

BLOCK 3
UNDERSTANDING PREHISTORIC
CULTURES



UNIT 7 PREHISTORIC TECHNOLOGY*

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Learning Objectives

Once you have studied this unit, you should be able to:

- Discuss the major techniques of tool making in prehistory;
- Discuss how and in what manner one technique differed from the other; and
- Find out the gradual change in technology as a result of changes in environment and human culture.

7.0 INTRODUCTION

The study of prehistoric stone tool technology is important because it tells us the evolution of not only tool or artifact making and its usage, but also because it tells us about human evolution both biological as well as cultural. The tools that people manufactured throughout their long history have been the means by which they augmented their limbs and extended the use of the environment. In the Stone Age, the people used simple tools at their disposal to make the prehistoric tools like handaxe, chopper, scraper and other types as well as pottery, but it is also true that they had a working knowledge of rock types and what rock types would suit what kind of tool manufacturing technique. .

7.1 IDENTIFICATION OF TECHNIQUES USED BY PREHISTORIC PEOPLE

When we look at the different tools found at different sites across the world, we cannot but marvel at how our ancestors must have created them. But today when a vast gap of thousands of years separates us from our ancestors, how do we know how they made them, and what technology they used?

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Today, when we try to identify and study the different techniques the prehistoric people had used, we depend on three factors –

- 1) *The study of stone tools* – When we look at a tool minutely at times it is possible to see how it must have been flaked or worked upon. There are specialists who study the morphological or physical features of the stone tools, and who can surmise how it must have been made.
- 2) *Imitation of the tools* – There is a large number of anthropologists working in this area which is better known as experimental archaeology where they conduct several experiments to find out what causes will lead to what effects. Some such experimenters are so expert that their products can hardly be differentiated from the century-old stone tools.
- 3) *Observation of similar kinds being made by living people* – A decade back, and even today, there are some living communities like in Papua New Guinea who still make stone tools and use them. Anthropologists can observe these groups of people and learn more about the technology.

7.1.1 Some Key Concepts

- **Core** – A core refers to the main stone from which a tool is made. These cores can vary in size from very large ones to tiny ones. They are usually, but not always, a water-borne pebble which is successively reduced to produce a tool. The selection of core size and type will depend on the type of tool that is to be manufactured. To make Lower Palaeolithic handaxes, prehistoric people in peninsular India used large quartzite cores; whereas in Central India, small cores of flint were used to make microliths in the Mesolithic period. Large tools like choppers and handaxes are also many times referred to as a Core tool, and in some of them the original part of the stone or rock is still visible.
- **Flake** – A flake is the small (or large) chip (or chunk) of rock that falls off when a core is struck or hit with another stone that acts as a hammer. The point on the core where the hammer strikes is known as point of impact. Without the flakes being removed, we can hardly make a tool on the core. However, sometimes, the flake is itself worked on, by removing smaller flakes, to create small tools like the scrapers and points. These tools are also popularly referred to as Flake tools. Sometimes a flake might have some portions of the original surface as the core is reduced, but a flake tool usually does not show any original surface.
- **Flaking** – This is the process of core reduction that takes place in the making of a tool where a number of flakes are removed. Flaking can be done by either (a) percussion, i.e., hitting one stone against another, or (b) pressure, i.e., by placing one stone against another and applying pressure. Usually when a flake is removed from the core, a depression is seen on the core – this is referred as the negative bulb of percussion. On the corresponding point on the flake an elevation or swelling is seen – this is the positive bulb of percussion. Flakings can also be of different kinds –
 - a) **Primary flaking** – This refers to initial flaking that is done on a core to achieve the required shape. These flakes are usually large ones, and show prominent bulb of percussion.
 - b) **Secondary flaking** – This refers to flaking that is done on the initially worked tool after primary flaking. This is done to refine and sharpen the tool, and⁹¹ therefore the flakes would be smaller in size.

- c) Controlled flaking – In this type of flaking the force of the blow is controlled to some extent. If the force of the blow is controlled by changing the direction, i.e., towards oneself, on the core, a step-like feature is seen. However, controlling of force can also be done by changing the hammer used. Therefore, in order to control the force, the tool maker could replace a stone hammer with a bone hammer.
- Hammer – This refers to the object that is used to hit or strike the core in order to remove flakes to shape it into a tool. Hammers can be of different types, shapes and sizes, and of different raw materials. Thus, we can have a stone hammer, bone hammer or even a wooden hammer. However, it is likely that the most commonly used hammer in the past must have been stone.
 - Striking Platform – A surface that is worked upon on the core and made flat where the hammer will strike in order to detach a flake. In some techniques, the striking platform is prepared, in others it is not.

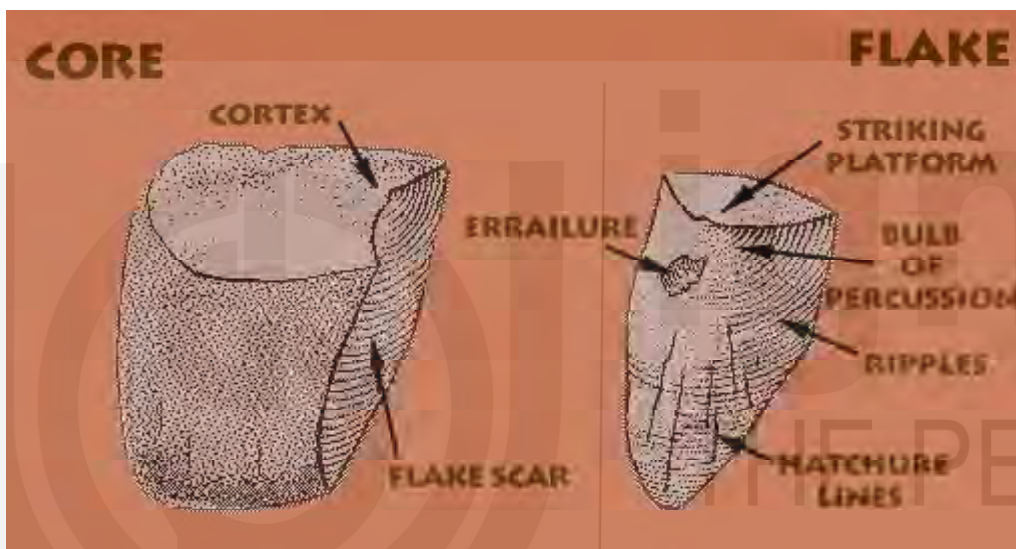


Fig. 1: A Core Tool and a Flake Tool

Source: <https://brainly.in/question/1382524>

Check Your Progress

- 1) How do anthropologists know what type of technology was used to make different types of stone tools?

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7.2 PALAEOLITHIC STONE TOOL TECHNOLOGY

The beginning and evolution of tool techniques took place during the Pleistocene period, which saw the emergence of Palaeolithic cultures – Lower, Middle, and Upper. The various techniques of manufacture of tools of the Palaeolithic period are discussed below.

7.2.1 Lower Palaeolithic

a) Block-on-Block or Anvil Technique

In this technique a core or a block of stone to be worked into a tool is struck against another large block or fixed anvil on the ground. This is done by holding the block of stone (to be shaped into a tool) in one hand or both hands and hitting it hard against the anvil. Understandably the flakes removed by this method will be large and massive. On the flakes the elevated portion called the positive bulb of percussion are highly pronounced. While on the core, a deep depression corresponding with the bulb of percussion is seen. Due to the largeness of the block that is used as a core and as hammer (fixed anvil), no secondary working or retouch is possible. Also, the tools made by this technique would be large ones, like chopper and chopping tools.

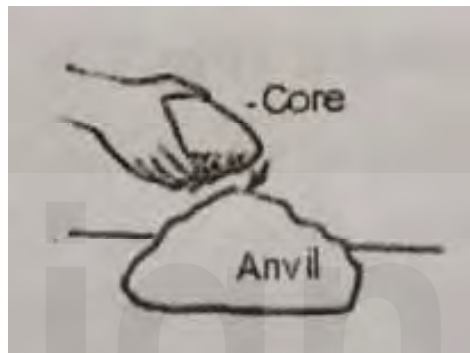


Fig. 2: Block-on-Block or Anvil Technique (Modified from Whittaker, 1994)

b) Stone Hammer or Direct Percussion

This is the most common method that was used by prehistoric people to make tools. For this, a core of suitable size is held on one hand, while another stone acting as the hammer is held on the other hand. The hammer is then struck repeatedly at suitable points in order to shape the tool. Alternate flaking done on both the surfaces would lead to bifacial flaking. Also since flakes are removed alternately, a zigzag cutting edge or profile line is seen. A prominent bulb of percussion is witnessed in this method. This technique was used for making the Abbevillian handaxes. Since direct blows are given with the stone hammer, therefore this technique is also known as Direct Percussion.



Fig. 3: Stone Hammer Technique (Modified from Whittaker, 2004)

c) Cylinder Hammer or Hollow Hammer Technique

In this technique instead of the stone hammer, a bone or a wooden hammer is used. This is the reason why it is called cylinder hammer or hollow hammer technique. Here, shallow and elongated flake scars are seen on the core. When L. S. B. Leakey, the

famous palaeontologist working in Olduvai Gorge, noticed shallow flake scars like this for the first time, he felt that these could have been achieved only by using a wooden or bone hammer. Tools made by this technique were first seen in St. Acheul in the Somme river valley in France. The beautiful Acheulian handaxes were made by this technique.

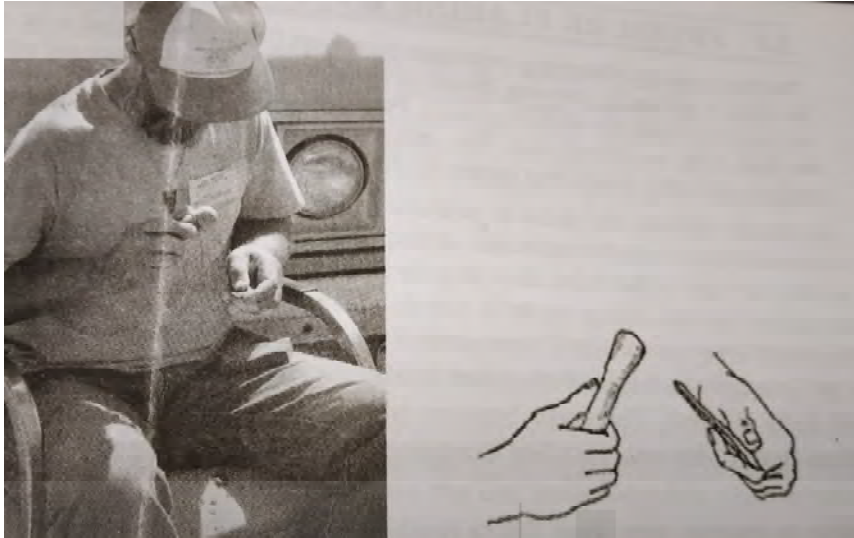


Fig. 4: Cylinder Hammer Technique (Modified from Whittaker, 2004)

The Clactonian technique was also used in some places to make Lower Palaeolithic tools like the large scrapers and some type of cleavers. This technique is discussed below.

7.2.2 Middle Palaeolithic

a) Clactonian Technique

The name of the technique comes from Clacton-on-sea in Essex, England where tools made on large massive flakes were witnessed. Essentially this is a flake tool technique, that is, a tool made on a large flake. In this technique, starting with a nodule, a sizeable flake was removed. The flakes would have been removed either by direct hammer or anvil technique. These flakes show the following characteristics:

- a) Flakes are large and massive, and bear a prominent bulb of percussion with ripple marks (occasionally),
- b) Striking platform makes an angle of 100-120° with the axis of the flake scar, and
- c) Striking platform remains unflaked and retains original surface.

This technique was used to make large unifacial scrapers and 'U' and 'V' shaped cleavers.

b) Levalloisean Technique

This technique is said to be a more advanced and skilful method of tool preparation in comparison to the previous techniques. The name of this technique is given after the site of Levallois Peret in France. Here, unlike the other techniques, the tool (flake) is prepared in advance on the core. Beginning with the rough trimming of the sides of the core, the technique involves the removal of flakes in such a way that the core looks are dressed in a rounded form. Finally, from the prepared striking platform, a blow is given to remove the flake. Thus, this technique has three steps in its preparation:

- a) Preparing the core,

- b) Preparing the striking platform, and
- c) Removal of flake from the core with one blow.

Since the resultant flake tool was prepared on the core, the features of a Levalloisean flake are different from a Clactonian flake. The main features include the following:

- a) Flakes are thin and small, undersurface usually shows one flake scar,
- b) The positive bulb is small and flat, and
- c) Striking platform makes an angle of 90° with the axis of the flake scar.

The resultant core is also referred to as tortoise core or prepared core, and the technique as tortoise core technique or prepared core technique.

7.2.3 Upper Palaeolithic

The technique adopted in this period resulted in uniformly thin, elongated and parallel-sided flakes commonly known as blades. This technique is termed as the blade technique. This is advancement on the previous techniques.

a) Blade Technique

Here, a more or less cylindrical or elongated core is first chosen. One end of this elongated core is struck off to prepare the striking platform. Then the core is held firmly, possibly on the ground, and by using a stone hammer flakes are removed in long grooves. This is done repeatedly, and finally a blow is given at the striking platform to remove a long elongated flake which looks like a modern blade. These stone blades are very sharp and can be used for fine slicing as well.

The main features of a blade flake include the following:

- a) Flakes are thin, elongated and almost parallel sided,
- b) The flake scars are also elongated and parallel sided, and
- c) Striking platform makes an angle of 90° with the axis of the flake scar.

At times instead of a stone hammer used in direct percussion, a punch might also be used to remove the flakes from the cylindrical core.

Thus, the blade technology sometimes also uses other techniques as a combination in the manufacture of tools which are discussed below:

- i) **Punching technique** – This technique involves the use of a punch, or an intermediate material, in order to control the flaking. Thus, in between the core and the hammer, the intermediate material used is the punch. This could be either a stone or bone or wood.
- ii) **Backing or blunting technique** – Once blades are manufacture by the blade technique, then sometimes they are blunted or backed along one border to allow gripping for the tool handler. This is made possible by retouching a selected area, and making one border blunt.

7.3 MESOLITHIC STONE TOOL TECHNOLOGY

In this period, the tools found become much smaller in size – so much so that the tools are referred to as microliths, meaning very small tools. They were also previously referred to as pygmy tools.

The technique used in this period is **pressure flaking** – which refers to the application of pressure to remove flakes. This was a new technique that was developed by the Mesolithic people in opposition to the technique of percussion that was commonly used in Palaeolithic times. Understandably, when pressure replaced striking (percussion), the flakes removed would also be very small. Thus, in this technique the hammer remained in direct contact with the core – and it is pressed hard into the stone core till a narrow, thin, and small flake is removed. It is also understood that only some type of rocks can be used for making tools by using this method.



Fig. 5: Pressure Flaking Technique (Modified from Whittaker, 2004)

To make small blades, or micro blades, the technique applied is similar to the blade technique, but instead of striking the core with a hammer, here pressure is applied to remove flakes. Since repeated removal of elongated flakes (by pressure) would lead to flutes, this technique is also known as **fluting technique**.

7.4 NEOLITHIC STONE TOOL TECHNOLOGY

In this period, a new technique was introduced. This came to be known as **grinding and polishing technique**. Here, a stone of suitable size is initially trimmed and flaked. Then the rough edges are made blunt by a technique called pecking. Finally the tool is ground by using some abrasives like sand and water against a hard surface like a rock to get a smoother and sharper surface and edge. In some tools, only the edge is ground. Thereafter, the tool is polished either intentionally by using animal fat, or unintentionally after regular and long use when it accumulates sheen on the surface.

Thus, the grinding and polishing method involves the following steps:

- a) Flaking – to get the desired shape and size
- b) Pecking – to blunt the rough edges
- c) Grinding – to smoothen and sharpen the tool
- d) Polishing – to acquire sheen or shine on the tool

Check Your Progress

- 2) List the techniques used in the manufacture of stone tools in the prehistoric period?

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7.5 CERAMIC TECHNOLOGY

Ceramic technology began in the Neolithic period (even though there are reports of it from Mesolithic Jomon) and flourished in the post-Neolithic period. The most common and predominant remains in the Chalcolithic to early historic period is ceramics. Therefore, it is not surprising that the techniques used for pottery making are many and varied. In the following the techniques of making pottery are given:

- a) **Clay preparation:** Usually clay for pot-making is collected from river banks or large lakes and these are considered the most suitable. These clays are usually rich in mineral content and capable of being moulded and have enough plasticity.

The clay that is used is first cleaned of straws and other impurities. It is then mixed with water kneaded into a plastic consistency. However, at times, this clay dough is mixed with a tempering material such as husks of paddy or sand etc., in order to lessen its stickiness. This prepared clay is well-kneaded till it reaches a consistency where it can be given shape.

- b) **Shaping Clay:** The actual shaping of the pot can be done in two ways – handmade or wheel made.

i) **Handmade pottery** – This pot-shaping technique is performed with bare hands. Here, it can be done by the coil-building method or the mould method. In the coil building method, the prepared clay is arranged in a long coil first, then the coil is added on in order to get a basic shape. This basic shape is then beaten with a beater (usually wooden) on the outside with a polisher inside to give strength (while beating), and the walls are flattened. In the mould method, either a basket or an old pot can be used as a mould to give the basic shape of the pot. Then with the help of the beater and polisher the walls are made thinner and regular.

ii) **Wheel made pottery** – In this method, the prepared clay is placed in the central portion of a wheel which is fixed on a fulcrum. A portion of clay is taken and the wheel rotated regularly. As the wheel rotates, the clay is given shape with the hands. In some places, instead of a rotating wheel on a fulcrum, a turn table is also seen, which is manually rotated. It is seen that wheel made pottery can be very thin and can be used to make pots of different shapes and sizes, depending on the expertise of the potter.

The pots which are made either by hand or wheel can then be burnished and slipped. **Burnishing** refers to a glossy feature that appears on the surface of the pot by polishing with a polisher (in case of handmade pottery), or by repeatedly touching the surface with wet hands (in case of wheel made pottery). **Slipping**, on

the other hand, is a process by which the pot is dipped in a solution of clay and colour – this process not only gives a colour to the pot but also closes up all the pores on the surface.

- c) **Firing:** The final texture of the pot depends on firing, and how it is fired. Only in open hearth firing with sufficient ventilation, a smooth and uniform texture can be achieved. Uniform supply of air can also be achieved by digging air ducts underneath the hearth or kiln where it is fired. This uniform firing with regular supply of air, referred to as well-fired, usually turns the pot red in colour. In insufficient air supply and un-uniform firing the pottery turns blotchy with patches of red, and the core is usually grey. This is referred to as ill-fired pottery.
- d) **Decoration and Painting:** Pots may be painted or decorated before firing or after firing. These paintings may be of various colours and designs such as geometric, non-geometric, and naturalistic. On the other hand, designs could be incised, in the form of appliqué, thumb impressions etc.

Check Your Progress

3) What are the two main methods of pottery shaping?

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7.6 SUMMARY

When we look at the techniques used by prehistoric people we cannot but marvel at their ingenuity, knowledge and skill, not only towards selection of raw materials but also towards manufacturing of tools out of it. They seem to know what technique would suit which rock and to what purpose. Thus, the technology seen from the Palaeolithic to the Neolithic varies not only in the application and manner of force given to make the tools, but also the resultant tools themselves. Another interesting observation that we can make from the study of these stone tools and their technology is the gradual reduction or downsizing in tool size, as well as in the methodology of tool making as we progress further.

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7.8 ANSWERS TO CHECK YOUR PROGRESS

- 1) Anthropologists study three factors to identify the different techniques the prehistoric people had used:
 - 1) The study of stone tools – When we look at a tool minutely at times it is possible to see how it must have been flaked or worked upon. There are specialists who study the morphological or physical features of the stone tools, and who can surmise how it must have been made.
 - 2) Imitation of the tools – There is a large number of anthropologists working in this area which is better known as experimental archaeology where they conduct several experiments to find out what causes will lead to what effects. Some such experimenters are so expert that their products can hardly be differentiated from the century-old stone tools.
 - 3) Observation of similar kinds being made by living people – A decade back, and even today, there are some living communities like in Papua New Guinea who still make stone tools and use them. Anthropologists can observe these groups of people and learn more about the technology.
- 2) The beginning and evolution of tool techniques took place during the Pleistocene period, which saw the emergence of Palaeolithic cultures – Lower, Middle, and Upper. The various techniques of manufacture of the Prehistoric period are as follows:

Lower Palaeolithic Techniques:

- a) Block on Block or Anvil Technique
- b) Stone Hammer or Direct Percussion
- c) Cylinder Hammer or Hollow Hammer Technique

Middle Palaeolithic Techniques:

- a) Clactonian Technique
- b) Levalloisean Technique

Upper Palaeolithic Techniques:

- a) Blade Technique

Mesolithic Techniques: Pressure and Fluting Technique

Neolithic Technique: Grinding and Polishing Technique

3) Two important methods of giving shape to the pottery are as follows:

- i) **Handmade pottery** – This pot-shaping technique is performed with bare hands. Here, it can be done by the coil-building method or the mould method. In the coil building method, the prepared clay is arranged in a long coil first, then subsequent coil is added on in order to get a basic shape. This basic shape is then beaten with a beater (usually wooden) on the outside with a polisher inside to give strength (while beating), and the walls are flattened. In the mould method, either a basket or an old pot can be used as a mould to give the basic shape of the pot. Then with the help of the beater and polisher the walls are made thinner and regular.
- ii) **Wheel made pottery** – In this method, the prepared clay is placed in the central portion of a wheel which is fixed on a fulcrum. A portion of clay is taken and the wheel rotated regularly. As the wheel rotates, the clay is given shape with the hands. In some places, instead of a rotating wheel on a fulcrum, a turn table is also seen, which is manually rotated. It is seen that wheel made pottery can be very thin and can be used to make pots of different shapes and sizes, depending on the expertise of the potter.



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UNIT 8 PREHISTORIC TYPOLOGY*

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- 8.8 Answers to Check Your Progress

Learning Objectives

Once you have studied this unit, you should be able to:

- Identify tools belonging to different prehistoric cultural periods;
- Differentiate between two sets of tools;
- Discuss how and in what manner the tools were used by prehistoric people; and
- Find out the gradual change in typo-technology as a result of changes in environment and human culture.

8.0 INTRODUCTION

When we study prehistoric tools many questions come to our mind. Why do we study Stone Age tools? How many are there? What is the need to study them?

The answer is very simple. A proper discussion on tools and implements used by prehistoric people can reveal many things about the past. For instance, it can tell us about the changes that occurred in the material culture of prehistoric people in terms of technique, use of raw material, and even in terms of usage. These in the long run can help us recreate not only material aspects of culture but also certain intangible aspects of their culture.

The study of different types of tools is mainly aimed at establishing the different tool-making techniques practiced by prehistoric people at different places in the initial phases

of their cultural development. However, for the later periods a typological study helps to identify diffusion, contact and migration of different traditions of the past cultures. As such, certain very clear-cut structural or morphological definitions have been made to classify the various kinds of tools coming from all ages. It does not in any way mean that the tools found from all over the world have to confirm to any of these defined typologies. This is mainly because prehistoric people worked according to their own plans and necessities without having anything to do with our present attempt of defining some common kinds. As a result within a typology many stylistic variations are noted and, as a rule, they are described on the basis of specific characteristics. For instance, the word handaxe stands for a defined typology. But if one finds a handaxe with some peculiarity which one wants to describe, one can always record it as triangular handaxe, or peariform, or such other types (Bhattacharya, 1972).

One important point to be kept in mind as we discuss tool classifications is that they are related to the various stone tool making technologies such as percussion, pressure flaking, and grinding. Therefore the discussion of these stone artifacts cannot be done in isolation and they have to be studied together with tool technology.

Check Your Progress

1) What are the two kinds of specimens archaeologists usually excavate?

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8.1 CLASSIFYING TOOLS INTO TYPES

Before we discuss the different common typologies of artifacts, it is important to briefly understand what classification means. Archaeologists usually excavate two kinds of specimens: artifacts and ecofacts. Artifacts are the material remains of cultural activities such as stone tools, weapons, ornaments, house remains etc. As a general rule, archaeologists identify ecofacts, whereas artifacts are usually classified.

Archaeology's basic unit of classification is a *type*. Artifact type is an abstract form, created to facilitate analysis. The most basic type is however the *morphological type*, coined by Julian Steward in 1954. This is also called the *descriptive type* designed to reflect overall appearance of an artifact. Length, width, weight, material, colour, and volume are some attributes designed to define such a type. The primary function of this type is descriptive in nature, to convey the appearance of artifacts or set of artifacts. When considering morphological criteria within these groups, several attributes have to be taken into consideration, such as, weight, sharpness, length, width, thickness, pattern of flaking etc.

8.1.1 Some Key Concepts

Before we classify the artifacts of the Stone Age, some key concepts need to be defined and elaborated.

- i) **Artifacts:** Artifacts refer to humanly manufactured or modified objects. These are objects that are deliberately shaped by humans and thus it includes a variety of

implements made from different raw materials such as wood, bone, shell, stone, metal as well as clay.

- ii) **Assemblage:** This refers to a set of artifacts, not necessarily of the same type, recovered from a specific archaeological context. Distinct groups of artifacts from different assemblages can be categorized as an industry. Distinctive assemblages or industries which recur in different contexts are often taken to be indicators of a specific culture.
- iii) **Industry:** When several artifacts are found of the same age at a site they constitute an assemblage. When such assemblages recur at several sites, they are called industry. They at times are characterized by a particular technology, technological style or morphology and are drawn from different but contextually related assemblages.
- iv) **Tradition:** This term is used to describe a set of industries that are technologically or aesthetically similar enough to imply underlying cultural or historical connection. It is used to describe a set of industries across time, so that, in effect, a tradition forms the genealogy of a given industry (Shaw & Jameson, 2002).

Check Your Progress

- 2) What do you understand by an assemblage while studying artifacts?

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8.2 PALAEOLITHIC STONE TOOLS

The Stone Age existed at a time in human prehistory when the Pleistocene and early Holocene geological epochs took place. Thus this is a cultural period which encompasses a time span over millions of years and which witnessed changes in tool technology. Referring to a time when stone tools were in use, this period can be grouped into three major groups – Palaeolithic, Mesolithic and Neolithic. Depending on typo-technology of tools used, economic activities, and other cultural features, the Palaeolithic can again be divided into Lower Palaeolithic, Middle Palaeolithic and Upper Palaeolithic.

8.2.1 Lower Palaeolithic

Some of the important lower Palaeolithic tools include the following:

- A) **Pebble Tools:** The term literally refers to all tools made on pebble. In usual practice, it applies to a variety of choppers, scrapers and handaxes, where working edge is made by block-on-block technique (See Figure 1). These tools are big and massive and characteristic of lower Palaeolithic culture of South East Asia (such as Burma), North West India (such as Sohan) and East Africa.

Two types of pebble tools are normally seen: Chopper and Chopping

- i) Choppers are unifacially flaked large massive tools.
- ii) Choppings are similar to the choppers except that they are bifacially flaked.

The term *Chopper-Chopping* was suggested by H. L. Movius in 1944 when he analysed Palaeolithic tools from India. These tools are used for chopping, scraping and clearing purposes.

- B) **Biface/Handaxe:** These are bifacially flaked core tools, with thick and heavy butt end and thin tapering pointed working end (Figure 1). They are also called *bifaces* and *coup-de-pong*. Boucher de Perthes, a French prehistorian was the first to find handaxes, following which they were discovered in Europe, Africa, Asia and most particularly in India.

In terms of its use, the pointed end was probably used for digging, while the sides were used for cutting or splitting. Because of their multifarious functions, they are also called *multi-purpose tools*.

On the basis of methods of manufacture, handaxes are placed under three traditions: Chellian, Abbevillian and Acheulian based on the evidence found in France. These traditions are indicative of their development through various stages:

- i) **Chellian-Abbevillian Handaxe:** These are tools crude in nature and flaked from the upper and lower surfaces. These handaxes are irregular in outline with zig-zag working end. The name is given after type sites, Chelles, located on the junction of rivers Seine and Marne in France; and Abbeville, on Somme River in France. The technique of manufacture was likely block-on-block or stone hammer technique.
- ii) **Acheulian Handaxe:** In St Acheul in Somme valley, France, Boucher-de-Perthes discovered very symmetrical handaxes in 1836. Regular in outline, beautiful to look at, these were worked by removing thin flakes from both surfaces. In cross-section, they were biconvex. They could have been produced by a light cylindrical hammer made of wood, bone or stone.

Some types of Acheulian handaxe include the following:

- a) **Peariform:** As the name suggests this is a specific kind of handaxe and resembles the shape of a pear and not just any kind of handaxe which may have a pear-like shape. It is a short heavy handaxe with rather a rounded off point at the working end.
- b) **Ovate:** This is an advanced variety of handaxe which is oval in shape. The tool though biconvex in profile is rather thin and symmetrical. The working end and the lateral borders continue in the form of a ridge across the butt-end.
- c) **Cordiform:** This handaxe is so named because of its similarity with the shape of the heart. The butt-end is well-rounded and curves gently into the sides to meet at the working end.
- d) **Lanceolate:** This type of handaxe has fairly long tapering or sloping sides ending in a pointed end, just like a lance head. The surface is found rather flattish as a result of probable well-planned controlled flaking. The width of the tool is always shorter than the length.
- iii) **Micoquian Handaxe:** These are small triangular handaxes, with thin elongated working ends. The thick and heavy butt end often preserves the original surface. However unlike Abbevillian it is finely retouched with extensive secondary flaking. They were first noticed in a French site, La Micoque and follow the Acheulian types stratigraphically. They are not as symmetrical as the Acheulian handaxes.



Fig. 1: Lower Palaeolithic Tools

Source: <http://historyhelpmate.blogspot.com/2017/11/palaeolithic-cultures-of-india.html>

Check Your Progress

3) What are the three types of Lower Palaeolithic tools along with their variations?

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C) **Cleaver:** Next to handaxe, cleaver is an important and regularly occurring lower Palaeolithic tool. This is a cutting or cleaving tool with a broad cutting edge and a prototype of the present iron axe. Though occurring in association with handaxe, it is later in antiquity than the handaxe. They were first found in association with middle Acheulian handaxes and recovered from Bed III at Olduvai Gorge, East Africa.

On the basis of (a) shape of the butt, (b) shape of the edge, (c) nature of cross-section, cleavers can be sub-divided into:

- i) Cleaver with square/round/‘U’ butt and straight edge, and generally square or rectangular in shape,
- ii) Cleaver with pointed butt and straight edge, roughly triangular in shape or ‘V’ like,
- iii) Cleaver with broad or narrow butt and flaring sides with straight, concave or convex edge, and
- iv) Cleaver with parallelogram shaped cross-section.

8.2.2 Middle Palaeolithic

Contrastingly the massive tools of the Lower Palaeolithic are replaced by much smaller tools in the Middle Palaeolithic. The earlier usage of the core to make tools is now replaced by the extensive use of smaller flakes. Thus new tool techniques such as Mousterian and Levalloisean made their appearance in this period.

A) **Scrapers:** These are usually smaller tools made on medium-sized flakes. A scraper is a tool essentially manipulated by fingers. This necessarily makes the scraper a thin tool usually made on medium sized triangular or fan-shaped flake in which the longest side is slightly convex. The convex edge of the flake is found thinned out by knocking off larger primary flakes from the surface and then subjecting it to uniform and controlled secondary retouching along the entire border. The undersurface of the tool is seen seldom touched, as it maintains the single flake scar of detachment (Bhattacharya, 1972).

These tools are used for scraping barks of trees, dressing of the wooden or bamboo shafts and skins of animals.

There are many varieties of scrapers that have been identified. These are mainly on the basis of (a) shape, (b) position, and (c) nature of the edge for scraping:

- i) **Side scraper:** In this type, one or both of the longer sides from the upper or underside or sometimes from both surfaces, retouch is done. They are thus called single sided or double sided scrapers respectively.
- ii) **End scraper:** The scraping edge in this type is confined to the shorter side which is steeply retouched. Usually the scraping end is located on the distal or proximal end of the flake in respect to the location of bulb of percussion.
- iii) **Round scraper:** In this type the working end is along the periphery, all round the flake.
- iv) **Concave or hollow scraper:** In this tool type the scraping edge is intentionally made concave by flaking or by taking advantage of the natural concavity. The tool is retouched from the upper or undersurfaces.
- v) **Convex scraper:** Regardless of the shape of the nodule or flake the working edge in this type of tool is convex or arched and obliquely retouched from above or undersurface.
- vi) **Concavo-convex scraper:** In this type the working edges are concave and convex respectively.
- vii) **Side-cum-end scraper:** Here one or two of the longer sides and ends bear retouch and hence they are called so.

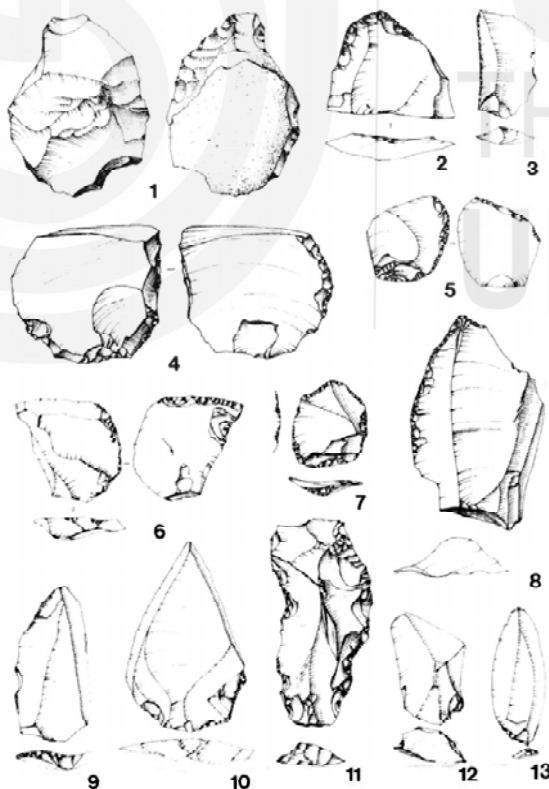


Fig. 2: Middle Palaeolithic Tools

{Levallois core (1), different types of scrapers (2–8 and 11), Levallois points and flakes (9, 10, 12 and 13). All the tools are made on local light grey chert, except for 3, which is of very dark green quartzite (1:2)}

Source: https://www.researchgate.net/figure/Middle-Palaeolithic-tools-Levallois-core-1-different-types-of-scrapers-2-8-and-11_fig3_259531793

- B) **Points:** Points are almost of the same size as the scrapers i.e., made on medium sized flakes. Unlike scrapers where a general slope is formed from the back border to the scraping border by flaking, there appears a slope of similar kind obtained for two opposite borders. Thus the central region is a little elevated than any of the borders. These two borders converge in the anterior part to give rise to a point. This is further enhanced by secondary retouching near the pointed end. Some special types of points may be grouped as follows:
- i) **Single shouldered point:** These are tools where a single corner towards the base is removed by a single blow.
 - ii) **Double shouldered point:** Here both corners towards the base appear to have been removed. These are also referred to as tanged points.

8.2.3 Upper Palaeolithic

The Upper Palaeolithic period is characterized by the blade and burin industries. The authors of these industries were fully modern men comparable to the *Homo sapiens sapiens*. Besides blade and burin industries, they made tools on bones, antler, and ivory. They lived in caves or rock shelter as shown by paintings on the walls and carvings on rocks. Their culture is found not only in Europe, Africa and West Asia but also in India. Some of the tools of this period include the following:

- A) **Knife Blades/ Blades:** Blades are thin, long, parallel sided flakes which may be retouched or unretouched. In some specialized varieties this retouching occurs in the form of backing or blunting of a border and these are called backed knives.
- B) **Borer or Awl:** These consist of artifacts usually made on flat flakes but sometimes on convenient nodules. It has a thick projecting point specially obtained by etching out two notches on the two sides of the projection.
- C) **Burin or Gravers:** This tool was specifically used for engraving on soft stone or bone as well as on the walls of rock shelters and caves. A typical burin is a blade with margins sliced obliquely at one end so that they meet to form a narrow chisel edge.
- D) **Bone Tools:** Tools made on bone, antler, ivory, horn etc. first appeared in the upper Palaeolithic times in the European sites. There are varieties of bone tools. Some of the commonly occurring ones include the following:
 - i) **Baton-de-commandement:** In its simplest form it consists of a portion of antler with one or more holes pierced through it.
 - ii) **Fish Hooks:** The simplest type of fish hook consists of a thin needle with a hole through it though not at the centre. Fish hooks were found during Magdalenian times.
 - iii) **Harpoons:** This constitute an important family of bone tools and show an evolutionary series such as (a) harpoons without barbs; (b) harpoons with one barb; (c) harpoons with single row of barbs; and (d) harpoons with double row of barbs.
 - iv) **Needles:** These were probably made by grinding a small fragment of bone in a groove in a piece of sandstone or some such hard surface.

- v) **Bone Lance points:** These are thin wands of bone pointed at one end. At the other end some workings are found in order to get the lance points hafted in the shafts.
- vi) **Spear Thrower:** This is made of a long flat piece of bone. At its one end there is a little projection on the upper side in the form of a hook. The other end is held in the hand in such a way that it points backwards over the shoulder of the operator and a projectile, usually a spear, to be thrown, can be rested upon it with its butt end.

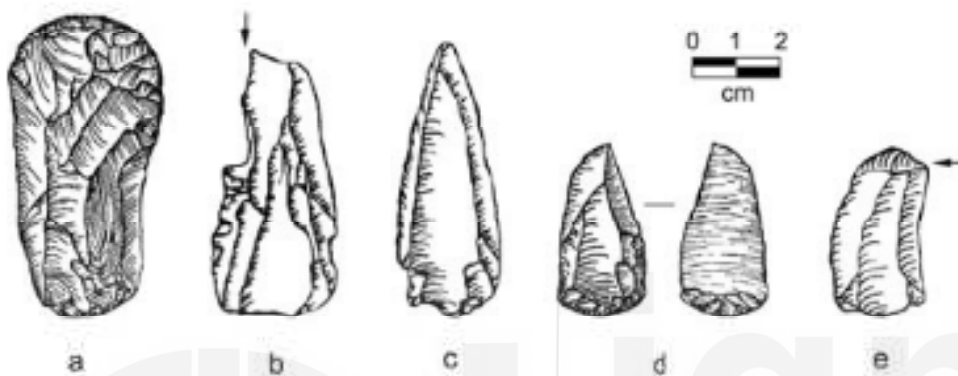


Fig. 3: Upper Palaeolithic Tools

Examples of Upper Palaeolithic tool types (a) end-scraper on blade (b) burin (c) Umm el Tl el point (d) Emireh point (e) chamfered piece

Source: https://www.researchgate.net/publication/316991124_The_Initial_Upper_Palaeolithic_in_the_Levant?_sg=yCqYOGOF2n5BaPapGEQvWrzWabnYIPfiXNEDOT1ulQEM0qLMSDhROQmTEpGrbYuowrcdwV2clA

Check Your Progress

4) Which industries does the Upper Palaeolithic period characterize?

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8.3 MESOLITHIC TOOLS

Mesolithic period is a transitional stage between Palaeolithic and Neolithic periods. It developed in the Holocene epoch. In this period the tools produced were tiny blades produced by the fluting and pressure flaking techniques. These extremely tiny tools are called microliths. This was probably needed since the focus was now on fast game hunting, and probably hafting was used widely. When viewed from this context, the tiny microliths possessed many advantages over the Palaeolithic tools. These were easier to make and took lesser time to manufacture. These economised the raw material and at the same time when hafted on a wooden shaft in a particular fashion they formed very effective tools and weapons. These are known as composite tools. Microliths as composite tools marks advancement in technology as compared to the Palaeolithic. Microliths usually comprise of the following:

A) Geometric Microliths

- i) *Lunates or crescents*: These are small microliths made on parallel sided blades resembling a half moon. They have a round back (or arc) and a straight opposite side (chord). The arc is thick and intentionally blunted by steep retouch to facilitate hafting in a handle, while the chord remains almost unretouched and sharp.
- ii) *Triangles*: These are made on broken blades, the sharp edge of which forms the base while the longitudinal sides are blunted. There are two varieties – non-geometric triangular form and a regular form with a longer cutting edge, such as scalene, equilateral and isosceles triangles.
- iii) *Trapezes*: They resemble geometric trapeze in which the shorter three sides are retouched steeply while the longest side remains as a sharp cutting edge. It may be taken as a transitional form to lunate. In a true trapeze the two parallel sides of the original blade remain unretouched while the non-parallel sides are retouched.
- iv) *Trapezoids*: These form a sub-type of trapeze in which no two parallel sides can be seen while the other longitudinal sides are retouched.
- v) *Transverse arrowheads*: In this type the length between the cutting edge and its posterior border is more than that between the lateral sides. It is usually an arrowhead having a transverse sharp edge instead of a pointed one.

B) Non-geometric Microliths

- i) *Backed blades*: These are parallel sided blades with one or both of their lateral sides retouched for cutting purposes.
- ii) *Obliquely blunted blades*: These are also called pen knife blades. These possess a steeply blunted side which curves to meet the thin, unretouched edge which acts as a working edge. Partial or complete blunting may be done on right or left side. The working edge could be concave or concavo-convex or straight.
- iii) *Truncated blades*: These are blades, the broken ends of which are trimmed either transversely or obliquely probably to produce a scraping end. The truncation is done at one or both ends. The working edge is transverse or straight.
- iv) *Tranchets*: These are flake tools the cutting edge of which is formed by the intersection of two or more flake scars from the two surfaces of the tool.
- v) *Hollow based points*: In these tools at least a part of one side of the point is steeply blunted while the base is intentionally hollowed by retouch. They include both symmetric and asymmetric types.

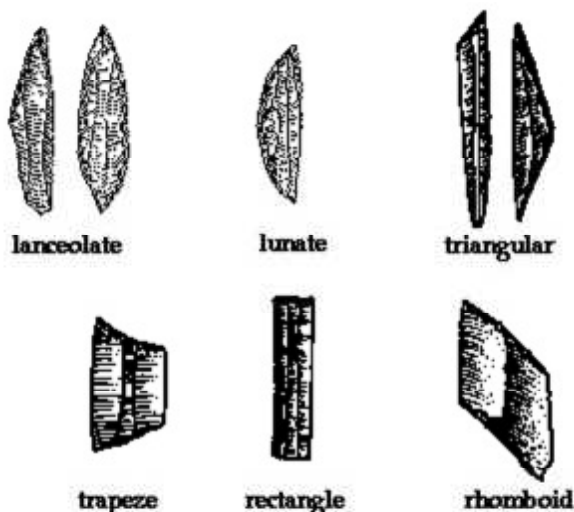


Fig. 4: Microliths

Source: <http://rogergrace.webmate.me/SARC/type/microliths.html>

Check Your Progress

5) In which epoch did the Mesolithic culture develop?

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8.4 NEOLITHIC TOOLS

Neolithic period marks a cultural revolution. From their role as foragers of nature, man became the controller of nature. The tools of this period were more durable and took longer time to finish. Besides stone tools, the people also introduced ceramics, which could be used for different purposes.

During this period prehistoric people made tools out of different types of igneous rocks by pecking, grinding and polishing in order to adapt to their environmental conditions although the use of earlier tools were still continued.. Surface of a wet sand stone was used as an abrasive. The tools thus made were more durable and one took longer time to make them. Thus mostly the Neolithic industry is referred to as pecked and ground stone tool industry.

- Celts (a term used for both Adzes and Axes):** Axes are mostly triangular in shape with a broad cutting edge with a butt which may be pointed, rounded, broad thick or broad thin. They constitute the most significant and major group in the pecked and ground stone industry. They vary in size from small to large specimens. Majority of them are medium sized. Small and large axes are quite rare. Working edge of the axe has got symmetrical beveled surfaces meeting at the sharp working edge. .
- Adzes:** An adze is a tool for chipping or slicing away the surface of the wood. These are thin, triangular shaped tools usually made on flakes. They differ from

axes in having one flat surface and the other slightly convex surface with a beveled, central edge. Adzes are hafted in such a way that the blade is at right angles to the handle. Usually the beveled edge is ground.

- c) **Chisels:** Chisels are narrow elongated cylindrical or rectangular celts with ground edges which may be straight or convex. They are actual prototypes of the metal chisels employed in carpentry. They might have been used for splitting purposes and for cutting as well.
- d) **Wedges:** These are small, roughly triangular/quadrilateral pieces with wedge shaped pointed ground edge and pecked surfaces. These were used for splitting wood and were probably made from broken axes.
- e) **Grinding or Rubbing stones:** These are domestic implements usually found in association with querns, serving the purpose of grinding and pounding of grains. They are made on small natural slabs in relation to the querns made on huge boulders. They may be oblong, rectangular, oval or circular in shape.
- f) **Saddle Querns or Mills stones:** They derive their name from their appearance to riding saddles. They were used for grinding and pounding grain and other cereals. They are rectangular, square and less frequently round in shape and made out of large granite boulders. Majority of them are long, broad and shallow in depth. Their surfaces were hollowed out by pecking.
- g) **Mace heads or ring stones:** These are thick massive circular stones with a well-drilled central hole. Their surfaces are sometimes pecked and ground. The central hole was pecked and drilled alternatively from both surfaces. The diameter of the hole narrows down from the surface to the centre, taking an hour glass shape. Their use as weights for digging sticks suggests they were agricultural implements.
- h) **Fabricators or hammer stones:** These are round or cylindrical in shape. These were put to use in the manufacture of blade tools and in making grinding and rubbing stones. Particularly the cylindrical ones with marks of battering at either end must have been used as punches for dressing axes and similar ground tools.

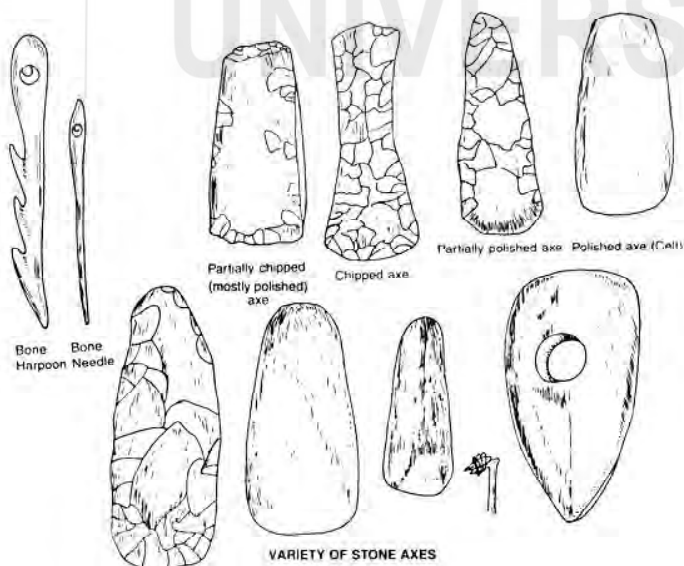


Fig. 5: Neolithic Tools

Source: <http://www.yourarticlelibrary.com/notes/history-notes/brief-notes-on-neolithic-stone-age-life-culture-and-tools/41957>

Check Your Progress

6) What kind of rocks was used to make tools during the Neolithic Period?

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8.5 CERAMIC TYPES

Pottery or ceramic ware appears in the Neolithic period, even though there are reports of stray finds from the Mesolithic period too. However, it was only in the post-Neolithic period that pottery technology becomes much advanced and found in almost all regions of the world. This refers to the craft of making pots from clay.

The clay used in pot making was invariably selected with the utmost care; often it was traded over considerable distances. The consistency of the clay is important – it is pounded meticulously and mixed with water to make it entirely even in texture. By careful kneading, the potter removes the air bubbles and makes the clay as plastic as possible allowing it to be molded into shape as the pot is built up (Fagan, 2001).

8.5.1 Types of Pottery

The basic classification that is made in pottery is handmade and wheel made pottery – the former used in Neolithic period, the latter used in a few sites of Neolithic, especially in the later part of Neolithic culture. Proliferation of wheel made pottery took place mostly in Chalcolithic period.

- a) **Coil building method** – Here, flattened long coils of clay are placed in a concentric manner and then squeezed and smoothed together.
- b) **Mould method** - The vessel is made from a lump of clay that is either pressed into a concave mold or placed over the top of a convex shape.
- c) **Potter's wheel method** –The vessel is formed from a lump of clay rotating on a platform turned by the potter's hands or feet.

8.5.2 Surface Treatment

Following the initial manufacturing and shaping process, clay vessels would be put aside for a short time until they reach the *leather-hard stage*. At this point most of the water that had been mixed with the clay to make it plastic and workable would have evaporated and maximum drying shrinkage would have occurred. However a small amount of water of plasticity still remains allowing secondary manufacturing techniques, such as *burnishing* (polishing) or the use of *paddle* and *anvil*. It is at this point too that decorative as well as functional surface treatments would be carried out – *comb*, *cord*, *finger nail* and *bird bone impressions* as well as *incised decoration*.

8.5.3 Firing

Firing produces irreversible change, and it is only after firing that the vessel becomes pottery. In the Neolithic period, firing was done using open fires or a pit-fire. In later

periods, sophisticated kilns were prepared for firing pots that were mass produced, such as those found at Harappa.

8.5.4 Some Example of Pottery Type

On the basis of the types of pottery, different cultures can be identified. In the following a few examples of well-known pottery type is given.

- a) **Malwa ware** – This is a characteristic pottery type of Malwa Chalcolithic culture. This is a wheel made pottery with buff or cream slip and has painted patterns in dark brown or black colour. The designs are usually of triangles/lozenges, and animals/birds/plants/dancing human figures.
- b) **Painted Grey Ware (PGW)** – PGW is a characteristic pottery of early Iron Age in India, the other being NBP. This is produced from well-levigated clay and on a fast wheel. A thin slip is applied on both surfaces and the vessels baked at 600° C under reducing conditions producing the smooth ashy surface. The vessels are painted with black pigment on both surfaces with geometric and naturalistic patterns.
- c) **Northern Black Polished ware (NBP)** – This is made on a fast wheel from well-levigated clay, well-baked with a blackish-grey and occasionally reddish core, and is thin and sturdy. Its distinctive feature is its glossy surface with mirror effect. Normal surface colour is light to jet black or steel blue but occasionally tends to be silvery, golden, brown or chocolate. It is rarely decorated with painted designs in dark steel blue, grey, light and deep red, black and dark brown colours.

8.6 SUMMARY

In the foregoing pages, we have seen how the Stone Age artifacts of the prehistoric period have been classified. This classification has been done keeping in mind the different kinds of tools that have been discovered from different parts of the world. This in no way means that the tools found in Europe or East Africa would be exact replicas of each other.

These objects made of stone and clay is called artifacts because they have been produced artificially by humans and not by nature. Their identification and later classification requires the necessary training, experience and objective and careful examination without which there is every likelihood of doubting their authenticity as man-made. These objects consist of a wide variety of tools and implements and weapons primarily produced from stone though other materials like wood, bone, antler, ivory, and shells were used. But stone being the most imperishable material survives time and hence prehistoric cultures are called Stone Age cultures.

These cultures show evolution in typo-technology and raw materials in time with the needs of people living in respective physical environments.

As we saw, in the beginning the stone tools were larger in size, crudely made by applying simpler techniques. In course of time the tools became relatively small sized and well made. The study of tool typology is related to technology as well. Both of these are in turn dependent upon the type of raw material available to a group of prehistoric people. Environment, both social and physical, plays a significant role in the type formation and usage of these artifacts.

The aim of study of prehistoric typology is to establish various tool making techniques adapted by prehistoric people at different places during early phases of their cultural development. The study of tool types is aimed at diagnosing diffusion, contact and

migration of different traditions and their effect on past cultures. The classification of different tool types is done by looking at different morphological criteria such as form, technique and possible functional significance. It is not necessary that all tool types found all over the world should conform to the defined typology since prehistoric men made tools according to their convenience. Therefore variation in the style of the types of tools is natural.

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8.8 ANSWERS TO CHECK YOUR PROGRESS

- 1) Archaeologists usually excavate two kinds of specimens: artifacts and ecofacts.
- 2) Assemblage refers to a set of artifacts, not necessarily of the same type, recovered from a specific archaeological context.
- 3) Three of the important lower Palaeolithic tools are Pebble Tools, Biface or Handaxe and Cleaver.
- 4) The upper Palaeolithic period is characterized by the blade and burin industries.
- 5) The Mesolithic Period developed in the Holocene epoch.
- 6) Different types of igneous rocks were used to make tools during the Neolithic Period.

UNIT 9 CULTURAL CHRONOLOGY*

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- 9.0 Introduction
- 9.1 Periodising Prehistoric Cultures
- 9.2 The Stone Age
 - 9.2.1 Palaeolithic
 - 9.2.1.1 Lower Palaeolithic
 - 9.2.1.2 Middle Palaeolithic
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 - 9.3.1 Chalcolithic Cultures in India
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 - 9.4.2.3 Non-Sepulchral
- 9.5 Summary
- 9.6 References
- 9.7 Answers to Check Your Progress

Learning Objectives

Once you have studied this unit, you should be able to:

- List prehistoric cultures belonging to different periods;
- State the main characteristics of each prehistoric cultures; and
- Discuss how the gradual change in cultures took place in the Old World.

9.0 INTRODUCTION

In this unit we will be discussing the different prehistoric cultures as they evolved. Let us begin by understanding the term prehistory. The term refers to that period when human beings first emerged from their animal ancestry and became erect walking bipedalists until the time when writing began. Therefore, it refers to the vast time period before written records were available or before the recorded history or the invention of writing systems.

The term “prehistory” was first coined by archaeologist Paul Tournal when he used the term *anté-historique* in describing the finds he made in the caves of southern France. Thus, the term came into use in France in the 1830s to describe the time before writing, and the word “prehistoric” was later introduced into English by archaeologist Daniel

Wilson in 1851. Later John Lubbock freely used the term in his book *Prehistoric Times* in 1865.

But what is the relevance of studying prehistoric human experiences chronologically? We do this in order to understand the cultural processes, human behaviours, and ultimately discuss human evolution. Human history encompasses the whole story of biological, cultural and behavioural development of humans from the time they ceased to be non-human primates and made the first move in the direction of humanity. The present man is the product of evolutionary processes and similarly culture is the outcome of the cultural processes operating through time in constant interaction with environmental and biological factors.

9.1 PERIODISING PREHISTORIC CULTURES

In dividing human prehistory, prehistorians typically use the Three-Age System. This system is the periodisation of human prehistory into three successive time periods, named for their respective predominant tool-making technologies and the type of raw materials used for making the tools. These are: the Stone Age, Bronze Age, and Iron Age.

Since the very beginning, measurement of time and placing prehistoric cultures in chronological sequences has been one of the main pre-occupations of archaeologists. How does one classify the past and measure the age of great events in prehistory? Time dimension becomes important in the description and interpretation of prehistory.

Since the very beginning there was free speculation about what happened in the past, and classification of the past was a major problem. In the 16th century, some antiquarians were writing about prehistoric ages of stone, bronze and iron. This concept was refined by Scandinavian archaeologists in the 19th century. Prof. R. Nyerup and others set up the Danish National Museum that housed a confusing collection of artifacts from bogs, burial chambers and shell middens. The first curator of the museum C. J. Thomsen was appointed in 1816. Thomsen put the museum collections in order by classifying them into three groups, representing ages of stone, bronze and iron, using finds in previously undisturbed graves as a basis of his classification. He claimed that his Three Ages were chronologically ranked.

Thomsen's classification was taken up by J. J. A. Worsaae, who proved the system's basic stratigraphic validity. By studying archaeological finds from all over the world, Worsaae demonstrated the widespread validity of the method that became known as the Three Age system. This system was a technological subdivision of the prehistoric past based on types of raw materials used for making tools..

In 1863, Lubbock made an effort to designate the Stone Age into two distinct periods, viz., the Palaeolithic and the Neolithic. The definitions of the two periods were mainly based on typo-technological features of the stone tools. Nearly seven years after Lubbock's attempt it was felt that the Neolithic, though a Stone Age culture, occupied a comparatively recent past in man's cultural history. As such Lartet in 1870 tried to divide the larger part of the Stone Age into three more periods, viz., Lower, Middle and Upper Palaeolithic. These divisions were mainly based on the change in fauna observed with different Palaeolithic industries. However, de Mortillet in 1930 advocated that traditions within the Palaeolithic Age are more meaningful and hence the terms should refer to traditions alone.

Check Your Progress

- 1) On what basis has human prehistory been periodised into three successive time periods?

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9.2 THE STONE AGE

As the word suggests, Stone Age would refer to a period during which stone was widely used to make artifacts for different needs of early humans. This period lasted roughly 3.4 million years, and ended between 4500 BCE and 2000 BCE with the advent of metalworking. Stone Age artifacts include tools used by humans and by their predecessors in the genus *Homo*, as well as the earlier hominids *Australopithecus* and *Paranthropus*. Besides stone, bone tools were also used during this period as well, but are rarely preserved in the archaeological record.

The Stone Age can be divided into the Palaeolithic, Mesolithic and the Neolithic based on chronology and typo-technology and other general features which are discussed below.

9.2.1 Palaeolithic

The word “Palaeolithic” comes from the Greek words *palaeos* meaning old and *lithos* meaning stone; therefore it refers to the Old Stone Age. This is a period that placed itself in the Pleistocene geological epoch. The Palaeolithic marks the beginning of the use of stone tools.

The early part of the Palaeolithic is called the Lower Palaeolithic, which predates *Homo sapiens*, beginning with *Homo habilis* (and related species), the *Homo erectus* and with the earliest stone tools, dated to around 2.5 million years ago. Early *Homo sapiens* originated some 200,000 years ago, ushering in the Middle Palaeolithic. In the same period, anatomic changes took place indicating modern language capacity. The systematic burial of the dead with rituals, and the use of increasingly sophisticated tools are highlights of the middle Palaeolithic. Modern man, *Homo sapiens sapiens*, emerged around 50,000 years ago and developed new tool making technologies in the form of blade and burin. Throughout the Palaeolithic period, humans generally lived as nomadic hunter-gatherers. During this period, man was a food gatherer depending on the collection of wild fruits, tubers and nuts, hunting of wild animals and birds, and fishing in lakes, rivers and seas. So humans did not produce anything and were completely dependent on natural resources.

The Palaeolithic can be divided into three main cultural periods which are chronologically ranked and thus called lower, middle and upper.

9.2.1.1 Lower Palaeolithic

The lower Palaeolithic covers approximately 3/4th of the Pleistocene epoch. The lower Palaeolithic began in Africa, and toward the end of its African phase it spread to Eurasia, where it remained long after it ended in Africa.

- a) **Oldowan Culture:** The earliest stone tools were found in East Africa, however

the authors are unknown. They belonged to an industry referred to as Oldowan, named after the type site of Olduvai Gorge in Tanzania; however, sites in Ethiopia were later found to be older. The tools were formed by breaking pieces off a pebble with a hammer stone to obtain one or more sharp edges. The original stone is called a *core*, and the resultant pieces are called *flakes*. The resultant tools are pebble tools like choppers, large scrapers etc.

These tools in Africa were manufactured and used predominantly by *Homo habilis*. Besides, Olduvai gorge (Tanzania), Oldowan tools have been found in Afar and Omo river basin in Ethiopia, East Turkana, Kenya, Sterkfontein in South Africa; parts of Eurasia such as Georgia, Russia, Spain as well as in East Asia and the Indian subcontinent.

- b) **Acheulean Culture:** In Africa, Europe and some parts of Asia, *Homo erectus* is associated with a distinctive tool kit that includes a variety of choppers, hand axes, cleavers, scrapers and some flake tools. These assemblages of handaxes are grouped under the Acheulean culture. The culture is named after the site St. Acheul in France, where this kind of handaxes were found for the first time.. The Acheulean handaxe was an artifact with converging lateral edges that met at a point. The maker had to envisage the shape of the artifact which they had to produce from a lump of stone and then fashion it, not with opportunistic blows but with carefully directed hammer blows. Makers were *Homo erectus*.

Tool types found in Acheulean assemblages include various types of handaxes, namely, pointed, cordate, ovate, peariform and lanceolate hand-axes. Cleavers, retouched flakes, scrapers, and chopping tools are also included in the assemblage.. Materials used were locally available stone types. Flint is most often associated with the tools but its use is concentrated in Western Europe. In Africa sedimentary and igneous rocks such as mudstone and altered basalt and quartzite were most widely used. In India, quartzite was most frequently used, though quartz is also found to have been used as rawmaterial.

- c) **Clactonian Cultures:** The Clactonian is the name of an industry that dates to the early part of the interglacial period known as the Mindel-Riss (c. 400,000 years ago). Clactonian tools were made by *Homo erectus* rather than by modern humans. The term is sometimes applied to early, crude stone flake tools from other regions that were made using similar methods. The term Clactonian in other continents refer more to the flake technique than to a culture.

The culture is named after 400,000 year old finds made by H. Warren in an old channel at Clacton-on-Sea in the English county of Essex in 1911. The Clactonian industry involved striking thick, irregular flakes from a core of flint, which was then employed as a chopper. The flakes would have been used as crude knives or scrapers.

9.2.1.2 Middle Palaeolithic

This is the period in which the Neanderthals (*Homo sapiens neanderthalensis*) lived in Europe and the Near East (c. 300,000–28,000 years ago). Their technology is mainly based on what came to be known as the Mousterian, named after the site Le Moustier in France discovered by Gabriel de Mortillet. The typical Mousterian industries include small discoidal cores (disc-shaped cores) and two main types of flake tools – the side scraper, and the triangular point. The Mousterian differs from earlier industries in that it is based on flakes produced from carefully prepared cores using Levallois technique. In France a few regional traditions of Mousterian culture are found.

In the following table (Table 1), different traditions of Mousterian culture are given.

Table 1: Mousterian Traditions

Sl. No.	Name of tradition	Tool types and features
1	Mousterian of Acheulean Tradition	Handaxe, side scraper, backed knives, notched tools
2	Typical Mousterian	Handaxe and knives reduced; Levalloisean flakes predominate
3	Denticulated Mousterian	Over 80% of denticulates* and notched* tools
4	Charentian Mousterian	Few or no handaxe and backed knives; abundance of side scrapers

* When one or more edges are worked into multiple notched shape, it is called a denticulate. When instead of multiple notches, there is only one such notch along an edge, it is called a notch. Denticulates are so named because the working edges of the tools look like teeth of a saw.

Check Your Progress

2) Describe the four Mousterian traditions.

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9.2.1.3 Upper Palaeolithic

This culture existed from 50,000 to 10,000 years ago in Europe, and ended with the end of the Pleistocene and onset of the Holocene era with the end of the last ice age. Approximately 40,000 years ago, *homo sapiens sapiens* or most modern man appeared. They still lived in caves and rock shelters in Europe but there were a few new inventions. They made diversified and specialised tools on blades. In addition to stone bone, ivory and antler were extensively used for making tools. Palaeolithic art was introduced, and this could have been evidence of practice of magic.

There are mainly three successive cultures prevailing in the upper Palaeolithic period in Europe as shown in Table 2. No other country yielded such divisions other than Europe.

Table 2: Upper Palaeolithic Cultures (Europe)

Sl. No.	Name of Culture	Sub-Culture	Tool types and features
1	Aurignacian	Audi Stage	Handaxe, disc, side scraper, Mousterian point, end scraper, graver. <i>Characteristic tool:</i> Audi knife blade & graver
		Chatelperronean/ Lower Aurignacian	<i>Characteristic tool:</i> knife blade with one edge straight and sharp, the other curved to a point and blunted by trimming.

		True Arignacian/ Middle Aurignacian	Bone tools like polished awl and point with a cleft base; stone tools like scrapers, end scrapers, edge trimmed blades, burins and fluted core etc. Also, paintings of animals and engravings
		Gravettian/ Upper Aurignacian	Both home art and cave art. <i>Characteristic tool:</i> narrow pointed blade like a penknife.
2	Solutrean		Bone tools like needles of bone and ivory, dart throwers, needle with an eye; stone tools like single shouldered point. <i>Characteristic tool:</i> laurel and willow leaf point by pressure flaking.
3	Magdalenian		Bone tools like spearheads, arrowheads, needles, arrow straighteners, spear throwers and fish hooks; Remarkable cave art, as well as home art <i>Characteristic tool:</i> parrot beak graver

9.2.2 Mesolithic

The Term Mesolithic literally means middle stone age derived from the Greek *mesos*, middle, and *lithos*, stone. It was the period lying between the Palaeolithic and Neolithic periods of the Stone Age. The Mesolithic period began at the end of the Pleistocene epoch, some 10,000 years BP, and ended with the introduction of agriculture, the date of which varied by geographic regions. In some areas, such as the Near East, agriculture already started by the end of the Pleistocene, and there the Mesolithic is short and poorly defined. In areas with limited glacial impact, the term Epipaleolithic is sometimes preferred.

Regions that experienced greater environmental effects during the so called ice age, with end of the Pleistocene, Mesolithic phase was much more evident, lasting several thousand years. In Northern Europe human beings were able to live well on rich food supplies from the marsh lands fostered by the warmer climate. Such conditions produced distinctive human behaviours that are preserved in the material record. These conditions also delayed the coming of the Neolithic until as late as 4000 BCE in northern Europe. Remains from this period are few and far between, and often limited to middens, which are like modern day garbage heaps.

The Mesolithic is characterised in most areas by small flint tools known as microliths. These were hafted on wooden or bone shafts in rows and made into composite tools. Microburins are quite common. Fishing tackle, stone adzes and wooden objects, like canoes and bows, have been found at some sites.

The Mesolithic people were nomadic similar to those in the Palaeolithic period. During this time people became species specific hunters and gatherers. They developed highly specialized hunting gathering mechanism. Environment in Europe during early Holocene was diverse. There were forested lands interspersed with bogs in Northern Europe. Expansive coastal area was open for habitation. In Mediterranean region typical

vegetation of the area grew. Central Europe had vast tracts of sandy, rocky and grass land. Mesolithic people living in diverse environment adapted themselves to the environment in which they lived. The artifacts from different environmental zones show that they formed a kind of ecological niche. Those who lived near the sea especially in Europe, led a life of hunting and fishing by using stone and bone tools and had a sort of semi sedentary life style. . The Mesolithic phases in Europe are divided into the following:

- a) **Azilian:** This culture is named after the site Mas d Azil in France discovered in 1890. During this time the reindeers became extinct in Eastern Europe and red deer and beavers became predominant. The stone industry consisted of small disc-shaped scrapers, back blunted knives etc. Flat harpoons made on stag horns with perforated base were also found. Some painted pebbles with red Ochre were found. The people of this period lived in the mouth of caves and rock shelters.
- b) **Tardenoisean:** This culture is named after the site Fere-an-Tardenoise . It represents a microlithic industry which becomes dominant and comprises various geometrical types such as triangles, trapezes, lozenges, lunates or crescents. They were perhaps employed as knife blades. These tools were not found in stratified layers but in sandy open sites. Some of these were found mixed with Neolithic ground axes, arrow heads and potsherds.
- c) **Maglemosean:** It derives its name from Maglemose, meaning big bog. Most of the cultural remains are recovered from bogs in Northern Europe.. Remains of this culture have been found in swampy areas near lakes and streams. Maglemoseans had different devices for catching fish, such as spears or harpoons. The typical bone implements were the harpoons with barbs on one side. Dugout canoes were invented at this time. Stone axes and adges were the main tools. They lived in forest zone.
- d) **Asturian:** It has taken its name after the site at Asturias in Spain. The remains of this culture are found in kitchen midden and are composed of sea shells carried in to the caves. Both stone and bone implements were found. Pick axe is a typical stone implement, while bone borers were also found.
- e) **Campignian:** Named after the site at Campigny, France, the stone industry includes campignian axe, rough awls, picks, transverse edged arrow heads, scrapers etc. There is evidence of crude pottery and land habitation in the form of pits.

Check Your Progress

3) Describe the Mesolithic phases in Europe.

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9.2.3 Neolithic

The term comes from the Greek *neos* meaning new, and *lithos* meaning stone literally meaning New Stone Age. The term was coined by John Lubbock in 1865 as a refinement of the Three Age system. This period developed in the Holocene epoch, which is preceded by Mesolithic. This period was characterized by the development of agriculture,

and shift from food gathering to producing. This shift is said to be one of the most revolutionary changes to have occurred in human history. The first Neolithic culture is said to have started in the Fertile Crescent in the Near East.

Referred to as a “Revolution”, by V. Gordon Childe, this period witnessed the development of pottery, polished stone tools and permanent settlements. Childe called the Neolithic a revolution because it opened an entirely new way of life and sowed the seeds of civilization. He describes it as occurring about 10,000 BCE in some places with the adoption of agriculture and domestication of plants and animals. In Europe it developed as late as 4000 BCE.

The impact of agriculture and domestication of animals on human life was rather profound. Neolithic was food producing self sufficing economy. The main changes that came about include the following:

- i) More or less settled communities near agricultural fields as opposed to small nomadic bands in search of games. Development of village.
- ii) There was regular food supply
- iii) Development of community life
- iv) Increase in population size
- v) Growth in specialization of craft and division of labour
- vi) Concept of property develops
- vii) System of ownership possibly led to wars
- viii) Utilization of hides, wool and manure
- ix) Animals for transportation.

Other important features of the Neolithic include new technology leading to widespread changes in lifestyle. Here, handmade pottery appeared and their use became regular. Neolithic pottery at its early stage was made by hand and not on wheel, and was built up of coils or strips of clay. Wheel made pottery came in the later phase of Neolithic. Besides pottery, the identifying technology is the use of polished or ground stone tools in contrast to the flaked stone tools used in the Palaeolithic period. The Neolithic people were skilled farmers manufacturing a range of tools necessary for tending, harvesting and processing crops such as sickle blades and grinding stones for processing grains. During this period, the naturalistic art found in the preceding period became rare. Here engraving and painting with various stylized designs on the earthen pots were made. Another new invention was weaving. Weaving was a byproduct of agriculture and stock breeding and was done by using the fibers of flax and sheep wool. Along with garments made from skins of animals Neolithic people resorted to spinning and weaving in simple looms. The discovery of spindle whorl is a testimony to the practice of spinning.

9.3 CHALCOLITHIC AND BRONZE AGE

The term Chalcolithic comes from the Greek *chalkos* meaning copper, and *lithos* meaning stone. This Age refers to a transitional period where early copper metallurgy appeared alongside the widespread use of stone tools. This period is a transitional one outside of the traditional three age system and occurs between Neolithic and Bronze Age. This cultural stage is more common in India. Bronze Age, on the other hand refers to the use of bronze an alloy of copper and tin, generally marking early civilizations in

different parts of the world. The term Bronze Age refers to a period in human cultural development when the most advanced metalworking (at least in systematic and widespread use) included techniques for smelting copper and tin from naturally occurring outcrops of ores, and then combining them to cast bronze. The Bronze Age is the earliest period for which we have direct written accounts, since the invention of writing coincides with its early beginnings.

9.3.1 Chalcolithic Cultures in India

In India, Chalcolithic cultures are rather widespread. They show a common economy and technology, however distinguished by distinct painted ceramic industry from one geographical zone to the other.. The area of diffusion is marked by black cotton soil, semi-arid climate and an economy based on agriculture, stock raising, hunting and fishing. Harappan culture where copper and stone were used can also be placed in this category.

In India, the chief Chalcolithic cultures include:

- a) Salvada Culture in Tapti and Pravara valley (c.2000-1700BC)
- b) Kayatha Culture in Central Malwa (c.2100-1800BC)
- c) Ahar Culture (Banas) in Southeast Rajasthan (c.3600-1500BC)
- d) Malwa Culture in Central and Western India (c.1700-1450 BC)
- e) OCP (Ochre colored pottery) Culture in Ganga-Yamuna Doab (c.1800-1400BC)
- f) Jorwe Culture in Western Maharashtra (c. 1500-900BC).

The common features of Chalcolithic cultures irrespective of different pottery fabrics and forms include the following:

- i) The houses were generally made of wattle-and-daub as represented by postholes, burnt lumps of clay with bamboo and reed impressions, and compact mud floors. They were usually of rectangular shape. At several sites the houses contained hearths and kitchen equipment like querns and mullers.
- ii) All potteries were made on wheel from well-levigated clay. The shapes comprise bowls of various sizes, including pedestalled and channel spouted pots, flat platters, dishes, basins, perforated vessels, jars and vases.
- iii) The artefacts of the Chalcolithic people comprised tools and weapons of copper, stone, bone and antler. Copper objects include knives, spearheads and arrowheads. Bone and antler tools comprise awls, points, tanged arrowheads and barbed arrowheads with socketed base. Microliths and blade tools have been found at almost all the sites.
- iv) The ornaments of these people comprise beads, pendants, bangles, rings and ear studs. Beads are made of semiprecious stones, terracotta, bone, shell, faience (a manmade substance used for making beads, seals etc.), steatite, copper and occasionally gold. Bangles are made of copper, terracotta and bone.
- v) The economy of the people was based on a combination of plant cultivation, animal domestication and hunting and gathering. Cultivated plants include wheat, barley, rice, jowar, green gram, gram, lentil, sesame, linseed and pea. Domesticated

animals include buffalo, sheep/goat, pig and dog, and wild animals include several species of deer and antelopes, and boar.

- vi) Evidence of disposal of the dead in the form of burial comes only from three sites, Kakoria and Magha in the Vindhya and Sonpur in the Ganga valley.

Check Your Progress

- 4) Discuss the salient features of Chalcolithic in India.

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9.3.2 Indus Valley Civilization

One of the oldest and largest civilizations in the world is the Indus valley Civilization (IVC) of the Indian subcontinent, so called since it developed in and around the river Indus. The area covered is larger than any other contemporary civilizations. The known eastern and western limits cover a distance of 1550 km between Alamgirpur in Uttar Pradesh and Suktagendor in Afghanistan. From north to south it expands over 1200 km between Rupar-Manda in Punjab to Daimabad-Bhagatrav in Gujarat.

IVC can be studied in different developmental stages as given under:

- 1) *Pre-Harappan Phase (7000-3300BC)*

This is seen in Mehrgarh, where an Aceramic and Ceramic Neolithic phase existed. The Aceramic phase was earliest and there was no pottery. The Ceramic stage yielded pottery.

- 2) *Early Harappan Phase (3300-2600BC)*

Emergence of several urban features like town planning, scripts and metal technology developed in this phase. Important sites include Kot Diji, Amri, Kalibangan, Dholavira.

- 3) *Mature/ Urban Harappan Phase (2600-1900BC)*

There was full growth of urban economy and society. Important sites include Mohenjodaro, Harappa, Lothal, Kalibangan, Dholavira, Ganweriwala, Rakhigarhi etc.

- 4) *Late Harappan Phase (1900-1300BC)*

There was a gradual collapse of urban character, and towards the end of this phase, IVC disappeared.

The characteristic features of IVC include the following:

- 1) *Twin dwelling and urban character:* Throughout the civilization, a twin dwelling structure is witnessed where there is a citadel area where administrative and religious activities took place; and a lower town area where the local people lived. Fortified townships with underground drains, individual houses separated from each other etc. are also seen. All these structures are made of bricks of uniform dimensions.

- 2) *Writing*: This is mostly known from seals, which often have impressions of cloth or cords on the back, suggesting that the seals marked bundles of some kind. Unlike Mesopotamia and Egypt, few tablets with writing on them, and very few painted symbols are found. This suggests that the writing might have had a different primary purpose. This has not been deciphered yet.
- 3) *Extensive trade*: Both internal and external trade had taken place. External trade had taken place with Sumerian Civilization, which has records of trading with Meluhha (probably the ancient name for Indus). The presence of a dockyard at Lothal supports the view of large volume external trade over sea.
- 4) *Weights and Measures*: Standardized units of weights and measures were used throughout. The basic length unit was a cubit of 52 cms. or a foot of 33.5 cms. The basic weight unit was 13.6 gms and thereafter multiples. Terracotta cakes, weights, measures, have been found.
- 5) *Identical pottery, shape & decoration*: The characteristic pottery is black and red ware with black painted designs. The most popular design is a series of intersecting circles. The other common types are plain ware and plain red ware, both glazed and unglazed.

By 1200 BC, IVC was no longer seen. But why did this civilization disappear? Sites in Baluchistan and Mohenjodaro show evidence of burnt-down houses and sprawled skeletons: Did it indicate warfare? However, invasion by foreigners is no longer accepted. There is no evidence of anyone else appearing. Perhaps then the people died and with it the civilization due to internal conflict or plague. The population seems to have dispersed as volume of long-distance trade declined dramatically because of tectonic movement, which raised the bed of River Sararswati. It was no longer navigable. Desert encroached upon fertile land.. Reasons for this change are coming out with new discoveries. However, it may be said that this change could have occurred due to one or more of the following reasons: (a) Flooding along the Indus, (b) Shifts in patterns of Mesopotamian trade, (c) Change in subsistence farming, and (d) Geological disturbances near the Saraswati river, which caused it to dry up, and tributaries diverted to new courses, catastrophically disturbing farming life along its bank., (e) encroachment of desert.

By the end of the Late Harappan Stage, the cities were permanently abandoned. Sumerian records ceased to mention trade with Meluhha. IVC tradition largely disappeared leaving only echoes in myths and general cultural traits. Unlike the Sumerian and Egyptian early civilizations, which were known from historical sources, the Harappan civilization was truly lost and forgotten until archaeologists rediscovered it.

9.4 IRON AGE

This age refers to the advent of iron technology. This is the stage in the development of a people where the use of iron implements as tools and weapons is prominent. The adoption of this material coincided with other changes in some past societies often including differing agricultural practices, religious beliefs and artistic styles, although this was not always the case. The Iron Age is the last principal period in the Three-Age system for classifying prehistoric societies. Its date and context varies depending on the geographical region. Classically, the Iron Age is taken to begin in the 12th century BCE in ancient Near East, ancient Greece, and ancient India. In other regions, it started much later.

Iron's hardness, high melting point and the abundance of iron ore sources made iron more desirable and cheaper than bronze and contributed greatly to its adoption as the

most commonly used metal. Once iron technology was mastered, tools, weapons and vessels of this metal became available to common people and slowly stone tools went out of use. The effective end of Stone Age came only after the introduction of iron technology.

Iron technology in South Asia including India is primarily associated with late prehistoric or early historic cultural periods. Archaeologically, Painted Grey Ware culture of Northern India is considered as iron using group in the sub-continent. Although not conclusive, but earliest iron tools in the sub-continent are found from different South Afghanistan sites, such as Deh Morio Ghundai, Mundi Gak, and Said Quala Tepe. All Chalcolithic cultures in India, except the Harappans, were village cultures with copper technology, and with copper technology only semi-arid alluvial plains of Indus and Saraswati were urbanised. With iron, the monsoonal forests of Bihar and Uttar Pradesh were cleared and colonized. This led to the second urbanization in India and this time in the Gangetic plains.

In Northern India, Painted Grey Ware and Northern Black Polish were the earliest Iron Age cultures; at some sites, a pre-Painted Grey Ware known as Black and Red ware is said to mark the beginning of Iron Age. In South India, iron technology is marked by megalithic cultures.

9.4.1 Painted Grey Ware (PGW) and Northern Black Polish Ware (NBPW)

PGW is a very fine ware, fired under reducing condition, which gives it a grey colour. On the other hand, NBP is made on a fast wheel from well-levigated clay, and it is well-baked. The quality of NBP is quite remarkable. Its distinctive feature is the glossy surface with mirror effect. NBP is an evolved version of PGW, but it is rarely decorated with painted designs. PGW is usually associated with cultures of rural areas and NBP with cities.

These cultures developed in the upper Gangetic basin in association with iron technology and marked the first large-scale exploitation of the region by settled population. Main concentration is Southern Punjab, Northern Rajasthan and Western Uttar Pradesh. PGW was first discovered in Ahichchatra in 1944, and its full cultural and historical significance realized only after B. B. Lal's excavation of Hastinapur in 1954-55. Over 400 sites have been discovered in Ravi-Sutlej basin, Ghaggar basin and Ganga-Jamuna Doab. Important excavated sites of PGW are Hastinapur, Ahichchatra, Alamgirpur, Atranjikere, Noh, Jodhpur, Bhagwanpur, Indraprastha, Kurukshetra, Panipat and Tilpat.

PGW people were agriculturists with cattle breeding as their principle occupation. They domesticated the cow, buffalo, pig, goat, sheep and horse. Their houses were of mud-bricks; walls occasionally made of reeds plastered with mud. Their diet consisted of rice, lentil, beef, pork, mutton, venison, horse flesh - attested by bones with definite cut marks from Hastinapur. Food was also supplemented by hunting with bows and arrows.

Iron technology accelerated colonization of middle and lower Ganga valley around 7th century BCE, when the NBP appeared. NBP saw emergence of cities and the first political entities known as Mahajanapadas in the Ganga plains in the 6th century BCE. This was the location of the second major Hindu epic, Ramayana and the rise of Buddhism and Jainism. This period witnessed the second urbanisation. NBP is seen throughout Northern India but its main occurrence is in the Ganges plains in Uttar Pradesh and Bihar. It is found in small quantities in Central, Southern and Eastern India, as well as Bangladesh and Sri Lanka. This pottery was probably carried off to far places by Buddhist monks and high officials.

By 6th century, a number of these Mahajanapads assimilated into the first Indian empire known as the Magadhan Empire with its capital at Pataliputra. After a long gap of 1500 yrs. (after the first urbanization of IVC), writing appeared in the form of the Brahmi script.

C-14 dates place PGW between 1000 – 600 BC, and NBP to 600 – 100 BC.

9.4.2 Megalithic Culture

The term Megalithic comes from the Greek word *megas* meaning “large” and *lithos* meaning “stone”. Therefore, this is a culture distinguished by the presence of monuments built by large stone structures used for funeral or other ceremonies. In Peninsular India, pottery associated with megaliths is black and red ware of various types. Associated iron objects include flat celts with two fastening rings; socketed and barbed arrowheads, long swords, lances, spearheads, wedges, sickles and hoes.

Black and red ware of megalithic association is found between 1000-700 BC, but C-14 dates place megalithic culture of South India within 1000BC-1BC, although among a large number of tribal groups in the Northeast, East and South India, megaliths are still erected.

In 1949 V. D. Krishnaswamy systematically classified the South Indian megaliths after an extensive survey. He found more than 40 types and sub-types, with the main concentration in Karnataka, Andhra Pradesh, Kerala, Tamil Nadu and Maharashtra.

In the following some of the types of megaliths are given.

9.4.2.1 Chambered Grave

These megaliths are meant for burial purposes, and constitute a stone chamber or ossuary. The sub-types of this include:

- a) Passage chamber tomb – These are irregular on plan, and consists of a passage leading to the main chamber where the burial has been made. This type is found in sites like Terdal, Halingali and Hunnar in Karnataka.
- b) Port hole chamber – These chambers have a port hole, on one wall of the chamber through which the bones would be kept or some other offerings of grave goods.. These megaliths are found in several sites in Karnataka, Andhra Pradesh and Kerala.
- c) Port hole cist – This is similar to the port hole chamber, however the chambered grave is completely underground. There exist rubble packing on top, and placed around a cist made of erect stone slabs in a coursed manner. These are also found in several sites in Karnataka, Andhra Pradesh and Kerala.
- d) Cist with slab circle – Here, the stone circle is made of slabs, and the top is alternatively rounded and flat. This structure is seen in Irulabanda and Bopanatham in Chittoor district, Andhra Pradesh.
- e) Rock-cut monuments – These are underground chambers scooped out of soft laterite bed rock. Each had an approach cut vertically in the rock, and provided with steps. The entrance is square or rectangular opening leading to a circular/semicircular/rectangular chamber with a vaulted roof with opening at the top. This is seen in Piklihal in Mallapuram district in Karnataka.
- f) Topikal – Here, the capstone rests on 3 or 4 clinostats, and the capstone is convex/circular looking like a hat, hence locally called “*topical*” (hatstone). An urn burial

is placed in a pit below the structure. This is a common type in the Malabar region of Kerala.

- g) Kudaikal – This is a variation of the Topikal where the capstone is plano-convex and looks like an “umbrella stone”. These occur near Topikal.
- i) Multiple hood stone – This is a rare type of Topikal found in Cheramanangad, Kerala. Here, instead of 4, there are 5-12 clinostats fixed and support multiple hood stones.

9.4.2.2 Unchambered Grave

- a) Pit burial – These are 2 to 4m pits where a burial is placed. These are simple, oblong/ oval/ cylindrical pits dug into the ground containing skeletal remains, black and red pottery, and iron objects. These are found all over south India.
- b) Menhirs or Nadukal – These are single standing monoliths between 1 to 3m in height. They usually mark the presence of an urn burial nearby. They are commonly seen in Palka and Trichur in Ernakulam district of Kerala, and Murradoddi in Andhra Pradesh.
- c) Cairn circles – This consists of a pit burial with heavy cairn circles at considerable depth. This is a thin spread of rubble bounded by stone circle. In Karnataka and Andhra Pradesh, the cairns are heavy; while in Tamil Nadu, they are thin.
- d) Terracotta Sarcophagus Burial – These are boat-shaped terracotta troughs with two rows of hollow legs and two lids to cover. These contain pottery and iron objects along with skeletal remains. These have been discovered in Jadigenahalli and Pallavaram in Tamil Nadu, and Gajjalakunda and Sankhavaram in Andhra Pradesh.

9.4.2.3 Non-Sepulchral

These megaliths have no sepulchral or burial functions. They were probably put up by Iron Age people for ceremonial purposes.

- a) Menhirs – single dressed or undressed standing stone with base driven into the ground. These are still raised among the Khasi communities of Meghalaya state commemorating a grand feast or an event.
- b) Stone Alignments – number of stones or menhirs placed in a line. These are found in Karnataka, Andhra Pradesh and Kerala.

9.5 SUMMARY

The prehistoric period is a vast period when the development of culture of human beings took place. This belongs to a time before the discovery of writing and recorded history. This vast time span, for convenience's sake, is divided by archaeologists and prehistorians into different phases. The classification that is generally followed is the one based on tool making raw material and typo-technology. Accordingly, the Three Age system initially suggested by Thomsen and later modified by Lubbock is widely used.

The Stone Age is thus the first phase in human history in which stone was widely used to make different implements. This is a period which is of interest to prehistorians and anthropologists alike since the first cultural and anatomical changes can be witnessed during this period. In this period several cultures on the basis of their unique technology or economy can be differentiated.

The Stone Age is followed by the Chalcolithic, Bronze and Iron Ages. In these succeeding phases, the use of metals which likely began with the smelting of copper, subsequent preparation of bronze, an alloy of copper and tin, followed by iron, were witnessed. It was iron technology which ushered in a dramatic change since with iron tools wooded and forested areas could be cleared up and colonized. Iron heads for hoe and plough enabled for better and extensive tilling of soil, which yielded surplus food, thereby leading to social stratification and state formation.

However one point to be noted is that these prehistoric cultures and their succession are not uniform throughout, and they played out differently in varying degrees in different parts of the world.

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9.7 ANSWERS TO CHECK YOUR PROGRESS

- 1) Human prehistory has been periodised into three consecutive time periods based on the respective predominant tool-making raw material and technologies, namely, the Stone Age, Bronze Age and Iron Age.
- 2) The four Mousterian traditions are Mousterian of Acheulean tradition, Typical Mousterian, Denticulated Mousterian and Charentian Mousterian. For more details please refer to the sub-section 3.3.1.2.
- 3) The Mesolithic phases in Europe are Azilian, Tardenoisian, Maglemosian, Asturian and Campignian. For further details please refer to the sub-section 3.3.2.
- 4) Please refer to the sub-section 9.4.1.

UNIT 10 EARLIEST EVIDENCES OF CULTURE IN THE WORLD*

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* Contributed by Prof. Ranjana Ray, Former Professor, Department of Anthropology, University of Calcutta, Kolkata.

Learning objectives

After reading this unit, you will be able to:

- Discuss about beginning of culture through biocultural process;
- Define culture;
- Elucidate about earliest cultures from Africa, Europe and Asia; and
- Learn why these cultures are important for understanding earliest human migration in the old world.

10.0 INTRODUCTION

Let us define culture. Usually in colloquial terms by culture we mean behavioural pattern of a person in the society. We also refer to fine arts like music etc. as culture. But the word culture has got a much deeper meaning for an anthropologist. It is true that it is the behavioural aspect of mankind but nothing good or bad in it. It is an integral part of human kind in the world of nature. We cannot deny that human beings are one of the groups in the animal world. Like any other animal we are born, grow old through time and die. Taxonomy is the method of classification of animal world based on its biological characters. Human being too is classified by the zoologists on certain biological characters, such as, walking on two legs; having an enlarged and complicated brain which gave mankind ability to think and act; hands are free to hold and carry objects; eyes with acute binocular vision and are capable of identifying all the colours in the world and can judge the distance and finally its ability to create language for communication with each other. All these biological characters enabled mankind to produce culture, which is not part of its biology but developed with the help of his biological features.

Although human kind has all the above mentioned biological features, even then physically it is quite weak compared to many other animals in the world. But with help of its biological ability it can pick up objects from nature and shape it to its advantage. It can take the fur of animals to protect itself against cold, pick up and to throw objects against some attacking animals and break stones to do various jobs like cutting, scraping, piercing etc which are needed for survival. Most of all it can talk to its fellow beings and stay in a group to protect themselves against attacking animals, against inclement weather and can get food and make shelter. All these behaviour of man is known as culture. Scholar like Oakley (1964) has defined it as extra corporal behaviour of man.

Definition of culture

- Simple definition of culture is “the extra corporal behaviour of man”.
- Culture is dependent on biological preconditioning.
- It refers to customary ways of thinking and behaving of a particular population or society.
- Language, religious belief, food preferences, music, work habits, gender roles, rearing of the children,
- Construction of houses, and many other behaviour that are shared customarily by a group.
- Earliest evidence of culture is found in the form of stone tools.

We have seen in the above description that mankind might have used a lot of objects for getting food, shelter and defence but we are talking about the earliest culture, which began more than 20 lakhs of years ago. Such organic materials as wood, bone etc. hardly survived through time. The manmade objects left for us through this vast time are mainly made on stones. Therefore the earliest culture of humankind may be considered as Stone Age culture.

In this section we shall be discussing earliest evidences of culture in the world. These cultures were made by human beings who belonged to genus *Homo* but in species level they were far from *Homo sapiens* types. The cultures that are to be discussed here are those from the sites of Olduvai Gorge, Ubeidiya, Dmanisi, Attirampakkam and Isampur. The first one is from East Africa; the third one is from Israel in Asia; the second one is from Georgia in Eastern Europe and the last two are from our own country, India. You already know that a culture is named after the place where it was discovered. The maker of the culture at Olduvai Gorge were both *Homo habilis* and *Homo erectus*. African *Homo erectus* was a little different and they are known by the name *Homo ergaster*. The rest of the cultures named here were made by *Homo erectus* group.

Check Your Progress

1) What is meant by culture?

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10.1 OLDUVAI GORGE (TANZANIA, EAST AFRICA)

10.1.1 The Site

The culture that was discovered at Olduvai Gorge is known as Oldowan culture. Olduvai Gorge is a very important site located in Tanzania, on the Great Rift Valley, a wide flat plain formed approximately 20 to 25 million years ago. The site is situated on the Serengeti Plain within the boundary of Ngorongoro crater through the great lake region in east Africa. Olduvai Gorge is made famous by Louis S. B. Leakey, a British Palaeoanthropologist, born in Kenya, Africa, trained in Cambridge University, in Anthropology and Archaeology. Olduvai Gorge yielded more than 60 hominid fossils and countless stone tools made by early men.

10.1.2 The Gorge and its Geological Features

On the upper reaches of Olduvai River a steep gorge is formed along the banks of the river. Wall of the gorge is over three hundred feet high. This has exposed geological layers from a time called by geologists as Tertiary into Quaternary periods. From the exposed beds biological and cultural remains of early men are found in a datable context. Large number of fossil and cultural remains suggests that the area was inhabited by early man. The water bodies of the lakes of the rift valley is considered as “pluviometer; meaning that climatic condition and its changeover could be measured by the water levels in the lakes. Olduvai Gorge presents an excellent cross section of Kamasian pluvial deposit belonging to Middle Pleistocene time period. Fossils and artifacts were

found from all the layers. On the basaltic base of the Gorge, several superposed beds were laid. Olduvai Gorge is divided into seven successive formations (Bed I to Bed VII).

10.1.2.1 *Bed I* (average thickness is 60 meters)

This is the lowest and the thickest deposit and consists of Lava. Bed I is dated by Potassium-Argon method. All the tool bearing areas and faunal remains came from the upper part of Bed I, belonging to dates ranging between 1.85 to 1.7 Myrs. Bed I is divided into five strata or layers. These are made up of clay stone and volcanic ash deposit of Ngongoro volcano. Bed I yielded tools belonging to Oldowan industry. This industry is divided into four evolutionary stages.

10.1.2.2 *Palaeoecology of Bed I*

At the time of formation of lower part of Bed I forested environment prevailed around the lake. By the time of deposition of middle portion of the bed mosaic environment with open woodland replaced the forest. Trees mingled with grassland surrounded the lake. This indicated that climate was changing to drier condition. Early hominines roamed the land at this time. Farther drying trend was found towards the upper part of Bed I, with open landscape which announced the beginning of a dry period.

Recognized stratigraphic climatic divisions in East Africa

Kageran, Kamasian, Kanjeran, Gamblian, Makalian and Nakuran are the pluvial sequences. Kageran was the earliest and Gamblian the last one during Pleistocene period. Major beds (Bed I – IV) at Olduvai Gorge yielded evidences of Kamasian and Kanjeran pluvials. From oldest to youngest, they are as follows: Bed I, Bed II, Bed III, Bed IV, the Masek beds, Ndutu beds and Naisiusiu beds. These beds provide relatively complete record of Pleistocene period from about 2.1 million years ago to 15,000 years B.P.

10.1.3 Oldowan Culture

Homo habilis appeared in Bed I and lived up to the lower part of Bed II. Environment was mostly dry savannah type grassland. Tools of the industry were simple pebble tools, produced with the use of percussion, stone hammer or block on block technique. These are mostly choppers and chopping tools. These were simple, crude, multipurpose tools used for chopping, scraping and cutting. Mary Leakey classified Oldowan industry on the basis of their probable function. She classified them into (i) Heavy duty, (ii) Light duty, (iii) Utilized pieces and (iv) Debitages or waste materials.

- i) Heavy duty tools are mainly choppers. Those worked only on one surface is called unifacial chopper and those worked on both the surfaces to produce an edge is called bifacial. Discoids are tools with edges along the circular periphery. Polyhedrons are called as polyhedral and spheroids were probably used as hammer stones.
- ii) Flakes were classified into Light duty categories. These are scrapers, awls and burins. The first one is for scraping; the second for boring holes and last one is for engraving.
- iii) Utilized pieces were mostly without retouch but were used according to need.
- iv) Debitages are flakes without any retouch or use mark and probably were manufacturing waste products.

According to current method of classification Oldowan industry belongs to Mode 1 type but subdivisions are made into classic Oldowan and developed Oldowan.

Classic Oldowan artifacts are found from Bed I and Lower part of Bed II and are dated to around 1.9 to 1.6 Myrs ago. Tools are made by detaching flakes from a pebble core with the help of hammer stone. Utilized materials were hammer stones and anvils.

Developed Oldowan culture flourished around 1.6 million years ago. Tools include protohandaxes. These are trimmed more along the lateral sides and represented types between a chopper and a handaxe.

Oldowan people could have used wood but no wooden item is preserved at Olduvai Gorge. Bone tools are found. Oldowan industry persisted for about 1 million years before the advent of Acheulian industry. Oldowan culture started almost 2 million years ago and developed through time into advanced forms and gave rise to bifacially worked handaxes and cleavers of the succeeding Acheulian culture. Acheulian culture with true handaxes and developed technologies are found from upper part of Bed II.

Subsistence pattern of Oldowan hominid may be compared with those of chimpanzees. Like the apes they too lived mainly by collecting fruits and other vegetable food. They probably scavenged upon medium to large games. It is important to note that though the makers of Oldowan culture were *Homo habilis* but they also lived at the same time with some *Australopithecines* at Olduvai Gorge.

Check Your Progress

2) Write a short note on tool typology and technology of Oldowan Culture.

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10.1.4 Some Figures on Olduvai Gorge



(a) Topographic map of Africa



(b) Location of Olduvai Gorge



(c) The Leakeys

Fig. 10.1: Some Figures on Olduvai Gorge

Sources:

- (a) https://commons.wikimedia.org/wiki/File:Africa_topography_map.png
- (b) <https://www.britannica.com/place/Olduvai-Gorge>
- (c) <http://www.leakey.com/>

Olduvai Sequence				
Cultural Stages		Bed Nos.	Geological Stage	Divisions
E. African Acheulian	vi	11	IV	'Kanjera'
	v	10		
	iv	9	III	UPPER
	iii	8		
	ii	7		
	i	6		
E. African 'Chellean'	Transit-	(5)	II	MIDDLE
	ional	(4)		
		3		
		2		
		1		
Oldowan (Pre-Chelles-Acheul)		I	'Kageran'	LOWER

Fig. 10.2: Olduvai Sequence During Pleistocene Period

Source: (Oakley, 1964)

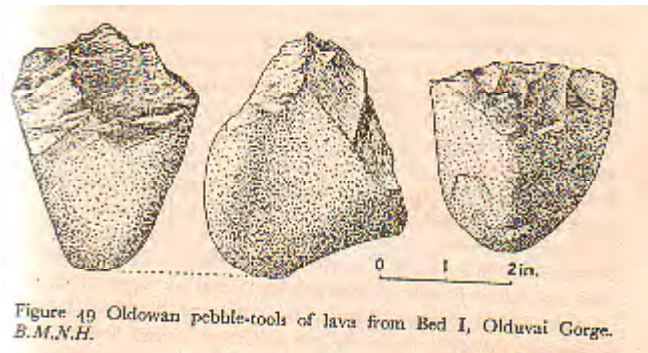


Figure 10.3: Oldowan Pebble-tools of Lava from Bed I, Olduvai Gorge
Source: Oakley, 1964

10.2 UBEIDIYA (ISRAEL, MIDDLE EAST)

Early cultural remains are found from Middle East in Asia. Ubeidiya culture is named after a most elaborately researched site of the same name situated in Israel in the Middle East in the continent of Asia.

10.2.1 The Site

The site Ubeidiya is located in the central Jordan valley, which is an extension of rift valley of East Africa. The site is situated on a small hill about 1.5 km. from the Lake Kinneret on the west bank of River Jordan. The principle formation of Ubeidiya is exposed at this place. Climate in the Central Jordan valley belongs to Mediterranean climate zone, characterized by a short rainy winter and a long dry summer.

10.2.2 Geological Features

Excavations had been carried out at Ubeidiya and showed the nature of the deposits and related climate for the deposition as well as artifacts left by human beings. Geological formations show that Ubeidiya had experienced tectonic movements at the end of Pliocene period and Pleistocene period. These eruptions laid basalts on the valley floor/ Limnic. Marshy and fluvial sediments gradually accumulated. These sediment are termed as “Ubediya Formation”. A later movement further tilted the formation. They found four cycles in the Ubeidiya formation (Figure 10.5). Two of the deposits are of low salt content and were deposited by of lakes or ponds. These deposits are called Limnic, Li (inferior or lower) and Lu (upper). The other two depositions were fluvial in nature and named as Fi, the lower one and Fu, the upper one. The limnic and fluvial deposits alternated with each other indicating that in ancient times there was an alternating existence of a lake and marshy land and a flowing stream.

10.2.3 Palaeoecology

Artefacts and faunal remains are found to be concentrated in Fi cycle. According to Bar Yosef and Goren-Inbar (1993) man appeared to have chosen a most suitable place for habitation. They lived on the shores of a lake into which a stream flowed with an adjoining marshy land. Large quantity of fresh water molluscs and mammalian remains were found. There were wild boars, elephants, monkeys, rhinoceros, roe deer, giraffe, horses, wild ox, bear, hyaena and others. Beyond the lake the hill sides were covered by Savannah type of grass land and woods of pistachio and oak trees.

10.2.4 Ubeidiyan Culture

Large quantity of tools and artefacts are found from Fi cycle. These are divided into four successive phases. These are named as IVO meaning Israel Variant of Oldowan. Besides the artefacts, living floors are also found in this deposit. Similar to people at Olduvai Gorge the Ubeidiyans also carried large flat square pieces of basalt. These were used as seats as well as base for hammering objects. Tools consisted of chopping tools, polyhedron and spheroids, picks and trihedrals, cores and flakes. Assemblages are quite homogenous. No change is observed in the typo- technological context within the formation. There is evidence of butchering of a hippopotamus.. There is close similarity with the Oldowan cultural assemblage. Ubeidiya site is dated to 1.4 million years ago (Tchernov, 1988). It was one of the stations in the route of migration of *Homo erectus* into Eurasia.

10.2.5 Some Figures of Ubeidiya

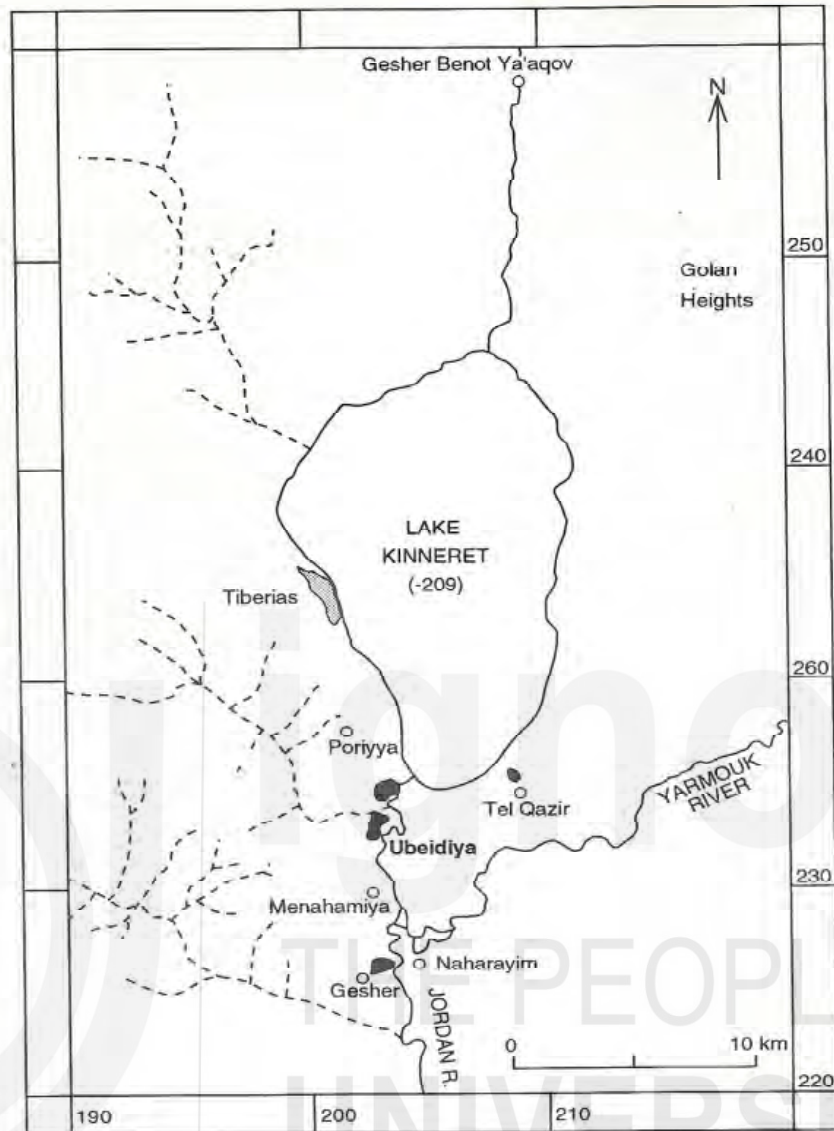


Fig. 10.4: Location of Site Ubeidiya

Source: Bar-Yosef, Gilead & Goren-Inbar, 1993

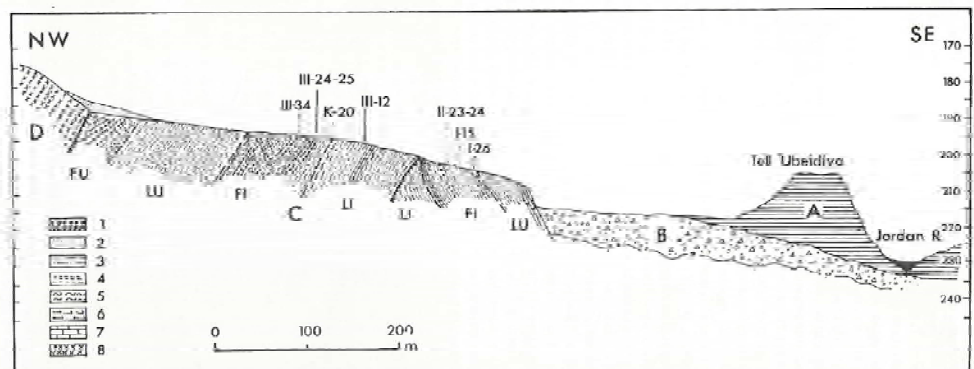


Fig. 10.5: Geological Section of Ubeidiyan Formation

Source: Bar-Yosef, Gilead & Goren-Inbar, 1993

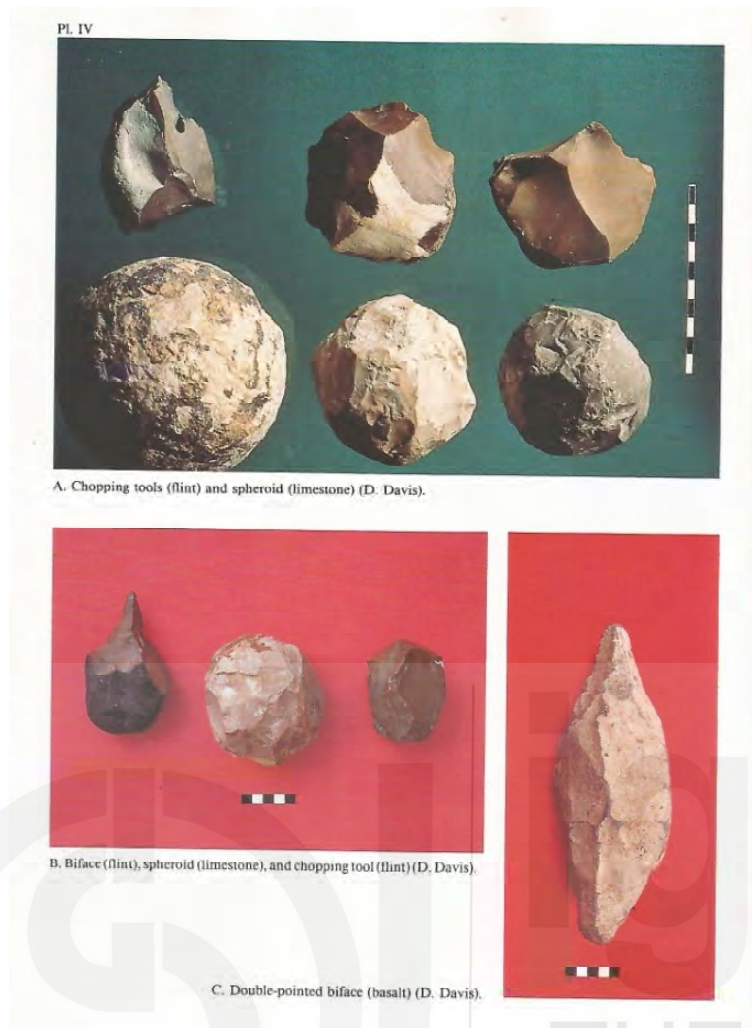


Fig. 10.6: Tools of Ubeidiya Formation

Source: Bar-Yosef, Gilead & Goren-Inbar, 1993

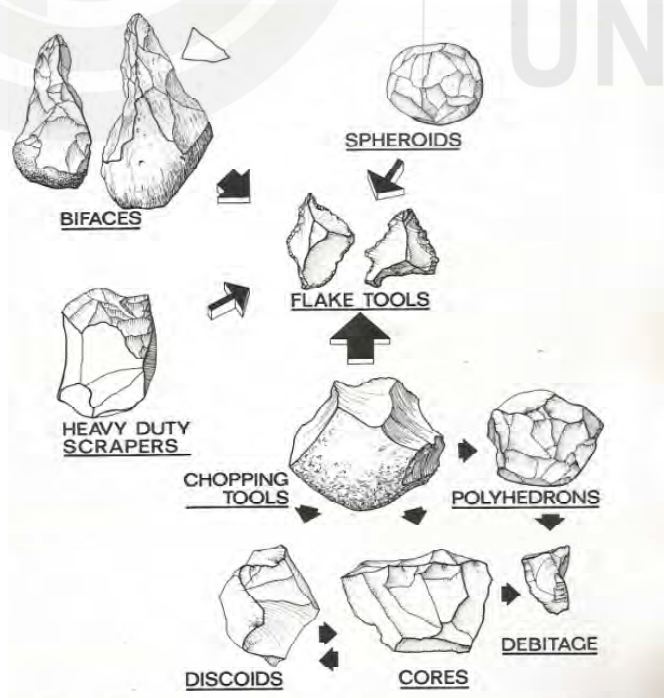


Fig. 10.7: Schematic Model of Ubeidiya Typological Components

Source: Bar-Yosef, Gilead & Goren-Inbar, 1993

Check Your Progress

3) What is “Ubediya Formation”?

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10.3 DMANISI (GEORGIA, EUROPE)

10.3.1 The Site

Dmanisi is a very old site of archaeological interest. It is located about 85 km. south west of the modern town Tbilisi in Caucasus of the Republic of Georgia near the confluence of the Rivers Mashavera and Pinezouri. The site is situated on a promontory elevated about 80 m above the confluence of the Mashavera and Pinezaouri River valleys. The site has yielded early cultural remains of the region but it is more famous for the discovery of remains of *Homo erectus*, who are supposed to be one of the earliest migrants from Africa into Europe. Cultural remains were found in 1983 but since the discovery of first mandible of early man in 1991 it became very famous. Five skulls, four mandibles, post cranial bones and numerous loose teeth were found in precise stratigraphic context together with artifacts and faunal remains. Most of them were discovered from layers IV to VI. Geologically belong to upper Villafranchian in date. The human remains suggest some characters close to *Homo habilis* and others put them into *Homo ergaster* group. Dmanisi is the only site in Europe belonging to such an early date.

10.3.2 Geological Features

Work at the site started in 1983 and is still continuing. Just before mankind came to live at Dmanisi, the Mashavera Valley suffered from volcanic eruption and it was filled by 80-100 m of lavas that formed the Mashavera Basalt. This basalt dammed the Pinezaouri Valley, forming a lake about 1 km long, which was located on the south of the site. The deposit yielding artefacts and human skeletal remains lie over the basaltic layer. Thickness of the deposit varies up to a maximum of 3 m. A total area of 300 square meters has been excavated to date. In the exposed sections of the deposit two strata A and B are identified. *Stratum A*, overlies the Mashavera basalt is dated to 1.85 Ma, had yielded maximum quantity of the faunal materials and hominid remains. The deposit consisted of volcanic silt and fine sand. Maximum number of stone tools came from stratum B. It is dated to 1.7 Ma. The deposit is of weathered volcanic silt and basaltic grey ash. The dates are based on $^{40}\text{Ar}/^{39}\text{Ar}$ Potassium Argon method). At a place named as M5 recent excavation has yielded valuable data (Ferring *et al*, 2011).

10.3.3 Palaeoecology

Evidence suggest that early hominid lived in a mosaic environment with alternate event of ashfall, soil stabilized by open grassland, a few trees.. Early hominid selected the place because of its warm climatic condition. Palaeobotanical evidences suggest that the climatic condition was warm and dry and resources were plentiful. The place had all the favourable condition for human habitation in the beginning of Pleistocene.

10.3.4 Culture

Hominid remains of Dmanisi reveal that the makers of the culture were of short stature with a cranial capacity of 500-775 cc. It is also revealed from stratigraphic data that the site was inhabited many times and the people were nomadic and mobile. From the beginning of original excavation till date over 1000 artefacts are collected from the site. Flakes dominated the collection but core and pebble tools are also found in good quantity. Flakes are not retouched. Tool making raw materials varied between the two strata. Stratum A consisted of locally available tuff found in the bedrock. Well rounded cobbles and pebbles were collected from distant alluvium deposits. Stratum B tools were mostly made on andesite and basalt, which were rare in Stratum A. Stratum B showed the source of raw material in the outcrops about 15 km. away from the site and as cobbles and gravels in the nearby Mashavera River gravel. The tools found were Oldowan type designated to Mode 1 type. Tool making technology was similar to those of Oldowan from Africa. Discovery of Dmanisi set a new light on population migration during early Pleistocene time with Oldowan like pebble core culture.

Ferring et al (2011) had concluded that the site was occupied over and again during the late Olduvai subchronology (ca. 1.85-1.75Ma). The authors have established from the stratification of archaeological sites that Dmanisi was occupied repeatedly for over 80 thousand years indicating a sustained regional group of hominids. Importance of Dmanisi lies in understanding of evolution of man and ancient population migration.

10.3.5 Some Figures of Dmanisi



Fig. 10.8: Location of Dmanisi Site

Source: <https://en.wikipedia.org/wiki/Dmanisi>

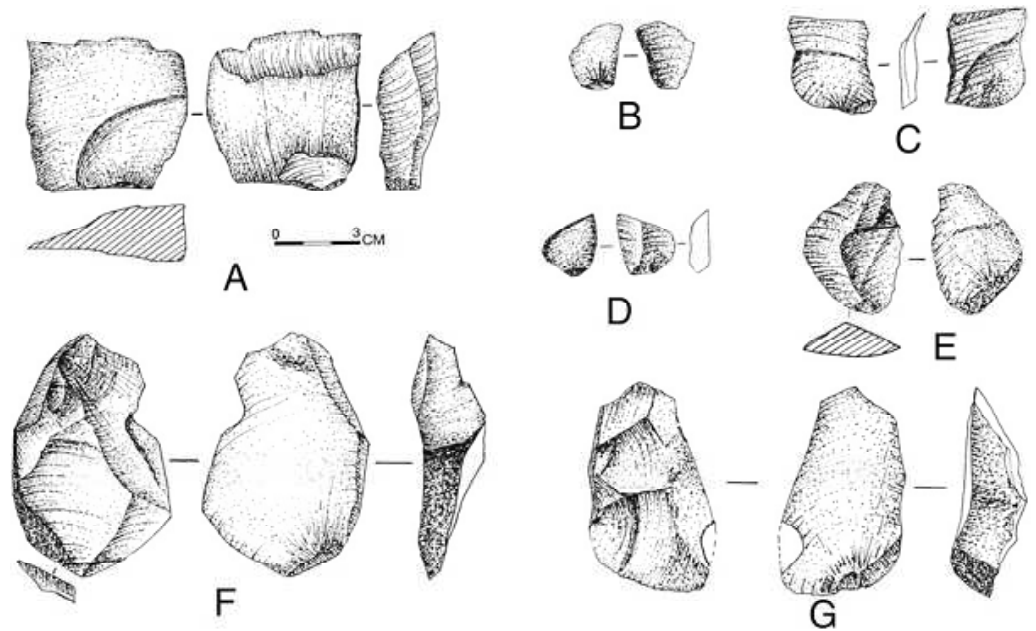


Fig. 10.9: Lithic Artifacts from Stratum A Deposits at Dmanisi

These flakes (A–G), all from stratum A2 (Fig. 2), were recovered from two of the five occupation horizons defined thus far in the 1.85- to 1.78-Ma deposits in the M5 unit. Although simple unidirectional flaking is dominant (B–E), three of these pieces have scar patterns showing core rotation to permit removal of large flakes with sharp edges (A, F, and G).

Drawn by O. Bar-Yosef, Department of Anthropology, Harvard University, Cambridge, MA.

Source: Ferring *et al*, 2011

Check Your Progress

4) What geological period does Dmanisi site belong to?

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10.4 ATTIRAMPAKKAM

Though the site was discovered earlier by Robert Bruce Foote and subsequently worked upon by the members of Yale Cambridge expedition and Archaeological survey of India but since the year 1990 the site was extensively explored, excavated and dated by the members of Sharma Institute of Heritage Studies under the leadership of Shanti Pappu.

10.4.1 The Site

Robert Bruce Foote, a British geologist is considered as the father of Indian prehistory because in 1863 he had discovered the first stone tool of Palaeolithic period from India from a site called Pallavaram near the erstwhile Madras city. Soon after him and his

colleague William King in course of the geological survey of the area discovered the site Attirampakkam in the same year. The site is located on the North West of the city of Chennai on the tributary stream of the River Kortallaiyar. It is situated at a height of 200-380 meters above sea level on an outlier of the Satyavedu hill of the Eastern Ghat. Foote had described the site, reconstructed its past environment, and interpreted the typo-technology of the tools found at the site. From 1990s under the leadership of Shanti Pappu reinvestigation of the site and culture of Attirampakkam took place. Her intensive and collaborative work had yielded important information about the Palaeolithic culture of the site. Application of modern dating techniques has established the site firmly on the world map of Palaeolithic culture and considered it as one of the stations in the route of migration of *Homo erectus* out of Africa into India.

10.4.2 Geological Features

Elaborate methods were followed for interpretation of stratigraphy, environment, culture, hominid behaviour and above all for establishing chronology in absolute terms. The surface collections were charted by means of contour mapping and formation of grid at an interval of 1 m sq. Other methods were digging test pits, carrying out excavations through step methods as well as horizontal digging. Eight depositional strata were identified at the site. Eight main sedimentary horizons were found (Papu and Akhilesh, 2014). The stratigraphy confirmed with the general sequence of alternating gravel and silt beds, very common in the peninsular India. A layer of argillaceous silt bed was deposited on the bed rock (Layer 8) followed by a gravel bed (layer 7). This bed was overlain by another bed of argillaceous silt (layer 6). Early men lived at the site at the time of formation of the deposits. Layer 6 was overlain by the ferruginous gravel bed of layer 5. Over these lay clay rich silt beds of layer 4 and 3. A deposit of fine grained ferricrete gravels marked by Pappu and Akhilesh as layer 2. The topmost layer consisted of clayey silt considered as layer 1. Layers 5 to 2 yielded cultural elements, which were later in date, namely, the late Acheulian and Middle Palaeolithic assemblages.

10.4.3 Chronology

Dating forms an important part in the study of Acheulian culture at Attirampakkam. Pappu and Akhilesh (2014) stated that for dating Acheulian horizon two different methods were used. The artefacts were directly dated by cosmic ray exposure method. This method was used first time in India at the Attirampakkam site. Date available was 1.51 $\pm$ 0.07 MYA. With help of this date and Palaeomagnetic data, it is assumed that the Acheulian hominids were present at Attirampakkam before 1.07 mya (Pappu and Akhilesh, 2014). The date corresponds with the dates of Olduvai Gorge, Ubeidiya and Dmanisi.

10.4.4 Palaeoecology

Environment of the time of Acheulian was mostly semi arid. Faunal remains were possibly *Bovini*, *Equus sp.* and *Caprini or Boselaphini*. It appeared that wild ox, horse and deer were present in the environment probably by the later part of Pleistocene. Acheulian men lived at a time when landscape was open under semiarid condition.

10.4.5 Culture

Evidences show that hominids lived continuously at Attirampakkam from Acheulian to Late Middle Palaeolithic. Attirampakkam site showed a continuous habitation by the hominids at the site from Acheulian to Late Middle Palaeolithic. Raw materials used for making Acheulian tools were fine to coarse grained quartzite.

The tool kits of Acheulian culture consist of Hand axes and cleavers. Hand axes are classified into larger and smaller ones. Larger ones are made on cortical flakes and smaller tools made on flake are without cortex. Most of the hand axes on flake have shapes of ovate and pointed. Cleavers are comparatively less in number than Hand axes. Most of the cleavers are convergent. Large trimmed flakes are found, which were retouched and used. Numerous small flakes are also present. Large flakes at the site probably were broken from larger cores elsewhere and brought into the site and were further worked upon at the site to prepare bifaces. Smaller cobbles were also brought into the site for taking out flakes. There were some tools made on cobble itself.

It appears that Acheulian hominids lived at Attirampakkam for a long time. Perhaps they visited the place seasonally for butchering of animals and for plant resources along the shore of the water bodies. An evidence of development of Middle Palaeolithic culture through transitional phase from Acheulian is noticed in the upper layers.

10.4.6 Some Figures of Attirampakkam

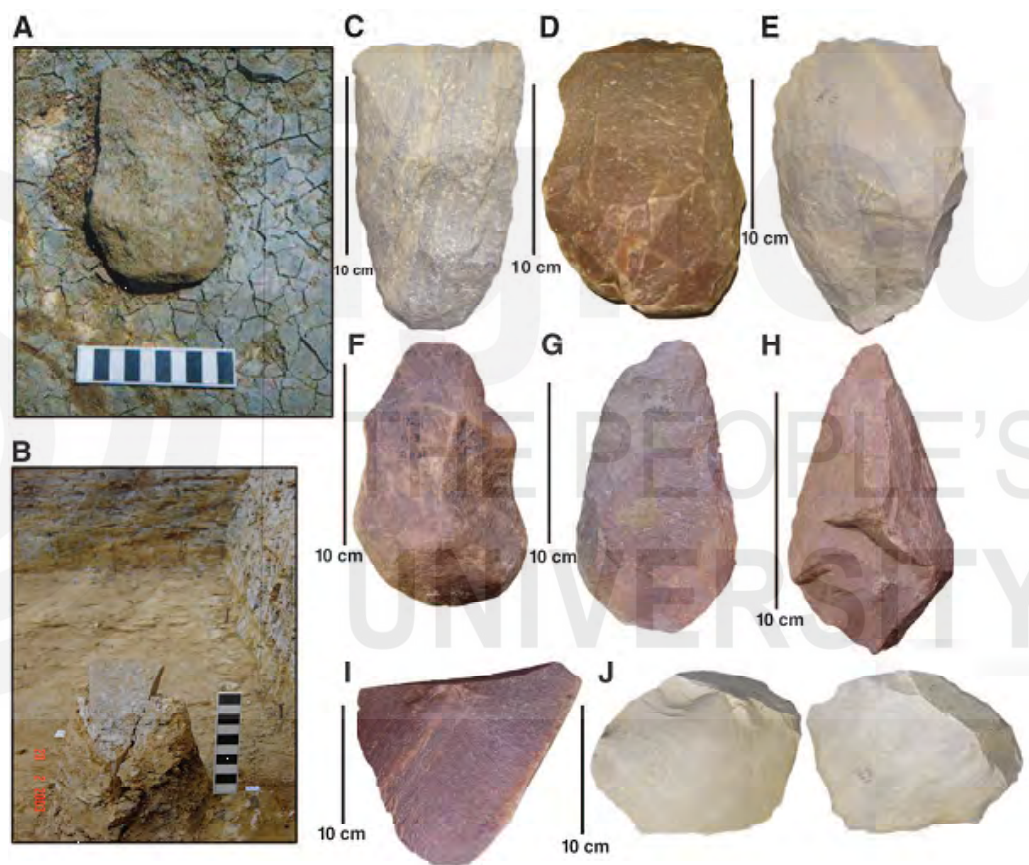


Fig. 10.10 : Attirampakkam Trench 8, layer 6 (Acheulian)

Source: Shanti pappu, 2011

Check Your Progress

5) What methods are followed for dating the cultural materials from Attirampakkam?

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10.5 ISAMPUR

Isampur site was discovered by K. Paddayya in 1983 in Hunsgi valley of the state of Karnataka. Subsequently Paddayya has carried out intensive research at the site and has unearthed evidences of an early Acheulian culture together with absolute date of the culture. He has reconstructed the life ways of the makers of the Acheulian culture who lived at Isampur.

10.5.1 The Site

Geographical location of the village Isampur is on the northwest part of Hunsgi valley. The Stone site is found at a distance of 2 km on the northwest from the village Isampur. The stone site is on a gorge like sub-valley, which Paddayya prefers to call Isampur valley. The Acheulian site is on the left bank of the Kamta Halla and about 750 m away from the foot of plateau on the east side of the valley. The site was strewn with tools of Acheulian tradition. Paddaya had carried out systematic surface studies and nine trenches were laid to get a full picture of the Acheulian culture of the region.

10.5.2 Geological Features

The sections at the trenches and at the naturally exposed surfaces showed that the cultural levels were within a thick deposit of silt, which was darker brown in the lower reaches and light brown in colour on the upper part. The lenses within the silt indicated that the deposition took place through several minor depositional phases. The silt bed was lying over lime stone blocks. A regular Acheulian deposit was found lying over the lime stone block and below 1.5 m thick blackish coloured silt. Middle Palaeolithic tools came from the upper part of the brownish silt, lying over the bed which yielded Acheulian tools. This indicated that early people lived in the valley continuously from Acheulian to Middle Palaeolithic times.

10.5.3 Paleoecology

Evidences suggest that the environment was quite congenial for the Palaeolithic people to select the site for habitation. There was a perennial channel providing water to the people, raw material for making tools and the high ground around to have a view of the valley in search of games and other resource. It seemed that early hominid at Isampur lived on the valley floor near the water channel and closer to the tool making raw material. This area probably was their home base, where they lived, manufactured tools and processed food. They foraged on the surrounding valley and hilly area for food and resources (Paddaya, 2014). Animal fossil remains suggest presence of wild cattle, horse, elephant and deer.

10.5.4 Culture

On the basis of concentration of tools the site is divided into four subzones. Five trenches were dug at the site. Trench 1 was the main trench dug. This trench has yielded major evidences of Acheulian culture. At a depth of 30 to 40 m, the layer of kankary brown silt yielded Acheulian occupation level with fresh artefacts, animal fossils and lime stone blocks. Seven chipping centres were identified. Each cluster yielded cores, large flake blanks, finished tools, hammer stones and waste products.

Lime stones formed the main raw material for manufacturing of the tools. Chert and quartzite were used in a limited manner. A total of 13,943 artefacts were collected. Other types were cores, flakes, utilized and or modified flakes. Tool types of Acheulian culture include Hand axes, cleavers, knives, scrapers, chopping tools, discoids,

perforators and indeterminates. Good numbers of handaxes and scrapers are characteristic of the collection. Knives were made on elongated flakes with blunted back. All these artefacts were used for animal and plant food processing. The typotechnology suggests that the assemblage belonged to an earlier tradition of Acheulian. Absolute date is derived from analysis of the enamel of a bovid teeth. This suggests that the culture at Isampur belong to a very early date between 1.2 and 0.7 mya (Paddayya, 2017).

10.5.5 Some Figures of Isampur

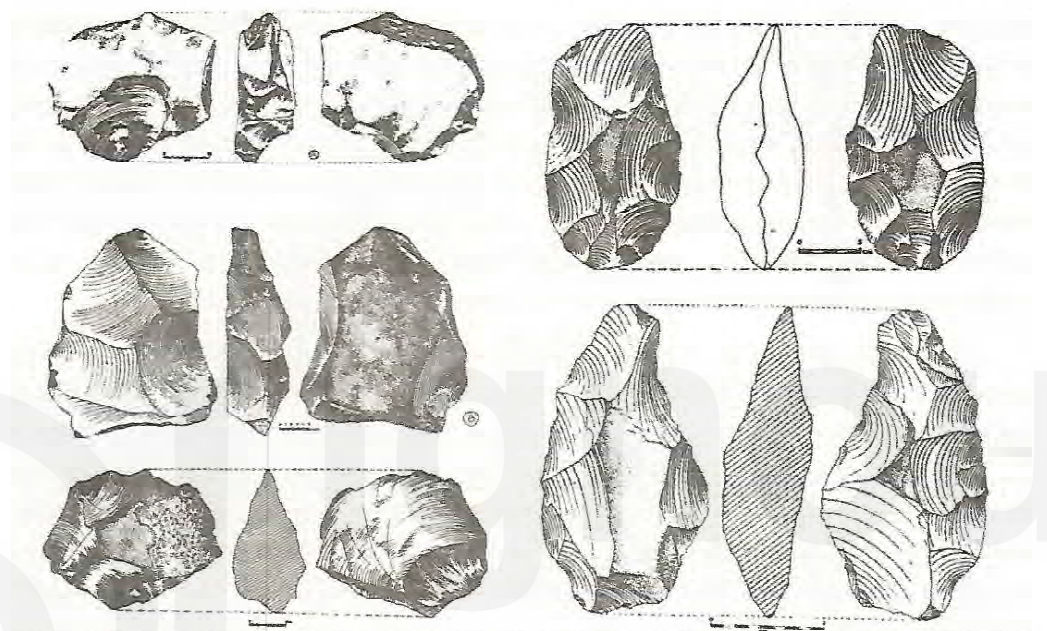


Fig. 10.11: Early Acheulian Tools from Trench I at Isampur, Hunsgi Valley

Source: Paddayya, 2017

10.6 SUMMARY

Earliest culture of the world began somewhat around 2 million years back. Beginning of culture happened due to change in the biological features of mankind. With the change in the physical features human being was able to make culture. The first undisputed culture discovered was at Olduvai Gorge. The earliest culture is named as Oldowan culture. The tool assemblage consisted of cores and flakes. Makers of the Oldowan culture were of genus *Homo*. Hominine types of *Homo habilis* and *homo erectus*/*Homo ergaster* (African type of *Homo erectus*) were responsible for producing Oldowan culture. At Olduvai Gorge, Oldowan culture evolved into Acheulian culture. Gradually with discovery of sites, with tools and sometimes with human remains and also with help of chronology it appeared that the early hominids spread into Asia and Europe from Africa. The sites discussed in this unit are now considered as some of the stations in the route of migration of early human kind. From Olduvai Gorge the culture spread to Israel at Ubeidiya, into Europe at Dmanisi and In India at Attirampakkam and Isampur. No doubt that there are many more sites of early culture but the above named ones are considered here. It is apparent that all the sites have shown preponderance of pebbles, cores and flakes. They used whatever raw material was locally available and suitable for tool making. Both Ubeidiya and Dmanisi have shown evidence of Oldowan type of culture. Attirampakkam and Isampur did not yield Oldowan material but started with Acheulian elements. All the sites showed evidence for cultural

evolution. Olduvai Gorge, Ubeidiya and Dmanisi yielded evidences for evolution of culture from Oldowan to Acheulian. Attirampakkam and Isampur showed evidence of evolution from Acheulian to Middle Palaeolithic culture. Our early ancestors preferred to live near to water bodies. In all the sites palaeoenvironment showed open steppe like grassland interspersed with shrubs and wood. Hominines lived, prepared tools and butchered animals at the site and used resources from the nature for their survival.

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10.8 ANSWERS TO CHECK YOUR PROGRESS

- 1) Culture is “the extra corporal behaviour of man” which is dependent on the biological preconditioning. For further details kindly refer section 10.0.
- 2) Tools of the Oldowan culture were simple pebble tools, produced with the use of percussion, stone hammer or block on block technique. These are mostly choppers and chopping tools. These were simple, crude, multipurpose tools used for chopping, scraping and cutting.
- 3) Geological formations show that Ubeidiya had experienced tectonic movements at the end of Pliocene period and Pleistocene period. These eruptions laid basalts on the valley floor. Limnic. Marshy and fluvial sediments gradually accumulated. These sediment are termed as “Ubeidiya Formation”.
- 4) Dmanisi site belongs to upper Villafranchian period.
- 5) The artefacts of Acheulian horizon at Attirampakkam were directly dated by cosmic ray exposure method. This method was used first time in India at the Attirampakkam site. Date available was 1.51+/-0.07 MYA. For further details kindly refer section 10.4.3.

PRACTICAL MANUAL*

Typo-technological Analysis of Prehistoric Tools: Identification, Interpretation and Drawing of the following tool types:

1. Core tool types
2. Flake tool types
3. Blade tool types
4. Microlithic tool types
5. Neolithic tool types

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8. Summary
9. References

* Contributed by Dr. M.K. Singh, Department of Anthropology, University of Delhi-110007 and Dr. D.K. Mondal, Department of Anthropology, University of Calcutta, Kolkata.

Learning Objectives

Once you have studied this practical manual, you should be able to:

- Know the necessity for understanding different stone tool types of prehistory;
- Understand tool making technology;
- Understand the idea of Practical in Prehistory;
- Learn method and importance of drawing tool types; and
- Learn the process of drawing and description of the tools of prehistoric times.

1. INTRODUCTION

Early human being made tools for performing certain functions. Therefore each of the stone tools of prehistoric times represents certain activities of mankind. You have already learnt about typology and technology. Similar tools are grouped together as type. There are certain techniques involved in making tools. Both tool typology and technology can be understood from the study of stone tools. A tool is made with a purpose. The purpose is to get some work done which is not possible to do with his hand or other parts of body. Basic functions necessary for survival are a few. These are cutting, scraping, grinding or crushing and piercing. These functions are universal (Braidwood, 1948; Bordes, 1989). Man may pick up a sharp or blunt object and use it. The object thus serving his purpose may be a stick, shell, wood or piece of stone or any such thing having a pointed or sharp or blunt edge. As you have already learnt that gradually early man learnt to replicate the sharp, blunt or pointed edge on whatever material was available to him. He used certain mechanism to shape the objects. The end product is known as tool and the method by which a tool is prepared is known as technique. The tool serves the function which his hands could not. For this reason a tool is said to be a “detachable extension of the forelimb” of man by Oakley (1972). Early human being could have made tools out of varied materials available but unfortunately the biodegradable materials have decomposed through time and we are mostly left with stone tools. You have also learnt that man had evolved through time and accordingly his capability of tool making developed. The tools had been classified into types and on the basis of chronology the prehistoric culture is divided into Palaeolithic, Mesolithic and Neolithic periods. Palaeolithic period had longest duration. It developed and continued in Pleistocene period. This culture is further divided into lower, middle and upper Palaeolithic stages. You have also learnt about the tool types which are specific to Palaeolithic, Mesolithic and Neolithic stages.

2. NECESSITY OF PRACTICAL COURSES

Prehistoric tools are cultural remains of early man. First work of a prehistorian is to keep record of the finding. These are done by drawing and description of each of the tools collected. For studying and classifying stone tools certain methods are followed. First step begins with scientific recording of the tool. The tools are drawn according to scale and labeled. This is not only for keeping record but also for analyzing the tool and finally to understand the type and technique of manufacture of the tool. Each tool is given a number. This is done with an abbreviation of the site name, the serial number and the year of collection.



3. TOOL MAKING RAW MATERIAL

First the student has to identify the raw material on which the tool is made. Out of all the raw materials used stones have mostly survived. Generally following stones were found to have been used as raw material for stone tools. These are cryptocrystalline materials such as, Quartz, Quartzite, Chert or Flint, Chalcedony, Obsidian and Basalt. Selection of raw material basically depends upon availability of suitable stones in the area. Flint is very common in Europe. Quartz and quartzite are used in the continents of Asia and Africa. However, it is also found that with the development of skill, early man had selected different kinds of stones to make tools (Semenov, 1964; Adams and Blades, 2009).

4. MORPHOLOGICAL ANALYSIS OF STONE TOOLS (TYPOLOGY)

As you have already learnt that tools are classified into types on the basis of their shape, size, form of material and on form and nature of working edge. These also indicate function of the tool. Since in prehistory we get antiquities but we do not always know their function, we need to form our own vocabulary of types which are solely defined on structure and probable function. Such types are called analytical types (Bordes and Bordes, 1970). We define them on the basis of technology and morphology and then may attribute a range of probable functions for them. Thus, function is not empirically demonstrable in prehistory and hence is entirely interpretative. Classification of prehistoric tools are done in the same way as zoologists use taxonomies for classifying animals into phylogeny of genus and species (Bordes, 1961). In this way tools are classified into several types, namely, Chopper, Hand axe, Cleaver, Scraper, Point. You must have noticed that the names denote function of each type. As mentioned earlier the tools vary with development biology and through time. There appears to be evolution of tool types in different cultural phases. There are two major changes, one is in size and the other is in refinement. Overall tool types show a general size diminution through time and at the same time there is refinement of tool making technology, which gave rise not only to more efficient tools but also diversity in tool types giving rise to many subtypes (Fig. 1).

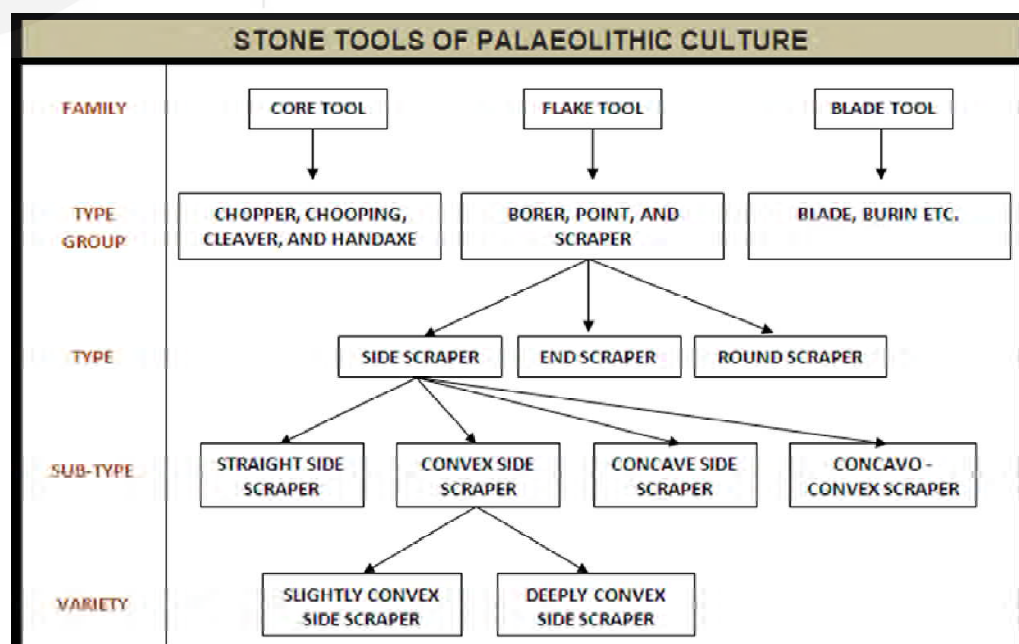


Fig. 1: Stone Tool typology of Palaeolithic Culture (eacharya.inflibnet.ac.in/data-server/eacharya...304/.../304-94-ET-V1-S1__file1.pdf)

5. TECHNOLOGY

You have already learnt about tool making technology. A tool is manufactured by a process known as lithic reduction. Simple form of reduction is to strike a stone with a hammer or fabricator to take out a flake from a nucleus. The nucleus is known as core. A stone tool maker also known as flint knapper, reduces the core into a rough unifacial or bifacial pre-form, which is further reduced to give a desired shape for a tool.

To understand the method of flaking one needs to diagnose the effect of a blow given on a stone with another stone. The point where the impact is given, a small depression is visible on the surface from where a flake is detached because of this blow. This surface is called a flake scar and the depression on this scar is called negative bulb of percussion (Fig. 2 and 3). The detached piece is called a flake (Fig. 4). Its surface which was attached with the core before the detachment occurred is called the main flake surface. The scar of detachment has a bulbous feature just below the point of impact and this is called positive bulb of percussion. On the core a negative bulb of percussion is left. The depth of the negative bulb on the core or the degree of pronouncement of the positive bulb on the flake determines the quality of force that was used to detach the flake (Inizan et. al., 1999).

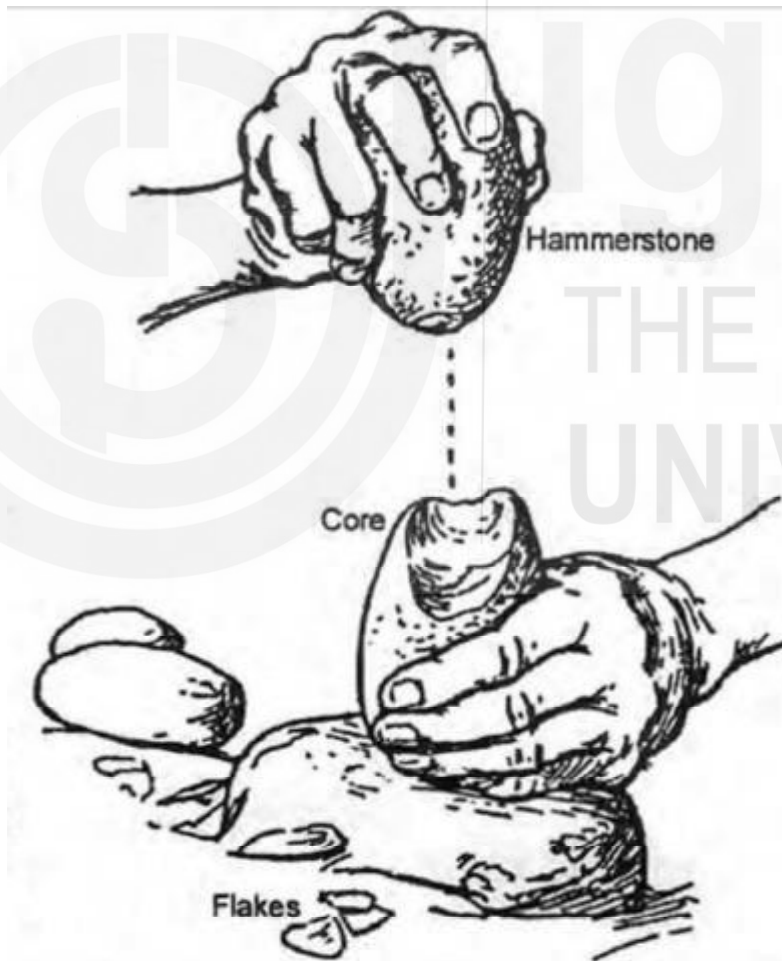


Fig. 2: Illustration of Reduction of a Nucleus of Stone with a Hammer Producing the Core and Flakes.

There are certain marks left by the force of the hammer on the reduced stones, so that a core can be differentiated from a flake.

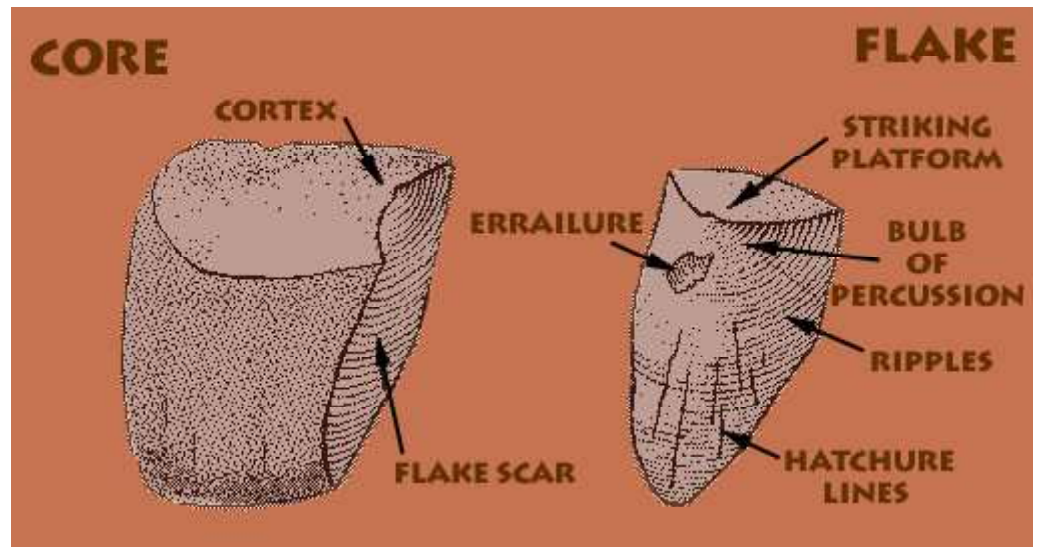


Fig. 3: Core and Flake (http://www.anth.ucsb.edu/faculty/stsmith/classes/anth3/courseware/LithicTech/4_Flake_Morphology.html)

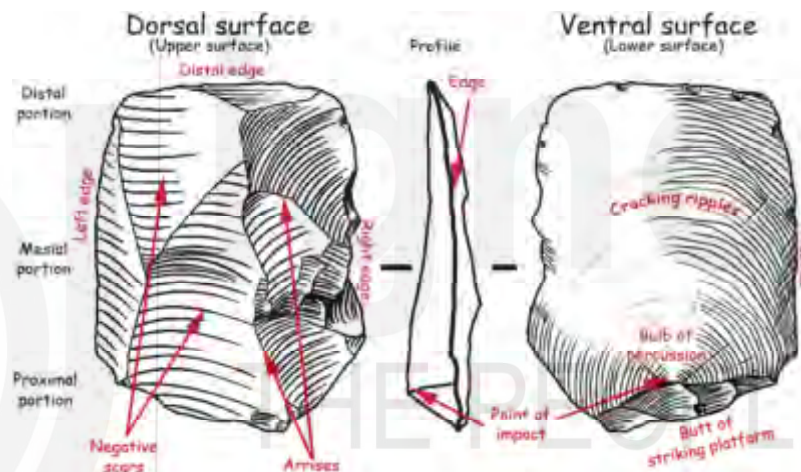
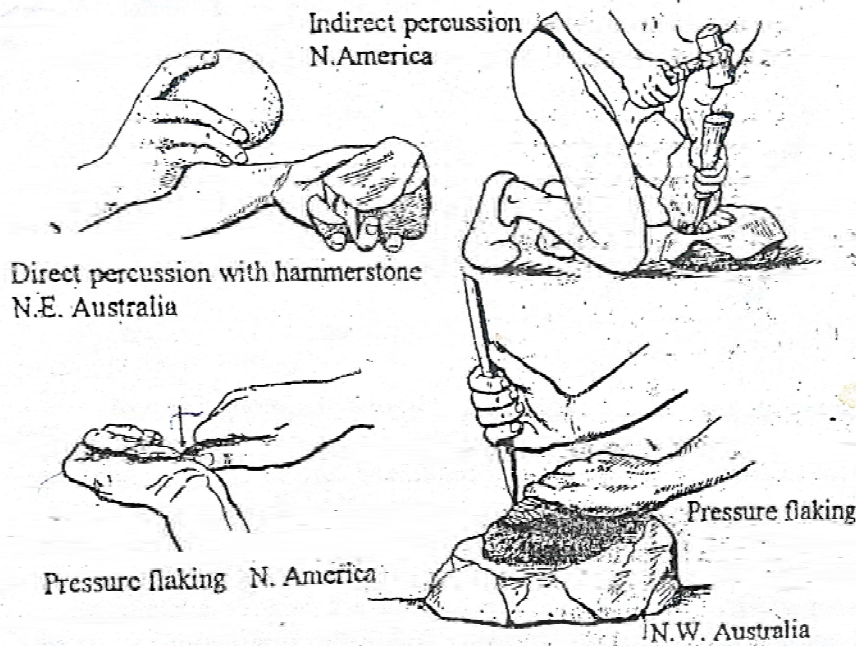


Fig. 4: Showing Fundamental Elements for the Technique Description of a Lithic Flake
(https://upload.wikimedia.org/wikipedia/commons/d/d8/Lithic_flake.png)

The force of percussion also creates ripple marks on the surfaces of both flake and core. Fig. 4, above shows the positive bulb of percussion and the ripple marks. You may pick up a stone and try to break it in the same way as the Fig. 1. And find the marks yourself. Fig. 4 also shows the way to draw a flake. In a flake the surface showing the bulb of percussion and ripple mark is considered as ventral or main flake surface and the reverse surface is known as dorsal surface. Keeping the body proximally, the distal end is determined. Two lateral margins can be considered as right and left successively (Fig. 4). In a core tool, determination of dorsal and ventral surfaces are preferential.

The techniques used in fabricating stone tools are described on the basis of experiments done by the scientists on various kinds of raw materials. Then specific features resulting from these techniques are recorded. The analyst then looks for these specific features in the prehistoric tools and on the basis of this he can identify that the technique he himself had used must have been used for the manufacture of the prehistoric tool. The stone fabrication techniques are as follows (Fig. 5)



METHODS OF FLAKING STONE

Fig. 5: Stone Tool Making Technology Reconstructed from Present Day Examples (Bhattacharya, 1991: 65)

Based on type of the hammer and on the control and skill of the maker manufacturing technique of stone tools have developed. Manufacturing technologies evolved with the biological evolution of human kind. Major techniques are as follows: (a) Direct percussion, (b) Indirect percussion (c) Pressure flaking, and (d) Grinding- polishing.

- a) Direct percussion: This is when a direct blow is given by the hammer on the stone to be chipped. Under this there are some subdivisions. They are as follows: (i) Block-on-block technique, (ii) Stone hammer technique. (iii) Resolved or step flaking technique, (iv) Cylinder hammer technique. These are described below:
 - i) Block-on-block or Block-on-anvil is a technique which is used when the core to be shaped is heavy and big. In such a case the core can be hit straight on a fixed stone on the ground. This will have the advantage of the weight of the stone itself providing the force of impact. The bulb of percussion (both negative on core and positive on flake) will be extremely pronounced when such a technique is used.
 - ii) Stone hammer technique: This was the most common method adopted by prehistoric man. In this technique the stone hammer hits the stone in a swinging blow. It results in a great shattering effect. The scar produced by such a technique is irregular in shape and is deep (Fig. 5 first picture on upper left.)
 - iii) Resolved flaking or step flaking technique: This is a controlled flaking technique. It sharpens the border of a core without sacrificing its mass. The technique involves directing force to the centre of the core. A step like fracture is created opposite the point of impact. Flake scars are shallow and regular in shape.

- iv) Cylinder hammer technique: This is one of the most widely used controlled flaking techniques. A cylindrical hammer, such as, long bone of a mammal or a hard wood or a suitable antler was used for this technique. The flake scars are shallow and almost always have parallel ridges. It would seem that most of the fine work of dressing and finishing of a tool were done by this technique (Fig. 6).



Fig. 6: Cylinder Hammer Technique (http://eacharya.inflibnet.ac.in/data-server/eacharya_documents/5717528c8ae36ce69422587d_INFIEP_304/95/ET/304-95-ET-V1-S1__file1.pdf)

- b) Indirect Percussion: This technique involves a medium on which hammer is struck to remove the flake. The media is usually known as punch and the technique is also known as punch technique. This technique is used to take out blades (Fig. 5, figure on upper right).
- c) Pressure flaking : The technique involves taking out fine and thin blades (never more than 0.5 cm in thickness). This was achieved by choosing suitable raw material (fine grained silicates) and using pressure with the pointed tip of a stone, hard wood or antlers on them. The process has been described as comparable to the way a pencil is sharpened (Fig. 5, the last two figures on lower row).
- d) Grinding and polishing: This is a technique that has evolved in the last phase of Stone Age that is Neolithic cultural phase. There was a need to cut down trees and clear land. Men smoothed the surfaces of the axes by Grinding and Polishing technique. The tool type which is prepared by this technique is called a *Celt*. It should be noted that at this time raw material chosen was hard grained stones like, altered basalt, diorite, epidiorite etc.

The celt making technique involves the following steps:

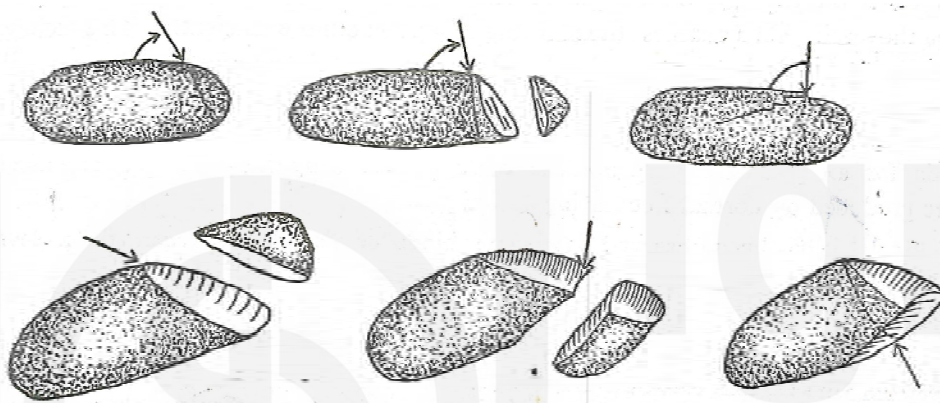
- i) Chipping: A suitable rock is chosen and then it is flaked in the shape of an axe (similar to a modern axe).
- ii) Pecking: A pointed hammer is used to systematically break all the ridges on the surfaces of the axe.
- iii) Grinding and polishing: The axes so prepared are now having a more or less smooth and regular surface. These are now rubbed on hard granite stone with sand and water thrown in from time to time. The result of this action creates an axe. When the grinding is fine and leaves a smooth and shining surface is called polished celt, which, unless told, can be mistaken as a metal axe. It is very shining.

Note that grinding polishing may not cover whole surface of the celt but may be restricted on the working edge.

Besides these primary stone fabrication techniques there are 3 more very significant combination techniques. These are: (a) Clactonian technique, b) Levalloisian technique and, c) Fluting technique

a) Clactonian technique (Fig. 7):

This is a technique by which large and massive flakes are removed from suitable cores. The flake is taken out using block-on-block technique. This technique derived its name from the site Clacton-on-Sea in Essex. Clactonian flake can be recognized on the basis of the following attributes (i) It is large and has a very pronounced positive bulb of percussion, (ii) The striking platform is not specially prepared or faceted. It is either original cortex or has just one scar (iii) The angle formed by the striking platform and main flake surface is more than 90° .



Clactonian flaking technique. The first row of three figures illustrate how once a critical angle is reached the core is shattered. The second row of figures illustrate how in Clactonian technique this limitation is remedied.

Fig. 7: Clactonian Flaking Technique (After Bhattacharya, 1979: 6)

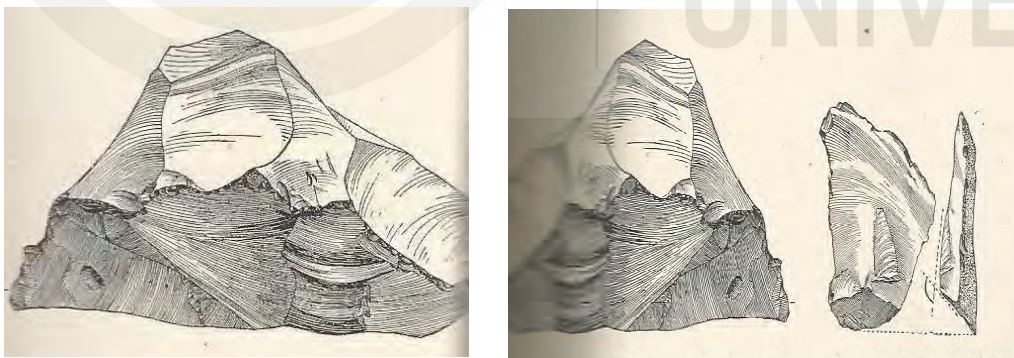


Fig. 8: Clactonian Core and Flake (British Museum 1956:37)

b) Levalloisian technique

This technique heralds the beginning of flake tool specialization. It involves the preparation of a core by delivering blows from both the borders in such a manner that the surface shows number of converging flakes. A flat surface is specially prepared at right angles to this surface (Dibble and Debenath, 1994). This is done by the removal of several small flakes in the manner of pecking. Finally a vertical blow is delivered on this surface. Thus, a flake is detached from the core. The resultant core from which this flake is removed is called discoidal core. The specific attributes of a Levalloisian flake are as follows:

- i) It will have a number of flake scars on the dorsal surface;
- ii) There will be a horizontal platform which has been specially prepared, known as, faceted platform;
- iii) The angle between the scar of detachment and the striking platform is 90° .

A Levalloisian flake is prepared by using cylinder hammer technique.

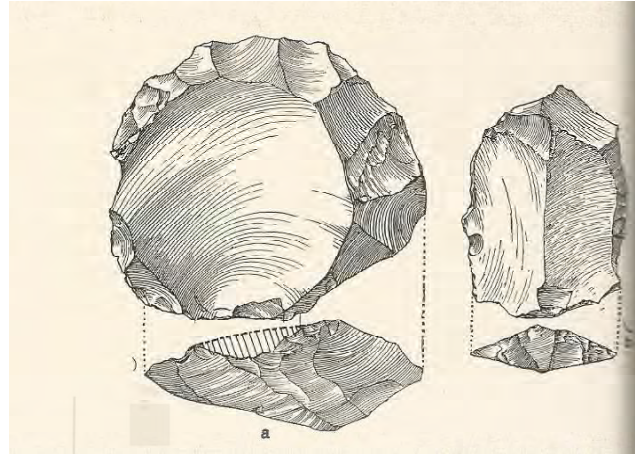


Fig. 9: Levalloisian Core and Flake (British Museum 1956: 40)

c) Fluting technique

Fluting technique is more specific for producing micro blades. A suitable core from which blades are removed by pressure flaking is known as fluted core technique. It is important to remember that pressure flaking can be used for final dressing or any other form of minute working but such workings will not be called fluting technique.



Fig. 10: Fluted Core and Detached Blades (http://eacharya.inflibnet.ac.in/data-server/eacharya-documents/5717528c8ae36ce69422587d_INFIEP_304/95/ET/304-95-ET-V1-S1_file1.pdf)

6. DRAWING AND RECORDING OF PREHISTORIC STONE TOOLS

6.1 Why Draw an Artifact?

An important part of the practical work in archaeology is drawing and description of an artifact. Drawing an artifact is important not only for recording the tool but also for analysis of the tool. Artifact illustration is not an art but a craft and the science. Anyone can do it with practice. Artifacts are commonly drawn at actual size that is at a scale as 1:1 and is marked with a scale bar. The drawing thus is a technical representation of the artifact. The main objective is to offer information through graphical conceptualization on the shape and most importantly on the method and order in which the flakes were removed from the artifact. A well crafted drawing of an artifact should therefore function as a reversed blueprint in which the reduction sequence of the artifact can be traced. It will provide important information for those studying the artifact without actual access to the artifact, stone tool in question. The lengthy process of documenting an object by drawing familiarizes the illustrator with the object drawn. Drawing lithic artifacts is relatively simple but effective way to gain insight into how stone implements were made. The drawing creates a data base of the knowledge acquired by the person drawing the artifacts. While drawing, the illustrator simultaneously examines the artifact for clues on the strategy employed by the flint knapper and tries to incorporate it into his illustration. Scrutinizing every aspect of an artifact in order to identify ridges and negatives, to determine the direction of the ripple, to locate the bulb of percussion, to identify pre and post- depositional damage and to look for other distinguishing features will yield insights that merely photographing or scanning the object will not produce.

Technical illustrations are not done free hand. There are certain standards and conventions that are to be followed. The lines, the shading and various other symbols in stone tool illustration are to serve an established function and are designed to represent a specific type of information. For these reasons drawing of stone tools of prehistoric times is done according to a relatively fixed pattern and all artifacts are illustrated in a fixed pattern and in a comparable manner. (Raczynski-Henk, 2017).

6.2 Equipments Necessary for Drawing Prehistoric Tool

- A sturdy desk or table with smooth surface,
- A desk lamp,
- Graph paper ruled or in millimeter squares,
- Tracing or chalk paper,
- A pencil (HB or B:0.5 mm),
- Black illustration pen (1 and 0.5mm),
- An eraser,
- Kneadable rubber,
- Sliding calipers,
- Profile or contour gouge with thin pins, and
- A magnifying glass.



Fig. 11: Equipments Necessary for Drawing Prehistoric Tool (After Raczynski-Henk, 2017: 24)

6.3 How to Draw a Lithic Artifact

Convention for drawing and illustrating stone tools are more or less uniform universally. Certain terminologies are used for describing the various properties and elements of lithic artifacts. The flake shown in Fig. 4 shows the various terms one would use whenever a stone tool is described.

Some of the important aspects of drawing of lithic artifacts are given below.

6.3.1 Angle of Incidence

When drawing an artifact everyone assumes that illumination comes from top left hand side. The result is that left side of the flake scars require more shading than the right side.

6.3.2 Projections

In order to represent a three dimensional tool in two dimensions on paper certain standard views are shown. These are after the methods employed by a physical anthropologist and a zoologist illustrating a skull. This means that each consecutive image is rotated 90 degree compared to previous one.

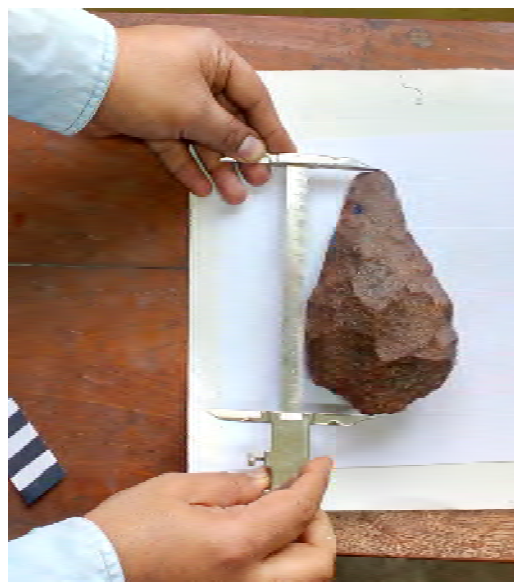


Fig. 12: Measuring the Tool (D. K. Mondal)

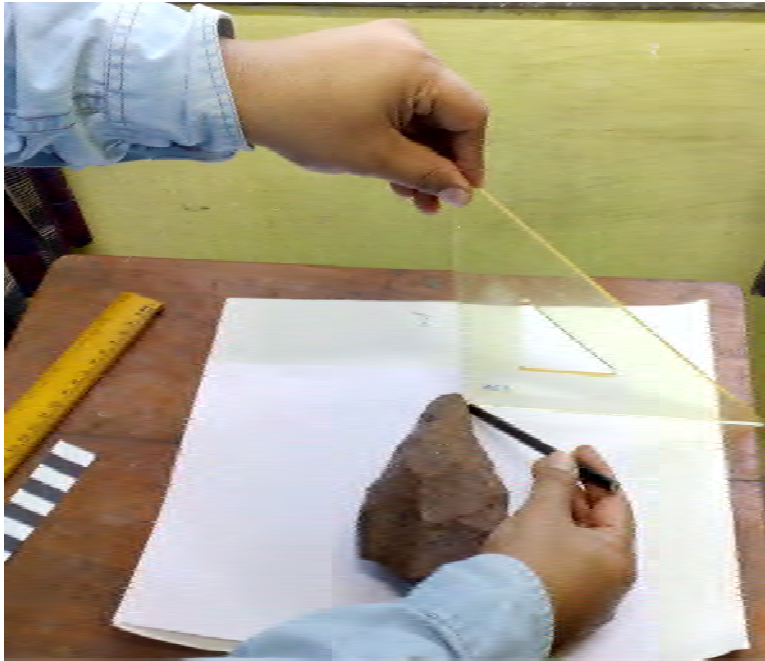


Fig. 13: Positioning of Tool Correctly (D. K. Mondal)



Fig. 14: Drawing Outline of the Tool (D. K. Mondal)

Following projections are drawn:

The dorsal surface

The ventral surface

Two lateral sides or profiles

Striking platform

One or more cross-sections.

Cross sections and striking platforms are always drawn with the ventral surface facing down. It is often impossible to distinguish ventral or dorsal surfaces in a bifacially or polished stone tool. Since these are mostly in symmetrical in shape it does not matter much. Next to these standard projections, Working edge, unusual retouching and other noteworthy features may be specially illustrated.

© **Lines:** Outline of the artifacts as well as fractures and fissures are drawn as accurately as possible with hard lines. After drawing the outline and ridges you have several empty blank spaces, namely flake scars, bulb of percussion etc. These are then filled in with different forms of hatching and other symbols. These are explained in Fig. 15.

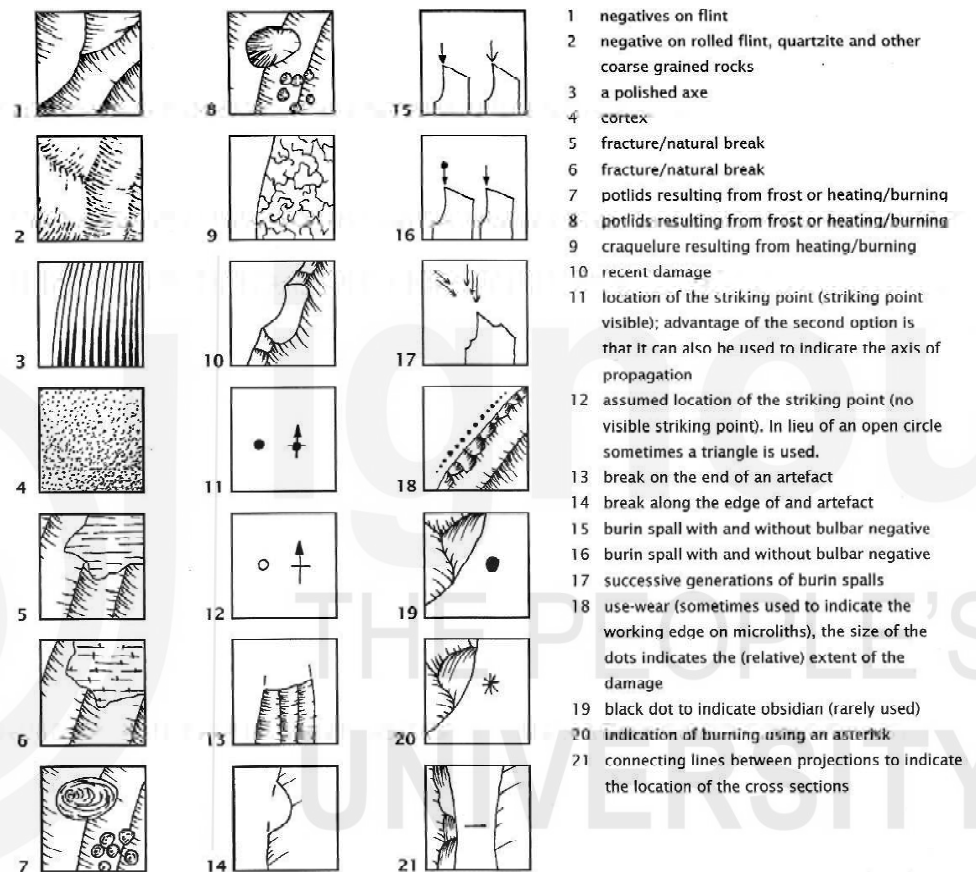


Fig. 15: An Overview of Various Types of Hatching and Symbols (After Raczyński-Henk, 2017: 19)

6.3.3 Ripples

Most of the stone tools show ripples marks of percussion in the flake scars and on the main flake surface. These percussion ripples are marked with the use of curved lines that extends from the left ridge towards the middle of the flake scar. The direction of the curve follows the direction of flaking. The curve indicates depth of the flake scar. Shallow flake scars are marked by slightly curved lines placed wide apart. Deep flake scars are marked by strongly curved lines with little space in between (Fig. 4).

6.3.4 The ventral/ main flake surface

The foremost feature of the surface is presence of positive bulb of percussion and ripple marks. These are marked by curved lines but for bulb of percussion the lines should be more concentric in nature. Some other features like fissures and bulbar scars are found near the bulb of percussion. These are to be marked as in Fig. 4.

6.3.5 Polished artifacts

Lithic toolkits of Neolithic culture consists of polished stone tools, such as, axe and adze. The surface of polished celts are drawn as a series of parallel lines drawn in the direction of polishing, more commonly along long axis of the axe. If there are any flake scar chipped surface, these should be drawn with curved lines.

6.3.6 Natural Cortex and Damage

The natural cortex is marked by means of stippling (Fig. 15: 4). Damages by natural fracture is marked either by drawing horizontal parallel lines or is left blank without any mark.

6.3.7 Microliths

These are so small that it is difficult to put ripple marks. Sometimes theses are drawn with outlines only.

Drawing lithic artifacts is a skill which develops with practice. The illustrator also becomes skilled in analysing the stone tools.

7 ANALYSIS OF PREHISTORIC TOOLS

7.1 Description of the tools

Each of the tools drawn for practical courses is also described. The format of description is as follows:

Museum Number: Each tool should have a number for identification in the laboratory

Locality: Name of the place from where collected. Any other information.

State of preservation: Whether tool is fresh or rolled and weathered. Nature of patination.

Measurement of the tool: Maximum length, maximum breadth, maximum thickness, thickness along the middle part of the tool.

Shape of the tool: This is to be given in geometrical terms, such as square, oval rounded etc.

Type of raw material: Name of the stone, such as, flint, quartz, quartzite etc.

Form of raw mater: This denoted the pre-form. Whether the tool is made on core, flake, blade or bladelet.

Dorsal surface: Type, number and form of flake scars; their alignment; whether cortical surface is present. Any noticeable feature.

Ventral surface: The description will vary between a core and a flake. In case of a core tool, the description will be done same way as it is done for dorsal surface. If the tool is on a flake or blade, one has to give the account of bulb of percussion etc and also of the flake scars if present. Any unusual feature is to be mentioned.

Cross section: Transverse section along the centre of the tool, is taken with the help of thin wire or contour gouge with thin pins. Sometimes sections are also taken along the anterior end and along the proximal end. These are described in terms of the geometrical shape of the section.

Tool type: On the basis of above mentioned criteria the tool type is identified. If necessary subtypes are to be mentioned.

Probable techniques of manufacture

Probable function

Probable cultural stage: This may be in comparison to the existing identified type.

Remarks: Any special information as evident in the tool.

7.2 Conventional Prehistoric Tool Types

Analysis of antiquities retrieved through either exploration or excavation needs to be done on the basis of several such attributes as: (i) raw material used, (ii) technique of manufacture, (iii) type of pre-form and (iv) state of preservation. As already mentioned stone tools are classified into industries or techno complexes on the basis of clustering of similar technological and morphological characteristics. Braidwood (1967) categorized prehistoric tools on the basis of form of raw material. These are: 1) pebble tools, 2) core-biface tools and 3) flake tools. Grahame Clark in 1969 proposed evolutionary stages of tool types from Mode 1 to Mode 5. He assigned Modes 1 and 2 to the Lower Palaeolithic tools, 3 to the Middle Palaeolithic implements, 4 to the Upper Palaeolithic artifacts and 5 to the Mesolithic elements. Clark's scheme is adopted by the prehistorians universally. However it is found that core tools characterize Lower Palaeolithic culture. It is observed that stone hammer technique was used earlier than cylinder hammer techniques. Flake tools characterize Middle Palaeolithic culture and blade tools are characteristics of Upper Palaeolithic culture.

7.2.1 Core Tool Types

Following are some of the core tool types.

7.2.1.1 Pebble Tool Types

There are many tools prepared on pebbles. Pebbles are stones, outer surfaces of which are smoothened by running water. Basic pebble tool types are known as choppers.

- i) **Chopper:** These are the earliest tool types made by man. A broad and thick pebble broken transversely to produce cutting edge is called chopper. There are two sub types of choppers, (a) Unifacial and (b) Bifacial.
- a) **Unifacial choppers:** The pebble is flaked along one surface only. The flake scars meet the flat ventral surface and give rise to transverse chopping edge (Fig. 16).

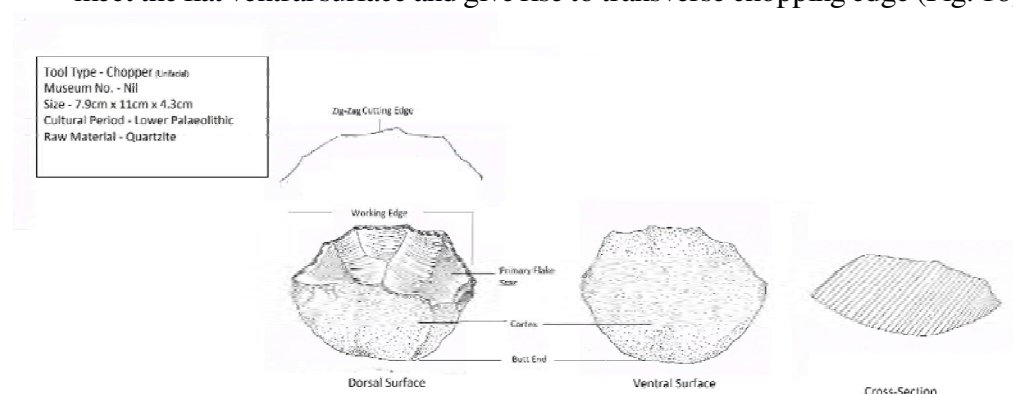


Fig. 16: Unifacial Chopper (Drawn by D. K. Mondal)

Choppers are one of the predominant tool types in Lower Palaeolithic Culture of East Africa. The culture found at Olduvai Gorge in Africa is called *Oldowan* after the name of the site (Leakey, 1966). Mostly these are all grouped together in a techno-complex termed Mode I.

- a) Bifacial choppers: The pebble is flaked from both the surfaces to produce the transverse working edge (Fig. 17, 18).

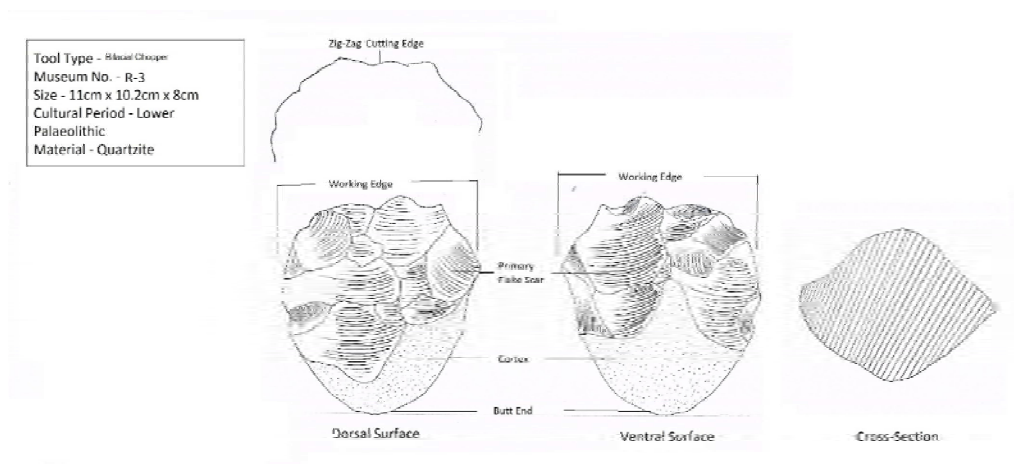


Fig. 17: Bifacial Chopper (drawn by D.K. Mondal)



Fig. 18: Chopper (Photo by D.K. Mondal)

Following are the most common core tool types.

Handaxe: Handaxe is one of the most prolific tool types found all over the world during the entire length of lower Palaeolithic. It is designated to Mode II. It is essentially a bifacial tool prepared in such a manner that one end of the specimen is broader and thicker while the other end is narrow. The sharp and the pointed end is considered as anterior end and the opposite end which is often thick and bulbous is called as the butt-end. The working edge is on both the lateral margins and on the anterior end.

When the handaxe is massive and the technique used is block-on-block or stone hammer technique such handaxes (Fig. 19, 20) are taken to characterize Abbevillian or lower Acheulian tradition (Soressi and Dibble, 2003). With the advent of cylinder hammer technique all the rough edges are regularized and smoothed by careful series of retouchings (Fig. 21, 22.). According to the shape of the hand axes, they are subdivided into sub-types, namely, almond shaped (Amygdaloid), lance head shaped (Lanceolate) and heart shaped (Cordiform) categories. Some of the middle to Upper Acheulian Handaxes also show a distinct extended S-twist at the lateral or working border. One of the most evolved of these handaxe is an Ovate. This is the tool, where the maximum thickness shifts from the proximal or butt end to the centre. Though handaxes are

commonly made on core there are some made on flake. Such hand axes may be distinguished by the presence of main flake surface.

Handaxe is a heavy duty multipurpose tool used in a variety of tasks. They could have been probably used for digging, cutting, scraping and also for butchering and skinning of animals etc.

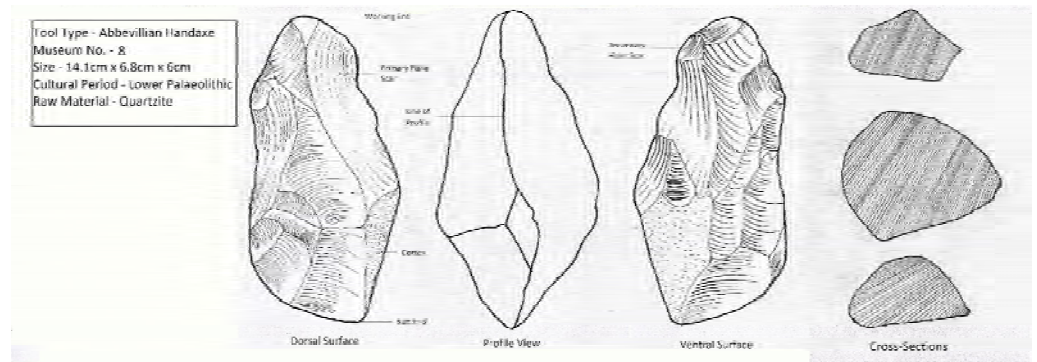


Fig. 19: Abbbevillian Hand Axe (Drawn by D.K. Mondal)

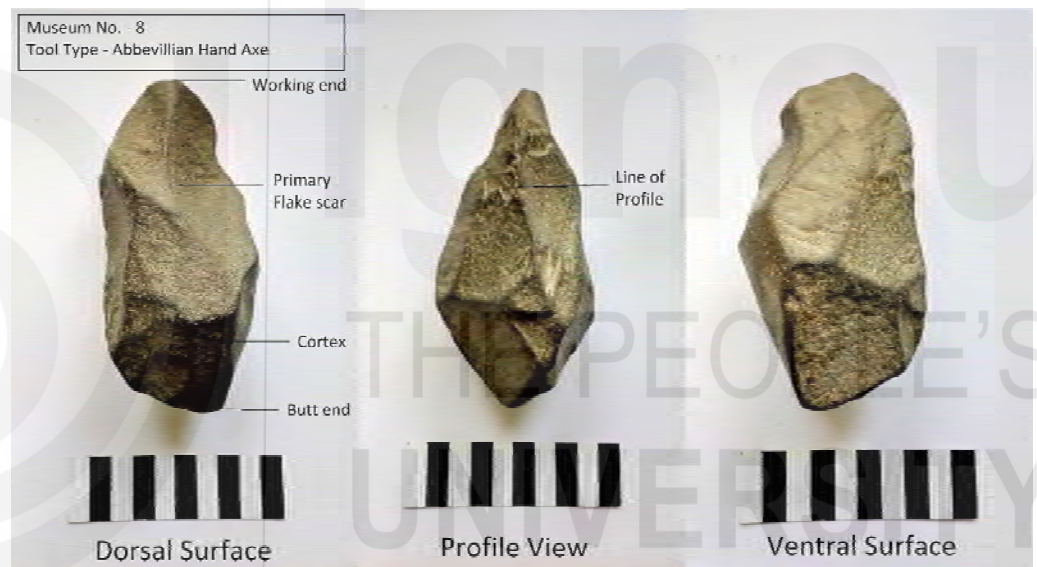


Fig. 20: Abbbevillian Hand Axe (Photo by D. K. Mondal)

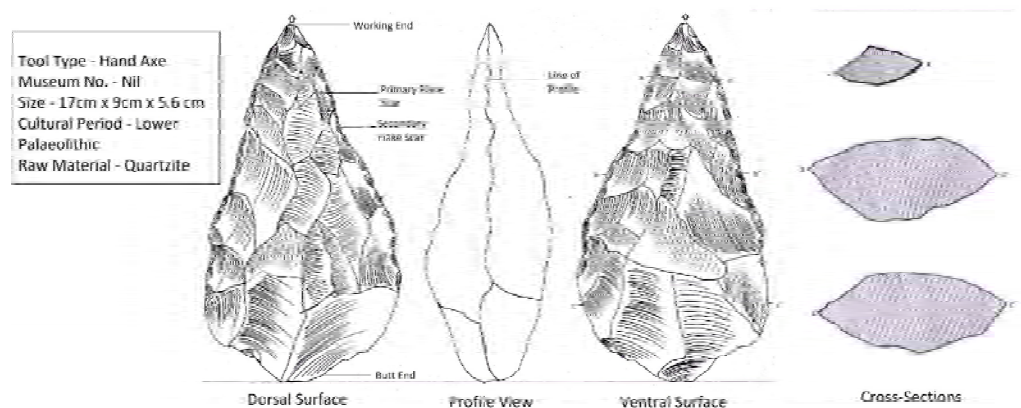


Fig 21: Acheulian Hand Axe (Drawn by D. K. Mondal)

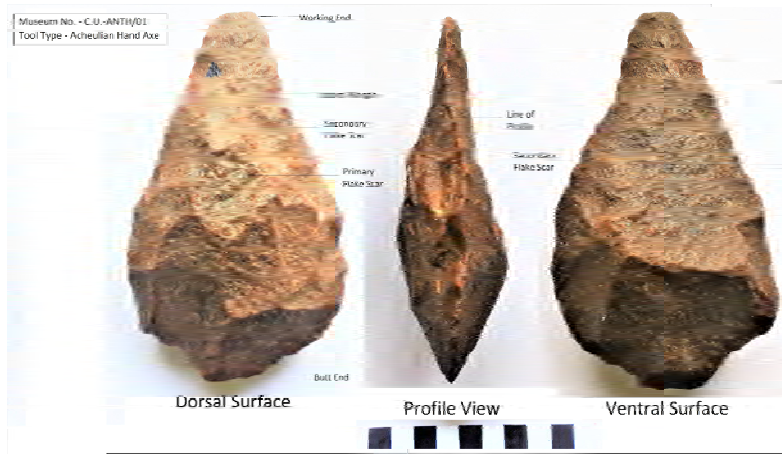


Fig. 22: Acheulian Hand Axe (Photo by D. K. Mondal)

Cleaver: (Fig. 24, 25). This is also a biface like a handaxe, with the only difference that working edge is transverse and located on the anterior side. It looks like a modern axe and is supposed to have used for cleaving wood, meat or such other objects. A flat and sloping flake scar is so removed from the anterior end in such a manner that this intersects with scar of detachment of the under surface to give rise to a transverse working end. The lateral borders are worked in such a manner that the cross section of the tool appears like a parallelogram (Sankalia, 1982). The cleavers as a rule have shape like a U or a V. For statistical analysis, as also for computation of proportion of core tools to flake tools, handaxes and cleavers made on flakes are counted within core category (Oakley 1974).

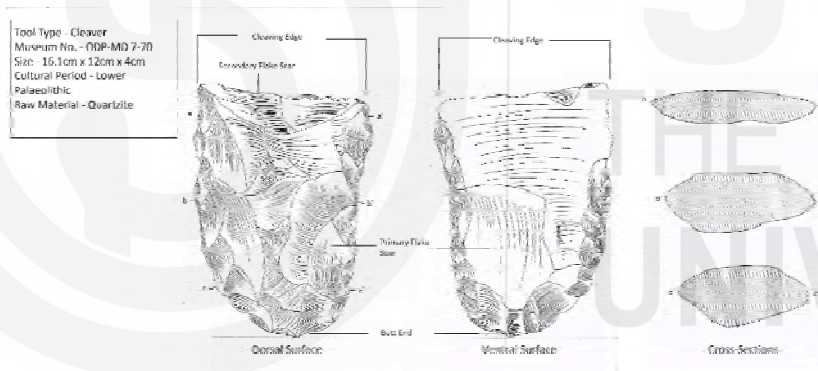


Fig. 23: Cleaver (Drawn by D. K. Mondal)



Fig. 24: Cleaver (Photo by D. K. Mondal)

7.3 Flake Tool Types

A flake can be big when detached from massive cores. But such massive flakes are seldom used to make flake tools. A flake becomes a tool only when it is retouched along one or more borders. The location, form and nature of retouch determines the type of a flake tool.

Here a word of explanation is required for the word “retouching.” A series of nibbling executed in a contiguous manner along a border is called retouching. In the case of Levalloisian flake, the entire dorsal surface will show the centrally directed flake scars removed before the flake was detached from the core.

There are four predominant flake tool types. These are (i) side scraper, (ii) end scraper, (iii) point, (iv) borer and (v) knife.

7.3.1 Side Scraper

This is the most prolific tool type of the Middle Palaeolithic period. A simple flake is taken and retouching is done along one of its lateral margins. This edge is the working edge used for scraping wood or skin or any such object. The working edge can be convex, concave or straight in outline. Accordingly the side scraper is sub divided. Side scrapers may have both the lateral margins retouched into working edges. These may be called as double edged side scrapers. There may be variation in the form of working edge, namely, convex, concave, straight or notched (Fig 26).

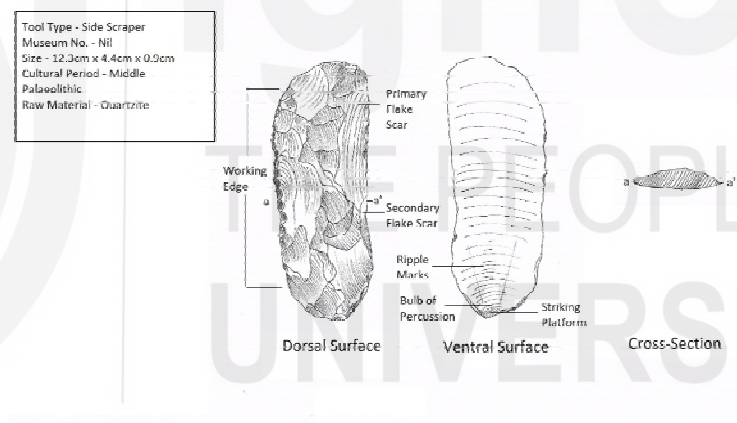


Fig. 25: Side Scraper (Drawn by D. K. Mondal)

7.3.2 End Scraper

In this type the scraping edge is located either on distal or on proximal end. Subtypes are according to the form of working edge that is convex, concave or straight (Fig.27).

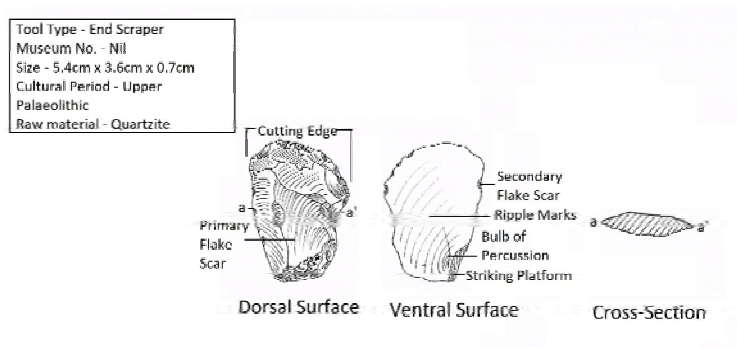


Fig. 26: End Scraper (Drawn by D. K. Mondal)

7.3.3 Discoidal or Round Scraper

This is rounded in shape with working edge along the periphery (Fig. 28)

Tool Type: Discoid/ Round Scraper

Museum Number: Nil

Size: 6.3cm.x6.5cmx1.1cm.

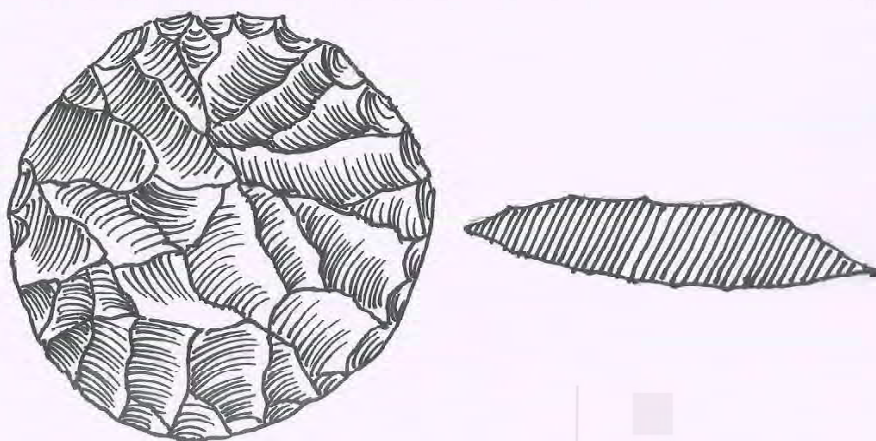


Fig. 27: Round Scraper (Drawn by D. K. Mondal)

7.3.4 Point (Fig. 28)

A flake is so retouched along its two converging borders that a pointed end projects out in the distal/ anterior end. The tool is more or less triangular in shape. The base of the point may be concave in shape. This type is known as hollow based point. There may be tang at the base. This type is known as tanged point.

Tool Type - Point
Museum No. - Nil
Size - 6.5cm x 3.2cm x 0.6cm
Cultural Period - Middle Palaeolithic
Raw Material - Quartz

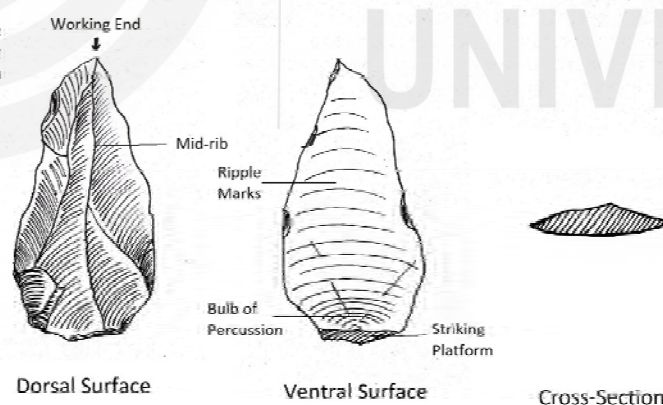


Fig. 28: Point (Drawn by D. K. Mondal)

7.3.5 Borer

These are usually prepared on sturdy flakes. Two lateral sides curve in such a manner that a part of the flake projects out as a boring edge (Fig. 29).

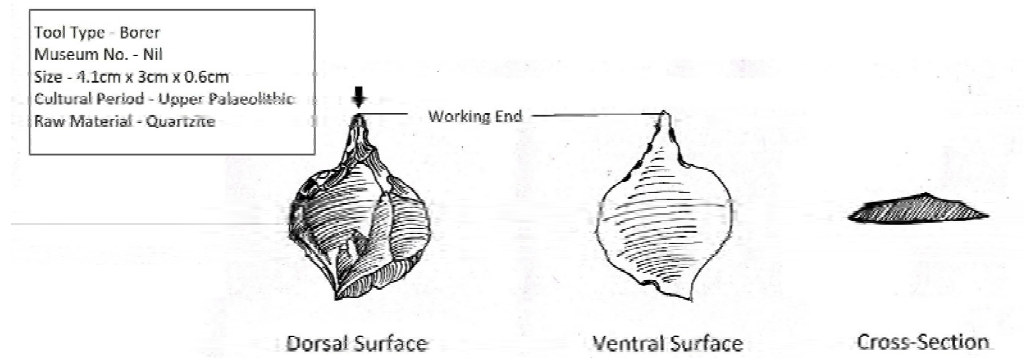


Fig. 29: Borer (Drawn by D. K. Mondal)

7.3.6 Knives

This is prepared on a thick elongated flake. One of the lateral borders is thick and is blunted by removing several step flake scars. The other border is sharp and runs along the long axis of the flake. The finished specimen somewhat resembles a modern knife. It is designated to, Mode-III (Fig. 30).

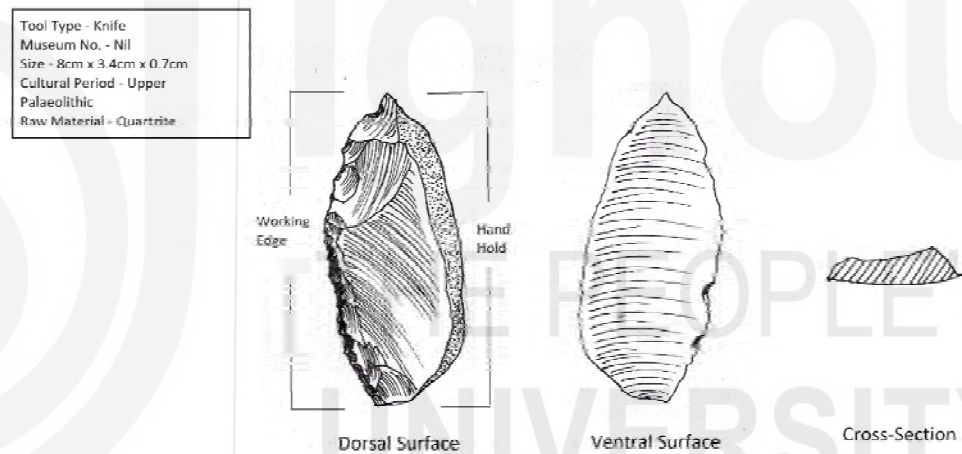


Fig. 30: Knife (Drawn by D. K. Mondal)

7.4 Blade Tool Types

Blade tools are defined as those flakes which have a length more than or equal to twice its breadth (Tixier, 1963). That is, every blade is essentially a flake but every flake is not a blade. These are usually 8-9 cm in length, 2-3 cm in breadth and 1-2 cm in thickness. The technique of their manufacture is punching, i.e., indirect percussion with an antler used as an intermediate punch.

There are numerous types of tools that are produced on blades during Upper Palaeolithic cultural stage, but the most dominant among these are (i) Retouched Blades, (ii) Backed Blades, (iii) Burins (iv) End Scraper and (v) Leaf points.

7.4.1 Retouched blades

A retouched blade is a thick blade which is retouched in a semi abrupt manner along the lateral sides (Fig. 31).

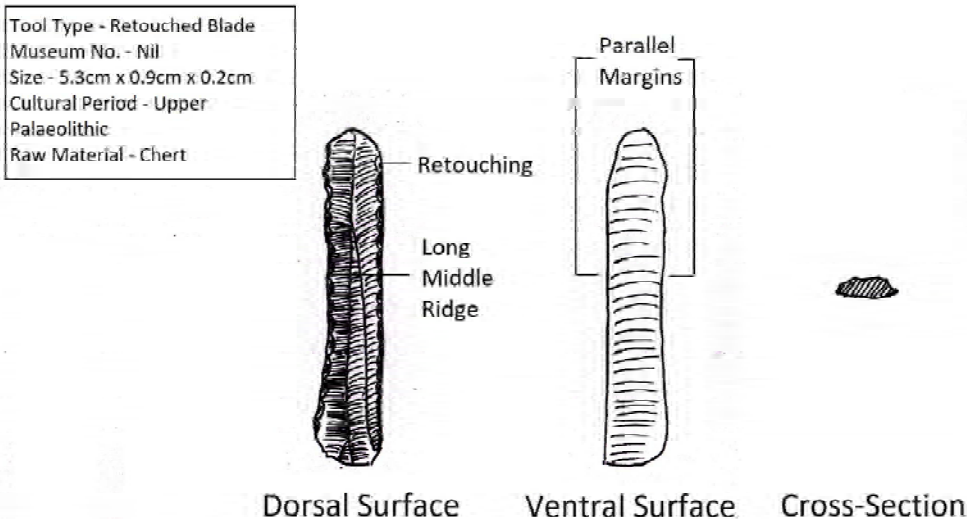


Fig. 31: Retouched Blade (Drawn by D. K. Mondal)

7.4.2 Backed Blades

These are blades in which one of the borders of the blade is blunted with the help of steep flaking and the margin parallel to the blunt surface is left sharp (Fig. 32).

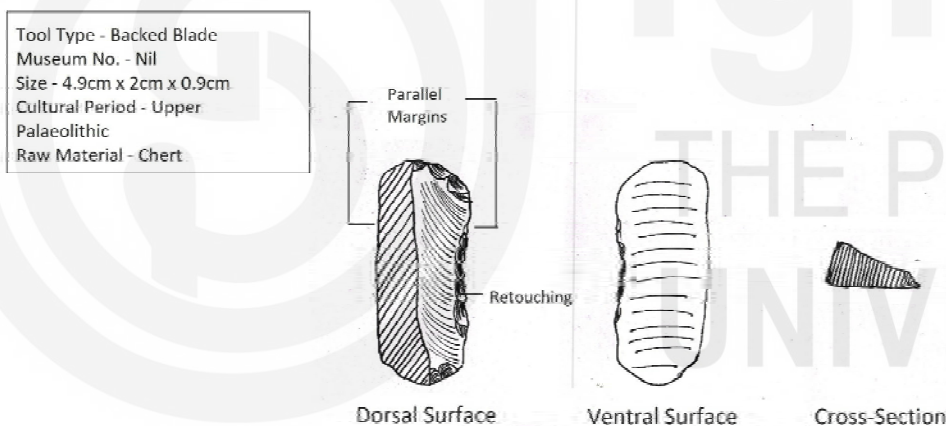


Fig. 32: Backed Blade (Drawn by D. K. Mondal)

7.4.3 Burins

These are blades in the anterior end of which a screw driver like edge is prepared by the careful removal of two sloping facets. These facets intersect to form the working edge which is equal to the thickness of the blade (Fig. 33).

7.4.4 Leaf Points (fig. 34) This is a very characteristic tool type of Solutrean tradition of French Upper Palaeolithic. Here flat flakes or blades measuring in average 6 cm x 2 cm are given series of scars on both the surfaces by pressure flaking technique. As a result the blades are so reduced in thickness that they tend to be less than 1 cm in thickness. The anterior end is pointed. These look like leaves of certain trees and hence the name. In France these are called *Laurel leaf points*. In slightly later period these leaf points became short and unifacillay worked. These may or may not have a shoulder. These are called *Willow Leaf Points*. It belongs to Mode-IV. However these types are not common in India.

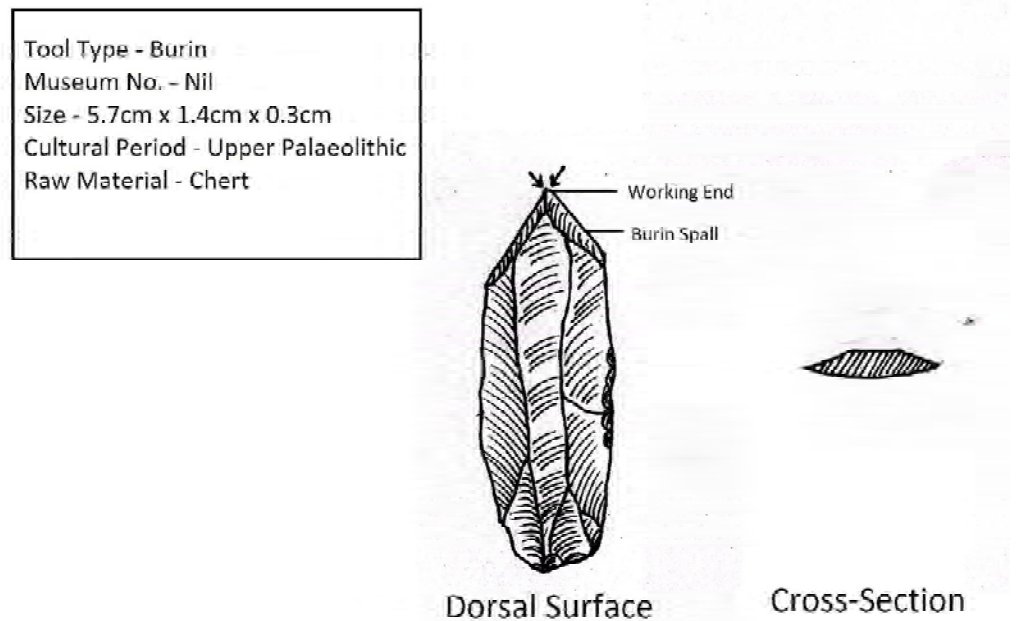


Fig. 33: Burin (Drawn by D. K. Mondal)

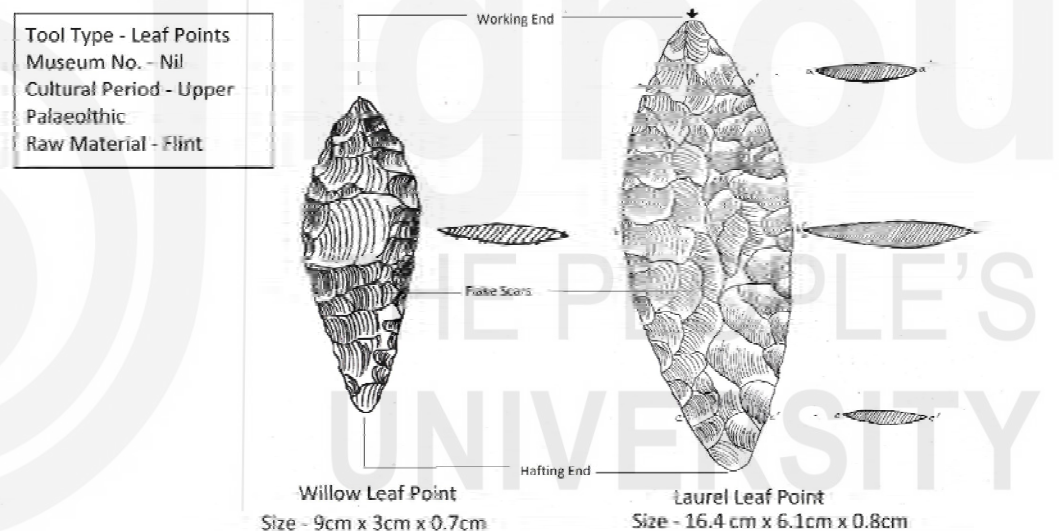


Fig. 34: Leaf Points (Drawn by D. K. Mondal)

7.5 Microliths

The word means small tools. These are small tools but have got specific typo-technology. These are made on small blade, better known as bladelets. There is a size dimension fixed for designating the status of microliths. It should be within 3cm in length and made by punch and pressure technique (Tixier, 1963). These are so small that nobody can imagine that they could have been used individually by holding them in hand. Further cave paintings as also some evidences from excavated materials have now confirmed that these were used by hafting in combination to produce the ultimate implements to be used (Braidwood, 1948). These are known as composite tools. Microliths appeared in small quantity in the upper Palaeolithic stage but it became the main tool type of Mesolithic culture. People continued to make and use microliths even into the Neolithic stage, with the start of agriculture. Microliths were hafted in rows on pieces of wood to make sickle or harvesting knife.

Microlithic tool types are mostly prepared by blunting a sharp border of a bladelet. The most common types are Lunates, Obliquely blunted Blades and Trapezes. Besides these one can also see some Upper Palaeolithic types repeated on these micro blades. These are end scrapers and burins.

Microliths are subdivided into non geometric and geometric types. Those having triangular, trapezoidal and crescent shapes are called geometric types. Microlith not conforming to any set geometric forms are known as non geometric types. Following are descriptions of some typical microliths.

7.5.1 Lunate or Crescent

If one border of a blade is so blunted that it is semi circular in shape, it is called lunate or crescent. Usually the arc is blunted and the cord is sharp (Fig. 35).

7.5.2 Obliquely blunted blades

These are similar to Gravettian points with the only difference that these are prepared on blades.

7.5.3 Triangles

It has got a triangular shape and two of the arms are blunted (Fig. 35).

7.5.4 Trapezes

This type of tool has trapezoidal shape. Two of smaller arms and one longer arm is blunted and the other long arm is left sharp. These could have been used as transverse arrowhead (Fig. 35)

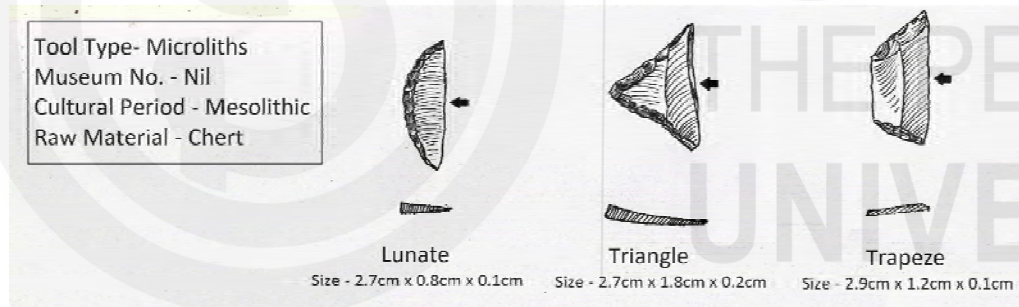


Fig. 35: Geometric Microliths (Drawn by D. K. Mondal)

7.6 Neolithic Tool Types (Celts)

Celt is a generic name and includes such types as *Axes*, *Adzes*, *Chisel*, etc. These tools are the most common and diagnostic feature of the Neolithic culture. Following is the description of the Neolithic tool types.

Axes: These are roughly triangular in form with a firm transverse working edge. The working edge is asymmetrical in profile and is invariably ground and polished. These look similar to the modern axes but without the socket. These were used for chopping wood (Fig. 36, 37).

Adzes are similar to axes in all general features except these have plano-convex cross section at the working edge. There is asymmetrical beveling at the working edge. These were used as modern adzes for shaping and scraping wood or as hoe for digging the soil for horticulture (Fig.38, 39).

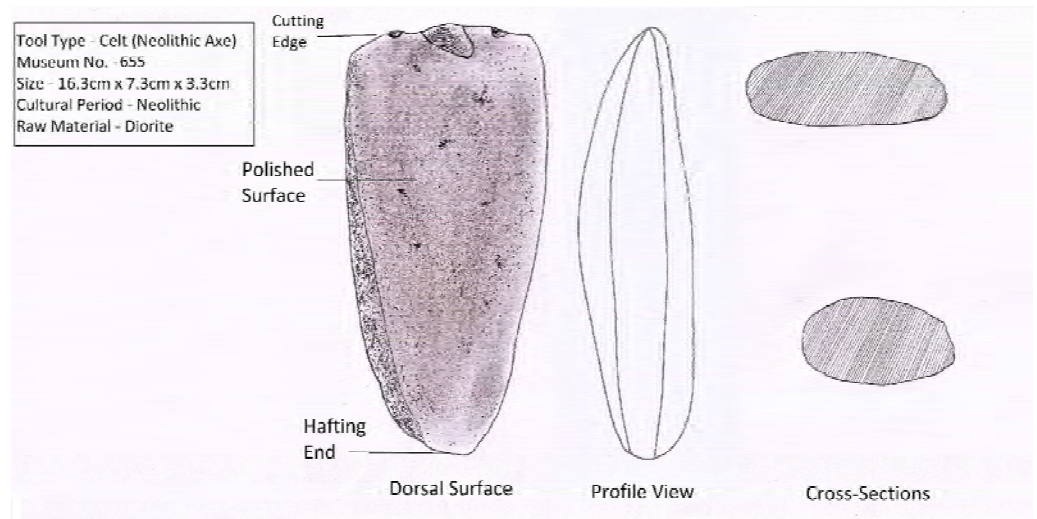


Fig. 36: Neolithic Axe (Drawn by D. K. Mondal)



Fig. 37: Neolithic Axe (Photo by D.K.Mondal)

Chisels are narrow rectangular pieces in which the two lateral margins are flat, faceted and square and run parallel to each other. The working edge is transverse. This is meant for chiseling wood (Fig. 40).

Ring Stone: These are circular pieces of stones with a hole in the centre. The hole is usually made by grinding from both the surfaces of the disc, so that the hole thus formed has a hour glass shaped out line. These could have been used as weight for digging stick or as mace head (Fig. 41).

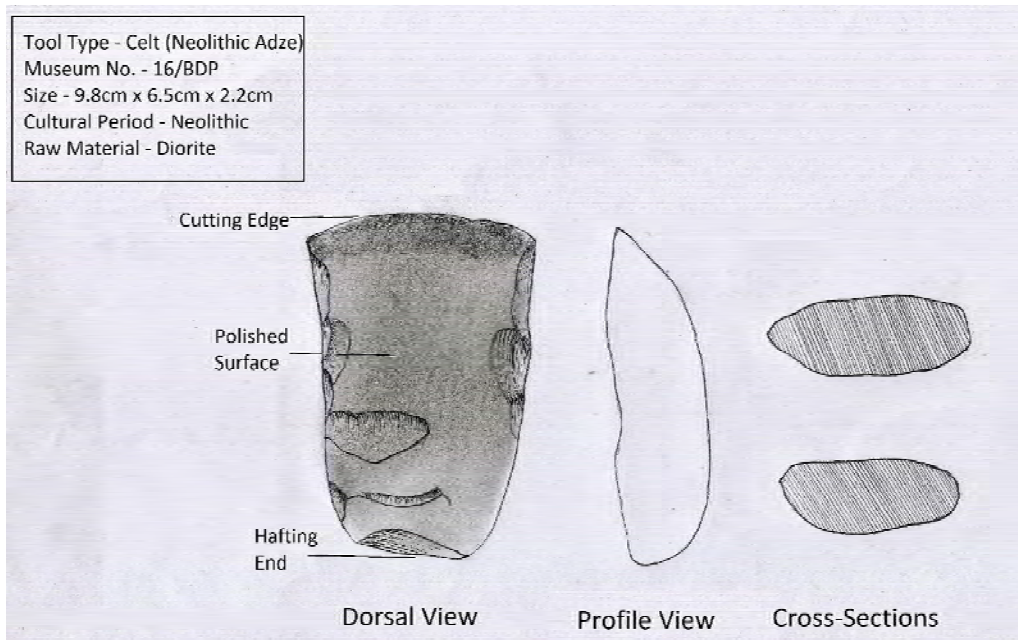


Fig. 38: Neolithic Adze (Drawn by D. K. Mondal)



Fig. 39: Neolithic Adze (Photo by D. K. Mondal)

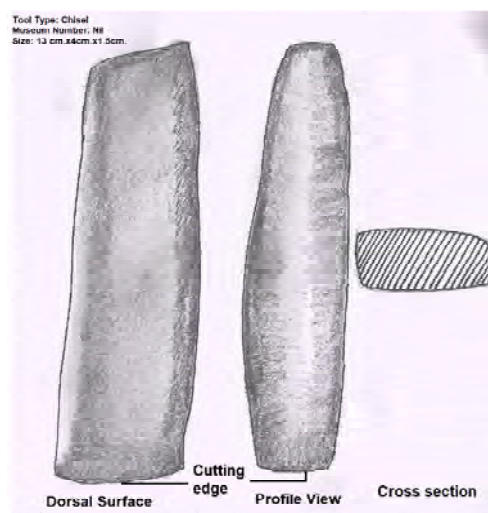


Fig. 40: Chisel (Drawn by D. K. Mondal)



Fig. 41: Ring Stone (Photo by D. K. Mondal)

ANNEXURE

SAMPLE DESCRIPTION OF SOME REPRESENTATIVE TOOLS

- **Description of tool (Fig. 17, 18)**

Museum No: R-3

Locality: Soan valley, Pakistan

State of preservation: Fresh

Measurement of the tool: 10.2 cm.x11cm.x8cm.

Shape of the tool: Oval

Type of raw material: Quartzite

Form of raw material: Pebble Core

Dorsal surface: It is a large chopping tool on pebble. Deep, broad, primary flake scars are present on the anterior part forming a sharp and zigzag cutting edge. Pebble cortex is present at the butt end.

Ventral surface: Ventral surface is flaked by primary flakings at the anterior end. Butt end is unflaked and smooth.

Cross section: Biconvex

Tool type: Bifacial chopper

Technique: Block-on-Block

Probable function: It could have been used in cutting of wood and smashing or cracking of the animal bone for marrow and the hard shell nuts.

Probable cultural stage: Lower paleolithic period

- **Description of tool (Fig. 19, 20)**

Museum No: Nil

Locality: Not mentioned

State of preservation: Fresh

Measurement of the tool: 7.9 cm.x11cm.x4.3cm.

Shape of the tool: Pear shaped

Type of raw material: Quartzite

Form of raw material: Core

Dorsal surface: Large and irregular flake scars on the surface with cortex on the butt.

Ventral surface: Ventral surface with irregular and primary flake scars

Cross section: Medial cross section is oval and plano convex at the butt end

Tool type: Abbevillian Hand Axe

Technique: Stone Hammer, Block-on-block

Probable function: Multipurpose, digging, cutting and scraping

Probable cultural stage: Lower paleolithic Period

- **Description of tool (Fig. 21, 22)**

Museum No: C.U.-Anth/01

Locality: Not mentioned

State of preservation: Fresh

Measurement of the tool: 17cm.x9cm.x5.6cm.

Shape of the tool: Almond (Amygdaloid)

Type of raw material: Quartzite

Form of raw material: Core

Dorsal surface: It is entirely flaked by a number of primary and secondary flake scars. Secondary flake scars are present at the lateral margins of the tool. Two lateral margins converge to the anterior end which forms a sharp and pointed working end.

Ventral surface: Ventral surface is also entirely flaked by primary flake scars. Secondary flake scars are also found.

Cross section: Biconvex

Tool type: Acheulian Hand Axe

Technique: Cylinder hammer

Probable function: It is a multipurpose tool used for digging, cutting as well as hunting after hafting with a shaft.

Probable cultural stage: Lower Paleolithic Period

- **Description of tool (Fig. 23, 24)**

Museum No: ODP-M.D. 7-70

Locality: Attirampakkam, Madras

State of preservation: Fresh

Measurement of the tool: 16.1 cm.x12cm.x4 cm.

Shape of the tool: U shaped

Type of raw material: Quartzite

Form of raw material: Core

Dorsal surface: The dorsal surface is entirely flaked by primary flake scars. Cleaver facet is at the interior part of the tool which form a broad cutting edge. Secondary flake scars are found at the lateral margins of the tool. Butt end is 'u' shaped.

Ventral surface: Ventral surface is flaked by both primary and secondary flake scars.

Cross section: Quadrangular

Tool type: Cleaver

Probable Technique: Controlled flaking

Probable function: It was probably used for cleaving i.e. chopping or splitting objects such as trunk of trees and skinning large games.

Probable cultural stage: Lower paleolithic period

- **Description of tool (Fig. 25)**

Museum No: Nil

State of preservation: Fresh

Measurement of the tool: 12.3 cm.x4.4cm.x0.9 cm.

Shape of the tool: Quadrangular

Type of raw material: Quartzite

Form of raw material: Flake

Dorsal surface: Dorsal surface is entirely flaked with primary and secondary flake scars. Retouches are found at the left lateral margin of the tool which form a sharp and straight cutting edge.

Ventral surface: Ventral surface of the tool is main flake surface. There is striking platform and positive bulb of percussion at the posterior end of the tool. Few secondary flake scars are found at the lateral margins.

Cross section: Biconvex

Tool type: Side scraper

Probable technique: Clactonian

Probable function: Side scraper probably used for scraping wood or processing of meat.

Probable cultural stage: Middle Paleolithic period

- **Description of tool (Fig. 26)**

Museum No: Nil

State of preservation: Fresh

Measurement of the tool: 5.4 cm.x3.6cm.x0.7cm.

Shape of the tool: Quadrangular

Type of raw material: Quartzite

Form of raw material: Flake

Dorsal surface: Dorsal surface is entirely flaked with primary and secondary flake scars. Secondary flake scars are found at the interior margin of the tool which form a sharp cutting edge.

Ventral surface: Ventral surface of the tool is main flake surface. There is striking

platform and positive bulb of percussion at the posterior end of the tool. Few secondary flake scars are found at the anterior margins.

Cross section: Biconvex

Tool type: End scraper

Probable technique: Levalloisian

Probable function: End scraper was probably used by holding the ventral surface facing upward for wood work and softening of skin.

Probable cultural stage: Upper Paleolithic period

- **Description of tool (Fig. 28)**

Museum No: Nil

Locality: Not mentioned

State of preservation: Fresh

Measurement of the tool: 6.5 cm.x3.2cm.x0.6cm.

Shape of the tool: Leaf shaped

Type of raw material: Quartz

Form of raw material: Flake

Dorsal surface: It is a flake tool. Two lateral margins are sharp tapering towards anterior part forming a pointed working end. Mid ridge is present at the medial axis of the tool.

Ventral surface: Ventral surface of the tool is main flake surface. There are striking platform and positive bulb of percussion at the posterior end of the tool. Few secondary flake scars are found at the lateral margins.

Cross section: Biconvex

Tool type: Point

Probable technique: Levalloisian

Probable function: Point was used as missile weapon after hafting with a shaft.

Probable cultural stage: Middle Paleolithic period

- **Description of tool (Fig.33)**

Museum No: Nil

Locality: Not mentioned

State of preservation: Fresh

Measurement of the tool: 5.7 cm.x1.4cm.x0.3cm.

Shape of the tool: Irregular

Type of raw material: Chert

Form of raw material: Blade

Dorsal surface: It is made on blade. The burin edge is made by the intersection of two planes met at an acute angle. Retouchings are found at the posterior end.

Ventral surface: Ventral surface is entirely flaked by shallow flake scars.

Cross section: Biconvex

Tool type: Burin

Probable technique: Punch and fluting.

Probable function: It is a multipurpose tool. The chisel like tip was very useful for engravings.

Probable cultural stage: Upper Paleolithic period

- **Description of tool (Fig. 35)**

Museum No: Nil

Locality: Not mentioned

State of preservation: Fresh

Measurement of the tool: 2.7cm.x0.8cm.x0.1 cm.

Shape of the tool: Semi lunar

Type of raw material: Chert

Form of raw material: Blade

Dorsal surface: The arc is the cutting edge and is straight. Arc of the semicircle is retouched.

Ventral surface: It is main flake surface

Cross section: Triangular

Tool type: Lunate

Probable technique: Fluting and pressure.

Probable function: It was used as one unit in the composite tool after hafting in a shaft.

Probable cultural stage: Mesolithic

- **Description of tool (Fig. 38, 39)**

Museum No: 16/BDP

Locality: Baidyapur, Odisha

State of preservation: Fresh

Measurement of the tool: 9.8 cm.x6.5 cm.x2.2cm.

Shape of the tool: Trapezoidal

Type of raw material: Diorite

Form of raw material: Core

Dorsal surface: Chipping, pecking and grinding all over the surface. Cutting edge is slightly convex and butt is squarish. Beveeling near the working edge.

Ventral surface: Chipping, grinding and polishing present. The surface is flat making asymmetrical bevelling at the working edge.

Cross section: Biconvex

Tool type: Neolithic adze

Probable technique: Pecking, grinding and polishing

Probable function: Wood working and digging soil for horticulture

Probable cultural stage: Neolithic

7. SUMMARY

Man is the only animal who can make and use tools. Man's capacity for producing tools lies in his biology. With biological evolution man's capacity for making tool developed, simultaneously tools also developed. Prehistoric period is the longest period in human history. Prehistoric culture is divided into subsequent chronologically evolved stages, Palaeolithic, Mesolithic and Neolithic stages. Tool making technology begins with breaking of stones to get sharp edges, to perform certain functions. Technology is divided into direct percussion, indirect percussion, punch and pressure flaking. Tools produced are core tools, flake tools, blades and bladelets. The bladelets are also known as microliths. Neolithic period needed heavy equipments like axe and adze. Technique of manufacture changed to chipping, pecking, grinding and polishing. A student of prehistory needs to identify and record tools. For this systematic and scientific drawing of tools are necessary. There are a few standard tools of each of the prehistoric stages, which needs to be drawn, analysed and identified. This involves practical work in prehistory.

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