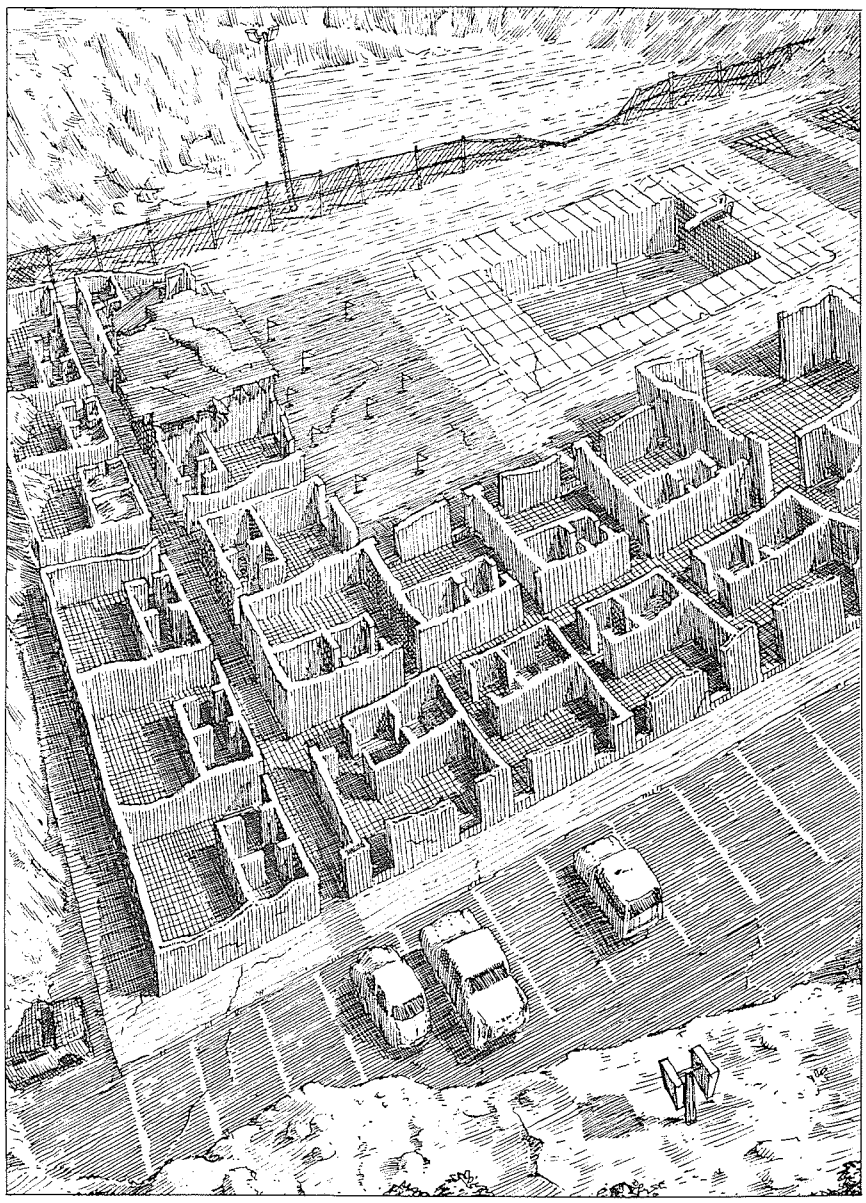

"Slowly, a vast funerary complex began to emerge from the soil." In Motel of the Mysteries *(1979), artist David Macaulay, describing an excavation undertaken in A.D. 4022, gently poked fun at archaeological speculation: "Specially marked funerary game areas intended to occupy the spirits of the dead during eternal life were located around the sacred pool."*

Archaeology

The quest for truth in history is an old one. "How difficult it is," Plutarch once complained, "to trace and find out the truth of anything by history." History, wrote Matthew Arnold, is a "huge Mississippi of falsehood." "Merely gossip," added Oscar Wilde. Such critics might have felt more hopeful had they seen the emergence of archaeology as a scholarly discipline. Known mostly for uncovering old tombs, old bones, and ancient cities, archaeologists occupy a peculiar place in academe: They are "social scientists," with strong links to anthropology and history, but their techniques are often those of natural science, borrowed from the physicist, chemist, and biologist. Archaeology has corrected many pages of history, given us new insights, and shown that much of our past can be accurately described. Here, Bea Riemschneider looks at archaeology's rapid development during the past two centuries. Don S. Rice reports on the advocates of a controversial "new archaeology," who are pursuing the *hows* and the *whys* of man's cultural evolution.

KNOWING THE UNKNOWABLE

by Bea Riemschneider

The stuff of archaeology is the debris of yesterday.

Archaeology is the science of what has remained, for any reason at all, anyplace in the world, from any period of the past. The breadth of its concerns is virtually limitless, its raw material correspondingly wide-ranging: From stone tools, held in the strata at Olduvai Gorge, to a Roman villa in England, its buried foundation appearing as a pattern of "crop marks" in a wheat field; from butchered bones, found at the site of Plymouth Colony, to the lava at Pompeii, whose ghostly hollows, when injected with plaster of Paris, reveal the shapes of human remains—a mother, say, shielding her child. The physical remains are by turns monolithic and

microscopic, solid and evanescent. They are discovered through diligence and through good luck.

And they possess a significance greater than themselves. The purpose of archaeology is to find and analyze such static material things and, as archaeologist Lewis Binford has written, "translate them into statements about the dynamics of past ways of life."

Thank You, King Charles

Needless to say, there is an important *contemporary* dimension to this endeavor. In complex ways, the past inheres in the present and anticipates the future. Archaeology can touch our daily lives, can affect politics, religion, economics; these factors, in turn, may advance or retard the progress of archaeology.

Mexico, for example, pours vast sums into archaeological excavation—in part to attract tourists who pour some $2 billion into the country's economy every year; but economic progress, in the form of new construction, also *destroys* many archaeological sites every year in Mexico, as elsewhere. Germans, Swedes, and white Rhodesians at various times used archaeology to support racist theories, the Rhodesians arguing, for example, that the ruins at Great Zimbabwe were the work not of black Africans but of Phoenicians; when white-ruled Rhodesia became a black-ruled state in 1979, the new government turned the tables and renamed the country . . . Zimbabwe. The government of Israel has long promoted archaeology as a way of demonstrating the great antiquity of Jewish claims in Palestine; but some Orthodox Jews have impeded digging in Jerusalem, fearing the desecration of their forefathers' graves. American Indians likewise object to violation of burial sites, and state archaeologists on both coasts have now agreed to rebury any excavated Indian remains.

In the United States today, there are roughly 1,700 active archaeologists, most of them affiliated with universities or museums. They represent an extraordinarily diverse array of men and women, highly specialized by technique and with varied geographical and chronological interests. One may be an ethnoarchaeologist, studying the Nunamiut Eskimos of Alaska, another an experimental archaeologist, concerned with agriculture in pre-Roman Britain. An archaeological chemist may devote his energies to the analysis of Shang dynasty fabrics; an

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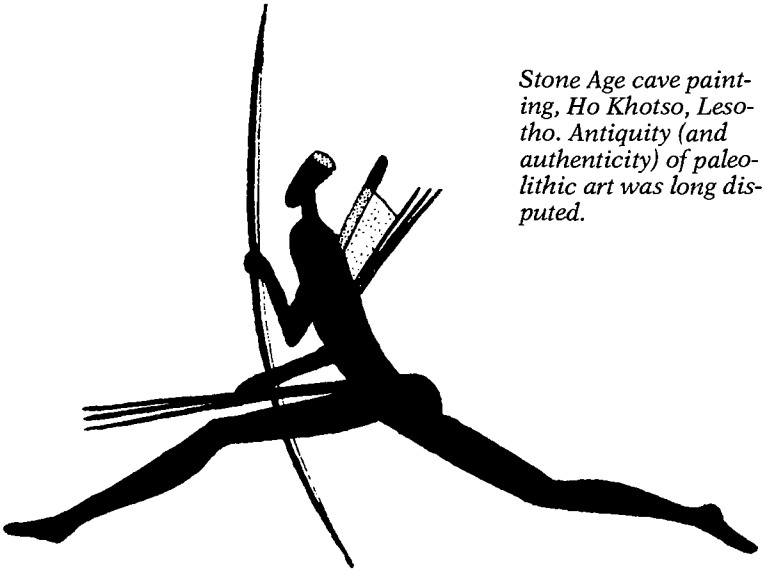


Stone Age cave painting, Ho Khotso, Lesotho. Antiquity (and authenticity) of paleolithic art was long disputed.

archaeoastronomer, to Anasazi petroglyphs in New Mexico. There are industrial archaeologists, urban archaeologists, historical archaeologists, underwater archaeologists, conservation archaeologists, and salvage archaeologists. The job of the latter is to keep one step ahead of the bulldozer, quickly excavating construction sites when artifacts are found or when local law demands.

The one thing most archaeologists around the world have in common, apart from advanced degrees, is a heavy dependence on the good will of others—private societies, philanthropists, foundations, governments—for money to finance their explorations. Fortunately for them, a goodly number of institutions seem to have concluded, with England's King Charles I, that "the study of antiquities [is] very serviceable and useful to the general good of the State and Commonwealth."

As a modern *academic* discipline, archaeology is relatively young—vastly younger than history, younger by decades than anthropology and sociology. But it boasts a long pedigree.

The history of what we might call "proto-archaeology" begins with banditry. The very first people to lay their hands on the undisturbed graves of antiquity, and the treasures they often contained, were the looters and grave robbers of Egypt. (As archaeologist W. B. Emery once noted, the ancient Egyptians believed that "you could take it with you.") Many plundered the tombs of their country's own deceased pharaohs soon after the

rulers were laid to rest, a distressing fact discovered thousands of years later by early 20th-century Egyptologists.

Looting, unfortunately, has persisted to this day. It is a serious problem worldwide, especially in the Mideast, Central America, and the American Southwest, because of the high prices many artifacts can fetch from dealers and collectors. In 1984, for example, one looter (later apprehended) in Utah received $70,000 for 30 Indian baskets, about 1,200 years old, that he found in a cave on U.S. Forest Service land. Many ancient pueblo sites in the Southwest, their terrain scored by hundreds of looters' shafts, are now virtually worthless from an archaeological perspective.

Antiquarians and Dilettantes

The mantle of "first archaeologist" is commonly bestowed on Nabonidus, the last king of Babylon (556–539 B.C.). Nabonidus dug at Ur and displayed the artifacts he found. The first museum was born. There are only a few examples of any passion for collecting during Greek and Roman times. Not until the Renaissance, when humanists such as Petrarch awakened a new interest in antiquity, did any kind of deliberate excavations get under way. Cyriacus of Ancona (circa 1391–1452), a merchant and humanist, traveled throughout the Mediterranean studying ancient monuments and deciphering inscriptions. His business, he liked to say, was "restoring the dead to life."

Collecting classical antiquities became the pastime first of Roman Catholic prelates, then of lay dilettantes all over Europe. Some collectors, such as England's Thomas Howard, the earl of Arundel (1561–1626), amassed vast holdings of curios from Italy, Greece, even parts of Asia. Howard's collection formed the basis of Oxford University's Ashmolean Museum. One thing led to another: Like collectors of plant and animal specimens, collectors of antiquities eventually sought to organize and classify their artifacts. They became "antiquarians," and the *science* of archaeology, primitive though it was, began with their early efforts at taxonomy.

Most European antiquarians focused on the remains of the classical world, a world already known to them through written records. In England, however, local historians were as much concerned with the remnants of *pre*history—with the conspicuous and mysterious ring forts and dolmens and stone circles in which Britain abounded—as they were with the relics of a transient Roman occupier. Not a little chauvinism was involved here as a mighty people, on the eve of empire, looked to the

mythic origins of their race. William Camden (1551–1623), a schoolmaster, traveled the length and breadth of England taking notes on Hadrian's Wall, Stonehenge, and other visible antiquities. The result, in 1586, was his *Britannia*, the first general guide to the archaeology of the sceptered isle. Later investigators sent out questionnaires: "Are there any ancient sepulchres hereabout of Men of Gigantic Stature, Roman Generals, and others of ancient times?"

During the 18th century, published accounts by European travelers in the Mediterranean and the Near East whetted interest in the lost civilizations of the region, particularly that of ancient Egypt. When Napoleon Bonaparte led a French military expedition to the banks of the Nile in 1798, he brought a corps of 175 "learned civilians" with him to make a careful study of archaeological remains. Within a year, one of his officers had unearthed the Rosetta Stone, with its trilingual inscription in Greek, demotic, and Egyptian hieroglyphs. The British seized the Stone when they occupied Egypt in 1801, but the French took away tracings. It was a brilliant French linguist, Jean-François Champollion, who in 1822 correctly deduced that the hieroglyphs were phonetic characters, not "picture-writing" as in Chinese, and finally deciphered the Egyptian script. By then, it was clear to many scholars that the unveiling of ancient languages—in effect, letting the Assyrians and Persians and Egyptians speak for themselves—would be the key to all future archaeological work in the Near East and elsewhere.*

Bulldozing Nimrūd

What Champollion did for Egypt, Sir Henry Creswicke Rawlinson did for Persia. Rawlinson spent years in what is now Iran, copying pictographic cuneiform inscriptions. By 1846, he had succeeded in translating the wedge-shaped Old Persian script, making possible the first intimate glimpse of ancient Persian society. Rawlinson and others soon mastered the Babylonian and Assyrian scripts as well—just in time, as it happened. For even as they toiled, whole libraries of clay tablets—grammars, dictionaries, histories, ledgers, works of literature—were being retrieved from the sands of Mesopotamia.

The large-scale European excavation of the ancient city of Nimrūd—mistakenly believed to be Biblical Nineveh—in what

*Linguistic mysteries remain. "Linear B," one of the scripts of Crete's Bronze Age Minoan civilization, was successfully decoded by Michael Ventris in 1952, but "Linear A," another Minoan script, still baffles archaeologists. So does the Mohenjo-daro script of the great Indus Valley civilization, which flourished around 2,300 B.C.

ARCHAEOLOGY AROUND THE WORLD

WQ asked a score of prominent archaeologists (see page 176) to list what they considered to be the most important current excavations in their area of geographical interest. The map here represents a summary of their views. NOTE: Sites may be important not only for "spectacular" finds but also for their historical significance or for their contribution to archaeological theory and methodology.

1. Malhada (Brazil)
Itaipu culture settlement, c. 1500 B.C.

2. Pacatnamu (Peru)
Large administrative center, c. A.D. 800–1500

3. Batan Grande (Peru)
Sicán ceremonial-political center, c. A.D. 850–1050

4. Rio Azul (Guatemala)
Mayan center, unlooted tomb, c. A.D. 350–830

5. Teotihuacán (Mexico)
Ceremonial, industrial center, c. A.D. 100–700

6. Las Colinas, La Ciudad (Arizona)
Hohokam pueblos, c. A.D. 900–1450

7. Chaco Canyon (New Mexico)
Anasazi pueblos, c. A.D. 900–1150

8. Blackwater Draw (New Mexico)
Paleo-Indian and Archaic settlements, c. 9000–3000 B.C.

9. Tellico (Tennessee)
Early Archaic campsites, c. 8500 B.C. and forward

10. American Bottom (Illinois)
Organized village settlements, c. A.D. 800–1000

11. L'Anse aux Meadows (Canada)
Leif Eriksson's Norse settlement, c. A.D. 1000

12. Nulliak (Canada)
Maritime Archaic Indian site, long houses, burial mounds, c. 1500 B.C.

13. Point Barrow (Alaska)
Eskimo dwelling, mummies, c. A.D. 1500–1700

14. Bache Peninsula (Canada)
Eskimo, Norse settlements, c. 2000 B.C.–A.D. 1500

15. Pincevent (France)
Reindeer hunter settlement, c. 12,000 B.C.

16. Stobi (Yugoslavia)
Roman city, c. 300 B.C.–A.D. 600

17. Vergina Cemetery (Greece)
Necropolis, possible Philip of Macedon tomb, 336 B.C.

18. Varna (Bulgaria)
Cemetery, gold ornaments, c. 4500 B.C.

19. Franchthi Cave (Greece)
Evidence of agriculture, c. 12,000–5000 B.C.

20. Kommos (Crete)
Minoan harbor town, Greek sanctuary, c. 2000

B.C.–A.D. 300

21. Cayönü (Turkey)
Farm village, c. 7000 B.C.

22. Ebla (Syria)
Cuneiform archives, 15,000 tablets, c. 2300 B.C.

23. 'Ain el Ghazal (Jordan)
Settlement series, c. 7500–5500 B.C.

24. Jerusalem (Israel)
Canaanite, Israelite, Roman series, c. 3000 B.C.–A.D. 400

25. Tell Jemmeh (Israel)
Canaanite, Philistine sites, c. 3100–200 B.C.

26. Tell el Da'aba (Egypt)
Hyksos's capital, c. 1900–1550 B.C.

27. Qasr Ibrim (Egypt)
Hill fortress city, c. 1000 B.C.

28. Igbo Ukwu (Nigeria)
Ceremonial center, bronze artwork, c. A.D. 850

29. Klasies River (South Africa)
Cave dwelling, oldest shellfish midden, c. 140,000 B.C. and forward

30. Great Zimbabwe (Zimbabwe)
Ceremonial site of Shona speakers, c. A.D. 1250–1500

31. Olduvai Gorge (Tanzania)
Proto-human fossils, stone tools, c. 2 million B.C. and forward

32. Hadar (Ethiopia)
Proto-human fossils (e.g., Lucy), c. 3.25 million B.C. and forward

33. Mehrgarh (Pakistan)
Pre-Indus village series, c. 6000–1000 B.C.

34. Khok Phanom Di (Thailand)
Shellfish midden, rice fields, c. 3000 B.C.

35. Lintong (China)
Emperor Shihuangdi tomb, terra-cotta army, c. 210 B.C.

36. Zhoukoudian (China)
Peking Man cave, c. 350,000 B.C. and forward

37. Yanshi (China)
Shang dynasty city, c. 1500 B.C.

38. Diring Yuryakh (USSR)
Chipstone tool site, c. 1 million B.C. and forward

is now Iraq, had gotten under way in 1845, quickly capturing public attention in Britain and France. The *Illustrated London News* devoted some of its earliest reporting to the English excavations, led by the young Austen Henry Layard, and to a rival French effort nearby, led by Paul-Émile Botta. Layard unearthed massive stone sculptures, thousands of cuneiform tablets, and a large assortment of weapons, pottery, carved ivories, and other artifacts. The digging was not very sophisticated. Layard essentially "bulldozed" through site after site, aiming to retrieve as many well-preserved objects as possible for the smallest outlay of time and money. He eventually recognized the destructive nature of his work at Nimrūd. "It seemed almost a sacrilege," he once reflected, thinking of two human-headed lions about to be shipped to the British Museum, "to tear them from their old haunts to make them a mere wonder-stock to the busy crowd of a new world." Many artifacts, exposed to the air, literally crumbled before his eyes. Famous at the age of 35, Layard abandoned archaeology and returned to London.

Grappling with Prehistory

The great discoveries in Mesopotamia were hailed by many for what they suggested about the "historicity" of some aspects of the Bible. There had hitherto been no firm proof that an Assyrian empire had ever existed, no proof that a flesh-and-blood Sennacherib had occupied its throne; now there *was* proof—in writing. But discoveries of a different kind, interpreted with the aid of stratigraphic techniques, called other aspects of the Biblical account into question.

Stratigraphy is the ordering of "depositional strata," or layers of earth, into a chronological sequence, thereby establishing the relative age of objects found at various levels. Thomas Jefferson employed stratigraphy in excavating an ancient burial mound near Monticello—"I proceeded then to make a perpendicular cut through the body of the barrow that I might examine its internal structure"— recording his observations in *Notes on the State of Virginia* (1784); this is one of the earliest known references to the technique. Jefferson concluded from his dig that such mounds had been constructed by ancestors of the indigenous Indian population—a controversial conclusion at a time when most scholars believed that a more advanced but now extinct race of "Mound Builders" had once inhabited the continent.

Of course, stratigraphy is useful only if one can assume that layers of earth are laid down sequentially, with layers at the bot-

tom being older than those at the top. This principle, called "uniformitarianism," was not widely accepted until after publication during 1830–33 of Sir Charles Lyell's three-volume *Principles of Geology*, a best seller. Thereafter, scholars doing stratigraphic and other studies began producing evidence that the world was far older than the Bible implied. The commonly held view that the world had been created on October 23, 4004 B.C., at 9:00 A.M.—the calculation of Dr. John Lightfoot, based on Biblical evidence—came under increasing attack.

Grappling with prehistory proved to be a challenge. Antiquarians in England and on the Continent had long been familiar with distinctly pre-Roman pottery, stone tools, even gold ornaments, recovered from burial mounds or turned up by a farmer's plowshare. How old were these artifacts? Would they someday enable scholars to write "text-free" history, to learn more about the distant past than ancient writers had told them? Slowly, researchers began imposing order on what had once been deemed unknowable. One important breakthrough occurred in Denmark, where archaeology as a systematic enterprise got off to a precocious start: Christian J. Thomsen (1788–1865) began classifying prehistoric implements according to a "three-age" theory. Thomsen argued that primitive man had risen through successive epochs marked by the successive use of stone, bronze, and iron.

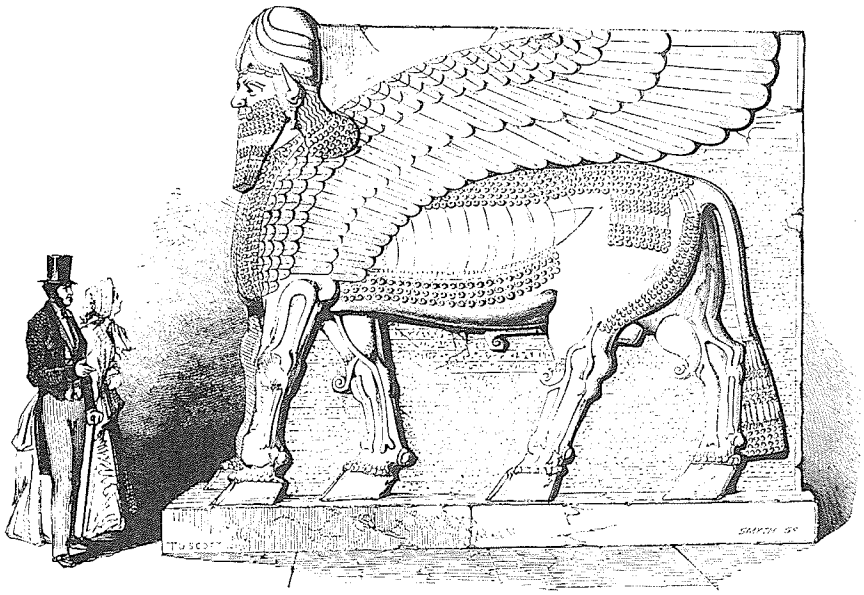
Pushing Back Time

The "three-age" theory dealt with relative rather than absolute time. How far back the Stone Age actually went remained an open question. In 1797, in what has been called the first "true" archaeological site report, a British antiquarian named John Frere had written a letter to the Society of Antiquaries in which he posited the extreme age of flint implements found at Hoxne, Suffolk. Frere presented stratigraphic evidence linking the flints, which he correctly deemed weapons, to the bones of extinct animals. "The situation in which these weapons were found may tempt us to refer them to a very remote period indeed; even beyond that of the present world." Frere's findings were largely ignored. Jacques Boucher de Perthes, a French customs officer, met a similar reception four decades later, in 1837, after discovering stone hand axes among fossil bones, both in substantial quantities, on the banks of the Somme River.

No one was quite ready to listen until 1859, when two eminent British scientists, Sir John Evans and Joseph Prestwich, at a meeting of the Royal Society, pronounced Boucher de

Perthes's finds authentic. Fortuitously, Charles Darwin's *On the Origin of Species* was published that same year. Darwin's theory of evolution by natural selection, which revolutionized scientific thinking, disturbed many people at the time (as it still does). Nevertheless, in tandem with the stratigraphic record, evolution undermined the creationists' insistence on the chronological accuracy of Scripture. As scientist Thomas Huxley predicted, Darwin's ideas extended "by long epochs the most liberal estimate that has yet been made of the Antiquity of Man." During the century and a quarter since Darwin wrote, paleoanthropologists have set the approximate date of modern man's emergence at 100,000 B.C.; man's oldest hominid ancestor, the ape-like *Ramapithecus* can be traced back 12 million years. It is both ironic and fitting that one of the most prominent of those paleoanthropologists, Mary Leakey, is a direct descendant of John Frere.

The Industrial Revolution created new wealth and, together with Darwin's ideas, fostered confidence among scholars and their patrons in the continuing ascent of man. France, Germany, Britain, and the United States carved new empires out of Asia, Africa, and North America—new empires often harboring the



Archaeological displays have long appealed to a broad public. The Nimrūd sculptures (above, an eagle-winged man-bull) created a sensation when first exhibited at the British Museum in 1848.

relics of older ones. It was a perfect climate for the expansion of the archaeological enterprise. The ancient city of Angkor Wat in Cambodia, capital of the Khmer empire, was discovered in 1868 by photographer J. Thomson. Luxor in Egypt, the site of ancient Thebes, was excavated by Sir Gaston Maspero throughout the 1880s, even as Adolph Bandelier roamed the southwestern United States (sometimes dressed as a priest, it is said, to curry favor with Catholic missionaries). In Central America, the Mayan sites described by John L. Stephens and Frederick Catherwood in their *Incidents of Travel in Central America, Chiapas, and Yucatán* (1841) were picked over for the rest of the century by a variety of Americans, Germans, and Frenchmen. During the 1890s, the great Max Uhle conducted important excavations, with typical Teutonic thoroughness, at locations in Bolivia and Peru. By the turn of the century, Sir Arthur Evans, at his own expense, was unearthing the great palace at Knossos—and with it the first glimpse of Minoan civilization.

The Quest for Troy

One of the greatest names of the period is that of Heinrich Schliemann (1822–90), the minister's-son-turned-wealthy-merchant who was determined to "prove the truth of Homer." Digging into a tell—the massive mound that gradually forms beneath mud brick villages as they are built and rebuilt over thousands of years—at Hissarlik, in Turkey, beginning in 1871, Schliemann discovered nine superimposed cities, one of them Troy of the *Iliad*. (He went to his death, however, not knowing which city it was.) Between digs at Hissarlik, Schliemann excavated Mycenae, the Greek kingdom ruled by Homer's Agamemnon. At both places, he found sizable hoards of gold ornaments. Some of the Trojan jewelry he displayed on his young Greek wife: "Helen!" he breathed, taking in the sight. In all, Schliemann excavated some 20 Aegean sites, in the process creating the field of prehistoric Greek archaeology. Literate Europeans and Americans avidly followed his exploits; Prime Minister William Gladstone of Britain wrote the introduction to Schliemann's *Mycenae* (1877).

Schliemann today does not enjoy an unsullied reputation—in large measure because his methods, like those of many of his contemporaries, sometimes smacked more of treasure hunting than of scholarship. At Troy, Schliemann employed 150 laborers to move a massive volume of dirt (325,000 cubic yards during the first two years alone), destroying much of the stratigraphic record in the process. Younger archaeologists, many of them drawn to the pro-

fession by the achievements of men whose methods they openly abhorred, labored to make excavation a more exacting process. Archaeologists such as Germany's Uhle and Britain's Sir Flinders Petrie (1853–1942) realized that the accurate interpretation of what was removed from the ground (and, therefore, of the past itself) depended heavily on *how* it was removed. Method and technique became increasingly important.

'Can You See Anything?'

Petrie, who supervised the annual expeditions of the Egypt Exploration Society and was the first to measure accurately the Great Pyramid at Giza, made several key contributions to archaeological method. Petrie was, above all, fastidious about excavating. He regarded many previously excavated sites in the Middle East as little more than "ghastly charnel houses of murdered evidence." In the field, Petrie took pains to record and describe minor everyday objects—pottery fragments, for example—not valued by treasure hunters. He pioneered the art of "typology," the classification and comparative study of objects according to their style and form; this led, in turn, to the technique of "sequence dating," which Petrie employed to clarify the chronology of Egyptian history. Petrie's work was complemented by that of George A. Reisner, an American archaeologist, who developed a meticulous system (later known as the Reisner-Fisher system) for both digging out a site and recording its contents.

Another American at the turn of the century, Harriet Boyd Hawes, was responsible for a breakthrough of a very different kind. A Smith College graduate and proper Bostonian, Hawes became the first woman of any nationality to direct an archaeological dig. During her excavation of the Bronze Age town of Gournia in Crete (1901–04), she supervised more than 100 laborers. A compatriot, Hetty Goldman, followed in Hawes's footsteps in 1916. It was not until the 1950s, however, that women entered the archaeological profession in any numbers. Today, they are well represented. What was advertised as the first ever all-female excavation, the American Women's Archaeological Research Expedition (AWARE), got under way last January at the Temple of Karnak in Egypt.

By the end of World War I, the days of romantic exploration were numbered as archaeology crossed the threshold from gentleman's hobby to scholarly vocation. In both the Old World and the New, archaeology as a discipline possessed full-time professional practitioners. Its character reflected the influence of anti-

Heinrich Schliemann, excavator of Troy (top left); Sir Flinders Petrie; and Harriet Boyd Hawes, "one of the very few ladies," wrote the Illustrated London News *in 1910, "who have organised and conducted archaeological expeditions."*

quarianism, geology, history, and the young field of anthropology. Most Western nations now boasted a full range of mature archaeological institutions—schools, museums, professional guilds. In the United States, for example, both the Smithsonian Institution and Harvard's Peabody Museum were sponsoring several expeditions every year. The prestigious Archaeological Institute of America had been set up in 1879 to promote research and publication. An American School of Classical Studies was thriving in Athens.

Yet, not surprisingly, it was still the spectacular project or find that caught the public imagination. Mohenjo-daro and Taxila in what is now Pakistan, Ras Shamra in Syria, Persepolis in Iran, Ur of the Chaldees in Iraq, Teotihuacán in Mexico—

these and many other sites were excavated between the wars. Perhaps the most famous moment in archaeological history occurred in November 1922, when Howard Carter and Lord George Edward Carnarvon first entered the unpillaged tomb of the boy-king Tutankhamen in the Valley of the Kings at Luxor. "Can you see anything?" Carnarvon asked as Carter thrust a candle into the antechamber. "Yes," Carter replied slowly, "wonderful things."

The public fixation on such episodes sometimes frustrated even its beneficiaries. "There *is* a romance in digging," conceded Sir Leonard Woolley, excavator of Ur, "but for all that it is a trade wherein long periods of steady work are only occasionally broken by a sensational discovery, and even then the real success of the season depends, as a rule, not on the rare 'find' that loomed so large for the moment, but on the information drawn with time and patience out of a mass of petty detail which the days' routine little by little brought to light and set in due perspective."

A. V. Kidder and Pecos Pueblo

The find by Carter and Carnarvon did not really advance archaeology as a discipline. The contemporaneous work of people such as Alfred Vincent Kidder, who in 1914 earned the first Ph.D. in North American archaeology bestowed by a U.S. university (Harvard), unquestionably did. In 1915, he began excavating a large pueblo in New Mexico's Pecos Valley—a difficult but rewarding site that, Kidder would learn, had been continuously occupied for 600 years, until 1839. He turned up more than 1,000 skeletons, hundreds of thousands of pottery shards, and no fewer than six different towns built one atop the other. With the help of a young aviator, Charles Lindbergh, Kidder conducted aerial surveys of the site, demonstrating the usefulness of this new technology.

Ultimately, from ceramic and stratigraphic evidence, Kidder proposed a cultural chronology of the prehistoric American Southwest; not entirely satisfied with it, he called together his fellow archaeologists of the Southwest for the first Pecos Conference in 1927. (A Pecos Conference has been held every year since then.) One result was the so-called Pecos Classification System, since modified, defining eight successive stages of cultural development in the region, from Basket Maker I to Pueblo V.

Later in his career, turning his attention to Mayan civilization at the behest of the Carnegie Institution, Kidder brought together a team of specialists—geologists, geographers, ethnographers, bota-

nists, zoologists, meteorologists, anthropologists—for a systematic, "pan-scientific" assault on the ruins of Chichén Itzá, in Mexico's Yucatán. Interdisciplinary studies are nowadays commonplace; 50 years ago, they were virtually unheard of.

Kidder was ahead of his time in one other respect—in his insistence that the purpose of archaeology was not simply to describe the past but also to understand the process of change. The "proper business" of the archaeologist, he observed, "is the study of the long, slow growth of human culture."

Lifting the Veil

One obstacle that hampered the conduct of that "proper business" was the difficulty in establishing the precise age of artifacts and sites. While it was usually possible to gauge the *relative* age of various objects, the absolute age more often than not proved elusive. At least for North America, the problem was partially solved by astronomer Andrew E. Douglass (who, as it happens, had attended the first Pecos Conference). Douglass conceived of the "tree-ring" dating (dendrochronology) method in 1913 and by 1929 had made it possible to determine the exact age—down to the very year—of any wooden object made from trees felled in the American Southwest after A.D. 700. The range has since been extended back many thousands of years.

In 1949, physicist Willard F. Libby announced his discovery of a method of radiocarbon dating, making it possible in theory to determine the approximate age of *any* object composed of organic matter. Radiocarbon dating works because all living things take in small amounts of radioactive Carbon-14. Upon a plant's or animal's death, the C-14 begins to decay at a fixed rate. Determining the level of radioactivity in the organism's remains will therefore indicate the amount of time elapsed since death, be it 500 years or three million. Sensitive instruments to do exactly this were soon developed.

As much as any science, archaeology has advanced during the postwar era on the wings of technology. The invention of the aqualung by Jacques Cousteau and Émile Gagnan in 1943 opened up underwater exploration. Aerial photography emerged from World War II in a state of high readiness. During the 1950s, development of the proton magnetometer made it possible to detect underground magnetic anomalies—often an indication that objects of interest lie below. As the archaeologist's tools improved—both in the field and in the laboratory—he could devote more time to interpretation, less (though still a lot) to tedious chores.

At the same time, there were more archaeologists to share the work. In the United States during the 1930s, many young people had gravitated to the profession as a result of depression-era "make-work" excavations sponsored by the Works Projects Administration. James A. Ford, noted for his work on the Indian cultures of the southeastern United States, was one of literally hundreds of archaeologists who received their training courtesy of the New Deal.

It was this generation and the one that followed that, during the 1950s and '60s, led the intellectual revolution that brought forth the "new archaeology." Moving away from the *description* of cultural history, they focused increasingly on studying the *process* of cultural adaptation. Traditional field techniques were refined, new methodologies introduced. When and how did farming begin, the new archaeologists wanted to know. How and why did settlements, villages, and cities develop?

These are important questions, and it may be decades before we have solid answers. In the meantime, we should not forget what an achievement the (still unfinished) task of "mere" description has been. Scarcely two centuries ago, mankind had little idea of history before the Greeks or beyond the Mediterranean world. "All that is really known of the ancient state of Britain is contained in a few pages," Samuel Johnson once contended. "We know no more than what old writers have told us." Of the 21 great civilizations identified by Arnold Toynbee in his *Study of History* (1934–61), most were totally unknown in Dr. Johnson's time. Today, they are all known in considerable, sometimes intimate, detail. At least in general outline, and for a period of several million years, the course of man's history on the planet is now plain. Mysteries and imponderables remain, but gone is the myth that what is unknown about the past must be forever unknowable.