

Perhaps the best place to start in our discussion of the Mousterian is with the idea of the tool tradition. This basic concept is defined as a "standardization of ways to make tools for particular jobs."<sup>1</sup> This concept is fundamental. A tradition must be seen as a habit of preparation - it is a 'usual method' which ancient men used time and time again to fashion a tool for a particular use. as Braidwood says: "The tradition shows us that persistent habits already existed for the preparation of one type of tool or another."<sup>2</sup> Thus, implicit in the idea of a tool tradition is ~~the~~ notion of time and habit. The tools have been made in one way over a long period of time until standardization has taken place. An analogy in our own society can be seen in the different ways in which flying machines are built. One standard method is the propellor driven airplane with one wing, another is the helicopter, still another, the blimp. Each of these represents a tradition of aircraft manufacture; each is a standard way of making a machine for a particular type of job. (The biplane, incidentally, would be seen as an outmoded or superseded tradition which, no longer being functional, has been phased out of our culture.)

Tool traditions are indicators of culture; they are not to be thought of as a culture themselves. To think of a Paleolithic tool tradition as a "culture" seems sensible at first glance but is incorrect since "cultures" don't correspond to



parallel lines of human evolution. To call a tradition a culture would be equivalent to distinguishing Americans' "cultures" by the cars they drive.<sup>3</sup>

Among prehistoric man of the Pleistocene there are four basic tool traditions: the pebble tool, the core-biface tool, the flake tool, and the chopper tool.

#### Pebble tools

Pebble tools are the earliest known tools produced by man and the oldest date from the basal Pleistocene of Africa of some 2,000,000 years ago.<sup>4</sup> The first pebble tools were simply split pebbles of about fist size and some were only jagged hunks of rock and probably used for hacking up meat into edible chunks - a job too difficult for man's small teeth and weak nails.<sup>5</sup> At this time man was primarily a scavenger and these tools were useful in allowing him to eat scavenged meat or to prepare the occasional piece of hunted game. More advanced hunting tools were absent at this stage and for hunting man could only rely upon bone or a tree-branch club.<sup>6</sup>

The great majority of pebble tools have come from Africa although a few have been identified in Europe and the Near East.<sup>7</sup> Although the evidence is scanty, pebble tools probably existed at least to some extent outside Africa since they are such a basic tool type.

Many people at first refused to believe that these barely worked rocks were even the result of human work but

were rather chance-broken stones. Even more refused to admit that they could have been used as tools. Although some of these tools could have been naturally fractured, most show definite signs of having been worked and as for their efficiency, this was clearly demonstrated by Leakey when he used them to quickly skin and prepare a fresh antelope carcass.

### Core-biface Tools

The core-biface tools were the next type of tools to come into use. They were large, varying from four to eighteen inches and were generally pear-shaped and trimmed flat on two opposite sides or faces. These faces were same and trimmed to a thin tip which made for a good edge all around.<sup>8</sup> This type of tool is generally known as a hand-ax and was a good utility tool, not a weapon.<sup>9</sup> It could be for digging up roots, digging pit traps, chopping up small bones, cutting up meat, sharpening stakes, skinning, and prying<sup>10</sup> and probably had a host of other uses.

It is in this tradition that we begin to find some type specialization, that is, some refined types for more specific uses. The cleaver represented such a type. It is a more advanced stage, similar to a hand-ax but with a straighter cutting edge and no point; it was well suited for skinning and flaying.<sup>11</sup>

The hand-ax is also known as the Coup-de-poing in the Chello-Acheulian industries. It is somewhat specialized in that it has two visible varieties, one traditionally

pear-shaped, the other flatter and oval.<sup>12</sup> A still more specialized form of it will be seen in the Mousterian.

### Flake Tools



Flake tools show a basically different approach to the manufacture of tools from that of the core tool. A nice big block of stone was selected and a large flake was knocked off it.<sup>13</sup> In the earliest flake tools the original flake was the cutting edge of the tool, the one produced by the primary fracture.<sup>14</sup> In later tools the flake was itself trimmed and shaped. Naturally this method took considerable skill since the flake had to be broken off in such a way that it was "broad, thin, and also had a good cutting edge."<sup>15</sup>

These tools generally produced a good, sharp cutting edge and were used primarily for chopping, scraping, and cutting; they spread from earliest times over Europe, Africa and Western Asia.<sup>16</sup>

### Chopper Tools

We won't be too concerned with this tradition although it may have some influence on the Mousterian. It has its roots in the African pebble tool tradition and grew up in Southern and Eastern Asia, spreading from Northwest India, through Java and Burma into China.<sup>17</sup>

There are three types of Chopper tools, all different from their Western counterparts. First there is the broad, heavy scraper or cleaver, second, the Adze, and third, the pointed pebble tool.<sup>18</sup>

The first and third speak for themselves. The Adze, however, needs some explanation. The difference between it and a hand-ax lies in the edge. Whereas an ax will have a -shaped edge, the adze edge is -shaped.<sup>19</sup>

In addition to these four main tool traditions there is another much less widespread and much less important tradition, namely, that of the Bola. This refers to spherical stones (either natural or shaped) attached to thongs of differing lengths used as a throwing weapon.<sup>20</sup>

It is important to emphasize at this point that simply because a particular prehistoric individual made use of, say, flake tools primarily, that this by no means rules out the possibility that he also was familiar with core tools. Indeed, the average prehistoric man was undoubtedly familiar with several traditions and would most probably make a flake tool for one job and a core-biface for another.<sup>21</sup>

The particular cultures which made use of these traditions will be discussed in detail in later chapters. A summary of the major cultures using the four main traditions will be found in Appendix A.

## II.

### Tool Industries and Culture

Our next consideration is with tool industries. This section is designed to explain the nature of an industry and not to go into detail about the various industries themselves. Then we will consider what we mean when we speak of a # "culture."

A tool industry can be defined as "an assemblage of artifacts at a given site, when all are of the same age."<sup>1</sup> Braidwood qualifies this still more: "An industry consists of all the different tools in one layer and made of one kind of material."<sup>2</sup> A tool industry is thus bound only within the limits of stratigraphy and local geography. Conceivably an industry might contain tools from several very different traditions although characteristically they consist of one main type with perhaps a scattering of tools of a different tradition. This characteristic tool is known as the type tool. The type tool for the Mousterian, for instance, is the medium to large-sized flake tool.

Basically, then, an industry is a classification of a group of tools on the basis of the number of different types in a given arbitrarily limited area qualified by time of manufacture.

"Cultures" are special groupings of industries. As

Leakey says:

When a number of industries have been found which are very similar to each other we say that they belong to the same "culture," even if it has to be remembered that the fact that two industries belong to the same culture does not necessarily mean that they are of the same age. There is every reason to believe that some cultures survived longer in one region than in another.<sup>3</sup>

Thus a culture denotes an assemblage of industries made by people of the same stock.<sup>4</sup> But of course to speak of culture takes in much more than simply the flint artifacts left behind. Culture, after all, is everything produced, mental or physical, by a people. But when we speak of culture we will be speaking in a very limited sense. The cultural name "Mousterian" will be used as if it applied to only a small group of artifacts while in fact it describes much more.

Industries and traditions are useful ways of portraying cultures. They are excellent indicators of the state of a particular culture. Single cultures may last for a long time with no change; if so, this is a sign of a series of identical, but not contemporary industries.<sup>5</sup> More often, however, cultures "evolve," that is, they change their form as time passes. Such an evolving culture can be divided into stages according to the appearance of the various traditions and industries

which appear. Each stage will be typified by a particular tool type. A widespread culture will have these according to development and two cultures may co-exist and interborrow.<sup>6</sup>

Leakey warns of the misleading tendency to "apply cultural names to describe certain techniques of making stone tools simply because certain cultures used those techniques to a marked degree."<sup>7</sup> An example of this sort of misleading naming is seen in the specialized flaking technique in which a flake of a "tortoise" type is knocked off a block of flint. This technique has come to be referred to as Levalloisian, a cultural designator. But many cultures used this technique. It would be better perhaps, to refer to this industry as a "prepared core" group and then specify which culture used it.<sup>8</sup> This is important to bear in mind since all the distinctive tool manufacturing techniques have been given very specific cultural names. The result has been to stereotype cultures: the Acheulian as a "core culture"; the Mousterian as a "flake culture." In reality there is no such thing.<sup>9</sup>

### III.

#### The Environment

Next we shall turn to the environment of the Pleistocene in an effort to understand what effect it had upon the tool cultures which led to the Mousterians.

The Pleistocene is perhaps the most important period in human evolution, being the time in which the first true men appear Day tells us:

All the known remains of fossil man have been attributed to deposits formed within the Pleistocene period which is taken as extending from one and a half million years ago to the recent or Holocene period, say the last 10,000-8,000 years.<sup>1</sup>

The environment was very unstable during the Pleistocene, the salient feature being great glacial periods. Arctic conditions spread from the poles in four occasions producing glaciers in Northern Europe, Asia, North America, the Antarctic and mountain ranges such as the Alps.<sup>2</sup> Warmer interglacial periods of varying length alternated with these glacial phases when the one-time frozen areas were temperate or even tropical.

Climatic conditions were also variable in Africa where wetter periods (pluvials) alternated with dry ones (interpluvials).<sup>3</sup> Those fluctuations appear to be correlated with the glacial-interglacial periods.



TABLE I

The Pleistocene Glacial and Interglacial Periods (probable equivalents)

Alpine terms	Numerical Terms	General Terms (Zeuner)	Years B.P. (not to scale) 10,000
Würm III Glaciation			24,000
Würm II/III Interstadial			27,000
Würm II Glaciation	Fourth Glaciation	Last Glaciation	32,000
Würm I/II Interstadial			45,000 Upper Pleistocene
Würm I Glaciation			70,000
Riss-Würm Interglacial	Third Interglacial	Last Interglacial	c. 150,000
Riss Glaciation	Third Glaciation	Penultimate Glaciation	c. 200,000
Mindel-riss Interglacial	Second Interglacial	Penultimate Interglacial	c. 300,000
Mindel Glaciation	Second Glaciation	Antepenultimate Glaciation	c. 400,000 Middle Pleistocene
Gunz-Mindel Interglacial	First Interglacial	Antepenultimate Interglacial	
Gunz Glaciation	First Glaciation	Early Glaciation	c. 1,000,000 Lower Pleistocene
Donau-Gunz Interglacial			(Villafranchian)
Donau Glaciation			

Plio-Pleistocene Boundary, c. 1,500,000

Naturally with so much water locked up in the form of ice, the levels of the sea dropped considerably. Land bridges connected Great Britain with Europe and the islands of Southeast Asia were joined to the mainland.<sup>4</sup> Off and on, land bridges apparently connected North Africa with Southern Europe, splitting the Mediterranean.<sup>5</sup> The Pleistocene glacial and interglacial periods are summarized in Table I on page 12.

It is within this rigorous climate that man evolved. Conditions changed rapidly and selective factors must have been high and only those forms which were able to adapt to these abrupt changes were likely to survive.<sup>6</sup>

It is in the third interglacial period that Neanderthal man first makes his appearance in Europe. Weckler believes that he was the result of separate evolutionary development in China and Southeast Asia from the lines of Pithecanthropus Erectus who made his way west into Europe at this time.<sup>7</sup> But whether his theory is correct or not, it is at this time some 150,000 years B.P. that Neanderthal man is first seen.

At this time Neanderthal Man's culture and mode of life was very much similar to that of the Acheulian culture already present. It was with the onset of the fourth glaciation that the "typical" Mousterian developed in Europe.<sup>8</sup> With the coming of the glaciers, this type

of men retreated south as they had done in the past. Neanderthal man remained and took possession of Europe. Certain physical traits helped him withstand the climate and he undoubtedly made use of fire. He lived in caves and rock shelters and it is no surprise, therefore, that true Mousterian industries very rarely occur in the open.<sup>9</sup> Then suddenly during a relatively warm phase of the fourth glaciation about 80,000 years B.P. Neanderthal man disappeared - no one knows why.<sup>10</sup> Sapiens returned to Europe (in the form of Cro-Magnon man) and evolution continued upon his line up to modern man.

Climate, then, played an important part in the life of Neanderthal man and we can be sure that it affected to a large degree the sorts of tools that he needed to produce. This fact must be borne in mind and will be referred to in subsequent sections. First, however, let us get a general overview of the cultural sequence of the Pleistocene period.

#### IV.

##### The Evolution of Paleolithic Cultures

The cultures of the Paleolithic follow, naturally, the tool traditions discussed in the first chapter. We find groups of cultures basing their flintwork in one of the various traditions, forming the industries which led us to describe them as cultures in the first place.

The first group of cultures we will be concerned with are the pebble tool - hand-ax cultures. The pebble tool groups such as the Kafuan and Olduwan date from the earliest Pleistocene of Africa.<sup>1</sup> When the pebbles they used came to be flaked all around (in biface), then came the dawn of the hand-ax culture.<sup>2</sup> The first hand-ax cultures also first appeared in Africa just prior to the Mindel glaciation, in the Chellean, spreading into Western Europe and Southern Asia as the Abbevillian.<sup>3</sup>

These hand-ax makers disappeared in Europe during the second glaciation but continued in Africa and when the second interglacial began the hand-ax makers re-established themselves in Europe as the Acheulian.<sup>4</sup> The differences between the Abbevillian and the Acheulian were many. The Abbevillian pieces were cruder and rougher and apparently made with hard, heavy, hammerstone and were usually pointed or almond-shaped.<sup>5</sup> The Acheulian

flints were much more finely chipped which suggests bone tool finishing techniques.<sup>6</sup> The Acheulian had industries in both the core biface and flake traditions and this flake tradition is important as it apparently exerted influence on the subsequent cultures, most importantly the Mousterian. Despite this strong flake tool strain within the Acheulian, however, the core-biface is considered its type tool.

In technique, the hand-ax reached its peak in the Acheulian. These oval or egg-shaped hand-axes with their shallow, flat flaking and their double cutting edge represent the best of the core-biface tradition.<sup>7</sup> The flake tools were crude and limited to simple scrapers and chips.<sup>8</sup>

Actually the Acheulian should be seen as properly being an African culture since it was present in a fully developed form at Olduwan.<sup>9</sup> The European stage is really a late form and is properly called the Upper Acheulean. This Upper Acheulian gradually changed its characteristics until it developed into a new cultural type - one very significant to our discussion of the Mousterian - the Micoquian.<sup>10</sup> The Micoquian is seen by most to be an industry of the Mousterian, by others as a sub-type which merged with the Mousterian and other cultures. In either case we shall have more to say about it later.

At the same time that these cultures were evolving in Europe and Africa there were several chopper tool

cultures forming in the Far East of which we are concerned with two for the most part. The first is the very crude basic chopper tool characteristic of the Choukoutien culture of China which is very close to its pebble tool ancestors. The second is the Soan of India whose choppers resemble Africa hand-axes and the flake tools of the Levalloisian culture of Europe.<sup>11</sup>

The two aforementioned groups of culture all flourished in the Lower Paleolithic from 1,000,000 to 250,000 years B.P. In summary, in the lower Paleolithic there were two distinct civilizations: the core tool, hand-ax group of African origin and the less stable Asian flake tool complex which was separated into many very different, separately evolved cultures.<sup>12</sup> When these two groups met the result seems to have been the stimulation of the incipient European flake tool tradition. Of this tradition, three cultures are especially important to our discussion; the Clactonian, the Tayacian and the Levalloisian.

Briefly, the Clactonian looks like it may have been an off-shoot of the Choukoutien - Soan group. Clactonian pieces are roughly bi-conical and sometimes chipped all-around; scrapers are common and the true Clactonian lacks hand-axes.<sup>13</sup> The various subgroups of the Clactonian will be discussed in greater detail later.

The Clactonian and the Acheulian blended and either

Table II

## CHRONOLOGICAL - CULTURAL TABLE OF THE DIVISIONS OF THE PALEOLITHIC PERIOD

	Alpine and Scandinavian glacial oscillations with corresponding changes of sea level and climate	Approximate Dates B.C.	West Central Europe	Human Types
UPPER	Finis-Glacial pause with Baltic ice-lake	8,500	Late Magdalenian	Chancelade Fredmøst etc
	Finis-Glacial pause with Baltic ice-lake		Early Magdalenian and Capsian industries	Cro-magnon Baker's Hole Rhodesian
	Gothi-glacial retreat with Baltic ice-lake	13,500	Solutrean industry. Late Aurignacian industry	
MIDDLE	Gothi-Glacial pause with Baltic ice-lake		Early Aurignacian or Chatelperronian and Capsian industries	Chatelperron Grimaldi, etc Cro-Magnon Africanthropus, so
	Wurm or Achen and Dani- Glacial retreats with Frank- fort and Pomeranian pause. Flanderian terrace	18,500	Final Mousterian of the caves	Boskop
	Wurm and Brandenburg or Dani-Glacial advances, 4th Glacial	50,000	Mousterian of the caves	Florisbad, Skhul, Gibraltar II Wadjak
	Riss retreat with Monasti- rian terrace. 3rd inter- glacial. Hot summer	75,000	Contemporary Acheulian, early Mousterian, Tayacian, Micoquian, Levalloisian, and Clactonian industries from Somme terrace, etc.	London Tabun, Ne- anderthal, Ehring dorf Fontchevade, so
	Riss and Polonian Ad- vances. 3rd Glacial	150,000	Derived implements	Montmaurin
	150,000			Steinheim
LOWER	Mindel retreat with tyr- henian terrace. 2nd Inter- glacial		Acheulian and contemporary Ab- bevilian and Clactonian indus- tries from 2nd Somme terrace. Clacton-on-sea, Mesvin, etc.	Swanscombe Gigantopithecus Heidelberg Sinanthropus, At- lanthropus
	Mindel advance 2nd Glacial	450,000	Derived implements	Pithecanthropus erectus
	Gunz retreat with Milaz- sian terrace. 1st Intergla- cial	550,000	Proto-Abbevillian industry from below the Cromer forest beds, 3rd Somme terrace	Pithecanthropus robustus
	Gunz advance. 1st Glacial	600,000	Pre-Abbevillian or Ipswichian flake industry of East Anglian Crag formations	Pithecanthropus (Modjokerto) Meganthropus
	PERISTOCENE PLIOCENE Donau with Sicilian terrace	1,000,000 yrs	Pre-Abbevillian or Ipswichian flake industry of subcrag Formations Pleistocene stage?	Kanam

it or the Tayacian probably developed into the Mousterian.<sup>14</sup>

The Tayacian has been regarded by some as "merely a small Clactonian."<sup>15</sup> Its type tool is a smallish flake tool. This name is applied also to artifacts found in the deepest levels at Mt. Carmel - a significant fact considering the Neanderthal remains associated with the site.<sup>16</sup> The Tayacian appeared in the middle Paleolithic some 75,000 years B.P. and was contemporary with the Clactonian, although the latter had already been in existence for some 175,000 years.<sup>17</sup>

The Levalloisian which also appeared about 75,000 years B.P. is also a very important culture in its relations with the Mousterian and as such will be considered with the Clactonian in a later chapter. At present it will suffice to say that it was a late-starting core tradition which was, according to Oakley, "possibly the result of contact of Acheulian and proto-Mousterian."<sup>18</sup> The early Levalloisian of Western Europe replaced the Acheulian as the dominant core culture at the beginning of the third glaciation.<sup>19</sup> The great unanswered question relating to the Levalloisian regards its exponents: were they Mousterian or Acheulian?

In any case it was at this same period that the early Mousterian began, apparently the later product of



the flake tool civilizations<sup>20</sup> with considerable influence from core cultures.

According to Burkitt the Mousterian is :

A spontaneous development within the great flake tool civilization.....this development took place somewhere east of the Rhine....

In general it replaces that of the coup-de-poing in Western European Palestine, and as far east as Siberia, and perhaps, too, in Northern China. Essentially, however,<sup>21</sup> it remains always a northern culture.

Indeed, somewhat similar cultures are seen even in Somaliland and South Africa, although they are not truly Mousterian.

The Mousterian disappeared at approximately 18,500 years B.P.<sup>22</sup> and was replaced by the Aurignacian of essentially modern man.

In brief, then, the Pleistocene prior to Aurignacian man saw flake tool makers of one tradition or another supreme east of the Rhine, core-biface tool makers supreme in the west. Gradually, coup-de-poing makers established themselves in the East but just before the last glacial maximum the coup-de-poing peoples retired and were replaced once more East of the Rhine by the flake tool makers. Apparently the core people couldn't stand the glacial periods as well and retired. Gradually flake tool producers invaded Western Europe.<sup>23</sup> Essentially, the flake tool was the tool (originally) of the steppe civilizations; the hand-ax the tool of the forest civilizations.<sup>24</sup>

Formerly the Mousterian was simply equated with the Middle Paleolithic but the term loosely used and covered cultures now considered to be Levalloisian, Aterian, etc.<sup>25</sup> As we have seen, this will no longer do. Instead the Middle Paleolithic is now seen as the period of time from the end of the Riss glaciation to the beginning of the Würm.<sup>26</sup> Thus only part of the Mousterian can be considered to be in the Middle Paleolithic.

Generally, working backwards, the Mousterian is seen as coterminous with Würm I, the Acheulian as Riss and post Riss, whereas the Lower Paleolithic cultures are mostly pre-Riss.

## V.

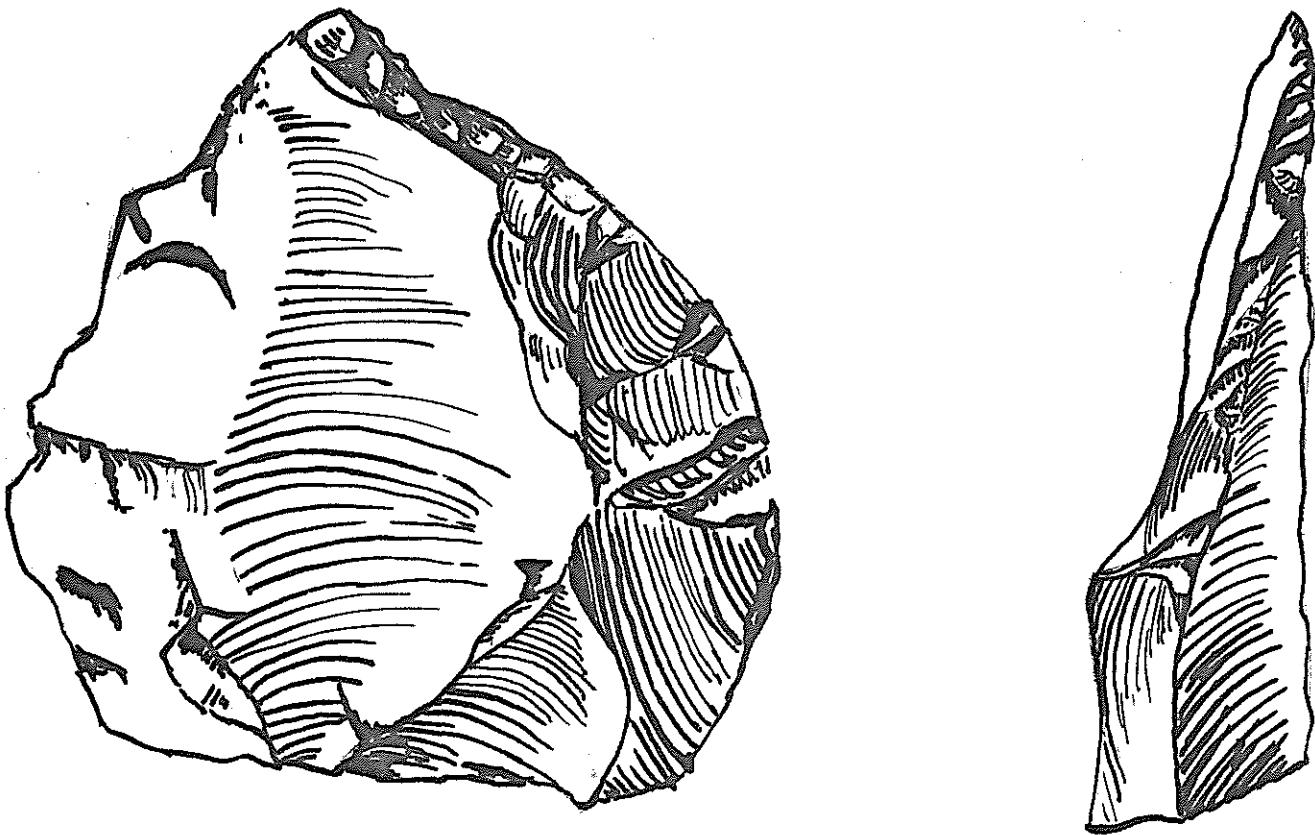
### The Clactonian and Levalloisian

At this time two cultures require greater examination, the Clactonian and Levalloisian. Both were in existence for at least some time with the Mousteesian and both influenced it heavily. Indeed, we cannot properly understand the Mousteesian unless we first understand these two cultures.

The Clactonian was spread all across Europe ~~but~~ it was especially strong in England; the culture draws its name, in fact, from Clacton-on-Sea in England, and the culture is well-evidenced on the Thames.<sup>1</sup>

The culture is crude and, by virtue of this fact, easily distinguishable. It is "contemporary with the lower and Middle Acheulian stage of the hand-ax during the Mindel-Riss interglacial,"<sup>2</sup> although the two cultures did not necessarily come into contact. It is possible, although not proven, that an early stage of it during the Gunz-Mindel interglacial was contemporary with the most simple Chellean-Acheulian hand-axes.<sup>3</sup>

The earliest Clactonian is considered the true Clactonian and, as has been said, at these levels there is no evidence of the hand-ax. This fact implies, as Leakey says, that "the interglacial hadn't been around long enough for the arrival of Lower Acheulian man from



. A Clactonian 'C' Side-scraper. recalling later Mousterian forms.

--after Jeakey

Africa,"<sup>4</sup> that is, the tradition hadn't spread north yet. Thus the Clactonian can be shown to be entirely independent of the Acheulian and not the mere "waste product" of that culture.

The second oldest Clactonian stage is known as Clactonian B. Here are formed scrapers and crude knives with crude backs which recall the Audi points (which see) of the later Mousterian.<sup>5</sup> Triangular points, end- and side-scrapers are also present.

Still later (Clactonian C) the Acheulian moved in (by now the Middle Acheulian) and influenced the Clactonian "form-wise but not in technique of manufacture."<sup>6</sup> It is these types which especially suggest the Mousterian. It certainly seems to have its roots in the developed Clactonian. Indeed both the Mousterian and the Tayacian seem to be derived from Clactonian C.<sup>7</sup>

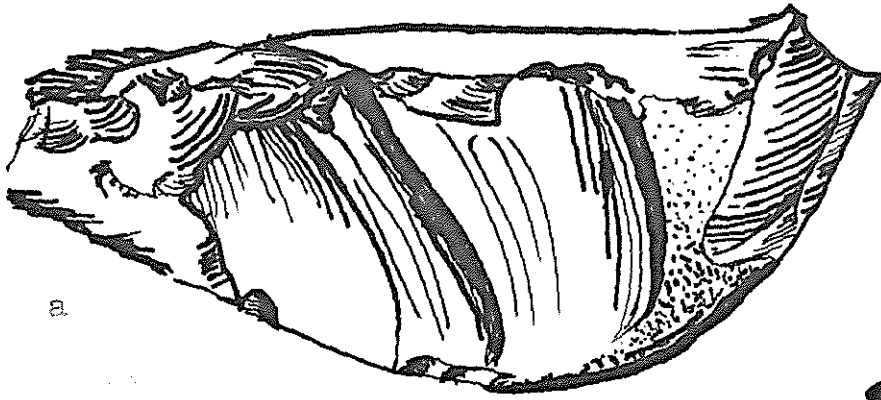
As regards technique of manufacture, Clactonian flakes are "almost invariably struck from an unfacted striking platform which is formed to be inclined at an angle of about 120° to the main flake surface."<sup>8</sup> For the most part the pièces are flake tools.

Levalloisian industries are also flake industries which seem to have grown out of a core tradition. They are found in western Europe along with all stages of the Acheulean and with the Mousterian. The salient feature

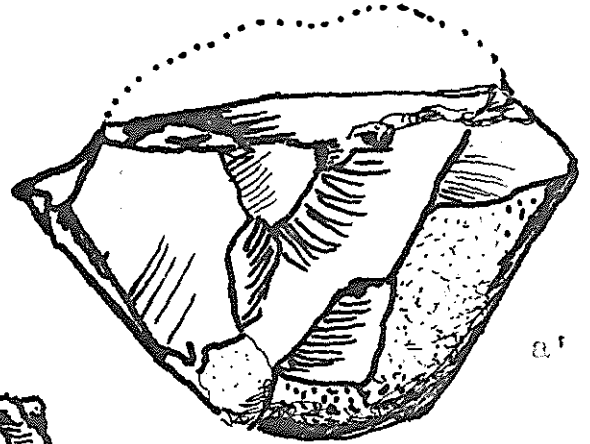
of the Levalloisian consists in its new method of tool making which involved the use of the Levallois flake and the tortoise cores. The upper surface was worked flat, then the rest of the tool roughed out while still attached to the core. The tool was then knocked loose leaving a piece with a flat surface (the result of primary flaking while still on the nodule) and a flake surface.<sup>9</sup> This tool is the Levallois flake, its core the tortoise core, so named for its typical shape.

These sorts of tools are common at the end of the Lower Paleolithic and the beginning of the Middle.<sup>10</sup> They are thin and roughly oval in shape. The edges are curved and trimmed with secondary flaking.<sup>11</sup> They differ from the Clactonian in that the latter is not produced from a tortoise-core.

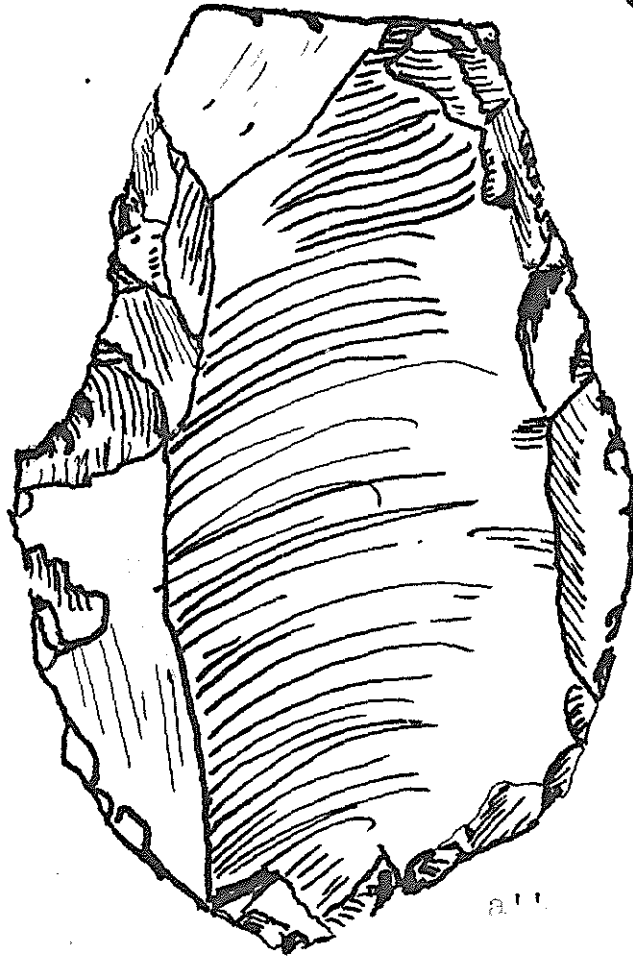
Levalloisian techniques influenced the Mousterian development and merged with it in several places. These cultures represent a combination of the core and flake traditions or a combination of the habits used in the preparation techniques of both traditions.<sup>11</sup> Thus there are several "hybrid" cultures such as "Levalloiso-Mousterian." There is no certain fixture of these hybrids. Their place in the Mousterian will be discussed shortly.



a



a'



a''

a, a', a''  
Levalloisian Tortoise-core (three views)

## VI.

### "Classical" Mousterian and its Variants

Thus far we have been defining Mousterian by what it isn't. We have seen what led up to it, what influenced it and what followed after it. Now we can examine this culture itself.

There are two varieties which make up what is known as "Classical" Mousterian, the Warm Mousterian and the Cold Mousterian. The Warm Mousterian began towards the end of the Riss-Würm interglacial and is so-called because it was associated in the beginning with a warm climate.<sup>1</sup> This early Mousterian shows the strongest resemblance to the Clactonian. Leakey believes that the Tayacian is a degenerate offshoot of this culture.<sup>2</sup> Of all the Warm Mousterian stations that have been found with the Krapina Neanderthal remains, this is the most reminiscent of the Clactonian.<sup>3</sup> This station will be discussed more thoroughly later. Other principle Warm Mousterian stations are those at Taubach, Weimar and Grimaldi.<sup>4</sup>

The Mousterian truly came into its own as the dominant culture during the Würm glaciation.<sup>5</sup> This stage is known as the "Cold" Mousterian. Since the Warm Mousterian had been contemporary with the Levalloisian and the final stages of the Acheulian, it had been influenced considerably. The result was, as Leakey points out, that:

different groups of Mousterian people



evolved their culture during the Würm glaciation along a number of distinct lines. Some groups adhered to a form of so-called "Warm" Mousterian and which show no influence of either Acheulian or Levalloisian elements. Thus the classical Mousterian has no hand-ax elements and no Levalloisian elements.<sup>6</sup>

The straight-line groups Leakey refers to are those which we are going to consider as Classical. This Classical Mousterian consists mostly of flake tools with a few Levallois-style flakes. The typical tools of each are the same.

Now let us discuss the tool types of the mainline Mousterian.

The point, along with the side scraper, is the most typical piece of the Mousterian culture. They are small, rarely longer than 10 cm., roughly triangular, and carefully trimmed to a very sharp point.<sup>7</sup> They are quite symmetrical, sometimes leaf-like, and according to Sollas, a "finer kind of Levalloisflake."<sup>8</sup> They are, of course, flake tools and often show part of the faceted striking platform. The upper surface is formed by a number of primary flake scars.<sup>9</sup> The under surface is unworked, being a fracture plain. Secondary work in the form of small resolved trimming on the edges intersects to form the point at the end opposite the bulb and platform.<sup>10</sup> This bulb end is an irregular base. The margins of these points are usually somewhat arched so that there is a slope to the

point<sup>11</sup>

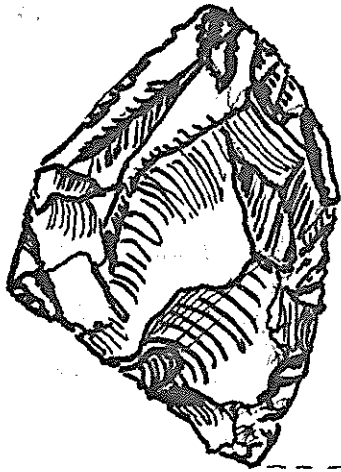
The points were evidently hafted but it is not known whether for use on a throwing or a thrusting spear.<sup>12</sup> They undoubtedly served other purposes, however; in fact, they were most likely something of a universal tool, well adapted to cutting, scraping, piercing or drilling; they would have made excellent awls or punches.

MacCurdy believes that in the Mousterian point we find a prototype of the two-edged pointed knife blade and possibly of the arrowhead.<sup>13</sup>

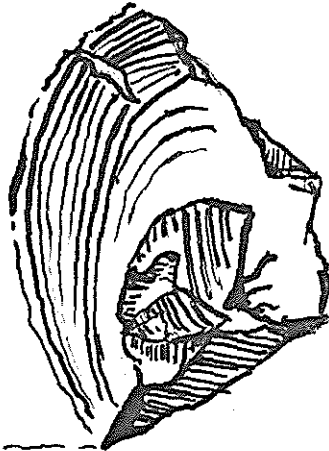
The other archetypal Mousterian implement was the side-scraper. The side scraper was also a flake tool. It did not originate with the Mousterian but it reached a new level of perfection in that culture. Leakey calls the Mousterian side-scraper "a specialized cultural variant of the ubiquitous side-scraper."<sup>14</sup>

These tools were essentially "convex primary flake surfaces intersecting with small flake scars from secondary work to form a cutting or scraping edge."<sup>15</sup> This convex edge was clearly essential--if it were straight the working edge of the tool would get stuck in and tear the skin.<sup>16</sup>

These tools were not worked to a point but in edge technique they were similar to the point.<sup>17</sup> Secondary flaking was usually restricted to the outer surface and, as in the points, the inner surface was a single fracture plain.<sup>18</sup>

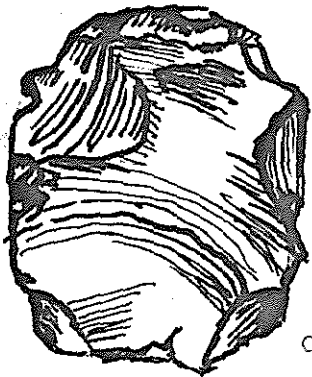
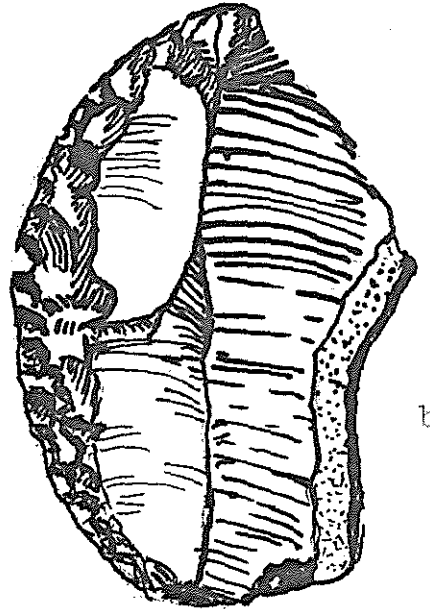


a



b

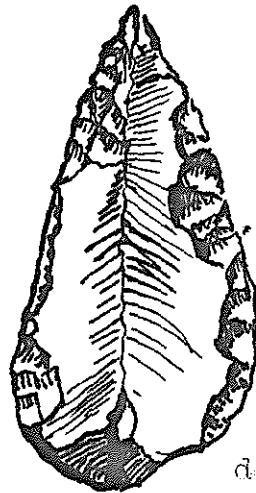
a) b) Side-scrappers



c

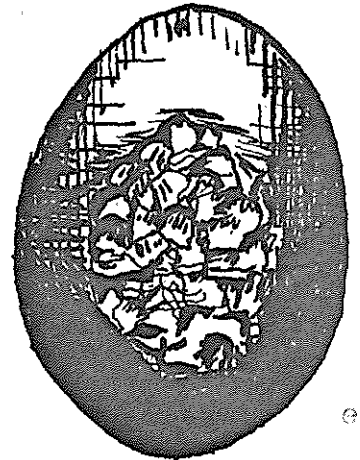


c) disc-core



d

d) Point

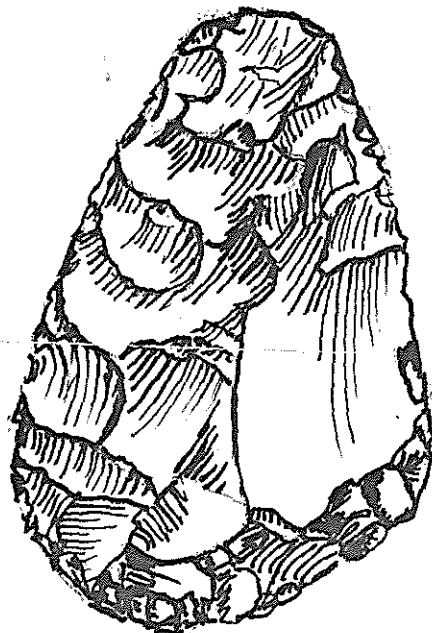


e

e) Small hammerstone

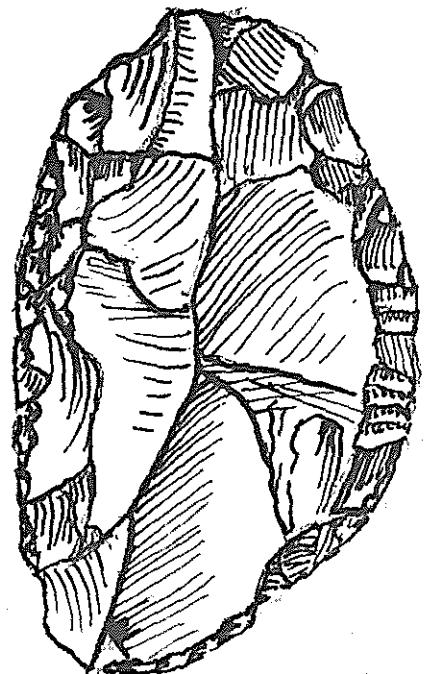


f



g

f) g) h) Mousterian of Acheulian tradition



h

Occasional scrapers are found which are alternately chipped from one side to the other which suggests that they were used for sawing.<sup>19</sup>

Generally speaking we can assume that scrapers were made from pieces of flint which, because of their shape, were not easily chipped to points.<sup>20</sup>

At least some end-scrapers have also been found.<sup>21</sup> In these specimens the back is one long flake surface, the front a series of very definite flakes.

Among the lesser tools were discs and knives, both of which show an increased concern with manipulating the environment.

A very interesting Mousterian object is the small roughly round Quartzite "Bola stone." Their exact use is unknown but they may have, as their name suggests, been used in bolas, throwing devices in which round stones are attached to thongs of various lengths which are thrown at the legs of animals where they tangle and trip the game.<sup>22</sup> These stones could also have been used as slinging stones, thrown from a split stick,<sup>23</sup> or as gaming stones.<sup>24</sup>

In general the Mousterian shows "a flint industry evolving in variety and precision."<sup>25</sup>

When it comes to Mousterian variants, however, then the picture becomes considerably more complicated. Among the European Mousterians, of which we have been mainly concerned so far, perhaps it will be easier to follow

these variants by using Burkitt's division of the Mousterian into three stages: the Lower, Middle and Upper.<sup>26</sup> The Lower Mousterian, according to this scheme, is exemplified by the Comb Capelle station where in the lowest layers immediately after the appearance of the Mousterians a hand-axe tradition appears in the form of the cordiform coup-de-poing. This is a very specialized form which is a common "polluter" of the very early pure Mousterian. It is relatively small and flat with often an incurved base which gives it a heart shape. The edges are "sharp and neatly trimmed with small, fine, resolved flake scars."<sup>27</sup> These layers show a definite Levalloisian influence. According to Burkitt:

It is perhaps true to say that the early Mousterians of France did not bring with them the cordiform coup-de-poing; it is more likely that on arrival they copied those which they found in use in the districts they had invaded.<sup>28</sup>

The great difference involved is, of course, the manner of preparation, the true Mousterian flakes being struck from a discoidal core whereas the Levalloisian were made from prepared ones.<sup>29</sup>

Levalloisian technique is also much in evidence at Le Moustier itself.<sup>30</sup> Le Moustier is an excellent example of how complicated cross-cultural influences can be. Leakey tells us that:

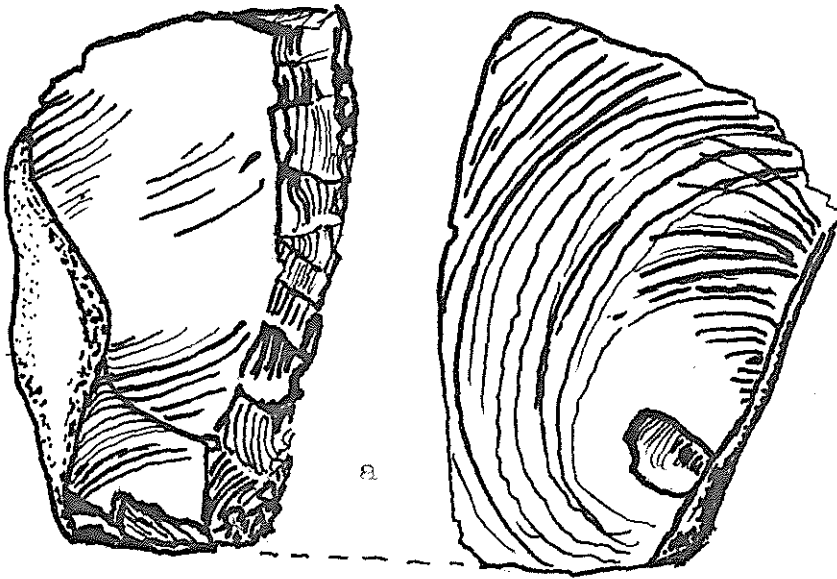
the shelter was occupied at various

times not only be the makers of the classical Mousterian culture, but also by what (Peyrony) calls Mousterio-Levalloisian and Mustero-Acheulio-Levalloisian.<sup>31</sup>

From this we can also see that at least in the early Mousterian, Acheulian hand-ax tradition were still present and influencing the techniques of the Mousterians. The Acheulaan influence could have been direct or have come through a similarly influenced Levalloisian. Leakey says that "contact of this Levalloisian-Acheulian and Mousterian could account for the Mousterio-Acheulio-Levalloisian of Peyrony."<sup>32</sup> It is important here to note that the hand-axes produced by the Mousterian cultures influenced by the Acheulian and the hand-axes of the Acheulian-influenced Levalloisian were made by different techniques than that of the true Acheulian,<sup>33</sup> Suggesting an intermediary Culture as yet undetermined. A comparison of the Classical Mousterian and the ~~Mousterio-Levalloisian~~ and the Mousterio-Acheulio-Levalloisian will be found in Table 3.

Still other Mousterian industries show no Levalloisian<sup>34</sup> influence but instead show Clactonian flake techniques. La Quina station is an example of this group. La Quina is totally without bifaces and the majority of the flakes have plain striking platforms. Flakes of the Levalloisian technique are very infrequent.<sup>35</sup>

The already mentioned Micoquan is also considered by some as a Mousterian industry.<sup>36</sup> Along with the usual



(left) a) Micoquian  
flake tool.

(below) b) Acheulian  
Hand-ax.



Mousterian tools are found fine hand-axes and some few Levalloisian flakes.<sup>37</sup>

To return to Burkett's Mousterian shrine, in the Middle Mousterian Levalloisian-like and Levalloisian flakes disappeared and only side-scrapers, points and so on remained.<sup>38</sup>

In the Upper Mousterian the implements became smaller and "somewhat monotonous."<sup>39</sup> Only little side-scrapers and points remained.

Thus the trend is toward a purification of the Mousterian. It would seem that the varied possibilities of the flake tool replaced the too-general hand-ax traditions.<sup>40</sup>

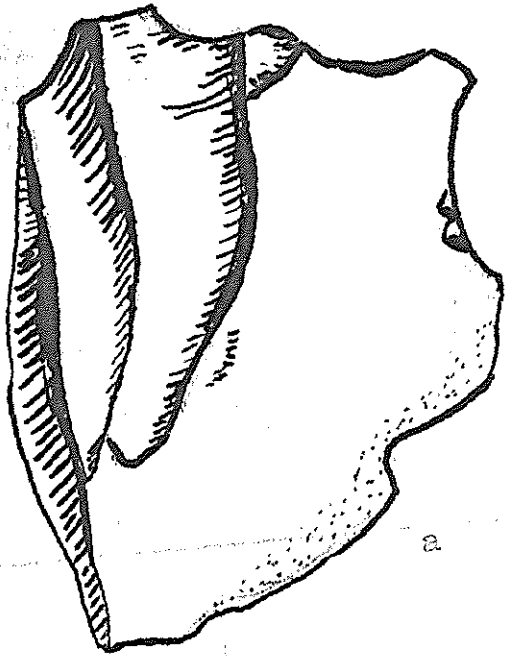
Next let us consider Mousterian variants from other areas:

First is the Mousterian denticulé which is an offshoot of Italy and North Africa. It, and the second group, the Micro-Mousterian also of Italy, and North Africa, seem to be regional specializations as a result of cultural diffusion.<sup>41</sup>

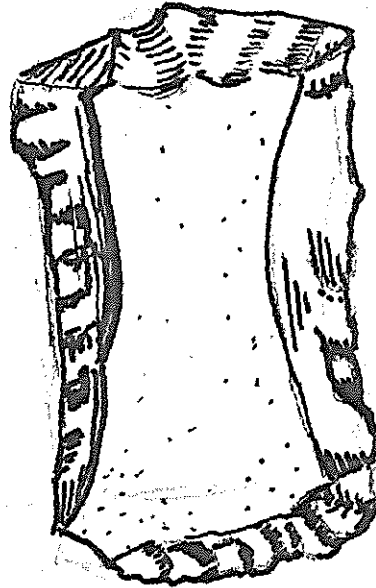
A third group, the Pontinian, found in parts of Italy, consists of Mousterian tools made on small pebbles and is an adaptation to peculiar geology.<sup>42</sup>

There are also numerous Mousterian industries from the German Highlands, Hungary, Northern Greece, and the U.S.S.R. which contain bifacial leaf-shaped artifacts.<sup>43</sup>





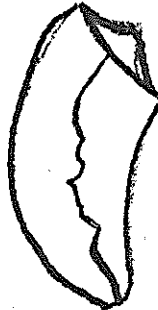
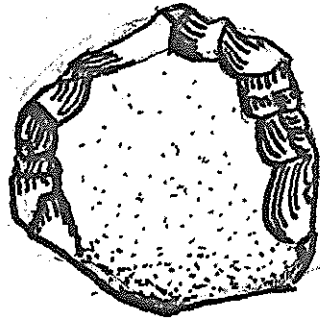
a



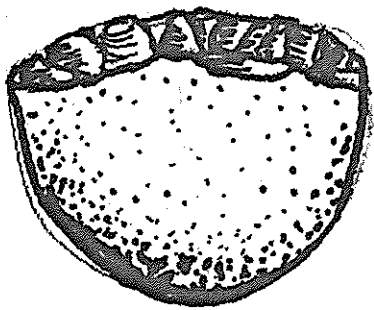
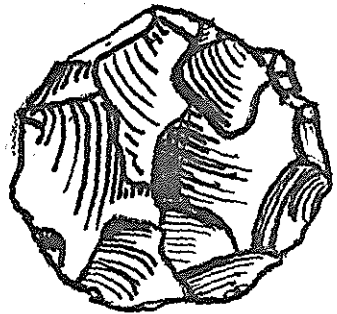
b



(Above),  
Mousterien  
denticulé  
a) flint flake  
with burin facets  
b) quadrangular  
scraper



a



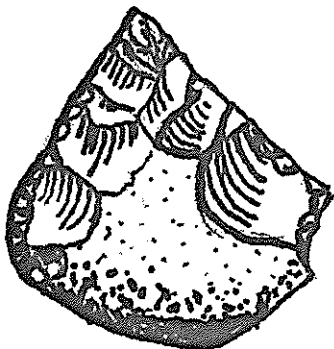
b



a) b) c) d)  
Pontician  
artifacts from  
sites in Italy



a

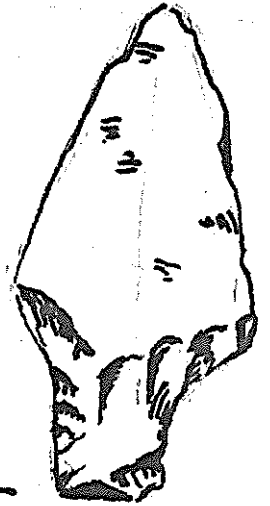
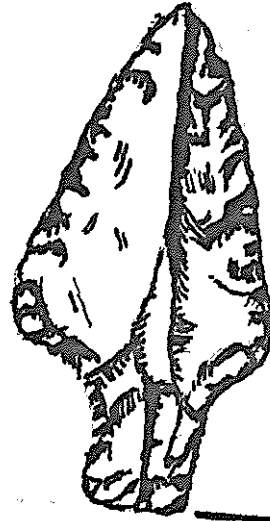
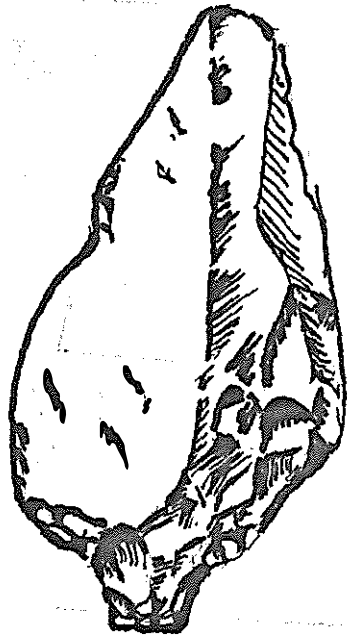


c



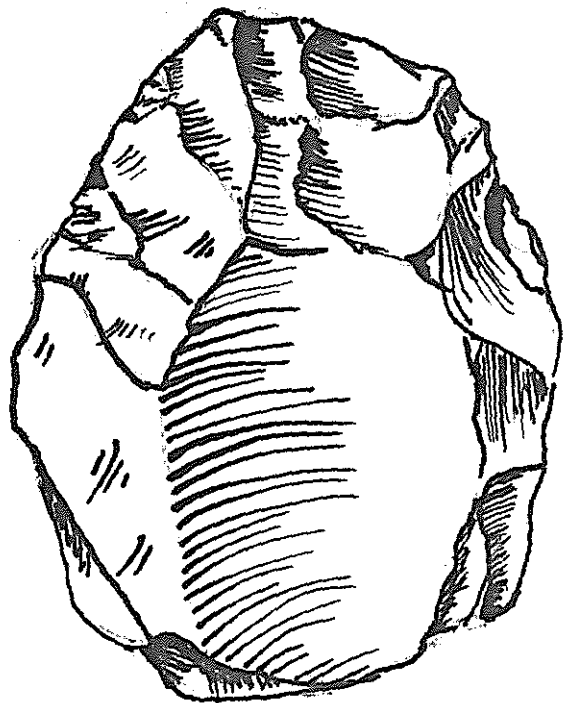
We now come to what is considered to be the North Africa Mousterian proper, the Aterian. This culture is known primarily from its points which are a further specialization of the Mousterian point.<sup>44</sup> They are tanged for hafting. Since the Aterian contains much that is absent from the classic Mousterian it is seen by some as indigenous North Africa culture. Others maintain that it was preceded by a true Mousterian without Aterian elements but this is doubtful since the artifacts produced to support the hypothesis resemble the Levalloisian. Probably the "true Mousterian" is a regional variant of the Aterian<sup>45</sup> which would thus be seen as indeed being indigenous though Mousterian influenced.

Then there is the matter of the Audi point. Audi station in North Africa is mainly Aurignacian but, as Peake and Fleure say, "most (of the) side-scrappers and scrapers show some resemblance to Mousterian forms, while some are quite indistinguishable from them."<sup>46</sup> The same holds true for the Audi point, a small flake whose under surface is a plain flake surface and whose upper surface shows primary flake scars a la Mousterian.<sup>47</sup> One of the primary scars intersects with the under surface to produce a cutting edge. The back is blunt which allows much pressure to be applied.<sup>48</sup> Audi station seems to be an Aurignacian culture which adopted the better Mousterian models.<sup>49</sup>



Tool types of the  
Aterian

--after Leakey



Finally attention must be given to the Palestinian Mousterian models. Leakey tells us:

during...the time corresponding to the greater part of the Würm glaciation of Europe...the dominant culture of the Near East was some form of late Levalloisio-Mousterian...such rare hand-axes that occur in this culture are more in the Levalloisian tradition than in that of the Acheulian...<sup>50</sup>

Indeed the culture of this area is never a full Mousterian but is divided solely into Lower and Upper Levalloisio-Mousterian. The Lower is of essentially Levalloisian affinities and resembles the European chipping than that of the more classic Levalloisian of Europe.<sup>51</sup> The culture seems to start at about the same time as the Würm Mousterian of Europe.

The Upper Levalloisio-Mousterian begins well into the Upper Paleolithic. Rust, in his researches, has shown some eight sub-types which involve combinations of the Mousterian with the Acheulian, Micro-Mousterian, and the Jabrudian.<sup>52</sup> More will be said relative to Palestine in a later section. The Levalloisio-Mousterian is followed in Palestine by the Lower Mousterian.

Some few words should be added regarding bone tools. It was in Mousterian times that bone industries first appeared.<sup>53</sup> Here we shall discuss two major bone tool finds, Pin Hole Cave and La Quine station.

Tool Types of the  
Classical Mousterian  
and  
Palestinian Mousterian  
Compared

<u>Tool types of Classical Mousterian</u>	<u>Tool Types of Mousterio-Levalloisian and Mousterio-Acheulio-Levalloisian</u>
triangular points and side-scrapers	triangular points and side scrapers
a wide variety of utilized flakes	a wide variety of utilized flakes
	small heart-shaped or triangular hand-axes
	a few burins - rare
	Audi points

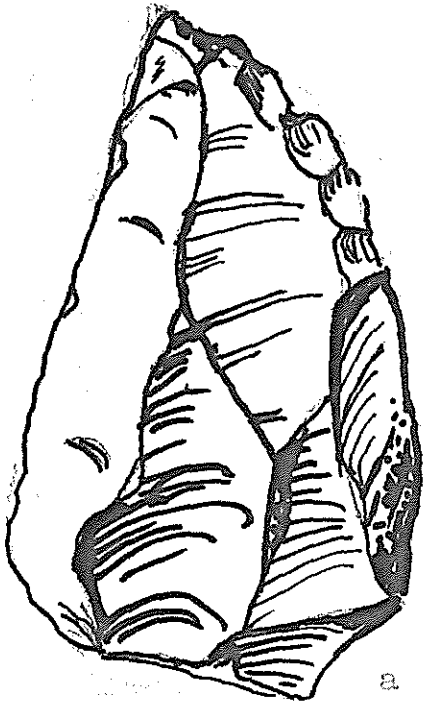
Pin Hole Cave in England has shown that Mousterian man used bone tools systematically.<sup>54</sup> Bones of large animals, carefully selected, were used as implements and for the manufacture of utensils. Bone tools in the cave show a preference for reindeer, hyena and woolly rhinoceros bones for tool manufacture.<sup>55</sup> The cave dates from just prior to the glaciation.

At La Quina some "rude pointed tools" have been found made of cave-bear fibula.<sup>56</sup> Broken obliquely across the center they were used as pointed instruments.<sup>57</sup> Innominate bones of bear with the distant ends of iliac, pubic, and ischial bones removed were evidently used for skin scrapers.<sup>58</sup> Bones of this site were apparently used as chopping blocks or retouchers.

Suddenly in the Upper Paleolithic, Mousterian disappeared and was replaced by very different types. Bulkitt tells us:

There is no question of any evolution from the Mousterian to the Aurignacian industries in our area. Something quite fresh arrived in Western Europe and not only are the industries totally different, but the men who made them in no way resemble their Neanderthal forerunners.<sup>59</sup>

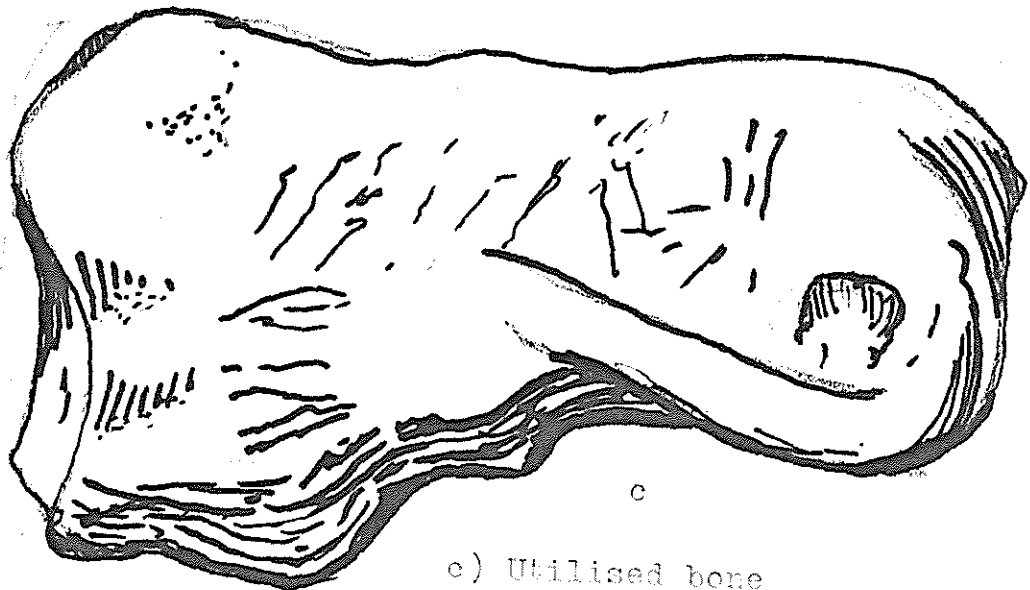
The Aurignacian culture which replaced the Mousterian on a blade tradition, a totally new approach to implement making.<sup>60</sup> In appearance and detail there was no similarity. Also the new culture made extensive use of bone and



a) An Audi Blade



b) A cordiform coup-de-poing



c) Utilised bone

horn tools and were much more varied in type.

There were some Mousterian holdovers, however.

Side-scrapers, points and especially Audi points lingered.<sup>61</sup>

Speaking of these Aurignacians and the hold-overs,

Burkitt says:

In no sense of the word does the new industry represent an evolution from an earlier Mousterian, but it would seem that the Mousterian culture was weakening rapidly and that new-comers were appearing on the scene. It is to these new-comers that the introduction of the Audi knife blades...was due. Whether at any given locality the industry of these times was made by degenerate Mousterians influenced by the new-comers or by some of the new-comers moving in and influenced by the Mousterian around them, it is difficult to say.<sup>62</sup>

In this light the Audi stage is seen as a period when Mousterian man and the new-comers coexisted.<sup>63</sup>

And so we have seen how the Mousterian became the dominant culture of Europe, North Africa, and the Near East; how it flourished and how it was replaced. Now we shall turn to a Paleontological examination in order to relate Mousterian tool finds to the fossil record.



## VII.

## Paleontological Finds and Flint Industries

As this paper deals with tool industries it is not the author's purpose to describe the physical characteristics of Neanderthal man or to go into detail regarding human paleontology. This section will select some salient fossil remains of Neanderthal remains and describe the tool industries found in association with them, making note of any significant physical anthropological aspects of the remains. A basic knowledge of Neanderthal characteristics is assumed.

The first remains we will discuss are those found at Montmaurin. They have been classified as Homo aff. neanderthanensis and apparently date from the second interglacial. The jaw is typically Neanderthaloid, but has Steinheim and Mauer affinities and is generally considered to be pre-Neanderthal. The associated tools are pre-Mousterian.<sup>1</sup>

The skeleton at Neanderthal is classified Homo sapiens neanderthalensis and apparently dates from the Würm glaciation. No artifacts were found.<sup>2</sup>

At La Ferrassie the remains were also those of Homo sapiens neanderthalensis. The individual was a "classic" Neanderthaler of the Würm glaciation. Here three levels of artifacts were found with an evolved Mousterian culture. Retouched blades and scrapers are present and there are

Keeled scrapers which are "almost Aurignacian."<sup>4</sup>

At Krapina the specimens which have been found are classified Homo neanderthalensis Var. Krapinensis. He dates from the late third interglacial and has mixed features, being archaic in the heavy super-orbital torus, chinless mandible, small mastoid processes, and broad palate, and modern in the post cranial bones.<sup>5</sup> He is a "generalized" Neanderthaler. He has Mousterian points and scrapers plus Acheulian and what have been called "pre-Aurignacian" tools.

At Tabun the remains are associated with three levels of Levalloisian tools, one level of Mousterian flake tools, two levels of Acheulian and one level of Tayasian. At nearby Skühl the artifacts are all Levalloisian-Mousterian.<sup>6</sup> These remains are related and Brothwell believes that the Tabun group at the Neanderthal stage were replaced or absorbed by a Skühl group at a sapient level.<sup>7</sup> The Skühl group is contemporary with the Levalloiso-Mousterian of Tabun. Here our stratigraphic study could be of value if, for instance, a layer of the Levalloiso-Mousterian of Tabun suddenly broke off at a point where Aurignacean (sapient) cultures began, we would have evidence for Brothwell's theory.

This is the sort of evidence the Anthropologist finds associated with the physical remains. The traditions and industries provide clues to the nature of the man; the fossils give leads as to possible interpretations of new chipping techniques.

## APPENDIX A

Cultural Divisions of  
the Four Main Traditions

Chopper Tools all about equally early)	Flake	Core Biface	Pebble tool
Anyathian(Burma)	"Typical Mousterian"	some blended elements in	Ain Haneck
Shoukoutienian(China)	Levalloiso-Mousterian	Mousterian	pre-Stellenbosch
Patjitanian(Java)	Levalloisian	Micoquian (Acheulean 6 & 7)	Oldowan
Soan(India)	Tayacian  Clactonian	Chellean-Acheulean  Abbevillian (once called "Chellean")	

## Appendix B.

### Some Words on Tool Making

The usual substances used for tool construction by the Mousterians was flint. Flint, in its natural state is a glossy black, grey, or brown minutely crystalline silica which originates in chalk rock formations.<sup>1</sup> The Mousterians found it in banks and beds of rivers and lakes or beaches. At this time it was scavenged although later men mined it. In addition several other rocks were used, among them chert, silicious slate, sandstone hardened by secondary silica, and diorite.<sup>2</sup>

There are **two** main methods of flint working which we will discuss: percussion flaking, and pressure flaking. Both were used by the Mousterians.

In percussion flaking blows are struck at suitable angles and directions with a hammerstone to knock off flakes of stone.<sup>3</sup> The flake thus struck off will carry a swelling near the point of impact known as the bulb of percussion. The core will have a corresponding hollow called the negative bulb of percussion.<sup>4</sup> A well formed bulb of percussion is a trait of the Mousterian. The bulbar scar is a small flake facet, produced naturally, which is seen often times on the bulb.<sup>5</sup>

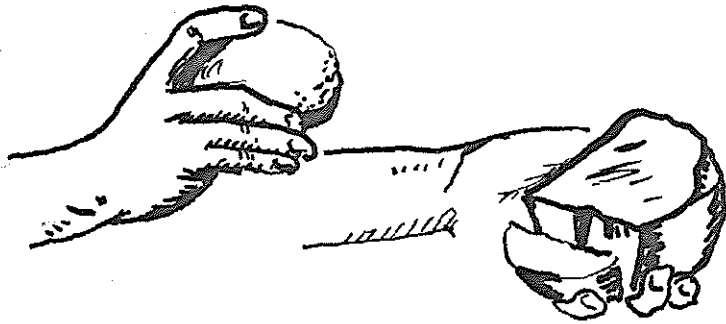
Three important types of percussion flaking were employed by Neanderthal man.

Free flaking, the first, refers to a blow struck out-

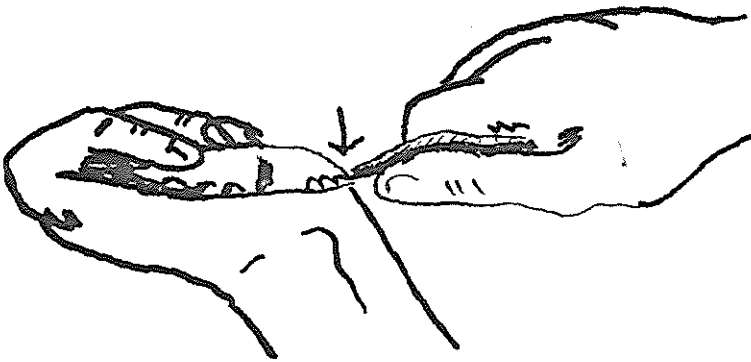
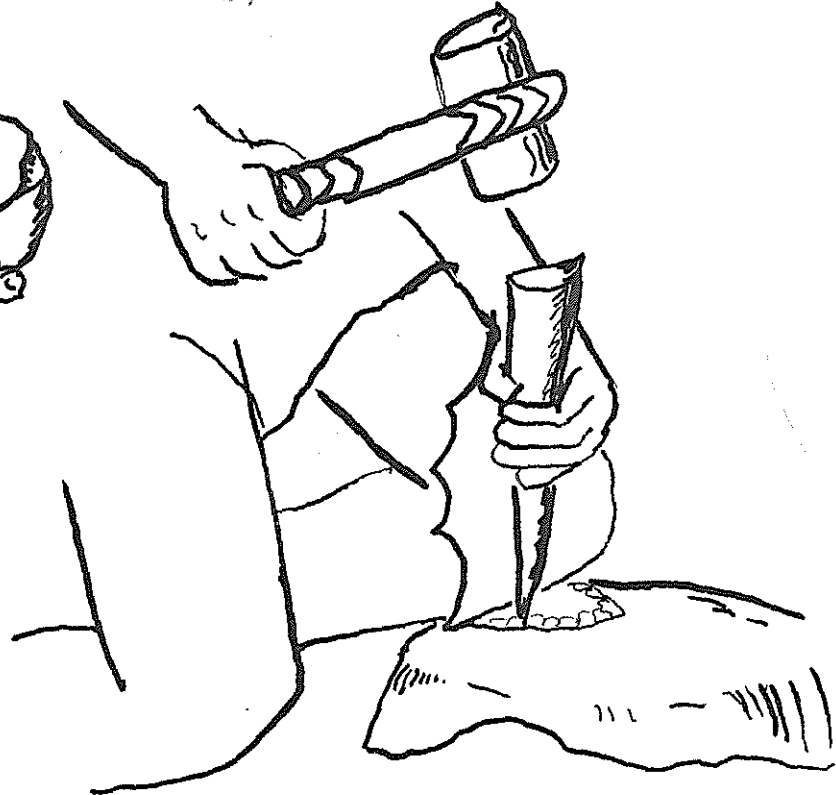
Methods of flaking stone

Fig. 10. 10. 10.

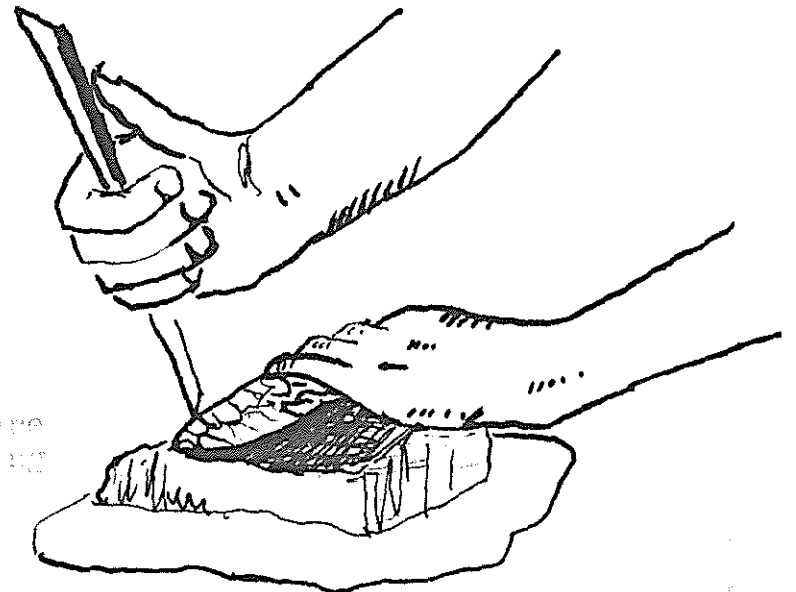
b). Indirect percussion



a) Direct percussion with hammerstone.



c) Pressure flaking



d) Pressure flaking

wards to remove a clean flake and leave a smooth flake scar.<sup>6</sup>

Resolved flaking, the second, refers to a blow struck inward. The resultant "shatter effect" breaks off a piece at right angles to the line of the crack, and a flake scar results.<sup>7</sup>

In controlled flaking, the third type, a long, thin, narrow flake is produced by striking the core with a piece of wood to give "pressure action" instead of a sharp percussion.<sup>8</sup>

Pressure flaking is unlike percussion flaking in that no blow is struck. Instead, pressure is applied at a given point with a stone or bone. This will remove a small flake. It is an entirely new technique which appears first in the Mousterian.<sup>9</sup>

Using these methods, Neanderthal man produced all his tools. In making a flake tool, a side-scraper, for example, the following process would be followed.<sup>10</sup>

First, any awkward lumps would be removed from the core to form the upper surface of the tool. This action is known as the Primary flaking.

Second, any curves or bends in the nodule were removed to form a flat surface known as the striking platform.

Third, the main blow was struck on the platform and the large flake removed.

Fourth, the edges of the flake were trimmed. This

process is known as secondary flaking and was quite sophisticated by this period. To produce an edge the scraper (or what have you) would be chipped away down one side (with pressure flaking). The many small flakes leave scars which intersect the main flake surface.

Secondary flaking was also used to trim the base to a rounded outline. Thickness might be reduced by flaking away the upper surface or removing the bulb of percussion.<sup>11</sup> If the edge were too thin it could be retouched to make it less fragile.<sup>12</sup> Such retouching was an even lighter technique which removed only very fine flakes to improve or shape the edge.<sup>13</sup>

To muffle blows to produce special effects, punch chipping could be used. In this method a muffle of bone would be placed between the core and the striker.<sup>14</sup>

Thus the Mousterian had an arsenal of flaking weapons for fine productions. Clark calls it an indicator of a new stage of technology:

(It) aims first and foremost at producing flake tools, and to this end goes to particular trouble to prepare cores from which they could be struck in a finished state.<sup>15</sup>

The Mousterian is in short a most significant culture - one worthy of study and one which can teach us much of the ways of primitive man.

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