



Indira Gandhi National Open University
School of Social Sciences

BANC-134

Fundamentals of Archaeological Anthropology



**FUNDAMENTALS OF
ARCHAEOLOGICAL
ANTHROPOLOGY**

**School of Social Sciences
Indira Gandhi National Open University**

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BANC-134 FUNDAMENTAL OF ARCHAEOLOGICAL ANTHROPOLOGY

Course Introduction

Archaeological anthropology is one of the main branches of Anthropology which deals with the origin and development of humankind prior to the invention of script. This branch reconstructs, describes and interprets the past human behaviour and cultural patterns through material remains such as food, tools, bones, weapons, dresses, ornaments, houses etc. The subject matter of Archaeological Anthropology also focuses on the social and cultural composition of ancient civilizations which is done through exploration, excavation and analysis of discovered artifacts.

Course Presentation

The present course on Fundamentals of Archaeological Anthropology consists of three blocks. Each block is further divided into respective units. The units in each block have been thematically arranged focusing on the understanding and recognition of significant aspects of prehistory. Furthermore, the units also highlights the scientific temper of the discipline by describing techniques from the earth, life, chemical, physical, social and behavioural sciences etc.

Block 1 comprises of four introductory units. Unit 1 outlines the history, aim, definition and scope of archaeological anthropology. Unit 2 explains its relationship with different branches of Anthropology and other allied disciplines like Biological, Physical and Earth Sciences. In Unit 3 a description of different methods of studying archaeological anthropology has been given. This unit also includes information on archaeological sites and focuses on various methods employed in archaeological anthropology to unravel the human past through the material remains. Unit 4 enlighten us as how the methods and approaches applied by other disciplines are used in understanding Archaeological Anthropology.

Block 2 (Unit 5 through Unit 7) highlights the scientific aspects of the discipline by presenting a description of dating methods, methods of climatic reconstruction and chronological events of Cenozoic era. Unit 5 provides a comprehensive account of both relative and absolute dating methods. In Unit 6, various methods of climatic reconstruction derived from fossil, fauna and geological evidences have been given. Unit 7 explores the significance of Cenozoic era in geological time scale with special reference to Quaternary period.

Block 3 (Unit 8 through Unit 11) explains the various stone tool making techniques and stone tools of prehistoric and proto-historic cultural periods. Unit 8 and 9 describes various stone tool types and their manufacturing techniques pertaining to Palaeolithic, Mesolithic and Neolithic periods. Unit 10 expands on major cultural chronological events of the above mentioned periods along with Megalithic and Chalcolithic periods. Finally Unit 11 describes the earliest evidences of culture in the world with a special focus on Olduvai Gorge, Ubeidiya, Dmanisi, Attirampakkam and Isampur sites.

In short this course provides a holistic picture of human past and cultures.

BLOCK 1
INTRODUCTION TO
ARCHAEOLOGICAL ANTHROPOLOGY

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UNIT 1 ORIGIN AND SCOPE OF ARCHAEOLOGICAL ANTHROPOLOGY*

Contents

- 1.0 Introduction
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- 1.2 Definition of Archaeological Anthropology
- 1.3 Origin and Development
 - 1.3.1 Three Age System
- 1.4 History of Development of Prehistoric Archaeology in India
- 1.5 Palaeolithic Culture
 - 1.5.1 Lower Palaeolithic Culture
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- 1.6 Mesolithic Culture
- 1.7 Neolithic Culture
- 1.8 Scope of Prehistoric Archaeology/Archaeological Anthropology
- 1.9 Summary
- 1.10 References
- 1.11 Answers to Check Your Progress

Learning Objectives

After reading this Unit, you would be able to:

- Define anthropology and its branches;
- Discuss the development of prehistoric archaeology; and
- Understand different cultural periods.

1.0 INTRODUCTION

Anthropology is the study of Humans. Etymologically the term 'Anthropology' is derived from two different Greek words, 'Anthropos' meaning man and 'logos' refers to study. Hence Anthropology can be defined as the holistic study of human beings. Accordingly Anthropology could be described as the science of Human cultural and biological variation and evolution. Anthropology could be broadly divided into four branches: Social-cultural anthropology, Physical/Biological anthropology, Archaeological anthropology and Linguistic anthropology. Definitions for the four branches are as follows:

Social-cultural Anthropology: This branch deals primarily with variations in the cultures

* Contributed by Dr. P. Venkatramana, SOSS, IGNOU and Prof. D.K. Bhattacharya, Former Professor, Department of Anthropology, University of Delhi, Delhi

of populations in the present or recent past. Its subjects include social, political, economic and ideological aspects of human cultures.

Physical/Biological Anthropology: It is the study of the mechanism of biological variation, genetic inheritance, human adaptability and variation, primatology, primate morphology and the fossil research of human evolution.

Archeological Anthropology: Archeological Anthropology is the study of socio-cultural behaviour in the protohistoric and pre-historic past. The archaeologist deals with such remains from the past societies such as tools, shelters, remains of plants and animals eaten as food, and other objects that have survived. These remains are termed artefacts and are used to reconstruct past behaviour. At the same time evolution of prehistoric culture in respect to biological evolution of early human being are studied. In other words, it is anthropology of the past.

Linguistic Anthropology: Linguistic Anthropology is the study of languages. Spoken language is a behaviour that appears to be uniquely human. This subfield of Anthropology deals with the analysis of languages usually in non-literate societies and with general trend in the evolution.

Check Your Progress

1) What are the different branches of Anthropology?

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After having studied the definitions of different branches of Anthropology, let us comprehend in-depth about the branch Archaeological Anthropology.

Before going further on Archaeological Anthropology, it is essential to understand the terms History, Protohistory and Prehistory.

The period for which written records are available and used as a chief source in understanding the past is historical period. This period is from approximately 1000 BCE to present. The settled life of human past, which led to the development of civilizations, and urban centres for which written records are available, but have not been deciphered is called as protohistory. In India the Harappan civilization falls under this category. This period began around 3000 BCE. However, the period preceding protohistory falls under prehistory. It is dated back approximately to 3.0 million years to 3000 BC. Prehistory is also called as Archaeological Anthropology.

1.1 PREHISTORY/ARCHAEOLOGICAL ANTHROPOLOGY

The term—prehistory was first used, in 1851, by Daniel Wilson, in his work “*The Archaeology and Prehistoric Annals of Scotland*”. Then it was popularised by Sir John Lubbock in his book *Prehistoric Times* published in 1865. Archaeological

Anthropology deals with the origin and development of humankind prior to the invention of script. The content and the methodology of the subject until recent times is called as Prehistory or Prehistoric Archaeology, and has been part of the disciplines of Anthropology and Archaeology, with an emphasis of bio-cultural evolution in the former and description of ancient objects in the latter. During recent years the Prehistoric Archaeology gained strength in terms of theory and methods by borrowing techniques from various scientific disciplines, and transformed into Archaeological Anthropology. At present this sub discipline is formulating its own body of theory and methodology. Archaeological anthropology is now gaining much importance in anthropological studies, as it has become integral in providing scientific information for the holistic nature of anthropology. It is also known as anthropological archaeology or simply archaeology in America and as archaeological anthropology in the Europe and in India. Some scholars view anthropology and archaeology as separate disciplines with independent history of development and heritage. But many agree that both are interdependent, interrelated, interconnected subjects like double helix of DNA which are inseparable as both study about humankind, one deals with study of living cultures and the other deals with extinct or past cultures.

1.2 DEFINITION OF ARCHAEOLOGICAL ANTHROPOLOGY

Archaeological Anthropology is variously defined as “anthropology of the dead”, “the ethnography of extinct societies (palaeo-ethnography)”, “study of extinct cultures”, “past tense of cultural anthropology” or simply the study of human past based on past material objects recovered by systematic explorations and excavations which are classified, analyzed, described and interpreted based on various scientific methods and theories. Archaeology has been defined by Brian Fagon (2016) as “a special form of anthropology that uses material remains to study extinct human societies”. However Oxford English Dictionary defined Archaeology as the “study of human history and prehistory through the excavation of sites and analysis of physical remains.” Major goals of this specialization is timeless and space less, the final aim is to generalize about all human beings in all times and all places. Very specifically three major goals are there: (i) the construction of cultural chronologies, (ii) the reconstruction of extinct life ways and (iii) the search for bio-cultural processes.

We understand from the above definition that *Prehistoric Archaeology/Archaeological Anthropology is studied through material remains.*

Check Your Progress

2) What is Archaeological Anthropology?

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Now let us briefly discuss about the origin and development of the Discipline of Prehistoric Archaeology.

1.3 ORIGIN AND DEVELOPMENT

In European countries, the beginning of archaeology can be traced back to the time of the Renaissance in Italy, when there was a new curiosity in the past and in the recovery of information about ancient Greece and Rome. This curiosity rapidly extended from Italy to other European countries. At the end of the 16th century and during the 17th century there were many antiquarians, and collection of classical statuary had become a hobby of the rich. Wealthy men built up private collections, some of which ultimately became museums. One such example was the Ashmolean Museum of Oxford, built in 1683, which contained not only objects of classical art but also ethnological curios brought back from foreign countries. Then in nineteenth-century the development of Darwin's theory of Natural Selection was one of the most important achievements of science. The nineteenth century was the period when archaeology emerged as a clearly defined discipline. One of the major achievements of nineteenth-century archaeologists were the creation of the Three-Age system.

1.3.1 Three Age System

During the nineteenth century, prehistoric artefacts and other collections poured into museums. During this time it was the work of Danish Antiquarian Christian Jurgensen Thomsen (Fig. 1) who was given the job of cataloguing collections for the newly founded National Museum of Antiquity in Copenhagen. He systematically classified the collections into three periods; the Stone Age, the Bronze Age, and the Iron Age-based on the material on which the artifacts were manufactured. Thomsen had arranged these periods chronologically, with the Stone Age being the earliest and the Iron Age the latest. This Three Age system (Fig. 2) formed the basis for all the Old World Archaeology. His guidebook to the National Museum was published in 1836, which introduced the idea of three age system to the academic world. However, the three age system was already accepted and used by the leading Scandinavian archaeologists by the time it was published. Thomsen divided Stone Age into Old and New Stone Age. Lubbock replaced the terms by Palaeolithic for Old Stone Age and Neolithic for New Stone Age. Later on a cultural stage was found chronologically lying between Palaeolithic on the one hand and Neolithic on the other. This culture is known as Mesolithic culture because it lies in between the two cultures.

Check Your Progress

3) Define Three Age system?

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Fig. 1: Christian Jürgensen Thomsen (1788-1865)

Source: https://en.wikipedia.org/wiki/Christian_J%C3%BCrgensen_Thomsen

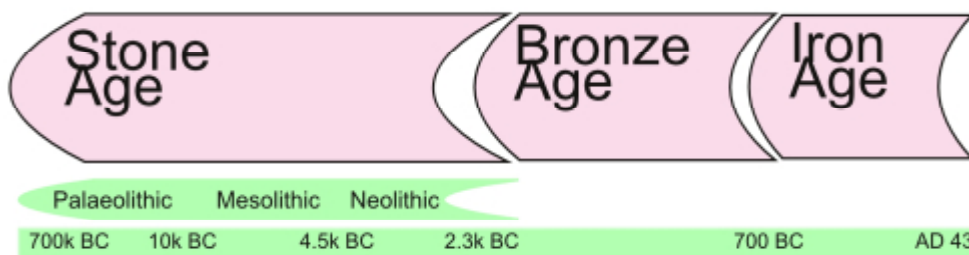


Fig. 2: Three Age System

Source: <https://www.schoolsprehistory.co.uk/tag/prehistory/>

The dates in the figure are based on dates available in Europe. The date of the Palaeolithic culture goes farther back in rest of the old world.

The entire prehistoric past has been divided into the following cultural periods:

Iron Age or Early Historic Period

Chalcolithic or Copper Age

Neolithic

Mesolithic

Palaeolithic

Of the above five chrono-cultural stages the earliest three stages (Stone Age) of our civilizational history span a period of nearly 3 million years, because metal was first discovered only around 4000BCE. In other words, it states that 99 percent of our past cultural history is covered by only Stone Age.

1.4 HISTORY OF DEVELOPMENT OF PREHISTORIC ARCHAEOLOGY IN INDIA

Many scholars have contributed to the development of Prehistory in India through the discovery of prehistoric sites. Some of the studies are discussed below.

Colonel Meadows Taylor of the early nineteenth century was one of the earliest to show interest in archaeology of India. His interest, however, remained more concentrated on the south Indian Megaliths. Alexander Cunningham in 1861 and Robert Bruce Foote in 1863 began their explorations and recording of prehistoric antiquities in the subsequent period. Alexander Cunningham concentrated on the historic period, but Robert Bruce Foote was more inclusive in his interest which was extended to even the earliest Stone Age period.

Robert Bruce Foote (Fig. 3) discovered the first Palaeolithic stone tool, a handaxe at the site called Pallavaram near Chennai in India. Hence Robert Bruce Foote has been called as the “Father of Indian Prehistory”. Later A. C. Carlleyle discovered microliths in the rock shelters of Mirzapur along with Mesolithic cave paintings during 1863 - 1865.

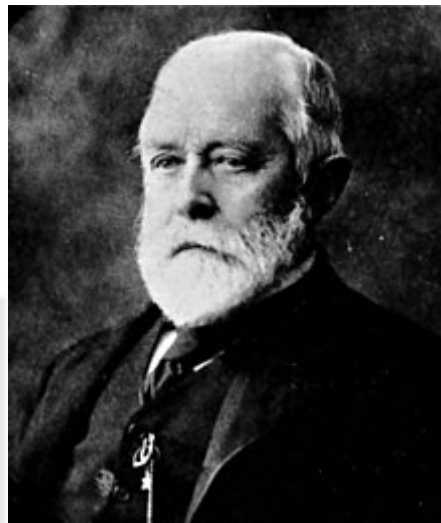


Fig. 3: Robert Bruce Foote (1834-1912)

Source: https://en.wikipedia.org/wiki/Robert_Bruce_Foote

A brief account of the Stone Age cultures in India is given below.

The Stone Age cultures have been divided into three periods:

Palaeolithic culture

Mesolithic culture

Neolithic culture

1.5 PALAEOLITHIC CULTURE

The term “Palaeolithic” refers to the entire range of prehistoric cultures that occur within the Pleistocene epoch (Please refer Geological Time Scale (unit 6). A conservative estimation of this period in terms of absolute dating will be anywhere between 2.8 million to 160,000 years. Again on the same method Lower Palaeolithic in India is taken to have existed as early as 1.5 million. Today we have a number of absolute dates from Lower Palaeolithic sites which push the date of arrival of man back to a date which is almost ten times more than what was earlier decided on geo-chronology. For instance, at Attirampakkam near Chennai, Lower Palaeolithic is dated to 1.5 million years; at Isampur in Karnataka date for the same culture is estimated to be 1.2 million years. In Maharashtra, Bori and Moregaon are two lower Palaeolithic sites which have dates beyond 600,000 years.

The Palaeolithic culture is further divided into three periods namely, Lower Palaeolithic, Middle Palaeolithic and Upper Palaeolithic .

1.5.1 Lower Palaeolithic Culture

The Lower Palaeolithic culture in India is dated back to 2.5 million years to 1,00,000 years. This period is characterized by pebble and core tools, such as, choppers and chopping tools, handaxes, cleavers and scrapers. The culture is broadly assigned to Acheulian culture.

India had experienced alternating glacial and interglacial phase in the Himalayan region. In the Peninsular region climate fluctuated between pluvial and interpluvial periods. This means that there was alternation of wet and dry climate. Lower Palaeolithic culture is widely distributed in India. Sites are found from all the states in India excepting for Indo-Gangetic plain. This area was not yet suitable for human habitation. Several of the works are mentioned here.

De Terra and Patterson came to India and published their discovery along terraces on the Sohan River near Rawalpindi in a book in 1939. Along Sohan river valley five terraces were formed due to climatic phases of glacial and Interglacial of the Himalayas during Pleistocene period. During second glacial period boulders were deposited by the glacier. Subsequently terraces were formed during second interglacial to last glacial periods. The context of the terraces was traced by the presence of a distinct early Pleistocene fauna – *Elephas hysudricus* which is also found in direct association with the Himalayan loess called Karewa I. Large number of tools were found and dated as belonging to inter glacial and glacial phases. The earliest of them found from boulder conglomerate is called pre Sohan and those found from the subsequent terrace are called Early Sohan, the tools from next deposit are called Late Sohan and finally the tools from the last terrace were called Evolved Sohan. Although both early Sohan and late Sohan have been divided into several chronological schemes, the tool types in the entire Sohan valley show an overwhelming variety of chopper and chopping tools. However, though early Sohan definitely belongs to Lower Palaeolithic, Sankalia considered that late Sohan belonged to Middle Palaeolithic culture.

Beyond Himalayan region work had been carried out in various states. Kortalaiyar river valley near Chennai yielded important lower palaeolithic sites. These are Pallavaram, Vadamadurai and Attirampakkam. In January 1980 Prof. V. N. Misra had organized a multidisciplinary investigation of a very rich Acheulian site called Singi Talav near the town of Didwana in Nagaur district of Rajasthan. Misra felt that the tools show enough evidence of being in primary context. The excavation shows three distinct depositional phases. These are termed Jayal, Amarpura and Didwana formations. Of these the Jayal group seems to have been laid down during late Tertiary and Lower Pleistocene period. These show an extremely powerful drainage force. Huge deposit of boulders in concrete form measuring 20 m to 60 m in thickness have been found lying over a stretch of nearly 16 km. apparently human occupation secured immediately after this period during the Amarpura stage. Acheulian tools are found from middle part of Amarpura and Middle Palaeolithic tools have been found to occur during the upper part of same phase. Date is taken to be anywhere between middle to upper Middle Pleistocene. Comparing with alluvial geo-chronology this should correspond to a period extending from Boulder Conglomerate or First Gravel to Cemented Gravel or Second Gravel of Himalayan region.

Subsequently five primary sites were discovered. These are: Bhimbetka in Raisen district and Alampur from Hoshangabad district of Madhya Pradesh; Chirkhi Nevasa from Ahmednagar district of Maharashtra; Paisra from Jamui district of Bihar and Hunsgi from Bellary district of Karnataka. All these sites were meticulously excavated but Lower Palaeolithic in none of them is seen to occur in more than one layer. Further,

almost all these sites show extremely rich upper Acheulian tools occurring in association with fairly good number of chopper and chopping tools. Bhimbetka, at least in the cave III F-23, does not show any chopper but this may be because of the non-availability of pebbles on the top of the mountains. It is also evident that a non-Acheulian or Mode I assemblage and an early Acheulian stage preceding a developed Acheulian is not demonstrable in any stratified context so far from India.

<p>Check Your Progress</p> <p>4) What do you understand about Lower Palaeolithic culture?</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p>

1.5.2 Middle Palaeolithic Culture

Middle Palaeolithic culture is distinguished from lower Palaeolithic with the presence of large quantity of flake tools. These tools are made by careful preparation of the core prior to the detachment of the flake. In Europe middle Palaeolithic culture is known as Mousterian culture also. In India no comparable Mousterian culture is found but prepared core technique is considered as a hall mark for middle Palaeolithic culture in India. Sankalia discovered this culture from the site Nevasa in Maharashtra.

The middle Paleolithic culture is flourished during upper Pleistocene epoch. Absolute dating method of this stage point to a time range of 1,00,000 to 40,000 years. It is important to mention here that unlike the preceding Stone Age for which we have more than one primary site to enable us the reconstruction of life style in the past, Middle Palaeolithic sites of this nature are still rare. Further, while some of the river valleys have yielded huge concentration of evidence of Middle Palaeolithic culture, there are others where such evidences are not so distinct. No wonder that this had earlier led many people to believe that Middle Palaeolithic is a phenomenon of central and Deccan region in India. Bhimbetka shows a classically Mousteroid industry developing right from within an Upper Acheulian base. Here the raw material also continues from the preceding phases. A hundred kilometers away at Shivna, the main Middle Palaeolithic of Narmada valley appear to be completely exotic because of the complete changeover to finer raw material. Maharashtra and Karnataka adopts a proper Levalloise based Middle palaeolithic and hence come close to Mousteroid character even thin leaf shaped tanged points is also known from this area.

1.5.3 Upper Palaeolithic Culture

Upper Palaeolithic culture belongs to late Pleistocene. Very broadly the age of the Upper Palaeolithic falls between 40000 BCE to 8000 BCE.

Upper Palaeolithic as a distinct cultural stage in India is still not comparable to what we would understand by this term in south west France or for that matter in Ukraine. In these areas upper Palaeolithic culture is represented by large number of blade and burin complex. It is essentially a typologically identified stage for most part of India. Profusion of worked blades are significant for Upper Palaeolithic culture in India. The bone tools and art objects which form a major characteristic of Upper Palaeolithic in

Europe are also more or less absent from India. It is to be remembered that by large India is a tropical monsoonal country. Bones and organic matters are hardly preserved. In the face of this missing character many scholars in the west and at home have been taking the claims of Upper Palaeolithic of India with doubt. Some scholars proposed an alternate term 'Flake-Blade culture' for all terminal Pleistocene cultures in place of Upper Palaeolithic.

Cultures which are undoubtedly upper Palaeolithic in India are briefly described as follows:

- i) **Renigunta:** M.L.K. Murthy reported three-four localities along the river Ralla-Kallava near the temple town of Tirupati. These localities called Vedullacheruvu and Nallagundlu yielded Upper Palaeolithic mixed with microliths.
- ii) **Muchchatka Chintamani Gavi:** In the district Kurnool of Andhra Pradesh a cave site with above name was excavated by Murthy. It became immediately famous because here, for the first time, Upper Palaeolithic with bone tool component could be demonstrated from a primary context. The lithic industry comprised of only 9.70 percent, while bone industry formed 90.30 percent. Most of the blades are not retouched. Besides these, one burin and four retouched flakes were identified.
- iii) **Bhimbetka:** These caves and rock shelters from Raisen district of Madhya Pradesh have already been discussed in Lower Palaeolithic consideration. The excavation in cave number III F-23 yielded a deposit lying between Middle Palaeolithic and Mesolithic which is distinctly Upper Palaeolithic in character. There are 6 cm to 10 cm long blades and tools made on them have been illustrated. The usually illustrated types include 8×4 cm blades retouched into burins, end scrapers and backed blade Gravettian points.

1.6 MESOLITHIC CULTURE

Mesolithic is the culture, which flourished in the early part of the geological epoch Holocene. People of Mesolithic culture were hunter gatherers. Their economy preceded agriculture. In India this period flourished between 8000 BCE to 6000 BCE.

It is characterized by the total adaptation to microlithic tools prepared by punch and pressure flaking technique. Evolution of this variety of tools has taken place well within Pleistocene period for instance at Jwalapuram in Kurnool and Bata Domba Lena in Sri Lanka microliths are found to occur from as early as 40,000 B.C. but it emerged in its fulfilled form and as major tool type during Holocene times.

Given below are some sites, which yielded evidences of Mesolithic culture in India.

- i) **Tilwara and Bagor:** Tilwara in western Rajasthan is the western most Mesolithic site of India and lies almost at the fringe of the desert in Barmer district. V. N. Misra excavated the site in 1971 and reported two distinct phases. Of these the earlier phase appears to be more clearly a Mesolithic settlement. The younger phase yielded bits of iron, glass beads and several wheel made pottery.

Bagor was another site in Bhilwara district which seem to be an extension of the Tilwara cluster. Here a deposit of 1.5 meter was excavated and within it three distinct cultural phases were identified. Phase I occupies a depth of 80 cm. It has yielded profusion of microliths and several animal bones. This phase has a radiocarbon bracket of 5000-2800 B.C. Phase I belongs to Mesolithic culture.

Phase II yields copper tools, pottery and the usual microliths. The date bracket of this phase is 2800-600 B.C. The last and the upper most phase III yields iron implements besides pot-sherds. The date of this phase is 600 B.C. – 200 A.D. Extended burial of skeletons measuring nearly 6 feet with the feet chopped off have also been found from this site. The microliths of Bagor are extremely tiny and sometimes measure as low as only few millimeters. Only phase is Mesolithic in nature.

- ii) **Bhimbetka and Adamgarh:** Both these are cluster of caves and rock shelters on either side of the river Narmada in Raisen (Bhimbetka) and Hoshangabad (Adamgarh). As usual both the sites yield profusion of microliths along with animal bones and also human burials. At Bhimbetka in addition to the excavated materials there is a suggestion that during Mesolithic period possibly there was an attempt to building a screen or wall by piling stones up to a height of 3ft. near the mouth of the cave.

Both Bhimbetka and Adamgarh shows huge amount of rock art executed in various shades of ochre. The art motifs have been studied by Yashodhar Mathpal, who demonstrated many economic activities of Mesolithic culture. These include fishing, hunting, use of microlith mounted arrows and harpoons.

- iii) **Teri sites:** A group of 11 sites of microlithic cluster occurs along the fossilized sand dunes of Tiruneveli district of Tamil Nadu. These are usually referred to as Teri sites. It is believed that older transgressions of the sea had caused the formation of these sand dunes. During the early Holocene and during the subsequent regressions dunes at three respective levels were created nearly as far as 10 km in land from present day coast. One of these transgression beaches has also been dated to nearly 5000 B.C.E. Microlithic occupation took place once these dunes were in the process of consolidation.

Check Your Progress

5) What are the various sites of Mesolithic Culture in India.

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1.7 NEOLITHIC CULTURE

The *Neolithic* period (New Stone Age) was the period following the Mesolithic when profound changes took place in human history. Agriculture and domestication of animals, manufacture of pottery, and grinding and polishing technique were newly introduced in this period. Domestication of plants developed in more than one centre in the world: the Near East, South-East Asia and Meso-America.

The impact of agriculture and domestication was tremendous. Communities became more or less settled and due to a regular food supply life became more secured. There was well-regulated community life, growth of specialization and division of labour such as weaving and pottery. Concept of property also developed leading to the system of ownership of land, cattle and tools etc. in the later phase of Neolithic culture, which

ultimately leads to conflicts, quarrels and wars. Agricultural advances were further intensified by domestication of animals.

In India this culture is found throughout the length and breadth of the country. Given below are some of the evidences for Neolithic culture.

Indo-Pakistan Border: Agriculture-based Neolithic settlements, which used only stone tools, have been known from sites like Kili Ghul Mohammed, Rana Ghundai etc. in the hilly terrain of Baluchistan for several decades. Their beginning was dated to 4000 BCE. However excavations at Mehrgarh have pushed back the antiquity of settled village life in the subcontinent to 7000 B.C.E. This is a site near the Bolan Pass in Baluchistan and excavated by Jarrige and Lechevallier in 1954. Here seven phases have been found, out of which Phases I-III are Neolithic. Phase I has been dated to 7000 – 5500 BC. The major findings of phase IA include polished stone tools, microliths bone tools. Possibly economy included hunting, stock-breeding and plant cultivation. Domesticated animals included cattle, sheep, goat and water buffalo while the cultivated plants comprise several varieties of wheat and barley. The houses were made of mud and mud-bricks.

Assam Complex: The tools found from this region include ground stone celts of shouldered and splayed varieties collected mostly as surface finds. These along with cord impressed pottery found in the excavations of Daojali Hading and Sarutaru in Assam, and Selbalgre in Meghalaya, form the material evidences. The pottery is handmade and of impure clay. Daojali Hading is a stratified Neolithic site from North Cachar Hills, Assam and due to the presence of a large number of household appliances like corn grinders, mortar, pestle, querns and mullers, it has been conjectured as an indirect evidence of food production by Neolithic inhabitants of the area. Large quantities of grinding stones and by-product flakes have been found here too. Parsiparlo, an excavated site from Kamala valley in Arunachal Pradesh, on the other hand showed Neolithic cultures preceding the Iron Age. Mostly pecked and ground stone implements together with a few sherds — square-grid and honey comb beater impressed pottery were found. Few fire places with deposition of ash and charcoal was found. However no structural remains were seen suggesting that Parsiparlo was an open-air site. Selbalgre, the site from Garo Hills in Meghalaya turned out to be a stratified site, with the Neolithic phase overlying geometric and non-geometric microliths. The Neolithic period showed handmade pottery, very coarse and grey or dull brown in colour. No radiocarbon dates are available for the Neolithic period in north-east India. However H. D. Sankalia inferred that the Neolithic cultures in the region could have been within the time frame of 5000 BC to 1000 BC.

Southern Region: Results obtained from Tamil Nadu, Andhra Pradesh and Karnataka are similar with a few exceptions. In the earlier phase, handmade coarse pale red ware with microliths and ground stone tools were found. In the later phase, handmade, dull burnished grey ware, ground stone tools like axes, adzes, wedges, chisels etc; and bone points, beads and terracotta were found. Extended exhumation with stone grave goods for adults and urn burials for infants were used. Ash mounds (*accumulation of cow dung burnt into ash*) were found in Utnur with evidence of stockade and cattle pen. They are closely associated with habitation sites and provide tell-tale evidence of the role of cattle pastoralism in the economy. It is believed that dung from cattle pens was allowed to accumulate and periodically set ablaze, probably in a ceremonial way as is done at annual cattle festivals in south India even today. The ash in the mounds consists of several distinct layers; in some layers it is soft and loose and in others heavily vitrified, suggesting that cow dung was burnt at varying temperatures. The contents of the ash include stone and bone tools, animal bones and pottery. At Utnur (Mahbubnagar,

Andhra Pradesh) and Budihal (Gulbarga district, Karnataka) hoof impressions of cattle have been found beneath the cow dung, showing evidence of cattle penning. Besides, Budihal has also produced evidence of a butchering floor. Animal husbandry evidently was the mainstay of their economy as 85% of bones found belong to domestic cattle, buffalo, sheep and goat. Plants cultivated were millets, pulses and legumes. Houses were probably made of wattle and daub - evidence of a burnt hut from Sanganakallu shows that the huts had a thatched roof. The Neolithic culture is dated by C14 dating from 3000-1000BC.

It is very clear that there are different cultural traits as far as Neolithic in India is concerned. Again as far as the time span is concerned, India seemed to have witnessed a very fluctuating Neolithic culture from the 7000 BCE Mehrgarh culture to the 1000 BCE of Assam culture. In terms of relationships, it would seem that with the exception of the Chotanagpur region which may have some connections with the south, the early farming communities in each region were distinct from each other. Of these the Indo-Pakistan community seems to be inspired from West Asia, the north from North-East, the Ganges valley from South, and Northeast from South-East Asia and vice versa. In fact, Northeast India which is very strategically located in the borderline of Southeast Asia and South Asia has been touted by many as the nuclear area of early rice cultivation. At Koldiwah, near Allahabad in Ganga valley, evidence of cultivated rice is found, which is dated to 5000 BCE.

1.8 SCOPE OF PREHISTORIC ARCHAEOLOGY/ ARCHAEOLOGICAL ANTHROPOLOGY

Prehistory refers to the life of early hunter gatherers and subsequent farming communities. The subject provides evidences about human societies which gave rise to civilizations/urbanizations (Renfrew and Bahn, 1991). Prehistory does not only study the life of early men before the advent of writing but also study the present day communities which are continuing as hunter gatherers, pastorals or primitive farmers. Study among such present day communities provide clue to the life style and cultural systems of comparable prehistoric societies.

Culture is a device of man for its survival on earth. Since it consists of materials taken out of the environment and is not a part of his body, it is known as extra-somatic behaviour of man. It is made of both tangible and intangible components. Tangibles are the material part of the culture and intangibles are of such behavioural aspects as, customs, beliefs and ideas. The latter may be reconstructed from the material remains. According to Gordon Childe (1956) prehistoric archaeology studies all changes in the material world that are due to human action. Usually material remains are food, tools, weapons, dresses, ornaments, houses etc. of daily necessities for survival. Prehistory covers major part of human existence on earth. Writing dates on an average 5000 years from the present day. Much of the evidences of prehistoric times is lost and perished under the severity of nature through the long time dimension. Fragmentary evidence of culture and fossils are found.

Anthropologists have devised scientific methodology for reconstruction of life and works of early man. Culture is found over wide areas on earth and it varies in response to subsequent environment. Environment varies from one geographical location to other. Area wise location of culture is very important for an archaeologist. Environment changed through time. Geologists call the time of man as Quaternary, which has two divisions, Pleistocene, the earlier and Holocene the later, starting roughly around 10,000 years ago and is still continuing. Smallest unit of material culture is stone tool and artefact. Any

object taken from the world surrounding man and used by him either in an unaltered or altered fashion is called artefact. Tools are artefacts, which are altered, fashioned and used by man (Childe, 1956). Tools give the prehistoric archaeologist clue to the purpose of its manufacture and understanding of the tool maker's necessity and capability for making a tool.

We cannot set us apart from our past because development depends on the tradition on which a particular culture is built. It illustrates course of development of a culture and civilization. The reason for defining aim and objective is that the mode of exploration varies due to the specific problem prehistory wants to solve. Main aim is to fit the facts of prehistory into the perspective of world history (Hole and Heizer, 1969). Broadly aim of prehistoric Archaeology is as follows: (i) reconstruction of culture history, (ii) reconstruction of past life ways, (iii) the study of culture process, (iv) building of sound chronology. Ethno-archaeology is included in prehistoric Archaeology. This provides for scope for study of settlement pattern.

1.9 SUMMARY

Prehistoric Archaeology is also known as Archaeological Anthropology. The term prehistory has a special connotation. It is the study of man of the time when writing was not known. In other words it is the study of preliterate time. Scripts came very late, only in last 5000 years back and that too is not simultaneously everywhere. Life ways of prehistoric time period is reconstructed on the basis of evidences of culture that are left by early man. In this unit you have learned about the history and development of prehistoric archaeology. The unit also discusses the Stone Age cultures in India.

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1.11 ANSWERS TO CHECK YOUR PROGRESS

- 1) Anthropology is broadly divided into four branches: Social-cultural anthropology, Physical/Biological anthropology, Archaeological anthropology and Linguistic anthropology.
- 2) Archaeological Anthropology is variously defined as “anthropology of the dead”, “the ethnography of extinct societies (palaeo-ethnography)”, “study of extinct cultures”, “past tense of cultural anthropology” or simply study of human past based on past material objects recovered by systematic explorations and excavations which are classified, analyzed, described and interpreted based on various scientific theories. According to Brian Fagan (2016), Archaeology is “a special form of anthropology that uses material remains to study extinct human societies”.
- 3) During the nineteenth century the work of Danish Antiquarian Christian Jurgensen

**Introduction to
Archaeological
Anthropology**

Thomsen systematically classified the prehistoric collections into three periods the Stone Age, the Bronze Age, and the Iron Age-based on the material manufacture. Thomsen had arranged these periods chronologically, with the Stone age being the earliest and the Iron Age the latest. This Three Age system formed the basis for all the Old World Archaeology.

- 4) The Lower palaeolithic culture is dated back to 2.5 million years to 1,00,000 years. This period is characterized by core tools such as handaxes, cleavers, choppers and chopping tools.
- 5) Three important sites of Indian Mesolithic culture are: (i) Tilwara and Bagor (ii) Bhimbetka and Adamgarh and (iii) Teri



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UNIT 2 RELATIONSHIP OF ARCHAEOLOGICAL ANTHROPOLOGY WITH OTHER DISCIPLINES*

Contents

- 2.0 Introduction
- 2.1 Anthropology and Archaeological Anthropology
- 2.2 Archaeological Anthropology
- 2.3 Relationship of Archaeological Anthropology with other Disciplines
 - 2.3.1 History
 - 2.3.2 Earth Sciences
 - 2.3.2.1 Geology
 - 2.3.2.2 Geography
 - 2.3.3 Archaeology
 - 2.3.4 Physical Science/Natural sciences
 - 2.3.5 Anthropology
- 2.4 Summary
- 2.5 References
- 2.6 Answers to Check Your Progress

Learning Objectives

This unit will help you to understand:

- The aim and scope of archaeological anthropology;
- The relationship of archaeological anthropology with other disciplines;
- How different disciplines contribute to the study of archaeological anthropology;
- The role of anthropology in the study of archaeological anthropology; and
- How other disciplines in conjunction with anthropology provide answer to the many questions of archaeological anthropology, namely, biology and its stages, culture, bio-cultural relationship, environment, space and time.

2.0 INTRODUCTION

Archaeological Anthropology is a part of Anthropology. It was known at first as Prehistoric Archaeology because it did not provide any written record and it is a time period of human beings when script was not discovered. This term was coined by Lord Avebury, also known as Sir John Lubbock in 1865 (Lubbock, 1865:2). Archaeology can only be defined in terms of Anthropology (Deetz, 1967). According to Penniman, (1965:16) archaeology is that part of anthropology, “which deals with the antiquity of man as ascertained by the earliest remains of his handiwork and is called Archaeology”.

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

Anthropology in its broadest sense is the study of human beings. Archaeology studies humans of the past. In other words archaeological anthropology is the anthropology of extinct people. Prehistoric and Archaeological Anthropology are synonymous in the realm of Anthropology.

2.1 ANTHROPOLOGY AND ARCHAEOLOGICAL ANTHROPOLOGY

Anthropology is defined as holistic study of human being. The discipline covers diverse areas on the study of humans. It studies the origin and evolution of humans in space and time. The change and development of human beings, not only in its physical characters but in the area of socio-cultural element as well forms the study area of anthropology. Diversity of humans and their culture are also studied through time and space. Anthropology has got practical value too. Anthropological knowledge is applied for the well being of human kind.

Anthropology is divided into several branches. The most important of them are Biological/physical anthropology, Socio-cultural anthropology, Linguistic anthropology and Archaeological anthropology. Physical anthropology studies biology of human being, variation of biological aspects and human evolution. Primatology is an important part of biological anthropology. It deals with the study of primates. Biology and behaviour of primates are important for the reconstruction of evolution of biology and culture of man. Socio-cultural anthropology refers to customary ways of thinking and behaving of a particular population or society. It covers languages, religious beliefs, food preferences, music, work habits, gender roles, how they rear their children, construct their houses, and many other behavioural aspects that are shared customarily by a group of people (Ember, *et al.* 2002). Linguistic anthropology at present has found an important position in anthropology. It is study of people through their language and of relation between language, biology and culture.

Archaeological anthropology is a part of socio-cultural anthropology but the main difference is that it is study of the past culture. The study is based on reconstruction of the day to day life of people who lived in the past. It also studies the change and development of culture. At the same time it seeks explanation for such change. This branch not only includes prehistory but also studies the makers of the prehistoric culture. Sometimes this part is separately known as Palaeoanthropology, meaning anthropology of past. Conventionally the fossil remains of early man are studied under this heading.

Human beings are taxonomically defined as an animal having erect posture, enlarged and complex neural system, manual dexterity, visual acuity, articulated speech and other related biological characters. Culture is the behavioural aspect of man. Tylor (1871) defined culture as “a complex set of behaviour, which includes beliefs, art, morals, law, customs and any other habits and capabilities acquired by human being as a member of the society”. Kroeber defined it as extrasomatic behaviour of mankind. Culture is a unique feature of Human being. Culture has got a biological base. Human being could make culture because it attained some specific biological features. Human kind is distinguished from other animals by culture, by the ability to make tools and communicate ideas. To sum up Archaeological anthropology is anthropology of the past. Both biology and culture are equally important in archaeological anthropology. This branch of anthropology too is holistic study of man but the main difference is of time dimension.

Check Your Progress

1) “Archaeological anthropology is the anthropology of the past”. State if the statement is true or false.

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2.2 ARCHAEOLOGICAL ANTHROPOLOGY

In the middle of the nineteenth century several events such as formation of *Société ethnologique de Paris*, discovery of stone tools by Boucher de Perthes, Charles Lyell’s finding of the principles of geological layers, publication of Darwin’s *The Origin of Species* and such other events laid the foundation for the development of the discipline of anthropology. Various branches of science had contributed to the development of the subject. According to Ember, Ember and Peregrine (2002) the discipline is indebted to a number of other disciplines for its growth but it remains as a distinct and special subject on its own right.

Similar to anthropology the scope of archaeological anthropology can be divided into a number of broad categories centering around humans, such as, biology, culture, environment, space and time. For proper study of this branch of anthropology multidisciplinary approach is necessary.

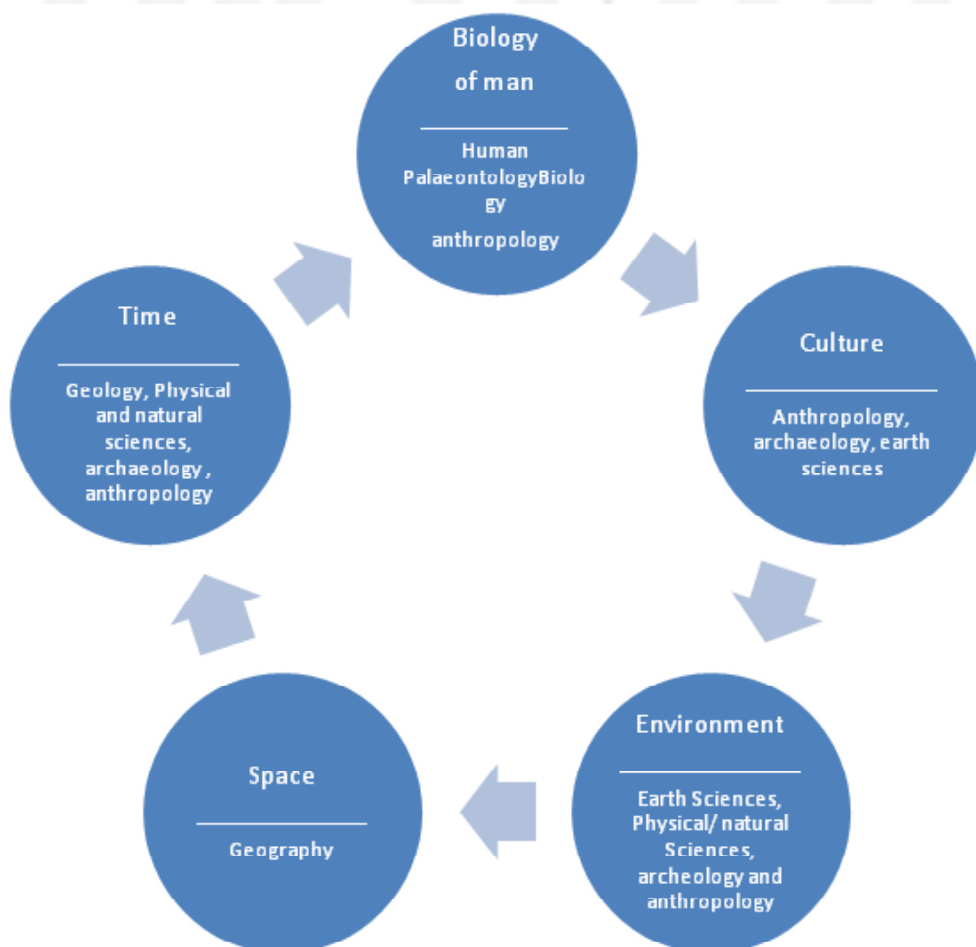


Fig.1: Scope of Prehistoric/Archaeological Anthropology and the Relationship with other Sciences to Reach the Goal of Reconstructing Anthropology of the Past

2.3 RELATIONSHIP OF ARCHAEOLOGICAL ANTHROPOLOGY WITH OTHER DISCIPLINES

Anthropology is considered as a master Science, which has collected data with the help of various specialised departments of already existing sciences. These are applied to the study of man, biologically, culturally, and in relation to the environment through time and space. None of the existing science alone can reveal the complete story of human being.

Man and culture in archaeological anthropology is reconstructed from bits and pieces of early man himself and his material remains found scattered over different spaces over the surface of the earth and below the surface as well. Method of reconstruction of anthropology of early man is considered as a conjunctive one. It is done with the help of a number of sciences.

A large number of sciences are involved in the methodology. Most important of the disciplines are as follows; Geography, Geology, Archaeology, History, Botany, Zoology, Chemistry, Physics, Mathematics and many other natural sciences. Anthropology of course is a very important part of the study of archaeological anthropology because it is the mother discipline and has evolved its own methodology.

2.3.1 History

Any subject for its study of its origin and development owes to its history of origin. The reason for the slow growth and development of the sub-discipline can only be understood in the study of its history of coming into being (Penniman, 1965). History says that prehistoric/archaeological anthropology is more than a hundred and fifty years old. History also points out the nature, time and sequence of finding of different artifacts and fossil remains. On the basis of history of discoveries the theory of evolution and understanding of development, change and diffusion mechanism can be studied. Reconstruction of cultural history is related to this discipline. Often archaeological data combined with historical records produce complete picture of man and culture than either would have given separately.

2.3.2 Earth Sciences

Earth Sciences cover both geography and geology. The common element between the two subjects is the prefix 'Geo' meaning earth. In many respects Geology and Geography are common as both of them deals with the study of the Earth. But they are not synonymous. Geology is concerned with time and Geography is involved with space. The former studies earth below the surface and the latter studies the surface of the earth. Earth which is under the study of geologists was at one time exposed but over time due to erosion and depositional activities caused by elements of nature, such as, water, wind and temperature was covered up by other deposits or removed to other places. When both geology and geography are taken together they give impression of diachronic study. The geological aspect presents vertical dimension mainly of time and the geographical science provides horizontal concept of space. Both time and space information are very important for archaeological anthropology. Relations of the two sciences with archaeological anthropology are discussed separately.

2.3.2.1 Geology

Geology provides chronology. It answers the question "when" man and culture originated and evolved. Main constituents of geology, which are essential for the present study are; stratigraphy, lithology, palaeontology and petrology. Each of the branches of geology mentioned has equal importance in relation to archaeological anthropology.

Stratigraphy

This is based on geological law of superimposition. It was first put forward by Charles Lyell in 1830. The principle is that layers of earth or strata are superimposed one on top of the other; lower the strata earlier the age. This is true for undisturbed deposits. Time dimension found in this way is relative, mainly in terms of earlier or later and in terms of the geological layer within which an artifact or fossil remains are found. Since the formation of the earth all the evidences are stored in geological stratigraphy.

Stratigraphy is observed either through excavation or at a naturally exposed surface, such as cliff sections along river beds, gorges, gullies etc. Biological characters of human being and its culture are divided into several stages on the basis of certain fundamental issues of geology. Even when we talk of archaeological or cultural stratigraphy, the underlying idea is borrowed from geology. Study of change and development in archaeological anthropology is meaningless without time dimension. Stratigraphy provides time dimension, which helps to understand the process of continuity of biology and culture through time, encompassing change, and development. The concept of time is an essential factor for determining diffusion mechanism.



Image 1: Example of Stratigraphy Showing Different Strata from Which Human Remains may be Found

Source: Prof. Ranjana Ray (authors) private collection

Check Your Progress

2) Define Stratigraphy.

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Lithology

This branch of geology is closely linked with stratigraphy. It gives information about the composition of each stratum. Example may be given of a stratum which is composed of materials which could only be brought down and deposited under a glacial condition. If any archaeological material is found from that stratum we can say that the people who made them lived under a cold climate. Many more inferences can be drawn about men and their culture from lithology, specially about climatic changes and environment.

Quality of stratum is studied through analysis of sediments. This involves three elements; i) components of the layer; ii) degree of humus present; and iii) physical properties of the layer. Various methods are involved in it which themselves are related to other disciplines, such as, soil science, chemistry, microbiology, botany, zoology etc. The composition of the stratum is not only indicative of materials with which the stratum is composed of but it involves issues related to the formation of the stratum. In pointing out and explaining the composition and formation of stratum, understanding of contemporary environment is done. Lithology points out changes in the climate that had taken place through time. In this way ecology and process of adjustment by human being under specific environment and under changed condition is reconstructed. It also gives an idea about patterns of culture, its growth and development with cause and effect in the given environmental background.

Palaeontology

This approach, though a part of geological method but can be taken up separately. Major relation of palaeontology with archaeological anthropology is dating, possible reconstruction of past environment and recovery of remains of early man.

Main objective of Palaeontology is study of fossils. Fossilisation takes place under fossiliferous environment. Bones of living creatures are made up of organic and inorganic materials. The organic material is bony protein, called ossein. The inorganic materials are minerals in different compositions. Ossein is replaced by silica particles present in the soil in which the bone is buried. The replacement is molecule by molecule. In this process the forms are perfectly preserved, whereas chemical composition changes. Fossils provide data about the morphology of the animals and even about human being, in case a human fossil is found. Skull not only provides information about its shape and form but the endocranial casts give estimation of cranial capacity. At present DNA are being extracted from fossil bones and important data on evolution and other biological aspects are coming out.

Two kinds of animal fossil remains have importance for archaeological anthropologists. They are as follows: i) some fossil remains continued from one geological period to another and II) some fossils are restricted to one particular period of time. The former are considered as 'index fossil' for a particular time period. When any form of human remains either biological or cultural or both are found to be associated, directly or indirectly, in a proper geological (stratigraphical) context, the human remains may be dated in terms of the associated palaeontological materials. Example may be given of *villafranchian* fauna, which is index fossil for Pleistocene period. This group of fauna consists of the genus of *equus* (horse), *bos* (cattle), *elephas* (elephant) and *camelus* (camel). Human remains found from any geological stratum bearing any one of the fauna will be considered as Pleistocene in date.

Animals of the contemporary period indicate generalized environmental condition of the time. From the environment cultural ecology can be reconstructed. Even ecological niche of early man can be understood. Presence of woolly rhinoceros and mammoth

indicates very cold climate. Butzer (1964:143) has given a chart of animal assemblages found at present in- different environmental zones of the world. Human beings possess greater and better capacity to adjust themselves to the changed condition of environment than the animals. Such adjustment is done with cultural innovations, such as, lighting fire and /or covering the body with fur or materials taken and fashioned from the natural resources.

Man and animal relationship can be established with the help of palaeontology. Types of animals early men hunted or the types they domesticated at a later date.

Human palaeontology is part and parcel of palaeoanthropology/ archaeological anthropology. Different stages of evolution are reconstructed on the basis of comparative anatomy of the modern man with those of fossil findings of early man. Human palaeontologists reconstruct the whole history of human evolution together with development of culture.

Petrology

This branch of geology studies rock types. Larger portion of human history belongs to Stone Age. Rock types played a major role in fashioning of stone tools. Petrologists make thin sections of different types of rocks and identify them into different categories. The analysis is important because it produces data on quality of the rocks and gives an idea about stone tools, their manufacturing techniques and about the skill and knowledge of the makers of stone tools. Petrologists provide information about suitability of rock types for preparation of stone tools. For a stone tool maker there could be bad or good rocks. Through this kind of study it was found that early man was capable of selecting ideal rock types for preparation of tools. The selection of rock types were very much connected with relevant technique of manufacture and of course availability in the locality. Quartz and quartzite were favoured in India and Africa for making lower palaeolithic tools like handaxe etc but with the development of prepared core technique (Levalloisian) they preferred finer grained raw material like cherty quartzite, chert etc. The heavy woodcutting implements like axe and adze of Neolithic times were made on hard grained rocks, for example, epidiorite, diorite or altered basalt. Technique of tool making and functions of the tools had changed with agriculture during Neolithic times. This necessitated for the change in raw materials. Petrology speaks about man's capacity for resource utilisation, its exploitation as well as migration in search of raw materials and new resources. Finally petrology throws a lot of light on understanding of stone tool making techniques, also known as reduction technology. Petrology is very important for archaeological anthropologists who are working on experimental reduction technology.

Check Your Progress

3) What is reduction technology?

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2.3.2.2 Geography

Any study on space is related to geography. Archaeological anthropologists begins

with the site of a finding of human remain, may be biological or cultural or both. The location of the site is marked in relation to its geographical situation. The site is described in terms of its latitudinal, longitudinal and altitudinal positions. Environment is very much part and parcel of geography. Contemporary geography provides clue to the past environment.

Geography points out man- region relationship. On the basis of geographical element an area may be considered as favourable or unfavourable for human habitation. Archeological anthropologist begins to look for remains of early human being on the basis of the areal suitability for human occupation. Arid zones both cold and hot desert are not favourable for human habitation. Early man preferred to live along the foot hill region of Himalayas but not on higher altitude where permanent frosting is present. Similarly the plains of river Ganga did not yield any evidence of human occupation of Pleistocene period because geographical evidence tells that the area was under mangrove swamp condition until the end of the Pleistocene period and was not suitable for human habitation. The deserts of western part of India had better climatic condition and palaeolithic men lived in the area from a very early time.

Man region relationship is further focused in geographically unsuitable areas. There are three aspects in case of change in the environment. They are: i) Early man may change his mode of adaptation, ii) it may bring in change in the environment by artificial means, such as, bringing in water in the dry areas by digging canals or clearing forest for grazing animals or for cultivation; iii) if nothing could be done they may abandon the area. Example may be given of towns and cities of Indus Valley Civilization, which were abandoned when the River Saraswati lost its navigability and the desert encroached upon the area (Danino, 2010). Physiographic information is largely related to this kind of understanding in archaeological anthropology, especially if the geographical information is substantiated by palaeo-geography of the region.

The concept of territory, culture area, and nuclear area of culture and area of its distribution is related to the discipline of geography. Any work in cultural perspective seeks to identify the centre from which the streams of culture originated and spread. The culture centre covers certain areas and usually possesses some special geographical elements. The extension of culture from the centre to the periphery is known as diffusion of culture and it depends on several geographical factors. Some amount of variation is found from centre to periphery, which increases with geographical situation. Important and interesting results are found in the transition areas, where culture areas merge into one another.

2.3.3 Archaeology

Archaeologists are anthropologists who excavate the material remains of past culture (Deetz, 1967). To begin with archaeology is largely concerned with material remains of man, both of past and recent past. Archaeological anthropology is restricted to very early times, before the discovery of writing. Archaeology too is dependent on other disciplines for its study.

Archaeology relates to search for material objects left by man. There are two kinds of search, namely, exploration and excavation. Exploration provides data from the surface and excavation brings out data from beneath the surface. Archeologists have developed methods and techniques for the recovery of materials both from exploration and excavation. After the materials are recovered they are put into order in relation to space, time and form (Deetz, 1967). Childe (1956) in his book "*Piecing Together the Past*" has pointed out how inferences can be drawn beginning with drawing and describing a single artifact and then going on to making a catalogue of all the related

objects in space and time. This he called assemblage. From assemblage archaeologists go on to make inference on culture and finally interpret the total cultural regime.

2.3.4 Physical Science/Natural Sciences

A number of other sciences are closely related to reconstruction, mainly in connection with dating. These range from chemistry, physics, astronomy, mathematics, statistics, botany, zoology and a few other subjects.

There are two kinds of dating; relative and absolute. The former establishes date of a human remain in relation to already dated event. The latter is chronometry where date of an object is established in absolute numerical order of the calendar. An account of the relationship of these sciences with the archaeological anthropology is given below.

Physics and Chemistry

Radiometric dating is based on physical and chemical sciences. Most important and most known is radio carbon method which is done on radioactive carbon (c14). Other radiometric methods are Potassium Argon method, Thorium Uranium method, Thermoluminescence, Obsidian Hydration, Fission Track, Archaeomagnetism, etc.

Flourine test, amino acid racemization, nitrogen analysis are a few examples of importance of chemistry in archaeological anthropology. Moreover these subjects also provide mechanism for preservation of perishable objects.

Electronics are providing means for detecting objects below the surface of the earth. With the help of electromagnetic resonance, buried objects, like, metal objects, burials, walls, foundations, kilns, furnaces, hearths and even pits and ditches filled up with topsoil or rubbish can be located. The satellite images help not only to identify unusual features of archaeological interest on the surface but it also point to buried objects. Remote sensing has become an important tool for the archaeological anthropologists.

Biological Sciences

Botany and zoology are important disciplines. Flora and fauna are valuable markers for environment. Human element both of biology and culture can be understood in the background of contemporary environment. In fact taxonomic identification of man in the animal kingdom is in the domain of zoology. Understanding of man animal relationship is largely dependent upon zoology. Man is a part of the animal kingdom. His relation with animals may either be positive or negative. Human beings may be prey of a carnivore or it may prey upon other animals. Some animals are domesticated by mankind to its own advantage. With the help of zoologist man - animal relationship and its cultural implications are properly understood. Past faunal remains are identified by the zoologists. This has been discussed above in relation to palaeontology.

Botany also plays a major role in archaeological anthropology. Pollen analysis provides with important data not only on chronology but it also throws light on the vegetation pattern of an area. Vegetation pattern points out the relevant environmental background for human activities. Example may be given of Clark's (Clark, 1980) work on Mesolithic culture of Europe. He had shown the dynamicity of adaptation by Mesolithic people to the changing environment during post Pleistocene period in Europe. This he had done with the help of data provided by the botanists and earth scientists regarding the development of forest and change in the environment and geography in Western Europe. He had superimposed archaeological data on them and established ecological niche formation by Mesolithic people who lived at that time in Europe.

Dendrochronology is one method of dating which the botanists provide. Botany also helps to analyse man - plant relationship. Plants resources are used by human beings for its livelihood, namely as food, fibre, medicine, container etc. Human beings not only used the plants in its natural habitat but also had domesticated them. These are turning points of human history and origin of cultivation and domestication mechanism can be researched with the help of plant science.

Finally there are a number of shell fish, mollusks, micro plants, animals and virus, which are sensitive to any kind of change in the environment. They also are important marker for dating and reconstruction of environment and culture.

<p>Check Your Progress</p> <p>4) What is dendrochronology?</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p>
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Mathematics and Statistics

Both the subjects are closely related to archeological anthropology. These are used for quantitative and qualitative analysis of data and for proper interpretation.

Astronomy

There is evidence that from a very early time mankind was attracted to the grandeur of the astral bodies. It has been reflected upon rock art, reliefs on potteries etc. Greatest contribution of astronomy is found in dating of the *Rigveda*, which coincides with the peak period of Indus Valley Civilization. This was done on the basis of location of constellation Pleiades, the *krittika nakshatra* (Tilak, 1893). Astronomy also helped to prepare calendars in prehistoric times.

These are some of the important relations of archaeological anthropology with other disciplines. There are other sciences as well which contributes to the knowledge of archaeological anthropology.

2.3.5 Anthropology

Main connection between anthropology and its branch archaeological anthropology is through human being. The focal point for both anthropology and archaeological anthropology is human kind. As discussed earlier scope of anthropology and archaeological anthropology are same. Identification of fossil men is done by human paleontology and biological anthropology. Biological anthropology relates the different stages of human evolution. There are at least three four stages of genus Homo or Hominoid. These stages are established with the help of data provided by paleontologist and dates estimated on the basis of natural sciences.

Socio-cultural anthropology helps in establishing relationship between biology and culture. Social manifestation of early man is reconstructed by anthropological method of analysis. Cause and factors responsible for culture, biological base for culture are part of anthropological study. Process of adjustment to the environment, any change or reasons for change are estimated with the help of common anthropological methodology.

Though there is no direct evidence for linguistic anthropology for archaeological anthropology but the biological factors responsible for development of articulated speech may be derived from biological and cultural evidences. For example the development of larynx, palate etc in the buccal area, concomitantly with brocas area in the brain postulates man's capability for language. Further to this the standard and uniform pattern of tool types, similar processes of artifact manufacture, use of similar raw material for preparing tools also indicate presence of some kind of linguistic media for communication.

Recent contribution of biological anthropology in the field of mitochondrial study of both modern and fossil men point out centre for origin of humans and their dispersal over the globe in a systematic manner. The study had been superimposed on the early cultures of the world and a clear picture of early diaspora and peopling of world from its cradle in Africa has emerged.

Ethno-archaeology is a special technique of archaeological anthropology. With the help of ethno graphic data cultural reconstruction can be done. This method is very much dependant on anthropology. Ethnographic data is collected by prescribed anthropological methods. Superimposition of present socio-cultural meaning on the past materials is to be done with extreme caution because socio-cultural elements are processes, which are dynamic that is constantly changing due to various reasons. Use of ethnographic data for reconstruction of past ways of life depends on the anthropological expertise.

It may be said that when the focus of study is man, anthropology has to play a bigger role. Anthropology synthesizes the data on man and culture and helps to reconstruct the past ways of life of man, together with the bio-cultural process which took place in the last two million years until we reached the present day status both biologically and culturally.

2.4 SUMMARY

Prehistoric/ archaeological anthropologists are anthropologists who study day to day life of people who lived in the past. They reconstruct the socio-cultural pattern, beliefs and customs of early man as well as they study their biological make up and the relationship between biology and culture. Growth and development of anthropology took place with the contribution of a number of other disciplines, namely biology, earth sciences, history, physical and natural sciences. Similarly archaeological anthropology also is related to all those disciplines. Scope of archaeological anthropology is same as anthropology with aim at holistic study of man. Main difference is the time factor. Archaeological anthropology is concerned with man and culture of past. Scope can be divided into biology of human being, socio-cultural element, environment in which it lived, space on the globe, which gave rise to diversity in the environment, leading to change in culture from one place to the other. Time is a very important part in the scope of archaeological anthropology. A number of disciplines are related for the study of this branch of anthropology. Basic theme of archaeological anthropology is reconstruction. Fragmentary evidences of human remains, both of biology and culture are available for reconstruction. Numbers of other disciplines such as history, earth sciences (Geology and geography), archaeology and physical and natural sciences are contributing to the reconstruction of man and his culture through time. Anthropology together with its branches, biological, socio-cultural and even linguistic anthropology are related for the study of early man and his culture. No single discipline on its own can answer all the questions related to man. Each discipline contributes in one way or other for the study. Biology of early man is understood through zoological classification. Different stages of

Homo or Hominoid are identified with the help of biological anthropology and human palaeontology. For the reconstruction of early culture archaeology and anthropology play major role. Knowledge about past environment is an important part in reconstruction of mode of adaptation of man through its biology and culture. Earth sciences like geology and geography have their important contributions. Natural and physical sciences are also equally important in this respect. Without the contribution of geography understanding of environmental condition, variation in space could not have been done. Time has an important role to play in the study of evolution, origin, and dispersal and diffusion mechanism. Prime importance in this respect is of geology, physical and natural sciences. Archaeology, history and anthropology are other disciplines contributing to the knowledge. In brief it may be said that a number of disciplines are related to the study of archaeological anthropology but the binding factor is anthropology. Anthropology synthesises the data available through other disciplines and reaches the ultimate goal of archaeological anthropology that is the study of early human being, its biology, socio-cultural milieu through time and space.

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2.6 ANSWERS TO CHECK YOUR PROGRESS

- 1) Yes, Archaeological anthropology is the anthropology of the past.
- 2) Stratigraphy is based on the geological law of superposition. The principle of

stratigraphy states that the layer at the top is the recent layer while the later at the bottom is of the earliest period provided there has been no disturbance to the layers like earthquake, tectonic movement, landslide etc.

- 3) Petrology is the study of rocks and it has a significant role in archaeological anthropology. The study of the rocks throws a lot of light on understanding of stone tool making techniques, also known as reduction technology.
- 4) Dendrochronology is a method of dating widely used by botanists.



UNIT 3 METHODS OF STUDYING ARCHAEOLOGICAL ANTHROPOLOGY*

Contents

- 3.0 Introduction
- 3.1 Archaeological Sites
 - 3.1.1 Types of Sites
- 3.2 Methods of Study
- 3.3 Exploration
 - 3.3.1 Aim and Objective of Exploration
 - 3.3.2 Area Selection for Exploration
 - 3.3.3 Extensive Exploration
 - 3.3.4 Intensive Exploration
 - 3.3.4.1 Grid System
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- 3.4 Excavation
 - 3.4.1 Kinds of Excavation
 - 3.4.1.1 Test Pit or Trial Trench
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 - 3.4.2 Other methods of Excavation
 - 3.4.3 Basic Method of Excavation
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- 3.5 Conservation and Preservation
 - 3.5.1 Care and Handling of Archaeological Objects
- 3.6 Summary
- 3.7 References
- 3.8 Answers to Check Your Progress

Learning Objectives

After reading this unit, you would be able to:

- Understand about the archaeological site;
- Elucidate the methods of study in Prehistoric archaeology;
- Know how the data is collected by Exploration;
- Discuss the Importance of Excavation in Prehistoric Archaeology; and
- Explain the importance of conservation and preservation in Archaeology.

* Contributed by Prof. Ranjana Ray, Former Professor, Department of Anthropology, University of Calcutta, Kolkata and Dr. P. Venkatramana, SOSS, IGNOU

3.0 INTRODUCTION

You already have learnt what Archaeological Anthropology means. In this unit we will be discussing the methods used by prehistoric archaeologists/archaeological anthropologists to study the man-made artefacts that are most times buried deep in the layers of the earth. Gordon Childe, a famous archaeologist, has defined the subject as study of all changes in the material world that are due to human action (Childe, 1956). Material remains of early men are found in the form of artefacts. Artefact is defined as things man made and unmade. These include movable items such as, tools, weapons, personal ornaments etc. and immovable items, such as houses, temples, palaces, canals etc. First task for archaeological anthropologists is to classify these artefacts. Method of classification is known as taxonomy.

Taxonomy is basic method in Archaeology. It involves description and classification of findings. Generally archaeologist deals with components of culture formed into units known as types. Types are arbitrarily 'designed' by the classifier for the convenience of studying the materials of the past. Types are the items which are similar to each other in form and function. Examples may be given as, handaxe, cleaver, scraper, knife etc. Each type has common characters. In other words, there are two basic methods for classification and determination of types. Firstly, classification of types is solely done on the basis of their usefulness; secondly, it is maintained that the types are related to certain behavioural traits of the prehistoric men. Types are considered as norms related to behaviour that is regulated by the society. Artefacts and their types are considered against the background of the occurrence in terms of time and space, also mentioned as temporal and spatial units respectively.

Before learning the different methods of study in Archaeological anthropology, a brief account about an Archaeological site and how the archaeological site is formed is discussed as below.

3.1 ARCHAEOLOGICAL SITES

An archaeological site is a place in which evidence of past human activity is preserved. Sites may range from those with few or no remains visible above ground, to buildings and other structures still in use. A site may be as small as the place where an arrowhead or a potsherd lies, a few centimetres, or as large as a town, such as the site of Harappa or Mohenjodaro which spans a few kilometres. Beyond this, the definition and geographical extent of a "site" can vary widely, depending on the period studied and the theoretical approach of the archaeologist. The site may be either primary, if people have deposited its own remains there or secondary, if the remains have been re deposited by another people or by natural agency. Any other human disturbance of the ground might result in elements of the site being moved around and re deposited. For example a primary deposit on a river terrace has been bulldozed into another part of the terrace; the place of redeposition is a secondary site.

3.1.1 Types of Sites

Types of sites can be identified in the following way:

- i) *By archaeological context:* Depending on where the artifact/feature or cluster of artifacts are found, a particular site may be a surface location site, if found on the surface, or a stratified location site, if found in layers or strata.
- ii) *By artefacts content:* The type or kind of artefacts found also delineates a site.

For instance, if Stone Age tools or Iron Age tools are found, a site may be referred to as a Stone Age site, or an Iron Age site.

- iii) *By geographical location:* If artefacts or evidence of past human activity is found inside a cave, then the site is a cave site. Similarly there could be sites located in a valley or a gorge or on a river terrace.
- iv) *By artefact content related to site function:* Depending on the kind of artefacts found in a site and its content, it is at times possible to delineate a site as a kill site, or a habitation site.

<p>Check Your Progress</p> <p>1) Name the ways by which archaeological sites can be identified.</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p>

Sites based on functionality may include the following:

- a) *Living or habitation sites*, where people lived and carried out a number of activities. This is usually marked by the presence of hearths, food remains or artifact remains, and features or structures.
- b) *Kill sites*, where prehistoric people slaughtered or butchered animals mostly for food. This can be gauged from large heaps of animal bones together with some projectile weapons such as arrowheads or spearheads.
- c) *Ceremonial sites*, where certain rituals or ceremonies might have taken place. This can be conjectured by the unique ritual objects found or by the patterning and positioning of artefacts, features or structures.
- d) *Burial sites*, where prehistoric burial took place and are now recovered in the form of cemeteries and isolated tombs. In some places where secondary burials took place, large urns, jars, or sarcophagus is found with evidence of burial remains.
- e) *Trading, quarry and art sites* are specialist activity sites. In areas where trading activities took place, large quantities of exotic trade objects are seen, along with their strategic location near major cities. Quarry sites, on the other hand, are located near quarries, as well as with evidence of special tools needed for mining raw material such as copper, flint, etc. Art sites, are sites where evidence of past art activities are still seen such as the beautiful cave sites of Altamira in Spain, and Las Caux in France.

3.2 METHODS OF STUDY

Scientific reconstruction of early man and his culture is major part of the study of prehistoric Archaeology. There are several important methods for the study of prehistoric Archaeology. First step for the study is collection of data on man and culture. This is done through exploration and excavation. Second step is to fix the time dimension of the materials and data collected. Prehistoric culture has progressed and evolved through

time. Sequential ordering of culture in the background of timescale is necessary for understanding change, development and evolution.

Check Your Progress

2) What are the two different methods of study in Archaeology?

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3.3 EXPLORATION

In most of the cases evidences for prehistoric Archaeology is spread out in the sites. Exploration starts with systematic site survey. Search for sites which had experienced human activities in earlier times is an important part of Prehistoric Archaeology. Such places are known as prehistoric sites. Looking for prehistoric sites is known as exploration or site survey. Sites vary in their type. A site may be a place where people camped/ lived or just came to procure food and other materials or prepared tools, bury their dead or may be a rock surface on which prehistoric men drew, painted or engraved pictures etc. A systematic survey in a scientific way is carried out for understanding of prehistoric archaeology of a given area. Such survey for finding out remains of prehistoric men is known as exploration. Exploration is surface survey for studying the importance of associated prehistoric materials. Exploration points out the importance of the site and determines subsequent need for future excavation.

3.3.1 Aim and Objective of Exploration

Exploration starts with collection of artefacts and associated materials. Purpose of exploration can further be for the following: (a) To locate site as part of salvage archaeology, (b) to locate sites and obtain information relevant to specific problems previously formulated. Goal of exploration may be selective in nature or it could even be biased. Picking up of diagnostic tools, potsherds or any other artefacts may destroy the spatial patterning present on the surface of a site. Prehistoric archaeologist should keep his eyes open for all kinds of evidences. Collection of evidences should be scientific because on the basis of such evidences logical reconstruction of life ways of men of prehistoric period can be made.

3.3.2 Area Selection for Exploration

Before going for actual survey work there are a few choices and understanding are to be made about the area to be explored. Firstly the explorer should have background information about the area. The geomorphology, drainage pattern, land contour, relief, vegetation pattern soil etc are very important deciding factors for possibility of human occupation and activity. Studies of topographic sheets are important. Topographic sheets provide detailed information regarding the area. Aerial photographs may be studied because these often point out unusual features of a land surface, which may not be natural but man-made. Information from published work provides idea about previous work in the area pointing out scope of prehistoric work in the area. Most important part of exploration is meticulous reconnaissance of the surface of the area on foot.

Therefore we may say that two points are outstanding for area selection, firstly, importance of earlier works, secondly actual survey by reconnaissance.

Exploration can be divided into two types, extensive and intensive explorations. The first one is the preliminary and second is in detail. However, both types of exploration are complementary to each other. To complete exploration of an area and to make a complete understanding of the Prehistoric culture of the region, both extensive and intensive methods are to be followed simultaneously.

3.3.3 Extensive Exploration

As the name suggests, this involves extensive area survey. The explorer covers as much area as one needs to do. The aims of extensive exploration are as follows:

- a) To know the general background of the area, its configuration and presence of any archaeologically important evidence. These may be evidences of human activity, such as, tools, artefacts, habitation ground, walls, ditches, roads, burials etc.
- b) The evidences collected are to be related to different geological strata, so that the artefacts could be classified into types and may be arranged into different stages of culture.
- c) The artefact types may further be related to the system of existing cultural stages of the region.
- d) Environmental situation, both of past and present may be understood from extensive exploration. Environmental reconstruction may be made by studying naturally exposed stratigraphy and relief pattern of the area. On the basis of such evidences ecological reconstruction may be made.
- e) Extensive exploration relates the past culture of the area to the present day cultural element of the region. This helps especially with the ethnological reconstruction of Prehistoric Archaeology (Greene, 2003).

3.3.4 Intensive Exploration

Specific objectives guide the method of intensive exploration. Data collected through exploration must be arranged in chronological order and its extent in space should be ascertained. The prehistorians look for the geological context and for the geographical extent of distribution of data collected. In this way the space and time are to be reconstructed for the cultural elements.

Check Your Progress

3) What is exploration and excavation?

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3.3.4.1 Grid System

This is an important part of intensive method of exploration. This system is an aid to mapping and recording the location of artefacts and features found within the site. For drawing the grid a fixed point is to be selected. This point is known as datum point. From this point the grid originates. A line known as site Meridian is drawn from this point in a North South direction. Another line is drawn from the datum point at perfect right angle to the meridian. This line is called base line or the east west line of the site. There may be various types of grids laid down. The basic grid system is the finite or limited grid (Fig. 1). This is laid on a smaller sized site, such as house circle, factory site for manufacturing artefacts, single burial etc. Grids are constructed by driving stakes. The stakes are connected by stretch of strong strings. Taking base line on the one hand and meridian on the other the area is divided into small square units. Size of the units varies according to the choice of the researcher. Each square unit is numbered by marking through the meridian and base line in sequential order. This system gives a proper picture of the site. In this way meaningful reconstruction of the activities carried out in the area by early men could be reconstructed. At a Stone Age work shop site a lot of discarded cores, waste flakes and both finished and unfinished tools are to be expected. At a kill site tools with utility mark on the edges will be found and if one is lucky, he or she may find bones of the kill as well. Such sites are found near Olduvai Gorge in East Africa.

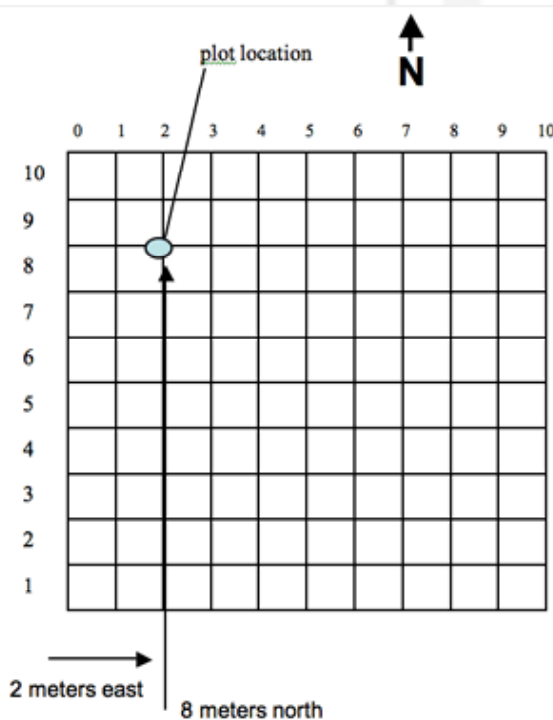


Fig. 1: Grid System

3.3.4.2 Collection of Materials

Exploration is conducted for collection of evidences. One must keep in mind that collection of data from the field also is kind of destruction of evidence from the site. For this reason the collection should be scientific in nature with careful recording of its occurrence in the grid. Earlier antiquarians collected whatever attracted their fancy. Such collection not only misuses the data but gives incomplete information. Complete tools as well as waste materials are important. The understanding of tool making technology depends on the debitage or waste materials. Other waste materials, broken and discarded objects have their own story to add to the cultural reconstruction of the

past. Therefore we may conclude that collection of materials in an exploration should be logical and scientific, not fanciful.

3.3.5 Analysis, Result and Interpretation

All the data collected should be recorded properly on a schedule. The artefacts are to be marked and catalogued. There should be adequate measure to preserve the artefacts collected. Finally according to objective set forth by the prehistoric archaeologist data to be interpreted and analysed.

In India major works on prehistoric sites and reconstruction of culture is done by exploration method. Several examples are cited here. Bruce Foote, a geologist is considered as the father of prehistoric studies in India. He discovered the first handaxe in 1863 from a site called Pallavaram, located near Chennai. He explored the area and for the first time presence of Palaeolithic culture was established in India (Paddayya, 2014). Subsequently many more site surveys followed. Some of the worth mentioning ones are given here. Joint expedition under the Yale and Cambridge universities were conducted in 1936. This expedition explored selected areas of the undivided Indian subcontinent, starting from Kashmir Valley, Punjab plateau, Narmada River Valley to Kortallyar River valley of the erstwhile state of Madras. De Terra, Patterson and others (De Terra and Patterson, 1939) explored and reconstructed Pleistocene glacial sequence around Pirpanjal ranges of Himalayas in Kashmir valley. They also explored Punjab area, especially Potwar Plateau (now in Pakistan) and found out Pleistocene climatic sequence and chronology of the region. From the valley of the River Soan, a small tributary of Indus, a culture which is famous by the name Soan culture was found. Both extensive and intensive methods of explorations were carried out. They reconstructed the culture on the basis of tools that they found in the datable context against geological strata and the nature of their occurrence in naturally exposed sections. Later on explorations in India were carried out by many famous prehistorians. In Narmada Valley De Terra and Patterson explored the Narmada basin and reconstructed cultural sequence of the region. They also showed that culture in the area grew under pluvial condition. Pluvial was a climatic condition which had experienced alternating dry and wet conditions. These were periods of more average annual rainfall compared to subsequent time period of lesser average annual rainfall. They further explored the Kortallyar river valley, where Bruce Foote had discovered Palaeolithic tools. As a result of this we get the account of Palaeolithic culture of India (Sankalia, 1977). Later on number stalwarts explored prehistoric sites of different corners of India and we at present have a complete account of past culture that existed in our country (Paddayya, 2014).

3.4 EXCAVATION

As opposed to exploration, excavation involves study of the under surface materials by digging them out. Excavation must have definite objective, otherwise however, it will be a waste. Excavation is not bulldozing of the surface of the earth but it is to be done meticulously, carefully and with a specific purpose. Excavation is done to discover cultural sequence in the site and also to collect and record details of cultural levels lying below the surface of the soil.

There are two types of digging. One is vertical and the other is horizontal. The vertical digging determines the different cultural levels lying one over the other. For this careful control over stratigraphy is to be maintained. Horizontal digging reveals relationship between each cultural material found in the same level.

Before going for actual digging the excavator must prepare a map of the area and take photograph of the site to be excavated. First work is to form a grid. The choice of laying the grid depends on the purpose of the dig. It also depends on the time, money and other resources available to the excavator. The figure (fig.2) below shows the layout of the trenches of an excavation. Grids are marked by pegs and square units are demarcated by stretched out strings. Some equipment like shovel, bucket and sieve is seen at a corner of the trench. The dirt heap is also located near the sieve.

3.4.1 Kinds of Excavation

First question that comes up in one's mind is where to dig? There are two types of excavation; one is by random sampling and the other by excavating the site completely. The first method is known as test pit or trial trench.

3.4.1.1 Test Pit or Trial Trench

This is also known as *sondage*, meaning sound pit. These are trenches dug to explore what lies beneath. This is a kind of random sampling. There are no hard and fast rules about the size of the trench. Trial digging is carried out first before going into extensive excavation. The place for digging trial trench is selected by means of computer or survey or intuition or at random or by logical reasoning. Test pit may be dug along a steep side of the site or it may be a rectangular trench. Trial excavation provides data on composition and location of cultural remains at the site. It locates areas of activity, especially rich deposits within it. Trial trenches are important for stratigraphy (Harris, 1969). It provides long, vertical profile of the site. Practice is to dig vertically until one reaches the culturally sterile level. Wheeler (1956) wrote that at Arikamedu in Puduchery, he had to dig the trial trench 11 feet below sea level to reach the base of his digging. At Mohenjodaro he went 10 feet below the water table and had to use water pump to reach the level. Test pits not only keep track of the cultural levels but also prevent unnecessary waste of money by digging at the wrong place. Sometimes step trenches are dug from the top of a mound to its base where it cuts into sterile soil. This kind of trench is laid to distinguish early materials from late ones. Later materials are found at the bottom layer. Test trenches are dug for sampling levels throughout the site (Fig. 3).



Fig. 2: Vertical Excavation

(Photo taken by Ranjana Ray at Museum of Human Evolution, Burgos, Spain)

3.4.1.2 Excavation of Large Areas

Once the vertical concept is cleared and vertical succession is ascertained lateral extension of trenches could be made. The purpose of digging large area is to expose the range of

activities that were carried out at the site. If a settlement site is dug, the excavator will try to expose as many habitation levels as possible and also would like to expose all kinds of activities that happened in the past. There too is no hard and fast rule for excavating large areas. It depends on the objective set forth by the excavator and the type of site to be excavated.



Fig. 3: Excavation of Large Area

Photograph taken at Hanoi Vietnam by Ranjana Ray

3.4.2 Other Methods of Excavation

There are a number of other methods of excavations. These are: (i) trenching, (ii) strip method, (iii) quadrant method, (iv) area or block excavation and (v) stripping excavation.

- i) *Trenching*: Long, narrow, rectangular trenches may be laid for getting the cross section of the site. This is especially important for understanding stratigraphy of the site. It provides a long vertical profile. Narrow trenching is used for sampling. This technique is useful for searching for houses, cemeteries and activity areas.
- ii) *Strip method*: This method is used in digging mounds and barrows. Excavation begins at the edge of the area to be excavated and digging continues straight towards the centre of the site in strips. The mound is investigated by working towards the centre in cuts of 5 feet wide.
- iii) *Quadrant method*: The mound is laid out into four quadrants with baulks three or more feet wide.
- iv) *Area or block excavation*: This is orderly excavation of a sizeable area of a site. The purpose is to obtain larger sample of artifacts, features, activity areas etc. This kind of excavation is usually done within a grid system. A baulk of about two feet wide is preserved between each square block of the grid until the very end of the work. This kind of excavation may be either or both vertical and horizontal excavation. The excavator may not always follow a grid system but expose an entire feature, which may be of importance.
- v) *Stripping excavation*: This kind of excavation involves complete removal of the surface material of the surface, so as to expose the stable land surface below. The stripping may expose features like living floor, houses etc. Binford (1972) considered it as the third phase of excavation; first being the test pit, second the area excavation. However stripping may be costly because it needs heavier machinery (Hester *et al*, 1975)

There however, are some special methods of excavation for some special sites like, caves and rock shelters, petroglyphs, water logged sites, underwater sites, graves, stone structures, timber structure and other building materials (Greene, 2003).

3.4.3 Basic Method of Excavation

Wheeler (1956) and many others think the method that an excavator should follow for digging the sites, vary from region to region and depends on the type of site that one undertakes for excavation. In Europe bulldozers are used for excavating Palaeolithic sites (Hole and Heizer, 1965). In most cases excavation is a careful, meticulous process with keen observation and adaptation to the situation. The surface and over burdens are carefully scraped off. Most important thing about excavation is that it is a process of destruction of evidences. Accurate recording of the site, findings in it and associated features are crucial for interpretation and reconstruction of culture of the area.

There are two basic methods. One is to strip the area by shovel in thin layers and thus expose the site horizontally. The other is to dig trenches in the ground into the area against a vertical face (Hole and Heizer, 1969). Archaeologists follow both the methods according to the need of the excavation. Horizontal excavation reveals the areal perspective of the site and vertical excavation is necessary for getting the time dimension of the site.

Layout of the trench is important. The trenches should be divided into square blocks and marked properly with pegs and strings (Fig. 4). The string gives the actual boundary of the trench to be marked. Between each trench balk with a minimum width of three feet should be left. A special “control trench” (Wheeler, 1956) should be made for recording the stratigraphy.

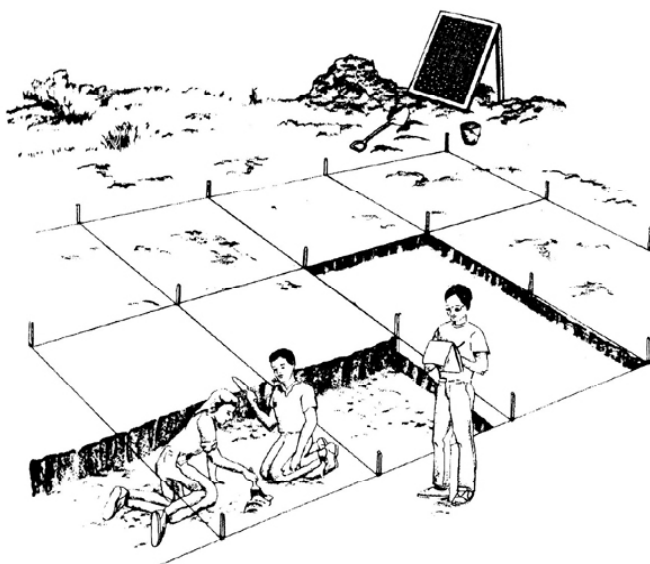


Fig. 4: Excavation

Source: Excavating an archaeological site. (Ward, H. Trawick, and R. P. Stephen Davis, Jr. 1999. *Time Before History: The Archaeology of North Carolina*. Chapel Hill: University of North Carolina Press.

The excavation must have a reference point, known as datum point for measuring the location of material objects and structures. This is chosen by the excavator. If there is no fixed point available the excavator should build a structure for fixing datum point. Throughout excavation this should be maintained. The distance from datum point should be measured through datum line. Datum line is made out of joining points laid tangentially

to the datum point. When excavation is in progress measurement of every single find should be noted and plotted. These will be longitudinal, outward and downward measurements. Lay out together with description of stratum in respect to finds must be maintained. Spoils should be placed at a place away from the trench. Spoil heap should be controlled otherwise important evidences may be lost in it.

All finds are to be recorded with reference to the section, structure and in relation with important objects together with the position of all measured sections. Finds should be classified in the note book with serial number, section label, stratum and sketches. Careful mapping of the objects in each level, plotting them position wise in the trench and photographing the objects are important parts of excavation. Preservation of the objects is important. Many fragile objects and perishable materials need immediate attention.

In addition to cultural materials there may be non artefacts that are to be collected, such as, pollen sample, charcoal, animal bones, plant remains etc. They will also have their own story to tell. They may also help in dating and reconstruction of the contemporary environment.

Finally on the basis of such recording reconstruction of the culture together with interpretation of different activities carried out by the people at the site will be made.

3.4.4 Equipments Needed for Excavation

For an accurate and scientific excavation proper and adequate equipments are necessary. Some of the equipments are given below:

Shovel: Long handled with pointed or rounded head should be provided to each worker.

Picks: These should have stout handles, heavy and with pointed ends. Picks are mainly needed to penetrate hard, compact and stony soil. Excepting for hard soil pick is not used because it damages the artefacts.

Screens for sifting earth: Usually a screen with half and one fourth inch mesh is used. Fine meshed shifts are preferred to find small objects like small tools, teeth and beads etc. Sometimes water screen is used so that all specimens are recovered without damage.

Bucket: It is used for fetching water. Sometimes specimens are washed for better viewing and also for photography. Care should be taken not to wash away fine specimens.

Measuring tape: These should be at least 50' - 100' long.

Smaller implement: Trowels for careful excavation, a rigid fine pointed pick, paint brushes, with 2" and less width. These are used to brush away dry, loose soil and also for washing specimens for photographs. Heavy brush and dust pans, pocket compass, note papers, graph paper, blank forms for recording findings, cataloguing of artefacts, cloth bag, strong paper bags, match boxes for storing artefacts found in the excavation, Soft metal or paper tags for marking the bags etc. Felt tipped pens for marking the boxes and bags, cardboard boxes for storing materials and wooden boxes for storing skeletal remains, wooden stake or iron spikes. These should at least be one foot long. Camera, pen, pencil are other important implements.

Check Your Progress

4) What are the tools required for excavation?

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3.5 CONSERVATION AND PRESERVATION

First of all it is absolute necessity to catalogue each and every finding. Specific source of the artefact should be mentioned. Each should have a catalogue or museum number. Individual finding should be recorded on individual sheets with drawings, which should be to scale. Final analysis will be made from the data recorded in the catalogue. The catalogues must be carefully preserved.

Human beings have immense capacity of producing artefacts. They have been fabricating such objects since very early times, ever since they became human from the rest of animals. About two million years have been passed for the human artefact production. The artistic and other creations of man have been destroyed by natural calamities and anthropogenic factors. At present only a small portion of material culture of man's activity is available, and is the heritage of humankind. It is the responsibility of the present generation to conserve and preserve the heritage for future research. Since these objects carry lot of hidden knowledge it is necessary that the present generation of people collect and properly preserve these vanishing objects for the posterity. The archaeological, historical and ethnological works of human kind carry lot of artistic, aesthetic and functional aspects, and they serve as an index of human civilization, thereby provide clue for understanding bio-cultural evolution. Any loss to such a material is irreplaceable. So it is the primary responsibility of all the culture historians and scientists to take all the precautions to conserve and preserve the objects in laboratories and museums for research as well as for display for public. The task of managing a museum needs knowledge on aspects like collection, transportation, physical cleaning, chemical treatment, display etc.

3.5.1 Care and Handling of Archaeological Objects

Archaeological findings are priceless heritage of humankind, therefore proper care is necessary for conservation of man-made objects, which are vulnerable against temperature, humidity, light, air etc., and biological beings like fungus, pests, insects etc. There are several purposes, for preservation, namely, for research, education, and knowledge of the people whether by a teaching and research department or by the government or private organization, the duty of the people engaged is to take proper care and preserve the objects in an appropriate manner, so that the objects can survive for a longer period of time.

3.6 SUMMARY

Basic method for archaeological anthropology is to identify and classify artifacts made and unmade by men. On the basis of characteristic features known as attributes the artifacts are classified into types. When similar types occur repeatedly, it is known as culture. Culture may be found in a specific locality, region or area. When similar cultures are found over a wide area, it is called tradition. There are various methods for collection of artifacts of early times. When it is a surface reconnaissance, it is called exploration. When the artifacts of prehistoric times are scientifically dug out it is called excavation.

Time and space are important. To understand time there are methods of dating. Geological layers give indication of time dimension. Functional identification is done by ethno-archaeological method. In this method present day parallel is taken and compared for understanding some functions and values for the prehistoric objects to its makers. Finally artifacts collected should be catalogued, analysed preserved properly.

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3.8 ANSWERS TO CHECK YOUR PROGRESS

- 1) Archaeological sites can be identified in the following ways: (i) By archaeological context: (ii) By artifacts content (iii) By geographical location (iv) By artifact content related to site function.
- 2) The two different methods of study in Archaeology are:

First method for the study is collection of data on man and culture. This is done through exploration and excavation.

Second step is to fix the time dimension of the materials and data collected. Prehistoric culture has progressed and evolved through time. Sequential ordering of culture in the background of timescale is necessary for understanding change, development and evolution.
- 3) A systematic survey in a scientific way is carried out for understanding of prehistoric archaeology of a given area. Such survey for finding out remains of prehistoric men is known as exploration.

As opposed to exploration, excavation involves study of the under surface materials by digging them out.

- 4) For an accurate and scientific excavation proper and adequate equipments are necessary. Some of the important equipments are given below:

(a) *Shovel* (b) *Picks* (c) *Screens for sifting earth* (d) *Bucket* (e) *Measuring tape* (f) *Smaller implement*: Trowels, Paint Brushes, Dust Pans, Pocket Compass, Note Papers, Graph Paper, Blank Forms, Cloth Bag, Strong Paper Bags, Match Boxes, Soft Metal or Paper Tags, Felt Tipped Pens, Cardboard Boxes, Wooden Boxes, Wooden Stake or Iron Spikes, Camera, Pen, Pencil etc.



UNIT 4 INTERDISCIPLINARY APPROACHES OF ARCHAEOLOGICAL ANTHROPOLOGY*

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- 4.0 Introduction
- 4.1 Environmental Archaeology
 - 4.1.1 Definition and Scope
 - 4.1.2 Types of Environmental Archaeology
 - 4.1.3 Importance of Archaeological Anthropology
- 4.2 Ethnoarchaeology
 - 4.2.1 Definition and Scope
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 - 4.2.3 Examples of Ethnoarchaeology
- 4.3 Experimental Archaeology
 - 4.3.1 Definition and Scope
 - 4.3.2 Criteria for Experimental Archaeology
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 - 4.3.4 Examples of Experimental Archaeology
- 4.4 Summary
- 4.5 References
- 4.6 Answers to Check Your Progress

Learning Objectives

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

- Understand the interdisciplinary approaches used in archaeological anthropology;
- Discuss the different components of environmental archaeology and how past environments are studied in Anthropology;
- Elucidate the interface between archaeology and anthropology, and how the study of a living group of people can aid in the understanding of the past; and
- Know the importance and use of experimentation (keeping certain criteria in mind) in archaeological anthropology.

4.0 INTRODUCTION

Interdisciplinary approaches have become popular in many fields of scientific investigation. New methods and approaches are now applied in studying different aspects of past culture even in anthropology. Earlier methods and approaches used were restricted to a particular subject. But today, more and more anthropologists are beginning to look at different socio-cultural aspects from broader perspectives, applying methods or expertise from other, related areas, or collaborating with specialists from completely different research fields.

In archaeological anthropology too, methods and approaches used by other disciplines and experts are being used for a better and holistic understanding of a phenomena. Newer methods incorporating the basics of other disciplines have also been devised and are being in use.

In the following we will be discussing three interdisciplinary approaches commonly studied in archaeological anthropology today.

4.1 ENVIRONMENTAL ARCHAEOLOGY

4.1.1 Definition and Scope

Environmental archaeology has been variously defined. Some of the definitions are given below:

- Environmental archaeology is the human ecology of the past; seeking to understand the relationships between past human populations and their environments (Boyd, 1990).
- It is concerned with the community ecology of ecosystems in which the genus *Homo* and its immediate ancestors were active elements (Coles, 1995).
- It is directed toward understanding the dynamic relationship between humans and the ecological systems in which they live. Environmental archaeologists apply information and techniques from the natural sciences to studies of the human past through analysis of archaeological deposits (Reitz *et al.*, 1996).
- Environmental archaeology is a field directed towards understanding human ecology. The ultimate goal is to determine the interrelationship between culture and environment, emphasizing archaeological research directed towards a fuller understanding of human ecology of prehistoric societies (Butzer, 1982).

Environmental archaeology, therefore, is the interdisciplinary study of past human interactions with the natural world – that encompasses plants, animals and landscapes. It studies the mutual effect of humans and environment on each other. The objective of environmental archaeology is not to merely learn about changes in the paleo-environment, but to find out how people of the past adapted to the surrounding natural environment, how they obtained various resources from the natural environment and how they altered the natural environment.

A prominent figure in this field is Karl Butzer, who has authored over 15 books on environmental archaeology and related fields.

4.1.2 Types of Environmental Archaeology

Environmental archaeology can be divided into two subfields: (a) Geoarchaeology and (b) Bioarchaeology.

- a) **Geoarchaeology:** In Geoarchaeology, the “environment” refers to the geographical environment. It uses the concepts and research methods of topography, geology, pedology, geography and so on. Geoarchaeologists study a wide range of phenomena, such as global climate, regional distribution of resources (raw materials for prehistoric people) like stone for tools or clay for pots, local geomorphology or topography, and the clues that soil can provide in studies of usage of land in the past.

- b) **Bioarchaeology:** In Bioarchaeology, the “environment” refers to the natural environment. It borrows the concepts and research methods of botany, zoology, anthropology and so on. Bioarchaeology can further be divided into (i) Zooarchaeology and (ii) Archaeobotany. Zooarchaeologists study animal remains from the archaeological context. These studies provide a better understanding of past life ways, human diets, changed landscapes, management of animals, impact of human exploitation on other animal populations, and other interactions between animals and humans. On the other hand archaeobotanists study plant remains that are preserved at archaeological sites including macro remains such as wood, seeds, nuts etc. Because these are fragile, they are only preserved in special conditions (desiccated, charred, frozen, waterlogged, or preserved as impressions in baked clay). They also study micro remains like pollen, phytoliths and spores, often found in the soils, as residues in pottery vessels, or in the sediments of stable water bodies around archaeological sites.

Check Your Progress

1) In how many divisions Environmental archaeology can be divided? How environment is defined in terms of these divisions.

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4.1.3 Importance of Archaeological Anthropology

Environmental archaeology often involves studying palaeo-environmental remains to see what species were present at the time, as well as how people interacted with and utilized them. It may also involve examining the physical environment and what resources would have been available to people and how they could be used. This field is also useful when human-made artifacts may be absent from the site, or in cases of earth movement, such as erosion, which may have buried artifacts and features of sites.

Reconstructing past environments give archaeologists insight as to what adaptations past peoples needed to undergo in order to survive, and what environmental changes may have played a role in their disappearance.

What distinguishes environmental archaeologists from other scholars who study ancient manifestations of these phenomena (e.g., palaeontologists or geomorphologists) is that environmental archaeologists are concerned with the interaction between people and the naturally occurring phenomena. They study how naturally occurring phenomena have been shaped by human activity (e.g., the effect of farming on soil development), how some component of the environment has been utilised directly (e.g., what plants were gathered by a particular society), or how the culture/environment dynamic operated in a particular time and place (e.g., a study of climatic change and its impact on human society) (Driver, 2001).

4.2 ETHNOARCHAEOLOGY

4.2.1 Definition and Scope

There are over 50 definitions of Ethnoarchaeology. Some of the commonly used definitions include the following:

- Ethnoarchaeology is the direct observation field study of the form, manufacture, distribution, meaning and use of artifacts and their institutional setting and social unit correlates among living, non-industrial peoples for the purpose of constructing better explanatory models to aid archeological analogy and inference (Stanislawski, 1974).
- It is an ethnographic research for an archaeological purpose linking material remains to the human behaviour from which they resulted (Gould, 1978).
- It is neither a theory nor a method, but a research strategy embodying a range of approaches to understanding the relationships of material culture to culture as a whole, both in a living context and as it enters the archaeological record exploiting such understandings in order to inform archaeological concepts and to improve interpretation [... it is] the ethnographic study of living cultures from archaeological perspectives (David and Kramer, 2001).

In other words, Ethno archaeology is the study of living societies to aid in the understanding and interpreting of the archaeological record. By living in, say, an Eskimo hunting camp and observing the activities of its occupants, the archaeologists hopes to record archaeologically observable patterns, knowing what activities brought them into existence (Fagan, 2001). Archaeologists have actually lived in San campsites, then gone back later and recorded the scatter of artifacts on them or have excavated them (Yellen, 1977).

The term was first used by Jesse Fewkes about 1900, but the early forms of ethnoarchaeology were freely applying modern cultural data to the past. In recent decades, archaeologists have taken a more serious view of the direct application of anthropological data, still using ethnographic data, but arguing for caution. The earliest ethno-archaeological work focused on studies of hunter-gatherer camps that might provide ways of interpreting the early human campsites of Olduvai Gorge (Fagan, 2001). But a major focus of later work has been to develop archaeological methods of inference that bridge the gap between the past and present (Cameron and Tomka, 1993). Today, a wide range of subject matters has been examined by ethnoarchaeologists, including different technologies of artefact manufacture; the nature, meaning and spatial consequences of artefact discard; the social and symbolic structuring of space; the locus and meaning of artefact style; and processes of site maintenance, abandonment and decay.

4.2.2 Use of Analogy and Direct Historical Approach

Analogy is the process of reasoning that assumes that if objects have similar attributes, they will share other similarities too (Fagan, 2001). Analogy in archaeology is applying observed behavior to non-observed behaviour. It is perhaps one of the most used research tools in archaeological interpretation. Analogies can best be drawn between those cultures who share similar environments. More importantly, these cultures must interact with their habitats in ways that are comparable to one another (Ascher, 1961). This is central to archaeological research (Hodder, 1999).

Analogies used in archaeology can be formal or relational. Formal analogies are based on the assumption that since two artifacts share a similarity in appearance or shape, they are likely to share other properties as well (Lane, 2014). In a 1971 study, Gould and his team (Gould, 1971) compared working edge angle of Mousterain Quina scrapers and modern Western Desert Aboriginal scrapers and found the Mousterain angles to be steeper. Gould reasoned this was due to the Western Desert Aborigines retouching the scrapers further than the Hominids of the Mousterian. They concluded that this

method of studying ethnographic tool use for comparison could be employed to determine what tools were used for.

Relational analogies are different from formal analogies. Here, instead of just drawing the conclusions, one must prove the relationship between the ethnographic artifact and the archaeological artifact (Lane, 2014).

Archaeologists develop analogies in many ways. One approach is the direct historical approach, using the simple principle of working from the known to the unknown. This approach relies on living cultures that may be closely related to the archaeological culture of interest in order to form analogies that may be used to explain findings. Gould (1971) explains how archaeologists should be able to measure the degree of differences between the tools found with the ethnographic material and the artifacts.

4.2.3 Examples of Ethnoarchaeology

- *Kung San of Kalahari Desert*: The !Kung San of the Kalahari has been studied by many including Richard Lee (1976), and John Yellen (1977). Richard Lee spent many years studying the human ecology of the San hunter-gatherers. Lee (1976) observed the food collecting and hunting habits of the San. John Yellen (1977) observed house and camp arrangements, hearth locations, census information and bone refuse. He pointed out that a San camp develops through conscious acts, such as the construction of windbreaks and hearths, as well as through incidental deeds as the discarding of refuse and manufacturing debris. He recognized communal areas in the campsites, often in the middle of the settlement, which belonged to no one in particular and family areas focused on hearths that belonged to individual families. The communal activities of the camp members such as dancing and the first distribution of meat take place in the open spaces that belong to no family. Such activities leave few traces in the archaeological record. Cooking and food processing as well as manufacturing of artifacts normally take place around family hearths. Yellen (1977) pointed out some interesting variation in this pattern – (a) Manufacturing activities that take place at one hearth will sometimes involve people from other families; (b) large skins will normally be pegged out for treatment away from main living areas because of vermin and carnivores; (c) activity areas are sometimes shifted around on hot days to take advantage of patches of heavy shade; and (d) such activity areas can be identified on recently abandoned sites where a scatter of discarded nuts and charcoal fragments lies outside the encampments.
- *Nunamiut Eskimo*: Lewis Binford (1978) and his students studied the Nunamiut Eskimos of Alaska, 80 per cent of whose subsistence comes from hunting caribou. He tried to find out all aspects of the procurement, processing, and consumption strategies of the Nunamiut Eskimos and relate these behaviors directly to their faunal consequences. He made a detailed study of their hunting methods, butchery, and distribution of meat, storage and re-distribution. The study revealed the following: (a) Local adaptation results in variation in the archaeological sites; (b) Interregional variations within a culture could also occur; (c) Adaptive strategies and factors affecting the people's decision making may remain constant, even if the archaeological remains show great variation; (d) Changes in stone tool frequencies or pottery forms may reflect no significant change in adaptation at all.

The study of hunter-gatherers proves that archaeologists can no longer assume that all variation in the archaeological record is directly related to cultural similarity and difference. Binford and others mainly made a functional, behavioural and ecological study.

Check Your Progress

2) What is ethnoarchaeology? Give two examples.

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4.3 EXPERIMENTAL ARCHAEOLOGY

4.3.1 Definition and Scope

- Experimental Archaeology refers to a category of experiments which entails operations in which matter is shaped, or matter is shaped and used, in a manner simulative of the past (Ascher, 1961).
- It is the systematic approach used to test, evaluate and explicate method, technique, assumption, hypothesis and theories at any and all levels of archaeological research (Ingersoll *et al.*, 1977).
- It is a replication of past processes in order to test falsifiable hypotheses or to gather data systematically (Flores *et al.*, 2014).
- Experimental Archaeology is an approach that employs a number of different methods, techniques, analyses, and approaches in order to generate and test hypotheses or an interpretation, based on archaeological source material like ancient structures or artifacts (Mathieu, 2002).

Coles (1979) states that the aim of Experimental Archaeology is to reproduce former conditions and circumstance, while Mathieu (2002) says it is designed to replicate past phenomena. However, it should not be confused with primitive technology which is not concerned with any archaeological or historical evidence, and generally undertaken as a hobby for entertainment or to demonstrate a romantic atmosphere of a specific prehistoric period (Fagan, 2001).

Experimental archaeology began in Europe in the 18th century when people tried to blow the bronze horns recovered from peat bogs in Scandinavia and Britain. Robert Ball of Dublin, Ireland after years of experimentation was able to produce a deep, bass sound resembling a bull. In one of his enthusiastic experiments he ruptured a blood vessel and died. However, it was in the mid-twentieth century that experimental archaeology actually began. One of the incidents that helped create this approach was the capture of Ishi, one of the last surviving members of the Yahi Indians, near Oroville California. Even though the story of Ishi is a tragic one, he left behind a mine of knowledge about Indian technology such as laying of traps and snares. Ishi was accompanied to his home by anthropologist Alfred Kroeber and others who documented his life and behaviour in his homeland, and in the Berkeley museum where he spent his last few years.

In the field of experimental archaeology stone working has been the most studied – how and in what manner prehistoric people made and used the stone tools. A few dedicated scientists have spent years experimenting with stone tools. Largely through

the trial and error efforts of scholars such as Francois Bordes of France and S. A. Semenov of erstwhile Soviet Union a tremendous amount has been rediscovered about the process of manufacturing stone tools (Hurst, 1974). Don Crabtree, an Idaho rancher worked for more than 40 years trying to replicate the Folsom points (originally used 9,000 to 11,000 years ago by Palaeo Indians as hunting weapons). He was ultimately able to produce points of great variation and beauty, and recorded 11 different methods of flake removal.

4.3.2 Criteria for Experimental Archaeology

Enthusiastic experimentation on stone tool technology has led to the replication of beautifully flaked stone tools. However, the making of these stone implements, makes one ask whether mere replication of implements would be the answer to what, why, and how, prehistoric people lived in an era past gone, some thousands of years ago. The answer to that is that we can never be sure. However, even when replicating past technology or phenomena, there are certain criteria that have to be adhered.

Following are the criteria required for experimental archaeology:

- 1) Materials used in the experiments must be those available locally to the prehistoric society one is studying;
- 2) Methods must conform to the society's technological abilities. Modern technology must not be allowed to interfere;
- 3) Results must be replicable and consist of tests that lead to suggested conclusions.

Check Your Progress

- 3) While experimenting with making of an artifact, such as a stone hand axe, which are the important criteria that one should keep in mind?

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4.3.3 Types of Experimental Archaeology

Reynolds (1999) mentioned five major types of experiments in experimental archaeology, which are reproduced below:

- i) *Construction*: 1:1 scale constructions that test a hypothetical design for structure (such as a house) based upon archaeological evidence.
- ii) *Process and function experiments*: Investigations into how things were achieved in the past. This includes investigations into what tools were for, how they were used and how other technological processes were achieved.
- iii) *Simulation*: Experimental investigations into formation processes of the archaeological record and post-depositional taphonomy.
- iv) *Eventuality trial*: Usually combining all the three categories above, these are large-scale and long duration experiments that investigate complex systems (such

as agriculture) and chart variations caused by unexpected or rare events (such as extreme weather).

- v) *Technological innovations*: Where archaeological techniques are themselves trialed in realistic scenario.

4.3.4 Examples of Experimental Archaeology

- One of the best known examples is the Kon Tiki expedition undertaken by Thor Heyerdahl in 1947, in which he attempted to prove that Polynesia was settled by adventurous Peruvians (Heyerdahl, 1950). The popular theory at that time was that it was colonized by people from Southeast Asia. After sailing for 101 days in a raft that was built, from balsa logs and in a manner that was mentioned in a 16th century Spanish report, he was successful in reaching the Tuamotu islands of Polynesia. His experiment proved that people from South America could have undertaken such a long journey over the ocean; however it did not prove that it was the Peruvians who did it.
- Many experiments have been done on tool technology. Many experiments on clearance of forests in Europe and elsewhere have been conducted. One Danish experiment yielded estimates that a man could clear half an acre of forest in a week. Tree ring and fire have been shown to be effective tree felling techniques in West Africa and Mesoamerica. Experiments with agriculture have also been conducted in Southern Maya lowlands and Mesa Verde National Park. The latter experiment lasted seventeen years. In this experiment, 1½ acres of land was planted with maize, beans and other such crops. Good crop yields were obtained in all but 2 of the 17 years, when there was drought (Fagan, 2001).
- One of the longest ongoing experiments is Overton Down earthwork in England lasting 128 years. Here, some archaeological materials like pottery, bone, leather, wood, textiles etc were buried in the earthwork, which were to be sectioned off at intervals and unearthed to study its decay patterns.

Check Your Progress

- 4) Who defined major types of experiments in experimental archaeology. Name all the major types.

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4.4 SUMMARY

Human behaviour is complex and its reconstruction is complicated by the vast time gap that separates us from our prehistoric ancestors, and by the difficulties of preservation conditions. In such a scenario, to understand fully how ancient humans behaved in a given environment, newer approaches with newer methods and techniques have to be used. Today, the reconstruction of the past has become interdisciplinary in nature, with scientists from different disciplines aiding in our understanding.

Many aspects of past human or hominid behaviour will never be fully understood; some may be guessed at but never proven. The actual materials an archaeologist works with are scanty and highly biased. In this light all possible avenues should be explored and encouraged. Environmental archaeology, Ethnoarchaeology and Experimental archaeology are approaches which provide one of many ways to move in this direction.

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4.6 ANSWERS TO CHECK YOUR PROGRESS

- 1) Environmental archaeology can be divided into two subfields: (a) Geoarchaeology and (b) Bioarchaeology. In Geoarchaeology, the "environment" refers to the geographical environment. It uses the concepts and research methods of topography, geology, pedology, geography and so on. In Bioarchaeology, the "environment" refers to the natural environment. It borrows the concepts and research methods of botany, zoology, anthropology and so on.
- 2) Ethno archaeology is the study of living societies to aid in the understanding and interpreting of the archaeological record. Two examples of ethno archaeology are: (a) *Kung San of Kalahari Desert* (b) *Nunamiut Eskimo*
- 3) Following are the criteria required while experimenting with making of an artifact:
 - i) Materials used in the experiments must be those available locally to the prehistoric society one is studying;

- ii) Methods must conform to the society's technological abilities. Modern technology must not be allowed to interfere;
 - iii) Results must be replicable and consist of tests that lead to suggested conclusions.
- 4) Reynolds (1999) mentioned five major types of experiments in experimental archaeology, which are given below:
- i) *Construction*
 - ii) *Process and function experiments*
 - iii) *Simulation*
 - iv) *Eventuality trial*
 - v) *Technological innovations*

