

Human Antiquity and the Old Stone Age: The Nineteenth Century Background to Paleoanthropology

JAMES SACKETT

Paleoanthropology's deepest roots are grounded in an intellectual revolution that took place in the middle third of the last century in Northwestern Europe. This was the realization by scientists in France and Britain that the human past extends back into the deep time of geological history and that this past can be given shape in terms of the vast body of archaeological data referable to what we call today the Paleolithic, or Old Stone Age. In his introduction to *The Descent of Man* (1871), Charles Darwin hailed this revolution as the "indispensable basis" for understanding human origins. Especially because it came to a head in 1859, the year *The Origin of Species* was published, scholars often assume that the revolution was an outgrowth of the major scientific trends that informed Darwin's own thought. They point, for example, to the replacement in geology of the supposedly old catastrophism by the supposedly new uniformitarianism and to the development of an evolutionary perspective in biology. But

modern research, as exemplified by Donald Grayson's *The Establishment of Human Antiquity*,¹ shows it did not happen that way. For one thing, while it is true that the men who brought about the revolution were mostly geologists and paleontologists, the expectations they shared about when and how mankind would find expression in the geological record largely cross-cut party lines. Only some of them believed mankind actually had an evolutionary past, and many others believed that thinking about evolution only got in the way of thinking about human antiquity.

The revolution was not, in short, simply the logical outcome of what we today regard as the major scientific trends of those times. To many of those who brought it about, it actually came as a surprise, and not necessarily a welcome one. Over the course of some 30 years before 1859, the year when the scientific establishment officially accepted human antiquity, there had been accumulating a body of evidence that a modern paleoanthropologist would view as sufficient proof of our ancient Stone Age past. But it seemed far from compelling to most scientists who considered it at the time, whose knowledge of the relevant geological and archaeological records was, of course, much sketchier than our own. Equally important, their empirical expectations were quite different, as they worked within an intellectual frame that differed from ours in its views not only of earth history but of human nature and of man's place in nature. This frame had much to do with theology, particularly in England. But even there, as

in the rest of Northwestern Europe, it was more a matter of intellectual convention than conviction, which probably made it all the more compelling.

ANTIQUARIAN BACKGROUND

In 1800 John Frere published illustrations of two hand-axes (Fig. 1) he had recovered from a brickyard clay pit at Hoxne in Suffolk.² Today we realize he had come upon a lacustrine Acheulian site that makes a good British counterpart to those his great-great-granddaughter Mary Leakey was to excavate at Olduvai Gorge a century and a half later. Frere wrote that the hand-axes appeared alongside giant bones (which he does not identify), that they were "fabricated and used by people who had not the use of metals," and that he was tempted to refer them to a remote period, "even beyond that of the present world."²

We are not sure what he had in mind. Some antiquaries, as the archaeologists of his day were called, spurred by knowledge of New World Indians and popular speculation about a primitive state of humanity, seemingly envisaged an ancient world of hunting and gathering and stone tools that to us suggests something along the lines of the Paleolithic. Probably, however, Frere's notions of ancient times, like those of most of his contemporaries, were still largely framed by the Book of Genesis. This was not necessarily because it was believed to be divinely inspired but rather because it was the oldest written account known to Europeans of his day, who by habit of thought could

James Sackett, Professor emeritus of Anthropology at the University of California, Los Angeles, directs the European Laboratory of the Cotsen Institute of Archaeology at UCLA. For several decades he periodically conducted archaeological fieldwork in the Perigord region of southwestern France, which included excavation of the vast open-air late Old Stone Age station of Solvieux. Apart from the Paleolithic, Sackett's interests include the history of archaeology and the play of style in material culture.

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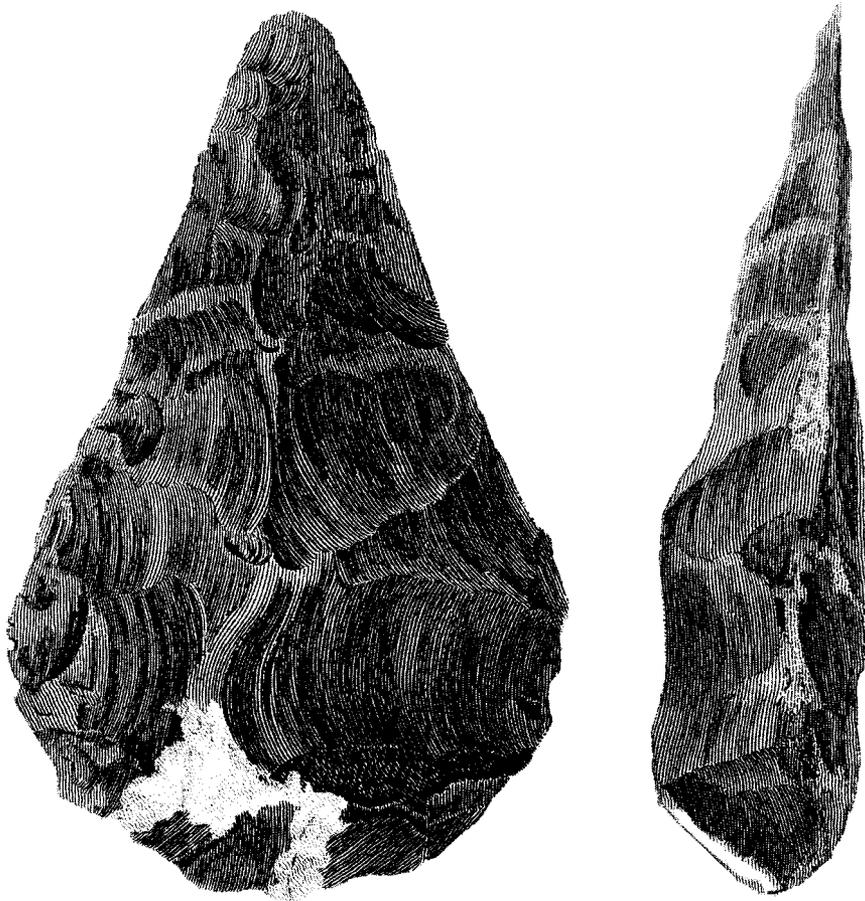


Figure 1. One of the two hand-axes depicted in John Frere's 1800 account² of the Acheulian site of Hoxne, Suffolk, which he was tempted to refer to a remote time "even beyond that of the present world."

only approach the human past by way of the written record. And according to the Mosaic account (Genesis was believed to have been penned by Moses), human history began only half a dozen millennia ago. And hunting and gathering could originally have played little part in it, for Adam was required to begin tilling the soil as soon as he was expelled from the Garden of Eden. Possibly in Frere's mind the makers of the hand-axes were not members of some pre-Adamite race but instead, like the ancestors of modern savages, simply unfortunates who had lost the art of working metal in the degeneration that afflicted much of humankind following the devastating Deluge of Noah's time.

Frere in any event seems to have been ignored by his fellow antiquaries in Britain and France, most of whom were preoccupied with building col-

lections gathered from more recent cemeteries and surface monuments, like megaliths and barrow tombs, that dated to the Neolithic and subsequent prehistoric periods. The antiquaries often observed, described, and illustrated with great skill. But in the end, their fine collections yielded very little culture history; they were unable to make much more sense of their own discoveries from later prehistoric times than they could have made of those which Frere had retrieved from a much more remote past.

Their problem was twofold. First, as we noted, the only history they could imagine had somehow to be linked with recorded history, as a consequence of which they insisted upon peopling the few millennia that separated the Roman occupation of France and Britain from the Biblical beginning of the world with tribes and

nations mentioned in written records. Earlier antiquaries had filled this gap with Noah's descendants or Trojans fleeing the destruction of their city. But by the nineteenth century, opinion had shifted in favor of the ancestors of the Celtic-speaking Gauls and Britons who had confronted the Romans. The notion of a rich Celtic past appealed to nationalistic sentiment and allowed some room for drawing ethnographic parallels from the natives whom Europeans had in turn encountered in North America. Yet even this did little to help penetrate the fog, as antiquaries themselves called it, that enveloped prehistoric times. The second problem was that their inability to realize the potential inherent in archaeological data extended even to organizing the archaeological record itself. They failed, in other words, to grasp the fact that monuments and artifacts tend to cluster by kind in different times and places, and that, once segregated, these clusters can be ordered into schemes that at least sketch the outlines of culture history. As a result, even where it was not hidden by fog, prehistory seemed to them rather like an undifferentiated and directionless jumble of archaeological odds and ends.

When Paleolithic archaeology finally began taking shape as an organized field of research in France and Britain in the 1860s, it was in fact firmly grounded in an antiquarian tradition. This was, however, a brand of scientific antiquarianism which developed in Scandinavia and from which the French and British had long held themselves surprisingly aloof. Yet the actual discovery of the Old Stone Age, as opposed to its realization by archaeology, had little if anything to do with this tradition; it did not result, in other words, from antiquaries successfully pushing their knowledge of culture history ever more deeply back into prehistoric times. (The Scandinavians could have accomplished this but, thanks to the rigor and glaciation of Pleistocene times, they had no Paleolithic record to work with.) Instead, the enterprise fell by default to geology: discovering the Paleolithic became a matter of empirically demonstrating that human remains and artifacts could be found in association

with the remains of extinct animals belonging to the deep time of earth history. While the job entailed working in what we today regard as archaeological contexts, only those who were geologically well-informed were equipped to do it. Their interests, of course, differed significantly from those of the antiquarians, and they were even less inclined by outlook or historic imagination to envisage a Paleolithic past for mankind.

GEOLOGICAL BACKGROUND

Frere did not, and probably could not, identify the giant bones found alongside his hand-axes, nor could he have been vaguer about what it meant to refer them to a remote period even beyond the present world. Little could be said or done along these lines until what we call the Pleistocene geological epoch became recognized by scientists. While it only became known by this name late in the last century, it began to take on recognizable form in the minds of geologists within a decade after Frere's speculation, thanks to pioneer geological and paleontological work in the stone quarries of the Paris Basin. This work led to George Cuvier's great monograph, *Reserches sur les Ossemens Fossiles du Quadrupèdes*, which appeared in 1812 and subsequently went through several editions.

According to Cuvier (1769–1832), the earth has passed through a series of revolutions whose successive landscapes and plant and animal life progressively approached the form they assume in the modern world. Though progressive, earth history was still discontinuous. Its major stages were discrete from one another, created and in turn destroyed by what came to be known as geological "catastrophies" in which the processes of change acted with greater force and abruptness than they do today. The last stage in this succession is the Quaternary, which at least in Europe subdivides into two phases. The later of these equates with what we call the Holocene or Recent, and sees the establishment of a fully modern earth whose natural history includes humankind itself. The earlier stage, more or less the equivalent of our Pleistocene, is represented geologically by various

superficial gravel features on the earth's surface such as glacial moraines and river terraces, along with caves and loess soils that contain remains of the same animals. This earlier fauna is more archaic than the recent fauna, as it includes several species of large quadrupeds that, at least in Europe, are now extinct: woolly mammoth, hairy rhinoceros, cave bear, cave lion, reindeer, steppe bison, cave hyena, and many others.

Cuvier's inundation was not a universal flood like Noah's Deluge. In fact, he thought it possible that the up-to-date suite of animals which appeared in the up-to-date landscape of Europe following the inundation could have come from some more dis-

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tant region that had been modern in form since the beginning of the Quaternary. But in Europe itself, he insisted, the two phases were discontinuous. Most importantly, contrary to the transformationist views of his colleague Jean-Baptiste Lamarck (1744–1829), animal species unique to, and hence diagnostic of, the earlier phase, like mammoths and cave bears, were extinguished at its end rather than somehow evolving into modern species of elephants and bears. Furthermore, even though they conceivably inhabited some other part of the world in earlier Quaternary times, human beings appeared in Europe only after the inundation. For, like other

animals, we are perfectly adapted to our environment, and our proper environment is the thoroughly modern one that only appeared in recent times. Insistence upon human recency also served to defuse Lamarck's claim that some of the modern quadrupeds are in reality archaic ones that had been domesticated before the inundation—a claim that obviates the complementary elements of extinction and discontinuity basic to Cuvier's catastrophic brand of earth history.

It was Cuvier's Quaternary that became the empirical frame in which human antiquity was argued in the earlier nineteenth century. If our skeletal remains or artifacts are to be referred to a remote period beyond that of the present world, then they must be found stratigraphically associated with the fossil remains of the extinct quadrupeds which characterize Pleistocene geologic features. Cuvier did not think this likely. Most of his colleagues and immediate successors regarded it as an impossibility. Here again the reason was the Mosaic account of the creation, which tended by and large to condition the thought of earth scientists even more than that of the antiquarians. Many geologists believed Genesis to be divinely inspired, many others at least regarded it as reliable history, and even those who belonged to neither of these factions still mostly agreed with its basic premise—that humans somehow stand apart from the rest of nature and that the modern world was the stage on which they made their appearance. Not surprisingly, by the way, few scientists in an age which accepted such views could give a sympathetic hearing to Lamarck's claim that humans are the descendants of an anciently transformed orangutan.

While Cuvier was quick to point out that flood stories can be found in many ancient traditions, his inundation inevitably became associated in many people's minds with the Biblical Deluge. This raised some challenging questions of absolute and relative chronology for an age that preferred to see geology harmonize with Genesis. Thanks to the great eighteenth century naturalist Georges Buffon (1707–1788), well before Cuvier's time

informed people had grown accustomed to regarding the first 5 days of the Biblical account of the creation as referring allegorically to geological epochs that took a hundred thousand years or more to unfold. But the Mosaic chronology was still taken literally when it came to the sixth day, that is, when humankind supposedly appeared on a fully modern earth. Scholarly calculations had long agreed that this took place about 6,000 years ago, and the Deluge of Noah some 1,700 years later. We have seen that people in the early nineteenth century did not find this chronology unreasonable. Antiquaries in Northwestern Europe found it convenient, in fact, to assume that Genesis covered human history in the Near East back to the creation itself, around 4000 BC, and that their own prehistoric period began with the dispersion of mankind after the Deluge around, say, 2300 BC.

That Cuvier dated his Pleistocene inundation to some 5,000 or 6,000 years ago was close enough for it to be equated with the Deluge. The Pleistocene gravel features soon became known as “diluvium,” and the preceding period whose fauna was partly extinguished by the flood that deposited the gravels became the “antediluvium.” This equation in fact created a troubling contradiction, since Genesis chronicles nearly 1,700 years of human history before the Flood, whereas Cuvier’s fully modern world, presumably created expressly to receive humankind, came into being only after it. The problem was resolved around 1830 when both the English and French came to recognize that the geological features Cuvier originally attributed to a single, fairly recent inundation actually represent a complex succession of events that began much further back in time. The words diluvium and diluvial continued to be used, however, but now with reference to both those features and their diagnostic extinct animals. By 1840, diluvium was replaced by the term “drift” in England, in the belief that superficial gravel features like moraines and river terraces had in fact been deposited by great icebergs during successive marine transgressions. The French, however, continued to refer to the diluvium even after

1850, by which time most geologists in both countries had embraced the glacial theory. To add to the confusion, usage dictated that the term antediluvial, formerly applied to the fossil animals, now mostly referred to human remains or artifacts that were thought to be contemporary with them.

At this point, the great Charles Lyell (1797–1875) needs introduction. Due to Lyell’s profound influence upon Darwin, it has often been assumed that his doctrine of uniformitarianism as it was promulgated in successive editions of *The Principles of Geology* (beginning in 1830) was the seedbed for the great revolutions of 1859. Lyell’s contribution to earth history was indeed profound, but this was not the form it took. For one thing, very many

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scientists continued until late in the century to find one or another version of catastrophism more congenial to their work. They believed they saw its rhythms and discontinuities clearly reflected in the geological record, which they equally believed represented a succession of worlds that progressively approached our own. The notion of catastrophism, however, was as alien to Lyell as the former. For, while his steady-state earth underwent continual change, it showed little direction and never really progressed. He was, in short, no evolutionist, and it has been said that his major objection to catastrophism was in fact that its inherent progres-

sionism could, in the wrong hands, lead to evolutionism. One needed to look no further than the small but influential school of Lamarckians in France, whose transformism posed a constant challenge to Cuvier’s notions of fixed species. Their geological gradualism also contrasted with Cuvier’s discontinuous geological stages, of course, but even in this they were hardly uniformitarian, given that their earth history retained much of the tempo and mode of the catastrophic one.

In any event, no matter what their disagreements in other domains, Lyell stood solidly with the catastrophists on the issues of human origins and antiquity. He could not, like the Lamarckians, “go the full orang,” as he liked to say. He was by no means an Evangelical Christian like so many of his British colleagues, but he shared the common view that the dignity of humankind calls for a “high genealogy.” Human intellectual and moral qualities, transcendent and yet ever-capable of improvement, set us apart from other animals. Our appearance must have constituted a break in the natural order of things, and could have taken place only once a benevolent providence had prepared the fully modern, post-Pleistocene world to receive us. Thus Lyell’s views on human nature and the human past conformed with the received scientific opinion of his day, and the events of 1859 appear to have taken him as much by surprise as anyone else. That he played such an important role in the revolution was due not to any ideas or data he contributed to it directly but rather because of his ability to face unwelcome facts and his standing in the world as the spokesman for earth science.

NATURE OF THE EVIDENCE

We now turn to the empirical data available to the scientists who found themselves wrestling with the problem of human antiquity. Apart from filling out the picture, this should help explain why events unfolded the way they did. How the nineteenth century approached the antiquity issue can be viewed as a history of ideas which dictated what scientists chose to see and chose to ignore. But it is also a history

of the confrontation between the scientists and an empirical reality whose nature shaped events as much as the ideas did.

Contrary to the expectations of the researchers, who usually thought like paleontologists, human skeletal material was to play only a very minor role. It was rare and fragmentary, and little of it in any case suggested a primitive human counterpart to the extinct quadrupeds found in the diluvium. Empirical reality instead consisted almost exclusively of artifactual material belonging to Pleistocene geological contexts, in other words, what we refer to today as the Paleolithic archaeological record. This largely concentrates in France (of which Britain in Pleistocene times was simply a northern, often unoccupied, appendage), and takes many forms. Like everyone else, Paleolithic people mostly lived and worked outdoors, and hence it is possible to discover intact sites in the open. But this calls for skills and knowledge that were not cultivated until after World War II. The bulk of the open-air Paleolithic, moreover, was incorporated long ago into the plow zone, where it is found indiscriminately mixed with stone tools, potsherds, broken tile, and other debris dating from Neolithic to modern times. To nineteenth century eyes, therefore, it was no more than an undifferentiated part of the archaeological background noise. The Paleolithic record they could see, at least potentially, took three other and quite different forms: stream gravel terraces, rock shelters, and bone caves.

Stream terraces are step-like formations of gravel and other water-laid sediments that rise along river flood plains (Fig. 2). They are the product of alternating cycles of stream deposition and downcutting, tied in with the changes in temperature and humidity that produced the glacial and interglacial stages of "Ice Age" Europe. Much archaeological material, mostly dating to Acheulian times, became incorporated into the terraces during the course of their buildup, representing both local riverbank occupation and archaeological debris locally redeposited in piecemeal fashion from older sites eroded out upstream. The immediate sedimentological context of

COUPE DU TERRAIN DE MENGECOURT PRÈS ABBEVILLE

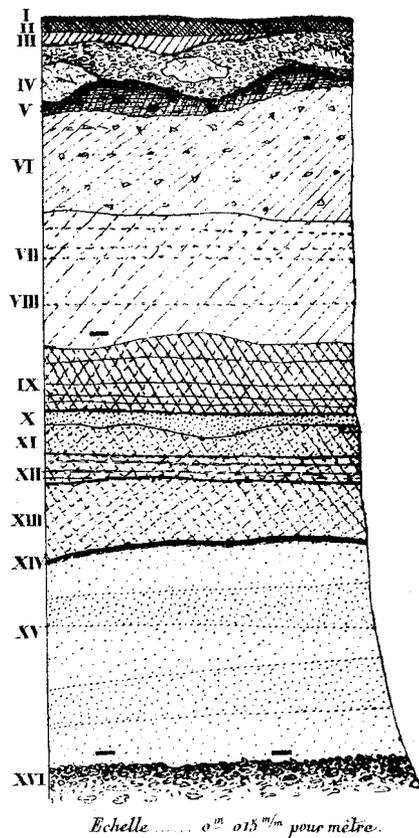


Figure 2. Stratigraphic profile published by Boucher de Perthes in 1847³ of a gravel terrace of the Somme River exposed in a gravel pit at Abbeville in Picardy. Black bars indicate where artifacts had been found.

stream terrace archaeology usually reflects a complex mixture of deposition, erosion, and freeze-thaw phenomena, and only rarely do intact occupation floors seem to have survived that are comparable to those being found today in open-air sites dating to later Paleolithic times. But the broader stratigraphy that encloses terrace archaeology can be deep and clear-cut, and it often provides fossil animal remains that can be correlated more or less successfully with the artifact-bearing zones. Thus, while terrace deposits shed little light upon Paleolithic lifeways, they do provide a useful if coarse-grained means for equating its earlier archaeological phases with the geological record.

A rock shelter is altogether different. It is a relatively large and deep cavity eroded into the face of limestone bedrock exposed along a valley

wall. Rock shelters provided fairly comfortable and dry shelter for human occupation in the Pleistocene, as indeed they do today, and consequently a succession of rich archaeological horizons of cultural debris often became incorporated into their geological infill in the course of its deposition. These horizons, which can number a score or more and occupy a stratigraphic section several meters thick, include not only quantities of stone tools and chipping debris, but also hearths and various stone features, abundant butchered animal re-

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mains, tools and art objects of bone and ivory, and even an occasional human burial. Epitomizing rock shelter archaeology are the 200 or so sites excavated in the Perigord region of Southwestern France, whose deposits constitute the frame of reference for Mousterian and Upper Paleolithic times in Western Europe.

Paleolithic archaeology centered upon rock shelters once it became a scientific discipline in the later nineteenth century. But they played no sig-

nificant part in the establishment of human antiquity, which had to come first. People in the earlier 1800s did not see rock shelters as we do, either in the landscape or in the archaeological mind's eye. Intact shelter deposits lie hidden under geological debris or modern occupation. And when they do come to light, their Paleolithic content largely consists of bones and flint industrial debris which look far from remarkable to the unpracticed eye. The animals only rarely include the more spectacular Pleistocene forms that typify Cuvier's diluvial period, but instead tend to be dominated by species of deer, horse, and cattle that in a heavily butchered state look very similar to their modern counterparts. And the stone tools, which only rarely include sculptured forms like hand-axes, are no different from those that rural people encounter daily in the indiscriminate archaeological mix brought up by the plow. Thus rock shelters, regardless of their subsequent importance to Old Stone Age archaeology, were not the sort of thing to attract the interest of geologists or even most antiquaries before 1859. One noteworthy exception was François Jouannet (1765–1845), who early in the century dug in the Perigord's rock shelters and, with considerable insight, distinguished their Paleolithic chipped stone tool industry from the ground and polished forms he found nearby in open-air Neolithic stations. Jouannet remained true to an older tradition, however, in assuming that the two industries were more or less contemporary and in arguing that their makers were probably descendants of Noah's grandson, Gomer, who many antiquaries believed colonized Northwestern Europe following the Deluge.

A bone cave, finally, is quite different from either a stream terrace or a rock shelter. It is a real cave consisting of one or more tunnels or chambers dissolved within limestone bedrock by running water. Its deposits consist of poorly stratified clay and silt and sand, much of it washed in from the outside, which is often brecciated by calcium carbonate and sealed by flowstone or stalagmitic concretions. Cold, dark, and dank, bone caves were not conducive to human occupation,

and archaeological remains appear only occasionally except where a cave happens to join a rock shelter cavity that intercepted it in eroding inward from a cliff face. But because they often served as dens, were frequented by carnivores, and sometimes formed the bottom of natural traps descending from the overlying ground surface, such caves can incorporate rich deposits of animal bones in fairly good condition. Bone caves appear in much of Northwestern Europe and, while constituting the poorest choice archaeologically, were the sites that received the most attention during the first half of the nineteenth century. They were obvious, accessible, and eerily compelling, especially in an age when giant Pleistocene fauna like mammoths and cave bears held the attention of paleontologists the way dinosaurs were to claim it later on.

We are now ready to review those discoveries that led to the recognition of human antiquity by the scientific establishment. Our interest involves not the earlier discoveries, like John Frere's at Hoxne, which only assume importance in retrospect, but rather those made later, when the scientific environment was at least potentially receptive to their significance. They fall into three chronological groupings. The first comprises a series of discoveries made in bone caves in Britain, France, and Belgium in the 1820s and early 1830s. The second concerns finds made in river gravel terraces in northern France in the later 1830s and over the course of the 1840s. The third involves a flurry of activity and comings and goings in an English bone cave and, again, the French gravel terraces in 1858 and 1859, which resolved the immediate question of human antiquity and raised a host of new ones.

BONE CAVES

The dean of bone cave research in Britain was William Buckland (1784–1856), professor of mineralogy at Oxford University. Like many British geologists at the time, he was an ordained minister in an age when, at least among the upper and emerging middle classes, everyday life was permeated with evangelical Christianity. Buckland was one of those who made

geology a safe, and in fact highly popular, pursuit for such people by reframing Cuvier's catastrophism within the mold of British natural theology. The title of his most popular book sums it up well: *Reliquiae Diluvianae, or, Observations on the Organic Remains Contained in Caves, Fissures, and Diluvial Gravel, and on Other Geological Phenomena, Attesting the Action of an Universal Deluge* (1823). While largely a treatise on paleontology, the work helped establish the age's attitude toward the question of human antiquity in its account of the "Red Lady" which Buckland found amidst diluvial animal fossils in the Paviland bone cave, which overlooks the sea near Swansea in Wales. It was probably the burial of a young male, covered with ochre and the remains of an ivory necklace, and accompanied by Upper Paleolithic (probably Aurignacian) flint tools. Buckland claimed, however, that it represented a fairly recent intrusion: the existence of a nearby "British" camp that was probably occupied in or shortly before Roman times was sufficient to account for the lady's real date, as well as her character and motive for residence in the cave. Contemporary sources differ as to precisely what he thought the lady's character and motive might have been.

Excavations of much greater significance soon followed at Kent's Cavern, a bone cave on the coast of Devonshire near Torquay in southwestern England. It is a series of interconnected solution cavities whose floor deposits at many points contained rich and varied remains of diluvial fauna that sometimes appeared mixed with stone tools. Too much excavation conducted too carelessly has largely destroyed the cave's archaeology. But it seemingly comprised what must have been one of England's oldest Acheulian industries, an important Mousterian industry, and at least remnants attributable to two or more phases of the Upper Paleolithic. Their excavator was the Reverend John MacEnery (1796–1841), Roman Catholic chaplain to a local family, who came upon the stone artifacts while collecting paleontological specimens. We have noted that, as a rule, the bone cave explorers were not antiquarians,

and MacEnery may have been the first of them to realize clearly that stone tools are as good as skeletal remains in attesting to the human presence. In fact, he recognized, like Jouannet before him, that the chipped stone implements from Kent's Cavern differed from the ground and polished ones found in local Neolithic barrows. And he claimed for a while, apparently correctly, that their association with the diluvial fossils was real, since the cave deposits in which they appeared intermingled were sealed in by undisturbed travertine.

Had MacEnery moved quickly, he could have accommodated the stone tools to the Mosaic account, simply by attributing them to predecessors of Noah who happened to find their way to Europe before the Deluge. But he was overtaken by events. He had started his excavations in the aura of *Reliquiae Diluvianae*, but by the time he finished them most geologists, including Buckland himself, had uncoupled the diluvium from the Flood. Pleistocene fauna were now assigned to deep geologic time and, whether Genesis-driven or not, received opinion was consequently inhospitable to claims that human remains and artifacts could be found associated with them. Buckland in the meanwhile had argued vigorously that the stone tools must be intrusive, mixed with the faunal remains in the cave earth as the result of having penetrated the travertine through "ovens" dug by later human occupants. And how, in any case, could people have successfully competed for food with lions and bears, or shared their living quarters with hyenas? While specifically denying the presence of ovens, MacEnery either lost his nerve or changed his mind, for he began attributing the association between stone tools and animal bones to some sort of admixture produced by natural agencies. Ill health soon drained his strength and resolve, and public subscriptions failed to raise enough money to cover the cost of publishing his Kent's Cavern monograph, which would have retained much significance to paleontology and archaeology despite MacEnery's own diffident views.

Meanwhile, several bone caves were being excavated in southern France

by Marcel de Serres and his associates Jules de Christol and Paul Tournal. De Serres (1780–1862) was a professor of paleontology and mineralogy at Montpellier, de Christol (1802–1861) held a similar position at Dijon, and Tournal (1805–1872) was a pharmacist at the town of Narbonne in the southeastern corner of France. In a period of 6 years the three dug several caverns in different parts of the Midi and came up with the same conclusion: human remains and artifacts (apparently both Mousterian and, especially, Upper Paleolithic) were to be found stratigraphically associated with extinct diluvial fauna such as cave bear and hyena, rhinoceros, boar, and a variety of horses, deer, and cattle. It is interesting to watch them feel their

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way through their data and its implications in successive publications in the late 1820s, especially since they did not all end up in the same place. De Serres, who seems to have conducted or directed the paleontological work of all three of them, believed he saw signs of domestication in some of the extinct horses and cattle. And, being at the same time anxious to reconcile Genesis and geology, he concluded that the extinct animals must be far more recent than Cuvier had claimed, indeed well within the range of time allowed by the Mosaic chronology. Tournal and de Christol, on the other hand, believed the fauna to be ancient and claimed an antedilu-

vian presence for humans. That pottery appeared too did not surprise them, since—along with the signs of animal domestication (and, of course, extinction)—it simply attested to their belief that humans already possessed a somewhat advanced state of culture in diluvial times and had themselves helped bring about the modern world.

We today are likely to find the pottery something of a jolt, along with the neglect the southern French workers generally showed toward flint artifacts (Tournal at first actually seems to have thought them to be natural). Yet, while based on shaky archaeological grounds, their claim for a fairly commanding human presence in Pleistocene times turns out to have been closer to the truth than the common view of the day that humans would have been no match for the great diluvial beasts. And a modern mind finds itself quite at home in reading what is considered the culminating publication of the Midi group, Tournal's *Considérations Générales sur le Phénomène des Cavernes à Ossements* (1833). Here the Genesis-inspired geological idiom of his day is set aside entirely, and earth history divides into a succession of periods which flow into one another without catastrophic breaks: an Ancient Geological Period and a Modern Geological Period, the second being distinguished from the first by the human presence. The Modern period in turn subdivides into Ante-historic and Historic periods, the second of which beginning some seven millennia ago. All this, of course, seems to foreshadow the way we fit human culture history to the geological record today. But Tournal never followed up this promising beginning, and soon after abandoned the bone caves for other pursuits. He had reason to feel discouraged. The southern provincials had attracted much attention and, in fact, some help from members of the scientific elite in the Académie des Sciences at Paris. But the commission it appointed to evaluate the work of the Midi group not surprisingly answered in the negative. It was headed by Cuvier, who was no doubt disaffected by the group's claims for domesticated fossil animals and geological gradualism (both of which, of

course, were Lamarckian notions) and by the knowledge that rival Parisian scientists had prompted some of Tournal's writings.

Yet by then, most geologists and paleontologists agreed that, in any case, Cuvier's views of Pleistocene times and human recency were not seriously challenged by the bone cave evidence. It was simply not to be trusted. Following the lead of Jules Desnoyers (1800–1887), they believed that cave deposits lacked good stratigraphy or indeed any stratigraphy at all, that the limy encrustations that sealed them did not necessarily imply geological antiquity, and that their contents in any case were a jumbled mixture of material that had washed in, fallen down, and been carried in by animals; then too, the human bones and artifacts occasionally found with them could easily have intruded from occupations that took place long after the era of the fossil animals. Many or even most researchers would probably agree with such views today, while allowing that valuable intact archaeological deposits do sometimes appear in bone caves (as in Tournal's principal site, the Grotte de Bize) and while stressing that the mistrust of bone caves ought not to extend to rock shelters, which we have seen are something quite different. They would strongly disagree, however, with the second part of Desnoyer's argument, which was given much weight even by scientists of Lyell's stature. This is that the flint tools associated with extinct animals in the bone caves are no different from those that appear in familiar features of the archaeological landscape like barrows and dolmens. What this view overlooks is that evolution within prehistoric stone technology was more a matter of accumulation than of replacement. Chipped stone implements do in fact belong to both groups of sites, but ground and polished ones are to be found only in the second group, that is, dolmens and barrows. Jouannet and MacEnery had already grasped this, but it was the kind of antiquary's fact that geologists were not equipped to appreciate.

Belgium provides the saddest chapter of bone cave research. In 1829, the Liège physician Philippe-Charles Schmerling (1791–1836) noticed a quarryman's daughter playing with gi-

ant bones from a nearby cave. Enlightened by study of Cuvier's paleontology, and spurred by knowledge of the accomplishments of the Midi group, he undertook a prodigious program of excavations in some 40 bone caves in the region. By 1833, he had published a splendid monograph, and his collection of diluvial fossils had become well enough known to warrant a visit by Lyell. Buckland followed 2 years later. While paying tribute to Schmerling's paleontology, they each dismissed his claims for having come upon both stone tools and human remains stratigraphically commingled with the fossil fauna (among other things, Schmerling's collection included two skulls from the cave of Engis, one essentially modern and the

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other, highly fragmented, of a Neanderthal infant). The next year Schmerling died, his money along with his health having been exhausted by his science. The numerous copies of his monograph that remained unsold were bought by a grocer for use as wrapping paper.

THE GRAVEL TERRACES

Although far more prosaic than bone caves, river terraces exposed by gravel quarries provide with enhanced stratigraphic obviousness the opportunity to come upon human artifacts in association with the fossils of extinct animals. Suitable terrace deposits exist throughout much of France

and southern England, and it seems surprising in retrospect that they attracted so little interest in the mid-nineteenth century. The research we turn to now all took place in and around the town of Abbeville in Picardy, shortly upstream from where the Somme River enters the English Channel.

In 1847 appeared one of the more curious landmarks in the history of archaeology, *Antiquités Celtiques et Antédiluviennes*.³ Its author was Jacques Boucher de Perthes (1788–1868), the director of customs at Abbeville. He was also president of the local Société d'Emulation, an important feature of cultivated life in provincial France that brought together men interested in the arts, sciences, and history. Boucher de Perthes became to French Paleolithic archaeology what Heinrich Schliemann was to become to the Aegean Bronze Age, and was in his own way an equally fabulous character. Early on, in the days of the Empire, he had enjoyed a successful governmental career and some reputation as a man of letters, a vein he continued to mine through the less heady years that followed after a subsequent regime posted him to the Abbeville custom house. He produced a stream of poetry, political and social tracts, plays, works on metaphysics and history, and antiquarian topics, filling innumerable pamphlets and 69 heavy volumes. He would be forgotten today, however, were it not for the archaeological pursuits he only took up when he was into his sixth decade. Exactly how this came about is not altogether clear, as Boucher de Perthes frequently rewrote the story, alternately depicting himself in the contradictory roles of world-renowned savant and prophet in the wilderness.

In any event, it appears that by the late 1830s amateur geologists in Picardy came to realize that the Somme terraces exposed in gravel quarries and the nearby bog deposits exploited for peat were of different ages, referring respectively to diluvial (Pleistocene) and postdiluvial (Recent) times. At the same time, the local antiquary Casimir Picard (1806–1841), who was not unaware of Jouannet's work, clarified the differ-

ences in technology between chipped stone tools like the hand-axes found in the terraces and ground and polished ones recovered from the peat bogs. These findings were aired frequently at the Société d'Emulation and greatly impressed Boucher de Perthes, who threw himself into the enterprise sometime before Picard's untimely death. The 1847 edition of *Antiquités*³ which resulted from this work made three particularly great contributions. First, it discussed the nature of archaeological and geological stratigraphy with a sophistication to be seen rarely at the time outside Scandinavia (Fig. 2). Second, it demonstrated that the association between human artifacts and extinct animal fossils observed in the walls of quarries cut into stream terraces could not be attributed to intrusion or other disturbance. And, third, its antediluvian and Celtic periods, despite their old-fashioned names, clearly organized the geological and archaeological evidence into distinct Pleistocene-Paleolithic and Recent-Neolithic (and later prehistoric) phases.

Had he stated all this in a straightforward manner, Boucher de Perthes at least would have gained a fair hearing. Unfortunately, however, in a manner that clearly betrayed both an overactive imagination and his marginal position with respect to the scientific currents of his day, he presented these ideas within a framework of outdated notions and fantastic speculation that virtually guaranteed they would be rejected. For one thing, he adopted an extreme form of catastrophism. His antediluvian times were separated from the Celtic period by a complete break, during which the older world was totally annihilated and the later one wholly created anew. Thus, in his view, people of the present could have no connection with those of the past. In fact, Boucher de Perthes maintained that the world had seen a succession of even earlier races of men, each in turn destroyed to make way for the creation of those who followed. To compound the difficulties, while the bone cave researchers may have found too little, Boucher de Perthes found much too much. Several plates of *Antiquités* illustrate what he claimed were "figured" stones, some simply natural objects and others obvi-

ously stone tools and debitage, that allegedly depict all sorts of animals (including ducks and an equivalent of the modern happy face icon) and even hieroglyphics. The stone artifacts he actually identified as such, which include hand-axes presumably referable to the Acheulian, are very poorly illustrated and often characterized not as utilitarian implements but instead as symbolic items used for purposes of ritual, exchange, and trade.

Not surprisingly, an Académie des

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Sciences that had rejected the claims of bone cave researchers who were reputable paleontologists inevitably dismissed such stuff from a provincial antiquarian who wrote five-act plays and tracts on metaphysics. Then too, from the very beginning doubt surrounded Boucher de Perthes' empirical evidence. His accounts of his discoveries were not always internally consistent, and it was widely suspected (correctly) that the quarry

workers whom he paid for a large portion of the artifacts in his collections often defrauded him. In short, he was an enthusiast who was not to be trusted, and the result was that stream terrace research was given a bad name. The scientific establishment paid little attention when, in 1853, the sound amateur naturalist Marcel-Jérôme Rigollot (1786–1854) published a straightforward empirical account of his findings at gravel pits around Amiens, some 40 km upstream from Abbeville, including Saint-Acheul (ultimately the type-site for the Acheulian), which fully confirmed Boucher de Perthes' claims. It also largely ignored the revised edition of *Antiquités* that appeared in 1857, whose geology was now up-to-date but which unfortunately retained much of the panoply of figured stones and symbolic hand-axes. Had Boucher de Perthes not lived long, been a tenacious propagandist, and by chance received the visit of an English paleontologist at a crucial moment, he would at this point drop out of the story.

RESOLUTION

The decade falling between the appearance of the first edition of *Antiquités* and the events of 1859 was quiet, at least on the surface. While not going away altogether, the human antiquity question moved further to the background. Bone cave research on the Continent languished. The only key figure remaining from its heyday, Marcel de Serres, finally gave up trying to reconcile Genesis and geology, and announced in 1855 that the supposed associations found between human remains and fossil animals in the Midi bone caves were spurious after all. In England, serious claims for such associations were now being made by a few gentlemen-geologists like William Pengelly (1812–1894) and Robert Godwin-Austen (1808–1884), who had continued MacEnery's work at Kent's Cavern. They gained experience and respect as solid empirical researchers, which were to pay off before the decade was out, but they did not gain many converts. The gravel terraces fared no better. Rigollot, who could have made a difference, was dead. Pretty much isolated in his own country, Boucher de Perthes barraged England and North America

with tracts and hand-axes; but sober-minded scientists continued to dismiss him as a credulous enthusiast. Besides, Pleistocene river terraces were now receiving the close attention of first-rate geologists like Joseph Prestwich (1812–1896), who never came upon hand-axes even though the river gravels he explored in southern England had similar fossil animal bones and in Ice Age times had belonged to the same drainage system as the Somme.^{4,5}

Nor did Prestwich expect to find any. Technology may have transformed Northwestern Europe since the first volume of Lyell's *Principles* had appeared, yet habits of mind had changed little insofar as they concerned human nature and man's place in nature. The Bible continued to dominate everyday metaphor and the rhythms of public oratory for the educated middle class in England. And, ironically enough, though it had lost some of Genesis to geology, the Bible had otherwise gained even more credence as a historical document among enlightened people on both sides of the Channel, thanks to the great achievements of Near Eastern archaeology. The Louvre and the British Museum were filling with the riches of Biblical lands as well as of Egypt; cities like Nineveh and Ur-of-the-Chaldees, the home of Abraham, had passed from myth to archaeological reality; and the actual names of Assyrian figures like Sennacherib and kings of Judah like Hezekiah had been found in cuneiform inscriptions. Ironically too, at least from our perspective, the tide of evolutionary thought that flooded intellectual life in both England and France in the 1850s only served to reinforce a conservative, traditional attitude about the human past. In biology it more often than not took the form of a nebulous, divinely inspired progressionism almost assured to disaffect the sober researcher of solid everyday facts. In social and economic affairs it often meant the writings of Herbert Spencer or, worse, Karl Marx, to whom, it was believed, evolution automatically meant social change and disruption—of which the century had already seen much and feared more.

In any case, members of the social establishment of the mid-nineteenth

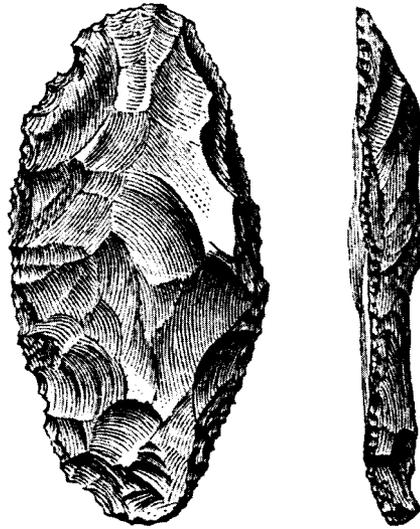


Figure 3. A chipped stone "knife" from Brixham Cave, Devon, one of the discoveries that challenged received opinion about human antiquity in 1859. It is illustrated in the official report on the site, which only appeared some years later.⁵

century largely maintained their grandparents' view that humankind was unique and that it was necessarily recent. Sharing this mindset, most scientists had no philosophical qualms about rejecting the claims occasionally made for human antiquity. Yet their cautious reaction to its partisans represented not simply their expectations but also a scientifically healthy commitment to rigorous empirical standards. The situation might change were the right facts to be seen by the right people.

The opportunity came in 1858, when quarrying revealed a virgin bone cave at Brixham, only a few miles from Torquay on the Devon coast. The infrastructure for a concerted effort at Brixham was already in place in the form of the Torquay Natural History Society and its prominent member, William Pengelly, a local schoolteacher and geologist whom we just saw honing his skills at nearby Kent's Cavern. Through the efforts of the distinguished Pleistocene paleontologist Hugh Falconer (1808–1865), a grant was made by the Geological Society of London for Pengelly to excavate Brixham Cave under the supervision of a committee that included, among others, Prestwich, Lyell, Falconer, the great comparative anatomist Richard

Owen (1804–1892), and Robert Godwin-Austen. The last was chosen, by the way, for his knowledge of regional geology and not because his work at Kent's Cavern had made him a proponent of human antiquity: the Brixham Cave project was undertaken strictly as a paleontological project designed to illuminate the nature and succession of Pleistocene faunal assemblages. No one mentioned human bones or artifacts.

Pengelly's methodical layer-by-layer excavation between the summers of 1858 and 1859 set new standards for care and precision in bone cave research. The deposits were rich in fossil remains, and by the end of the first 6 weeks alone some 1,500 bones were recovered of animals like rhinoceros, cave bear and hyena, and reindeer. Unexpectedly, worked flint also began to appear in the same stalagmitically sealed deposits. Despite its great significance, the flint remains something of a mystery. By the project's end, only 36 dispersed pieces had come to light, even though they supposedly include flake cores (which, of course, should have accounted for far more). Some of it was lost over the years, and its industry was never satisfactorily determined. Except for one possible hand-ax, all of the 15 undeniable artifacts were referred to as "knives" (Fig. 3); and, reflecting the state of English archaeology even at that late date, the ensemble was described as being "Keltic or pre-Keltic." Nonetheless, given the quality of the excavation techniques that recovered them, the worked flints were sufficient to have the needed impact. Pengelly and Godwin-Austen, of course, saw them as confirmation of their belief in human antiquity. The other committee members reacted with caution and some surprise. Owen suggested that perhaps the animals had after all become extinct only in geologically modern times; most of the others, like Prestwich, voiced the conventional mistrust of bone cave travertine deposits.

What could have been an impasse was averted when, while on his way to Paris in autumn 1858, Falconer visited Boucher de Perthes and viewed the finds from Abbeville and Amiens in the light of the Brixham Cave discoveries. The next several months saw the comings and goings of Prestwich, Godwin-

Austin, and Lyell himself, along with some newcomers to the enterprise such as the antiquarian John Flower (1807–1873) and the distinguished numismatist and stone artifact expert John Evans (1823–1908). Boucher de Perthes was, as always, cordial, opened up his collections to the visitors, and invited them to witness the work at the terrace quarries and dig there themselves. The British were gradually won over by their host's claims, the turning point coming when Prestwich and Evans were able to photograph a hand-ax in place in a fossil-bearing stratum at Saint-Acheul (Fig. 4). There followed what was obviously a concerted campaign of lectures and publications announcing the Brixham Cave committee's conversion. Lyell addressed the British Association for the Advancement of Science, Evans the Society of Antiquaries, Flower the Geological Society of London, and Pengelly the Royal Institution of Great Britain. In the most detailed and authoritative report of all, Prestwich addressed the Royal Society, giving particular symmetry to the occasion by retrieving from oblivion and displaying as corroborative evidence John Frere's hand-axes with which we began this story. The British scientific establishment had made up its mind.

How about the French? Of course they did not suddenly embrace the notion of human antiquity simply because a group of English gentlemen told them it happened to be true. But science was more international in spirit then, and Lyell's great reputation, along with the ease with which Prestwich (by profession a wine importer) moved in French circles, certainly helped smooth the way. The English impact was in any event as much political as it was intellectual, as they enjoyed more influence among the scientific establishment centered in the Académie at Paris than did the provincial French who actually undertook most of the field research. At any rate, although their efforts were momentarily obscured by political machinations within the Académie, many of the active players in the events of 1859 were in fact French.

Albert Gaudry, a distinguished paleontologist, and the naturalist Georges Pouchet both published reports of how they had visited Saint-Acheul and re-

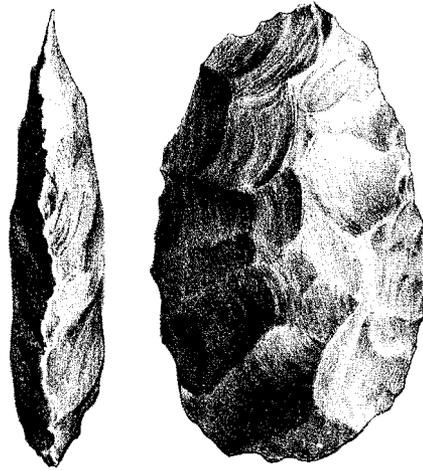


Figure 4. Hand-ax illustrated in Prestwich's 1861 account⁴ of archaeological discoveries in the gravel terraces of the Somme River, which signalled the acceptance of human antiquity by the scientific establishment.

covered hand-axes themselves. Desnoyers, who some 25 years before had written the definitive statement rejecting the bone cave evidence, came and was converted. The group of scientists now vindicating Boucher de Perthes included at least a few who probably had accepted human antiquity well before 1859. Prominent among them were the zoologist Isidore Geoffroy Saint-Hilaire (1805–1861) and the paleontologist Edouard Lartet (1801–1871), the discoverer of both *Pliopithecus* and *Dryopithecus*. In 1858 the two of them had confirmed the discovery of human teeth intermingled with the remains of cave bear and hyena in a cave near Massat in southern France. Massat was their Brixham Cave, and, like their English counterparts, they pointed to hand-axes from Abbeville and Amiens as corroborating evidence for their claim. In 1860, Lartet began publishing the results of a detailed study of extinct animal fossils (some in fact from Cuvier's own collections), that supposedly bore human incisions made when the bones were fresh—a paleontologist's approach to proving contemporaneity that was far more difficult to refute than simple geological association between human and animal remains. The breadth of Lartet's sample and detail of his analysis suggest a project that had gone on for some years.

SEQUEL

The events of 1859 were followed by a wave of archaeological discovery. Stone tools began to be found in river gravel terraces throughout northern France and southern England, and what remained of the bone cave deposits in both countries was soon nearly exhausted. Much more important, it was finally realized that the true artifactual wealth of Paleolithic times was to be found in the rock shelters of France. Within 2 years, Lartet and Henry Christy, a London banker-antiquary, began an intensive program of excavation in the shelters of the Perigord, including such key stations as Laugerie-Haute, Le Moustier, and La Madeleine (Fig. 5). This led to

The British were gradually won over by their host's claims, the turning point coming when Prestwich and Evans were able to photograph a hand-ax in place in a fossil-bearing stratum at Saint-Acheul.

the first great work of French paleoethnology, *Reliquiae Aquitanicae*, published serially over a decade (1865–1875) and completed only after Lartet and Christy themselves were dead. Its several authors filled out the stones, bones, and stratigraphy of rock shelter archaeology with information on such diverse topics as hunting and fishing practices among Canadian natives and the habits of reindeer and game birds.

Meanwhile, France and England had finally embraced the Three Age System developed long before in Scandinavia, that is, the notion that the prehistory of Europe can be organized in terms of successive Stone, Bronze, and Iron

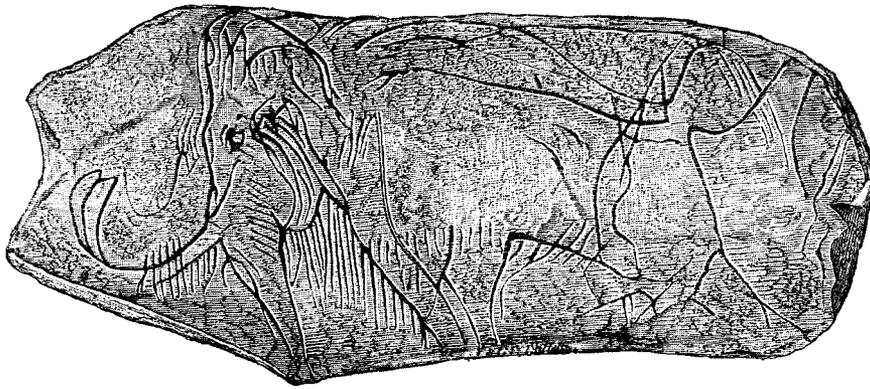


Figure 5. Mammoth engraved on a tusk fragment, discovered in 1864 by Edouard Lartet and Henry Christy at the site of La Madeleine in the Perigord, France. Apart from illustrating the archaeological potential of Paleolithic rock shelters, this piece served to remove any lingering doubts that humankind had coexisted with extinct Pleistocene animals (one of the better depictions of the engraving, this one appeared in Dawkins¹⁹).

Ages. It was realized that the stone tools associated with extinct diluvial animals in France and Britain predated the earliest stone implements of Scandinavia, and the Stone Age was consequently subdivided into newer and older phases, that is, the Neolithic and Paleolithic. What was now the Four Age System served as the basis for organizing the great archaeological exhibits at Paris' 1867 Exposition Universelle, where visitors could promenade room by room through the prehistory of Europe. Scientific archaeology had replaced the antiquarian tradition. One could now envisage a culture history independent of the written record, reaching back to Paleolithic times by way of the Iron Age cemeteries of France and Britain, the Bronze Age lake dwellings of Switzerland, and the Neolithic kitchen middens of Denmark. Whoever it was that left the flint at Brixham Cave and in the gravel at Saint-Acheul began to seem less remote and alien.

So did the Pleistocene. As geologists now depicted it, unconsciously echoing Tournai, the once sharp contrast between Pleistocene and Recent times became more blurred and the transition between them less abrupt. The former came to be regarded as simply an earlier version of the modern world, in which humans had found themselves at home from the start (indeed, they may have had a hand in the successive animal extinctions that were to follow). This shift in geological perspective had the virtue of re-

moving issues that could have gotten in the way of productive research. For one thing, it pushed the quarrel between catastrophists and uniformitarians back to the Pliocene-Pleistocene boundary, safely out of the way at least for the moment. For another, it gave some latitude to those who still needed to temper their geology with natural theology. The modern world which a divine providence had created to receive humankind had simply made its appearance somewhat earlier than previously thought. Prestwich suggested, for example, that it was ushered in by the Ice Age glaciers, which would have served to stabilize the earth's crust.

This new synthesis of archaeology and geology animates the single most important book of the new era, Lyell's *Geological Evidences for the Antiquity of Man* (1863). As we have seen, Lyell had done little to advance research on human antiquity, and indeed had done much to discourage and discredit it. But such was his prestige that, once he announced his acceptance of Boucher de Perthes' claims and the findings at Brixham Cave, large segments of the scientific community and the educated public were willing to go along with him. And, just as he was in the habit of elegantly summing up the state of geology every few years in a new edition of *Principles*, it was almost inevitable that he should sum up the question of human antiquity when the time came. Nearly

4,000 copies of *The Antiquity of Man* were sold the first week, and two new editions appeared the same year. It is really three books in one, dealing in turn with the history of relevant discoveries, glacial geology, and the question of evolution. Readers seem to have been engrossed by the first, wearied by the second, and troubled by the third. Only the last should require comment by this point.

Because the publication of *The Origin of Species* in 1859 followed just after the manifold reports of the Brixham Cave committee, people tended, then as now, to confound the issues of evolution and human antiquity. However, while Lyell had come to agree by 1863 that evolution had taken place in the nonhuman world, he still could not go the whole orang. He cited with approval the conclusion Thomas Huxley was about to make in *Evidences as to Man's Place in Nature* (1863) that anatomically, at least, humans stand alongside the anthropoid apes. But this in itself did not necessarily imply descent, nor was there any fossil evidence to indicate that humans were in fact a transmuted ape. The only candidates available when Huxley wrote were Schmerling's thoroughly modern Engis skull and the original Neanderthal calotte from Germany, which may have had "simian" features but which betrayed a modern-sized brain and, in any case, was without geological context. A complete skull exhibiting primitive features was not discovered in an indisputable Pleistocene setting until 1885, when the Spy Neanderthal came to light. Lyell declined to accept human evolution until satisfactory empirical evidence had come to hand, just as he had earlier waited for satisfactory evidence of human antiquity. The Darwinists believed, of course, that here he faltered and failed. Yet most in England, as well as in France, tended to agree with Lyell, whose position was in any event perfectly consistent with the tenets of the new synthesis of archaeology and geology. Human evolution had gotten the time it needed, but no more.

One final point: it was inevitable that the realization of human antiquity would follow sooner or later from the nineteenth century's collision with the geological and archaeological records

for Paleolithic times. But precisely how and when this realization took place were largely a matter of historical accident; things could have happened differently. What if Brixham Cave had been discovered a year after, rather than a year before, the appearance of *The Origin of Species*? Would things already have come to a head by then in France, with men like Lartet and Desnoyers and Geoffroy Saint-Hilaire successfully overcoming the resistance of the Académie without the help of their British colleagues? Then too, the denouement might have assumed quite different form a decade earlier, had Rigollot lived another few years or MacEnery survived long enough for members of the Torquay National History Society to rally to his cause. And how much easier it would have been to recount this story if some 10 years still earlier had, say, Jouannet, Tournal, and Picard happen to have been visiting Bordeaux and found themselves seated at the same table on a crowded night in the restaurant at the Hotel Splendid.

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SUGGESTIONS FOR FURTHER READING

Intended as a quick foray over a broad terrain, this paper has been left free of encumbering textual citations. Readers who wish to pursue the topic should find the following references useful. The key work is Grayson's magisterial book,¹ whose detailed account of the sources and debates concerning human antiquity in the nineteenth century is unlikely to be surpassed for a long time. Gruber's seminal essay⁶ on Brixham Cave set the stage for modern thinking on the history of human antiquity research, and it still constitutes the best and most readable single article on the topic. The small book by Clark⁷ admirably treats the British bone cave explorers, to whom Lyon⁸ adds those in France. General treatments of research on human antiquity in the broader context of the history of archaeology are provided by Bahn,⁹ Schnapp,¹⁰ and Trigger.¹¹ Recent years have seen several important new works in French to join the classic, and still highly useful, account by Laming-Empeire.¹² Coye's survey¹³ is particularly enlightening, and finds a useful complement in Groenen's source book.¹⁴ Cohen and Hublin¹⁵ project Boucher de Perthes against the background of nineteenth century French cultural life. Stoczkowski¹⁶ provides a fresh look at Boucher de Perthes and Tournal. Laurent¹⁷ exhaustively treats French geology from Cuvier and Lamarck to Darwin, and also has a particularly informative article on Lartet.¹⁸

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