THE 'NEW' ARCHAEOLOGY

by Don S. Rice

Archaeology as a scientific discipline has undergone a series of radical changes during the past 30 years in both its intellectual orientation and its methods—giving us the "new archaeology."

What is the new archaeology? It is not, really, a coherent intellectual movement, but at its heart lies the desire of archaeologists to contribute to the general body of social-science *theory* regarding the nature of human behavior and the processes of cultural evolution. When and how did man evolve and become "human"? What led to the development of agriculture and sedentary settlements? How do social inequality and social complexity come about? What accounts for civilization?

Above all, "new" archaeologists wish to explain *why* past events took place rather than simply demonstrate that they did.

Critics of the new archaeology ("that precious and prissy phrase," in the words of Cambridge University's Glyn Daniel, perhaps the doyen of the "old" archaeology) have argued that archaeologists should remain primarily the handmaidens of historical inquiry and cultural chronology. Daniel has complained—with justice—that the new archaeology is "bedevilled by jargon and by people who, apparently unable to speak and write in clear English, use such phrases as the 'logico-deductive-evolutionary systems paradigm.'" Proponents of the new archaeology, most of whom have training in anthropology, counter that the traditional approach amounts to little more than the narrow, unscientific reconstruction of the past.

There exists, of course, a middle ground in this debate. Six years ago, David Hurst Thomas, of the American Museum of Natural History, conducted an informal poll of 640 archaeologists across the country. His question was simple: Are you a new archaeologist, a traditional archaeologist, or something else? The response to the survey was illuminating. Roughly 20 percent of those polled called themselves "new," another 20 percent called themselves "traditional," and the remainder, a large majority, called themselves something else entirely. The "something else" ranged from the whimsical ("new fogey") to the deadly serious ("diachronic anthropologist").

Such results suggest that most "mainstream" archaeologists

regard the distinction between new and old archaeology as either irrelevant or an oversimplification. At the same time, many of the methods and ideas subsumed under the imprecise rubric "new archaeology" have entered the mainstream. One may argue over terminology, but the transformation is real enough.

Lewis R. Binford, now at the University of New Mexico, is widely acknowledged to be the father of the new archaeology. With "Archaeology as Anthropology," an essay published in 1962, Binford emerged as the angry young man of his field, challenging colleagues to rethink their methods and their aims. He argued that the way in which archaeologists thought about data, method, and theory—their devotion in particular to "culture history" and the chronicling of its sequences—actually *prevented* them from developing a truly scientific understanding of the cultural processes that operated in past societies.

"Interpretive literature," Binford wrote, "abounds in such phrases as 'cultural stream' and in references to the 'flowing' of new cultural elements into a region." He questioned whether this "aquatic" view of cultural change really contributed anything to our understanding of human social dynamics.

Looking for 'Laws'

Binford urged a new approach. Instead of viewing culture as simply a collection of shared values, which regulate behavior within a society, why not look at culture as a means of human adaptation to both the natural and social environment? To be sure, typological differences among artifacts may—sometimes—help us to distinguish one culture from another. But too much effort had been lavished on making such distinctions. Culture, he pointed out, is itself an artifact of sorts, and its physical remains must be placed in context. Tools and figurines, for example, are not mere carriers of stylistic information: They tell us something about the physical environment (in the former case) and the social environment (in the latter). The collected technological, social, and ideological contexts of a society make up a cultural "system." Binford believed that, examined scientifically, the archaeological record would yield up nothing less than laws that governed cultural change, laws that could be tested and

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Archaeologist Indiana Jones prepares to make off with a priceless artifact in the film Raiders of the Lost Ark *(1981). Scholarly efforts today are focused less on retrieving antiquities, more on tracing cultural processes.*

proved with the evidence at hand, laws that (this being the 1960s) might even be relevant to contemporary society.

Binford was not the first to make some of these points. Walter W. Taylor, a young archaeologist educated at Harvard and Yale, had gone over much of the same ground in his controversial *Study of Archaeology* (1948), taking on the leading archaeologists of his day, most notably A. V. Kidder, who specialized in the Mayans and the Indians of the American Southwest. Kidder, Taylor charged, did not practice what he preached: He talked anthropology, but his archaeology remained descriptive cultural history. Taylor proceeded to lay out some of the essentials of what would become the new archaeology.

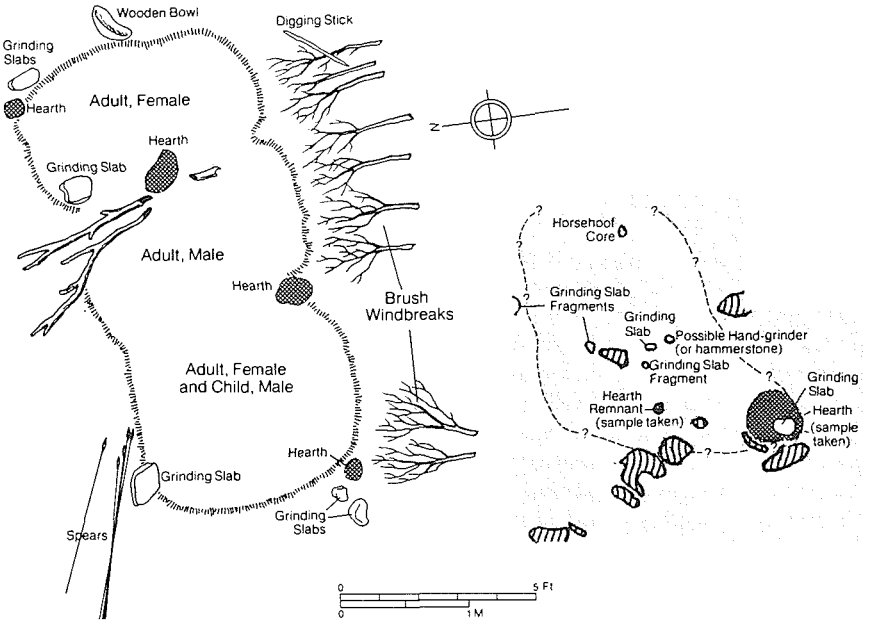
Taylor's arguments created a stir but not a revolution. Why? One reason was his polemical style—he needlessly irritated his colleagues. There was also a matter of status. Taylor was barely out of graduate school and had no body of published work to his name. But just as important was the timing. Taylor's study appeared before the advent of certain key innovations in archaeological method and technique, innovations that, once accepted, would pave the way for Binford's work.

One of these was the development of "settlement archaeology." Even as Taylor began putting pen to paper, another young archaeologist, Gordon R. Willey, was conducting the first settlement survey in Peru's coastal Virú Valley—looking, as he put it, at "the way in which man disposed himself over the landscape on which he lived." Prior to the 1940s, archaeologists had focused primarily on large individual sites such as Chichén Itzá, in Mexico, and Mohenjo-daro, in Pakistan. Willey shifted his attention not only to smaller, more poorly preserved sites but also to a whole group of them—more than 300 altogether. Classifying the sites functionally (e.g., as cemeteries, pyramids, fields, fortifications, dwellings, dumps), he sought to establish how, over a period of 1,500 years, they related both to one another and to the natural environment. It is now difficult to believe that this sort of thing had not been done before, but it had not.

Ecofacts

Settlement archaeology stimulated new interest in ecological studies—a field pioneered during the 1920s and '30s by cultural anthropologist Julian Steward, who studied the seasonal movements of the aboriginal Shoshoni among four ecological zones in the North American Great Basin. From an ecological perspective, culture is seen as the way in which humans adapt to an environment. Cultural change results from alterations in the adaptive relationship—as it did, for example, in pre-Columbian Mexico when, to compensate for the deleterious consequences of slash-and-burn agriculture, the Mayans began tilling fields they built up from the swampland. To understand how the environment is both used and influenced by humans, ecological archaeologists began to gather "ecofacts," analyzing soil and water chemistry, taking inventories of the remains of microfauna and microflora, looking at climate, geology, topography, and other aspects of the ecosystem.

A third key innovation was the introduction of radiocarbon dating, giving archaeologists at last a means of gauging (roughly) the *absolute*, rather than merely the relative, age of artifacts. Radiocarbon dating solved some long-standing enigmas but led as well to surprising reversals in archaeological thinking. For example, from the days of V. Gordon Childe (1892–1957), the brilliant British prehistorian, archaeologists had believed that the skills of metallurgy and megalithic architecture were spread to Europe from a "cradle" of civilization in the Near East. In fact, as Southampton University's Colin Renfrew now made clear, the megalithic structures of Spain,



Diagrams compare distribution of material remains at modern Australian aborigine campsite (left) and prehistoric site. By analogy with living societies, ethnoarchaeologists infer past patterns of human behavior.

France, and Britain were older than their supposed prototypes in the eastern Mediterranean. Stonehenge, to take one instance, was older than the citadel at Mycenae. Western Europe, it appeared, had developed independently.

Radiocarbon dating and even newer chronometric methods have finally given archaeologists control over time, transforming chronology from an end in itself into a tool of research. "It can no longer be the archaeologist's ultimate ambition to make chronologic charts of cultures," observed social anthropologist Frederik Barth in 1950. "The only way the archaeologist can contribute to the general field of anthropology is by asking questions of *why*, for which a general framework is needed."

Lewis Binford provided that framework in a series of papers published throughout the 1960s. He built on many of the methodological advances of the previous decades. Binford's most important message was that archaeologists must look at culture as the behavior of people doing things within a cultural *system*. This behavior left behind artifacts. The task of the archaeologist

was to infer the dynamics of human behavior from the distribution of static artifacts—tools, dwellings, bones—in time and space. Taking a lesson from the natural sciences, Binford urged the use of new techniques, including statistical analysis and computer modeling, to evaluate data and test hypotheses.

He put his methods on the line, choosing to tackle a thorny problem in archaeology—what he called the "challenge of the Mousterian." The main premise of traditional archaeology was that a variation in types of artifacts found at a site reflected a variation in cultures. If one looked at a stratigraphic sequence of, say, stone hand axes and observed that the upper strata contained types of hand axes different from those of the middle strata, and the middle different types from the lower, then it followed that several different cultures had occupied the same site at different times. The late François Bordes, one of the most eminent prehistorians of his day, believed this very situation to have been the case in Europe and the Near East during the so-called Mousterian period, which began roughly 130,000 years ago and ended around 30,000 B.C.

Bordes classified four basic types of Mousterian artifact assemblages, or "tool kits," each characterized by a distinctive variety of stone implements mixed in distinctive proportions. He discovered that, over many thousands of years, the various types of tool kits on a given site kept alternating with one another in layers of strata and that the patterns of alternation differed from one site to another. What could this mean? Bordes reasonably inferred the existence of various "tribes" of Mousterian folk who occupied (and reoccupied) common sites at different times.

Feedback Loops

Binford was not satisfied with this explanation. Using factor analysis, a statistical method long employed by psychologists to study human behavior, and an IBM 7090 computer, Binford demonstrated that the variation in assemblage types found by Bordes at different levels or at different sites reflected not ethnic differences but *functional* differences. Had the site been a "base camp"? Had it later been used for butchering? For preparing food? At the same time, Binford sought to relate tool kit variability to "adaptive readjustments" occasioned by changes in climate (as revealed by pollen) and in the availability of game (as revealed by animal bones). Binford saw the archaeological record as the product of a whole ecosystem, of which man was merely one component—"a culture-bearing component, to be sure, but one whose behavor is rationally deter-

mined." To understand the behavior, one had to understand the system. The system was the solution.

This simple, but powerful, concept was avidly seized upon by archaeologists. It was given its most expansive treatment by the late David Clarke in his monumental *Analytical Archaeology* (1968), which drew on disciplines as diverse as geography, cybernetics, and general systems theory. Hoping to introduce "powerful new methods into our analytical armoury," Clarke described cultural systems as aggregates of distinct subsystems (e.g., social, political, economic, environmental) that are integrated by positive and negative feedback loops. By creating models and analyzing how changes in any one subsystem might ultimately affect all of the others, archaeologists, Clarke argued, could gain insight into the stability and resilience (or lack of it) of any cultural system.

Coping with Debris

One classic example of the systems perspective in use comes from the work of the University of Michigan's Kent Flannery. In an important study published a decade and a half ago, Flannery demonstrated how genetic changes in wild maize (*Zea mays*) and beans, beginning roughly 7,000 years ago in Mexico's Tehuacán Valley, could have made sedentary agriculture more attractive than hunting and gathering. Based on archaeological evidence, Flannery described five nomadic "procurement systems"—for maguey, cactus fruit, mesquite, wild grass, white-tailed deer, cottontail, and water fowl—each of which was "regulated" by the seasons and the need to schedule competing activities. Flannery then factored in the effect of a sudden "kick" to this system when, thanks to accidental hybridization, the size of a corn cob and the number of kernels it held began steadily to increase. Gathering—and then cultivating—maize gradually crowded out other activities, becoming "the most profitable single subsistence activity in Mesoamerica."

Given the nature of systems analysis, and the work of Binford on the Mousterian, it was not long before computers began to play a major role in archaeology. Archaeologists had been using simple statistics for years; only after computers became widely available could they routinely exploit sophisticated methods such as multidimensional scaling, cluster analysis, discriminant analysis, and a plethora of other techniques. The computer gave researchers, for the first time, the capacity to explore problems with many variables and large amounts of data. In a 1978 review of the uses of statistical methods in archaeology, published in *American Antiquity*,

THE CANNIBAL DEBATE

In scholarship as in journalism, perhaps the most common sins are those of omission. In archaeology, they usually take one of two forms. The first is classic and direct: failure to see what is in front of one's eyes. The other is more subtle: failure to give sufficient thought to what is *not* in front of one's eyes. I was recently reminded of the second when I set the thesis of cultural anthropologist William Arens's controversial *The Man-Eating Myth* (1979) against the archaeological evidence on cannibalism.

Arens's position is simple: Despite a massive literature on the topic, cannibalism has actually occurred infrequently in human history, and almost never does it appear to have been customary. This rather startling conclusion is based on two findings. One is that there are few credible eyewitness accounts. The other is that people, as Arens demonstrates, have often called other people "cannibals" in order to make themselves look more civilized and their actions more righteous.

Have there really been so few cannibals in man's past as Arens claims? As far as archaeology is concerned, the answer is to be found not in sifting unreliable testimony for contradictions but in "kitchen middens," in the scraps left behind from meals.

For example, at the base and back of the human skull lies the occipital bone. In the fossil skulls of our earliest ancestors—*Australopithecus* and *Homo erectus*—the occipital bones are often badly damaged or missing. In fact, almost no intact hominid occipitals are found until the late Pleistocene, just over 100,000 years ago. Is this evidence that people commonly ate human brains? For some archaeologists it is. Others point out that the occipital is a rather fragile bone and is likely to be broken by natural causes—by the pressures of soil creep, by roof falls, by the jaws of large carnivores.

Since there are no detailed descriptions of cannibal feasts, it is not easy for archaeologists to decide what plate scrapings should look like. There are, of course, a few characteristic traces for which archaeologists watch on human bones—burning, cutting, cracking, splintering—but these traces can also be caused by cremation, weathering, and so on. Archaeologists usually assume that the larger the number of these traces in a single set of bones, the more valid the inference of cannibalism. If a case of cannibalism can be established in a society, a second more important question arises: Does the material at hand represent only an isolated case or was the practice common?

Both aspects of cannibalism—presence and frequency—can sometimes be established. During the 1970s, Arizona State University archaeologist Christy Turner and some colleagues reported on two sets of bones from different sites in the southwestern United States, one

set involving some 30 men, women, and children taken prisoner in a legendary raid by one group of Hopi Indians against another in about A.D. 1700, the other involving 11 individuals killed 800 years earlier. He determined that cannibalism had occurred in both instances. Skeletons had been dismembered, brains had been exposed, the bones were fresh when broken. A great many were charred. Both cases, Turner also concluded, seem to have been isolated events.

The most notorious of ancient "cannibals" are the Aztecs (opposite). Spanish eyewitnesses, notably Bernal Diaz, who accompanied Hernando Cortés, made no bones about it: The Aztecs sacrificed a slew of people. But were the victims eaten? The *conquistadors* usually mentioned cannibalism in their memoirs, although none claimed to have witnessed the practice. Some anthropologists believe that sacrificial victims were a protein source that tided the Aztecs over crop failures and other hard times. If this was the case, Tenochtitlán, the Aztec capital, must have been built on mounds of mutilated human bones. Mexican archaeologist Eduardo Matos Moctezuma has been digging into Tenochtitlán's Great Temple and finding stacks of intact skulls, monstrous carvings of fantastic creatures, and stone implements of sacrifice. What he has *not* found are bones marked by cannibalism.

Currently, the only evidence for customary cannibalism of which I am aware comes from four Algonquin Indian sites (A.D. 1300–1650) excavated by the University of Toledo's David Stothers in northern Ohio and southern Michigan. It is interesting that the Algonquins, like the Aztecs, were newcomers to already occupied territory. In such cases, the eating of captives could have been seen by the locals as a powerful argument for giving the interlopers plenty of breathing room.

These pieces of the cannibal controversy lead me to two conclusions. First, the debate underlines the value of physical evidence. Archaeologists such as Turner and Stothers provide Arens with the only evidence of cannibalism in a past society that he cannot refute or call into question. More importantly, there are very few cases, such as Stothers's, where customary cannibalism can be documented. Even cases for the *isolated* occurrence of cannibalism are rare.

Second, there is a lesson in the fact that archaeologists did not arrive at Arens's conclusion long ago. Arens had to expend considerable effort probing unsubstantiated rumors and questionable sources to find the naked truth. For archaeologists, it should have been so much easier. But with all their hard evidence (or in this case, lack of it), we failed to suspect the possibility that accusations of cannibalism were fraudulent. The reason may well be that we do not normally see what is not there.

The penance for this sin is to keep one eye on what is there and the other eye on what is missing—it takes both to learn lessons from the objects we excavate.

—William L. Rathje

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archaeologist David H. Thomas noted that "archaeology's single greatest problem is coping with the magnitude of debris that has accumulated as a result of human occupation over the last couple of million years." Statistical methods and the computer have helped archaeologists to cope.

Yet on this score, as on others, the picture is not unrelievedly rosy. With one key exception—the shift in emphasis from cultural *history* to cultural *process*—the changes that have overtaken archaeology in recent decades have been methodological; they are fundamentally new ways of obtaining important kinds of data. But they also display certain drawbacks.

Telling a Better Story

An environmental perspective, for example, is important, indeed necessary, in archaeology—but it may overemphasize the material world, deflecting attention from social, religious, economic, political, even psychological factors. As for systems analysis, some critics believe that because it must focus on *aggregate* behavior, human decision-making at the group or even individual level is given short shrift. Other critics argue that systems analysis places too much emphasis on cultural equilibrium, too little on the processes of cultural change. Rather than looking at societies over time, the temptation is to see how subsystems interact at a given instant. Such manipulations may be elaborate, even fun. But do they really tell us anything?

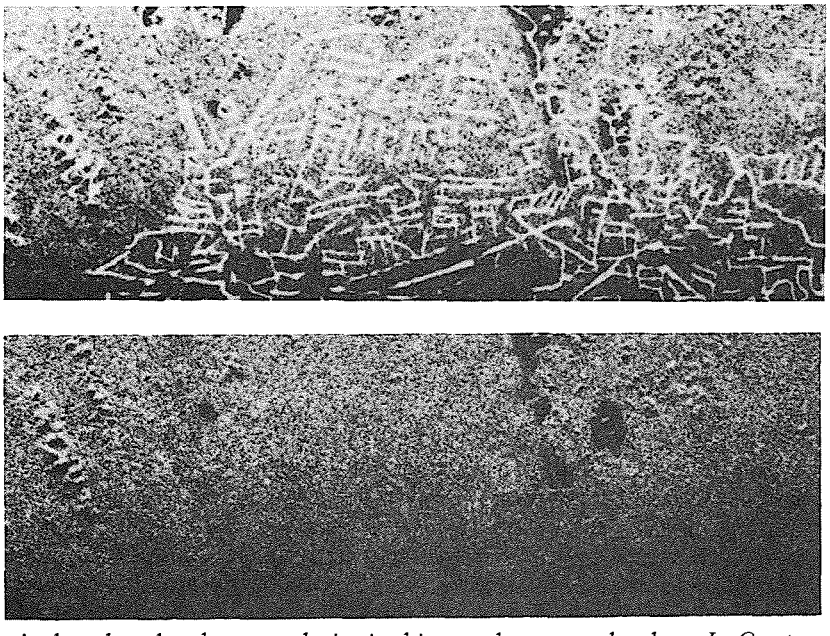
The problems with statistics are even more pervasive. Many archaeologists, unfamiliar with quantitative analysis, were ill-prepared to deal with the new mathematical techniques being pressed into service—but felt compelled to jump on the bandwagon anyway. In his 1978 study, Thomas classified recently published archaeological research papers according to how well the authors had used statistical methods. He came up with three categories: "the good" (designating proper use), "the bad" (misuse), and "the ugly" (outright abuse). The "bad" and the "ugly" constituted a majority of the published papers. While the situation is improving, there are still some lingering questions about what role statistics should play in archaeology. Some scholars worry that what archaeologist James Deetz once called "sterile methodological virtuosity" has become an end in itself.

Increasingly, archaeologists are coming to realize that, in fact, better methods alone will not answer every question, that major new breakthroughs in our understanding of the past await a rethinking of our *concepts*. Gordon R. Willey and Jeremy A. Sabloff pointed out in 1980 that, yes, after almost two

decades of the new archaeology, the material evidence "could be made to tell a better story than it had done previously—better in a behavioral sense and in the sense of providing a richer context of past life." That is, archaeologists have become more adept at describing—at reconstructing—the past; more adept, in a word, at the "old" archaeology. But they have not done very well in formulating what Binford called "laws of cultural dynamics," in contributing a body of theory to social science. What *kinds* of conditions cause what *kinds* of cultural change?

The gap between our data, on the one hand, and answers to some big questions, on the other, remains vast.

Binford has drawn attention to the problem—and to a possible solution: lowering our sights. He has called for the development of a body of "middle-range" or "bridging" theory—a set of basic, building-block propositions that link the static archaeological record that exists in the present with the dynamic behavior of the past that created it, propositions that can be tested empirically and that might eventually be incorporated into broader theory. Before asking Why did it happen? Binford cautioned, we need to know What does it mean? and What was it



Archaeology has been revolutionized in part by new technology. In Guatemala, radar survey (top) revealed what aerial photo (bottom) could not: a network of Mayan irrigation canals, dug between A.D. *250 and 900.*

like? Examples of middle-range theory would include the answers to questions such as: What determines the form of a house? What patterns of hunter-gatherer social organization lead to the patterning of camp activities we find in the archaeological record?

The quest for such middle-range propositions has only just begun. They may come through "actualistic" research—by actually observing how material objects find their way into the archaeological record, through breakage, loss, and discard. Two types of actualistic research have become important to contemporary archaeology: ethnoarchaeology and experimental archaeology.

Moving toward Realism

Ethnoarchaeology is the ethnographic study, from an archaeological perspective, of a living cultural system. Ethnographers, of course, have been studying human societies for some time, but in general, they have failed to observe the dynamics of material culture in a manner informative to an archaeologist. Archaeologists such as Richard Gould of Brown University have thus found themselves in the wilds of the Australian outback watching today's aborigines making wooden spears or bowls.

In the Australian case, spears are made in batches, when suitable trees are found. The act of making a spear often takes place at the source of the wood and not back at the camp. What tool is used to make the spear depends on a complex set of circumstances. Sometimes a man may have left his hafted stone ax behind and will make a scraping tool from whatever is at hand. He may be lucky and scavenge a lost adz from a habitation site. In other circumstances, he may be forced to use stone of inferior quality; the tool that results will bear little resemblance to the preferred stone adz. Each of these acts has an effect on the archaeological record, sometimes additive, sometimes subtractive. Information like this is important. One cannot properly interpret the archaeological record until one knows how it was formed.

Experimental studies involve attempts to *replicate* aspects of past behavior. Some archaeologists have taught themselves the art of "flintknapping" both to determine how tools were made and what kinds of debris various tool-making technologies leave behind. Others, beginning with Sergei Semenov, a Soviet, have focused less on how tools were manufactured than on how they were employed. Lawrence Keeley, of the University of Illinois, has demonstrated that, under the right conditions, it is possible to distinguish the traces of wear left on stone tools that have been used, variously, on bone, hide, wood, and meat. His

experimental studies have stimulated large numbers of young archaeologists to take up "wear analysis," butchering sheep, goats, cattle, and even elephants with Stone Age tools. In Denmark, experimental archaeologists have built replicas of Iron Age villages—and then burned them down to observe patterns of collapse and attrition.

The chief drawback of both experimental archaeology and ethnoarchaeology is that analogy is a fragile form of proof. There may be more than one way to make an arrowhead; the technique chosen by the archaeologist may not be the one employed by a Neanderthal flintknapper. For reasons that may not even be guessed, the behavior of primitive peoples in the 20th century may differ significantly from that of their distant ancestors. Still, archaeologists have to start somewhere.

Archaeology in 1985 has not really come full circle, but the "revolution" in archaeology was a revolution in more senses than one. Having modified their research orientations and methods, archaeologists have come to realize—once again—that what really needs work is something more basic. How does one conceptualize human behavior in archaeological terms? Developing middle-range theory is going to take time; it will involve false starts and dead ends. It may itself be a dead end. In the main, archaeologists today remain ambitious for their profession, confident that someday it will reveal important truths about how the world works. But they have acquired a more realistic notion of how quickly that knowledge can be had. And they understand that the *means* to that end are still subject to debate.

This is a healthy turn of events. Let us hope that it is not also irrelevant. The fact is, archaeology faces challenges of a more fundamental variety. Looting and construction destroy thousands of archaeological sites every year. More and more countries around the world have declared themselves off limits to foreign archaeologists—or are simply unsafe. And money for archaeological research is drying up, a victim of recession and government cutbacks.

These are serious, crippling problems of which the general public is almost entirely unaware. Yet they can gravely diminish what all of us come to know about man's evolution and his long struggle to survive and prosper.