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INTRODUCTION: HISTORY AND DEVELOPMENT OF ARCHAEOLOGY

ARCHAEOLOGY AND EGYPTOLOGY

Archaeology, as defined by the *Oxford English Dictionary*, is the “study of human history and prehistory through the excavation of sites and analysis of physical remains.” These physical remains include not only every item ever made by humans – from a piece of burnt charcoal to awe-inspiring stone monuments – but also the remains of humans themselves. As such, archaeology is one of the widest-ranging scientific disciplines and incorporates method and theory from art, history, linguistics, geology, biology, chemistry, mathematics, and the social sciences.

What is Egyptology and how does it differ from archaeology? Egyptology is a historical discipline devoted to the study of ancient Egypt. It is modeled after classical studies of Greece and Rome, which rely on written records to supply chronology, historical data, and information about beliefs of the past. Egyptologists work with specific texts to understand nuances of the ancient culture, often within a well-defined time period. As with all historical disciplines, Egyptology is a particularizing discipline. That is, it is primarily interested in defining what happened at a specific place and time.

Egyptology has an obvious relationship with anthropological archaeology, because both deal with the human past, its narration, and its explanation. Some Egyptologists interested in the development of art and architecture employ archaeological techniques to recover objects, but they analyze them within their own historical (not anthropological) theoretical framework. Texts, too, can provide very specific information on a given time, place, or career of an individual. Archaeology, on the other hand, generally only provides insights into broad processes of change in material culture over long periods of time. Where Egyptology and archaeology really converge is in studies of sites and areas where textual sources, monumental architecture, and

objects of art-historical significance are absent, rare, or poorly understood. It is under these circumstances that archaeological methods and techniques take the forefront of Egyptological investigations.

DEVELOPMENT OF A DISCIPLINE

In the West, the scientific discipline of archaeology (and Egyptology as well) has its roots in the Italian Renaissance, when fourteenth-century scholars began to question the origins of the ancient monuments located throughout the Mediterranean region. It was clear that these monuments were built by a civilization prior to Renaissance Europe that in many ways rivaled or even surpassed it. Europeans began traveling to other lands, particularly Italy, Greece, and the Near East, to retrieve ancient objects for their governments' museums or simply to profit from the sale of the pieces. Thus began a collecting spree that continues, at least to some degree, today.

Others with an interest in the past, and who were often driven by a nationalistic ideology, turned their attention to the mounds and monuments within the borders of their own countries. Although neither as overtly spectacular nor as easily recovered as the material remains of the ancient Mediterranean cultures, when subjected to careful study, the artifacts and sites of northern Europe did yield tantalizing clues about their ancient makers. It was this line of discovery, characterized by painstaking recovery and meticulous documentation that laid the foundation for the scientific discipline known today as archaeology.

From Denmark, we see the first systematic classification of artifacts. Building on traditional scholarly divisions of antiquity, C. J. Thomsen of the National Museum of Denmark was the first archaeologist to clearly define the classic Three Age System – Stone, Bronze, and Iron – that would form the basis for all Old World archaeology. Developed and promulgated by Thomsen between 1818 and 1825, the Three Age System was already accepted and used by leading Scandinavian archaeologists by the time it was officially published in 1836. Later, Thomsen's protégé, J. A. A. Worsaae, verified and refined the three-part classification system through careful stratigraphic excavation and analysis.

Yet there were still crucial developments that needed to take place in the fields of geology, biology, and the social sciences before modern archaeology could be born. The first of these was the publication of Charles Lyell's *Principles of Geology* (1830–33), which demonstrated the earth's great antiquity and broke

the so-called biblical time barrier for the world's creation (4004 BC). Building on previous work by Cuvier and Hutton and using evidence he gathered in the region around Mt. Etna, Lyell proposed that there are natural explanations for all geologic phenomena, that the ordinary natural processes of today do not differ in kind or magnitude from those of the past (the doctrine of *uniformitarianism*), and that the earth must therefore be very ancient because these processes work so slowly. Although these concepts may seem obvious to us today, they were revolutionary in Lyell's time. In addition to laying out the methods and principles that modern geologists use every day, Lyell's *Principles of Geology* provided a younger group of scholars the opportunity to speculate on time and change.

One young scientist profoundly influenced by Lyell's work was Charles Darwin. Darwin's seminal treatise *The Origin of Species*, published in 1859, expounded on the diversity of life and proposed the mechanism of natural selection for evolutionary change through time. Simply put, he believed that those groups of living organisms best adjusted to the conditions in which they live have the greatest chance for surviving and passing on their traits to the next generation. This concept of natural selection would have great import not only to biologists, but also to scholars interested in explaining cultural change through time.

These two principles – the great antiquity of the earth and natural selection – were soon applied to human and extinct animal remains found in the Somme Valley of France, and for the first time scholars began to accept human coexistence with extinct animals, a fact that many people had refused to believe even when confronted with the clear evidence of stone tools lying juxtaposed with ancient bones. In 1869, soon after the acceptance of this coexistence, the first evidence of prehistoric humans in Egypt was reported: stone tools, tens of thousands of years old, found in the Nile Valley.

During the second half of the nineteenth century, advances in archaeological methods and techniques taking place in the Mediterranean region were turning the field from mere treasure hunting into a more rigorous, scientific discipline. From 1860 to 1875, Giuseppe Fiorelli directed excavations at the site of Pompeii in Italy. He was a progressive and innovative archaeologist who was one of the first to apply the principles of stratigraphy and large-area excavation. Under his guidance, exploration became more methodical, record keeping was improved, and frescoes were left in place rather than removed. He was also responsible for the now-famous plaster casts of Pompeii's victims. Perhaps most importantly, Fiorelli began a training school for archaeological

methods, providing a resource for many future archaeologists. In Britain, A. H. L. Fox Pitt Rivers excavated Roman and Saxon sites with military rigor and precision during the last two decades of the nineteenth century. Influenced by Darwin's work, Pitt Rivers developed his own parallel theory of cultural evolution and applied it to his extensive collection of archaeological and ethnographic material, but his most important methodological innovation was his insistence that plain, everyday objects were the key to understanding the past.

A generation younger than Fiorelli and Pitt Rivers, the man who arguably did the most to usher archaeology into the modern era was Sir William Flinders Petrie, and his almost six decades of work in the Middle East remains unsurpassed. From 1880 to 1938, Petrie surveyed and excavated numerous sites in Egypt and Palestine including Giza, Tanis, Naukratis, and Daphnae in the Nile Delta, the Fayum, Thebes, Abydos, Amarna, Naqada, the Sinai peninsula, and Tell Hasi in Palestine. In 1904, Petrie published *Method and Aims in Archaeology*, the definitive work of his time. But he is perhaps best known for building a chronology based on stylistic changes in artifacts he excavated from cemeteries in Upper Egypt. This method of relative dating, known as sequence dating, would prove invaluable to archaeologists working to build chronologies without recourse to historical records. In particular, New World archaeologists seized upon this technique because the indigenous cultures of the Americas either did not have written language or, as in the case of the Maya, their written language was as yet undecipherable.

Although the nineteenth century can be characterized by the initial development of archaeological methods and techniques, the twentieth century can be characterized by the development of archaeological theory. In the Old World, archaeology was basically an outgrowth of history, and the archaeologists were generally historians looking at material culture. In the New World, on the other hand, archaeologists were more closely affiliated with ethnographers and cultural anthropologists because they were excavating sites that belonged to the direct ancestors of the living peoples whom the anthropologists were studying. Thus, it was perfectly natural for the New World archaeologists to work closely with the anthropologists and borrow their theoretical perspective. At first this distinction had very little practical impact, as both the historical archaeologists and the anthropological archaeologists were primarily interested in constructing cultural chronologies of their respective regions, but by the middle of the twentieth century, the two types of archaeology began to diverge. Anthropologists, and by extension anthropological archaeologists, began to focus on questions of process – the “how” and “why” of

culture change, in addition to the historical questions of “what,” “when,” and “where.”

ARCHAEOLOGICAL THEORIES OR PARADIGMS

There are few words more misunderstood or used to mean different things than the word “theory.” To most nonscientists, “theory” and “hypothesis” are often – incorrectly – used interchangeably, but even among scientists (particularly social scientists) there is considerable variation in how the term is used. Although many practitioners of archaeology use “theory” to refer to the approach to their discipline’s subject matter, the concept of paradigm may actually be more appropriate. Developed by historian of science Thomas Kuhn and defined in his book *The Structure of Scientific Revolutions* (1962), a paradigm determines (1) what is to be observed and studied, (2) what kind of questions are to be asked and how they are structured, (3) how an experiment is to be conducted, and (4) how the results of scientific investigations should be interpreted.

It must be noted that Kuhn himself felt that the term “paradigm” was not appropriate for the social sciences, and in fact developed the concept while surrounded by social scientists and observing that they were never in agreement on theories or concepts. (Having experienced more than my fair share of just such gatherings, I sympathize with Kuhn. Most of us finding ourselves in similar situations, simply retire to our rooms after a few stiff drinks; one cannot but admire Kuhn’s genius and fortitude under such adverse conditions.) Kuhn’s intentions notwithstanding, today the term “paradigm” is used widely in both the social and natural sciences to denote an explanatory model or conceptual framework, and it is this meaning that I intend in the following discussion.

There are three main paradigms at work in archaeology today: culture history, processualism, and post-processualism. Each developed as a reaction to perceived deficiencies in the previous paradigm, but none has completely supplanted the others. Indeed, all three have made and still make contributions to our understanding of the past.

CULTURE HISTORY

Culture history emerged in the nineteenth century and, as the name suggests, it is closely allied with the field of history. Its primary goal is describing the “what,” “when,” and “where” of past peoples, based on the material record.

By describing and classifying assemblages of artifacts through design style, geographic distribution, and time, culture historians group sites into distinct “cultures.” (A culture in archaeological terms is the material manifestation of the people that created the artifacts.) Using inductive reasoning, culture historians identify common themes between cultures, which in turn lead to the construction of overarching narratives to explain the past.

Creating culture histories through archaeology is fairly straightforward and accurate, particularly when one deals with periods where written records are preserved. Histories are made by first amassing large collections of artifacts (pottery, mud-brick buildings, stone-lined tombs, stone and metal tools, etc.) and then making enlightened inferences about the relationships between the people who created the artifacts. Modern forms of dating have helped arrange these collections in time, but most inferences are still made by comparing artifacts.

For example, from my own experience investigating the early Predynastic period of the Egyptian Delta, our crew went from site to site collecting samples of pottery, charcoal, and anything else we could recover from the surface of some thirty sites. Using an auger, we collected buried materials, some as deep as 17 meters below the surface. At the end of each day we examined the pottery and other artifacts for similarities and differences. Based on the assumption that sites with the most similar types of pottery and other datable artifacts were most closely related in time, we constructed a rough map of settlements for Egypt’s east central Delta, noting where and when sites first appeared and how they expanded in size and shifted localities through time. We were able to re-create our early settlement history of this area because the pottery types are relatively well known and can be associated with a particular period of time. Of course, our culture history of this region is only as precise as the dates traditionally attributed to the pottery we recovered and our ability to identify the pottery properly.

PROCESSUALISM

Most archaeologists recognize that “description” is what creating histories is all about. Culture historians do an excellent job of classifying items and constructing chronologies, but they do not attempt, at least in a theoretical sense, to explain how or why those artifacts came to be. Addressing such questions is the intent of processual archaeology.

Presaged by Walter Taylor’s critique of culture history, and articulated by Gordon Willey and Philip Phillips in their 1958 classic *Method and Theory in*

Archaeology, the idea that archaeology should be the study of cultural process, not just culture history, began to take hold in American circles. Proponents of this “New Archaeology” claimed that with the rigorous use of the scientific method, specifically the hypothetico-deductive model, it was possible to get past the limits of the archaeological record and actually reconstruct the lifeways of the people who made and used the artifacts. The assumption on which processual theory is based is that of cultural evolution – the belief that culture is an extrasomatic means of environmental adaptation for humans. As such, processualists believe that culture change is not only understandable, but also objectively predictable once the interaction of the variables is understood. With the work of Louis Binford in the 1960s and Kent Flannery in the 1970s, processual archaeology became the dominant theoretical model for archaeology in America.

As an example of processual archaeology, when conducting research on the ancient shores of Lake Qarun in the Fayum, I recovered an enormous number of fish bones. Most of these bones came from fish crania. The common explanation for this pattern was, given the large size of these fish, that the ancient Fayum fishermen removed the head (which had little meat) and left it at the lake, transporting the rest of the fish to a camp or home site for further processing and eating. Other equally viable explanations exist, however. First, the skull bones of fish are far more numerous than postcranial skeletal bones. Second, cranial bones are easier to identify taxonomically than ribs and vertebrae. Third, some bones tend to be more durable than others and thus preserve better. Given that nature and human activity could create a similar archaeological fish bone record, further tests are needed to better re-create the ancient Fayum fishing strategies. For example, those believing in the decapitation explanation need to find a site where vertebrae and ribs dominate the fish bone record, thereby validating the existence of two types of sites, one for fishing/processing and one for consuming. Thus far, this has not occurred. However, tests conducted on the mechanical breakdown of fish skeletal elements showed that fish vertebrae and ribs were among the first to be damaged to such a point that their identification was compromised. This would suggest that the archaeological pattern noted in the Fayum was not necessarily a by-product of human behavior.

POST-PROCESSUALISM

Processualism began to be critiqued soon after it emerged, largely by British archaeologists who, because Old World archaeology was more closely allied

with the humanities, had never felt comfortable with their American counterparts' identification with anthropology. In particular, Michael Shanks, Christopher Tilley, and Ian Hodder took issue with processualism's environmental determinism, failure to take into account human individualism such as gender, ethnicity, and identity, and supposed objectivity of interpretation. Influenced by the broader movement of post-modernism, they argued for a subjective and relative view of the past and undertook to analyze not only the material remains they excavated, but also themselves, their attitudes, and their biases. Called post-processualism, this new model found favor with a diverse group of scholars, including feminists, neo-Marxists, and cognitive and contextual archaeologists, all of whom are united by their opposition to processualism.

Post-processualists believe that the entire scientific approach to archaeology is flawed, because we cannot possibly interpret archaeological phenomena without relying on our own cultural biases as part of that interpretation. That is, there is no reason to believe – and no way to prove – that our perception of the ancient world in any way matches the perception of the ancients themselves. Post-processualists state that personal biases inevitably affect the very questions archaeologists ask and direct them to the conclusions they are predisposed to believe. The essential difference between post-processualism and processualism can be captured in their fundamental views of archaeology: processual archaeologists attempt to construct an objective past whereas post-processualists believe that the past is what we create it to be.

For example, a processual archaeologist might attempt to describe the ancient Egyptian state as a functionally differentiated but integrated society where scores of occupational specialists, from farmers and bricklayers to judges and tax collectors, as well as a myriad of other occupations, depended on each other for goods and services. If the army did not receive its rations, then it could not defend against the “hordes” of intruders trying to cross Egypt's frontiers. If administrators did not store and redistribute goods collected through taxation, then those not involved in food production might starve. Thus, the poorest farmer and the king himself were linked in a mutually dependent, hierarchically arranged socioeconomic and political relationship. If one sector were to break down, the entire complex could falter or even collapse.

In contrast, a post-processualist would likely dismiss the very term “state” (or civilization) on the grounds that it imposes a sterile and untenable typology on Egyptian culture that presupposes its culturo-historic, transformative

path through time. Rather, he or she would seek to analyze ancient Egypt not by the material remains and the techniques used to make them, but by detailed descriptions of the complex social and ideological contexts and activities through which the remains (i.e., artifacts) were originally created and used. Traditional archaeologists naturally question the soundness of basing explanations on inferences about ideologies and activities for which there are no mechanisms to substantiate or negate any derived conclusions.

Despite differences between the three approaches, there is common ground between them, and all make useful contributions to understanding the past. All are concerned about how we know about people in the past and whether that knowledge represents the actual past or just a personal mental reconstruction of the past. Good culture history is still the foundation for processual-type explanations – that is, the “what,” “when,” and “where” need to be answered before the questions of “how” and “why” can be framed. Even archaeologists who subscribe to post-processual theoretical frameworks rely on many techniques such as stratified sampling, statistics, and biochemical/material analysis that originated from the scientific, processual mind-set.

ARCHAEOLOGICAL TERMS

All archaeologists are interested in learning about past humans by examining the material culture they have left behind. Thus, the bases for all archaeological investigations are artifacts and features – broadly defined as anything that owes its physical characteristics or its location to human activity. A beautifully made Egyptian vase is an “artifact,” as is a pile of stones used to mark the boundary of an ancient field, or a bone left over from an ancient meal. “Features” are non-portable artifacts. Examples include ancient fire hearths, storage pits, or even a linear mound of earth used to direct water. A grouping of artifacts and/or features is called a “site.” To an archaeologist, both the great Temple of Karnak and a scatter of stone chips made by a Paleolithic hunter are sites, and both are worthy of investigation.

The myriad ways in which artifacts and features are collected and analyzed are known as archaeological “methods.” Although excavation – the documentation and collecting of artifacts from controlled removal of earthen layers – is a hallmark of archaeology, it is expensive, time-consuming, and destructive, so it is undertaken sparingly. Other means for artifact study include the examination of museum collections, remote sensing using high-tech means to “view” subsurface materials, and site survey whereby surface collections are

used as indicators of subsurface deposits. Determining the age of an artifact can also be done using a variety of methods such as seriation and radiocarbon dating.

When a method is applied to actual data, it is known as a “technique.” This can be rather confusing to both archaeologists and non-archaeologists alike, as the distinction is not applied uniformly in the literature. Sometimes, the word “method” is taken to mean a general procedure whereas “technique” refers to a specific type of that procedure, as in “sampling” is a method and the various types of sampling – random, stratified, and so forth – are techniques. But in actuality, all archeological procedures, be they general or specific, are methods when they are spoken of as a concept and become techniques when they are applied in the real world. This separate use of the terms allows for the evaluation of both the actual method and its application in a specific instance. In other words, researchers need to be able to determine if errors can be introduced through the use of a faulty method or the misapplication of a good method (faulty technique).

When archaeologists move from data collection and analysis to the explanation or interpretation of relationships in the data, they utilize concepts from science such as law/principle, hypothesis, and theory. A scientific “law” or “principle” is a statement of fact about or a description of the natural world that is accepted to be true and universal (sometimes termed an axiom). As such, it is an initial premise, or assumption, on which further scientific arguments are based. Examples of laws of nature include the law of gravity, Newton’s laws of motion, and the laws of thermodynamics. The geologic law of superposition – that older layers of earth lie beneath more recent layers – is the basis for much of archaeology.

A “hypothesis” is an *explanation* for a single phenomenon or event based on empirical observation. Hypotheses make predictions that can be supported or refuted by experimentation or continued observation. The use of hypotheses and hypothesis testing in archaeology comes out of the processual approach and its attempts to apply scientific rigor to archaeological research. Archaeologists use hypotheses to define problems for current and future research.

Although the term “hypothesis” is used fairly consistently in science, in popular discourse it is often confused with the word “theory.” This has resulted partly from the fact that there is no standard definition for “theory” even among scientists, although there is consensus about what a theory consists of and what it should do. In its broadest sense, a theory is an overarching, comprehensive explanation of how nature works and why. Theories allow us to