

ARCHAEOLOGY

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Contents

1. Introduction
2. The History of Archaeology
3. The Archaeological Record
4. Doing Fieldwork in Archaeology
5. Analyzing Archaeological Data
6. Archaeological Interpretation
7. The Archaeology of Human Life Support Systems
8. Preserving the Past for The future

Acknowledgments

Glossary

Bibliography

Biographical Sketch

Summary

Archaeology studies history through the material remains of past human activities. Sometimes called the archaeological record, such remains offer a glimpse of the past that is independent of written accounts and oral traditions. The archaeological record contains evidence of the successes and failures of a wide variety of past life support systems beginning as early as 2.6 million years ago. This essay introduces the fundamentals of archaeology as it is conceptualized and practiced today. The theme articles, published in the on-line EOLSS provide more detailed discussions of the methods used to gather and analyze archaeological data, approaches to interpretation, and current knowledge of the world archaeological record. With the dawn of the new millennium, development, tourism, and a multitude of other forces threaten the preservation of the archaeological record as a critical resource for sustainable development planning.

1. Introduction

Knowledge of what has happened to human life support systems in the past clearly should be an important component of planning for sustainable development in the future. Historians contribute to this knowledge through the study of written texts and other documents. The written record of the past, however, is limited to the last few thousand years. Furthermore, it gives glimpses of the past only through the eyes of a very few literate individuals who lived during that time span and who often wrote to achieve political ends. Archaeology is another pathway to knowledge of the human past which

is independent of and complementary to the written record and oral traditions. The archaeological record consists of the material remains of past human activities such as building foundations, trash dumps, landscapes, shipwrecks, and tombs. It extends back to the very beginning of human existence and documents a plethora of successes and failures of past life support systems. And it more often is an unintentional and, therefore, less biased record of not just elite groups but also of common people.

Archaeology is the study of the human past primarily through the documentation and interpretation of the material remains of past human activities. The remains may be building foundations or domestic trash dumps or shipwrecks or tombs. They also may be roads or food residues or stone quarries or rock art. Archaeologists, however, often use other sources of information about the past as well. These sources include written texts, pictorial images such as photographs or paintings, art and architecture, memories and oral traditions from still-living people, and landscapes. In this sense, archaeology is inherently an interdisciplinary field of study. Archaeologists often draw upon the expertise of specialists in other disciplines to provide new sources of information about the past, to identify important research questions, and to give new perspectives on how to interpret the physical remains of the past.

1.1. The Goals and Objectives of Archaeology

Archaeology holds in common with other historical disciplines the goal of understanding the human past. Toward this end, archaeologists work to accomplish four objectives. First of all, they locate, document, and, whenever possible, preserve the archaeological record of the human past.

The archaeological record is made up of the material remains of past human activities along with the physical context within which the remains occur. Archaeological records often occur in geographically bounded clusters of material remains or sites. Sometimes, however, the archaeological record consists of no more than a type of artifact such as a projectile point that is distributed over an ancient or modern landscape and occurs in isolation. Archaeologists locate sites and other remains with such methods as pedestrian surveys, remote sensing such as satellite images and ground penetrating radar, documentary sources such as old maps, and oral testimony. Accidental discovery, of course, also is common. Documentation of the archaeological record involves the detailed and meticulous exposure and recording of the provenience, matrix, and associations of material remains. The documentation methods include mapping, photography, narrative descriptions, standard record forms, and drawings. Preservation methods include avoidance, burial, architectural stabilization, cleaning, storage, artifact catalogs, and the like.

The next objective of archaeological research is to interpret the uses, functions, and meanings of the material remains making up the archaeological record. Form, associations, and analogy are the most basic keys to these interpretations. The form of artifacts, such as shape and material composition and decoration, helps in interpretation. Other material remains found in association with the object under consideration provide additional clues. The occurrence of a pile of “green” or unfired brick and an excavated clay bank next to what appears to be the remains of a kiln structure, for example, helps

to interpret its past use as a brick kiln. Analogy is the most common reasoning tool used to infer use, function, or meaning from the form and associations of artifacts and other material remains of the human past. Analogy includes experiments that attempt to replicate the object, historical descriptions of objects and their uses (such as trade catalogs), and ethnographic observations of how living people use the objects.

The third objective of archaeological research is interpreting cultural history from the archaeological record and associated sources of historical information such as written documents or oral testimony. Writing cultural histories first of all involves asking the journalistic questions of who, what, where, and when. Archaeologists use methods such as radiocarbon dating, tree ring dating, and documents to help answer the question of “when.” Answering the question of “what” requires research into the specific historical events associated with the material remains, such as a battle or a bison kill or a royal burial in a Viking ship. The question of “who” brings into focus issues of ethnicity and race, gender and sex, social class and status, occupation, and migration. Finally, archaeologists answer the question of “where” with research into the geographical boundaries of social and cultural regions such as states or chiefdoms, settlement systems, trading and exchange networks, and world-system interactions.

As a fourth objective, archaeologists seek an answer to the question “why.” Archaeologists generally seek explanations in either process or agency. Processual explanations use laws or principles that operate cross-culturally and are not bound by time. Some processual explanations are focused on the formation of the archaeological record (such as site formation processes). Others interpret the development of general social and cultural patterns, such as state formation or urbanism, or large-scale economic interactions such as world-systems. Archaeological explanations also may invoke agency. Agents include individuals seeking goals within complex social fields, ideologies, and environments.

1.2. The Many Faces of Archaeology

Most archaeologists specialize in a time period, geographical region, cultural tradition, or methodology. Prehistorians, for example, explore the most remote human past, all the way back to the archaeological record of the earliest fossil hominids, and cover by far the longest time span of all the archaeological specialties. In contrast, historical archaeologists work with the most recent end of the time spectrum. They limit themselves to the last several hundred years of human history, and take advantage of the abundant written records that often are available. Archaeologists also focus on particular geographical regions (such as Oceania, the Mediterranean, North America) or cultural traditions. Classical archaeologists, for example, study the material remains of ancient Greek and Roman civilizations; Mayanists investigate the remains of the ancient Mayan civilization in Mexico and Central America; and Sinologists examine the archaeological record of ancient China. Finally, some archaeologists develop expertise in particular research methods and designate themselves accordingly. Underwater archaeologists, for example, work with shipwrecks and other submerged archaeological remains such as town sites (for example, Port Royal in Jamaica). Geoarchaeologists apply geological methods such as sedimentology to the interpretation of the archaeological record. Zooarchaeologists analyze bone and other animal remains found in or associated with

archaeological sites. Iconographers interpret physical representations such as signs and symbols. Professional archaeologists recognize the specialized knowledge of their specialties and endeavor to do research only within the boundaries of their expertise.

1.3. Relationship of Archaeology to Other Disciplines

Archaeology began as antiquarianism and speculation. The earliest attempts to explain the physical remains of past human activities took place within the limits of existing stories about the human past such as the Bible, the classics of ancient Greece and Rome, folklore, and cultural traditions. Today, however, scientific method drives much of the practice of archaeology. The method begins with the assumption that the natural world, including the human past, is knowable through observation by the human senses. Observational data are then analyzed and interpreted within a specific structure of inquiry. The structure includes asking questions that are linked to theories on the one hand and to testable hypotheses on the other. Scientific inquiry is unique in that knowledge arising from the questioning process involves a set of methods that is self-correcting.

Archaeology, however, is a historical science that holds more in common with geology and biology than with the physical sciences such as physics or chemistry. Like other historical sciences, archaeology is not experimental for the most part, although experimentation is sometimes used as a reasoning tool to develop analogs. In the United States, archaeology historically developed as a specialization of anthropology, a social science. Anthropology is unique among the social sciences in taking a holistic, comparative, and historical approach to the study of the human condition. Until recently, the discipline used primarily scientific methods to search for general principles that explain variability and change in human behavior and biology. Today, however, both anthropology and archaeology often take a much more humanistic approach to understanding the past.

In most of the world, archaeology developed historically as a specialization of history. In this approach, archaeology becomes a source of historical information which, like written accounts and memory, is intended to tell stories about the past. Archaeology as history involves using primarily material remains to construct images of the people who lived in the past, when and where they lived, their ways of life, and how they changed over time. Scientific, humanistic, anthropological, and historical approaches to archaeology are best thought of as different perspectives on the human past rather than competitors.

1.4. Archaeology as a Profession

The first archaeologists practiced their craft as dilettantes. Not until the twentieth century did archaeology emerge as a profession. Universities or colleges or museums offered almost all the jobs for professional archaeologists until the passage of significant cultural resource management legislation in the mid-twentieth century. Most professional archaeologists today work in universities or colleges, private businesses such as environmental companies, museums, or governmental agencies. Professional archaeologists working in academia typically have a doctorate in anthropology,

although some, especially in community colleges, have a Master's degree. Professionalism in archaeology has many dimensions, including ethics, standards, career development and training, and workplace issues. Professionalism involves lifelong learning, a sense of responsibility, and a strong commitment to practice archaeology according to an agreed upon code of conduct. Scholarly organizations in archaeology occur at the local, regional or state, national, and international levels. In the United States, for example, the three largest scholarly organizations are the Society for American Archaeology, the Society for Historical Archaeology, and the Archaeological Institute of America. The Southeastern Archaeological Conference in the south-eastern United States and the Society for California Archaeology are good examples of regional scholarly organizations. Other archaeological organizations are focused on professionalism. These include the Register of Professional Archaeologists in the United States and the Institute of Field Archaeologists in the UK. Both organizations certify professional archaeologists who meet a set of training qualifications and agree to abide by a Code of Conduct and a set of Standards of Research Performance.

2. The History of Archaeology

The roots of professional archaeology can be found in what seems to be an almost universal human propensity to think about the past, perhaps a logical extension of the evolutionary development of the “future planning” capacity of the human brain. Speculations about the past appear in some of the earliest written documents around the world. Collecting relics has been a common expression of this interest for an equally long time. The most direct historical antecedent of professional archaeology, however, can be found in the Renaissance period of modern European civilization. As early as the fifteenth century, the elite of Western Europe began to travel to the ruins of ancient Greece, Rome, and Egypt. They studied and collected, sometimes by digging, the physical remnants of these early civilizations, and brought back relics that became the backbone of the earliest European museums. Museum collections and travelogues from this period formed the foundation of the earliest comparative studies of artifacts gathered from archaeological sites. Perhaps reflecting emulation of the Renaissance elite culture, less affluent Europeans also indulged in antiquarianism at home. They explored, collected artifacts from, and speculated about the origins of local earthworks, stone monuments, and burial mounds. Museums also emerged from these efforts.

The search for the meaning of antiquities during this early period mostly took place within the realms of myth and legend, theology, and idiosyncratic speculation. Classical texts, such as Homer's *Iliad* and the Bible, offered popular accounts of the human past which were used to explain ancient monuments and artifacts. Elves and other mythical beings provided explanations of stone implements. The idea of progress strongly influenced early explanations of the human past and continues to do so. Early philosophers, including biblical accounts, speculated that the human past began with a golden age and then degenerated to the miserable life of the present which will only become worse in the future. The degenerative historical scheme of the Greek philosopher Hesiod and the biblical account of the Garden of Eden are but two examples. But the European Renaissance brought with it a new sense of optimism about human history. Charles Darwin's theory of evolution, first published in 1859, provided the intellectual framework for the earliest progressive schemes of human history to

influence the development of professional archaeology. Perhaps the best known of these is the model of evolutionary stages proposed by Lewis Henry Morgan in his book *Ancient Society* published in 1877. The model portrayed the human past as beginning with the stage of savagery and then evolving first into barbarism and finally into the stage of civilization. In the twentieth century, Vere Gordon Childe followed a similar model within a Marxist explanatory framework in books such as *What Happened in History?* (1954). Childe's stages of human development involved a series of progressive revolutionary transformations in human history, including the agricultural revolution and the urban revolution.

2.1. The Natural Science Revolution

The early development of professional archaeology involved a shift toward the natural science activities of describing and classifying the physical remains of the human past. Science emerged in the European Renaissance as a distinctly new way of explaining the natural world. The method involved detailed observation, description, and comparison of natural phenomena such as plants, animals, and the earth itself. Antiquities easily fell into the realm of natural science. Early archaeologists in the eighteenth and nineteenth centuries developed better methods for observing the physical remains of the human past, for describing their characteristics, and for classifying them into categories that could be compared in space and time.

Field observation is the most basic of archaeological methods. Archaeological field methods must be adequate to allow the observation and documentation of the physical context in which the remains of the human past are found. The field methods used to identify context include surface surveys and excavation. Early archaeologists gathered information about the geographical distribution of distinct styles of bronze or iron axes, megalithic monuments, burial mounds, and pyramids. They also laid the foundation for the emergence of diffusion and the migration of human populations as a popular explanatory concept that still exists. Among the more popular of these ideas has been the global migration of ancient Egyptians, Lost Tribes, Vikings, and Phoenicians. The geographical distribution of megalithic monuments and tombs has been used to argue first for the spread of Mediterranean culture into Western Europe and then for the reverse. The concept of cultural area, the geographical boundaries of a distinct culture, also rose from studies of geographical distribution to strongly influence historical and comparative studies in anthropology and geography from the late nineteenth until well into the twentieth centuries.

Time was perhaps the fundamental issue of the natural science period in archaeology. The concept of linear time, together with biblical accounts suggesting a short time span, furnished the dominant model of time in modern European civilization. The earliest explanations of the human past assumed the short chronology of the approximately 6,000 years in this commonly accepted chronology. But several historical events soon questioned this chronology. More detailed observations of the archaeological context of antiquities showed that they sometimes occurred together with the bones of extinct animals. William "Strata" Smith, James Hutton, and, later, Charles Lyell formulated the geological principle of uniformitarianism, which states that the same slow and gradual

natural processes observable in today's world shaped the earth in the past, to replace the ideas of special creation and catastrophes such as floods.

Classification is another product of archaeology as a natural science. In 1819, Christian Thomsen of the Danish National Museum of Antiquities devised the earliest known systematic classification of antiquities. He grouped artifacts by material into the “three ages” of stone, bronze, and iron, assuming that this sequence reflected the historical development of people in ancient Europe. His Danish colleague Jens Worsaae gathered archaeological data from the excavation of burial mounds and other sites during the following few years, which showed the basic correctness of the system. Old World archaeologists still use a modification of the three-age model. Scholars in the New World, however, lagged behind in thinking about the chronological implications of archaeological remains, in large part because of the widely held belief of no significant time depth in the New World. Some did consider the functional implications of the material remains. In 1848, for example, Ephraim Squier and Edwin Davis published *Ancient Monuments of the Mississippi Valley*, which gave detailed descriptions and geographical distributions of earthen mounds in this area of North America. They classified the mounds into groups intended to reflect their uses, such as burial mounds, temple mounds, and effigy mounds. Not until the early twentieth century did chronology become a significant part of New World archaeology. The change began with the seminal stratigraphic excavations of Manuel Gamio in Mexico and N. C. Nelson in the south-western United States, which led to the development of time-sensitive classifications of artifacts. Perhaps the best example of this is the Pecos Classification, based upon A. V. Kidder's excavations at the pueblo of Pecos in the 1910s and 1920s.

2.2. The Emergence of Cultural History

Archaeologists in the first half of the twentieth century extended the descriptions and classifications of the natural science period into regional cultural histories. They used the archaeological record to answer the journalistic questions of who, what, where, and when about the human past. The goal of cultural history, therefore, is to chronicle the past. Toward this end, the period saw the development of new dating methods such as dendrochronology (tree ring dating) and, after the Second World War, radiocarbon dating. Typical studies of the period such as V. Gordon Childe's *The Dawn of European Civilization* (1957) or Gordon Willey and Philip Phillips's *Method and Theory in American Archaeology* (1958) painted the past with broad regional sequences of archaeological cultures that could be compared and correlated in time and space. Distinctive forms or styles of artifacts with reasonably clear temporal and geographical boundaries defined each culture. Cultural historians developed such concepts as components, phases, horizons, and traditions for this purpose. A component, for example, is the archaeological record of a single occupation at one site. Similar components from different sites or from different occupations at the same site may be grouped together into a phase. Horizons are geographically widespread artifact complexes or styles that link together phases from different regions, and traditions are artifact complexes or styles that occur over long periods of time. The cultural history approach uses comparisons such as these to search for broad generalizations about the human past. Writing cultural histories also involved describing the lifestyles, the social

and cultural behavior, of the people who lived in the past. To do so, archaeologists made extensive use of analogy. They found analogues in historical documents, oral traditions, experiments, and observations of still-living people. New World archaeologists, for example, began using the direct historical approach to interpret the past as early as the 1890s. They started their research with historically documented or still-living social groups, and worked backward in time to identify those who left a particular set of archaeological remains and to reconstruct their behavior.

2.3. The Processual Revolution

Increasing interest in scientific approaches to the “why” of the human past led to the development of what is often called “processual archaeology.” In his classic *A Study of Archaeology* (1948), however, Walter W. Taylor criticized culture history as mere description and chronicle. He argued that it should be replaced with the functional interpretation commonly found in the cultural anthropology of the time. Not until the 1960s, however, did archaeology change in this direction. Led by American archaeologist Lewis Binford, this new approach searched for general processes and laws that could explain variability and change in human behavior cross-culturally and without reference to time. Unlike the cultural history approach, which studied normative behavior, processual archaeologists focused upon variability in past societies and cultures. They used scientific methods based on the objectivity and observer-oriented interpretations of positivist philosophers such as Carl Hempel. The systematic application of rules of evidence played a key role in interpretations of the archaeological record. In the nomothetic approach, archaeologists searched for general laws of human behavior by using research strategies that followed the rules of deduction, beginning with theories from which hypotheses could be derived and tested with observations of the archaeological record. Processual archaeologists also used systems models that focused on the ecological, social, or cultural functions of past human behavior. Ecological and evolutionary theories played key roles in the explanation of past behavioral variability and change. Computers emerged as important tools in archaeological analysis during the 1970 and 1980s, especially in “number crunching” and in the modeling of complex systems of behavior. Statistics played an important role in both the analysis and interpretation of the archaeological record. Archaeologists also began to use space-age technologies such as satellite remote sensing.

2.4. Archaeology at the End of the Millennium

The 1980s brought a new generation of archaeologists who questioned the basic tenets of the processual revolution. Information age technology also began to revolutionize field methods and the gathering of data from the archaeological record. The new technologies included geographic positioning systems, geographical information systems, laptop computers, digital cameras, remote controlled underwater vehicles, electronic surveying instruments, and the Internet for instant global communication. “Interpretive archaeology” emerged as a distinctive and popular counterpoint to the science of the 1960s and 1970s. Led by British archaeologist Ian Hodder, the interpretive archaeologists advocate a research focus upon the meanings rather than the functions of past human behavior. They argue for replacing social and cultural processes with individual experience and agency in archaeological interpretation. In this

view, individuals actively pursuing goals within a social and ecological context of opportunities and constraints become the interpretative tools of past human behavior.

The interpretive archaeology approach replaces the philosophy of positivism with the subjectivity of the Frankfurt school of critical theory. Postmodern literary criticism and the interpretive approach in cultural anthropology (as in *The Interpretation of Cultures* by Clifford Geertz) play important roles in the development of interpretive archaeology. Interpretive archaeology applies critical theory to archaeological interpretation, and considers the influence of social and cultural context on both research agendas and the archaeologists engaged in research. Archaeologists attempt to counter social and political hegemony by dominant majorities by seeking viewpoints from minority and disenfranchised groups. Personal insight also plays a key role in interpretation. Instead of providing evidence for a single interpretation by an observer, the archaeological record becomes the source of many alternative stories about the past told through the eyes of the multiple social agents, classes, ethnic groups, genders, and others who left the archaeological remains behind. In the new millennium, the debate between the processual and interpretive schools of thought in archaeology intensifies.

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Biographical Sketch

Donald L. Hardesty is Professor of Anthropology at the University of Nevada–Reno. He received his Ph.D. in anthropology from the University of Oregon. Hardesty specializes in historical archaeology of the American West and is the author or editor of six books or monographs, including *Ecological Anthropology*, *The Archaeology of Mining and Miners*, and *The Archaeology of the Donner Party*, along with many articles in scholarly journals. He is a past president of the Society for Historical Archaeology, past president of the Mining History Association, and past president of the Register of Professional Archaeologists. He a past member of the UNESCO Man and the Biosphere Programme (MAB) Directorate for Arid Lands Ecosystems.