NJESR/August-2025/Volume-7/Issue-8 E-ISSN-2582-5836
DOI-10.53571/NJESR.2025.7.7.12-15

Dating Methods In Archaeology

Dr. B. Magendran
Assistant Professor of History
Govt Arts college, Ooty-2
The Nilgiris
Tamilnadu

(Received-15-July2025/Revised-30-July2025/ Accepted-10-August2025/ Published-30August2025)

Abstract

Dating methods in archaeology are essential for establishing the age of sites and artifacts. They are divided into relative methods, like stratigraphy, which order events without exact dates, and absolute methods, such as radiocarbon and dendrochronology, which provide calendar ages. Together, these techniques help build accurate timelines and deepen our understanding of the Human past. This paper explores the principles, applications, and limitations of key dating techniques used in archaeological research. Advances in Dating technologies and interdisciplinary collaboration continue to refine chronological models, thereby enhancing our ability to interpret archaeological records with greater precision.

Keywords: Archaeology, Dating Methods, Absolute Dating, Dating Methods, Chronology

Introduction

Archaeological investigations have no meaning unless the chronological sequences of events are re-constructed faithfully. Dating of remains is vital in archaeology, in order to place finds in correct relation to one another and to find what was present in the experience of any human being at a given time and place. Dating is a process of assigning to an object or an event a date in the past, allowing such object or event to be located in a previously established chronology. This generally requires a 'Dating Method'. A number of dating methods are used by the archaeologists to determine the antiquity of archaeological materials, organic remains like plants and animals, and of archaeological sites. These Dating techniques can be broadly subdivided into two groups: Relative Dating and Absolute Dating. Relative Dating identify the order in which the sites or artefacts were used in a sequence from earliest to latest. Absolute dating techniques attempts to establish an exact or approximate calendar date for a site or artefact.

Relative Dating

Relative Dating is basic to Chronology. It is the ordering of events in the absence of any written record or evidence. Under relative dating method a tentative date is achieved based on

archaeological stratigraphy, palaeography seriation, linguistic style, context, art and architectural features. Archaeologists use relative dating techniques when the absolute dates are not possible or feasible.

Typology

Typology involves putting a number of finds into chronological order. It is a method of comparing reference objects with the purpose of classifying them according to their similarity or dissimilarity and associating them to a specific context or period. This technique is often used when it is not possible to make use of absolute dating methods.

Stratigraphy

Stratigraphy can be described as a ‘ layer cake’ type arrangement of deposits called strata, with the older layer beneath the latest. It is also known as the ‘Law of Superposition’. It is the branch of the geology that deals with the study and interpretation of the sedimentary stratified rocks, as well as of the identification, description, sequence, both vertical and horizontal, cartography and correlation of the units stratified of rocks.

Seriation

Seriation is a relative dating method in which artefacts from several sites, in the same culture, are placed in chronological order. It is a method of ascertaining the age of the artefacts on the basis of style, type and technique. It is broadly classified into two categories namely stylistic seriation and frequency seriation. Stylistic seriation is a method in which the artefacts and attributes ae positioned on the basis of resemblance in style. For instance, dish-on-stand, S-shaped jar and perforated jar are some of the diagnostic styles available in Harappan sites.

Geo-Archaeological Dating

For the early prehistoric period archaeologists have borrowed techniques from geography, geology, and the other earth sciences to reconstruct the environments of early people and also to establish a relative chronology based on environmental changes. With the change of climate, the types and relative numbers of different flora and fauna also changed. Where organic preservation is good, changes can be traced byanalyzing pollen (palynology) found in sediments and animal bones. To provide pollen sequence a core through a deposit such as peat is taken and for each layer the proportions of different types of pollen are recognized.

Obsidian Hydration Dating(OHD)

Obsidian is a hard , dark, glass- like volcanic rock formed by the rapid solidification of lava without crystallization. In 1960, two geologists, Irving Friedman and Robert Smith introduced

Obsidian Hydration Method (OHD) to the archaeological community. It is a geochemical method of determining the age of an artefact made of obsidian either in absolute or in relative terms. Obsidian contains about 0.2 percent water.

Chemical Dating of Bones

Bones are one of the important organic samples recovered in excavations. These bones help to reconstruct various aspects human life such as the dietary pattern, palaeo,-climate, trade network and rituals performed in ancient times. Therefore, the control over the date would help to identify the changing pattern of diet, climate, ritual and trade. Burried bones absorb fluorine and uranium from water in the ground at the same time as their nitrogen content reduces as collagen in the bones decays. These processes take place at a uniform rate so it is possible to establish the relative age of different bones by measuring the proportions of these chemicals.

Absolute Dating

Absolute dating is a method in which involves precise dating of artefacts using various scientific techniques and in a few cases it is dated based on the hidden historical data available with historical documents such as inscriptions, copper plates, seals, coins, inscribed portrait sculptures and monuments.

Radio Carbon Dating(C-14)

Radiocarbon dating (also known as carbon dating or C-14 Dating) is a method for determining the age of an object containing organic material by using the properties of radiocarbon, a radioactive isotope of carbon. The Radiocarbon dating is the oldest and perhaps the most widely used in archaeology. This method was developed in 1948 by Willard F. Libby as spin-off from atomic research during the Second World War. He received the Nobel Prize in Chemistry for this work in 1960. It is based on the principle that radiocarbon C-14 is constantly been formed in the atmosphere by the interaction of cosmic rays with the nitrogen present in the atmosphere. The resulting C-14 combines with atmospheric oxygen to form radioactive carbon dioxide which is absorbed by the plants by means of photosynthesis and by animals through eating. When the plant or animal ceases to be living it stops receiving fresh supply of C-14. The existing C-14 now undergoes a process of decay which is called radioactivity. C-14 is a radioactive isotope or element of C-12, and both are present in equal amounts. We may measure the decaying C-14 with reference to C-12, and find out the number of years that have elapsed since the decay began. The object which contains less C-14 proves to be older in age, and that which contains more C-14 turns out to be younger. This measurement is based on the fact that the half-life of C-14 is

5568 years. The half-life of a radioactive material is defined as the period during which one -half of the amount of material decays out. Since most organic materials perish in due course, charcoal because of its high content of carbon is the commonest material utilized for radiocarbon dating.

Thermoluminescence

Thermoluminescence(TL) dating is a method that is based on the analysis of light release when heating crystalline material. It is used in mineralogy and geology, but is also increasingly being applied for dating of anthropological and archaeological samples. Thermoluminescence uses the phenomenon of ionizing radiations that exist naturally in the atmosphere.

Conclusion

Thermoluminescence can replace radiocarbon dating to date events that occurred more than 50,000 years ago, it is used mainly for dating stone fireplaces, ceramics and fire remains. However, it is useful for older periods and cases where there are no organic remains such as dating Upper Palaeolithic figures.

References

1. http://epgp.inflibnet.ac.in/epgpdata/uploads/epgp_content/S0008291C/P001688/M020081/ET/1493287698P07_M17_Relative DatingMethods-ET.PDF.
2. https;//www.thecanadianencyclopedia.ca/en/article/dating-in-archaeology
3. https://www.ucl.ac.uk/museums-static/digitalegypt/archaeology/dating.html
4. Jim Grant, Sam Gorin, Neil Flemming,2008, 'The Archaeology Coursebook: An Introduction to Themes, Sites, Methods and Skills', Routledge, London& New York,p.82
5. Jim Grant, Sam Gorin, Neil Flemming,p.86