Arbitrage can be done when equivalent assets or combinations of assets sell for two different prices. When the opportunity for arbitrage arises, arbitrageurs exploit that opportunity as long as it generates a profit. A simple example of an arbitrage trade would be the simultaneous purchase and sale of the same security in different markets at different prices. Another example would be cross-rate arbitrage transactions in a foreign currency market, in which three currencies are purchased and sold in different markets to exploit mispricing in the cross-exchange rate.

A third example involves the put-call parity relationship in options markets. A put is an option granting the right to sell the underlying asset at a predetermined price (the exercise price) at or before a predetermined date (the maturity date). A call is similar to a put except that it grants the right to buy. With the same underlying asset, exercise price, and maturing date, prices of European-style put options and call options should have a parity relationship in which owning a call option is equivalent to owning a put option, owning the underlying asset, and selling a risk-free bond that matures on the option’s expiration day with a face value equal to the exercise price of the option. If the prices do not conform to put-call parity, an arbitrage strategy can be applied to sell the overpriced instruments and buy the underpriced instruments simultaneously, generating a guaranteed profit that is equal to the amount by which the put or call option is mispriced.

Arbitrageurs deal with market imperfections such as transaction costs and limitations on short selling to generate arbitrage profit. If an opportunity is profitable after the full transaction costs have been paid, it is considered pure arbitrage. The arbitrage trade forces the prices of the overpriced assets and the underpriced assets to reach an equilibrium that eventually eliminates the opportunity to generate an arbitrage profit. When there are market imperfections, that equilibrium usually provides boundary conditions that prevent arbitrage opportunities. The principle that no arbitrage opportunities should be available for any significant length of time is one of the elementary principles of derivative pricing. Theoretical boundary conditions of derivative pricing conform to models that assume no arbitrage. That is, the price of a derivative instrument can be modeled on the return of a synthetic portfolio, which is an appropriate combination of the underlying asset and the risk-free asset constructed to replicate the derivative instrument.

Arbitrage profits are examples of abnormal returns and are violations of the principle of market efficiency. In efficient markets arbitrage opportunities are nonexistent or are eliminated quickly. Arbitrage trade facilitates flows of market information. It also forces efficiency in intertemporal resource allocation because arbitrage transactions usually take place over a period of time. The rule of no arbitrage is upheld only if arbitrageurs are vigilant in finding arbitrage opportunities.

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ARCHAEOLOGY

Broadly defined, archaeology is the study of the human past through the discovery, analysis, and interpretation of the material remains of that past over space and time. The bulk of such material evidence is artifactual, which is anything made or modified by human action. Artifacts encompass everything from the stone tools discarded at Gona in Ethiopia 2.5 million years ago to the trash discarded yesterday. Immovable artifacts, such as hearths or postholes, are called features. Non-artifactual evidence that have cultural significance, such as human, faunal, or botanical remains, are called ecofacts. These material remains tend to co-occur at archaeological sites. Collectively, these traces of the past are referred to as the archaeological record. It is the province of the archaeologist to find, record, and preserve, where possible, the archaeological record in order to identify, analyze, explain, and understand past events and processes. They are also interested in contemporary material culture—ethnoarchaeologists study how modern-day people use material culture in their everyday lives. While there are a variety of scientific and other investigative techniques used to reconstruct the past based on this wealth of evidence, archaeological interpretations are constrained by issues of preservation. Not everything discarded in the past will survive in the archaeological record, and thus there will always be gaps in our knowledge.
Archaeologists attempt to bridge these gaps by making use of theoretical models, often based on data provided by ethnographic or ethno-archaeological studies. These theoretical models may vary depending on the training and context of the researcher as archaeology has developed differently in different parts of the world. As will be demonstrated below, archaeology in Europe developed from historical roots and is in some cases regarded as “long-term history.” By contrast, archaeology in the United States falls under the aegis of anthropology and is seen as the study of past cultures.

Archaeology can be characterized as an omni-competent human science as it is concerned with the entire scope of human life from our hominid ancestors to the modern-day industrial age. Archaeological projects are conducted at many different scales. They range from studies of how past peoples used and perceived the landscapes that they inhabited to the re-creation of an individual’s life and death, as exemplified by the work done on mummified or skeletal remains. Archaeologists study long-term change at sites that have been occupied for hundreds if not thousands of years as well as the immediate at “time capsule” sites such as shipwrecks or Pompeii. It is both a science and a humanity. Many archaeologists also have sub-specializations in the natural sciences such as zoology, botany, and chemistry while others make use of anthropological and historical methodologies and sources.

DOING ARCHAEOLOGY

Archaeologists make use of a diverse methodology. While the most important task is to place finds within a chronological and spatial framework, techniques differ depending on the scale at which the archaeologist is working. The upper end of such a scale is that of the identification of sites within a region. Many finds of archaeological sites and artifacts are still the result of accidental discovery by non-archaeologists, but there are a wide range of survey techniques in existence that allow for the location of archaeological sites within the landscape. These range from systematic pedestrian surveys of a region in search of surface traces to the use of aerial photography and other remote sensing techniques (including ground-penetrating radar, bowsoning, and magnetometers) to locate buried remains. Archaeologists often cannot afford either the time or money to achieve total coverage of a region and may thus use sampling techniques designed to either maximize site location or to statistically reflect the occurrence of sites within a region.

Once a site has been located and recorded, the material remains at that site can be further explored and their relationship to one another determined by excavation. Excavation can be conducted either horizontally (clearing excavations) or vertically (penetrating excavations) depending on the nature of the site and the kinds of questions that the researcher is attempting to answer. Most excavation projects will include a mixture of both. Excavation involves the physical destruction of the site and the removal of artifacts and other remains and is thus guided by rigorous standards of recording and fieldwork practice. Most importantly, the context of finds is recorded so that their position in the site and their relationship to one another can be reconstructed once their original provenance has been destroyed.

Context is also crucial for establishing either the relative or absolute age of archaeological remains. Relative dates do not allow a specific age to be assigned to an archaeological find or excavation layer; rather they indicate the age of finds relative to one another. Relative dating was paramount until post–World War I advances resulted in a wide range of chemical and other dating techniques that allow absolute or calendar dates to be assigned to artifacts and sites. Foremost among these are radiocarbon, uranium series, potassium-argon, and thermo-luminescence dating. The most widely used of these is radiocarbon dating, which is used to date organic remains and can provide fairly reliable dates back to forty thousand years ago. The other chemical dating methods mentioned above can be used to date inorganic remains and offer a much greater chronological depth. Archaeologists working in more recent time periods can also use documents or other written evidence to date sites.

Once excavated, artifacts are sorted, classified, and analyzed in an archaeological laboratory. This analysis allows the archaeologist to create order out of a mass of data; to summarize many individual artifacts by identifying their shared characteristics; and to define the variability present within an archaeological assemblage. There are many debates about the best way to classify artifacts. They are mostly analyzed in terms of formal, stylistic, and technological attributes. Philosophically, there is a question as to whether or not the categories of artifacts that archaeologists devise reflect the emic order (items analyzed in terms of their role as structural units in a system) created by the people who produced the artifacts or if they are etic (items analyzed without consideration of their role in a system), artificial categories imposed by the archaeologist. Most archaeologists, however, recognize that the best classification systems are a combination of the two.

The suite of techniques that we associate with modern day, professional archaeology did not, of course, emerge fully fledged but developed over the course of more than a century. While many societies over the centuries displayed an interest in the material remains of the past and there are even instances of past societies excavating to uncover those remains, it was not until the nineteenth century that archaeology truly became a scientific
discipline. Archaeology's roots lie in two disparate contexts: the development of classical studies from the 1500s onward and subsequent discoveries in various parts of the world; and the gradual recognition of the true age of the earth in the eighteenth and nineteenth centuries.

CLASSICAL BEGINNINGS

The fifteenth-century Renaissance in western Europe prompted interest in the Greek and Roman civilizations, particularly as their art and architecture were still highly visible. The buried Roman cities of Pompeii and Herculaneum were rediscovered in the 1700s and were excavated for art and antiquities. The foundation for art history and subsequently much of classical archaeology was laid in 1764 by the publication of Johann J. Winckelmann's History of Ancient Art (1764), in which he contextualized the art's production and set out the first systematic chronology for classical remains. Early excavation of these classical sites was by no means methodical. Smaller artifacts and "unimportant" structures were destroyed during the search for highly desirable works of art. It was these classical studies that provided a model for the development of Egyptology and Assyriology, which themselves evolved within a larger context of European imperial expansion.

Egyptology developed as a direct result of Napoleon Bonaparte's (1769–1821) invasion of Egypt in 1798. Accompanying the French army on this expedition was a Commission of Arts and Sciences that published multiple volumes of Description de l'Egypte from 1809 onward. The invasion also led to the accidental discovery of the Rosetta Stone, which featured the same passage written in hieroglyphs, Demotic (a cursive form of hieroglyphs), and Greek, thus enabling Jean François Champollion to finally decipher the hieroglyphic script in 1822. At this time there was widespread looting by both locals and foreigners in search of treasure for sale or collection, including not only easily transportable artifacts but also the wholesale removal of large monuments, such as Giovanni Belzoni's 1816 removal of the seven and a quarter ton granite head and torso of Ramesses II from Thebes to Alexandria. Belzoni, and others like him, worked as agents for the European elite and were involved in the discovery and excavation of many sites in Egypt. At this time there was little interest on the part of Egypt's rulers in preserving or investigating their past through the preservation of the remains of that past. They thus sanctioned the activities of many of the European agents at work in the country. It was not until Frenchman Auguste Mariette was appointed as the director-general of the Antiquities Service in 1858 that the sanctioned plunder and export of Egyptian antiquities ended.

There was widespread interest in the Egyptian past and many expeditions were funded, but the systematic excavation and recording of Egypt's archaeological past only began with William Matthew Flinders Petrie (1853–1942) in the 1880s. Petrie emphasized the careful recording of all artifactual material recovered in the excavations as well as the full publication thereof. Further, he developed the first typological sequence dating (based on ceramic jars recovered from graves) to be used in Egypt. His work laid the foundation for other archaeologists such as Howard Carter (1874–1939) who, funded by his patron Lord Carnarvon, discovered and carefully excavated the sealed tomb of Tutankhamun in 1922. As all other tombs discovered in the Valley of Kings had been looted, this find remains one of the most spectacular Egyptian discoveries.

As European governments began to take a political interest in places like Egypt and the Near and Middle East, historical and archaeological scholars followed suit. These areas were of especial interest to the European public because of their link to places mentioned in the Bible. Unlike in Egypt, however, there were few impressive structures that had survived the ravages of time in Asia Minor, Syria, Palestine, Mesopotamia, or Persia. Rather, explorers in the region reported the existence of large mounds that local tradition held to be biblical locations such as Babylon and Nineveh.

The first systematic work on mounds in Mesopotamia was carried out by the French consul in Mosul, Paul Emile Botta, who had previous experience in Egypt. The French government funded his excavations and paid for the transport of finds to Paris. Further research was also carried out by Henry Layard, an Englishman who is best known for his work at Nimrud. Wholesale excavation and exportation of finds was only halted after World War I (1914–1918) when much of the Near East was placed under French or British control. Museums were established, as were departments of antiquity and stratigraphic (layered) excavation, and the recording of all finds became the new standard. This standard was exemplified in Leonard Woolley's excavations at the site of Ur in the 1920s.

While these major discoveries were being made in Egypt and the Near East, the traces of civilizations of equal complexity were being discovered in the Americas. Monumental ruins were not common in North America, but large earthen mounds were often remarked upon. The question of who built these mounds—the ancestors of Native Americans or a lost race of moundbuilders—swiftly became one of the most contentious issues in American archaeology and remained so until the end of the nineteenth century. In 1781 Thomas Jefferson became the first person known to have used the principle of...
stratigraphy to interpret archaeological remains during his excavation of a mound on his Monticello estate. Meanwhile in South America, Antonio del Rio “discovered” the Mayan ruins of Palenque in 1786. It was not until 1896, however, that a stratigraphic excavation was conducted on that continent when Max Uhle started working at Pachacamac in Peru. Peru also yielded the well-preserved Inca site of Macchu Picchu, which was located by Hiram Bingham in 1911.

ROOTS OF PREHISTORIC ARCHAEOLOGY

While discoveries were continuing apace in the eighteenth and nineteenth centuries, intellectual trends in Europe were laying the groundwork for an archaeology of Europe’s prehistory. These trends eventually led to the emergence of archaeology as an academic discipline rather than merely the occupation of adventurers and collectors, and they include the development of typological sequences, the use of stratigraphy, and the acceptance of the principles of uniformitarianism, all of which center around the key issue of chronology.

Up until the seventeenth and eighteenth centuries, it was widely accepted, based on biblical chronology, that the earth was no older than six thousand years. Several discoveries of stone tools in association with the bones of extinct animals by individuals such as John Frere in 1797 and Jacques Boucher de Crèvecœur de Perthes in 1837 demonstrated, however, that the earth and human existence on it was much older than had previously been believed. Two theories had been advanced to explain these and other geological and paleontological finds. Catastrophism, advocated by scientists such as Georges Cuvier, was the notion that the earth had been periodically destroyed numerous times in the past, after which a new creation would occur. Uniformitarianism, put forward by geologist Charles Lyell in his Principles of Geology, Being an Attempt to Explain the Former Changes of the Earth Surface by Reference to Causes Now in Operation ([1830–1833] 1969), was the theory that the earth had been formed over a long period of time by a series of geological processes that are still observable in the contemporary world. It was this latter theory, in addition to the increasing fossil evidence, that contributed to the theory of biological evolution and the publication of Charles Darwin’s Origin of Species by Means of Natural Selection, or The Preservation of Favored Races in the Struggle for Life ([1859] 1998). Lyell’s work also gifted archaeology with the concept of stratigraphy, and thus the law of superposition, which states that stratigraphic layers are arranged chronologically, with the oldest layers at the bottom and the younger layers at the top, unless disturbed by later processes. This is the foundation for all interpretations of stratified archaeological deposits.

Even before the age of the earth had become widely accepted, chronological sequences for archaeological material, independent of written records, were being developed. One of the first was that of Danish scholar, Christian Thomsen (1788–1865), who was given the task of cataloguing and preparing for exhibition a collection of antiquities in 1816. He used the Three Age System, subdividing the prehistoric period into stone, bronze, and iron. While the idea was not new, Thomsen was the first to apply it to a large artifactual assemblage. He solved the problem of knowing which finds should be placed in which age by using “closed finds,” artifacts that had been buried together in hoards and graves. By delineating which types and styles of artifacts were found or not found together he was able to work out a stylistic typology with chronological significance. This kind of stylistic ordering is known as seriation and is an important relative dating technique. Stratigraphic excavations of Danish burial mounds conducted by Jens Worsaae, a student of Thomsen, supported this sequence. The notion of technological progress, coupled with the ideas of biological evolution, gave rise to the unilineal cultural evolution of E. B. Tylor and L. H. Morgan and was expounded in John Lubbock’s archaeological text Pre-historic Times, as Illustrated by Ancient Remains, and the Manners and Customs of Modern Savages ([1865] 1971).

There were further major developments in archaeological methodology at the end of the nineteenth and beginning of the twentieth centuries. Oscar Montelius refined Thomsen’s seriational method of dating using a typological approach, while between 1880 and 1900, Augustus Henry Lane-Fox Pitt Rivers, a retired British general, conducted several excavations of barrows on his estate and developed the standards for excavation, recording, and publication associated with modern-day archaeology. These included the recording of all finds including those not directly related to the research questions being asked, as well as the recognition of the chronological value of even unimportant finds (potsherds, for example) if their context was correctly recorded. Later, it was a student of Pitt Rivers, R. E. M. Wheeler, who developed the grid method of excavation and, in the 1940s, went on to revolutionize the archaeology of the Indian subcontinent with his work at Mohenjodaro and other sites.

THE CULTURE-HISTORICAL APPROACH

The unilineal evolution of the nineteenth century was replaced in the early twentieth century by an interest in historical questions. This shift from an evolutionary perspective to culture-history resulted in an increased empha-
sis on descriptions of past cultures. In Europe there was a desire to discover how particular peoples developed in the past in order to promote national unity. In the United States, where archaeology was regarded as part of anthropology, there was an increased emphasis on data collection as the foundation for the development and testing of theory and explanations, in addition to chronologies.

Culture history, as a theoretical approach, has a normative view of culture. Basically it holds that cultures are composed of shared norms and values and that their members share a particular worldview. Artifacts are therefore seen as expressions of the shared norms and values of any given culture. This approach emphasized data collection, which allowed for the construction of site and regional chronologies. The results of these endeavors were often represented in a time-space grid. In the cultural historical view, change is most often attributed to the action of outside forces, most commonly migration and diffusion, or environmental change.

In the United States this approach was pioneered and applied par excellence by Alfred V. Kidder, who was also the first archaeologist to use the stratigraphic method on a large scale in the Southwest. The first scholar to systematically apply it to archaeological data in Europe was Gustav Kossina in his book Origin of the Germans (1911). Kossina argued that cultural boundaries (as reflected in material culture) were also indicative of ethnic boundaries. His work was extremely nationalistic and was later used by the Nazis in the Socialist education system. By tracing the migrations of the Indo-European people and demonstrating the supposed racial purity of the German people, he argued that the Germans were the true heirs of the Indo-Europeans and, by extension, the true heirs of Europe. Archaeology was thus also used to establish historical rights to territory. Kossina's work had little impact outside of Germany and while British archaeologists recognized the importance of repeated invasions and migrations, they did not rigorously apply the culture concept until the appearance of V. Gordon Childe's The Dawn of European Civilization ([1925] 1958), after which the "archaeological culture" became central to European archaeology.

COLONIAL ARCHAEOLOGY

By the end of the nineteenth and beginning of the twentieth century, archaeological fieldwork was also increasingly conducted in colonial contexts. While much of this archaeology was essentially cultural-historical in approach and method, the situation in the colonial arena was complicated by the sociopolitical relations that existed between colonized and colonizer. Bruce Trigger in his 1984 work offers a definition of colonialist archaeology as comprising that archaeology which developed either in countries "whose native population was wholly replaced or overwhelmed by European settlement or in ones where Europeans remained politically and economically dominant for a considerable period of time" (p. 360), specifically, an archaeology as practiced by "a colonising population that had no historical ties with the peoples whose past they were studying." Tied up as it is in land and heritage issues as well as its commentary on the supposed political or social sophistication of the cultures being studied, archaeology in these places had an increasingly political dimension.

This was especially the case in the southern African context. At sites such as Great Zimbabwe, it was denied that the ancestors of local people could have been the builders and inhabitants of what was clearly an advanced civilization. As with the myth of the moundbuilders in the United States, this made it easier to claim a civilizing mission and to take ownership of the land. Great Zimbabwe represents possibly one of the most famous examples of the misuse of the past to suit political purposes in the present. The racist theories of Zimbabwe's past have not been easily laid to rest. Claims that it was the place of King Solomon's mines or was built (variously) by the Queen of Sheba, the Sabaea Arabs, or the Phoenicians were still being disseminated well into the 1970s.

PROCESSUAL ARCHAEOLOGY

By the 1940s some North American scholars were becoming dissatisfied with the shortcomings of culture history, which was severely hampered by a lack of absolute dating techniques that would allow the refinement of chronologies. Walter Taylor called for a conjunctive approach to the past in A Study of Archaeology ([1948] 1983), advocating that artifacts should be looked at in their broader social contexts. His book did not spark a revolution, but in the 1960s a series of articles written by a young Lewis Binford (1962, 1967) did. Influenced by the 1950s neoevolutionary anthropology of Julian Steward and Leslie White, Binford and his fellow "New Archaeologists" criticized the normative view of culture as inadequate in that it did not address how people interacted with their environments or how material culture was used as an adaptive tool in that environment. They emphasized the relationship of archaeology to anthropology and stressed the need to go beyond description to explanation. Culture history was seen as too particularistic and its practitioners as not being explicit enough about their research objectives, methods, and expectations.

The school of thought and methodologies for research espoused by the New Archaeology have come to be more generally known as processualism. Processualism, as an approach to archaeology, is heavily influenced by scientific positivism. It is based on a belief in "objective sci-
ence” and aimed to test archaeological propositions against data in order to answer anthropological questions and to deliver broad generalizations—law-like statements—about human behavior. While the most famous processualists are undoubtedly American scholars such as Lewis Binford and Kent Flannery, many of the ideas espoused by them were also taken up by British archaeologists including Colin Renfrew. While Renfrew did not wholeheartedly embrace all aspects of processualism such as the search for law-like generalizations, its systemic approach to the study of culture and the new methodologies proved attractive.

The New Archaeology was characterized by a battery of new methods, techniques, and aids fostered by advances in scientific dating methods. The most important of these was the development of radiocarbon dating, which made internal development more likely than migration and diffusion as an explanation of change. It also meant that archaeologists were finally free to focus on broader questions of cultural and social significance rather than on the development of regional chronologies. Other scientific advances included the use of computers and, in the study of the environment, pollen diagrams and soil geomorphology. The application of these to archaeology necessitated increasing specialization on the part of archaeologists; and increased funding from bodies such as the National Science Foundation led to the scientificization of archaeology, especially in the United States.

Fieldwork also became more rigorous and standardized. This was partly a response to the expansion of cultural resource management, which meant an increased need for systematic control and monitoring. Most processual archaeology has strong environmental overtones and thus new field and research methods were developed to accommodate those questions. Regional approaches—the analysis of sites in their settlement systems and environments—were developed, as well as new survey, sampling, and screening techniques to recover the most environmental evidence possible.

The New Archaeology changed the way in which archaeological research projects were administered and carried out. Advocates of this school adopted a formalized methodology that had hypothesis testing as its central emphasis. Archaeologists were expected to clearly and explicitly state the conditions and expectations of their hypotheses. Models employed by processual archaeologists include systems models, cultural ecological models, and multilinear cultural evolution models. One of the best-known case studies is Kent Flannery’s use of systems theory to explain the increasing reliance on maize agriculture in Mesoamerica, which he detailed in 1968.

One of the most important aspects of processualism was the desire for an objective evaluation of ideas and research designs. To achieve this Binford developed Middle Range, or bridging, theory. This solved one of the primary problems facing archaeologists, that of inference, the linking of the (observable) present with the (unobservable) past. In order to understand what happened in the past, a way had to be found to link the dynamics of human action in the past with the static material traces of those activities in the present. Binford felt that archaeologists should observe the processes that give rise to the patterns and their variations, discernible in the archaeological record. This interest of Binford’s in actualistic studies led to an increased focus on experimental- and ethno-archaeology.

The greatest contribution of processualism was methodological, in the sense that issues of sampling, inference, and research design were paramount. These were of course closely linked to the increased use of scientific techniques in archaeological fieldwork and analysis. The second contribution is seen as the shift away from description to explanation, particularly the notion of culture as adaptive and the interconnectedness of social and ecological variables. It also moved archaeology forward in the consideration of long-term processes. While processualism was seen as advancing research in some areas, it was also seen as retarding research into others. While significant advances were made in the study of prehistoric economies, topics such as the role of the individual decision-making, conflict and negotiation between different social groups, and prehistoric ideology were neglected while certain actors/interest groups were excluded from analysis. Many of these arise directly from the processual focus on entire systems and the overriding view that the environment plays the most important role in bringing about change.

POST-PROCESSUALISM

In the light of these limitations, by the late 1970s and early 1980s some archaeologists were arguing that while processual archaeology aimed to explain the past, it could not understand it. In Reading the Past (1986) Ian Hodder argued that material culture and past events had to be understood with reference to people’s attitudes and beliefs, not just their adaptation to an external environment and, further, that archaeological remains could be “read” as a “text.” Similarly, Michael Shanks and Christopher Tilley critiqued the scientific focus of processual archaeology in Re-constructing Archaeology (1987), arguing that archaeologists have to be critical of the context in which archaeological interpretations of the past are produced and that multiple interpretations of the past are valid. This critical approach has also been adopted by feminist archaeologists, such as Margaret Conkey and Janet Spector (1984), who have highlighted in “Archaeology
and the Study of Gender” the androcentric bias in representations of the past and the practice of archaeology.

While post-processual and cognitive archaeology is an umbrella term incorporating many different theoretical approaches, it is characterized by its cognitive—as opposed to normative or adaptive—view of culture. Thus culture is seen as being actively constructed and reworked by individuals in order to fit the context of their own lives. The various approaches included within post-processualism can be divided into three different categories. The first deals with approaches that have at their base a concern with structure, such as structuralism, cognitive approaches, and Marxism. Second is contextual archaeology, which views material culture as a text that can be read. The third incorporates a variety of approaches that seek to offer alternative perspectives on the world and the way in which archaeological results are communicated, such as phenomenology, feminism, and postmodernism. Post-processual approaches have been especially embraced by historical archaeologists, who also have written documents to draw on. James Deetz, for example, used structuralism in his seminal study In Small Things Forgotten (1977) to explore the changing worldview of North American immigrants while Mark Leone has adopted a critical approach in his study of ideology in Annapolis.

Undoubtedly the post-processual critique has made contributions to the discipline. It has moved archaeology away from modeling the environment as the prime mover in past human societies and has added greatly to our ability to understand the past. The political nature of the study of the past and the sociopolitical context of the researcher have also been problematized. More attention is now paid to the way in which archaeologists interact with contemporary groups that have a stakehold in the past and how that past is represented. It remains, however, a largely Anglo-American phenomenon and has hardly affected archaeology on the European continent.

AN EVOLVING SCIENCE

Since the 1980s archaeology has been characterized by a wide diversity of approaches that draw on a range of theory from other social sciences including anthropology, sociology, geography, history, and political science. Like their counterparts, archaeologists make use of practice theory, agency theory, political economy, cultural ecology, world systems theory, and so on. Many times these viewpoints are combined or applied in interesting new ways to the archaeological record.

Archaeology is a constantly evolving discipline. New fields of study are always being created. Since the 1950s sub-disciplines such as landscape, historical (post-medieval), and industrial archaeology have grown rapidly. Further archaeological discoveries and fine-grained analyses continue to make important contributions to ongoing research that include, inter alia: the study of human origins; the origins of agriculture; human migrations; human use (and abuse) of the environment; the rise and fall of civilizations; the processes and impact of colonialism; as well as the lives of people who are generally overlooked in major historical narratives, such as slaves. Yet there are still many parts of the world which, due to environmental, political, or economic factors, have very sparse archaeological coverage, for example sub-Saharan Africa, especially when compared with Egypt. Many times archaeologists in these countries do not have adequate resources with which to pursue research.

Archaeologists are also actively involved in cultural resource management and the conservation of archaeological sites. Sites are threatened by the ever-increasing development that results from expanding urbanization and industrialization. Many sites are destroyed without ever being recorded. Even well known monuments are under threat from wars, pollution, and vandalism. The worldwide antiquities market, which fueled wholesale looting during the early development of archaeology, remains in existence. Archaeology is also a highly politicized discipline, and the balancing of archaeological research objectives with those of other stakeholders, including conservation authorities and local communities, remains an ongoing challenge.

SEE ALSO Agricultural Industry; Anthropology; Anthropology, Biological; Burial Grounds; Cultural Landscape; Cultural Resource Management; Culture; Feminism; Geography; Leakey, Richard; Material Culture; Migration; Postmodernism; Schliemann, Heinrich; Structuralism; World-System

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Architecture

Architecture is the art and science of building the human environment. Because that environment is meant to enclose, enhance, and shape human activity, architecture thus extends beyond abstract issues of formal geometrical design and structural science into a far broader social dimension. As Winston Churchill is famous for saying to Parliament in 1943: “First we shape our buildings, and then our buildings shape us.”

Exactly when the conscious, deliberate shaping of the human environment began defies dating, since the earliest structures most likely were made of organic materials that quickly returned to earth. Archaeological evidence discovered near Marseille, France, however, revealed repeated construction of wood-framed dwellings dating back as far as 300,000 to 400,000 years ago, and several skin coverings and wooden house frames from 13,500 years ago were surprisingly preserved at a Chilean site called Monte Verde. The well-known stone structures of megalithic Europe date to 6,000 years ago, but it is significant that these were almost universally built for ceremonial or religious purposes, while the construction of dwellings apparently still relied on vegetable and animal materials long since vanished. Hence, the first intentionally permanent architecture was shaped for the most fundamental of social communal purposes—to bring a sense of visible order to the cosmos and to provide a link to the dead.

Architecture is a decidedly social activity, for it involves the interactions of many individuals, beginning with the patron—individual, committee, or organization—who calls a building into being. The architect and assistants, or architectural firm, then translate the client’s wishes into abstracted drawings and other construction documents that are used in turn by an army of construction specialists to fabricate the final product. At every step of this process, social exchanges, discussions, and negotiations are required to adjust the design to changing needs and costs. This multidisciplinary social process involves large numbers of people specializing in many occupations, such as drawing and computer design, materials acquisition, preparing written specifications, scheduling construction, arranging construction materials, assembling the prepared materials, and applying the interior finishes, among many others. For the most complex buildings, additional management specialists are required to ensure that materials and subassemblies arrive at the building site with optimal timing to prevent costly delays.

As a social art, architecture is subject to a range of controlling forces to ensure public safety. In ancient Rome, huge privately financed urban apartment blocks, called insulae, sometimes were so shoddily built that they collapsed. With the establishment of a firmer centralized authority during the Roman Empire, regulations were enforced to curb the worst of these building shortcuts. Later, during the seventeenth and eighteenth centuries, governing authorities in France and Britain similarly instituted building regulations to reduce the spread of urban fires. In the United States, following disastrous fires in Boston and Chicago in the late nineteenth century, building codes and regulations were instituted in larger cities. To ensure general public safety, nearly every community now has zoning regulations and building codes controlling where types of buildings can be located and governing density as well as engineering requirements of design.