

ARCHAEOLOGY 101

INTRODUCTION

Archaeology is the study of past cultures through the material (physical) remains that people left behind. These can range from small artifacts, such as arrowheads, to large buildings, such as pyramids or temple complexes. Anything that people created, used, or modified, and the places where they did so, is part of the archaeological record.

Archaeologists use these remains to understand and recreate all aspects of past culture, from the daily lives of ordinary people to the grand conquests of emperors. Often, these objects are buried and have to be carefully uncovered or excavated before they can be studied. In many cases, they are the only clues archaeologists have to help them reconstruct the lives of ancient people. These objects are like pieces of a giant jigsaw puzzle that the archaeologist must solve.



Careful excavation of Iron Age pots at Tongobriga, Portugal (photo courtesy of Jason Urbanus).

Archaeology helps us to appreciate and preserve our shared human heritage. It informs us about the past, helps us understand where we came from, and shows us how people lived, overcame challenges, and developed the societies we have today. The focus of archaeology has changed over the years. Today, archaeologists study everything from ancient pots to DNA to 3-dimensional reconstructions of ancient sites. This expanded scope of archaeology has necessitated the creation of many new interpretive approaches and recovery techniques. While the trowel continues to be a primary tool, archaeologists have also added satellite imagery, computers, and robotics to their

arsenal. Excavations now often include dozens of experts from varied disciplines, including ceramics, osteology, geology, and botany, as well as research technicians with highly specialized talents.

MATERIAL CULTURE

When we talk about culture, we mean the behavior and beliefs of groups of people. These cannot be excavated directly, although they can be seen to influence the physical remains, material culture, that archaeologists find. These remains range from stone tools to buildings to written records. Features are remains that can-not be moved (large buildings, post holes), while artifacts are smaller, portable objects.

The preservation of material culture depends on the type of materials (organic, which usually decay more quickly, or inorganic) and the environmental conditions to which they have been exposed. Materials deposited in the open are affected by factors such as rain, sun, snow, wind, and other natural phenomena. Buried materials are usually better preserved than those exposed to the elements. Dry conditions generally preserve remains better than wet, although the airlessness of bogs and other underwater conditions can also preserve many objects. In rare circumstances freezing conditions in mountaintop or tundra environments, can likewise preserve sites, artifacts, and even human remains.



An excavator brushes sand away from an elephant bone at Hierakonpolis, Egypt (photo courtesy of Hierakonpolis Expedition).

TYPES OF ARCHAEOLOGY

There are many branches of archaeology, a number of which overlap. Prehistoric archaeologists deal with time periods before the invention of writing. Historical archaeologists have the luxury of examining both physical remains and texts (when they survive). Industrial archaeologists study buildings and remains that date to the period after the Industrial Revolution. Archaeologists generally choose to focus on a particular culture that is often associated with a chronological period: classical archaeology covers the civilizations affected by the Greeks and Romans; Egyptian archaeology deals with Egypt; Mesoamerican archaeology focuses on cultures in Central America and Mexico, and so on.



A fragmentary amphora or storage jar recovered from a thirteenth-century shipwreck (photo courtesy of Black Sea Shipwreck Research Project)

Archaeologists help reconstruct the past in other ways besides excavating sites belonging to a particular culture. Ethnoarchaeologists study people living today and record how they organize and use objects. The study of modern behavior can help reveal how and why people in the past left behind certain types of remains in certain patterns. Environmental archaeologists help us understand the past environmental conditions as well as human activities like ancient agriculture. Experimental archaeologists reconstruct techniques and processes used in the past to create artifacts, art, and architecture. Underwater archaeologists study material remains that survive underwater, including shipwrecks and sites inundated by a rise in sea level. Others, working in the field of cultural resource management, assess archaeological remains at construction sites in order to record critical information and preserve

as much as possible before the site is destroyed or covered over.

THE PROCESS OF ARCHAEOLOGY

Archaeology uses scientific principles to guide its practices. Before beginning to excavate, an archaeologist needs a reason to dig, an excavation plan, and permission from the government of the place being excavated.

Although archaeology is usually associated with digging, sometimes the goal is not to excavate, but rather to identify and plot sites across a landscape or region to see the big picture of habitation or activity in an area. These are some of the steps an archaeologist might follow:

Hypothesis Creation

Archaeologists do not dig randomly in search of artifacts. When they do find artifacts, they are much more interested in the information these can provide, rather than if they are visually pleasing. Excavations are conducted to answer specific questions or resolve particular issues. The only exception is in cultural resource management, undertaken when sites are in danger of being destroyed.

Survey and Site Location

Once archaeologists have a reason to dig, they must identify where to dig. Sometimes, unexpectedly discovering evidence that a site existed in an area is the impetus to dig—but even then the goal is not just to dig the site, but to answer questions about the ancient people, their culture, and their environment. Evidence for sites can take many forms, including information provided in myths and stories, historical references, old maps, farmers' reports of finds in their fields, satellite photographs, and the results of subsurface detection methods such as ground-penetrating radar. Traditional surface survey often involves hours of walking over miles of terrain to find sites. Sites identified during survey (usually by density patterns of small artifacts, such as broken pieces of pottery) are plotted on a map. If a team decides to excavate a site they have identified by survey, a detailed map is also made before digging begins. The map is the first of a series of records made during an archaeological investigation.

Excavation

This is the best known aspect of archaeology. Archaeologists excavate remains buried under the earth. Soil and other deposits build up naturally above sites over time through slow accumulation and more dramatic climatic events such as flooding or volcanic eruptions. As sites grow, change, are destroyed, and rise again over time, successive layers of soils surround artifacts and features. These layers are called strata, and the recording and analysis of the layers is called stratigraphy (to write or record strata). Archaeology and the earth sciences share the goal of examining the changing layers of the earth, although an archaeologist focuses on human time and human agency.



Trench wall showing various strata at Welqamex, a Native American site in southern British Columbia (photo courtesy of Anthony P. Graesch)

Unlike the image in cartoons and movies of archaeologists as treasure hunters, excavation requires extremely careful work. Like detectives at a crime scene, archaeologists evaluate and record an archaeological site with great precision in order to preserve the context of artifacts and features, and they work in teams with many other specialists. A site is divided into sections to help keep track of the location of each find, and a site plan (a map) is created to keep track of all the features and artifacts.

Since they will continue to develop better techniques and tools for recovering the past, archaeologists usually leave areas unexcavated so that others can examine the site again in the future. The site architect establishes a datum point, an easily identifiable, fixed spot

at a known elevation above sea level. Excavators record the vertical as well as horizontal relationships of every object. Within each “square,” every artifact is located vertically in relationship to the datum point and horizontally in relationship to the sides of the square and to structures.

Data Collection and Recording

Artifacts must be carefully removed for further analysis and study. However, before they are moved records—including photographs, drawings, and detailed notes—are made of all artifacts and features and their surroundings. Archaeologists are trained to notice changes in soil texture, color, density, and even smell, and to draw and record on a top plan any changes they notice in the soil as they excavate. A photographer photographs every find as it starts to emerge from the ground, again after it has been uncovered, but before it is removed from the square, and then again after it has been removed, cleaned, and recorded. The dirt removed from the square is sieved if it seems likely that small finds, perhaps seeds, small bones, or other evidence, may have been missed. Any sieved finds are recorded as coming from the square or a particular deposit within it.



Students measure the depth of an excavated surface in a 1 by 1 meter trench at Welqamex, British Columbia (photo courtesy of Anthony P. Graesch)

As at a crime scene, if information is missed or lost while excavating because of careless procedures, it may be lost forever. It is very important to excavate properly and record everything (even the unexciting finds and the things that no one was looking for), and then to publish thoroughly, so others can perhaps interpret finds the current excavators do not

yet understand. Archaeological context is the association of artifacts and features found within an area or layer, and the relationship of this area or layer to what lies above and below it. The context of archaeological finds is what allows us to interpret them and understand their meaning in ancient peoples' lives.

Laboratory and Conservation

Ancient objects that have been preserved underground or underwater for years have to be cared for appropriately once they are exposed to the air. Conservators are specialists trained to preserve and restore delicate or damaged objects. Conservation is usually done in a lab, but sometimes objects are so fragile that some work to save or stabilize them must be attempted in the field. In the lab, objects are further cleaned, stabilized, and conserved, and thorough records are created for each object: its material, its dimensions, color, function, and more.

Interpretation

Once excavation is completed and the features and objects have been conserved and analyzed, the team is responsible for interpreting the findings and explaining the story of the site and the significance of the finds to the people of the past. The story is one possible version of the site's history.

The evidence archaeologists interpret is incomplete, since many remains have been destroyed and many will never be found. Even when written records survive, they generally provide only a partial account of what really happened. Together the specialists evaluate what survives, consider what seems to be missing, and develop a theory about what may have happened.

Publication

The end result of excavation is the publication of all the finds, plans, and photographs along with an interpretation of the site. Ideally, the publication will be thorough enough that other archaeologists and historians can look at the data for themselves and agree, disagree, or take the interpretation further—or in a different direction.

TECHNIQUES AND TOOLS

Archaeologists use many tools, some created for them, and others borrowed from other fields.

Excavation

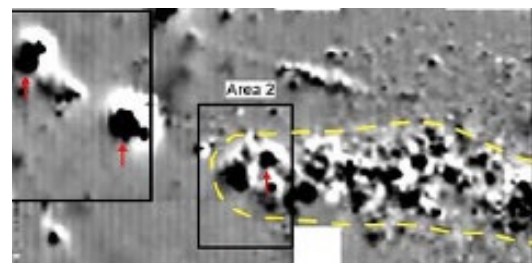
Common archaeological tools include shovels and trowels to loosen dirt, brooms and brushes to sweep the loose dirt, buckets to carry the dirt, and sieves to screen it.

In addition to these usual tools, archaeologists use a variety of objects to carefully move soil and uncover objects. For very fine and delicate excavations, archaeologists use dental picks, brushes, spoons, and very fine blades. For larger scale operations, archaeologists may use large earth-movers, such as bulldozers and backhoes, but only to remove topsoil and overgrowth.

The primary tool used by most archaeologists is the mason's pointing trowel with which they slowly scrape away the soil in horizontal motions. Scooped gardening trowels have a tendency to dig holes, which the archaeologist does not want to do. The goal is to work horizontally until all the finds in an area have been exposed and their relationships noted.

Survey and Mapping

Imagery from satellites (photographic, infrared, and radar), airplanes, kites and drones helps archaeologists identify surface features, while geophysical prospecting tools, such as magnetometers, conductivity meters, and ground-penetrating radar, aid in locating subsurface features.



Magnetometer survey results from Sagalassos, Turkey, show subsurface features including iron kilns (indicated by red arrows) and slag heaps (indicated with yellow), photo courtesy of Sagalassos Archaeological Research Project.

Traditional survey tools used in finding and recording sites are taken from land survey. Archaeological surveyors use compasses, tape measures, stadia, and various other survey tools. Today, most archaeologists also employ electronic devices, such as Total Stations and Global Positioning System (GPS) units, to help them map an area or site. A Total Station is an instrument set on a tripod that shoots a signal at a target (or prism) placed on the feature to be mapped. The signal bounces off the target and returns to the Total Station, which calculates the distance and angle of the object. This information is stored in the instrument's memory and can be downloaded to a computer with software that generates a map. GPS technology uses satellite signals to record a feature or site's location. It is especially useful in survey, as these units are portable and can be accurate to within a few centimeters. This information can also be downloaded and used to create a map.

DESTRUCTION OF CULTURAL HERITAGE

Unfortunately, fascination with the past does not always translate to careful scientific study. Often sites are destroyed by people interested solely in finding objects to collect or sell for profit, with no regard for legal concerns or the loss of knowledge caused by such activity. Sites are also destroyed by development when attention is not paid to what lies beneath the soil. In many cases, cultural heritage is destroyed and information is lost during construction and acts of war and terrorism. Unfortunately, sites can also be badly damaged even by well-meaning tourists who touch or take pieces of objects, art, or architecture. Over time, our very interest in the past can be detrimental to a site when many people visit, breathe on, touch, or take away remains.

Most archaeologists are actively involved in the conservation and preservation of cultural heritage. They try to ensure that there are adequate laws to protect and preserve archaeological remains and devise plans to save sites that are being destroyed. The Archaeological Institute of America, for example, has a Conservation and Site Preservation Program that provides grants to projects that are interested in preserving and protecting sites.

ADDITIONAL RESOURCES

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