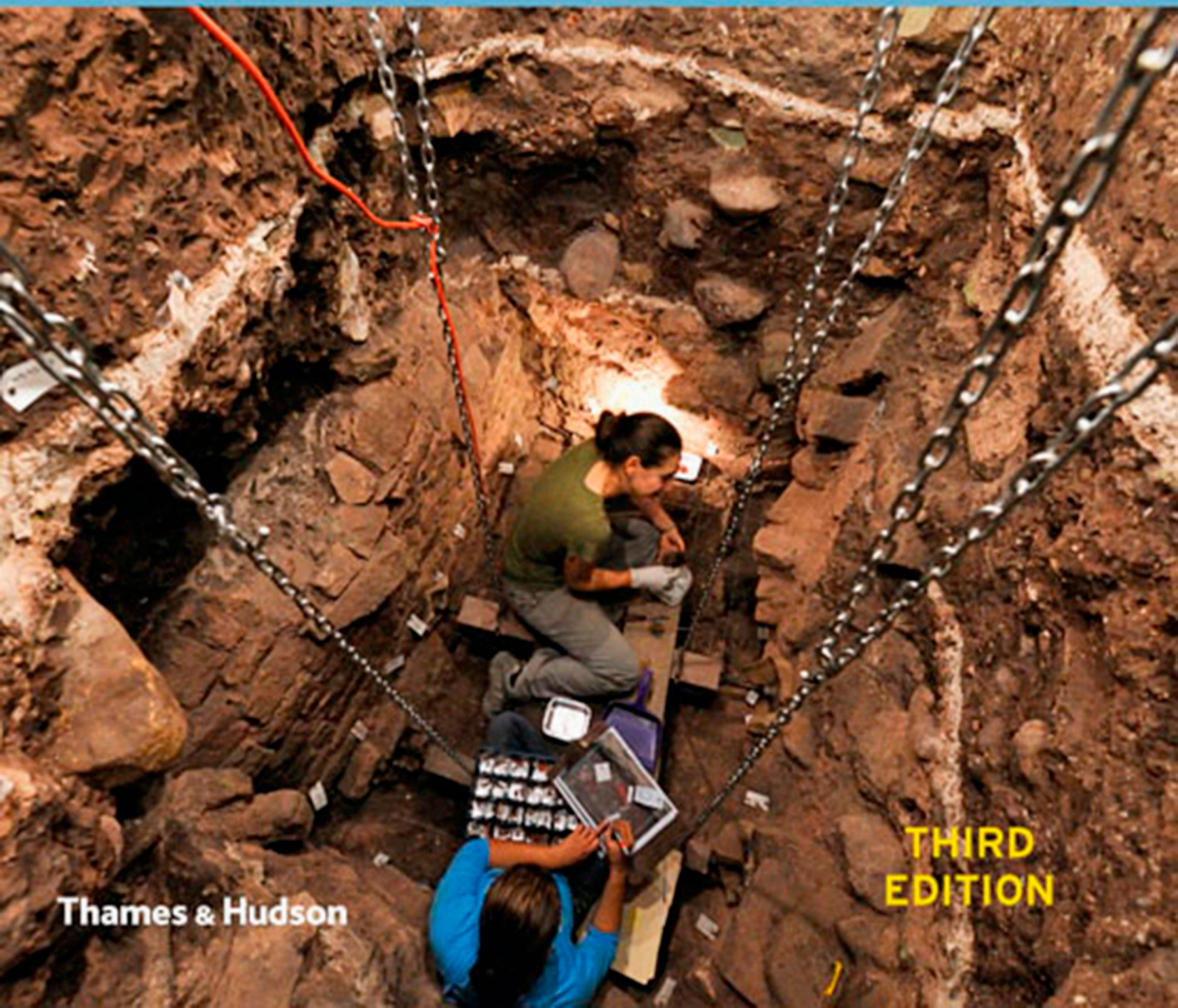
Archaeology Essentials

Colin Renfrew
Paul Bahn

Theories / Methods / Practice



THIRD EDITION

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Colin Renfrew • Paul Bahn

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Theories / Methods / Practice

With 295 illustrations

Thames & Hudson

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DIGITAL RESOURCES

We offer additional resources for instructors and students on the *Archaeology Essentials* webpage at:

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Our website for instructors provides a test bank and images in Jpeg format to be shown in class; projects to support key learning objectives; and five videos on specific subjects of related interest. Our student website offers chapter summaries, self-test quizzes, flash cards to revise terminology and concepts, a glossary, and useful internet links.

EBOOK

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Preface

Archaeology Essentials is designed for college students taking an introductory course in archaeology. It aims to convey some of the excitement of archaeology in the 21st century and to give students a concise and readable account of the ways in which modern archaeologists investigate and understand our remote past. Archaeologists usually make the headlines when they find something spectacular: in 2013, for example, the discovery of the skeleton of the English King Richard III, buried in what remained of the former church of Greyfriars in Leicester, now a parking lot, created a sensation. Here were the remains of Richard "Crouchback" (the deformity in the spine clearly visible), the last English monarch to die in battle, at Bosworth Field in 1485. However, most archaeologists spend their time engaged in research that rarely makes the news, but is nevertheless vitally important for our understanding of the past.

Archaeology is still often a matter of painstaking excavation of an ancient site, but today archaeologists can use new techniques that sometimes avoid the need for excavation altogether. Advances in the methods for analyzing and evaluating archaeological finds mean that archaeologists can reach conclusions that would have been impossible just 15 or 20 years ago.

This book will introduce students to the methods, new and old, used by archaeologists: from the traditional shovel and trowel to satellite imaging, laser-based mapping using LIDAR (Light Detection and Ranging), and ground-based remote sensing. New technology has affected the work of archaeologists in the laboratory as well as in the field: we cover, for example, the use of genetic evidence. But the story of modern archaeology is not just about technology. There have been enormous advances in the questions archaeologists ask and in the assumptions and theoretical models they apply to archaeological evidence. Some questions, which an earlier generation of archaeologists might have considered closed, have now been opened up for new examination.

In other words, whatever the focus of an individual college course, it is our intention that students will find in this book an authoritative, concise, and clear explanation of modern archaeological practice.

Introduction
The nature and aims of archaeology

About 5300 years ago, a 40-year-old man made his last journey on a mountain path in the European Alps. He lay undisturbed until his body was discovered by hikers in September 1991. Archaeologists were able to determine not only his age, but also the contents of his last meal: meat (probably ibex and venison), plants, wheat, and plums. The Iceman suffered from arthritis, and analysis of a fingernail showed that he had suffered serious illness 4, 3, and 2 months before he died. At first it was thought that he died from exhaustion in a fog or blizzard. However, later analysis revealed what may be an arrowhead in his left shoulder and cuts on his hands, wrists, and ribcage, as well as a blow to the head, so he may well have died a violent death. These observations are just a sample of what archaeologists were able to learn about this long-dead man.

The thrill of discovery and the ability of **archaeology** to reveal at least some of the secrets of our past have been the theme of many famous novels and movies: notably Steven Spielberg's Indiana Jones series. But although many discoveries in archaeology are far less spectacular than either the Iceman or those represented in fiction – perhaps a collection of broken pieces of pottery – these kinds of remains too can tell us a lot about the past, through careful collection and analysis of the evidence.

Archaeology is unique in its ability to tell us about the whole history of humankind from its beginnings more than 3 million years ago. Indeed, for more than 99 percent of that huge span of time, archaeology – the study of past **material culture** – is the only source of information. The archaeological record is the only way that we can answer questions about the **evolution** of our species and the developments in **culture** and society that led to the emergence of the first civilizations and to the more recent societies that are founded upon them.

This book provides a brief introduction to the ways in which archaeologists uncover and collect evidence about our past (an impression of the extraordinary diversity of modern archaeological work is given by the images overleaf), how they analyze it (often using sophisticated scientific methods), and how they interpret it (both for fellow scholars and members of the public).

The Discipline of Archaeology

Many archaeologists consider themselves as part of the broader discipline of **anthropology**. Anthropology in the most general sense is the study of humanity: our physical characteristics as animals, and our unique non-biological characteristics. Anthropology is thus a broad discipline – so broad that it is often broken down into different fields:

- **Physical** *or* **biological anthropology**: the study of human biological or physical characteristics and how they evolved.
- **Cultural anthropology**: the study of human culture and society.
- Linguistic anthropology: the study of how speech varies with social factors and over time.
- Archaeology: the study of former societies through the remains of their material culture and, in the case of such literate cultures as those of Mesopotamia or Mesoamerica, such written records as have survived.

Archaeologists who are interested in the societies of ancient Greece and Rome, their empires and neighboring territories, consider themselves Classical archaeologists. They study the material remains of the Greek and Roman worlds, but can also take into account the extensive written records (literature, history, official records, and so on) that survive.

Similarly, biblical archaeologists work in much the same way as anthropological archaeologists, but with reference to the events set out in the Bible. Archaeology has some aspects in common with both history and with science. Like history, archaeology is concerned with documenting and understanding the human past, but archaeologists operate in a time frame much larger than the periods studied by historians. Conventional historical sources begin only with the introduction of written records in around 3000 BC in Western Asia, and much later in most other parts of the world (not until AD 1788 in Australia, for example). The period before written records and history (meaning the study of the past using written evidence) is known as **prehistory**.

Although archaeologists spend much of their time studying **artifacts** and buildings, it is worth emphasizing that archaeology is about the study of humans and, in that sense, like history, it is a humanity. But although it uses written history, it differs from the study of written history in a fundamental way. Historical records make statements, offer opinions, and pass judgments (even if those statements and judgments themselves need to be interpreted). The objects that archaeologists discover, on the other hand, tell us nothing directly in themselves. It is *we* today who have to make sense of these things. In this respect the practice of archaeology is rather like a science. The scientist collects data, conducts experiments, formulates a hypothesis (a proposition to account for the data), tests the hypothesis against more data, and then devises a model

The diversity of modern archaeology:

This page: (Right) Urban archaeology: excavation of a Roman site in the heart of London. (Below left) Working in the on-site archaeobotanical laboratory on finds from Çatalhöyük in Turkey. (Below right) An ethnoarchaeologist in the field in Siberia, sharing and studying the lives of modern Orochen people, here making blood sausages from the intestines of a recently butchered reindeer.

Opposite page: (Above right) Underwater archaeology: a huge Egyptian statue found in the now-submerged ruins of an ancient city near Alexandria. (Below left) An Inca "mummy," now known as the "Ice Maiden," is lifted from her resting place high up on the Ampato volcano in Peru (see p. 56). (Center right) Piecing together fragments of an elaborate mural from the early Maya site of San Bartolo in Guatemala. (Below right) Salvaged in advance of development: a 2000-year-old Western Han Dynasty tomb is excavated at a construction site in Guangzhou, China.

(a description that seems best to summarize the pattern observed in the data). The archaeologist has to develop a picture of the past, just as the scientist has to develop a coherent view of the natural world. It is not found ready made.

Archaeology, in short, is a science as well as a humanity. That is one of its fascinations as a discipline: it reflects the ingenuity of the modern scientist as well as the modern historian. The technical methods of archaeological science are the most obvious, from **radiocarbon dating** to studies of food residues in pots. Equally important are scientific methods of analysis: archaeology is just as much about the analytical concepts of the archaeologist as the instruments in the laboratory.

The Important Questions of Archaeology

Because the evidence of archaeology cannot speak for itself, it is important that archaeologists ask the right questions of the evidence. If the wrong questions are asked, the wrong conclusions will be drawn. For example, early explanations of the unexplained mounds found east of the Mississippi river assumed that they could not have been built by the indigenous American peoples of the region; it was believed instead that the mounds had been built by a mythical and vanished race of Moundbuilders. Thomas Jefferson, later in his career the third President of the United States, decided to test this hypothesis against hard evidence and dug a trench across a mound on his property. He was able to show that the mound had been used as a burial place on many occasions and found no evidence that it could not have been built by the indigenous peoples. In other words, Jefferson asked questions about what the evidence suggested: he did not simply reach a conclusion that fitted his prejudices and assumptions.

Traditional approaches tended to regard the objective of archaeology mainly as reconstruction: piecing together the puzzle. But today it is not enough simply to recreate the material culture of remote periods: how people lived and how they exploited their environment. We also want to know *why* they lived that way, why they had certain patterns of behavior, and how their material culture came to take the form it did. We are interested, in short, in explaining change.

How to Use This Book

This book is organized around some of the most important questions that archaeologists ask. Chapter 1 looks at the history of archaeology, the kinds of questions asked by archaeologists in the past and the methods they used. In Chapter 2 we ask the question What Is Left?: the evidence with which archaeologists work. The next chapter examines the important question Where? Archaeologists can learn a good deal from the **context** in which evidence is found, and have developed many techniques for locating and recovering evidence.

In Chapter 4 the question is When?: how can we know whether something dates from a few hundred years or many thousands of years ago? Chapter 5

examines the fascinating question of How Were Societies Organized? In Chapter 6 we look at the world in which ancient people lived: What Was the Environment and What Did They Eat? Technology was an important factor in changing society and the lives of our ancestors, as were contact and trade with other ancient peoples: the key question for Chapter 7 is How Were Artifacts Made, Used, and Distributed?

Chapter 8 looks at the archaeology of people: What Were They Like? The next chapter addresses some of the more difficult questions that modern archaeologists are trying to answer: the ways ancient peoples thought about their world and issues of identity. In other words, What Did They Think? An equally difficult question is Why Did Things Change?, the subject of Chapter 10. In Chapter 11 we address the often controversial question: Whose Past? The past may be remote in time but it can be very relevant today if it touches on the beliefs, identity, and wishes of the descendants of those who lived long ago. Finally, in Chapter 12 we look at both the practice of applied archaeology (a profession that now employs more people than the academic archaeology pursued in universities) and more generally The Future of the Past. At the end of that chapter we also include a new section on Building a Career in Archaeology.

If you follow the questions examined in this book you will understand how archaeologists work, think, analyze, and seek to understand the past. You will also discover that not all questions can be answered, or perhaps that there might be more than one answer.

To help you understand how archaeology works, we have provided some special features in this book. Case studies in boxes throughout the text show you archaeology in action and will help you understand the issues that archaeologists deal with in their research and fieldwork. Key Concept and Key Fact boxes summarize and review important concepts, methods, or facts about archaeology. At the end of every chapter there is a summary to recap what you have read and a suggested reading list that will guide you to the most important and helpful publications if you want to research any subject further. Archaeological terms in the text that are defined in the glossary are highlighted in bold (e.g. **excavation**) when they first occur in a chapter.

The Searchers
The history of archaeology

1

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The Beginnings of Modern Archaeology

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- Indigenous Archaeologies

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Summary
Further Reading

The history of archaeology is commonly seen as the history of great discoveries: the tomb of Tutankhamun in Egypt, the lost Maya cities of Mexico, the painted caves of the Paleolithic, such as Lascaux in France, or the remains of our human ancestors buried deep in the Olduvai Gorge in Tanzania. But even more than that it is the story of how we have come to look with fresh eyes at the material evidence for the human past, and with new methods to aid us in our task.

It is important to remember that just a century and a half ago, most well-read people in the Western world – where **archaeology** as we know it today was first developed – believed that the world had been created only a few thousand years earlier (in the year 4004 BC, according to the then-standard interpretation of the Bible), and that all that could be known of the remote past had to be gleaned from the earliest historians, notably those of the ancient Near East, Egypt, and Greece. There was no awareness that any kind of coherent history of the periods before the development of writing was possible at all.

But today we can indeed penetrate the depths of the remote past. This is not simply because new discoveries are being made. It is because we have learned to ask some of the right questions, and have developed some of the right methods for answering them. The material evidence of the archaeological record has been lying around for a long time. What is new is our awareness that the methods of archaeology can give us information about the past, even the prehistoric past (before the invention of writing). The history of archaeology is therefore in the first instance a history of ideas, of theory, of ways of looking at the past. Next it is a history of developing research methods, employing those ideas, and investigating those questions. And only thirdly is it a history of actual discoveries.

In this chapter and in this book it is the development of the questions and ideas that we shall emphasize, and the application of new research methods. The main thing to remember is that every view of the past is a product of its own time: ideas and theories are constantly evolving, and so are methods. When we describe the archaeological research methods of today we are simply speaking

of one point on the trajectory of the subject's evolution. In a few decades' or even a few years' time these methods will certainly look old-fashioned and out of date. That is the dynamic nature of archaeology as a discipline.

The Speculative Phase

Humans have always speculated about their past, and most **cultures** have their own foundation myths to explain why society is how it is. Most cultures, too, have been fascinated by the societies that preceded them. The Aztecs exaggerated their Toltec ancestry, and were so interested in Teotihuacan – the huge Mexican city abandoned hundreds of years earlier, which they mistakenly linked with the Toltecs – that they incorporated ceremonial stone masks from that **site** in the foundation deposits of their own Great Temple. A rather more detached curiosity about the relics of bygone ages developed in several other early civilizations, where scholars and even rulers collected and studied objects from the past.

The Roman city of Pompeii lies in the shadow of Mount Vesuvius in Italy. When the volcano erupted in AD 79, the entire city was buried, all but forgotten until excavations began in the mid-18th century. Such spectacular discoveries generated huge interest in the past, and greatly influenced the arts.

During the revival of learning in Europe known as the Renaissance (14th to 17th centuries), princes and people of refinement began to form "cabinets of curiosities," in which curios and ancient **artifacts** were displayed rather haphazardly with exotic minerals and all manner of specimens illustrative of what was called "natural history." During the Renaissance also, scholars began to study and collect the relics of ancient Greece and Rome. And they began too in more northern lands to study the local relics of their own remote past. At this time these were mainly the field monuments – those conspicuous sites, often made of stone, which immediately attracted attention, such as Stonehenge. Careful scholars, such as the Englishman William Stukeley, made systematic studies of some of these monuments, with accurate plans that are still useful today. Stukeley and his colleagues successfully demonstrated that these monuments had not been constructed by giants or devils, as suggested by such local names as the Devil's Arrows, but by people in antiquity. Stukeley was also successful in phasing field monuments, demonstrating that, since Roman roads cut barrows, the former must have been built after the latter.

The First Excavations

In the 18th century more adventurous researchers initiated **excavation** of some of the most prominent sites. The Roman city of Pompeii in Italy was one of the first of these. Buried under meters of volcanic ash after the cataclysmic eruption of nearby Mount Vesuvius, Pompeii was only rediscovered in 1748. Although to begin with the motivation of the excavators was to find valuable ancient masterpieces, it was not long before published finds from Pompeii were attracting enormous international attention, influencing **styles** of furniture and interior decoration, and even inspiring several pieces of romantic fiction. Not until 1860, however, did well-recorded excavations begin.

The credit for conducting what has been called "the first scientific excavation in the history of archaeology" traditionally goes to Thomas Jefferson (later in his career third President of the United States), who in 1784 dug a trench or section across a burial mound on his property in Virginia. Jefferson's work marks the beginning of the end of the Speculative Phase.

In Jefferson's time people were speculating that the hundreds of unexplained mounds known east of the Mississippi river had been built not by the indigenous Americans, but by a mythical and vanished race of "Moundbuilders." Jefferson adopted what today we would call a scientific approach, that is, he tested ideas about the mounds against hard evidence – by excavating one of them. His methods were careful enough to allow him to recognize different layers (or **stratigraphy**) in his trench, and to see that the many human bones present were less well preserved in the lower layers. From this he deduced that the mound had been reused as a place of burial on many separate occasions. Although Jefferson admitted, rightly, that more evidence was needed to resolve the Moundbuilder question, he saw no reason why ancestors of the present-day Native Americans themselves could not have raised the mounds.

Jefferson was ahead of his time. His sound approach – logical **deduction** from carefully excavated evidence, in many ways the basis of modern archaeology – was not taken up by any of his immediate successors in North America. In Europe, meanwhile, extensive excavations were being conducted, for instance by the Englishman Richard Colt Hoare, who dug into hundreds

"The First Excavation"

- Thomas Jefferson, later to become President of the United States, conducted the "first scientific excavation" in Virginia in 1784
- By carefully digging a trench across a Native American burial mound he was able to observe different layers and to draw reasoned conclusions from the data

Early excavations: Richard Colt Hoare and William Cunnington direct a dig north of Stonehenge in 1805.

of burial mounds in southern Britain during the first decade of the 19th century. None of these excavations, however, did much to advance the cause of knowledge about the distant past, since their interpretation was still within the biblical framework, which insisted on a short span for human existence.

The Beginnings of Modern Archaeology

It was not until the middle of the 19th century that the discipline of archaeology became truly established. Already in the background there were the significant achievements of the newly developed science of geology. The study of the **stratification** of rocks (their arrangement in superimposed layers or strata) established principles that were to be the basis of archaeological excavation, as foreshadowed by Jefferson. It was demonstrated that the stratification of rocks was due to processes that were still going on in seas, rivers, and lakes. This was the principle of "**uniformitarianism**": that geologically ancient conditions were in essence similar to, or "uniform with," those of our own time, introduced by the great geologist Sir Charles Lyell. This idea could be applied to the human past also, and it marks one of the fundamental notions of modern archaeology: that in many ways the past was much like the present.

The Antiquity of Humankind and the Concept of Evolution

These advances in geology did much to lay the groundwork for what was one of the most significant events in the intellectual history of the 19th century (and an indispensable one for the discipline of archaeology): the establishment of the antiquity of humankind. It had become widely agreed that earth's origins extended far back into a remote past, so that the biblical notion of the creation of the world and all its contents just a few thousand years before our own time

Charles Darwin caricatured as an ape, published in 1874. The drawing was captioned with a line from William Shakespeare's *Love's Labour's Lost*: "This is the ape of form."

could no longer be accepted. The possibility of a **prehistory** of humankind, indeed the need for one, was established.

This harmonized well with the findings of Charles Darwin, whose fundamental work, *On the Origin of Species*, published in 1859, established the concept of **evolution** to explain the origin and development of all plants and animals. The idea of evolution itself was not new – earlier scholars had suggested that living things must have changed or evolved through the ages. What Darwin demonstrated was how this change occurred. The key mechanism was, in Darwin's words, "natural selection," or the survival of the fittest. In the struggle for existence, environmentally better-adapted individuals of a particular species would survive (or be "naturally selected"), whereas less well-adapted ones would die. The surviving individuals would pass on their advantageous traits to their offspring and gradually the characteristics of a species would change to such an extent that a new species emerged. This was the process of evolution. The implications were clear: that the human species had emerged as part of this same process. The search for human origins in the material record, using the techniques of archaeology, could begin.

Darwin's work on evolution also had an immediate impact on archaeologists who were laying the foundations for the study of artifacts and how they develop over time. But his influence on social thinkers and anthropologists has been even more significant. The principles of evolution can also be applied to social organization, for culture can be seen as learned and passed on between generations, albeit in a more general way than in biological evolution.

The Three Age System

As we have noted, some archaeological techniques, notably those in the field of excavation, were already being developed. So too was another conceptual device that proved very useful for the progress of European prehistory: the **Three Age System**. As early as 1808, Colt Hoare had recognized a sequence of stone, "brass," and iron artifacts within the barrows he excavated, but this was first systematically studied in the 1830s by the Danish scholar C.J. Thomsen. He proposed that prehistoric artifacts could be divided into those coming from a Stone Age, a Bronze Age, and an Iron Age, and this **classification** was soon found useful by scholars throughout Europe. Later a division in the Stone Age was established – between the **Paleolithic** or Old Stone Age and the **Neolithic** or New Stone Age.

These terms were less applicable to Africa, where bronze was not used south of the Sahara, or to the Americas, where bronze was less important and iron was not in use before the European conquest. But it was conceptually significant. The Three Age System established the principle that by studying and classifying prehistoric artifacts, they could be ordered chronologically. Archaeology was moving beyond mere speculation about the past, and becoming instead

a discipline involving careful excavation and the systematic study of the artifacts unearthed. Although superseded by modern dating methods, the Three Age System remains one of the fundamental divisions of archaeological materials today.

Ethnography and Archaeology

Another important strand in the thought of the time was the realization that the study by ethnographers of living communities in different parts of the world could be a useful starting point for archaeologists seeking to understand something of the lifestyles of their own early native inhabitants, who clearly had comparably simple tools and crafts. For example, as early as the 16th century, contact with native communities in North America provided antiquarians and historians with models for tattooed images of Celts and Britons.

Soon ethnographers and anthropologists were themselves producing schemes of human progress. Strongly influenced by Darwin's ideas about evolution, the British anthropologist Edward Tylor and his American counterpart Lewis Henry Morgan both published important works in the 1870s arguing that human societies had evolved from a state of savagery (primitive hunting) through barbarism (simple farming) to civilization (the highest form of society). Morgan's work was partly based on his great knowledge of living Native Americans.

Frederick Catherwood's accurate, if somewhat romantic, drawing of a stela at Copan; at the time of his visit to the site, in 1840, Maya glyphs had not been deciphered.

Discovering the Early Civilizations

By the 1880s, then, many of the ideas underlying modern archaeology had been developed. But these ideas themselves took shape against a background of major 19th-century discoveries of ancient civilizations in the Old World and the New.

The splendors of ancient Egyptian civilization had already been brought to the attention of an avid public after Napoleon's military expedition there of 1798–1800. It was the discovery by one of his soldiers of the Rosetta Stone that eventually provided the key to understanding Egyptian hieroglyphic writing. Inscribed on the stone were parallel texts written in both Egyptian and Greek scripts. The Frenchman Jean-François Champollion used this bilingual inscription finally to decipher the hieroglyphs in 1822, after 14 years' work. A similar piece of brilliant scholarly detection helped unlock the secrets of cuneiform writing, the script used for many languages in ancient Mesopotamia.

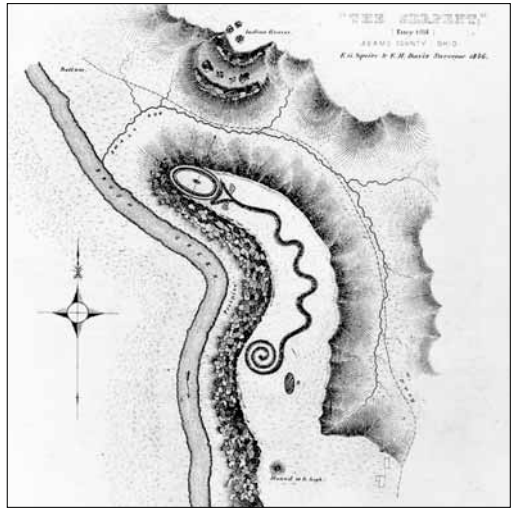
Egypt and the Near East also held a fascination for the American lawyer and diplomat John Lloyd Stephens, but it was in the New World that he was to make his name. His travels in Yucatan, Mexico with the English artist Frederick Catherwood, and the superbly illustrated books they produced together in the early 1840s, revealed for the first time to an enthusiastic public the ruined cities

of the ancient Maya. Unlike contemporary researchers in North America, who continued to argue for a vanished white race of Moundbuilders as the architects of the earthworks there, Stephens rightly believed that the Maya monuments were, in his own words, "the creation of the same races who inhabited the country at the time of the Spanish conquest." Stephens also noted that there were similar hieroglyphic inscriptions at the different sites, which led him to argue for Maya cultural unity – but no Champollion was to emerge to decipher the glyphs until the 1960s.

19th-Century North American Pioneers

In North America, two themes dominated 19th-century archaeology: the enduring belief in a vanished race of Moundbuilders; and the search for "glacial man" – the idea that human fossils and Stone Age tools would be found in the Americas in association with extinct animals, as they had been in Europe. Ephraim Squier, for example, an Ohio newspaperman who excavated more than 200 mounds in the 1840s, considered the mounds beyond the capabilities of any Native Americans, who were "hunters averse to labor," maintaining the myth of the Moundbuilders. His work does still have some use, though, since the plans and records he made are now the best record there is of the many mounds that were destroyed as settlers moved westward.

Samuel Haven, Librarian of the American Antiquarian Society, produced a remarkable synthesis in 1856, *The Archaeology of the United States*, which is considered a foundation stone of modern American archaeology. In it, he argued persuasively that the Native Americans were of great antiquity, and, through cranial and other physical characteristics, he pointed to their probable links with Asiatic races. Disagreeing strongly with Squier and others, he concluded that the mysterious mounds had been built by the ancestors of living Native Americans.



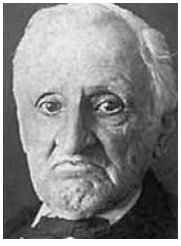
Plan of Serpent Mound, Ohio, as prepared by Squier (with the help of Edwin Davis, an Ohio physician) in 1846.

Ephraim Squier.

Samuel Haven.

Part of a 348-ft long painting used by lecturer Munro Dickeson in the 19th century to illustrate his mound excavations.

John Wesley Powell.



Cyrus Thomas.

Another scholar, John Wesley Powell, had spent much of his youth digging into mounds and learning geology. Eventually he was appointed director of the U.S. Geographical and Geological Survey of the Rocky Mountain region. He published a wide range of information on the rapidly dwindling Native American cultures. Moving to Washington, Powell also headed the Bureau of American Ethnology, an agency he set up to study the Native Americans. A fearless campaigner for native rights, he recommended the setting up of reservations, and also began the recording of tribal oral histories.

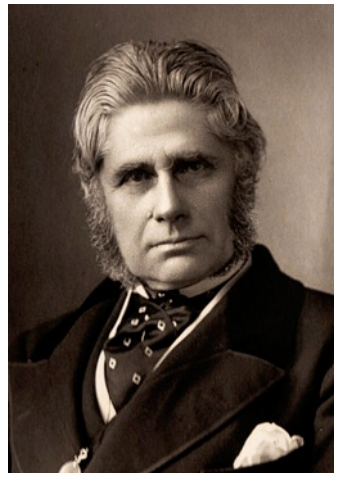
In 1881 Powell recruited Cyrus Thomas to head the Bureau's archaeology program, and to settle the Moundbuilder question once and for all. After 7 years of fieldwork and the investigation of thousands of mounds, Thomas proved that the Moundbuilder race had never existed: the monuments had been erected by the ancestors of modern Native Americans.

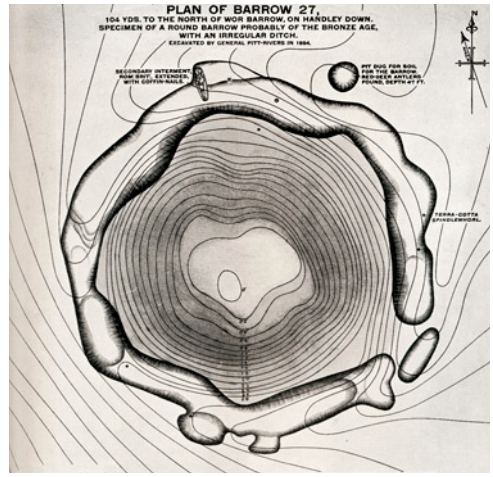
The Development of Field Techniques

It was only in the late 19th century that a sound methodology of scientific excavation began to be generally adopted. From that time some major figures stand out, who in their various ways have helped create the modern field methods we use today.

General Augustus Lane-Fox Pitt-Rivers, for much of his life a professional soldier, brought long experience of military methods, survey, and precision to impeccably organized excavations on his estates in southern England. Plans, sections, and even models were made, and the exact position of every object

General Pitt-Rivers, excavator of Cranborne Chase, and pioneer in recording techniques. To the right is his meticulous plan of a barrow on Cranborne Chase.

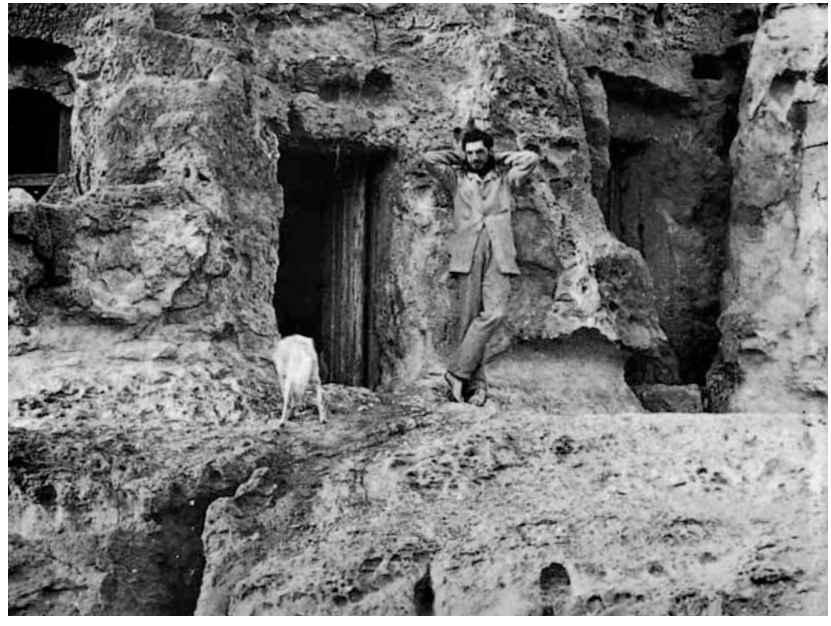




was recorded. He was not concerned with retrieving beautiful treasures, but with recovering all objects, no matter how mundane. He was a pioneer in his insistence on total recording, and his four privately printed volumes, describing his excavations on Cranborne Chase from 1887 to 1898, represent the highest standards of archaeological publication.

A younger contemporary of Pitt-Rivers, Sir William Flinders Petrie was likewise noted for his meticulous excavations and his insistence on the collection and description of everything found, not just the fine objects, as well as on full publication. He employed these methods in his exemplary excavations in Egypt, and later in Palestine, from the 1880s until his death.

Flinders Petrie outside the tomb in which he lived in Giza, Egypt, in the early 1880s.



Sir Mortimer Wheeler, and his excavation at Arikamedu, India, 1945.

Julio Tello, arguably the greatest Native American social scientist of the 20th century – he was a Quechua Indian – and the father of Peruvian archaeology.

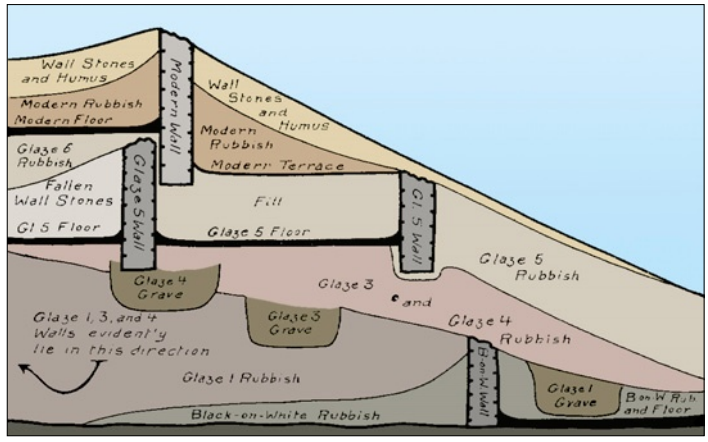
Sir Mortimer Wheeler fought in the British army in both world wars and, like Pitt-Rivers, brought military precision to his excavations, notably through such techniques as the grid-square method of dividing and digging a site. He is particularly well known for his work at British hillforts, notably Maiden Castle. Equally outstanding, however, was his achievement as Director-General of Archaeology in India, where he held training schools in modern field methods, and excavated at many important sites.

Julio Tello, "America's first indigenous archaeologist," was born and worked in Peru, began his career with studies in Peruvian linguistics, and qualified as a medical doctor before taking up anthropology. He did much to awaken an awareness of the archaeological heritage of Peru, and was the first to recognize the importance of the key site of Chavín de Huantar and indeed of such other major sites as Sechín Alto, Cerro Sechín, and Wari. He was one of the first to stress the autonomous rise of civilization in Peru, and he also founded the Peruvian National Museum of Archaeology.

Alfred Kidder was the leading Americanist of his time. As well as being a major figure in Maya archaeology, he was largely responsible for putting the Southwest on the archaeological map with his excavations at Pecos Ruin, a large pueblo in northern New Mexico, from 1915 to 1929. His survey of the

Key Early Advances

- The rejection of a literal interpretation of the biblical account of early human history and the establishment of the antiquity of humankind
- Charles Darwin's theories of evolution and natural selection
- The establishment of the Three Age System that divided prehistory into a Stone Age followed by a Bronze Age and an Iron Age
- The development of archaeological field techniques



Alfred Kidder (above) and his cross-sectional drawing (above right) of the stratigraphy at the Pecos pueblo site.

region, *An Introduction to the Study of Southwestern Archaeology* (1924), has become a classic. Kidder was one of the first archaeologists to use a team of specialists to help analyze artifacts and human remains. He is also important for his "blueprint" for a regional strategy: (1) reconnaissance; (2) selection of criteria for ranking the remains of sites chronologically; (3) organizing them into a probable sequence; (4) stratigraphic excavation to elucidate specific problems; followed by (5) more detailed regional survey and dating.

Classification and Consolidation

As we have seen, well before the end of the 19th century many of the principal features of modern archaeology had been established and many of the early civilizations had been discovered. There now ensued a period, lasting until about 1960, that has been described as the "classificatory-historical period." Its central concern was chronology. Much effort went into the establishment of regional chronologies, and the description of the development of culture in each area.

It was scholars studying the prehistoric societies of Europe and North America who made some of the most significant contributions to the subject. In the United States there was a close link between anthropologists and archaeologists studying the Native Americans. The anthropologist Franz Boas reacted against the broad evolutionary schemes of his predecessors and demanded much greater attention to the collection and classification of information in the field. Huge inventories of cultural traits, such as pot and basket designs or types of moccasins, were built up. This tied in with the so-called "direct historical approach" of the archaeologists, who attempted to trace modern Native American pottery and other styles "directly" back into the distant past. By the 1930s the number of separate regional sequences was so great that a group of scholars led by W.C. McKern devised what became known as the "**Midwestern Taxonomic System**," which correlated sequences in the Midwest by identifying similarities between artifact collections.

Professor Gordon Childe at the site of the Neolithic settlement at Skara Brae, Orkney, in 1930.

Meanwhile, Gordon Childe, a brilliant Australian based in Britain and a leading thinker and writer about European prehistory, had almost single-handedly been making comparisons of this sort between prehistoric sequences in Europe. Both his methods and the Midwestern Taxonomic System were designed to order the material, to answer: To what period do these artifacts date? and also: With which other materials do they belong? This latter question usually carried with it an assumption that Childe made explicit: that a constantly recurring collection or "**assemblage**" of artifacts (a "culture" in his terminology) could be attributed to a particular group of people. This approach thus offered the hope of answering, in a very general sense, the question: to whom did these artifacts belong?

But Childe went beyond merely describing and correlating the culture sequences, and attempted to account for their origin. In the late 19th century scholars had argued that all the attributes of civilization, from stone architecture to metal weapons, had spread or "diffused" to Europe from the Near East by trade or migration of people. With the much greater range of evidence available to him, Childe modified this approach and argued that Europe had undergone some indigenous development – but he nevertheless attributed the major cultural changes to Near Eastern influences.

Later Childe went on to try and answer the much more difficult question: Why had civilization arisen in the Near East? Himself influenced by Marxist ideas and the relatively recent Marxist revolution in Russia, he proposed that there had been a **Neolithic Revolution** that gave rise to the development of farming, and later an Urban Revolution, which led to the first towns and cities. Childe was one of the few archaeologists of his generation bold enough to address this whole broad issue of why things happened or changed in the past. Most of his contemporaries were more concerned with establishing chronologies and cultural sequences. But after World War II scholars with new ideas began to challenge conventional approaches.

The Ecological Approach

One of the most influential new thinkers in North America was the anthropologist Julian Steward. Like Childe he was interested in explaining cultural change, but he brought to the question an anthropologist's understanding of how living cultures work. Moreover he highlighted the fact that cultures do not interact simply with each other, but with the environment as well. Steward christened the study of ways in which adaptation to the environment could cause cultural change "**cultural ecology**." Perhaps the most direct archaeological impact of these ideas can be seen in the work of Gordon Willey, one of Steward's graduate associates, who carried out a pioneering investigation in the Virú Valley, Peru, in the late 1940s. This study of some 1500 years of pre-Columbian occupation involved a combination of observations from detailed maps and aerial photographs, survey at ground level, and excavation and surface potsherd

Key Developments

- The early 20th-century establishment of regional chronologies and sequences of artifacts
- The development of scientific aids for archaeology, notably radiocarbon dating
- The post-World War II development of an environmental or ecological explanation for past change
- Increasing collaboration with specialists in other disciplines, such as animal or plant studies
- Gordon Childe's bold questioning of why things happened or changed in the past

collection to establish dates for the hundreds of prehistoric sites identified. Willey then plotted the geographical distribution of these many sites in the valley at different periods and set the results against the changing local environment.

Quite independently of Steward, however, the British archaeologist Grahame Clark developed an ecological approach with even more direct relevance for archaeological fieldwork. Breaking away from the artifact-dominated "culture history" approach of his contemporaries, he argued that by studying how human populations adapted to their environments we can understand many aspects of ancient society. Collaboration with new kinds of specialists was essential: for example, specialists who could identify animal bones or plant remains in the archaeological record could help build up a picture not only of what prehistoric environments were like, but also what foods prehistoric peoples ate.

The Rise of Archaeological Science

The other striking development of the period immediately after World War II was the rapid development of scientific aids for archaeology. We have already seen how pioneers of the ecological approach forged an alliance with specialists from the environmental sciences. Even more important, however, was the application to archaeology of the physical and chemical sciences.

The greatest breakthrough came in the field of dating. In 1949 the American chemist Willard Libby announced his invention of **radiocarbon dating**. It was not until well over a decade later that the full impact of this momentous technical achievement began to be felt, but the implications were clear: here at last archaeologists might have a means of directly determining the age of undated sites and finds anywhere in the world without complicated cross-cultural comparisons. Traditionally, prehistoric Europe had been dated by supposed contacts with early Greece and hence (indirectly) with ancient Egypt, which could itself be dated historically. The radiocarbon method now promised a completely independent chronology for ancient Europe. It also meant that to establish a date was no longer one of the main end products of research. It was still important,

but it could now be done much more efficiently, allowing the archaeologist to go on to ask more challenging questions than merely chronological ones.

Archaeological applications for scientific techniques now include plant and animal studies, and methods for analyzing human remains and artifacts. Over the past decade developments in biochemistry and molecular genetics have led to the emergence of the new disciplines of molecular archaeology and archaeogenetics. Sensitive techniques in the field of chemistry are beginning to allow the precise identification of organic residues and are giving fresh insights into both diet and nutrition. The study of **DNA**, both modern and ancient, has offered novel approaches to the study of human evolution, and is now beginning to give the study of plant and animal domestication a systematic, molecular basis.

A Turning Point in Archaeology

The 1960s mark a turning point in the development of archaeology. By this time some archaeologists were dissatisfied with the way research in the subject was being conducted. These dissatisfactions were not so much with excavation techniques, or with the newly developed scientific aids in archaeology, but with the way conclusions were drawn from them – how archaeologists explain things.

The fundamental cause for dissatisfaction with the traditional archaeology was that it never seemed to explain anything, other than in terms of migrations of peoples and supposed "influences." Already in 1948 the American archaeologist Walter W. Taylor had argued for an approach that would take into consideration the full range of a culture system. And in 1958 Gordon Willey and Philip Phillips argued for a greater emphasis on the social aspect, for a broader study of the general processes at work in culture history (a "processual interpretation").

That was all very well, but what would it mean in practice?

Lewis Binford, the founder of the "New Archaeology," lecturing on his work among the Nunamiut hunters of Alaska.

The Birth of the New Archaeology

In the United States the answer was provided, at least in part, by a group of younger archaeologists, led by Lewis Binford, who set out to offer a new approach to the problems of archaeological interpretation, which was soon dubbed "the **New Archaeology**." Binford and his colleagues argued against trying to use archaeological data to write a kind of "counterfeit history." They maintained that the potential of the archaeological evidence was much greater than had been realized for the investigation of social and economic aspects of past societies. It was a more optimistic view than that of many of their predecessors.

They also argued that archaeological reasoning should be made explicit. Conclusions should be based not simply on the authority of the scholar making the interpretation, but on an explicit framework of logical argument. Thus conclusions, if they are to be considered valid, must be open to testing.

These processual archaeologists sought to explain rather than simply to describe, and to do so, as in all sciences, by seeking to make valid generalizations.

Key Concepts
Processual Archaeology

In the early days of the New Archaeology, its principal exponents were very conscious of the limitations of the older, traditional archaeology. The following contrasts were among those that they often emphasized:

The Nature of Archaeology:
Explanatory vs Descriptive

- Archaeology's role was now to explain past change, not simply to reconstruct the past and how people had lived. This involved the use of explicit theory.

Explanation:
Culture process vs Culture history

- Traditional archaeology was seen to rely on historical explanation: the New Archaeology, drawing on the philosophy of science, would think in terms of culture process, of how changes in economic and social systems take place. This implies generalization.

Reasoning:
Deductive vs Inductive

- Traditional archaeologists saw archaeology as resembling a jigsaw puzzle: the task was one of "piecing together the past." Instead, the appropriate procedure was now to formulate hypotheses, constructing models, and deducing their consequences.

Validation:
Testing vs Authority

- Hypotheses were to be tested, and conclusions should not be accepted on the basis of the authority or standing of the research worker.

Research Focus:
Project design vs Data accumulation

- Research should be designed to answer specific questions economically, not simply to generate more information, which might not be relevant.

Choice of Approach:
Quantitative vs Simply qualitative

- Quantitative data allowed computerized statistical treatment, with the possibility of sampling and significance testing. This was often preferred to the purely verbal traditional approach.

Scope:
Optimism vs Pessimism

- Traditional archaeologists often stressed that archaeological data were not well suited to the reconstruction of social organization or cognitive systems. The New Archaeologists were more positive, and argued that it would never be known how hard these problems were until archaeologists had tried to solve them.

They tried to avoid the rather vague talk of the "influences" of one culture upon another, but rather to analyze a culture as a system that could be broken down into subsystems (such as technology, trade, or ideology), which could be studied in their own right. They placed much less emphasis on artifact **typology** and classification.

In order to fulfill these aims, the New Archaeologists to a large extent turned away from the approaches of history toward those of the sciences. There was a great willingness to employ more sophisticated quantitative techniques and to draw on ideas from other disciplines, notably geography.

In their enthusiasm to use a battery of new techniques, the New Archaeologists drew also on a range of previously unfamiliar vocabularies, which their critics tended to dismiss as jargon. Indeed in recent years, several critics have reacted against some of those aspirations to be scientific. But there can be no doubt that archaeology will never be the same again. Most workers today, even the critics of the early New Archaeology, implicitly recognize its influence when they agree that it is indeed the goal of archaeology to explain what happened in the past as well as to describe it. Most of them agree too that in order to practice good archaeology it is necessary to make explicit, and then to examine, our underlying assumptions.

Increasingly also there has been a readiness to apply the techniques of archaeological investigation to more recent times. In the United States James Deetz made significant contributions, and, more widely, medieval archaeology and industrial archaeology are now recognized fields.

The Postprocessual Debate of the 1980s and 1990s

Post-modernist currents of thought in the 1980s and 1990s encouraged a great diversity of approaches to the past. While many field archaeologists were relatively untouched by theoretical debates, and the processual tradition established by the New Archaeology rolled on, there were several new approaches, sometimes collectively termed "postprocessual," which dealt with interesting and difficult questions.

Influential arguments, some of them first advanced by the archaeologist Ian Hodder and his students, have stressed that there is no single, correct way to undertake archaeological inference, and that the goal of objectivity is unattainable. However, this well-justified critique of the scientism of the early New Archaeology sometimes overlooks more recent developments in scientific methodology. It can also lead to charges of relativism, where one person's view has to be regarded as as good as another's, and where, in interpretive matters, "anything goes," and where the borderlines between archaeological research and fiction (or science fiction) may be difficult to define.

For its early proponents, postprocessual archaeology represented so radical a critique of processual archaeology as to establish a new beginning in archaeological theory. However, others saw "postprocessualism" as simply a development of some of the ideas and theoretical problems introduced by the New Archaeology. To these critics it brought in a variety of approaches from other disciplines, so that the term "postprocessual" was a shade arrogant in presuming to supersede what it might quite properly claim to complement.