

Archaeology and the Future

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The emergence of archaeology as a scientific discipline is one of the great intellectual triumphs of the twentieth century. In 1900, only a handful of professional archaeologists studied the human past, most of them working in Europe and southwestern Asia. The discipline has expanded dramatically in recent years. For example, even a quarter century ago, there were less than a dozen archaeologists in the whole of sub-Saharan Africa. Now there are over a hundred in South Africa alone and close to 10,000 professionals worldwide. A century ago, people considered archaeology a harmless pursuit. Archaeologists were pith-helmeted, eccentric professors peering at mysterious inscriptions in the shadow of ancient pyramids. They were romantic figures, given to adventure in exotic lands, their image stemming from the romantic discoveries of lost civilizations by Victorian adventurers. The Indiana Jones movies of recent years show how the stereotype dies hard, when, in fact, archaeology has become a complex, multidisciplinary science, the only way we have of explaining human cultural, and, to some extent, biological change over enormously long periods of time.

Our early twentieth-century predecessors like Egyptologist Flinders Petrie and prehistorian Henri Breuil gazed back at an open-ended landscape of the remote human past, peopled with only a handful of cultures, human fossils, and early civilizations. There were the Neanderthals, the controversial *Homo erectus* from Java, and the even more enigmatic Pilt-down skull from Southern Britain. Most scholars believed humanity was no more than 100,000 years old. Even when I was an undergraduate in the late 1950s, human antiquity stood at a mere 200,000 years. Breuil and his colleagues believed agriculture began only 6,000 years ago, that the first civilizations developed a thousand years later, and then only in southwestern Asia and the Nile Valley. Everyone assumed that humanity,

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agriculture, and civilization developed in either Europe or what is now called the Fertile Crescent between the Nile and Mesopotamia. Archaeology was ethnocentric, immature, and of marginal use except as a mild curiosity.

The revolution in archaeology began between the world wars, and accelerated in the late 1940s and 1950s. The discovery of the potential of pollen analysis for environmental reconstruction, the development of radiocarbon dating, the routine use of the computer, and new, non-intrusive ways of studying archaeological sites - all played a part in turning a mere pastime into the rigorous science of the late twentieth century. At the same time, new bodies of archaeological theory promise sophisticated explanations of ancient human behaviour and culture change. But the greatest change of all, and the one with overwhelming potential for the future, came with the development of a truly global archaeology in the 1960s that spanned the entire world and the full time span of the human past, from our origins over two-and-a-half million years ago up to the study of the Industrial Revolution and the garbage of our own society.

World archaeology stemmed directly from the invention of radiocarbon and potassium argon dating as ways of establishing a chronology for early human prehistory. The new methods allowed archaeologists not only to date such major developments as the beginnings of agriculture in all parts of the world, but also to compare such improvements in widely separated areas, and to measure rates of cultural change. Intellectually, world archaeology stemmed from the brilliant vision of Cambridge University prehistorian Grahame Clark, who trained a generation of archaeologists to work, not just in Europe and southwest Asia, but in all parts of the world in the 1960s. In 1961, he wrote his seminal *World Prehistory*, the first comprehensive account of the prehistory of humankind. Clark's *tour-de-force* set the stage for a new approach to the human past just as the massive expansion of the social sciences and higher education in general fueled a quantum growth in archaeology as a serious academic discipline.

Nearly half a century after Clark's pioneering synthesis, archaeology is at a crossroads. Highly specialized, methodologically and theoretically sophisticated, and truly global, archaeology is finally realizing its true potential as a source of precise information about the human past, and as a vital tool for humanity in the twenty-first century. We were once practitioners of what one archaeologist once cynically but accurately called "the science of rubbish." In 1998, we are a barometer of the past and future, also stewards of a remote past that is vanishing rapidly in all corners of the

world. Yet, our dramatic scientific progress is distracted by a growing concern that archaeology as we know it is destined for extinction. Archaeological sites, the priceless and unique archive of ancient human achievement, are finite resources. Once disturbed, they are gone for ever. So far, archaeologists have had little success in stemming the inexorable destruction of our universal cultural heritage. The effectiveness of archaeology as a tool for the future rests on our ability to save the past for the twenty-first and future millennia to enjoy-and on our ability to educate people in the importance of the past as a way of looking ahead into unknown decades and centuries.

The success of archaeology is all-too-often measured by its dramatic discoveries - the tomb of Tutankhamun, the Lords of Sipan in Peru, or the spectacular cave art in the Grotte de Chauvet, France. But few people realize its real success comes from the light it throws on important issues for the future.

Human Origins

When Victorian biologist Thomas Huxley proclaimed we humans were descended from apes in 1860, respectable families shuddered with Christian fervor. Charles Darwin's theory of evolution and natural selection challenged the literal historical truth of the Old Testament and laid the foundations of today's complex theories of early human evolution. Astoundingly, over 40% of Americans are said still to believe in the story of the Creation as told in Genesis chapter 1, despite more than a century of scientific investigations into human origins.

During the twentieth century, archaeology has proved conclusively that Darwin was correct when he stated that humans probably originated in Africa. Thanks to the discoveries of the Leakey family and others, we now know that the first tool making humans flourished in eastern and southern Africa at least 2.5 million years ago and that there was a far greater variability of hominids on the African savanna than was once suspected. The past quarter century have witnessed a minor revolution in our perceptions of early human behavior. We have moved away from the notion of "man the hunter" and "woman the gatherer" to more sophisticated formulations that perceive early human behavior as more ape-like than human.

The discoveries of the past half century are just a beginning. During the twenty-first century, we will gain a much fuller understanding of the full

variability of early humans and of their ancestry among as yet unidentified, and at present theoretical, ancestors of both humans and chimpanzees. We will learn a great deal more about early human cognitive abilities, about the differences between hominid, ape, and modern human behavior from a new generation of multidisciplinary researches, of which archaeology will be just a part.

These advances, and the excavation of many new fossil-bearing sites, will come as part of the logical progress of science. But from the futur-ological point of view, by far the most important lessons will revolve around the issue of our common ancestry yet emerging behavioral and cultural diversity from the very first moment that the human line separated from that of our closest modern primate relatives, the chimpanzees.

Understanding, and living with, human biological and cultural diversity is an overwhelming issue for the twenty-first century. Archaeology will show us with no uncertain voice that we are all descended from common African roots, that our creation came as a result of powerful, and still little understood, evolutionary forces. At the same time, we will gain remarkable insights into common traits of human behavior, many of which we consider to be of relatively modern origin.

A full appreciation of our ultimate common biological and cultural origins in Africa is fundamental to any understanding of our great diversity. By the year 3,000 we will have an extremely complete knowledge of our ancestry.

Modern Human Diversity

One of the great controversies of late twentieth century archaeology and human genetics surrounds the origins of modern humans - ourselves. Did we evolve in one general location and spread from there to every corner of the globe? Or did modern humans evolve quite independently in several parts of the Old World over 100,000 years ago? As the twentieth century draws to a close, most scientists believe that our ancestors evolved from earlier, more archaic humans in tropical Africa some 200,000 to 150,000 years ago, then moved across the Sahara into southwest Asia by 100,000 years before present. Then our ancestors migrated throughout the Old World and eventually into the Americas during the late Ice Age and immediately thereafter.

This now widely accepted scenario implies not only that we are descended from what evolutionary biologist Stephen J. Gould calls "a com-

mon evolutionary twig," but that the roots of modern-day biological and cultural diversity are very recent by evolutionary standards. We live in a world which tends to emphasize biological and cultural differences rather than similarities. Bigotry and racism are still commonplace on every side, largely because of ignorance, and because people are afraid of other folk who are "different."

The origins of racism are easy to discern, as they go back to the racist, evolutionary doctrines of racial superiority, which fueled colonial settlement during the nineteenth and early twentieth century. Such theories have long been discredited in academic circles, but still persist in the popular mind, largely because recent archaeological and genetic discoveries remain almost unknown to a wider audience. This makes recent, and still-to-be-made, archaeological discoveries of critical importance to the world of the future, as a weapon for combating racism and ignorance, for teaching that biological and cultural diversity disguise our essential "sameness," our ancestry from a common African twig a mere 150,000 years ago. Archaeology will bring home a vital lesson for all of us: that the roots of our diverse modern world lie deep in the past and result from different environmental challenges and diverse solutions to many common problems faced by humankind again and again - hunger, social inequality, and population growth, to mention only a few.

Every society on earth has its own world view, its notion of the cosmos in which it flourishes. Western society uses science to reconstruct the human past; many non-Western societies have entirely different visions of their ancestry, of the passage of time, of life and death. Until today's global world of instant communication, we often thought of a world within and a world without, exotic, little known, and dangerous, often peopled by hostile people and animals. We have a profound fear of the unknown, of "them," people who live in other lands, elsewhere. This usually irrational fear comes from ignorance and from deeply set notions that biological and cultural diversity are often synonymous within comprehension and hostility. We cannot afford such illogical fears in the world of the future. Again, archaeology is a powerful weapon in demolishing stereotypes, for understanding the forces of history that have forged and changed the modern world. Archaeology is about diversity, about understanding the biological and cultural processes that created human diversity thousands of years before the European Age of Discovery and doctrines of racial inequality forged artificial chasms within humanity.

Written history spans a mere 5,000 years in southwest Asia, much shorter periods of time elsewhere. These mere five millennia are but the final chapter in the story of human diversity. In its fuller maturity of the next millennium, world archaeology will write a compelling story of how early humanity evolved and created the underpinnings of the historical world. This scientific tale of creation and emerging human diversity must be one of the foundations of all history taught to future generations.

Environmental Change

Fifteen thousand years ago, the world was in the deep-freeze of the late Ice Age. Enormous ice sheets covered northern North America and mantled Scandinavia. World sea levels were 90 meters lower than today. The submerged continent of Beringia linked Alaska and Siberia. Only some 80 kilometers of open water separated mainland southeast Asia and its of flying islands from New Guinea and Australia. Britain was part of continental Europe. The last Ice Age was one of many cold snaps that have descended on earth during the last 700,000 years. For more than three quarters of that time, the world has been in transition from warm to cold and back again. Invariably, the warming process has proceeded with lightning speed by geological standards, as it did after 15,000 years ago. Within four thousand years, the great ice sheets of the north had shrunk to a fraction of their former size, sea levels were rising, the Americans were no long erpart of Asia. Then, suddenly, the cold returned 11,000 years ago and endured for a millennium before warming resumed. This was the moment when farming began in distant southwestern Asia.

No one knows exactly why this sudden cold snap came out of nowhere. One plausible theory blames the massive flow of fresh water from melting glaciers into the northern North Atlantic. The fresh water blanketed the Labrador and Greenland Seas, where the salt water brought by the warm North Atlantic Current sinks to the bottom. The down welling ceased abruptly, the flow of warm water toward Europe and the north slowed down. Intense cold descended in the north as glaciers advanced again. But this time, there were enough people living on earth that some of them were forced to cultivate the soil to feed growing hunter-gatherer populations. An intriguing idea, but one as yet untested by scientific research.

From the earliest times, human societies have adapted to constant local and global climatic change, to glacial episodes, interglacials, massive

global warming, and to the constant fluctuations of the tropical Southern Oscillation, which brings the El Nino to the Peruvian coast, drought to Africa and Australia, and frequent monsoon failures to India. A vast amount of human experience is locked up in the past-strategies for irrigating dry lands, decision making processes used by centralized societies to mitigate famine and catastrophic floods, a myriad of strategies for dealing with climatic change. A revolution in paleoclimatology promises a new era in archaeological research which, one day, may allow us, for example, to study patterns of El Nino episodes over many centuries, even millennia, and to study the teleconnections between such events as the cold snap of 11,000 years ago and the beginnings of agriculture.

We live in a warm interval between glacial events. Inevitably, temperature curves will cool again and plunge us into another Ice Age. This time, the stakes for humanity will be infinitely higher, for millions of people live off the intensive agriculture of Europe and North America and cluster in enormous cities. Judging from earlier millennia, the cooling will be gradual, giving us, perhaps, time to adjust to a new economic and political world, where power shifts southward. Or will it? A generation of studies of global weather link the Gulf Stream and North Atlantic Current with cycles of warmer and colder weather in Europe, with down welling cycles in northern seas. What would happen if humanly induced global warming melted glaciers and dumped their freshwater into the ocean? Would 11,000 years ago repeat itself? Would millions of people in Europe and North America perish from starvation? At least some insights can come from a proper understanding of non-industrial peoples' reactions to sudden climatic change in the past. The next ten centuries will also bring a much greater understanding of the global conveyor belt in the oceans which plays a major role in long- and short-term climatic change.

Archaeology is at its most effective when studying human societies in the contexts of their changing environments. A century of research has produced an enormous body of information about the ways in which ancient human societies adjusted to drought and increased rainfall. Now we are acquiring a new generation of information that links changes in ancient societies not only to local environmental change, but to all-powerful global teleconnections that changed history.

Within a few decades, we will have learned a great deal about how climate change affects human societies over many centuries in a world where global warming from fossil fuels and other human activities was unknown. The environmentalists of tomorrow will learn a great deal from the lessons of the remote past.

Archaeology and Subsistence

Archaeology studies the ancient, pre-industrial world, where people obtained their food and made their living using methods learned deep in prehistory. Whether foragers or farmers, they knew their environments intimately, were aware of the minutest habits of game animals, of the subtle medicinal and poisonous uses of plants of every kind imaginable. Ancient farmers often used slash and burn methods, rotating their crops and fields as they cleared new land. The same simple farming systems are still commonplace in the non-Western world, yet we know little about the intricate cultural and environmental dynamics that are in play in such societies.

We know more about intensified agricultural production. Mesopotamians, Egyptians, Aztecs, Chinese, and Inca: all were experts on irrigation agriculture which relied not on high technology farming but on labor-intensive methods that sometimes produce remarkably high crop yields year after year, in seasons of plentiful rainfall and drought. One of archaeology's great scientific contributions of this century has been to develop fine-grained recovery methods that allow the study of ancient agricultural systems, whether simple or complex. Yet the knowledge gained from such research rarely reaches the headlines.

In Bolivia and Peru, for example, the ancient farmers of Tiwanaku and Lake Titicaca built thousands of acres of highly effective raised and irrigated fields for growing potatoes on the high altitude *altiplano*. Frost-resistant and high yielding, these field systems supported thousands of farmers and one of the greatest of Andean states. The raised fields fell into disuse after a sustained drought 1,000 years ago. In recent years, teams of archaeologists have studied these ancient field systems, grown crops in replica fields, and taught hundreds of local villages how to develop similar plots - in an era when millions of acres of the *altiplano* are being given over to industrial-scale agriculture, while village farmers go hungry.

Our industrial civilization has pursued the new at the expense of the old, favored elaborate development schemes and high technology agriculture at the expense of simple, low technology approaches to cultivating the soil which worked successfully in the past and, as the Bolivian example shows, could work very well in the future. I am convinced that archaeology has the potential to provide vital information about low technology farming for the world of tomorrow.

A century ago, much of the world still fed itself by subsistence agriculture, using methods developed in ancient times and often honed over many centuries, even millennia. In the twenty-first century, a burgeoning world population will not be able to rely on industrial economies to support everyone on earth. Traditional farming and self-sustaining agriculture will become of priceless importance. In the earlier twentieth century, anthropologists working among surviving non-Western peoples acquired a great deal of information about traditional agriculture, as did colonial agricultural departments in Africa and other continents. In the next ten centuries, only archaeology will be able to reconstruct such farming methods, calling on increasingly rare surviving oral and written information from traditional sources.

Cycles of Civilization

As the great German statesman Otto von Bismarck remarked over a century ago, we all live on a stream of time, which flows on inexorably, taking us toward our fate. Archaeology gives us the long perspective, the ability to gaze backward not just at the mere 5,000 years of written history, at Egypt, Mesopotamia, and the Mayans, but at the full panoply of human diversity, and at long-forgotten societies which came into being, prospered, then faded into historical oblivion. It is easy to become obsessed with cycles of rise and fall, especially in an era when the future looms menacingly, hinting at catastrophe, famine, and nuclear destruction. But the fact remains that we have much to learn from the successes and failures of the societies of the past, whether simple or complex, successful or unsuccessful. Many of the ingredients which shape our world were present in early Sumer or ancient Egypt: the evils of famine and despotism, militarism, urban crowding, the threat of epidemics, intolerance of others, and, above all, institutionalized social inequality. Informed hindsight is a powerful weapon for studying the future.

Archaeologists have been trying to explain the rise of civilization and of individual states for more than a century, but have only recently turned their attention to the dynamics of collapse. We can argue that the lessons of the pre-industrial world are hardly relevant to the industrial one of the present and future, but to do this ignores a fundamental reality—that human beings, for all their cultural differences think and behave in much the same way. In the next century, we will search frantically for precedents, for insights into why despotic regimes fail and military solutions do not necessarily work, for ways in which people have responded to sudden

climatic change, to the perils of drought and flood when they do not have an industrial infrastructure to support them. We have forgotten that most of the world's people still live on the margins of, or outside, industrial civilization. Yet the lessons of this world stare us in the face from the past—the dangers of putting too many economic eggs in one basket, of too strongly centralized, despotic government which breaks down easily under stress, the wisdom of diversifying potato species to prevent epidemics of blight and other conditions, or dispersing cattle to prevent the spread of disease and minimize the effects of drought.

It is a truism to say that the past offers precedents for the future, but tomorrow we will need every precedent and fragment of insightful hindsight we can find. The future looms like threatening, uncharted waters, and, indeed, in many respects it is, simply because industrial civilization is out of control. Never have we needed the lessons learned by ancient societies for studying the future. In the final analysis, a knowledge of the remote and not-so-remote past gives us not only lessons for the future at a practical level, but also a quiet confidence that we will survive and prevail. If there is one lesson that the study of the past teaches us, it is self-understanding, and a need to learn from our forebears, so we avoid mistakes such as those that caused Maya civilization to collapse and the Roman empire to implode.

The study of the past in an era when the future threatens may seem like an oxymoron, but the precedent of rise and collapse, of the past, is the only one we have. The world we live in and will live in the future is the product of history and human diversity. We cannot shape the future without a far more detailed understanding of the past, for it is dangerous, indeed stupid, to assume that today's world is setting entirely new rules for studying the future. We may deny it, but all human societies are, in part, a product of historical forces. Hindsight is vital for a proper study of the future.

Cultural Heritage

Humanity has many pasts, some reconstructed with documents and the archaeologist's spade, others carefully preserved in legend, myth, and oral tradition, still others a matter of religious faith. Herein lies one of the great challenges of human diversity — preserving cultural heritage for the future. Archaeologists are fond of talking about the "common cultural heritage of humankind" — the Parthenon, Stonehenge, the city of

Teotihuacan, Mexico. Heritage tourism is now a highly competitive international business. Entire nations depend heavily on the past to support their economies. We all talk about cultural heritage, but it is rarely taught in schools, nor does preservation of the past take centerstage in many countries.

Cultural heritage defies universal definition. It is something intensely personal, of concern to communities, cities, ethnic groups, and entire nations. Governments and rulers use the past to manipulate the present, exploit it for political and economic advantage. But they rarely cherish it in a meaningful way, or make preservation of the past, tangible or intangible, a priority for the future.

We live and breathe from our cultural heritage, it is the essence of our individual and collective being. Yet there is no sense of urgency to bring this most vital of sources of human and cultural identity to the very center of our lives. Archaeology has discovered much about the brilliant achievements of our forebears, not just about architectural masterpieces or great treasures, but about the day-to-day, the mundane, and the simple, about humble, anonymous folk living out their lives in the shadow of great events, laughing, loving, interacting, quarreling, and surviving. We still do the same today, yet the anonymous and increasingly global world of tomorrow may cast aside cultural heritage as irrelevant to an increasingly complex humanity. I believe that an understanding of, and proper appreciation for, cultural heritage, individual and communal, Western and non-Western, will be a cornerstone for the world of the future. Archaeology is one of the vital catalysts for bringing cultural heritage to the center of our lives, as a source of identity, inspiration, and precedent.

We cannot understand the future, or live it, without a clear and analytical knowledge of our past. The scientific triumph that is archaeology offers hope for achieving such a more profound understanding, for maximizing the value of sophisticated hindsight.

