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Indira Gandhi National Open University
School of Social Sciences

BHIC-102

Social Formations and Cultural Patterns of the Ancient World

'' शिक्षा मानव को बन्धनों से मुक्त करती है और आज के युग में तो यह लोकतंत्र की भावना का आधार भी है। जन्म तथा अन्य कारणों से उत्पन्न जाति एवं वर्गगत विषमताओं को दूर करते हुए मनुष्य को इन सबसे ऊपर उठाती है।''

–इन्दिरा गांधी

" Education is a liberating force, and in our age it is also a democratising force, cutting across the barriers of caste and class, smoothing out inequalities imposed by birth and other circumstances."

– Indira Gandhi

BHIC-102

SOCIAL FORMATIONS AND CULTURAL PATTERNS OF THE ANCIENT WORLD

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Guidelines for Study of the Course

In this Course we have followed a uniform pattern for presenting the learning material. This starts with an introduction to the Course underlining the significant developments in chronological order and covers 6 major themes with coverage of 15 sub-themes or Units. For the convenience of study, all the Units have been presented with a uniform structure. Objectives as the first section of the Unit have been included to help you find what you are expected to learn from the study of the Unit. Please go through these objectives carefully and keep reflecting and checking them after studying a few sections of the Unit. Introduction of the Unit introduces you to the subject area covered and guides you to the way subject matter is presented. These are followed by the main subject area discussed through sections and sub-sections for ease of comprehension. In between the text, some check your progress exercises have been provided. We advise you to attempt these as and when you reach them. These will help you assess your study and test your comprehension of the subject studied. Compare your answers with the answer guidelines provided after the summary. The key words and unfamiliar terms have been provided at the end of each Unit, which have been marked in bold in the text. At the end of each Unit under Suggested Readings we have also provided a list of books and references. These include sources and books which are useful or have been consulted for developing the material for the concerned Unit. You should try to study them. We have also included instructional videos for an enhanced understanding by the students. Please try to watch these videos, they will help you in understanding and learning the subject matter in an all-inclusive manner.

COURSE INTRODUCTION

Origins of humans is as momentous a process as the very origin of life. However, we, the *homo sapien sapiens*, as biological specie, are very different from our 'primate cousins'. In this course we propose to study the saga of this transformation as well as the leap of humans from hunter-gatherers to empire builders, their remarkable interaction with the nature and environment. The contribution of all humans spread over the regions took forward the story of this evolution and credit cannot be given to one or the other region or group of people. Thus, this Course should be seen as the history of humanity rather than that of individual societies and specific regions.

The Course starts with a detailed discussion on how we get to know the story of human evolution. Here sources of our knowledge have been divided into two major parts. One, generally referred to as prehistory which is the period for which we do not have any written sources. Second, where we start getting the written records also along with other sources. Following this, we shall proceed to identify the phenomenon of human evolution. A broad understanding of human past begins with tracing the trajectory of human evolution. Changes in the climatic conditions led to better adaptability and emergence of bipedalism amongst species *homo*. The modern humans evolved, passing through many stages in more than a million years, some 40,000 years ago named *homo sapiens*. The human evolution was marked by not just biological changes but cultural changes as well. Diverse cultures were witnessed in different parts of the world during the Palaeolithic (2.5-0.01 MYA[1]) and Mesolithic (11,500-5000 BP[2]) periods in history. From making simple Oldowan tools (the oldest stone tool technology, named after Olduvai Gorge in Tanzania) the humans began to produce fine tools. From scavenging they evolved as expert hunter-gathers. These developments led to the transformation of hunting-gathering society to the complex food producing economies of the Neolithic period (*c*. 12,000-3500 BCE).

Such a transition was not uniform at all the places and did not involve identical practices and patterns. For instance, there was diversity in the nature of agricultural practices in West Asia and in Mesoamerica, China and Europe. One of the basic stage for the beginning of agriculture was the domestication of plants and animals. Although production of food was not the reason behind this transition in all regions. The explanations for the origin of agriculture is debated amongst historians with no single reason gaining consensus. The impact of agriculture is considered by some experts as having such huge implications that they consider it as 'Neolithic Revolution'. Varied patterns of material culture such as aesthetics in pottery designs, styles of weaving and metallurgic techniques emerged across different regions of the world. These trends promoted economic contacts amongst people, thereby encouraging interactions and cultural exchanges in addition to material exchanges. Thus, leading to the emergence of complex social formations and civilizations.

For ease of understanding and comprehending the social formations and cultural patterns of the Ancient World, the Course is divided into six *themes* and the themes are further divided into 15 *sub-themes*. Each sub-theme is presented as a Unit or a Chapter.

The Course begins with **Evolution of Human Kind (Theme I)** which gives an explanation of the central concern of historical research i.e. knowledge of the past. The attempt here is to provide a clear understanding of prehistory, protohistory, the earliest recorded history and various branches of modern knowledge of human past, especially the branches of archaeology and anthropology. Prehistory or the prehistoric period

[1] Million Years Ago
[2] Before Present

refers to the historical time-period when there was no writing or engagement with written records. The many procedures that are followed to gain insights on the process of human evolution and their cultures include analysis of artefacts and features found during an archaeological exploration. Besides these, the different dating methods, their merits and limitations are also elaborated. The field of archaeology has progressed in recent years. With the help of scientific technologies such as Seismic Methods investigation of submerged sites has also become possible. Thermoluminescence as a dating method is significant for understanding prehistoric cultures which practiced pottery-making (**Unit 1**).

Biological evolution of humans is dealt in the **Second Unit** of the course. The Unit deals in detail with the pre-Darwin theories of evolution that included the evolutionary thought ranging from Greek theories of spontaneous generation, theories of medieval times, to the theories of organic evolution. During the mid-nineteenth century, Charles Darwin defined evolution in his work *Origin of Species*. This most influential theory of evolution was taken forward by Neo-Darwinists who supported the concept of natural selection. The breakthrough in the history of human evolution was achieved with the discovery of fossil records which ascertained the similarities and differentiation of humans from apes. A number of species of humans inhabited different parts of the world till the modern humans evolved and other species gradually became extinct. These are *Homo sapiens* or 'wise human' – the species to which the modern humans belong. Therefore, all these theories of evolution in addition to the evidence unearthed by paleoanthropologists have led to a comprehensive understanding of the trajectory of human evolution that spanned a time-period extending from 6,000,000 years ago to 40,000 years ago.

The beginning of human evolution is associated with the cultural evolution which is discussed in the next **Unit (3)**. It focuses on cultural patterns ranging from tool making cultures to art forms that had emerged in the world, especially in Europe and West Asia. The first of these stages of human development was the Palaeolithic Culture or Old Stone Age. It covers the time-period from around 2.5 million years ago to the time when humans were making stone tools of specific type. The Mesolithic Period or Middle Stone Age, which is generally understood as a prelude to Neolithic Period, on the other hand was marked by reduction in tool size and striking climatic changes. It was characterized by the microlithic tools and an intensification of food gathering strategies. The Mesolithic Period is the best manifestation of cultural adaptation of humans to a more sedentary existence based on early domestication of plants and animals. Thus, the Palaeolithic and Mesolithic period provided the foundation to the human society and paved the way for transformation of hunting-gathering-scavenging cultures to the food producing society of the Neolithic Period.

The food procurement strategy of hunter-gatherers underwent a change towards the end of the Pleistocene epoch or Last Ice Age (**Theme II**). In the early Holocene epoch, there were drastic environmental changes that triggered changes in world geography and affected vegetation patterns. Thus, in order to cope up with these changes and deal with the food shortages, the humans broadened their diet and became dependent on a broad-spectrum economy consisting of specialized hunting, seasonal gathering, fishing and other activities. In many parts of the world people were exploring new ways of acquiring food. One of the prerequisites for the beginning of agriculture was the process of domestication of plants and animals, which has been dealt in **Unit 4** of the Course.

It is very difficult to arrive at the exact nature of the origin of agriculture as there is no single theory for the beginning of agriculture that has been accepted by historians. Although the how and why of the Neolithic transition remains among the intriguing questions of prehistory, by about 6000 BCE substantial proportion of the world

population was pursuing pastoral and farming activities on a regular basis. Due to its revolutionary significance, many scholars have termed the beginning of agriculture as Neolithic Revolution. One needs to remember that not every hunting gathering economy led to the domestication of plants and animals. Many sites reveal that there could be repeated settlements in the same region without full-blown agriculture being practiced (**Unit 5**).

Though climate change did not induce agriculture, but it was one of the crucial factors that forced migratory trajectories at many places. Among other factors were the need to support large population and intensification of food procurement strategies. Many changes were witnessed such as new and sophisticated tool kit, changing housing patterns, other architectural constructs like flood control works, diversified human interference with nature, dependence on irrigation, elaborate village settlements, unique pottery styles, local adaptation of ideas, and regular exchange relations between regions. CatalHoyuk, Anatolia, is the largest and one of the most prominent of the late Neolithic sites.

The transition to agriculture was a prerequisite for the emergence of complex societies and civilizations. It encouraged a more rigorous attitude towards nature and neighbouring human communities. To begin with, it had significant impact upon human physiology. The human diet became more diversified and cereals became an important component of their food regime. This stimulated long-distance trade and led to the introduction of ceramic pottery. Significant changes in the human skull, jawline and life-span were witnessed with many periodontal diseases being caused as a negative consequence. There was a consequent growth in qualities of observation and questioning faculties among the humans. With dependable supplies of grain at hand and augmented carrying capacity of land, settled agricultural populations tended to register an upsurge. Differentiation of roles was also enabled in the farming societies.

New concerns of order and dispute, kinship ties, distribution of resources and workload surfaced. Such contestations explain the presence of fortifications in many Neolithic villages. Similar restructuring was visible in the field of belief systems and religion. New forms of worship of fertility cults and ancestor worship amongst early village communities were noticed. For example, ceremonial structures were found at the site of Gobelki Tepe in present-day Turkey. Noteworthy alterations in the material culture were also evident such as pottery, weaving and metallurgy. Pottery, among other features of material refinement, is a crucial archaeological artefact in the identification of a culture and related facets. Exchange of such commodities of production eventually promoted the diffusion of copper (usually in the Chalcolithic Period) and bronze metallurgy across the major sites of Neolithic period (**Unit 6**).

In the trajectory of human usage of materials right from using stone, followed by copper-bronze and eventually with the shift to iron. 'Bronze Age' signified a time-period in human history when bronze was used extensively for making tools. The term Bronze Age is not limited to just the material use by humans, it is also associated with a certain kind of social formation known as civilization. 'Civilization' is a stage of social development which is characterized by features such as writing system, art forms, craft and tool techniques, and belief systems. These features, manifested as regularities over a large geographical area, are known as 'cultures'.

Cultures were similar collections of artefacts in assemblages from a particular geographical area over a stretch of time. It needs to be remembered that not every region of the world went through Bronze Age but several civilizations did exist in time. We have discussed general features of Bronze Age Civilizations but specific study of only Egypt and China has been undertaken in this theme (**Theme III**).

The Bronze Age civilizations were marked by developed writing forms: the Cuneiform style in Mesopotamia, Hieroglyphs in Egypt and Oracle Bone Writings in China.The Bronze Age Civilizations were marked by levels of social stratification as apparent in the burials and writings recovered. Their settlements were largely along the river valleys and existed from roughly the fourth to the second millennium BCE. Urbanism constituted one of the major features of these civilizations to such an extent that Gordon V. Childe has termed this development as the Urban Revolution. The locale of the Bronze Age was the city. Craft specialization lent mobility to the people. Agricultural productivity was also dependent upon the technology of ploughing. In the absence of a monetary economy, high levels of specialization were achieved through the systematic labour appropriation. Much of this information is assessed through the myths and stories that were recorded then. There appears to be a strong correlation between wealth, power and prestige in these societies. Rulers emerged as autocratic personalities who had appropriated both secular as well as sacred authority. Competencies among the city-states led to the emergence of secular power centres (**Unit 7**). The magnificent pyramids constructed during the Bronze Age in Egypt are still considered to be one of the wonders of the world and at the same time as the symbol of great exploitation as these were built through slave labour. The presence of maritime trade and sea faring activities of the Egyptians are documented in their paintings of ships and boats (**Unit 8**). At the same time, another distinctive Bronze Age culture which got flourished was in the region of China (**Unit 9**). The unique and unvarying bronze casting technology and unearthing of the largest collection of bronze objects from here have been the marvel of technology. The legacy of the Shang as a formative period in Chinese civilization justifies the study of this Bronze Age civilization during the journey of this Course.

The emergence of Iron Age (**Theme IV**) is contemporaneous with the decline of Bronze Age cultures and coming of nomadic groups. Unlike bronze which was an elite metal alloy, the use of iron had a greater impact on society due to its easy availability in most of the regions. The shift to iron as a metal of choice is considered by some scholars to be as significant in human history as the domestication of plants and animals.The knowledge of iron smelting and its strength is said to have democratized agriculture, industry and warfare. Early iron objects were accidental by-products with the know-how of smelting developing over a period of time (**Unit 10**). Later, the Greeks and Persians employed iron for the purposes of construction. Thus, iron emerged from being a precious metal to a metal of common use. Another crucial development during this period was the domestication of horse and the introduction of chariots with spoked wheels. Therefore, during the Iron Age in addition to the introduction and spread of iron technology, manifold increase in extension of cultivation with increased agricultural production was an important feature. This along with emergence of a horse riding warrior class, money, trade and new towns transformed the society.

The **Eleventh Unit** discusses the major nomadic groups of Central and West Asia roughly from seventh century BCE. In the case of Central Asia, its environmental reasons, along with foraging eventually paved the way for the establishment of Nomadic Empires. Horse riding emerged as one of the factors that facilitated the domination of nomads in the region for several centuries. The horse and their peculiar tents based on principles of social hierarchy, known as *yurts*, lent them ease of mobility. In the sixth and seventh century, the Hephthalites were the most powerful nomadic group of Central Asia. However, by the tenth and eleventh century, several powerful states including that of Samanids, Seljuk Turks and Khwarezmid Empire had emerged powerful in this region. These nomadic groups shared a relationship of cooperation and conflicts with their neighbouring sedentary communities. With the use of weapons, the former gained

supremacy over the latter. The interior of the Arabian Peninsula, Southern Syria and Iraq was occupied by the Arab nomads, called the Bedouins. The origin of Bedoiuns is a subject of contestation amongst the scholars. Their relationship with the Sleybs of Arabia has been discussed in detail in the **Unit 11**. The nomadic groups of West Asia and Eurasia were acquainted with highly developed techniques of livestock-rearing, grazing of herds, nomadic movements and various forms of crafts and warfare. They also had a unique and highly developed social structure based on the dual system of individual ownership of herds and communal ownership of pastureland. They were usually settled near the oasis, i.e. in vicinity of the settled agriculturalists. The nomads lived under the leadership of their chiefs who possessed a great deal of power over their fellow tribesmen. Nomadic cultural life presented itself with rich colours. Though certain nomadic groups, like Mongols, consolidated their power and formed nomadic empire.

The new political formation known as the Empire, thus, originated in the region of West Asia (**Theme V**). These empires were mostly monarchical in nature, functioned through the collection of tribute and comprised of people having kinship ties amongst themselves (either due to their ethnic background or tribal linkages). These expansive empires necessitated foundation of organized systems such as taxation systems, elaborate bureaucratic and legal systems, and a standing army. The Babylonians of Mesopotamia initiated the process of empire formation, followed by the Hittites and the Assyrians. These empires served as a model for various subsequent empires that arose in the region and elsewhere (**Unit 12**).The next **Unit (13)** deals with the Sassanid Empire, its growth and consolidation, administrative institutions, social organization, economy and urbanization, religion and culture of the empire. The period of Sasanian empire is considered to be the Golden Age of pre-Islamic Iranian empire. The trajectory of the empire is generally said to have begun around the fourth and third century BCE when its foundation was laid. This was followed by a period of decline wherein the Hephthalites invaded the region. Under the rule of Khusrau (who introduced many reforms in various systems of governance in the empire), the empire attained great heights and witnessed multiple rulers in succession. Finally, the Arabs moved into the region marking the decline of the empire.

The last **Theme (VI)** of the Course covers the Greek Civilization: its geographical extent; diverse sources; social, political and economic aspects of Greek society. Other important aspects covered in the Unit are urbanism; material culture; Greek world view; nature of democracy; the existence of slavery; and its legacy. The Greek Civilization of ancient world was a shifting geographical entity with the Mediterranean Sea at its core (**Unit 14**). In the age of empire formation, the Greek society remained a collectivity of independent city-states (such as Athens and Sparta) that constituted a civilizational unity. With the collapse of Mycenaean Civilization, the so-called 'Dark Age' commenced with disappearance of long-distance trade, decline in economy, destruction of cities, and disruption of social life.

The Greek society,with all its rational and civil buoyance, was essentially a slave society along with other forms of labour in co-existence. There existed a unique relationship between town and countryside. The economy was based on strong trading network, especially coastal trade with no city-state extending beyond twenty-five miles inland. There were frictions between the landed class and peasantry. Women were subordinated. They were not considered citizens and could not participate in the political realm. The Greek city-states or *polis* were a mix of monarchy, oligarchy and democracy as institutions of governance.

The last **Unit (15)** of this course provides an in-depth analysis of the Greek cultural developments, distinct from the preceding Unit wherein the social basis of Greek democratic polity was discussed. The Greek philosophers provided richness to the Greek cultural traditions. They were aware of the contributions of the East rather than the indigenous developments alone in its prosperity. Many thinkers emerged during the long era, the most famous of them known today being Socrates, Plato and Aristotle. Aristotle, considered as the Father of Western Philosophy, contributed works in zoology, physics, metaphysics and politics, among other fields. Greek medicine and science, thus, opened up new avenues of knowledge storehouses. It is the Greeks who are credited with founding the basic elements of what we refer today as historiography. Herodotus is considered as the world's first historian. Thucydides, on the other hand, is credited with writing the first scientific history.

Greek philosophy explored explanations to fundamental natural phenomenon. They speculated the rationality and workings behind these phenomenon. With this rationality, it became possible to challenge the religious and mythical beliefs. Through the Dark Ages, Archaic and Classical Greece, public rituals became more elaborate with huge temple complexes serving as community spaces. For example, the temples at Delphi and Olympia. The city-states are said to have been held together by the myths and stories adored across the region. The Greek literature carried didactic expressions of universal values. Epics like Homer's *Iliad* and *Odyssey* described in detail not only the society of that time, but also the perceptions of human life held by the author. The realm of art, architecture and sculpture travelled from the collective to the individual. With the celebration of human prowess, physical strength and sports eventually became an essential part of their lives. The modern-day Olympic dates back to the Ancient Greece.

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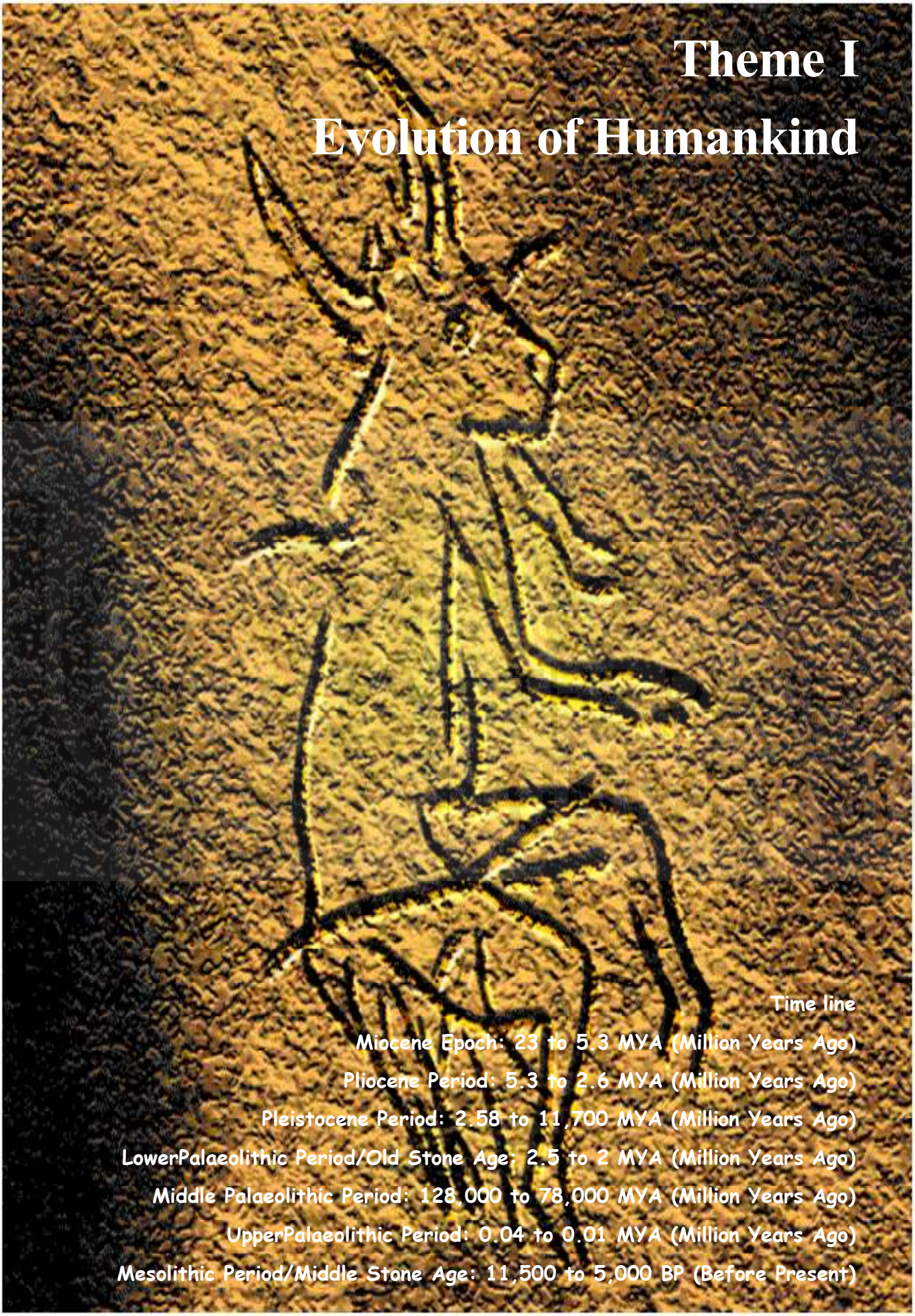
Theme I

Evolution of Humankind



Time line

Miocene Epoch: 23 to 5.3 MYA (Million Years Ago)

Pliocene Period: 5.3 to 2.6 MYA (Million Years Ago)

Pleistocene Period: 2.58 to 11,700 MYA (Million Years Ago)

LowerPalaeolithic Period/Old Stone Age: 2.5 to 2 MYA (Million Years Ago)

Middle Palaeolithic Period: 128,000 to 78,000 MYA (Million Years Ago)

UpperPalaeolithic Period: 0.04 to 0.01 MYA (Million Years Ago)

Mesolithic Period/Middle Stone Age: 11,500 to 5,000 BP (Before Present)

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Photograph: Paleolithic cave painting in Dordogne, France.
Credit: Locutus Borg, 2007
Source: https://upload.wikimedia.org/wikipedia/commons/7/74/Gabillou_Sorcier.png

UNIT 1 PRE-HISTORY AND SOURCES*

Structure

1.1 Objectives

1.2 Introduction

1.3 What is Prehistory?

1.4 Branches of Knowledge on Prehistory

1.5 An Introduction to Archaeology

1.6 Sources and Methods of Archaeological Research

1.7 Dating Methods in Archaeology

1.8 What is Anthropology?

1.9 Branches of Anthropology

1.10 Summary

1.11 Key Words

1.12 Answers to Check Your Progress Exercises

1.13 Suggested Readings

1.14 Instructional Video Recommendations

1.1 OBJECTIVES

In this Unit, we will discuss about **Prehistory** and its sources. The period of history for which there are no written records is generally referred as Prehistory. After going through this Unit, you would be able to:

- Define the meaning of prehistory;
- Outline the difference between prehistory, **protohistory** and history;
- Identify the sources on prehistory;
- Identify the main branches of research on prehistory;
- Explain the meaning and methods of archaeological research;
- Discover the meaning and methods of anthropological research;
- Distinguish between archaeology and anthropology; and
- Discover the new developments in research on prehistoric period.

A study of prehistory and its sources is important to comprehend the nature of the past where there was no written documentation. This will also help you to identify and compare the transition from prehistory to the historical period.

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1.2 INTRODUCTION

The recovery of knowledge of the past is the central concern of historical research. In this Unit we will journey back to prehistory the period of human evolution and activities before the availability of written records. Prehistory is now recognised as a vast field of human experience. It gained serious academic recognition particularly from the publication of Charles Darwin's seminal works – *On the Origin of Species by Means of Natural Selection* in 1859 and *Descent of Man* in 1871 wherein the fossil record of human origins and the worldwide evidence of the origins of civilization was documented remarkably. Since then, significant research and methods have been developed to recover knowledge on prehistory. This Unit will discuss the major characteristics, sources and significant branches of research on prehistory.

1.3 WHAT IS PREHISTORY?

Prehistory, also called the prehistoric period, refers to the period extending back when there was no writing and no engagement with written documentation. The beginning of prehistory is indicated with the origin of the earliest representatives of genus Homo (comprising the modern humans and the group of their close extinct ancestors – detailed in Unit 2 of this course). This evidence is currently dated between 5-2 million years before present (BP) in Africa, approximately one million years ago in Europe and Asia, an estimated 40,000 years BP in Australia, and even less in America.

BEFORE PRESENT (BP)

- This dating scale originated after the invention of Radio Carbon dating method in the late 1940's (See Section 1.7).
- *c.*1950 is used as the reference point to indicate 'the present' in this method of dating scale.

The term 'prehistory' originated from the phrase *périodе anti-historique* which was coined by French archaeologist Paul Tournal in 1833 to refer to the period of human history before the emergence of written documents (Grayson, 1983). The French phrase shrank to 'prehistory' and was first used in 1851 by Daniel Wilson in his seminal book *The Archaeology and Prehistoric Annals of Scotland*.[1] The term 'prehistory' was initially coined to indicate the period during which humans were the contemporaries of animals now extinct, the remains of which were found by **geologists** (scientists who study the solid and liquid matter that constitutes the Earth) and **palaeontologists** (scientists who study fossils) in old geological deposits. Prehistory now encompasses the entire span of human cultural evolution before written documentation that extends back at least 2.6 million years. In the absence of written records from this period, **artefacts** or material remains form the primary source of understanding prehistory. The material remains are available mostly in the form of stone tools, the remains of animals, human fossils, biofacts and cultural landscapes, more on which is detailed in the later Sections of this Unit.

It is important to learn here that between prehistory and the earliest recorded history, researchers have identified a transitory period which is termed as protohistory. The term protohistory was coined to denote the period in a culture that occurred immediately before its recorded history begins. Protohistory is also used to indicate the history of a people or of a region in a period during which the people or the region's inhabitants were still illiterate but were written about in the texts of neighbouring peoples who were

[1] The term 'prehistory' was however given wider coverage by Sir John Lubbock in his *Prehistoric Times: As Illustrated by Ancient Remains, and the Manners and Customs of Modern Savages*, published in 1865 (London and Edinburgh: Williams and Norgate).

more advanced and already literate. For example, in the 4th century BCE, the Celtic tribes were written about by Greek and Latin historians while the tribe was still illiterate (*History of Humanity*, I: 95). The term 'protohistoric' is often also used for populations whose writing has not been understood so far (e.g. the language of the Etruscans, the ancient Italic people and the Harappans).

1.4 BRANCHES OF KNOWLEDGE ON PREHISTORY

The study of the evolution and development of the modern human has remained a central concern of many branches of modern knowledge. Different branches of the physical and biological sciences, medical sciences, linguistic studies, fine arts and the social sciences, to name a few. All these areas of study work upon with diverse methodologies to arrive at the knowledge of the human past. As the narration of all these fields and the nature of the sources they work upon is too vast to be covered in this Course, we will primarily confine the discussion here to two fields of social sciences – Archaeology and Anthropology. The Unit will elaborate the sources and research methods of these two fields to provide you with insights on the process of human evolution and their cultures.

1.5 AN INTRODUCTION TO ARCHAEOLOGY

Archaeology is a field of inquiry that provides the knowledge of the past through a study of the material remains. The oldest roots of the study of prehistory is to be sought in the activities of *antiquaries* (people, mainly elites, who collected antiques). The *antiquaries* paved way for the emergence of classical archaeology around the 14th – 15th centuries in Europe during the period of Renaissance (14-17th centuries CE) and Humanism (emerged in late 14th century CE).

Archaeology delves back into the time before written languages existed through an analysis of things made and left behind by the humans in the past. Through an analysis of such materials, archaeology provides us with a glimpse of the lives of people in the past. Archaeology is however not confined to providing knowledge of prehistory. It is in fact the only field of study that covers all time periods and all geographic regions inhabited by humans. With the developments in archaeological methods of research, archaeology informs us about the lives of individuals, families and communities that for lack of documentary evidence could have remained invisible.

1.6 SOURCES AND METHODS OF ARCHAEOLOGICAL RESEARCH

Artefacts or material remains from the past form the primary source of archaeological research on prehistory. An artefact is 'any portable object used, modified, or made by humans' (Renfrew and Bahn, 2008: 578). Artefacts come in many forms, such as those listed below:

a) crude or finely made tools of stone, bone and other remains which may be thousands or even millions of years' old

b) durable pot fragments of clay and stone vessels used by early farmers

c) bones and their fragments

d) wooden artefacts

e) textiles

Figure 1.1 : Prehistoric stone tools
found in Les Combarelles cave, in Les Eyzies de Tayac, Dordogne France.
Dated near 12,000 - 10,000 BP.
Credit: Semhur, 2009
Source: https://upload.wikimedia.org/wikipedia/commons/5/5f/Prehistoric_Tools_-_Les_Combarelles_-_Les_Eyzies_de_Tayac_-_MNP.jpg

Figure 1.2 : Prehistoric cave paintings from Lascaux, Dordogne, France
Dated over 17000 BP
Credit: Prof. Saxx, 2006
Source: https://upload.wikimedia.org/wikipedia/commons/1/1e/Lascaux_painting.jpg

Non-portable artefacts called 'features' are also important sources of information on archaeological sites. Features include things like soil stains that indicate where a storage pit, garbage dump, structures, or fences may have once existed. Similarly, biofacts (also called ecofacts) or natural remains found on archaeological sites also help archaeologists to understand the past. Biofact primarily include organic remains of animals and plants such as animal bones, pollen seeds and wood which particularly help in

determining the diet, food habits and subsistence patterns of the people. The availability of one or more kind of material remains on a site depends on the natural preservation conditions, viz. the climate and environment, of a region. Everything found on the site is however of relevance for the archaeologists as each provides an indication to human behaviour in the past. Reconstructing this behaviour from fragmentary records requires great scientific skill, insight, and creativity. For this purpose, archaeologists follow a series of research steps that are highlighted in the box that follows.

Steps of Archaeological Exploration

1) **Research**: to identify a site and by reading previous research, if any, understand the worth of a site for exploration. At this level, the archaeologist is primarily interested in the spatial aspect.

2) **Land Reconnaissance**: personal investigation of the field to find groupings/clusters of artefacts. This method is also followed to locate a site. Once at site, identify landmarks that indicate human presence and activity.

3) **Test Pitting**: in this step the excavators do a thorough survey of the site to locate the spot of maximum artefacts which is taken to indicate the heart of the site wherein full **excavations** (unearthing or digging a site) are begun.

4) **Full Excavation**: the entire site is excavated and alongside the archaeologists draw maps, take measurements and collect artefacts. The process also involves cleaning, sorting, counting and drawing samples of artefacts found.

   It is important to note here that the artefacts discovered in an archaeological deposit are always found within the context of a series of layers or strata. This constitutes what is called stratification of the site i.e. the superimposition of one layer or strata on top of the other. The study of stratification by archaeologists is called stratigraphy. The basic idea of superimposition is that in any series of undisturbed strata the bottom layers are older while the top most layers are youngest. When an archaeologist identifies the different layers of an excavated site it is called 'reading the section'. This is an important step in understanding a site and a prerequisite for its proper excavation. An archaeologist must also ascertain which layers are meaningful and chronologically viable. The identification of individual strata is based on a series of criteria such as colour of the layer, soil composition (pebbles, gravel, sand or silt), texture, cultural materials occurring within the layer, etc.

5) **Reconstruction and Cataloguing**: the archaeologists move to the lab with the artefacts where each of them is catalogued.

6) **Analysis**: this involves the scientific study of the collected artefacts. Such study then reveals one or more of the following information: age of the artefact, material of the artefact, its usage, how often was it used and so on.

7) **Reporting**: the main point of digging is to derive and spread knowledge of the past so at this stage the gathered wisdom from the artefact(s) is made available for public by way of publication or/and displaying the artefact(s) at a museum.

Partially adapted from: https://prezi.com/1plupeynwwpv/the-seven-stages-of-archaeology

For more details on excavation, see the following documentaries:

'The Excavation Process: How We Excavate' from https://www.youtube.com/watch?v=PcT1vGyJzyg

'Unearthing the Past' from http://www.egyankosh.ac.in/youtubevideo.jsp?src=P4LVNTL8egk&title=Unearthing%20the%20Past

As elaborated above, the selection of a site is the first and the most important step in archaeological research. Earlier the sites were selected based on information from oral tradition, mythological references, finds of certain items on the surface due to soil erosion or shapes of the mounds. Many important sites have also come to notice accidentally

or by chance, while digging through building construction, laying of roads, railway lines or in the process of cultivating a land. The Harappan Civilization, for instance, first came to light when some contractors who were laying a railway line nearby decided to procure bricks from the mound and exposed it. Subsequent excavations of the mound, as is well known, went on to reveal the earliest civilization of the Indian subcontinent.

In recent times, archaeologists employ many scientific methods to gather a proof or indication of human habitation on a site in past. Some of these recent archaeological methods of inquiry are:

1) **Aerial Photography**: This method involves taking of aerial photographs of a field either from an aircraft, a helicopter, a hot air balloon or with the help of a drone. Deployed with the help of highly accurate cameras, the aerial photographs are taken to record changes in the level of the ground surface. The photographs also help to record differences in the colouring of the soil (soil marks) or the development of vegetation (crop marks), which are often a result of buried archaeological remains. Owing to its nature, this method is more effective in open landscape and is not suitable for surveying a forested area. The method has been in use for archaeological research since 1919 (For examples of aerial photographs, see the photographs in Georg Gerster. 2005. *The Past from Above: Aerial Photographs of Archaeological Sites*. ed. Charlotte Trumpler. Los Angeles: Getty Publications).[2]

Figure 1.3 : Aerial archaeological photograph of the "Nazca monkey" in Peru
Credit: Maria Reiche,1953
Source: https://upload.wikimedia.org/wikipedia/commons/3/3b/Nazca_monkey.jpg

2) **Underwater Prospection or Marine Archaeology**: This method is employed to detect archaeological objects and submerged sites in marine and fresh water. The method has been particularly useful in recovering wrecks of ships. Formal systematic investigation in this field gained prominence with the availability of modern equipment and in particular by the invention of the aqualung (underwater breathing apparatus that has promoted scuba diving) by Cousteau and Gagnan around 1943. Tools such as underwater television camera and bathyscaphe (a deep sea submersible free-diving vessel) are other important instruments used for underwater surveys.[3]

[2] For more information on methods and tools of aerial photography, see, https://www.jstor.org/stable/pdf/277280.pdf?refreqid=search%3A18d0eebe497372b8716ba5ea76ed57f9

[3] For a detailed discussion on underwater and fresh water archaeology, see, https://www.jstor.org/stable/pdf/0562008.pdf?refreqid=search%3A7faa211567c6f4597417b3dfdaa2ce9b ; https://www.jstor.org/stable/pdf 20617994.pdf?refreqid=search%3A9edb4c1038d9fea98e2889501eb44e48

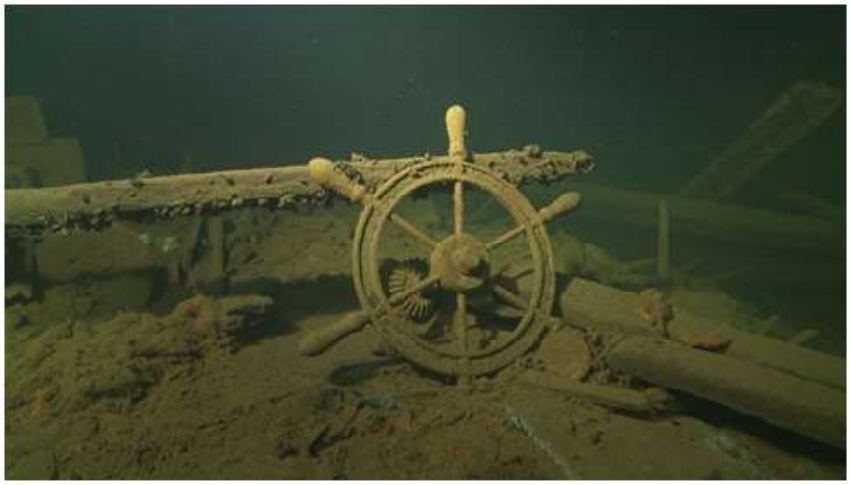

Figure 1.4 : Wreck of British steel cargo ship *E. Russ* in Estonia, North Europe.
Credit: Juha Flinkman, SubZone OY, 2013
Source:https://upload.wikimedia.org/wikipedia/commons/0/07/Kaubalaeva_%22E._Russ%22_vrakk.jpg

3) **Magnetic Survey**: This method, also known as magnetometry, involves a geophysical survey technique which helps in detecting and defining areas of past human activity. This is done by way of mapping spatial variations and contrast in the magnetic properties of soil, subsoil and bedrock. The technique is carried out over grasslands, crop fields and areas of open soil. The method is particularly helpful to detect and define metal objects, ovens, hearths, filled-in pits and wells, foundations, tombs and other structures. Caesium magnetometers and fluxgate gradiometers are currently the primary instruments used for magnetic prospection in archaeological research. These instruments help in ascertaining the magnetic waves and thereof help in indicating the date and associated knowledge about an artefact.[4]

Figure 1.5 : Fluxgate Magnetometer
Credit: Zureks, 2008
Source:https://upload.wikimedia.org/wikipedia/commons/5/5c/Magnetometr_transduktorowy_by_Zureks.jpg

[4] For details of this method, see A. Schmidt. 2007. 'Archaeology, Magnetic Methods'. In D. Gubbins and E. Herrero-Bervera (eds) Encyclopedia of Geomagnetism and Paleomagnetism: 23-31. *Encyclopedia of Earth Sciences Series*. Heidelberg, Springer : 23-31..

PDF Download Available from the following web link: https://www.researchgate.net/publication/228666190_Archaeology_magnetic_methods.

4) **Chemical Analysis of Soil**: This procedure is conducted to measure the content of phosphate and potassium in a soil which help to indicate the presence of human activity in early periods.[5]

5) **Detection of Anomalies in Subsoil**: In this method archaeologists use an electric device called potentiometer to measure the resistivity or resisting power of a subsoil. Variations in resistivity and the detection and extent of any anomalies/irregularities are used to deduce the possible presence of archaeological structures such as cultural layers, stone walls, ditches, graves, etc. For instance, the presence of foundations is deduced if the conductivity or the power of resisting electric current is seen to be reducing in the subsoil. Increased conductivity, on the other hand, indicates the presence of filled-in pits.[6]

6) **Prospection by Acoustic or Seismic Methods:** In this method, a ground is struck to record the resulting sound and vibrations. The method is executed by using instruments that register vibratory phenomena obtained by reflection, refraction or resonance following the sounding of the site or variable-frequency Hertzian wave transmission. The method is particularly helpful in identifying and investigating submerged sites and proves useful if combined with underwater prospection.

While all these modern techniques are significant contributors to archaeological research yet the result from such inspections are only indicative. Therefore, it is always imperative for archaeologists to make a physical inspection of the site before finalising its excavation.

When it comes to analysing the remains and artefacts found during excavation, one of the important aspect is to determine and preserve the location of the find, including to record, the layer at which it was spotted. Any artefact in isolation removed from its site and location serves very little purpose for the archaeologist.[7] To overcome this problem, archaeologist draw detailed maps and site plans of different portions of the site. Detailed records are kept in the form of diaries and markings on site plans of the location of finds. No excavation is of relevance unless records of these maps, plans and location of structures and artefacts have been maintained. The record of the shape, measurement of material and physical examination of each find is an essential element of excavation.

Check Your Progress Exercise-1

1) Explain Prehistory in about 50 words.

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2) What is the difference between Prehistory and Protohistory?

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[5] For details of this process, see, https://www.jstor.org/stable/pdf/276788.pdf?refreqid=search%3A3ee2e08b47a983f42563c9254349a44a

[6] For more information on this method, see Anthony Clark. 2003. *Seeing Beneath the Soil: Prospecting Methods in Archaeology, new edition*. New York: Routledge.

[7] Thousands of valuable objects have been lost to archaeologists and historians as they have been removed from their original settings and sold as artefacts by thieves and diggers.

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3) What is an artefact?

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4) List the steps of archaeological research.

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5) How has the field of archaeology progressed in recent times?

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1.7 DATING METHODS IN ARCHAEOLOGY

A crucial aspect of archaeological research is fixing the date of an excavated object and site. This part of the research process is termed as dating. Working without the aid of written records or calendars, in the days before accurate dating techniques were available, the early archaeologists often found that chronological ordering constituted an enormous but necessary undertaking. Therefore, a major focus of early archaeologists became the ordering of archaeological materials into space-time frameworks. Over the years, archaeologists have come to employ several methods to determine the actual or approximate period of an artefact and culture. Some of the most commonly used methods are as follows:

Dendrochronology: This method is based on the analysis of the number of annual growth rings on trees and the variations in thickness of those rings which incurs due to the influence of the climate. However, not all species of trees are equally affected by climatic variations and this poses a limitation for this dating process. Further, the data concerning a given region cannot automatically be transferred to another one with a different microclimate. Nevertheless, dendrochronology is increasingly used now because it enables the datingof actual wood samples going back as far as eight millennia. The

method has also gained importance since it can be used to check the accuracy of other dating methods, particularly, that of radiocarbon dating.

Radiocarbon Dating: Also called Carbon-14 or 14-C, radiocarbon dating is the most common scientific dating method. The method is based on the cosmic ray production of new atoms in matter, also known as the principle of radioactive decay. Carbon-14 lasts 8300 years on an average before reverting in radioactive decay to nitrogen-14 and during this time, it enters all living things as well as sea water and air. Chemically carbon dioxide which is a product of the combustion of carbon with air (which is 20 % oxygen) is the food of life and presumably the freshly produced radiocarbon is passed on uniformly to all living beings through carbon dioxide. Only when a plant or animal dies does the uptake of 14C begin to decline through radioactive decay. The American chemist Williard Libby first used this method to calculate radiocarbon dates and estimated that it took 5568 years for half the 14C in a sample to decay its half-life. Modern research suggests that the more accurate figure is 5730 years. However, knowing the decay rate or half-life of 14C, Libby recognised that the age of dead plant or animal tissue could be calculated by measuring the amount of radiocarbon left in a sample.

Libby's great practical achievement was to devise an accurate means of measurement. The traces of 14C are minute to start with and are reduced by half after 5730 years. After 23000 years, only one sixteenth of the original tiny concentration of 14C is available to be measured in the sample. Libby discovered that each atom of 14C decays releasing beta particles and he succeeded in counting these emissions using a Geiger counter. This is the basis of the conventional method which is still employed by many radiocarbon laboratories. Samples usually consist of organic materials found on archaeological sites, such as charcoal, wood, seeds, and other plant remains, and human or animal bones. While C-14 method is most effective in determining the dates of objects which contain carbon content like wood and charcoal, the method is also helpful in determining the dates of other objects (which do not have carbon content) found on the same site or layer.

The accurate measurement of the 14C activity of a sample can be affected by counting errors, background cosmic radiation, poor sampling techniques, and other unaccounted factors. Despite these limitations, C-14 is one of the primary dating tool for organic materials that go back to about 50,000 to 80,000 years ago. The dates so ascertained are generally expressed in Before Present (BP) **(See Section 1.3)**.

Potassium-Argon Dating: This method, also known as K-Ar dating, is based on the fact that a radioactive isotope of potassium (K40) which is present in minute quantities in rocks and volcanic ash, decays into the gas argon (Ar40) at a known rate (half of a given amount of K40 will change into Ar40 in about 1.3 billion years). Since Ar40 is a gas, it escapes when rock is molten (as in lava), but when the rock cools, the Ar40 gets trapped inside. By using sensitive instruments to measure the ratio of K40 to Ar40, it is then possible to estimate the time taken by a rock or ash to cool and solidify. Because of the long half-life of K40 (1.30 billion years), potassium-argon dating can be used to estimate dates of materials dating back to several million years.

Palaeomagnetism: This dating method was introduced to archaeology in the early to mid- 1960s by Dr. Robert Dubois. Magnetism occurs whenever electrically charged particles are in motion. This method relies on remnant magnetism on earth and is the study of the record of the Earth's magnetic field preserved in various magnetic minerals through time.

To elaborate, when clay is heated, the microscopic iron particles within it acquire a remnant magnetism parallel to the earth's magnetic field. These particles point toward

the location around the geographic north pole where the magnetic north pole was at that moment in its wandering. Once the clay cools, the iron particles maintain that magnetism until the clay is reheated. By using other dating methods (such as dendrochronology or radiocarbon dating) to obtain the absolute date of an archaeological feature (such as a hearth) and measuring the direction of magnetism and wander in the clay, it is possible to determine the location of the magnetic north pole at the time this clay was last fired. This process is called the virtual geomagnetic pole or VGP. Archaeologists assemble many of ancient VGPs and construct a composite curve of polar wandering (known as the VGP curve). The VGP curve is then used as a master record against which the VGPs of samples of an unknown age are compared to and assigned a date.

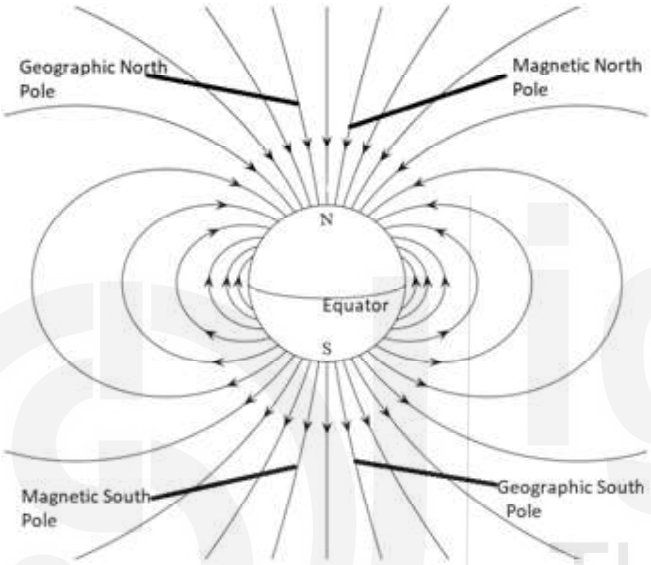

Figure 1.6 : Representation of a virtual geomagnetic pole

Credit: Geek3, 2010

Adapted from https://upload.wikimedia.org/wikipedia/commons/7/70/VFPt_Dipole_field.svg

Thermoluminescence (TL): This method is used mainly for dating objects made of bakedclay. The soil, including the clay from which pottery is made, contains many natural isotopes mainly of uranium, thorium, potassium and rubidium, which irradiate certain minerals such as quartz causing displacement of electrons which then accumulate in 'traps' (or defects in the crystal lattice) at a regular rate. When such minerals are heated, the accumulated energy is liberated at 320 degrees Celsius or more in the form of light. Once they have cooled such minerals again accumulate energy owing to radioactivity. For instance, a piece of pottery when fired, releases the energy accumulated in the quartz it contains, but as soon as it cools down, the quartz again starts to accumulate energy. On the other hand, when potsherds are heated, extra energy is liberated with the emission of light. The intensity of this light depends on the quantity of accumulated energy. The light is measured by means of laboratory processes, and on that basis, the rate of energy accumulation is ascertained whereby archaeologists can calculate the time elapsed since the baking of a pot. This method can also be applied to flints that have been subjected to fire and therefore the method holds significance for dating prehistoric cultures which were familiar with the making of pottery.

There exist many other dating methods like the electron spin resonance, uranium series, fission-track dating etc, but we will not go into their details here primarily because in archaeology, the other methods either have a restricted field of application or are still in the experimental stage.

Check Your Progress Exercise-2

1) Name and describe the most common scientific dating method for organic materials in Archaeology.

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2) Which of the following methods for dating a feature relies on the position of geomagnetic field on Earth's surface to date a deposit:
   a) Thermoluminescence
   b) Palaeomagnetism
   c) C-14
   d) Potassium-Argon Dating

3) What is K-Ar dating?

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1.8 WHAT IS ANTHROPOLOGY?

Anthropology is a branch of knowledge that explores the biological evolution of humans and their culture. Anthropologists help in analysing the changes in the biological, and physical features and forms of various types of hominids i.e. any member of the group consisting of all modern and extinct humans and great apes including gorillas, chimpanzees, and orangutans and all their immediate ancestors, through millions of years. The cultural patterns, food habits, behavioural patterns and communication methods of early men are the other areas where anthropology helps us in understanding prehistory.[8]

Archaeology as the study of the ancient and recent human past through material remains is in fact a subfield of anthropology which is the study of all human culture. Therefore, when an archaeologist excavates a cemetery for instance, he or she is advised to collaborate with an anthropologist who can provide information of a demographic nature – the age, sex and stature of the dead. Like archaeology, anthropology involves several research steps:

1) The first step of anthropological research is to determine whether a discovered artefact is a bone or not.

2) Next comes the dating. Anthropologists can often determine the approximate date of a skeleton by the context of deposition.

[8] One must however remember here that in addition to prehistory, physical anthropology also deals with more recent times.

3) An analysis of the location, position, and condition of the body which gives clues to probable events that would have led to the burial.

4) In the next step, anthropologists attempt at developing a biological profile: age, sex, stature and ancestry through the recovered bone. By examining the size, shape, and structure of a bone, an anthropologist determines if the bone is of a human or an animal.[9] At times, this also helps to indicate the cause of the death.

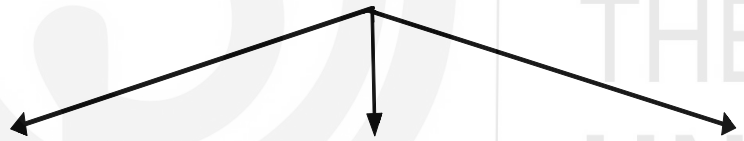
5) Further interpretation, such as what a bone seems to indicate, its importance and associated features are detailed in report writing. It might be added that the study of cremated bones can yield information similar to that obtained from studies of uncremated ones.

1.9 BRANCHES OF ANTHROPOLOGY

Anthropology comprises four major sub-disciplines biological anthropology, prehistoric anthropology, linguistic anthropology and ethnology which is also called cultural anthropology.

i) **Biological (or physical) anthropology** is a study of the non-cultural aspects of humans and near-humans. Non-cultural refers to all those biological characteristics that are genetically inherited, in contrast to learned aptitudes. The term near-human is used to indicate apes, monkeys, and the other primates and fossil ancestors of present humans. Biological anthropologists examine the process and mechanism of human evolution, genetic inheritance and human variation and adaptations to different environmental conditions.

Subfields of Biological Anthropology



Human Biology

Concerned with human diversity, genetic inheritance patterns, non-cultural adaptations to environmental stresses, and other biological characteristics of *Homo sapiens,* the human species.

Primatology

Principally interested in learning about the capabilities and behaviour patterns of primates – our closest living relatives-to understand the lives of our earliest human ancestors.

Paleoanthropology

Study of fossil record of early humans and their primate ancestors to retrace the stages of anthropogenesis the process of emerging as the present-day human, also known as hominization.

ii) **Cultural (or socio-cultural) anthropology** examines the cultural aspects of human societies all over the world. These aspects include social and political organizations, marriage patterns and kinship systems, subsistence and economic patterns, and

[9] All mammals share a generalized skeletal template, in the sense that they all have the same bones in roughly the same locations: a skull, spine (which ends in a tail), ribs (which support the internal organs), and four sets of limb bones. However, the shape of the bones and the way they relate to each other, differ between animals. Thus, by examining the size, shape, and structure of a bone, an anthropologist can determine if it is of a human or not.

belief system of different societies. While most cultural anthropologists study contemporary societies rather than the ancient ones but even in doing that, these anthropologists attempt to retrace the lost diversity and cultural practices of the past and that way contribute to an understanding of prehistorical period.

iii) **Linguistic anthropology** focusses on the human communication process. Linguistic anthropologists primarily study the physiology of speech and the social and cultural influences on speech and writing. They also examine nonverbal communication and the evolution of languages. In this context, some anthropologists attribute prehistory with a pre-language i.e. archaic body of words and proto-language i.e. archaic form of languages, now lost, but hypothesised as predecessors of several present languages. It is in the latter field that linguistic anthropology contributes to an understanding of prehistory – a period for which we have no written documents.

Check Your Progress Exercise-3

1) What is the difference between Archaeology and Anthropology?

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2) How do the different branches of anthropology contribute to an understanding of prehistory?

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1.10 SUMMARY

Through this Unit you would have understood that the knowledge of the past is not limited to information from written records alone. In fact, different forms of material remains form a significant source base for understanding prehistory. With diverse methods of research, archaeologists and anthropologists, are continually working to expand our knowledge about the past and more specifically about the prehistorical period.

Moreover, one must also note here that, apart from archaeology and anthropology, which we studied in detail in this Unit, fields such as palaeobotany (study of plant remains), palaeozoology (study of animal remains), medical science, molecular chemistry and genetics also contribute to understanding prehistory and the biological evolution of hominids through various phases. Amongst these various fields, the study of DNA (the deoxyribonucleic acid) present in cells and which is considered responsible for carrying the genetic characteristics from one generation to the other, is a major breakthrough in research of the past. Since the emergence of this research, scientists have been studying the DNA found in cells or bone marrow preserved in various human species found in different parts of the world. They have also worked out a certain pattern through which

DNA changes over long periods of time. In this method, the DNA of the present-day humans, living in different regions of the World, including some groups living in present day in isolation or in rare small pockets as hunter gatherers is compared with preserved DNA obtained from different cultures. Along with this, the study of blood groups, form and shape of skull, cranial capacity, bone structure, musculature and limb forms, has provided valuable insights into the process of biological evolution of modern humans (*homo sapiens sapiens).* The details of biological evolution are discussed in **Unit 2** of this course.

1.11 KEY WORDS

Artefact : material objects that have been used, modified or made by humans in the past.

Excavation : the process of unearthing or digging up an archaeological site.

Geologists : scientists who study the solid and liquid matter that constitutes the Earth as well as the processes that shape it.

Hominin : any member of the group consisting of all modern and extinct humans and all their immediate ancestors, specifically species more closely related to modern humans than to chimpanzees.

Palaeomagnetism : a study of the magnetism of rocks that were formed in earlier time periods. More broadly, the study of changes in the earth's magnetic fields during geological times.

Palaeontologists : scientists who study fossils to arrive at the history of the beginning and developments of life.

Prehistory : the period for which we do not have any written records and the source of knowledge are the archaeological remains.

Protohistory : the period between prehistory and history, during which a culture or civilization has not yet developed writing, but other cultures may have noted its existence in their writings.

1.12 ANSWERS TO CHECK YOUR PROGRESS EXERCISES

Check Your Progress Exercise-1

1) See Section 1.3
2) Period without any written records vs. period of transition. See Section 1.3
3) Material remains of past. See Section 1.6
4) See the information in the box in Section 1.6
5) Aerial photography, underwater prospection etc. See Section 1.6

Check Your Progress Exercise-2

1) C-14, see Section 1.7

2) Option b. See Section 1.7

3) Potassium-Argon Dating. See Section 1.7

Check Your Progress Exercise-3

1) Study of human past through material remains vs. study of human culture through bone remnants. See Section 1.8

2) Human evolution, cultural practices, understanding of pre/proto languages etc. See Section 1.9

1.13 SUGGESTED READINGS

Agrawal, D. P. and A. Ghosh (eds.). 1973. *Radiocarbon and Indian Archaeology.* Bombay: Tata Institute of Fundamental Research.

Barnard, Alan. 2016. *The Evolution of Language: An Anthropological Approach Language in Prehistory.* Cambridge: Cambridge University Press.

Clark, Anthony. 2003. *Seeing Beneath the Soil: Prospecting Methods in Archaeology*, New edition. New York: Routledge.

Clark, J. G. D. 1965. 'Radiocarbon Dating and the Spread of Farming Economy'. *Antiquity,* 39: 45–48.

Kulkarni, A.C. 2015. 'Offshore Technology and Marine Archaeology.' In A.S Gaur and Sundaresh (ed.). *Recent Researches on Indus Civilization and Maritime Archaeology in India.* Delhi: Agam Kala Prakashan.

Laet, S.J. de (ed.),A. H. Dani, J. L. Lorenzo Gieysztor and R. B. Nunoo (co-eds.). 1996. *History of Humanity, Volume 1: Prehistory and the Beginnings of Civilization*. UNESCO. London: Routledge.

Lubbock, John. 1865. *Prehistoric Times: As Illustrated by Ancient Remains, and the Manners and Customs of Modern Savages*. London and Edinburgh: Williams and Norgate.

Renfrew, C. and P. Bahn. 2008. *Archaeology: Theories, Methods and Practice*. 5th edition. London: Thames and Hudson.

Schmidt, A. 2007. 'Archaeology, magnetic methods'. In D. Gubbins and E. Herrero-Bervera (eds.) *Encyclopedia of Geomagnetism and Paleomagnetism*: *Encyclopedia of Earth Sciences Series.* Heidelberg, New York: Springer: 23-31.

PDF:

https://www.jstor.org/stable/pdf/20079007.pdf?refreqid=search%3Af78cba054579b0acebd3139146894353

https://www.jstor.org/stable/pdf/25801250.pdf?refreqid=search%3Af78cba054579b0acebd3139146894353

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https://www.jstor.org/stable/pdf/3024893.pdf?refreqid=excelsior%3A44638ad7fb36c31784cc9f708821de2b

https://www.jstor.org/stable/pdf/73915.pdf?refreqid=excelsior%3Af23c3833695fc94278db8240d22ba613

1.14 INSTRUCTIONAL VIDEO RECOMMENDATIONS

Dating-The Radiocarbon Way
https://www.youtube.com/watch?v=-xKvq6VLe4s

The Excavation Process: How We Excavate
https://www.youtube.com/watch?v=PcT1vGyJzyg

Underwater Archaeology
https://www.youtube.com/watch?v=qgCvnogeN2s

Space Archaeology: A new frontier of Exploration
https://www.youtube.com/watch?v=gxD32LRC1QE

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UNIT 2 BIOLOGICAL EVOLUTION OF HUMANS*

Structure

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- 2.3.2 Darwinism
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2.1 OBJECTIVES

This Unit deals with the biological evolution of humans. After going through the Unit, you will be able to:

- Describe the phenomenon of evolution;
- Compare and evaluate the various theories of evolution;
- Explain the contribution of Darwin to evolution;
- Appreciate how fossils are the greatest evidence of evolution of humans;
- Identify differences between apes and humans; and
- Explain how apes transformed to *Homo sapiens*.

2.2 INTRODUCTION

Hall and Hallgrímsson (2008) defined evolution as 'change in the heritable characteristics of biological populations over successive generations'. Herbert Spencer, an English philosopher and sociologist, first articulated the term 'evolution' in 1862 to denote the

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historical development of life. Evolution is the progressive change within the organism. This change is termed as 'micro-evolution' when it occurs over a period of time and referred as 'macro-evolution' when it involves the transformational changes from one being to the other. Charles Darwin, a significant evolutionist defined evolution as 'descent with modification' which implies that closely related species resembleeach other because of the inheritance; and differ from each other owing to the hereditary differences acquired during the separation of their ancestors.

Before embarking on the evolution of human beings, let us first understand the process of evolution, with its various theories.

2.3 THEORIES OF EVOLUTION

The evolutionary thought ranges from classical theories of Aristotle to the modern synthetic theory of evolution. These various theories serve as basis of understanding the evolution of life and its diversity. These also determine the successive stages unto which the modern theory of evolution came into being.

2.3.1 Pre-Darwin Theories of Evolution

Charles Darwin is known to be the scientist who changed the course of evolutionary theory and established a firm ground on which evolution could be studied. However, before Darwin, many theories were put forward which actually laid down the path for the growth of evolutionary thought. Beginning from Greek thinkers to the theories of Lyell, the Pre-Darwin theories talk about ways in which scholars before Darwin understood evolution.

Greek Philosophies

Greek philosophers such as Aristotle (384-322 BCE), Herodotus (484-425 BCE) and Empedocles (504-433 BCE) were the pioneer scholarswho proposed the idea of evolution. They believed in the idea of the continuity of life forms giving rise to new forms. Aristotle proposed that living organisms have certain inner abilities to strive better through the process of adaptation. He observed this potential among plants, animals and humans. Being the first to highlight the insights of humans, Aristotle is also credited for coining the term Anthropology or the study of human beings (for further details see **Section 1.8**, **Unit 1** of this course) and is therefore known as the 'Father of Anthropology'.

Herodotus and Empedocles also developed certain ideas related to living beings and their biological evolution. The ideas of these philosophers indicated the concept of adaptation; plants evolving before animals indicating the gradual evolution of higher organisms, and finally the humans. The obsolete **Theory of Spontaneous Generation or Abiogenesis** holds that life originated from inanimate and inorganic matter such as manure, dew, rotten slime, dry wood, sweat and meat etc. Until the 17th century, scientists like Aristotle, Thales, Plato and Von Helmont supported the idea of abiogenesis. By the middle of the 19th century abiogenesis was refuted by Francesco Redi, Spallanzani and Louis Pasteur.

Theories of Medieval Times

The medieval times also famous as 'the Christian era' in the European world refuted the views of evolution given by Greeks. This time period was dominated by the **Christian Theory of Special Creation**. According to this theory all living organisms present on the earth were created by supernatural power in six days. Since all these living forms

are created by divine power, they are non-changeable and permanent from the day of their creation. Spanish Priest, **Father Suarez** (1548-1671) was a strong supporter of this theory which was followed until middle of the 19th century.

The Theory of Eternity of Present Condition proposes the unchanging nature of the universe. This theory states that organisms remain unchanged throughout their individual existence and will remain in the same form throughout eternity.

Theories of Organic Evolution

By mid-18th century the idea of the biological evolution of living organisms had revolutionized the scientific world. During this time **Carl Linnaeus** (1707-1778) a Swedish Botanist, published his immortal work 'Systema Naturae'(1735). Linnaeus also introduced the binary nomenclature of living organisms and designated each organism with two Latin names, one for Genus and the other for Species. Since the time of Linnaeus, Humans have been scientifically termed as Homo-Sapien.

In the late 18th century, the French scientist, **Comte de Buffon** (1707-1788) who was contemporary of Carl Linnaeus, stated that life forms are not fixed and permanent. He argued that the evolution of living organisms is strongly influenced by the environment.

Thereafter, another 18th century evolutionist, **Erasmus Darwin** (1731-1802), the grandfather of Charles Darwin, highlighted the evolutionary aspects of animals through his work and strongly recommended that the life on the earth must have been evolving for millions of years whereas the evolution of humankind is the most recent.

Lamarck (1744-1829), a French naturalist, was the first evolutionary scientist who confidently proffered the idea of biological change in the living organisms. His theory of evolution explaining the origin of new species is called 'Inheritance of Acquired Characters'. Lamarck, who possessed specialization in animal classification, perceived that the various species could be arranged into an orderly relationship that will form a continuous succession extending from the simplest little polyp to complex human. He was the first naturalist who believed that animals modify themselves in order to adapt to the altered conditions of environment. In his theory he stated that species were not constant but were derived from pre-existing species. He further suggested that the structure of an organism is majorly dependent on its function. He presented the example of Giraffe for the justification of his theory, explaining that the long-neck of Giraffe could have been evolved because of its continuous stretching and use in order to reach higher foliage on trees. Based on this observation, he propounded a theory based on four principles, namely:

1) Use and disuse of organs
2) The acquired characteristics are inherited
3) Internal urge
4) Direct environment and new desires

For him, Giraffe's long neck was an acquired character which was inherited by the next generations. Similarly, snake's smooth body was the result of disuse of its limbs as it chose to live in burrows.

Unfortunately, Lamarck's theory of inheritance of acquired characteristics did not prove tenable among the scientific community because it was not supported by enough evidence to resolve all the queries. However, it was proved to be an important milestone in evolutionary biology.

George Cuvier (1769-1832) another French scientist disapproved Lamarck's theory of evolution; however, he supported views on **fossil** evidence and biological relationship. He believed that dinosaurs disappeared from the planet due to 'fixity' of species. He further advocated the theory of 'Catastrophism' which argues that changes in the earth's crust have been caused by sudden natural disasters.The theory however was not fully supported by scientific explanation.

Charles Lyell (1797-1875), a significant geologist and English lawyer, refuted Cuvier's Catastrophism theory. Lyell in his famous book 'Principles of Geology' (1830-1833) which was published in three-volumes, reported that unlike the Biblical view, the earth must be older than few thousand years; and it has undergone numerous structural and climatic changes that occurred gradually over geological time scale through natural processes like, erosions, earthquakes, glacial movements and volcanoes. He also presented conclusive evidence for the theory of uniformitarianism which holds that the earth's natural changes acted in the same manner and intensity in the past as they act in the present.

2.3.2 Darwinism

A study of existing theories before Darwin, led Charles Darwin (1809-1882) to think of the process of evolution of living beings and subsequently, in 1859, he propounded his famous theory of natural selection in his famous book 'Origin of Species'. According to Darwin, natural selection is the process by which organisms adapt to changes in their environment and are able to survive and thus reproduce. Darwin was influenced by the works of significant scholars such as Sir Charles Lyell, T.R. Malthus and Alfred Russel Wallace.

The Two Major Influences on Darwin	
Malthus and his Theory of Population	**Alfred Russel Wallace and his Principle of Natural Selection**
• **Thomas Robert Malthus** (1766-1834) was an 18th century English philosopher and economist. • Malthus proposed the principle that while human populations grow exponentially (i.e., double with each cycle), food production grows at an arithmetic rate (i.e. uniform increase in each interval of time). • The theory was aimed to highlight that the growth in population will lead to a shortage of food production and food availability. • This theory was published in 1798 under the title 'An Essay on the Principle of Population' which was modified and published again by Malthus in the next edition of 1803.	• **Alfred Russel Wallace** (1823-1913) was a British naturalist, biogeographer, author and humanitarian. • Wallace was a co-discoverer of the theory of evolution with Darwin. • The working principle of Wallace's theory, like that of Darwin, was based on the natural selection and adaptation of species to their environment. • Wallace and Darwin's research papers were com-bined and published under the joint authorship in 1859.

Darwinism consists of five principles which are:

i) **Over-production or prodigality (lavishness) of over-production**: Influenced by the Malthusian theory of population, this concept is related to reproduction and lays down that more individuals are born in each generation than will be able to survive.

ii) **Variation and Heredity**: Individuals of the same species are not all alike and differ from each other in various characteristics due to natural variations. Favourable adaptations are inherited and are passed on to the off springs of the next generations.

iii) **Struggle for existence**: Organic individuals tend to increase in a geometrical ratio, whereas food production only increases in an arithmetic ratio. As a result, there is a struggle for the limited resources. Only selected individual get access to the limited resources and rest get eliminated in this struggle for existence.

iv) **Survival of the fittest or natural selection**: Individuals with favorable characteristics or variations have a better chance of surviving and reproducing than those who lack these characteristics.

v) **Modifications of species**: With gradual change in the environment that occurs over long periods of geological time, genes for selection also change. As a result of these additive changes species gets modified and becomes totally different from its ancestral population.

Darwinism became the most influential theory of evolution, but it was unable to define how natural selection actually leads to evolution. Darwin's idea was however taken forward by a set of scholars like Charles Lyell, Thomas Huxley, Earnest Heckle, August Weismann, Alfred Russel Wallace and George Simpson. These scholars are known as Neo-Darwinists as they supported Darwin's concept of natural selection. Later, some scholars of this school such as Sewall Wright, Ronald Fisher, and J.B.S. Haldane described natural selection by explaining modern synthesis, or Neo-Darwinism.

2.3.3 Synthetic Theory of Evolution

This theory of evolution was essentially a combination of natural selection, genetic inheritance, population genetics, systematics and theories of speciation and macroevolution. In addition to it, this theory also emphasizes non-selectionist factors of evolution, especially isolation, **mutations**, and recombination (Reif et al., 2000).

Isolation of living individuals into various small groups or populations under geographical or physical barriers is one of the important factors responsible for evolution. These barriers include oceans, rivers and mountains that prevent the process of interbreeding between related individuals. On the other hand, mutations which are responsible for the alterations in the structure of a gene produce variations in the individuals. These variations can be harmful or lethal or recessive to the normal genes. Most geneticists believed that the frequency of gene alterations by mutation was much smaller than the change by natural selection.

With a more complete understanding of mechanism of inheritance, it is now understood that the evolution is actually the total aggregate of the genetically inherited changes in the individuals who are the members of the gene pool of a population and the factors of evolution function on the whole population rather than the individuals alone.

The following three aspects highlight the differences between Darwinism and modern theory of the mechanism of evolution:

i) Apart from the natural selection the modern theory identifies several significant forces of evolution such as mutation, isolation and genetic drift.

ii) The modern theory of evolution recognizes the discrete inherited entities in a human that are known as genes. The multiple forms (alleles) of a gene are responsible for variation within a population.

iii) This theory further suggests that new species are generally formed due to the gradual accumulation and inheritance of small genetic changes.

Basically, the modern synthetic theory explains the functioning of evolution at the level of genes, phenotypes and populations. This theory is however often challenged by Neo-Mutationism. Driven by molecular biologist Masatoshi Nei along with many others, the theory of Neo-mutationism advocates the phenomenon of mutation, rather than natural selection, as the central force of evolution.

These theories of evolution have been responsible for making history of human evolution understandable. Evidence from the past, in the form of fossils played a key role in determining how humans evolved from apes. The principles of evolution were applied to the evidence excavated by **paleoanthropologists** and archaeologists. The evidences in the form of hominid fossils were able to provide a trajectory to human evolution. It determined how ape-like mammals evolved into modern human beings. Scientists suggest that this process took about 6 million years.

Check Your Progress Exercise-1

1) Define evolution in 50 words.

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2) What are the main features of Lamarck's theory of evolution?

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3) List down the main features of Darwinism.

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4) Fill in the blanks:

a) According to Malthusian theory of Population, human population grows ..... while food production grows at an ..... .

b) The theory of 'Inheritance of Acquired Characters' was proposed by ..... .

c) Alfred Russel Wallace proposed the principle of ..... .

5) How is Darwinism different from the synthetic theory of evolution?

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2.4 HOMINIZATION

Homonization is defined as the gradual emergence of anatomically modern humans from their primate ancestors of genus *Homo.* The Swedish naturalist (student of natural history) Carl Linnaeus was the first one to use the Latin word 'homo', which stands for human being. *Homo* is the genus that comprises the species ***Homo sapiens***, which includes modern humans, as well as several extinct species which are closely related to modern humans, most notably *Homo erectus*.

The story of human evolution began with primates, 65 million years ago. Beginning from prosimians to monkeys, apes, great apes and finally humans. It was Darwin who made it possible to understand a link between apes and humans. In his 'Origin of Species' he put forth the idea of evolution of new species from their forerunners. The history of human evolution also involves a breakthrough stage between the hominids and the humans. This stage marks the beginning or birth of human beings, separated from its ancestor, apes.

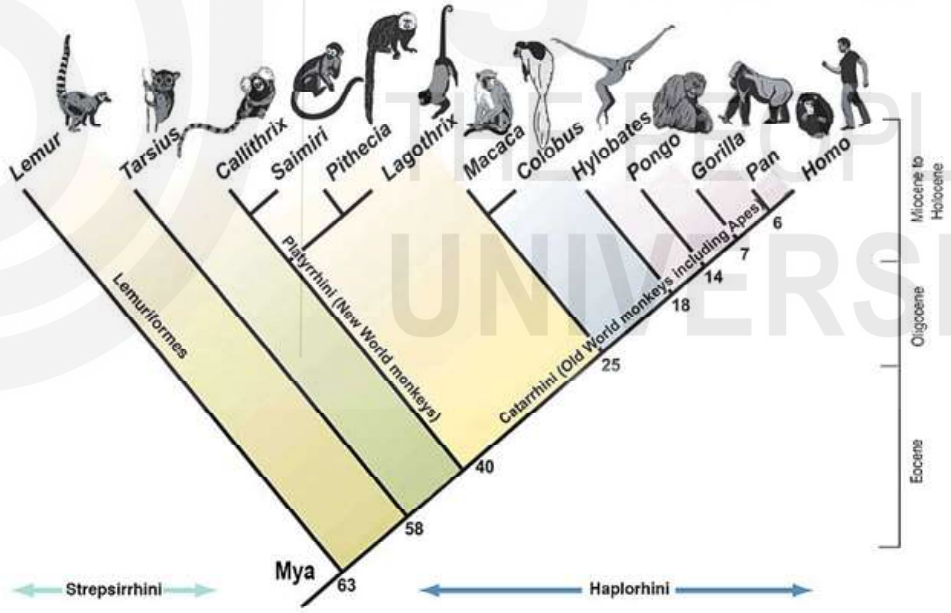

Figure 2.1 : Primate tree

Credit: Wikimedia Commons

Source: https://en.wikipedia.org/wiki/File:PrimateTree2.jpg

The most closely linked ancestors of humans are said to exist during the late Miocene Epoch (23 million to 5.3 million years ago). Due to evergreen broad-leaved forests turning into open woodlands, shrub-lands, grasslands, and mosaic habitats, sometimes with denser-canopied forests bordering lakes, rivers, and streams, ape-like primates flourished in this epoch. Such diverse environments stimulated novel adaptations involving locomotion in many types of animals, including primates. This led to a shift from arboreal to terrestrial life. The development of **bipedalism** i.e. the ability to walk upright enabled

hominins to strive better in the open woodlands. We will discuss below the major distinguishing features between an Ape and a human, of which Bipedalism was the most distinguishing.

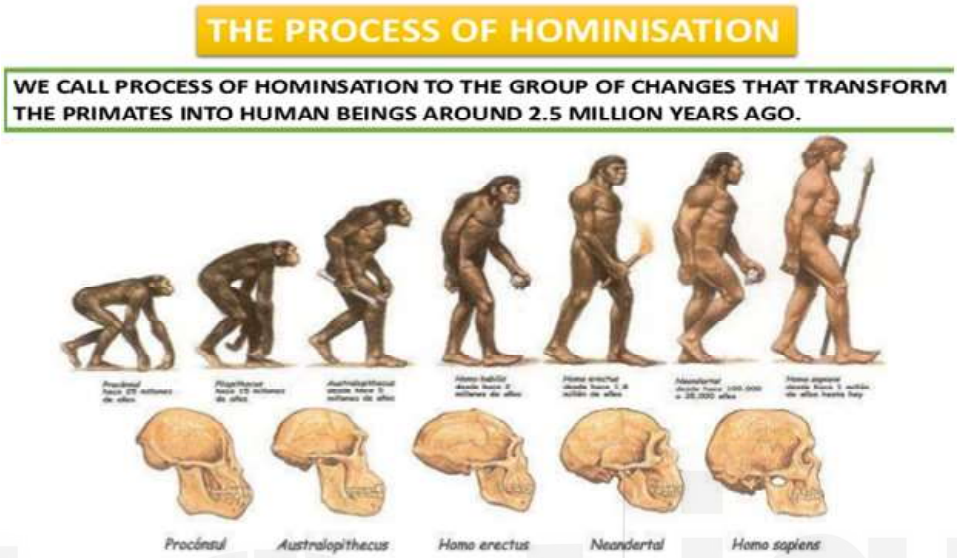

Figure 2.2 : Hominization

Credit: Prof. Pedro Flores, Professor de Geografia e Historia en IES Blas de Otero

Source: https://www.slideshare.net/pflores88/the-prehistory-72472639

2.4.1 Bipedalism

Bipedalism is a major reason behind the skeletal changes shared by all bipedal hominids. *Sahelanthropus* or *Orrorin* are the most primitive examples of bipedalism. These are regarded as the last primates, sharing ancestry with knuckle walkers — gorilla and chimpanzee. Bipedalism had several advantages such as:

1) Upright walking freed the hands for reaching and carrying food,
2) Bipedalism saved energy during locomotion,
3) It enabled long distance running and hunting,
4) It provided an enhanced field of vision,
5) It assisted in avoiding hyperthermia by reducing the surface area which was exposed to direct sun,
6) It helped in multi-tasking and increased productivity, and
7) Bipedalism led to a fairly proportionate ratio of hindlimbs and forelimbs, opposite to long fore or hindlimb apes. Opposable thumb helped in tool making.

Other changes associated with bipedalism include long toe, shortening of the pelvis and birth canal and other skeletal changes.

2.4.2 Encephalization

Another significant change in the process of hominization was the increase in the size of human brain which grew nearly three times bigger in size than that of a gorilla or chimpanzee. This process, of the enlargement of the brain, is termed as Encephalization and it began with *Homo Habilis.* Consequently, there was an increase in temporal lobes of the brain, used in language processing and pre-frontal cortex, used in complex decision making, (evolution of humans is discussed in **Section 2.5** of this Unit).

2.4.3 Sexual Dimorphism

Another factor distinguishing apes from human ancestors is sexual dimorphism i.e. the condition in which the two sexes of the same specie exhibit different characteristics. There emerged a reduction in sexual dimorphism in humans which is characterized by the reduction of the male canine toothin comparison to other ape species (except gibbons, also called the smaller apes) and reduced brow ridges and general robustness of males. Another significant physiological change which was related to human sexuality was the evolution of hidden estrus (state of sexual receptivity).

2.4.4 Other Factors

Several other factors such as the ulnar opposition (the contact between the thumb and tip of the little finger of the same hand), increased vision as opposed to smell, smaller gut, change in dental arcade, evolution of sweat glands etc. led to the differentiation of humans from the apes.

The connection between apes and humans had been established on the basis of many evidences. Molecular biology found a 95-99% similarity of DNA between a chimpanzee and a human. The split between chimpanzee and hominin is marked at 4-8 million years ago.

The most prominent evidence of human evolution came with the discovery of fossil records. Paleoanthropologists were able to ascertain evolution of humans from apes by finding similarities and differences in the fossils of apes and human beings. The fossil remains helped in defining the successive stages in the evolution of modern human beings.

- The fossils discovered in 1891 were found in Trinil, in the island of Java, Indonesia.
- Based on the place of its discovery, the fossil is popularly known as the 'Java Man'.
- The specie was discovered by a team of excavators headed by Eugene Dubois.
- The specimen was originally thought to be a new specie between humans and apes and was classified as *Pithecanthropus erectus*.
- Eventually in the 1940/50s, German biologist Ernst Mayr established connections between Java Man and the fossil of *Sinanthropuspekinensis* (Peking Man) whereby both were classified as being part of the same species, the *Homo erectus* (Detailed later in the Unit).

When the first hominin fossil was found, it was mistaken to be that of a human being who might have been suffering from some kind of illness in 1891. By the 1920s when similar kind of fossils began to be discovered, these were classified as different specie.

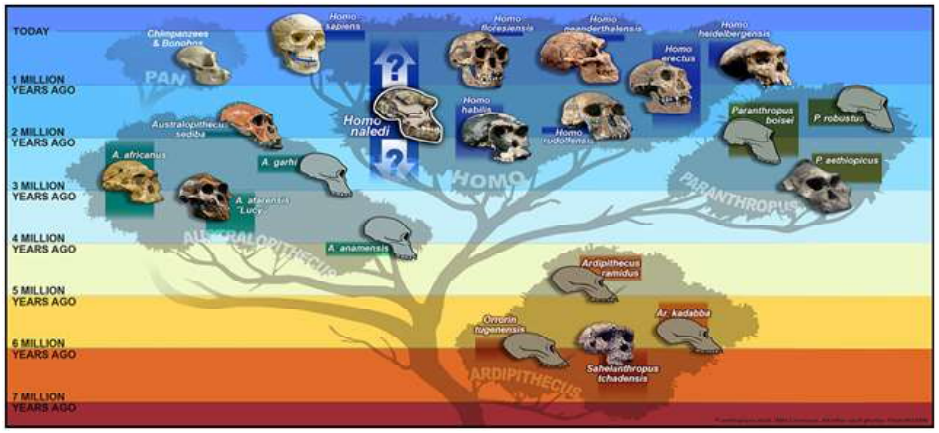

Figure 2.3 : Homo naledi: A New Species on the Human Family Tree
Credit: Illustration: S.V.Medaris, UW-Madison
Source: University of Wisconsin (https://news.wisc.edu/naledi/)

2.5 HUMAN EVOLUTION

Evolution of the closest ancestors of humans can be divided into two categories: Before *Homo* and Evolution of genus *Homo* (For illustration see, https://www.britannica.com/science/human-evolution).

2.5.1 Before Homo

This category is characterized by fossil evidences of hominids which had a close resemblance to humans but had a closer proximity to apes.

Dryopithecus

Dryopithecus is a genus of extinct ape-like animal which represents the stage of human evolution when humans and apes shared common ancestry. It was found as fossils in Miocene and Pliocene deposits (23 to 2.6 million years old) and apparently originated in Africa. Several distinct forms of *Dryopithecus* are known, including small, medium, and large, gorilla-sized animals. It lacks the characteristics, distinguishing an ape and a human. The canine teeth are larger than those in humans but not as strongly developed as those in other living apes. The limbs were not excessively long. The skull lacked the well-developed crests and massive brow ridges found in modern apes. So, it was a forerunner of gorillas and chimpanzees (For illustration, see https://www.thoughtco.com/dryopithecus-tree-ape-1093073).

Figure 2.4 : Fossil of Dryopithecus
Credit: Ghedoghedo, 2013
Source:https://upload.wikimedia.org/wikipedia/commons/0/02/Dryopithecus_fontani_ mio_med_francia.JPG

Ramapithecus

The first Ramapithecus fossil was found in 1932 in fossil deposits of Siwalik hills of North-western India. The fossil primate was dated from the Middle and Late Miocene epochs (about 16.6 million to 5.3 million years ago). Two species: *Ramapithecus Punjabicus* and *Ramapithecus Wickeri* were the first to be found. The fragments of jaw contained in the fossil encouraged an association of *Ramapithecus* as a distinct genus, that was the first direct ancestor of modern humans (*Homo sapiens*). However, when American anthropologist David Pilbeam discovered a complete *Ramapithecus* jaw, it had a distinctive V shape that differed markedly from the parabolic shape of the jaws of members of the human lineage. On the basis of this evidence, Pilbeam concluded *Ramapithecus* to have a resemblance to *Sivapithecus,* ancestor to orangutan (For illustration of Ramapithecus mandible discovered by Richard Leakey, see http://www.angelfire.com/mi/dinosaurs/zramapithecus.html).

Gigantopithecus

A genus of large fossil ape, of which two species are known: *Gigantopithecus bilaspurensis*, which lived 6 to 9 million years ago in India, and *Gigantopithecus*

blacki, which lived in China until at least 1 million years ago. These apes are known from teeth, lower jaw bones, and possibly a piece of distal humerus (bone in the upper half of the arm). They were large in size, perhaps larger than gorillas. They lived in open country and had powerful grinding and chewing teeth (For illustration, see https://prehistoric-fauna.com/Gigantopithecus-blacki).

The first specimens were found by the German-Dutch palaeontologist G.H.R. von Koenigswald in Chinese drugstores, where they were known as 'dragon's teeth'. The teeth, though large, have a few similarities to human teeth, and this led some palaeomorphologists to speculate that humans might have had 'giant' ancestors. Later discoveries of complete jaw bones demonstrated that they were from extinct apes (Rafferty, 2018).

Australopithecus

The first fossil of Australopithecus was discovered in 1924 by Raymond Dart, an anatomy professor at Johannesburg in the town of Taung in South Africa. It was the skull of a 5-year old child, with his milk teeth. The skull had many ape-like features such as a projecting face and a small brain. It also had distinctly human features for example, a rounded jaw unlike the pointed jaw of apes. The ventral position of the foramen magnum (the hole at the base of the skull from which the spinal cord emerges) suggested that the creature had walked upright. The skull was found to be 2.8 million years old and was named *Australopithecus africanus.* The skull is also popularly known after the place of its discovery, as the Taung Child.

Figure 2.5 : Australopithecus fossil
Credit: Durova, 2007
Source:https://upload.wikimedia.org/wikipedia/commons/7/7d/Australopithecusafarensis_reconstruction.jpg

The most prominent and best preserved Australopithecus specimen is that of a female skeleton which was found in 1974 by a team of scientists led by paleoanthropologist Donald Johanson at Hadar in Ethiopia. Anthropologists assembled about 40% of her skeletons and she was nicknamed as 'Lucy'.[1] The skeleton was found to be 3.2 million years old.

In 1938, another kind of fossil, in the genus of Australopithecus was found, which was named *Australopithecus Robustus*.

Australopithecus

The various species of *Australopithecus* lived during the Pliocene (5.3 to 2.6 million years ago) and Pleistocene (2.6 million to 11,700 years ago) epochs. There was *Australopithecus* (Au.) with species such as *Au. anamensis*, *Au. afarensis*, *Au. africanus*, *Au. bahrelghazali*, *Au. garhi*, and *Au. sediba* around 4-1.8 Million years ago. There was *Kenyanthropus* with species *K. Platyops around* 3-2.7 Million years ago. Last sub-genera were *Paranthropus*, with species *P. aethiopicus*, *P. boisei*, and *P. Robustus* around 3-1.2 million years ago.

[1] Her name is said to have been inspired from the rock band Beatles' famous song 'Lucy in the sky with Diamonds'.

Australopithecus is differentiated from the genus *Homo* primarily because of smaller body size, relatively smaller brain size, relatively small teeth and larger face, besides other anatomical differences.

Latest Discoveries

Palaeoanthropologists are incessantly involved in the discovery of fossils. And in the recent past, many new evidences have come up regarding the origin of human being. For instance, in October 2009, Ethiopia's middle Awash team discovered the largest record of human fossils from different species of *Homo Australopithecus* and *Ardipithecus*.

On 8th April 2010, some scientists discovered fossils of a new species of *Australopithecus* in South Africa . The new species, named *Australopithecus sediba*, came from a cave called Malapa. The fossils are between 1.95 and 1.78 million years old. The fossils include a skull and partial skeleton of a young male approximately 12 to 13 years old at the time of his death, and an adult female jaw and partial skeleton. Previously, brain enlargement and the birth of larger-brained babies were considered critical factors in the origin of *Homo* but anew research on the fossil skeletons of *Australopithecus sediba* shows, that important changes in the pelvis and outer surface of the brain occurred prior to brain expansion.

In December 2003, scientists mapped the Neanderthal genome from fragments of DNA taken from three Neanderthal fossil bones, each from different individuals, making it the first extinct species to have their DNA discovered. The fossils were recovered from Vindija Cave, Croatia, and are around 44,000 years old.

In March 2015 scientists found a new fossil, named the 'Ledi jaw' from Ethiopia which is dated 2.75 to 2.80 million years old. The lower jaw, known only from the left half, has smaller teeth than the ancestor *Australopithecus* while other features bear similarities to later species of *Homo*, such as *Homo habilis*.

Another breathtaking discovery took place on September 10, 2015 when fifteen skeletons were found in the Rising Star Cave in South Africa. These skeletons had feet and hands similar to that of present humans, combined with high shoulders, broad pelvis, and a flared ribcage typical of *Australopithecus*, the likely ancestor of *Homo*. Since this combination of traits is unknown in the fossil record until now, the research team gave the fossils a new species name, *Homo naledi* (Source: https://www.si.edu/; For more details on *Homo naledi,* watch https://www.youtube.com/watch?v=oxgnlSbYLSc).

Let us now move onto the Genus *Homo* and take note of various species which have been found around the world.

2.5.2 Evolution of Genus Homo

It is believed that the first humans evolved from australopithecine ancestors about 2 million years ago. *Australopithecus afarensis* is commonly regarded as the closest ancestor of genus *Homo.* Genus *Homo* was characterized by use of stone tools and the development of hips.

Homo Habilis

Homo Habilis lived from 2.8 to 1.4 million years ago. It evolved in South and East Africa in late Holocene and early Pleistocene epoch. The first fossil was discovered by a team led by Mary Leakey and Louis in 1960s from Olduvai Gorge in Tanzania, East Africa. At this site, stone tools were found along with the bones. Because of its association with tools, this early human was called *Homo habilis*, meaning 'handy man'. *Homo habilis*

was small in stature, with arms longer than legs and a skeleton much like Australopithecus. Their brains were larger and had small molars unlike Australopithecus.

Figure 2.6 : Forensic Reconstruction of Homo Habilis

Credit: W. Schnaubelt & N. Kieser, 2006/7

Source: https://upload.wikimedia.org/wikipedia/commons/4/48/Homo_habilis.JPG

Figure 2.7 : Replica of a Homo Habilis skull discovered at Koobi Fora, North Kenya

Credit: Locutus Borg, 2007

Source: https://upload.wikimedia.org/wikipedia/commons/4/45/Homo_habilis-KNM_ER_1813.jpg

In May 2010, a new species, *Homo gautengensis*, was discovered in Sterkfontein Caves in Gaunteng near Johannesburg, South Africa. Two types of specimens, *Homo rudolfensis* and *Homo ergaster*are placed between *Homo Habilis* and *Homo Erectus.*

Homo Erectus

Homo Erectus meaning 'upright human' is an extinct species of genus *Homo*. It lived around 1.9 million years ago in Pleistocene epoch. *Homo Erectus* was a human of medium stature that walked upright. The braincase was low, the forehead was receded, and the nose, jaws, and palate were wide. The brain was smaller and the teeth larger than in modern humans. *Homo Erectus* appears to have been the first human species to control fire, some 1,000,000 years ago.

Three subspecies: *Homo Erectus Javanensis* (Java), *Homo Erectus Pekiensis* (China) and *Homo Erectus Narmadensis* (India) were found.

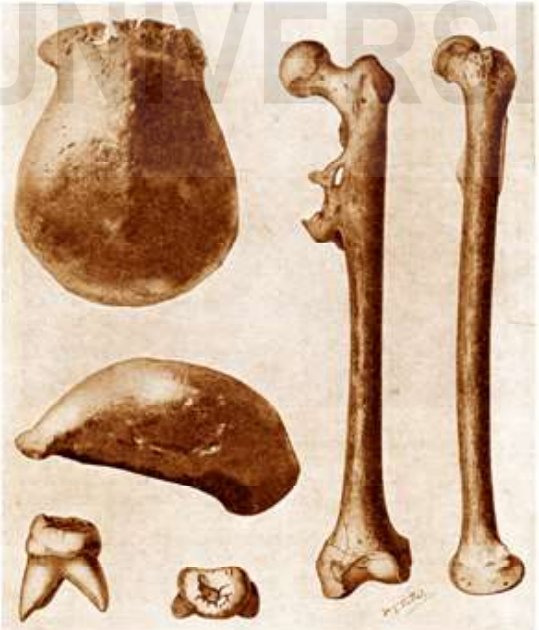

Figure 2.8 : Original Fossils of Homo erectus found in Java in 1891

Credit: Personal Scan 120

Source: https://commons.wikimedia.org/wiki/File:Pithecanthropus-erectus.jpg

Homo Soloensis

Homo Soloensis, discovered between 1931-1933 by Gustav Heinrich Ralph von Koenigswald, is a sub-species of *Homo erectus*. The sites whence this discovery was unearthed were along the Solo River, the Indonesian island of Java. This species is a late variant of *Homo erectus* and overlaps with *Homo Heidelbergensis.* It also possibly overlaps with early *Homo Sapiens*. Morphologically it has a cranial capacity of 1,013-1,251 cm^3 (Brown, 1992) which is similar with *Homo Erectus*.

Denisova Hominins

Denisova Hominins or Denisovans are extinct species or subspecies of archaic human of genus *Homo*. In March 2010, scientists announced the discovery of a finger bone fragment of a juvenile female who lived about 41,000 years ago, found in the Denisova Cave in the Altai Mountains in Siberia, a cave that has also been inhabited by Neanderthals and modern humans (Krause et al., 2010). The only physical remains discovered from this species are finger bone, two teeth and a toe bone. These evidence indicate that the Denisovans were extremely robust, perhaps similar in build to the Neanderthals.

Homo Neanderthalensis

The Neanderthal, often called *Homo Sapien Neanderthalensis,* were named after the Neander Valley of Germany where their fossils were first discovered in 1856. They lived in Europe and Asia from about 400,000 to about 28,000 years ago. The Neanderthals made diverse tools, including scrapers, spearheads and hand-axes. They lived in huts or caves, took care of their injured and sick and commonly buried their dead with objects. These burials suggests their belief in a life after death. This is the first evidence of the symbolic thinking characteristic of modern humans (Raven et al., 2005).

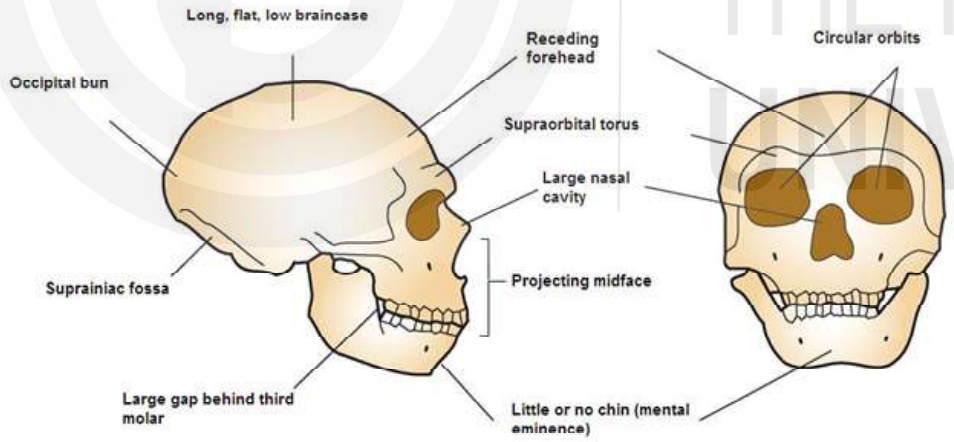

Figure 2.9 : Neanderthal Cranial Anatomy

Credit: Jason Potter

Source: https://commons.wikimedia.org/wiki/File:Neanderthal_cranial_anatomy.jpg

However, there are a number of anatomical differences between modern humans and Neanderthal populations. Neanderthals had superior adaptation ability to cold, they had significantly larger brains, better vision, and were physically superior.

Neanderthals went extinct around 38,000 years ago. Over recent decades two main theories have been emerged that focuses on their extinction. According to the first theory, a huge amount of stress was placed on the species due to the period of extreme cold in Western Europe. Another theory propounds that due to competition with modern

humans who had bigger brains and better adaptations to the environment at the time didn't give Neanderthals chance to sustain.

During the course of evolution many traits of human intelligence, such as empathy, theory of mind, mourning, ritual, and the use of symbols and tools were developed. These traits were found to be apparent in great apes although in less sophisticated forms than found in humans, such as great ape language. *Homo sapiens* developed the full-fledged capability to comprehend and communicate with one another. The evolution of human cognition is closely related to the evolution of the human brain, speech and to the origin of language. Both humans and Neanderthals experienced a steady drop in the position of their hyoid bones which played a precise role in the formation of variety of rich sound. Speech also goes hand-in-hand with intelligence. Intelligence is the most cognitively advanced thing that is hard-wired into our brains. In fact, most anthropologists agree that the 'great leap forward', which ushered in the modern era of human existence, was due to the final cognitive advances that allowed complex language.

Homo Sapiens

Homo sapiens meaning 'wise human' is the species to which the modern human belongs. *Homo sapiens* have existed from the past 40,000 years ago. These are also called Cro-Magnons, named after the valley in France where their fossils were first discovered in 1868. The Cro-Magnons had a complex social organization and are thought to have had full language capabilities. They lived by hunting. They are further characterized by intra-cranial volume expansion and the elaboration of stone tool technologies, providing evidence for a transition from *Homo erectus* to *Homo sapiens*.

Early *Homo sapiens* subsisted on hunting and gathering besides leading a sedentary life style. They lived in large caves or tent houses and involved themselves in cave paintings, engravings and other forms of art. They had a larger tool inventory and various weapons for hunting.

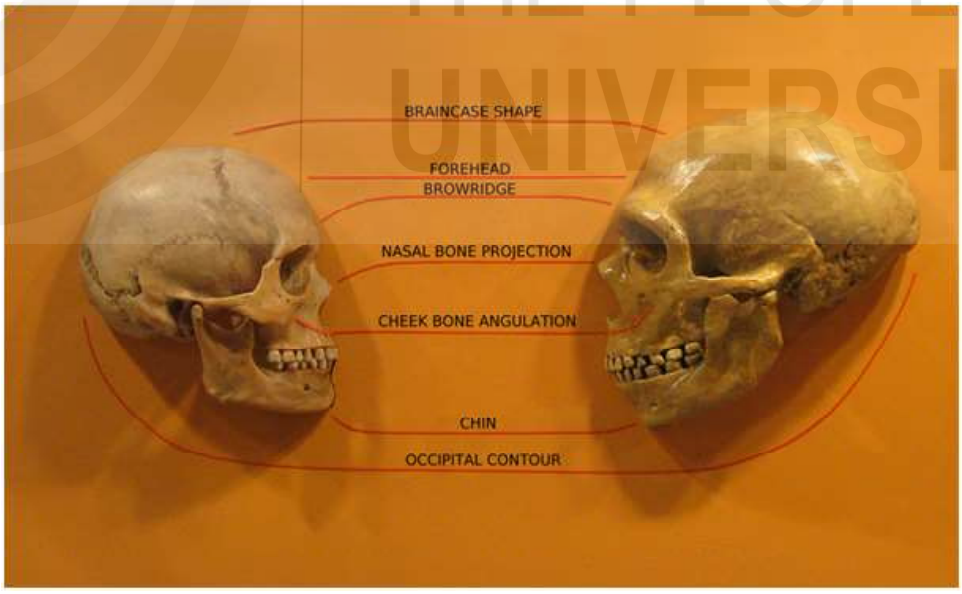

Figure 2.10 : Anatomical Comparison of skulls of home sapiens (left) and homo neanderthalensis (right) (In Cleveland Museum of Natural History)

Credit: hairymuseummatt, KaterBegemot (https://www.flickr.com/photos/hmnh/3033749380/)

Source: https://commons.wikimedia.org/wiki/File:Sapiens_neanderthal_comparison_en.png

Check Your Progress Exercise-2

1) Which features characterize human beings as different from apes?

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2) What is Bipedalism?

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3) What makes the genus Homo different from the rest of hominid fossils?

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4) Fill in the blanks:

a) The best preserved Australopithecus specimen is nicknamed as ..... The fossil was discovered by paleoanthropologist ..... at .....

b) The term *Homo sapiens* stands for ..... .

c) ..... stands for the 'Upright Human'.

d) First *Homo Habilis* fossil was discovered by a team led by Mary Leakey and Louis in 1960s from ..... .

2.6 SUMMARY

Evolution is a very complex phenomenon that has been studied by many scholars since the time of Greeks. Many significant theoretical contributions by Lamarck, Lyell, Mandel, Malthus led to the widely accepted theory of Darwinism. This was further polished by Fisher, Wright and Haldane who gave us the synthetic theory of evolution. These theories were characterized by a fusion of natural selection and inheritance of genes, as factors leading to evolution. These phenomena were used along with other evidence of physical anthropology to establish the origin of human being. One such evidence was fossil record, which by far has been the most reliable in ascertaining the successive stages of human evolution. Palaeoanthropologists have discovered fossils and classified them through a comparative anatomy. Apes and Humans are established as ancestors through the help of fossil records. The journey of human evolution began with primates and developed into apes. Changes in the climatic conditions led to better adaptability towards

open lands and hence gave birth to bipedalism. From thereon, began the birth of closest ancestors of humans who walked on foot. From *Dryopithecus*to *Australopithecus* to *Homo sapiens,* modern humans evolved merely 40,000-10,000 years ago through the process of evolution, spanning along from 6 million years ago to 40,000 years ago.

2.7 KEY WORDS

Bipedalism : the ability to walk upright.

Fossil : remains or impressions of prehistoric plants, animals or humans. Human fossils are primarily found in the form of skeletons and teeth.

Mutation : action or process of altering the structure of a gene.

Paleoanthropologist : expert who studies the origins and predecessors of the present human species, using fossils and other remains.

2.8 ANSWERS TO CHECK YOUR PROGRESS EXERCISES

Check Your Progress Exercise-1

1) See Sub-section 2.2
2) See Sub-section 2.3.1
3) See Sub-section 2.3.2
4) a) Exponentially, Arithmetic Rate
   b) Lamarck
   c) Natural Selection
5) Compare Sub-section 2.3.2 and 2.3.3 (see 2.3.3 carefully)

Check Your Progress Exercise-2

1) See Section 2.4 and Sub-section 2.4.1 to 2.4.4
2) See Sub-section 2.4.1
3) See Sub-section 2.5.2
4) a) Lucy, Donald Johanson, Hadar in Ethiopia
   b) Wise Human
   c) Homo Erectus
   d) Olduvai Gorge in Tanzania, East Africa.

2.9 SUGGESTED READINGS

Brown, P. 1992. 'Recent human evolution in East Asia and Australasia'. *Phil. Trans. R. Soc. Lond. B*, *337*(1280): 235-242.

Hall, B., & Strickberger, M. W. 2008. *Strickberger's Evolution*. Jones & Bartlett Learning.

Krause, J., Fu, Q., Good, J. M., Viola, B., Shunkov, M. V., Derevianko, A. P., &Pääbo, S. 2010. 'The complete mitochondrial DNA genome of an unknown hominin from southern Siberia'. *Nature*, *464*(7290): 894.

Rafferty, J. P. 2018. Gigantopithecus. Encyclopaedia Britannica.

Raven, P. H., Johnson, G. B., Losos, J. B. & Singer, S. R. 2005. *Biology Seventh Edition.* New Delhi: Tata McGraw- Hill Publishing Company Limited.

Reif, W. E., Junker, T., &Hoßfeld, U. 2000. 'The synthetic theory of evolution: general problems and the German contribution to the synthesis'. *Theory in Biosciences*, *119*(1): 41-91.

Spencer, H. 1862. *First Principles*. McMaster University Archive for the History of Economic Thought.

Smithsonian National Museum of Natural History. Accessed on August 28, 2017. https://www.si.edu/

Stone, Linda, Lurquin, Paul F. and Cavalli-Sforza, L. Luca. 2006. *Genes, Culture and Human Evolution: A Synthesis*. New York: Wiley-Blackwell.

PDF:

How humans evolved.

www.mhhe.com/biosci/genbio/raven6b/graphics/raven06b/other/raven06b_23.pdf

https://www.britannica.com/animal/Gigantopithecus

https://www.jstor.org/stable/pdf/4330635.pdf?refreqid=search%3A57645ec65070a67f12177cb266930cc7

https://www.jstor.org/stable/pdf/192425.pdf?refreqid=search%3A1c2eb48887010d229bb6ab4511e283e5

https://www.jstor.org/stable/pdf/24931324.pdf?refreqid=search%3Aec37a33d68c0038dbf95a1537f171fc0

https://www.jstor.org/stable/pdf/2742808.pdf?refreqid=search%3Ad44a9ef7270a9ad75f42b6c72cd2472a

https://en.wikipedia.org/wiki/Human_evolution

2.10 INSTRUCTIONAL VIDEO RECOMMENDATIONS

Origin of Humans
https://www.youtube.com/watch?v=SUfujVWcj5I

The Neanderthals: First Peoples of Europe
https://www.youtube.com/watch?v=FbAptAnrwN8

New Human Ancestor Discovered: Homo naledi
https://www.youtube.com/watch?v=oxgnlSbYLSc

Ape to Man: Evolution Documentary
https://www.youtube.com/watch?v=5sMqFivWTmk

UNIT 3 PALAEOLITHIC AND MESOLITHIC CULTURES*

Structure

3.1 Objectives

3.2 Introduction

3.3 Palaeolithic Cultures

3.3.1 Perspectives on Gender Division of Labour in Palaeolithic Society

3.3.2 Lower Palaeolithic Cultures

3.3.3 Middle Palaeolithic Cultures

3.3.4 Upper Palaeolithic Cultures

3.3.5 Artistic Expressions

3.4 Mesolithic Cultures

3.4.1 Environmental Changes

3.4.2 Microlith Tools

3.4.3 Subsistence Pattern and Social Complexity

3.4.4 Mesolithic Cultures in Europe

3.4.5 Mesolithic Cultures in Scandinavia and Britain

3.4.6 Mesolithic Cultures in Southwest Asia

3.5 Summary

3.6 Key Words

3.7 Answers to Check Your Progress Exercises

3.8 Suggested Readings

3.9 Instructional Video Recommendations

3.1 OBJECTIVES

This Unit looks at the **Palaeolithic** and **Mesolithic** cultures in the world context.

After going through this Unit, you would be able to:

- Explain the meaning of the term Palaeolithic and Mesolithic;
- Identify the tool technology associated with these cultures;
- Provide illustrations from the sites associated with these cultures;
- Outline the cultural features of these cultures; and
- Describe the Palaeolithic and Mesolithic cultures as a process of evolution.

3.2 INTRODUCTION

The beginning of the story of humans is connected with cultural evolution. As Ian Hodder (2016), the British archaeologist opines, human association with tool making and other material culture contributes to evolutionary changes, both biological and cognitive. In a similar vein, William Andrefsky Jr. (2009) has stated that the lithic technologies and how they are designed, produced, recycled and discarded, tell us about the adaptive strategies of the foragers. Often, the only artefact that survived the vagaries of time and could provide a peep into the lives of the prehistoric humans are the stone tools. To

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understand importance of such early artefacts, this Unit discusses the various forms of cultural patterns, from tool culture to art forms, that had emerged in the world, with a focus on Europe and West Asia.

Story of early humans began when they started making changes to their surroundings and started to interact with their environment. The ability to survive and make tools led to the beginning of cultural transformations. As you would have learned from Unit 2 of this course, the genus Homo had appeared around 2.5 million years ago (MYA) and along with them appeared the stone tools. Tool has been described as a human-made object used to perform manual work. Tools provide the best evidence for cultural changes. With the technique of flaking (peeling out small pieces of stone from a larger one) tools were turned into distinct shapes and could be put to different functions. The distinctions in shaping and functioning of the tools emerged as a significant marker of distinction between various cultures. Besides, the adaptive quality was an important survival technique, which ensured proliferation and development of the early humans. The story of humans starts from making simple tools for hunting-gathering and then making innumerable changes, which modified the living conditions of humans.

Historians, anthropologists, archaeologists and physicists have proposed various theories to understand and explain the human cultural development (*History of Humanity,* Vol. I, 1996). C.J. Thomsen for instance, proposed the following three-fold classification of prehistoric cultures:

a) The early Palaeolithic as representing the food-gathering stage,

b) Later Palaeolithic as the stage of organized hunting and selective collection,

c) Neolithic as the food producing stage.

S. Nilson, on the other hand, formulated four stages of evolution in terms of savage, huntsmen or nomads, agriculturists and civilization stages. According to Edward Taylor, human beings had common sense and rational behaviour which led to cultural development. He mentions three stages of human cultural development as: savagery, barbarianism, and civilization. American anthropologist, Lewis H. Morgan (in *History of Humanity*, Vol. I, 1996) holds social evolution as a result of human societies adapting to the stress of their environment and classified them into seven stages of development, starting from lower stage of savagery going through a stage of simple food gathering and culminating into the stage of civilization when the society developed writing.

3.3 PALAEOLITHIC CULTURE

The term '***Palaeolithic***' is made up of two Greek words: *palaios* meaning 'old' and *lithos* meaning 'stone' and is used to indicate 'old stone age'. The term was coined by archaeologist John Lubbock in 1865 and is used for the period of prehistory from around 2.5 million years ago when humans began to make stone tools.

Evolution of humans from *Homo habilis* to *Homo sapien sapien* is a long-drawn process, about which you learnt in Unit 2 in relation to the biological changes. The changes that led to evolution were not just biological but cultural as well. The cultural changes had a major role in the development of the early humans. In this context, when we mention cultural changes, we are not only referring to manufactured stone tools and how they evolved over a period of time, but also changes in the environment and accessibility to resources. The latter includes the hunting strategies, methods of communication, ability to control fire, making and modifying tools, subsistence patterns, burials, paintings and so on.

Closely linked to the tools produced is the question about the use of these tools. This is invariably linked to the subsistence strategy of the period. Howfar was hunting the basis of the economy has been an issue of debate among scholars. Can we designate the early humans as hunters or as hunter-gatherers or as scavengers? And even on the basis of the evidence found in terms of tools as well as fossil records, can we talk about a gendered division of labour?

3.3.1 Perspectives on Gender Division of Labour in Palaeolithic Society

For a very long time the 'Hunting hypothesis' was the most accepted theory which talked about hunting as a way of life and was understood as a male activity. Hunting was portrayed as the central economic pursuit and it was assumed that men controlled food provisioning and sharing. It was believed that men were the leaders and 'in-charge' of and also dominant over women and children. It was held that women, owing to their reproductive capabilities, were limited to function as mothers and caretakers which also restricted their movement beyond the base area. On the other hand, men took upon the responsibility of hunting, and bringing food to the base –Richard B. Lee and I. Devore (1968) began with the concept of Man the Hunter, in a symposium, and later book of the same title. These theories that are based on gender polarization have been strongly criticized by a set of scholars such as Nancy Tanner, A. Zihlmann (1978) and others who refute the notion of a gendered division of labour in prehistoric societies. These scholars understand hunting as opportunistic in nature. According to them, the crude tools and their functions suggest that hunting was not the main economic activity of the early humans rather they were scavengers. These scholars question the assumption that all women were mothers and argue that the notion of child-bearing as basis of labourdivision is misleading. Many ethnographic studies show that women worked as tool-makers in early times. For example, Joan Gero (in Kathryn W. Arthur, 2010), a pioneer in feminist archaeology, argues that women in prehistory must have been tool-makers for they would have required **flakes** to carry out a number of tasks. Ethnographic studies show that women contributed a large share in food production processes in most foraging societies. Further, in many societies, women went for hunting, alone and along with men. In a way, foraging challenges the notion of gendered division of labour in prehistoric societies.

Furthering the arguments of these scholars is the Gathering hypothesis according to which women played a central role as opposed to men in prehistoric period. This theory suggests that women used tools to gather and process plant food. They argue that gathering was an equally important activity and should not be qualified as less productive 'women's work'or equated as being less productive. This hypothesis, however, accepts the presence of gendered division of labour in the early societies. Scholars such as A. Zihlman (1978), supposes that the human way of life was not based on sexual division of labour but on a system where male as well as female collect and engage in predatory behavioural flexibility which was a major contributing factor to early hominid survival. In a way both contributed equally in the early society which was pertinent for their survival.

3.3.2 Lower Palaeolithic Cultures

The palaeolithic culture may be divided into three periods based on the type of tools, social and economic changes, nature of habitation and a few other criteria. It begins with the Lower Palaeolithic Culture as we will be discussing in this Sub-section.

Brian Fagan (2014) points out that four criteria have been commonly used to define a 'human'. First, the brain size that should be more than 600 cubic centimeters. Secondly,

possession of language, which can be identified from the patterns found inside the brain case. Third, having a human-like precision grip and opposable thumb. And lastly, the ability to manufacture tools.

Who were the first tool makers or the first 'humans' has been an enigma in prehistory. The human species named *Australopithecus garhi*, dated to 2.5 million years ago is an interesting find in this context. The specie's brain size was one-third of that of the early humans and features were ape-like. But bones of deer and antelope, found nearby the fossils of *Australopithecus garhi*, had cut marks from stone tools. Although no tools have been found yet such evidence makes the identity of the first tool-makers difficult to ascertain. Moreover, evidence suggests that these early human species were meat eaters and used some sort of stone tools.

The tools made by the *Homo habilis* were simple and crude tools which were first found are believed to have existed around 2.5 million years ago. The technology associated with them is called the Oldowan tool technology, named after Olduvai Gorge in Tanzania, the place where these tools were first discovered. Chopper-chopping tools are considered theearliest tools. These were generally made by percussion method (i.e. striking one object to another), usually hitting a lava cobble with another. The flakes (small, thin piece of scraped stone), thus produced were long and sharp which were used to make scrapers and cutting tools to cut or scrape wood, plants, skin and also meat.

Nicholas Toth (*History of Humanity*, 1996) has argued that the first tool-makers had a clear understanding of the potential of the tool, as well as the mechanics of the tool technology. Tool-making required good hand-eye coordination, ability to recognize acute angles in stone and mental processing for shaping a tool. The shapes and edges in a stone thus make it possible to identify if it was prepared as a tool by the early humans. D. Strout (2011) has shown that even the simple artefact such as the Oldowan tools, involved a complex method which consisted of careful selection of the raw material, followed by flake production and then flake detachment. Following this, working on the percussion method, tools could be produced.

Figure 3.1: Oldowan Stone Chopper

Credit: José-Manuel Benito Álvarez, 2007

Source: https://upload.wikimedia.org/wikipedia/commons/a/a7/Oldowan_tradition_chopper.jpg

The Oldowan technology was the only form of tool technology in use for more than a million years. The term **'knapping'** has been used to describe removal of flakes from the core and the term 'debitage' is referred to indicate the waste material. The earliest core was simple unipolar (single) core from which one or two flakes were removed. Later, early humans moved to more complex Levallois technique where flakes of pre-determined size and shape could be removed. The earliest cores were generally called the pebble-tools.

The recent research on tool usage shows that the Oldowan tools were not hunting tools and were useful in chopping or scraping plants and animals. They were mostly used to process carcasses, for skinning, opening joints and meat and breaking to open bones. Both at Olduvai Gorge and Koobi Fora (near Lake Turkana in Northern Kenya) large number of animal bones along with tools concentrated over a small area have been found. With the presence of other predators, absence of the discovery of fire or domestication of animals at this stage, the early hominids were mostly dependent on opportunistic foraging for meat along with gathering plants for their diet which explains the presence of animal bones along with tools at these sites.

Steven Mithen (1995) believes that the cognitive or learning and understanding ability of the early humans was important as it was a method of understanding their surroundings. Social intelligence might have also evolved with these changes that could be seen in terms of subsistence pattern, tool making etc. Anthropologist Robin Dunbar (in Fagan, 2014) has argued that *Homo habilis* must have lived in groups, as it was an essential survival strategy. G. Clarke (in Fagan, 2014) suggests that they probably made some kind of shelter with branches supported by stone structure. Another development associated with this period is communication skills. They must have been using grunts and gestures to communicate. The ability to interact with others would have paved way for other complex social interactions, which would have further contributed to the increase in their cognitive abilities.

The coming of the *Homo Erectus* has been associated with not only biological changes but also significant changes in the tool technology. These early humans were associated with the Acheulian tool technology, named after the site named Saint Acheul in France. This technology involved bifacial tools i.e. flaking was done on both sides and these tools were thus sharper and better. They were multipurpose tools, which were used for wood-working, scraping skin as well as butchering animals. Tools such as hand-axes and the cleavers come into picture for the first time and proved to be very useful as they could be sharpened multiple times. Evidence of butchery and big-game hunting have been found at sites such as Boxgrove (West Sussex, England), and Ambrona and Torralba (Central Spain). At Ambrona and Torralba, crude hand-axes, cleavers, scrappers and cutting tools have also been found. Evidence indicates that big animals such as elephants, rhinoceros, bison, deer etc. were dismembered in these sites. Many scholars believe that these sites represent sophisticated hunting with farsightedness and planning.

FLAKES

- Flakes are categorized into two groups: by-products and intentional flaking.
- Flakes can be produced as a result of tool working and are part of flake debris.
- Intentional flakes could be produced by methods such as the Clactonian, the Levallois and the Mousterian, details of which are highlighted further in this Section.

Figure 3.2 : Different sides of an AcheuleanHandaxe. Found at Haute-Garonne France, dated 500 000 and 300 000 BP

Credit: Didier Descouens,2010

Source:https://upload.wikimedia.org/wikipedia/commons/8/87/Biface_Cintegabelle_MHNT_PRE_2009.0.201.1_V2.jpg

The most characteristic tool of the Acheulean technology was the hand-axe, a tear-drop shaped tool. Based on the innovations in tool technology,the Acheulian technology can be divided into early and late phase. Production of large flakes called blanks, suitable for shaping into a hand-axe was a key innovation of early Acheulean technology though in this phase the hand-axes were small and symmetrical tools. The *Homo Erectus* were better hunters and could use such hand-axes as projectiles. Thus, the hand-axe could be used both as a tool as well as a weapon. Another important tool was the cleaver, which was a large flake with a straight cutting edge at one end and shows no signs of retouch. These tools could be reused, re-sharpened and recycled as a flake tool. Wood, antler, and bones besides stones were used as material for producing these tools. Inclusion of meat in their diet led to other kinds of social changes, such as group formation and a distinct tool kit. The tools such as scrapers, cleavers, side-scrapers, bola stones and others were simple, efficient tools which were produced at this time.

Figure 3.3 : Clactonian hand axe, dated to about 350,000 years BCE and excavated from Rickson's Farm Pit, in the United Kingdom.

Credit: Bellroth, 2010

Source: https://upload.wikimedia.org/wikipedia/commons/6/6e/Hand-axe-Clactonian.JPG

By the later phase of Acheulian technology, tools were produced using prepared core technique i.e. first, the core was knapped and then flakes were produced to make the desired tool. A distinct lithic assemblage associated with Lower Palaeolithic technology is the Clactonian technique, named after the site Clacton-on-Sea, Essex, England. As per Henry Breuil's (in M.Y. Ohel, 1978) characterization of these tools, they were

large, wide and thick flakes, produced by block-on-block method. These were considered distinct from the Acheulian tools. However, many recent scholars such as Ohel and others do not see Clactonian technique as a distinct tool technology but instead, as constituting part of the flaking process. This method is sometimes understood as Lower Palaeolithictool culture without the hand axe. Many scholars hold this method as a precursor to the Levallois technique.

Homo Erectus were the first group to move out of Africa which again reflected their adaptive quality. They could adapt to harsher climates from the Savanna in East Africa to Java, Northern Africa, Europe, Asia, etc. They were also associated with the ability to control fire. Earliest evidence of hearth-like arrangements has been discovered from Wonderwerk Cave, South Africa, dated 1.8 million years ago. Other sites such as Swartkrans (South Africa) and Chesowanya (Rift Valley, Kenya) have also shown frequent use of controlled fire along with ash and bone fragments. Similarly, at Gesher Benot-Ya'agov in Israel, dated to 790,000 years, charred wood and seeds have been discovered. In Zhoukoudian Caves in Beijing, China dated to 400,000 years, evidence of charcoal, burned bone fragments and ash accumulation in hearth indicates that the hominids used fire. They made flakes from quartz. They also made chopper, scrapers, awls, crude points and other artefacts.

The subsistence pattern of the Lower Palaeolithic period was based on hunting, scavenging as well as gathering plant food. They probably by now had better understanding of the seasons. They lived in large bands and sometimes when there was abundant plantfood, they lived in smaller bands. This would reflect considerable social intelligence and flexibility. They had a well developed Broca's area (region in the frontal lobe of the dominant hemisphere, usually the left side of the hominid brain with functions linked to speech production) associated with speech. Therefore, on the basis of this evidence it is inferred that the hominids might have had the potential for articulate speech. Development of language gave stimulus to development of brain besides being a means of communication in addition to gestures and grunts.

The Lower Palaeolithic culture reflects the evolutionary processes from making simple Oldowan tools to more complex Acheulian tools. Along with the biological changes which marked the foundation of a human society, transformations could be seen in terms of the subsistence pattern, control of fire, group formation and language.

Check Your Progress Exercise-1

1) Discuss the subsistence strategies during the Lower Palaeolithic period.

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2) Write a short note on the Oldowan tool technology.

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3) What are the cultural changes associated with the *Homo Erectus*?

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3.3.3 Middle Palaeolithic Cultures

The Middle Palaeolithic period (*c*. 78,000 to 128,000 Years Ago) was based on a new tool technology, newer forms of subsistence strategy as well as another specie of the hominids, the Neanderthals. The Neanderthals were associated with a distinct tool kit i.e. the Mousterian tools. The Mousterian tools were made with two prominent methods: the Levallois method and the Disk core technique. In these techniques, the core is prepared and then flakes of pre-determined shape and size are removed. Thus, the tools are much sharper as well as smaller in size. The core gradually becomes smaller and the flat disk can be used for points and scrapers.

The Levallois technique is understood as a method of reduction i.e. knapping to produce large flakes, generally oval in shape, and with acute-angled, sharp, usable edges. Most importantly, this method was used to predetermine the shape of the end-product before their removal from the core. This method was used to produce a variety of flakes, such as sub-circular flakes, blades, blade-like flakes, etc.

Figure 3.4 : Levallois point found from Beuzeville in France

Credit: Didier Descouens, 2010

Source:https://upload.wikimedia.org/wikipedia/commons/c/cf/Pointe_levallois_Beuzeville_MHNT_PRE.2009.0.203.2.fond.jpg

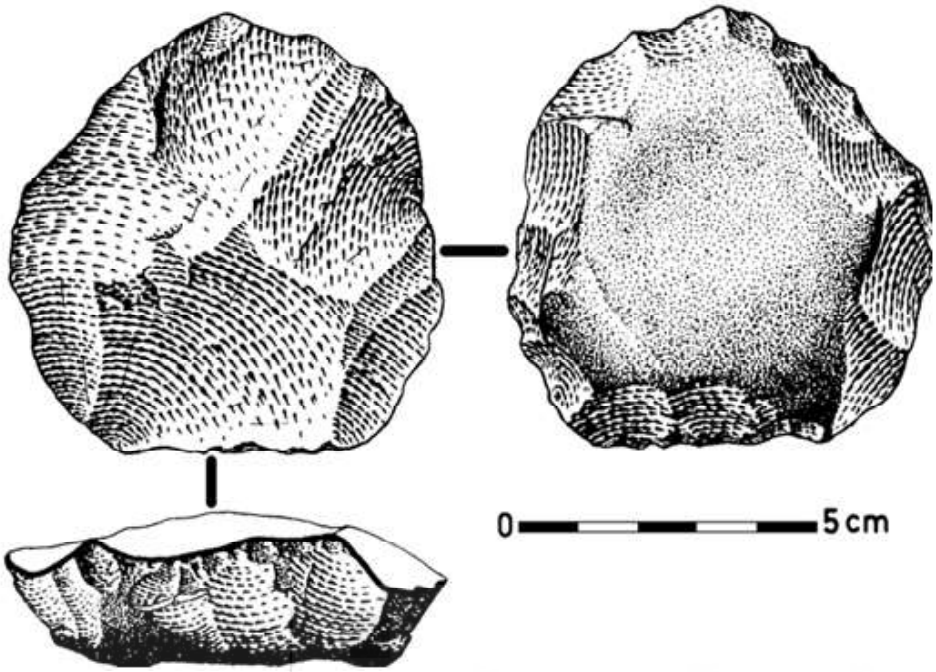

Figure 3.5 : Levallois Technique

Credit: Jose-Manuel Benito Alvarez

Source: https://commons.wikimedia.org/wiki/File:Levallois-Nucleo_reiterativo.png

By this period composite tools were being produced. Cultural variability is reflected in the Mousterian tool, named after the site Le Moustier, southwest France. These were mostly flake tools, of which most common were scraping tools, burins and spear points, besides hand-axes, notched flakes which were used for stripping meat, etc. For example, a spear was produced by combining a point and shaft held together with a binding material. This assisted Neanderthals to hunt better. There is great variability in Mousterian technique which has been a matter of debate among scholars. According to P. Bordes (1961), the variability reflected different time-periods, and variable climate or seasons. Lewis and Sally Binford (1966) hold that the tool variability represents different tasks done by the Neanderthals although these tasks remain unclear. The artefacts such as stone spear points were not multipurpose and they were used for specific purposes.

Neanderthals occupied large territories on a seasonal round i.e. they came back to same location year after year. They knew their local environment well and planned their migrations accordingly. They lived in bands in caves and rock shelters. They were good hunters and hunted large animals such as mammoths (an extinct species of elephants), reindeers, wild horses besides birds and fishes.

Another very important complexity associated with the Neanderthals was their religious beliefs. Many scholars believe that the Neanderthals buried their dead. Burials have been discovered from rock shelters and caves as well as in open air sites. Single burials were more common and contained flints tools and food/charred meat. Such burials have been found in Shanidar Caves in Zagros mountains, Iraq. Another site is La Chapelle-aux Saints in France which has provided evidence of a burial with bison leg on the chest, bone tools and other debris. Many scholars believe that these are circumstantial and not intentional burials. La Ferrassie, a rock shelter in Les Eyzies in France has yielded remains of two adults, and four children buried close together in a camp site. However, Fagan (2014) says that although the Neanderthals buried their dead but to associate it with afterlife can be questioned.

The Middle Palaeolithic period saw changes not only in terms of better tools and complex hunting strategies but also in terms of social and environmental adaptive strategies. Besides we have evidence of some rituals in terms of burial practices which makes early humans different from other animals.

Check Your Progress Exercise-2

1) How would you differentiate between the Lower and Middle Palaeolithic period?

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2) Discuss the Neanderthals and their culture.

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3.3.4 Upper Palaeolithic Cultures

The first fully evolved human specie is known as the Cro-Magnons, named after a rock shelter in Les Eyzies in southwestern France. They settled in southeastern and central Europe around 40,000 years ago and had entered southwestern France by 35,000-40,000 years ago. The tool technology of the Upper Palaeolithic period was called the Blade technology. The Cro-Magnons made sharp long parallel side blanks which could be used to produce a wide spectrum of artefacts for a range of activities from hunting, butchering, processing skin, woodwork or cloth manufacturing, among others. The blade tools were effective tools such as the scrapers, awls, knives, eyed-needles burins, etc. The tools were made of bones, stones as well as ivory. Flint, chert or obsidian were also commonly used for the production of tools. They refined the burin, which was an engraving tool and contributed in efficient antler and bone working. The technique used for bone and antlers was called the groove and splinter technique.

The economy of the period was based on gathering and hunting which included fishing. The Cro-Magnons of western and central Europe developed more elaborate and sophisticated hunting cultures. These cultures not only differed in terms of tools but also in terms of social and religious life. The Cro-Magnons of these regions migrated towards the river valleys. They not only hunted big animals but also smaller animals such as rabbits, wolves, birds etc. besides gathering plant food. As Fagan has pointed out, they mostly lived in small groups subsisting on range of games and stored food and would have come together in larger groups during spring, summer and early fall when reindeer were abundant. In winters they would diverge into smaller groups again.

Some Upper Palaeolithic Cultures

One of the prominent cultures of the Upper Palaeolithic period is the Chatelperronian

culture which was dominant in Western Europe and is dated to around 35,000-30,000 BP. This culture was known for making blades. Most common tools were side-scrapers, denticulate implements (stone tools containing one or more edges), points, besides burins, knives, chisels etc. The characteristic tool of this culture was the Chatelperronian knives made from a blade with one cutting end while the opposite edge was curved or blunted. People of this culture also made bone tools. They had well organized dwelling structures. Mostly, there were circular dwellings with calcerous blocks (i.e. soil with more calcium carbonate) around hearth with postholes or mammoth tusks stuck into the ground.

Another important culture of this period is the Leaf-shaped Point Culture. This culture was found around the same time as the earlier culture in some sites in Britain and Russia. Like the Chatelperronians, people of this culture also made knives but they were formed in the shape of a leaf, from which the culture derives its name. One of the important sites of this culture was Les Cottés, France. This culture was considered important as it is held to have led to the formation of Gravettian complexes (the last of the Upper Palaeolithic archaeological industry) in central Europe.

However, preceding Gravettian Culture was the Aurignacian Culture which can be dated to around 40,000 BP in West Asia. It is believed to be the culture of the Cro-Magnon man. The tool culture is represented by beaked burins, keeled scrapers, end scrapers besides many varieties of bone tools. The culture also provides evidence of ornaments such as pendants, ivory beads, drop-shaped pendants and rings besides perforated teeth. Moreover, ivory figures have been found in caves of Swabian Jura, Germany, which generally depict animal forms in round. Rock shelters at other sites have also been found with engravings representing animals and humans. At Les Eyzies, Dordogne, France a group burial was found in a Cro-Magnon shelter.

The Gravettian Culture, dated from 27,000-22,000 BP, is known for thin blades which are called the Gravettian points. People also used barbs and flat leaf-shaped darts. Other tools such as scoops, picks, pickaxe were used for making dwelling structures. They used both bones and antlers as raw material. Round dwellings were found with tombs and open areas for making figurines. This shows that these would have been permanent dwelling places, which included both natural shelters and open-air spaces.

The Gravettians were particularly known for the 'Venus figurines'. These were female figurines with broad hips, pendulant breasts and prominent posteriors. The limbs were mostly broken, and these figurines had no facial features. In DolníVstonice, Moravia, Czech Republic, the figurines were made of soft stones, ivory or terracotta. In Moravia as well as Ukraine, besides female figurines, figurines of animals such as rhino and mammoth were also found. These figurines are presumed to have been used for cultic or religious practices.

The Solutrian Culture dated to around 20,000-15,000 BP found mostly in France and Spain, may have come from the earlier Gravettain Culture. This culture produced various kinds of points, barbs, needles and eyed-needles from bones. They had sub-circular dwelling structures and provide evidence of cave paintings and engravings. The bas-relief carved on the blocksat Solutrian sites represent potbellied, short-limbed animals. This culture declined soon and gave way to the Magdalenian Culture in Western Europe.

The Magdalenian Culture dated from around 18,000-8,000 BP. The culture is known for building complex settlements. People of this culture also made composite tools such as the **microlith** projectiles, bows, harpoons and bladelets. This culture is also known for its artistic accomplishment especially the Cave art, which is discussed in the next Sub-section.

But before we move onto that, it is important to recall that the Upper Palaeolithic period was represented by regional variations in terms of tools used, dwelling structures, hunting strategies, etc. The development of the Upper Palaeolithic cultures was further marked by their artistic activities to which we now turn.

3.3.5 Artistic Expressions

By 48,000 years ago, Europeans started making ornaments such as beads, pendants, perforated teeth etc. besides making figures on cave walls. There are two major varieties of pre-historic art:mobilier and parietal. Decorations or art work executed on a movable object or one that can be moved from one place to another is called art mobilier or home art. Ones that are found in cave walls and ceilings is called cave art or parietal art. Moreover, prehistoric art comes in various forms such as engravings, paintings, bas-relief etc. and all these forms of art can be witnessed as early as the Upper Palaeolithic times. Another important form of artistic expression was flutting, which were zig-zag marks made on the cave walls. Scholars believed that these were made by children but supported by adults as these have been found at considerable height on the walls. It is assumed that these were assigned to children based on the mere simplicity of such art forms. Although scholars also believe that such art forms must have held some ritual purposes as well.

The paintings show the cognitive ability and greater emotional power of the prehistoric humans thus were understood as a way of communication. It was believed that they represent symbolic meanings which is difficult to comprehend. It represents a deeper understanding of their social, spiritual and natural worlds into a single continuum (Fagan, 2014).

Palaeolithic art was executed on stone, bone, antlers, wood, clay and ivory. The art includes depiction of Venus figurines, ornaments such as pendants and beads and musical instruments such as flute, found in Germany. The Magdalenians also decorated harpoons, spears and other artefacts with naturalistic engravings. Stephen Mithen (1995) holds that as a result of higher cognitive ability there have been two major consequences, first complex social relationships and second development of visual symbolism, i.e. development of art as a means of communication and expression.

Rock Art

Most famous Upper Palaeolithiccave art is found in sites such as Lascoux (south west France), Les Cambarelles (Les Eyzies de Tayac, Dordogne, France), Altamira (Cantabria, Spain) and Grotte de Chauvet, France. The cave art from these sites usually depict animal motifs, human figures andanthromorphic (such as human-animal forms) figures. They also represent abstract and non-naturalistic signs, generally called tectiforms. Such art was made on murals or painted over the natural shape of the rock wall. The engravings and the bas-relief were also repeated in clay and stone slabs found near and around the cave sites. The painting was done with pigments prepared by grinding naturally occurringochres, mineral oxides etc. with fat and blood of animals and other materials such as urine, water etc. Black, red and occasionally yellow pigments were mixed or used separately to draw outlines. In Grotte de Chauvet, France, dated to around 30,000 BCE, more than three hundred paintings have been found. The paintings give an effect of movement which was achieved by depicting over lapping heads of animals in motion.

The Magdalenian site of Lascaux in South West France dated to around 16,000 BCE in its painting depicts wild horses, bulls, reindeer, and other animals. The colours used

for these paintings were derived from the minerals and most common was hematite i.e. red. Besides this, manganese, natural earth and charcoal, both natural and burnt mixed in blood or animal marrow or fat were also used as colouring agents. Early humans used feathers, twigs and hair as brush, besides using their fingers. They mostly made paintings on the natural surface of the rock. They generally preferred plain and smooth surface but again that was not the sole criteria in choosing a surface as they also made figures at a height, on ceilings and deep inside the caves. The bodies of the animals were generally left blank and the pictures range in sizes from small to very large ones.

Figure 3.6 : Altamira Cave Painting

Credit: Museo de Altamira y D. Rodriguez, 2010

Source:https://upload.wikimedia.org/wikipedia/commons/8/8b/9_Bisonte_Magdaleniense_polícromo.jpg

Scholars do not have a unanimous opinion for the existence of these art forms. Some scholars believe that these art forms represent ritualistic belief. Others argue that they were made for aesthetic purpose. While a few scholars associate the Palaeolithic cave art with magic or sorcery. Scholars such as Gordon Childe have argued that these were not amateurish work rather they were well made and that these early societies must have specialists who made such paintings. This brings us to the question as to why a society based on subsistence economy spent time and energy in making these paintings in difficult to reach caves. H. Breuil (in Fagan, 2014) has stated that the hunter-gatherers performed rituals in these caves and such practices were to ensure success of hunt. In fact, some experts like Lewis-Williams and Dowson (in E. Palacio-Perez, 2013) argue that cave art was involved with shamanistic rituals and the animal figures were images of spirit creatures or life force for the shamans. In contrast to these ideas, many scholars believe that the cave arts simply represented the world of the early humans. They were also explained as sympathetic magic oftotemism by Ucko and Rosenfeld (in E. Palacio-Perez, 2013). Thus, interpretations of Palaeolithic art vary from pure aesthetics to a functional view.

Check Your Progress Exercise-3

1) Write a note on the Upper Palaeolithic cultures in Europe.

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2) Evaluate the Rock art and how does that represent the complexity of the Upper Palaeolithic period.

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3.4 MESOLITHIC CULTURES

The term Mesolithic means Middle Stone Age. It is generally understood as a prelude to Neolithic. This period is recognized in terms of marked reduction in tool size and striking climatic changes. It witnessed the end of the Ice age and beginning of a warmer period and then again a colder phase later. The warmer period led to increase in sea levels. Coasts, estuaries and lakes became highly productive and aquatic resources therefore were well utilized (Fagan, 2014). These changes had an impact on vegetation as well as the animals found, for example woolly mammoths disappeared and deer became more common. Plant food such as nuts became more prevalent. Increase in food would have contributed to an increase in population.

3.4.1 Environmental Changes

Major changes were seen with the Holocene epoch, a geological division which started from around 13,700 BP. The climatic fluctuations and changes could be noticed in terms of the end of Palaeolitic phases and beginning of new small tools, called microliths, changing hunting strategies with introduction of bows and arrows besides intensive gathering (as will be discussed in this Sub-section). The climate was becoming dry and arid and along with it there were changes in the flora and fauna in this region. Population had also increased and led to two kinds of changes. Firstly, change in the use of tools and secondly a change in the utilization of the available food resources.

Mesolithic gained recognition as a distinct cultural phase with the discovery of Mas d'Azil, a cave site near France. In this site, the Mesolithic tools were found over the Magdaenian tools of the Upper Palaeolithic period and with this discovery, a separate phase was identified in Europe. The Mesolithic period has been often defined as the culture between Palaeolithic and Neolithic.

D. Price (1991) holds that Mesolithic is not exclusively associated either with utilization of microlithic tool or with the exploitation of forest or coasts nor with the domestication of dog. It can be defined as a post-glacial period prior to the introduction of agriculture. Clark also holds that the Mesolithic period was essentially a prelude to the fundamental changes in the development of culture rather than in being the dead end.

3.4.2 Microlith Tools

The tools that are associated with this period are called the microlith tools. These were small in size, sharp and very useful. This period also saw development in terms of better composite tools and weapons. The Microliths were generally made in geometric forms, such as triangular and trapezoidal but they were also made in non-geometric forms such as the lunates and others. The blade technology of the earlier period was further modified in this period and various backed-bladelets have been found. The period is also associated with the use of bows and arrows which must have made the Mesolithic humans better hunters. The period is moreover marked by increasing localization of artefacts and the formation of new cultures as will be discussed in the next Sub-section.

Figure 3.7 : Microlith Tools
Credit: York Museums Trust, Ellie Cox, 2018
Source: https://upload.wikimedia.org/wikipedia/commons/d/d0/Microlith_%2C_Mesolithic_%28FindID_628327%29.jpg

Fishing was commonly practiced during this period as can be seen from the tool kit which now included barbs, harpoons, spears etc. which were specialized tools used for fishing. Tools were made of stone, bone and wood. Other tools such as knives, axes, spearheads, blades, chisels, wooden arrowheads etc. have also been found from this period. The bladelets were made with pressure flaking technique and thus the tools were more regular in design with parallel edges. By this period, humans could produce well-shaped projectile points in some parts of Europe.

3.4.3 Subsistence Pattern and Social Complexity

The Mesolithic economy was based on hunting, gathering and fishing. The Mesolithic humans lived in groups in semi-permanent or permanent settlements near river banks. Star Carr in England is an important Mesolithic site dated to around 9500 BP. There is evidence that, by this period, humans had domesticated or befriended dog. Though the Mesolithic economy does not show any marked change from the preceding Upper Palaeolithic economy.

Fagan (2014: 292) mentions that the Mesolithic was a period of broad variation in

economic and social life with intensification of food gathering strategies in uncertain climatic conditions. The ability to adapt to newer circumstances was seen from the Upper Palaeolithic period. It became more relevant during the Mesolithic period. These strategies involved new tools which were useful in hunting aquatic resources such as sea mammals and fishes. According to Binford (in Fagan, 2014), during the Mesolithic period, humans settled around the river valley due to the availability of fishes. The availability of water resources allowed the societies to become sedentary and capable to handle the increase in population. C. Gamble (in Fagan, 2014) on the other hand, holds that the shift to river valleys was the result of an increase in population that led to shortage of food and thus aquatic resources was the last resort. Fishing was labour intensive and not as nutritious as food resources on land. David Yesner (in Fagan, 2014) takes a different perspective and argues that with changing environment, population pressure, and food shortage shifting to aquatic resources was the 'optimal strategy' for early humans.

3.4.4 Mesolithic Cultures in Europe

The Mesolithic in Europe is represented by different cultures as result of variation in climatic changes and newer food collection and hunting strategies as well as different tool cultures. The Azilian, Sauveterrian, early Tardenoisean, Asturian and Larnian were most prominent in western Europe while the Maglemosian, Kitchen-Midden, and Campignianwere prominent in northern Europe. In the Mesolithic culture of Western Europe importance of shellfish can be noticed. Trapezoidal microlith was found in large numbers in many of the sites (Gabel, 1958).

The northern European cultures from around 10,000 BP are characterized by the tool technology of bows and arrows, domestication of dog, use of canoes (a narrow water-rowing vessel), and other sea going crafts besides a range of fishing tools such as nets, hooks, traps etc. (Price, 1991). Tools such as axes, celts (long and thin tools made of stone), projectiles (made of bone, wood, antler and stone) also appeared in the northern Europe towards the end of Mesolithic period around 6000 BP. Europe, especially northern Europe, witnessed changing sea levels as a result of melting of glacial ice. This led to an increase in aquatic resources which were well utilized during this period.

3.4.5 Mesolithic Cultures in Scandinavia and Britain

The Mesolithic period in Scandinavia and Britain is characterized by well-marked population pressure and permanent settlement. The coastal villages have revealed mixed economy based on the exploitation of marine as well as forest resources. By the later period, after around 4000 BP, they had begun pottery making. The Mesolithic culture here has three sub-divisions, Maglemose, Kongemose, and Ertebolle periods.

The Maglemosean culture (*c*. 9500-7700 BP) is characterized by river valley settlements with hunting and foraging economy. Most of the sites were summer lakeshore settlements. Evidence suggests dependence on marine resources as lot of fish bones have been found. The people of this culture mostly lived in small huts which occasionally had prepared floors. For example, Ulkestrup in Denmark where huts have been found with bark and wood floors (Fagan, 2014).

Like the Maglemosean, the Kongemoseculture (*c*.7700-6600 BP) also developed near river banks. Segebro, near north-west Swedish coast, is a prominent site of this culture. This site is characterized by rhombic arrowheads. Hunting was the mainstay of the economy. The Kongemose culture was succeeded by the Ertebolle culture.

The Ertebolle culture (*c*. 6600-5300 BP) had an elaborate tool technology with bone,

antler and wood tools. The economy was based on hunting. Fishing was also an important activity as fish was an integral part of their diet. They buried their dead in cemeteries and placed the body in various positions. Sometimes dog was buried with the human corpse. The burials show some kind of social differentiation. Cemeteries found in Zealand (Denmark's largest island) and Scania (southernmost province of Sweden) show increase in social and ritual complexity. Excavations of the cemeteries in Skateholm, south Scania has 40 graves with variable body placements and several interments (burials) of dog.

The tools from Ertebolle culture include axes, trapezes, scrapers, perforated antlers etc. Some cooking pots were also found. The sites also revealed evidence of year round occupation of coastal and inland sites. They had diverse subsistence base with evidence of shell middens and faunal remains.

3.4.6 Mesolithic Cultures in Southwest Asia

Southwest Asia has been a fascinating area specially for the growth of domestication of plants and animals. It is the region which became the cradle of food production. The beginning can be traced from the Mesolithic period with the emergence of the Mushabian and the Kebaran culture which was followed by the Natufian culture. The Mushabian culture emerged around *c.*14,000-12,800 BP in eastern Mediterranean region. This culture is characterized by small geometric microliths. The Kebaran culture (*c.*13,500-11,500 BP) is marked by removing of bladelets from the core. The bladelets were microliths ranging from 4-7 milimetre which were variedly shaped. The economy was based on the practice of hunting and gathering. By *c.*13,000 BP, southwest Asia saw environmental and vegetational changes. Ground stone tools (one of the feature of Neolithic culture) such as pestles and mortars and other implements were found.

The Natufian culture, *c.*12,500-10,200 BP in Levant, has revealed evidence for the beginning of agriculture. It is therefore seen as the period of transition between the Mesolithic and Neolithic phases. This culture was marked by a sedentary lifestyle with village settlements. The culture was defined by microliths, burins, borers, scrapers, blades, knives and picks. Later arrowheads were found. Along with that, querns, pestles, pounders and other ground stone tools and stone vessels were also found. Evidence of fish-hooks, and nets reflects the importance of fish in the human diet of this culture. However, the people of this culture were still hunters and gathers and evidence reveals that they hunted animals such as gazelles, deer, wild goat etc.

Based on their explorations, archaeologists, Anna Belfer-Cohen andOferBar-Yosef (1989) argue that sedentarism can be observed by the early Natufian culture with many sites found throughout Levant. According to them, it was a culturally complex hunter-gatherer society with dwellings, underground storage, graves, flint artefacts, stone and bone artefacts. The evidences show a distinction between 'base camps' and 'seasonal camps' (Belfer-Cohen, 1989:473-74). The change in settlement pattern ranging from sedentary and semi-sedentary base brought change in Levant (Belfer-Cohen, 1989: 474).

Check Your Progress Exercise-4

1) What are the important features of the Mesolithic Culture?

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2) What is the tool technology associated with the Mesolithic period?

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3) Discuss the Mesolithic Cultures found in Europe.

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4) Discuss the importance of the Natufian culture in Southwest Asia as a period of transition.

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3.5 SUMMARY

The Palaeolithic and the Mesolithic period were periods of major transformations and provided the foundation for evolution of the human society. Alongside biological changes, the early humans were making great cultural modifications. From making simple Oldowan tools they reached the stage where they began to produce fine blades. From scavenging they evolved as expert hunters as well as gatherers. From adapting to environmental changes, to adjusting to newer circumstances, early humans paved their way for transformation from a simple hunting-gathering-scavenging society to food producing economies. The changes that we observe in this period in terms of tool technology, society, economy, religion as well as culture paved the way for development of humans to the next stage.

3.6 KEY WORDS

Flakes : small and thin pieces of scraped stone used for making tools.

Knapping : the process of removal of flakes from the core of a stone.

Mesolithic : literally meaning the middle stone age, it refers to

the period of human prehistory between Palaeolithic and the Neolithic periods.

Microlith : small stone tools.

Palaeolithic : period of prehistory marked by the development of stone tools and therefore called the Old Stone Age.

3.7 ANSWERS TO CHECK YOUR PROGRESS EXERCISES

Check Your Progress Exercise-1

1) Mention hunting-gathering and scavenging economies. Also mention tools used and their functions. See Sub-section 3.3.2

2) Mention simple tools such as chopperchopping tools and how useful they were as hunting tools. See Sub-section 3.3.2

3) Changes associated with *Homo Erectus* pertaining to tools, control of fire, language etc. See Sub-section 3.3.2

Check Your Progress Exercise-2

1) Differentiate in terms of tools, their age, their types, useand function, economic activity, societal changes as well as burials. See Sub-sections 3.3.2 and 3.3.3

2) Mention the Mousterian tool technology, hunting strategies, various sites, and burials. See Sub-sections 3.3.2 and 3.3.3

Check Your Progress Exercise-3

1) Mention the cultures found in Europe along with details about their tools and subsistence strategies. See Sub-section 3.3.4

2) Mention details of the rock paintings: their subject matter, colour, choice of stone, themes etc. Also discuss various interpretations to these activities. See Sub-section 3.3.5

Check Your Progress Exercise-4

1) Mention features in terms of food procurement, changes in tools, subsistence economy etc. See Section 3.4. and Sub-sections 3.4.1, 3.4.2 and 3.4.3

2) Refer to microlith tools: their variety and use. See Sub-section 3.4.2

3) Mention both the central European and north European cultures. See Sub-section 3.4.4

4) Mention importance of Natufian as period of transition along with the feature of the culture. See Sub-section 3.4.6

3.8 SUGGESTED READINGS

Andrefsky Jr. William, 2009. 'The Analysis of stone Procurement, Production and Maintenance', *Journal of Archaeological Research*, Vol. 17(1):65-103.

Arthur, Kathryn W., 2010. 'Feminine Knowledge and Skill Reconsidered: Women and Flaked Stone Tools', *American Anthropologist*, New Series, Vol,112(2): 228-243.

Belfer-Cohen,Anna andOfer Bar-Yosef, 1989. 'The Origins of Sedentism and Farming Communities in the Levant', *Journal of Prehistory*, Vol. 3(4):447-498.

Binford, Lewis R. and Sally R. Binford. 1966. 'A Preliminary Analysis of Functional Variability in the Mousterian of Levallois Facies', *American Anthropologist,* 68 (2):238-295.

Bordes, François.1961.'Mousterian Cultures in France', *Science*, New Series, 134 (3482): 803-810.

Childe, V. Gordon. 1956 [1942]. *What Happened in History*, Harmondsworth : Peregrine Books.

Childe, V. Gordon.1945. 'Directional Changes in Funerary Practices During 50,000 Years', *Man*, 45: 13-19.

Fagan, Brian M.,and Nadia Durrani, 2014. *People of the Earth: An Introduction to World Prehistory*,14th edition. New York: Routledge.

Fagan, Brian M., 2002. *World Prehistory A Brief Introduction*.Fifth Edition. New Jersey: Prentice–Hall.

Gabel, W.C., 1958. 'The Mesolithic Continuum in Western Europe', *American Anthropologist*, New Series, Vol. 60(4): 658-667.

Hodder, Ian, 2016. *Studies in Human-Thing Entanglement*. Open Access license from Creative Commons Attribution.

Laet, S.J. de (ed.), A. H. Dani, J. L. Lorenzo Gieysztor and R. B. Nunoo (co-eds.). 1996. *History of Humanity, Volume 1: Prehistory and the Beginnings of Civilization*. UNESCO. London: Routledge.

Lee, Richard B. and I. Devore (ed.). 1968. *Man the Hunter*. New York: Aldine De Gruyter.

Mithen, Stephen, 1995. 'Palaeolithic Archaeology and the Evolution of Mind', *Journal of Archaeological Research*, Vol. 3(4): 305-332.

Ohel, Milla Y. 1978. "Clactonian Flaking" and Primary Flaking: Some Initial Observations', *Lithic Technologies*, 7 (1): 23-28.

Palacio-Perez, E., 2013. 'The Origins of the Concept of 'Palaeolithic Art': Theoritical Roots of an Idea', *Journal of Archaelogical Methods and Theory*, Vol. 20(4):682-714.

Price, Douglas, 1991. 'The Mesolithic of Northern Europe', *Annual Review of Anthropology.* Vol. 20: 211-233.

Sandgathe, Dennis M. 2004. 'Alternative Interpretations of the Levallois Reduction Technique', *Lithic Technology*, 29 (2):147-159.

Stout, Dietrich. 2011.'Stone Toolmaking and the Evolution of Human Culture and Cognition', *Philosophical Transactions: Biological Sciences*, 366 (1567):1050-1059.

Tanner, Nancy and Adrienne Zihlman.1976, 'Women in Evolution. Part I: Innovation and Selection in Human Origins'. *Signs*. 1 (3): 585-608.

Wenke, Robert and Olszewski, Deborah I. 2006 (1980).*Patterns in Prehistory: Humankind's First Three Million Years. Fifth Edition.* New York: Oxford University Press.

Zihlam.Adrienne L. 1978.'Women in Evolution, Part II: Subsistence and Social Organization among Early Hominids', *Signs*, 4 (1): 4-20.

PDF:

https://www.jstor.org/stable/pdf/2949307.pdf?refreqid=search%3Af915cb64622b05eda2bd630f15cf13ea

https://www.jstor.org/stable/pdf/41492314.pdf?refreqid=search%3Af9d917af0f4d7cdaf506748db9444eed

3.9 INSTRUCTIONAL VIDEO RECOMMENDATIONS

History Documentary - Stories from the Stone Age: The Human Adventure
https://in.video.search.yahoo.com/search/video?fr=spigot-nt-gcmac&p=prehistoric+tool+bbc+documentary#id=2&vid=9ce7c690f5fdd1c32adb23b72f71a334&action=click

Why Prehistoric Women Had Super-Strong Bones
https://video.nationalgeographic.com/video/171129-strong-prehistoric-women-vin-spd

Mystery of Life in the Paleolithic Age
https://www.youtube.com/watch?v=Tx9cuROQWlM

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