
UNIT 3 INTERDISCIPLINARY RELATIONS AND APPROACHES

Structure

- 3.1 Introduction
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 - 3.2.2 Fauna
- 3.3 Earth Sciences
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 - 3.3.3 Geology
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Learning Objectives



Once you have studied this unit, you should be able to understand the relationship of Archaeological Anthropology with:

- Biological Sciences (Flora, Fauna);
- Earth Sciences (Geomorphology, Sedimentology, Geology);
- Physical Sciences (Chronometry);
- Chemical Sciences; and
- Social Sciences (History, Sociology, Archaeology, Anthropology, Psychology).

3.1 INTRODUCTION

It is now clear to us that archaeology – the very basis of archaeological anthropology—is aimed at the total reconstruction of ancient human societies. It is a study of the chronological and geographical limits of ancient cultures. To put the matter in a more formal way, archaeology or archaeological anthropology has a three-fold goal: a) reconstruction of respective environmental settings of past cultures; b) to fix their temporal limits; and c) to reconstruct the material as well as ideational aspects of these cultures. Archaeology seeks to realise these goals by, in addition employing its own methods, drawing upon concepts and methods of various other sciences. In this unit therefore we will examine the relationship of archaeology with various, biological sciences, earth sciences, physical sciences and social sciences.

3.2 BIOLOGICAL SCIENCES

Biological sciences deal with organic components (plant and the animal worlds) of the environment. Ecology seeks to reveal the interrelationships between man and the biological world.

3.2.1 Flora

Archaeobotany is the study of all kinds of plant remains found in archaeological sites. These comprise actual materials like charcoal, wood remains and grains as well as indirect evidence in the form of impressions of leaves and husks on clay and pottery. These are microscopic remains too in the form of phytoliths and pollen. Flotation and other techniques are used to collect these plant remains from excavations and are then subjected to scientific examination in the laboratory.

Plant remains are particularly important for studying food economy of ancient societies. In the Paleolithic and Mesolithic stages man was essentially parasite on nature. In tropical regions like India, wild plant foods played a bigger role, and these included a variety of roots and tubers, fruits, seeds, berries, gums, and leafy greens and flowers. Wood was also used for preparing tools and weapons. In the Neolithic stage food production commenced and man eventually began to raise crops of many cereals and pulses. This brought about a drastic change in man-nature interaction, including vegetation clearance leading to environmental degradation. Plant remains are helpful in other ways too. These provide clues for reconstructing past climate. Dendrochronology or tree ring analysis is a useful relative dating method. Charcoal is commonly used for C-14 dating of archaeological sites.

3.2.2 Fauna

Animal kingdom is the second important component of man's biological environment and is again intimately connected with human adaptations. That this was so right from Stone Age times is revealed by the occurrence of animal bones and other animal-related features on archaeological sites of various time periods. Palaeontology is the study of fossilised remains of extinct wild animals which lived in the Pleistocene period. Archaeozoology is the study of animal remains found on Holocene archaeological sites (Mesolithic onwards).

Animal remains found in archeological sites are varied in character : bone and antler, shells, fish remains, bird and rodent bones, even insect remains. Animals were exploited for various purposes. Bones and antlers were sometimes used for tool-making and hides were employed for clothing and roofing of huts. Also ornaments like beads were prepared. More importantly, animals were used for food purposes. Hunting of large game and scavenging of kill sites of carnivorous animals were common in the Palaeolithic. Small animals and birds were also trapped for food purpose. In the succeeding Neolithic stage animals like, cattle, sheep/goat, pig, were domesticated. But hunting and collecting still continued. Animal remains could also give clues about past climate and vegetation.

3.3 EARTH SCIENCES

Earth sciences play a pivotal role in the analysis of archaeological sediments and in the reconstruction of physical features of ancient landscapes. Geomorphology, Sedimentology and Geology are very important from this point of view.

3.3.1 Geomorphology

Geomorphology is a branch of Physical geography which is primarily concerned with the study of the land forms and the evolution of landscape. Archaeological sites are generally found with reference to geomorphological situations like hills, foothills, plains, river banks, lakes, coasts etc. Stone Age groups generally preferred rocky terrain with open forest vegetations which facilitated easy movement as required for hunting purposes. Availability of raw materials like stone for tool making and perennial surface water sources, and good landscape visibility influenced location of Stone Age sites. From the Neolithic period onwards human groups also began to occupy plain lands like alluvial and coastal plains suitable for agricultural purposes. Geomorphology enables us to reconstruct these varied landscapes.

Archaeological anthropology has interdisciplinary approach of studying in relation to various sciences viz., Biological sciences, Earth sciences, Physical and Chemical sciences, Social sciences etc.

3.3.2 Sedimentology

Archaeological sites are nothing but small or large deposits of soils and sediments associated with past human activities of various kinds. Sedimentology deals with a systematic study of these sediments both in the field and in the laboratory. Examination of physical and chemical properties of soils like nitrogen and phosphate contexts provides complementary evidence to recognise various activity areas on an archaeological sites, e.g. human-dwelling spots, animal penning spots, animal-butchered areas, pottery-making workshops, burial spots, etc. Studies of soils and sediments can also tell us about the formation of natural sediments on the landscape by non-human agencies like water, wind and volcano. This study is extremely useful for palaeolandscape reconstruction.

3.3.3 Geology

Geology is one of the oldest scientific disciplines and deals with study of various rock formations on the earth's surface. Its application for studying archaeological sites has led to the origin of what is called geoarchaeology. Geology served as the basis for the development of archaeological stratigraphy. Also the terms like Paleozoic, Mesozoic, etc. used for partitioning geological time inspired archaeologists to coin terms like Palaeolithic, Mesolithic, etc. to divide prehistoric time.

Geoarchaeology now helps archaeologists in understanding the properties of rocks, minerals and ores and their utilisation by ancient communities. It also helps us in understanding how archaeological sites have been preserved or disturbed due to natural forces like wind, water, ice, earthquakes etc.

3.4 PHYSICAL AND CHEMICAL SCIENCES

Physical sciences (Physics and Chemistry) also play a very important role in the reconstruction of past human societies from the archaeological record.

3.4.1 Chronometry

Earlier archaeological sites and their deposits were dated in relative terms with the help of methods like stratigraphy, stylistics of artifacts and monuments, and

degree of patination. During the last half a century a number of absolute dating techniques developed in Physics and Chemistry have proved to be very useful for dating archaeological sites. Their time range has now been extended to nearly three million years. Radiocarbon, archaeomagnetism, potassium-argon, uranium-thorium, fission-track, electron spin resonance, and thermoluminescence are some of these methods.

The carbon 14 (radiocarbon-carbon of atomic weight 14) method gives absolute date up to ca. 50,000 B.P. on wood, wood charcoal from fire, peat, grass, cloth, shell, bones, dung, remains of plant and animal life. This dating technique was for the first time introduced in 1949 by Williard F. Libby. Similarly, potassium-argon method gives dates ranging up to a few million years on rocks, minerals, pottery, volcanic glasses and meteorites etc. and the thermoluminescence (TL) give dates on rocks, minerals and pottery.

In India too, these and other dating methods have now begun to be used commonly for dating archaeological materials and sediments. C-14 dates have pushed the antiquity of the Indus civilization to the beginning of the third millennium B.C. and the beginning of crop and animal husbandry to 6th-7th millennium B.C. Likewise, the Stone Age sites of Riwat and Uttarbaini in the Siwalik zone have been dated to beyond two million years by palaeomagnetism. The Acheulian sites of Isampur and Attirampakkam in South India are dated to 1.2 and 1.5 million years by electron spin resonance and cosmogenic nuclide methods, respectively. Indeed we realise that these dating methods taken from physical sciences have caused a revolution in archaeological chronology in India.

3.4.2 Chemical Analyses

Techniques borrowed from organic and inorganic chemistry have also contributed in a significant way towards the analysis and interpretation of archaeological materials. The application of these techniques has, for example, given fresh knowledge about ancient copper, iron and glass technology. Also, analyses of food and blood residues on ancient objects and pottery containers led to interesting information about preparation of food items and their consumption. For example, chemical analysis of starch grains on stone tools shows that already in Middle Palaeolithic times sun-dried bread of wild grass seeds was being prepared and consumed in Africa and Europe.

3.5 SOCIAL SCIENCES

Our foregoing observations about the role of natural sciences should not be construed to mean that archaeology has no interconnections with social sciences. In particular, it benefits from interpretations and analogies drawn from anthropology, history and human geography.

In unit 2 we have already considered how clues derived from cultural anthropology are used in archaeological reconstruction. These are ethnographic parallels or analogies derived from the study of contemporary simple (peasant, pastoral and hunting-gathering) communities. These analogies are of two types: general comparative and direct historical. Considering that India is home to a tremendously large number and variety of simple societies inhabiting hill tracts still clothed in good vegetation. It is reassuring to know that prehistorians have

already studied hunting-gathering communities like the Chenchus, Yanadis, Irulas, Hill Pandarams, Pardhis and Van Vagris, and Gonds and made use of the analogies for reconstructions of Palaeolithic and Mesolithic life ways. Likewise, studies of pastoral communities like the Todas, Badagas, Kurubas, Dhangars and Bharvads have provided to be very helpful for understanding various aspects of early agropastoral communities.

Biological or physical anthropology is concerned with the origin, evolution and variation of human beings. It seeks to study the physical characteristics like physique, age, sex, cranial capacity, DNA, blood group, gene, medical history, nutrition, food habits, dental formula, pathology and demography.

Human geography also helps archaeological reconstruction. It deals with the study of distribution of human settlements on a given landscape and how this distribution is governed by consideration of physical factors like terrain form, soils and availability of water and other resources and also by symbolic and religious factors. Such studies in human geography provide many useful clues for reconstructing settlement geography of ancient societies.

Archaeology and history are sister disciplines; both seek to reconstruct ancient societies and their lifeways in a comprehensive way. The differences lie in methodology. While archaeology is based upon the use of non-written or antiquarian materials, history makes use of written documents of all kinds. The notion of history as the story of kings and rulers and their political victories and defeats which prevailed for a long time has now given way to total history involving the study of economic, social, religious and other aspects of ancient societies. The Annales school of France has played a pivotal role in this transformation. The concepts and methods of this new history are helpful in archaeological reconstruction.

Other social sciences like sociology, psychology and economics as well as humanities like philosophy, literary theory and art history also contribute to archaeology in terms of concepts and methods.

3.6 SUMMARY

By now you will have realised that archaeology is an eclectic branch of knowledge. While it has an independent status from the point of view of both aims and methods, it takes the help of almost all natural and social sciences and humanities in the recovery of antiquarian remains, their analysis and dating, and their reconstruction and interpretation of past human societies.

Suggested Reading

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Sample Questions

- 1) Critically examine the role of Natural Sciences in archaeology.
- 2) How floral and faunal remains are helpful to study the archaeological anthropology? Discuss.
- 3) How physical and chemical sciences help to study archaeological anthropology? Discuss.

Write short Notes on the following

- i) Relationship of geology with archaeological anthropology.
- ii) Relationship of archaeological anthropology with geomorphology.