UNIT 4 INTERDISCIPLINARY APPROACHES OF ARCHAEOLOGICAL ANTHROPOLOGY*

Contents

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.

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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*