Crafting a New Science

Defining Paleoanthropology and Its Relationship to Prehistoric Archaeology, 1860–1890

By Matthew R. Goodrum*

ABSTRACT

Paleoanthropology emerged as a science during the late nineteenth century. The discovery of prehistoric artifacts in Pleistocene deposits soon led to the excavation of fossilized human bones. The archaeologists and geologists who unearthed them were primarily concerned with determining whether the human fossils and the artifacts found with them actually dated from the Pleistocene, thus offering evidence for the geological antiquity of humans. Prehistoric archaeologists reconstructed the way of life of prehistoric peoples through the artifacts found, while anthropologists examined the human fossils. They wanted primarily to identify the races of prehistoric humans. It was within this context that French anthropologists began to use the term “paleo-anthropologie” to refer to a new scientific discipline devoted to the study of prehistoric human races and human paleontology. This essay examines how paleoanthropology was defined as a science during the 1870s and 1880s. It shows that a tension existed between the objectives and methods of archaeologists and anthropologists. Paul Topinard criticized archaeologists and argued that a new type of scientist, the paleoanthropologist trained in anatomy or zoology, was needed to study human fossils properly.

I N RECENT DECADES paleoanthropologists and some historians of science have begun to express a great deal of interest in the history of paleoanthropology.1 Little attention has been given, however, to the process by which paleoanthropology emerged as an independent

* Department of Science and Technology in Society, 133 Lane Hall, Virginia Tech, Blacksburg, Virginia 24061.

discipline or to how paleoanthropology was defined in relation to other disciplines. Paleoanthropology emerged as a new science at a time when the study of human origins was being revolutionized by new discoveries and new theories. From 1859 geologists and archaeologists in Britain and France began to accumulate strong evidence that humans had lived during the “Glacial Period.” At numerous sites stone artifacts were found mixed with the bones of extinct animals in Pleistocene deposits, indicating that humans lived on earth far earlier than previously thought. The discipline of prehistoric archaeology, which was also emerging at this time, studied these ancient artifacts. It relied heavily on ideas and methods from geology (especially stratigraphy) and paleontology to interpret these artifacts, since artifacts were frequently found in ancient geologic deposits and were associated with either extinct or existing species of animals. But prehistoric archaeologists also relied on ethnological data about contemporary “primitive” peoples from around the world, many of whom still used stone tools, as models for understanding prehistoric stone tool–using peoples. The increasing acceptance of the geological antiquity of humans during the 1860s and 1870s prompted excavators to search for human artifacts in Pleistocene and even earlier geologic deposits. (See Figure 1.) The wealth of Paleolithic artifacts found throughout Europe also served to heighten the desire of paleontologists and archaeologists to unearth the fossil remains of the prehistoric humans that had manufactured them, and it was not long before researchers were rewarded with discoveries of human skeletal material associated with Paleolithic artifacts and the bones of extinct animals. One could accept the existence of humans using Paleolithic artifacts who lived during the Pleistocene without accepting the idea of human evolution; but the implications of Charles Darwin’s theory of evolution for the problem of human origins was a hotly debated subject during this period, and for some researchers it did bear an important relation to the new discoveries of Pleistocene human fossils.

It was in the midst of the growing evidence for the geological antiquity of humans and the formulation of the idea of human prehistory by archaeologists and geologists, as well as the debate over human evolution at the end of the nineteenth century, that a new discipline called paleoanthropology first appeared. This essay explores the events that prompted the establish-

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3 Terms referring to geological and archaeological periodization appear frequently throughout this essay. Geologists began to identify a chronological sequence of strata at the beginning of the nineteenth century. The most recent geologic strata consisted of superficial alluvial deposits; beneath those were diluvial deposits that were usually called the “diluvium,” and the time of their formation was often called the “diluvial period.” The diluvium contained the bones of animals that we now associate with the Ice Age, such as the mammoth. The English geologist Charles Lyell designated the geologic period that contained these extinct Ice Age animals the Pleistocene period (although originally he referred to this period as the Post-Pliocene), and the period following this he referred to as Recent. Because Lyell supported a uniformitarian view of geologic change, he argued that the Pleistocene occurred hundreds of thousands of years ago. Separately from the geologists, some prehistoric archaeologists were beginning to adopt the Three Age System, a chronological sequence that proceeded from an ancient Stone Age to the Bronze Age, which was followed by the Iron Age. With the discovery of crudely chipped stone artifacts associated with Ice Age animals, which differed significantly from the finely polished stone implements found in megalithic tombs, the English archaeologist John Lubbock proposed the terms “Paleolithic” to refer to the early crude stone tools found in Pleistocene deposits and “Neolithic” to refer to the polished stone tools that appeared later. It is important to note that both the geological and the archaeological periods represented only relative chronologies and that there was considerable debate over how many years had elapsed since the Pleistocene or when Paleolithic tools had been used. When referring to geologic periods I will use the terminology used by the specific author being discussed.
Figure 1. Chart showing Gabriel de Mortillet’s correlation of geologic periods (Mortillet, like many French geologists and prehistorians, used Quaternary and Present; while British geologists more often used Lyell’s system, where the Pleistocene is followed by Recent; prehistoric, protohistoric, and historic; and Stone, Bronze, and Iron Ages. Mortillet places the boundary between the Paleolithic and the Neolithic right at the end of the Glacial Period, after the diluvium was deposited. It is important to note that not all geologists and archaeologists would have agreed with Mortillet’s correlations. From Gabriel de Mortillet, Le préhistorique antiquité de l'homme, 2nd ed. (Paris: C. Reinwald, 1885), p. 21.
ment of this new science, but more particularly it examines how paleoanthropology was defined by its founders and how its definition reflected specific concerns and problems unique to the period in which paleoanthropology emerged as a discipline. This was a period when anthropology and archaeology were professionalizing and undergoing their own theoretical and methodological changes, which would influence the way paleoanthropology was framed by its founders. Anthropology, especially in France, emphasized the observation and measurement of specific traits (such as skull shape, skin color, and hair texture) in order to identify and classify humans into distinct races, whereas ethnology dealt with the customs and manners—the culture—of different human groups. The relationships between (physical) anthropology, ethnology, and philology were undergoing change and differed from country to country. All of this was, of course, occurring within political and social contexts that helped to promote and influence the direction of research into prehistory. But one of the critical questions that emerged in relation to this new science was its proper relationship to prehistoric archaeology and the kind of professional training that was most relevant to the investigation of prehistoric humans.

I. NAMING AND DEFINING PALEOANTHROPOLOGY

Louis Lartet was one of the first to use the term “paleoanthropology.” Lartet was the son of the geologist Edouard Lartet, who excavated Paleolithic sites in the 1860s and was an early advocate in France of the geological antiquity of humans. The younger Lartet was renowned in his own right for his excavation of the Cro-Magnon human skeletons from Les Eyzies in 1868, which will be discussed below. In a paper published in 1872, Lartet identified three subdisciplines within paleontology: paleo-anthropologie, paléozoologie, and paléophytologie. He does not limit “paleoanthropology” to the study of human paleontology, however, but seems to use the term to refer to the general investigation of prehistoric peoples—or what other Italian and French researchers referred to as “paleoethnology.” When Lartet referred to “paleoanthropology” again in a paper on the Paleolithic inhabitants of France published two years later, he used the word in the context of discussing the archaeological evidence relating to geologically ancient humans. Lartet’s use of “paleoanthropology” to mean the general study of prehistoric humans was soon refined and replaced by a narrower definition of the term.

Clémence Royer used the term “paleo-anthropologie” in a paper published in 1879, but she clarified its meaning in significant ways. Royer was a French scholar and activist deeply interested in the natural sciences, especially anthropology and biology. She was elected the

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4 There is a substantial scholarly literature on the history of anthropology during this period. Two prominent examples are Claude Blanckaert, De la race à l’évolution: Paul Broca et l’anthropologie française (1850–1900) (Paris: L’Harmattan, 2009); and George W. Stocking, Jr., Victorian Anthropology (New York: Free Press, 1987).


first female member of the Société d’Anthropologie de Paris, and she produced the first French translation of Darwin’s *On the Origin of Species* in 1862. Royer defined “paleoanthropology” specifically as the study of the “lost races of humans” whose fossil remains were being discovered throughout Europe. She acknowledged that paleoanthropology bore a close relationship to prehistoric archaeology, which studied the artifacts left behind by prehistoric people. These two disciplines together, she argued, “reveal to us the successive phases of the social evolution of humankind, of its customs, of its instincts and of its rudimentary institutions.” Royer may have been the first clearly to distinguish paleoanthropology from prehistoric archaeology.

However, the person most responsible for formulating and promulgating the conception of paleoanthropology that was generally accepted during the late nineteenth century was the French anthropologist Paul Topinard. (See Figure 2.) Topinard studied medicine and interned at the Hôpitaux de Paris, receiving his medical degree in 1860. After meeting Paul Broca he became increasingly involved in anthropological research and became a professor at the École d’Anthropologie as well as a member of the Société d’Anthropologie de Paris and director of the journal *Revue d’Anthropologie*. Topinard addressed the disciplinary definition of paleoanthropology and its relationship to other disciplines in three works published between 1885 and 1891. For Topinard, anthropology was a branch of natural history that studied humans and human races, as well as our relationship to the rest of nature. He acknowledged the significant contributions made by prehistoric archaeology in recent decades to the understanding of the geological antiquity of humans and prehistoric human races. But he took issue with the French prehistoric archaeologist Gabriel de Mortillet’s assertion that the study of human prehistory was an anthropological science that treats the origin and development of humanity, and he particularly objected to Mortillet’s use of the term “paléoethnologie” (“paleoethnology”) to describe this new branch of anthropology. Mortillet was an influential figure in the development of prehistoric archaeology in France as curator at the Museum of National Antiquities and the organizer of conferences and journals, as well as through his many publications, especially *Le préhistorique antiquité de l’homme* (1883). His conception of prehistoric research and of human prehistory serves as an alternative to the vision proposed by Topinard and more anthropologically minded researchers.

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8 Clémence Royer, “Les Congrès d’anthropologie, de démographie et d’ethnographie au Trocadéro en 1878,” *Journal des Economistes*, 1879, Ser. 4, 5:405–420, on p. 408 (here and throughout this essay, all translations are mine unless otherwise indicated). The concept of race has a long and complex history, but anthropologists of the late nineteenth century sought to distinguish and classify geographical varieties of humans on the basis of morphological differences. It was common for anthropologists to distinguish not only Caucasian, Mongoloid, or Negroid races, for example, but also to distinguish numerous “races” even among the current population of Europe. More will be said about this later, but on the concept of race in the nineteenth century see Nancy L. Stepan, *The Idea of Race in Science: Great Britain, 1800–1960* (Hampden, Conn.: Archon, 1982).


Topinard instead urged the use of the term “paleoanthropology,” and his reasons for doing so reflect important questions about what objects were being studied and how they should be studied. He took up these questions in some detail in a paper he presented in 1889 at the International Congress of Prehistoric Anthropology and Archaeology. Here he carefully distinguished between prehistoric archaeology, which studies the artifacts and objects of art...
produced by prehistoric humans, as well as their customs, and paleoanthropology, which studies the physical characteristics and diverse races of prehistoric humans. While prehistoric archaeologists were responsible for excavating and interpreting the artifacts left behind by prehistoric peoples, Topinard argued, paleoanthropology should focus instead on studying the fossil bones of those prehistoric peoples and particularly on determining their racial characteristics. He then drew a significant conclusion from this distinction. While prehistoric archaeologists needed to know how to excavate sites and interpret the geological, stratigraphic, and paleontological context of the artifacts they recovered, paleoanthropologists needed a very different set of skills and training. Since they had to be able to examine and interpret human bones and determine their racial characteristics, they should be trained as naturalists or anatomists. The paleoanthropologist “must be a zoologist or a physician, and have the fundamental knowledge that makes an anthropologist.”

Topinard’s concern over the kind of training a paleoanthropologist needed was directly connected to his generally poor assessment of how prehistoric research was being conducted and what he saw as its primary objects of interest. He was harshly critical of prehistoric archaeologists for their pervasive emphasis on collecting stone implements and other artifacts. In particular, he complained about “excavators” (fouilleurs), whom he described as amateurs who were very keen to amass collections of artifacts and extinct animal bones but much less concerned with searching for rare and fragile specimens of human bones. The result was that museums and private collections were full of prehistoric artifacts but very few held skeletons of the peoples who made them. He recognized that there were notable exceptions to this generalization, and he noted approvingly the examples of Philippe-Charles Schmerling and Louis Lartet (who will be discussed below) as naturalists who conducted important excavations at Paleolithic sites. Topinard blamed amateur excavators for many of the problems he saw confronting anthropologists interested in prehistoric humans, since hasty and poorly conducted excavations led to confusion about the geologic period human fossils belonged to. He also noted that excavators often relied on paid laborers to do the digging, which meant that the excavator was frequently not present when artifacts or bones were discovered.

The historical events that formed the basis for these criticisms are explored in this essay. The broader significance of Topinard’s argument was that he, more than anyone before him, offered a detailed and substantial definition of this new scientific discipline called paleoanthropology. In defining this new science, Topinard sharply distinguished it from prehistoric archaeology. These sciences had different objectives, studied different objects, and required quite different skills and training. The task of the paleoanthropologist is to interpret fossil human bones, just as the paleontologist interprets fossil animal bones, while the archaeologist’s task is to interpret artifacts and provide accurate stratigraphic data about where human bones were found, since this was critical in determining their age. Topinard wanted to rectify the problem that the people best trained to study human fossils (anthropologists, naturalists, and physicians) were rarely the ones who actually conducted excavations and collected

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12 Topinard, Éléments d’anthropologie générale, p. 178; and Topinard, L’homme dans la nature, pp. 382–383, 388.
human remains. Instead, it was usually geologists and archaeologists who found human fossils and then only sometimes brought them to anthropologists to study. In this essay I examine the events that led to the recognition that a new discipline was needed. Topinard purports to be addressing a set of problems relating to the study of prehistoric humans, and he makes powerful claims about the kind of training needed to conduct this research. Therefore we need to examine the research and the discoveries being made in the decades before Topinard began to define paleoanthropology as a science. The following section examines many of the fossil human remains found between 1860 and the late 1880s, from the time when the geological antiquity of humans began to be accepted to the publication of Topinard’s major pronouncements on paleoanthropology. Particular attention will be devoted to describing who made these discoveries, what their professional training was, and what their publications tell us about their research interests and how they dealt with the human bones they recovered. The people and discoveries discussed below do not exhaust the very large number of researchers from across Europe who contributed to the study or interpretation of fossil humans and thus in their own way contributed to the formation of paleoanthropology as a discipline. The development of paleoanthropological research at the end of the nineteenth century was a complex process, and scholars such as Richard Delisle have explored the ways that comparative anatomy, evolutionary theory, and human paleontology helped to shape that research. The central questions investigated in this essay—how and why paleoanthropology came to be defined as it was by a specific group of people (all of whom were French)—should not obscure the fact that paleoanthropological research during the late nineteenth century often exceeded the particular definition of the field proffered by any of its practitioners.

II. GEOLOGY, PALEONTOLOGY, AND THE EXCAVATION OF FOSSIL HUMANS

Geologists and paleontologists exploring caves in the early decades of the nineteenth century did on rare occasions encounter human bones. The Oxford geologist William Buckland unearthed a human skeleton buried with a variety of artifacts from deposits in a cave in Wales that also contained extinct animals, but he concluded from the similarity of the artifacts with those found in ancient British barrows that the skeleton belonged to a Roman-period Briton. Jules de Cristol, Paul Tournal, and Jules Teissier, independently exploring caves in France, found human bones and crude artifacts among the fossilized bones of extinct mammals; but while Cristol and Tournal suggested that they were evidence that humans had lived during the geologically remote epoch when these extinct animals roamed Europe, Teissier remained skeptical. In all these cases the evidence was too limited, the nature of cave deposits too complex, and the implications too incredible to allow most serious observers to overcome the generally held opinion that humans appeared in the world after the events that led to the

extinction of the mammal species found in these deposits.16 Less easy to dismiss were the artifacts and human bones, including several human skulls, discovered by Philippe-Charles Schmerling while excavating caves at Engis near the Belgian city of Liège. The quantity and condition of the bones and their position in undisturbed deposits containing large numbers of extinct animal bones in a similar condition of fossilization convinced him that these humans represented an uncivilized race that lived at the same time as the extinct animals.17 (See Figure 3.)

16 Grayson, Establishment of Human Antiquity (cit. n. 2).
These discoveries generated discussion and debate in the scientific community, but prior to 1860 few geologists or anatomists examined these bones. But when workmen quarrying stone from the Feldhofer grotto in the Neander Valley near the German city of Düsseldorf stumbled upon human bones in 1856, the response by Europe’s scientists was quite different. The bones were obtained by a local schoolteacher, Johann Karl Fuhlrott, who recognized their potential significance and brought them to Hermann Schaaffhausen, professor of anatomy at the University of Bonn. Debate over the geologic age, race, and significance of the Neanderthal fossils raged throughout Europe for decades, and these debates have been ably studied by many historians.18 The nature of that debate changed in the 1860s, as other prehistoric human remains were found that provided material to compare the Feldhofer Neanderthal fossils with. While historians have written extensively on the Feldhofer Neanderthal, much less attention has been given to the many human fossils discovered over the following three decades,19 but it was precisely the circumstances surrounding the discovery and examination of human fossils between 1865 and 1885 that provided the context for Topinard’s critique of that research and led him to think that there needed to be a science of paleoanthropology distinct from prehistoric archaeology.

In 1865 fragments of a human skull were discovered near the German town of Eguisheim and came into the possession of Charles-Frédéric Faudel. Faudel was a physician in the nearby town of Colmar and a founding member of the local natural history society and museum. In his report on the human skull Faudel described in detail the local geology and the stratigraphic position of the skull, as well as the fact that these deposits contained the remains of *Elephas primigenius* and other extinct animal bones. He was careful to note that the human frontal and parietal bones came from the same deposit as these animal bones, that all were completely fossilized, and that there was no evidence that the deposit had been disturbed. These points were all critical in determining beyond a doubt that the human remains dated from the diluvial period (Pleistocene) and were therefore extremely old. This was important, because some researchers still doubted the claims for the geological antiquity of humans, while supporters of this idea also realized that it was possible for human remains and artifacts from more recent times to become accidentally mixed with fossils from older deposits through intrusive burials or geological processes such as flooding. Faudel provided a description of the human bones, noting that they contained some features also seen in the Engis and Neanderthal skulls. Notably, he acknowledged that most of his report dealt with geology and that its primary significance lay in providing new evidence for the antiquity of humans. It was necessary, he wrote, to leave the interpretation of the human cranium to scientists who possessed the relevant expertise.20

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19. A surprising number of prehistoric human fossils were discovered during this period, and it is not possible to discuss all of them here. A summary of the human fossils discovered up to 1880 can be found in Armand de Quatrefages, Ernest Théodore Hamy, and Henri Célestin Formant, *Crania ethnica* (Paris: J. B. Baillière, 1882).

Meanwhile, in Belgium, Edouard-François Dupont was excavating caves lying along the Lesse River. Dupont was a geologist and director of the Royal Museum of Natural History in Brussels. During the winter of 1865–1866 he began collecting extinct animal fossils, flint knives, and human skeletons from these caverns. In the spring of 1866 he unearthed a human jaw from Trou de la Naulette. His description of the jaw was minimal, but he described the geology, stratigraphy, and fossil animals found in the cave in great detail in order to defend his opinion that it was extremely old. By 1867 he had excavated twenty-one caves, and in four of them he found human remains from what some archaeologists called the Reindeer Age, which was generally considered immediately to precede the Neolithic period. Dupont wanted to use the artifacts and human remains found in these caverns to reconstruct the character of the prehistoric inhabitants of the Lesse Valley, determine their race, and understand their culture and customs.

After discussing the stratigraphic position of the Reindeer Age within the series of deposits in these caverns and enumerating the animals that lived during this period, he turned his attention to a lengthy examination of the artifacts and human bones recovered during his excavations. Because he was not an anatomist, Dupont enlisted the assistance of Jean Louis Armand de Quatrefages, Franz Ignaz Pruner-Bey, and Louis Lartet (the first two were anthropologists trained in medicine, and Lartet was a paleontologist). Their analysis of the bones, particularly the skulls, indicated that these people belonged to a brachycephalic race. The morphology of the skulls suggested a link between the humans of the Reindeer Age and existing Uralo-Altaic peoples while distancing them from the Indo-Germanic peoples who entered Europe at some later time. The section of Dupont’s essay devoted to an anatomical and anthropological examination of the human fossils from the Reindeer Age is relatively brief in comparison to the long sections treating the implements and ornaments found with them, the evidence of their diet, and a discussion of their customs and manner of living.

Dupont’s research was received with great interest and generated considerable discussion, especially over the interpretation of the Naulette jaw. The artifacts received much attention, and the human remains were of interest as much for the evidence they provided in support of the geological antiquity of humans as for the light they shed on the anthropological and anatomical nature of these prehistoric peoples. The situation was quite different when workmen constructing a railroad near the French village of Les...
Eyzies revealed a rock shelter in a limestone cliff in 1868. At the rear of the shelter the workmen found prehistoric artifacts, which led the Minister of Public Instruction to invite Louis Lartet to excavate the site. Lartet was a geologist and paleontologist like his father, Edouard Lartet, who was a leading figure in the rise of Paleolithic archaeology in France. Edouard Lartet and the English businessman Henry Christy were collaborating on excavations of caves in the Périgord region in France that were producing a wealth of artifacts dating from what they called the Reindeer Age, but no human remains had yet been discovered. At Les Eyzies, however, Louis Lartet's excavations not only unearthed flint artifacts, perforated shell ornaments, and worked ivory and reindeer antler; the rock shelter also contained four adult human skeletons and one partial skeleton of a child, along with the bones of extinct animals.

Lartet published a series of papers on these excavations, describing the site, its geology, and the fossil animals found. He described the artifacts recovered and the location of the human bones within the cave, as well as their stratigraphic location in its deposits. This was important in establishing the geologic age of the human remains. Franz Ignaz Pruner-Bey and Paul Broca immediately examined the Cro-Magnon skeletons, as they came to be called, and their investigations will be discussed in the next section. But Lartet understood the value of these skeletons for the rare information they offered about the “ethnic character” of the humans of the Reindeer Age. Significantly, he acknowledged that the question of who these people were and where they came from could not be answered by the geologist alone. Only the anthropologist, Lartet admitted, could determine the characteristics of the race to which the Cro-Magnon skeletons belonged. But he also foresaw how geologists, anthropologists, and archaeologists might cooperate to conduct “paleo-ethnologic studies” (études paléo-ethnologique) of the artifacts, human remains, and animal fossils in order to reconstruct the prehistoric world. New areas of research were opening, and existing disciplines would need to work together in new ways to investigate prehistoric peoples and their culture.

More human fossils came to light in the years following the discovery of the Cro-Magnon skeletons at Les Eyzies. During the excavation of rock shelters in Laugerie-Basse, in the Dordogne region of France, Élie Massénat, Philibert Lalande, and Émile Cartailhac unearthed Paleolithic artifacts and a human skeleton. The artifacts consisted of implements made from flint and worked reindeer antler, as well as carved reindeer antler and bone depicting horses and reindeer, which suggested that the artifacts and human remains belonged to the Reindeer Age. The human body had been buried in the cave, so they carefully described its orientation, its depth in the deposits, and the placement of the artifacts around it. The human bones themselves, they stated, would be described in a later paper.

Émile Rivière discovered additional human skeletons associated with Paleolithic artifacts while excavating caverns at Baoussé-Roussé in Italy. Rivière had begun to study medicine but illness forced him to quit his studies, and in 1869 he traveled to Menton in

southern France, near the border with Italy, to recover. He soon began to conduct archaeological excavations, and in March 1872 he found a human skeleton along with flint implements and animal bones in Cavillon Cave. (See Figure 4.) The body had been buried in a sleeping position with perforated shells and a flint artifact placed near its head. As in discussions of previous discoveries of this kind, Rivière devoted much attention to the location of the skeleton in the cavern and to examining the artifacts and animal bones found with it, because these were critical in demonstrating the “high antiquity” of the human remains. Regarding the human bones, Rivière examined them in some detail, taking measurements and comparing them with the Cro-Magnon humans. His measurements of the skull showed that it was dolichocephalic, and he estimated the facial angle to be 80 degrees. These observations reflect Rivière’s familiarity with contemporary anthropological methods and his recognition of the importance placed on such measurements by anthropologists. Moreover, in a tacit acknowledgment of the debates taking place over the question of human evolution, he also noted that the skeleton showed no characteristics that approached those of apes.

Further excavations produced a second human skeleton in another set of caves. The body lay in deposits with the bones of the cave bear, hyena, *Bos primigenius*, and other extinct animals. Again there were flint and bone implements, but Rivière was careful to assert that none of them belonged to the “age of polished stone” (Neolithic) but were truly Paleolithic. As in the first case, he carefully described the burial, recording the position of the skeleton in the cavern, identifying the bones that were preserved as well as their dimensions, and noting that a bracelet made from shells and stag teeth lay across the arm bones. From the dimensions of the bones Rivière concluded that the “prehistoric people of Menton very probably belonged to a race of great stature.” Rivière’s report reflects the familiar concern with establishing the Paleolithic age of the human remains as well as an interest in ethnological questions pertaining to the burial practices of these prehistoric peoples. Indeed, it is worth noting that this paper was published under the heading of “Paléo-ethnologie.” Rivière recovered three more human skeletons from the caverns of Menton between June 1873 and January 1874, and his report on the excavations again emphasized the nature of the burial, the artifacts found with each body, and the animal fossils found associated with the skeletons. The only anthropological observation he made about the skeletons was that the adult skull was distinctly dolichocephalic.

Lest one should think that the emphasis on stratigraphy, fossil fauna, and artifacts that dominated published accounts of human fossils was a distinctly Western European phenomenon, it would be useful to examine some Central European cases. One prominent example is the human jaw discovered by Karel Jaroslav Maška in the Moravian-Silesian

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region of what is today the Czech Republic. Maška studied at the University of Vienna and became a professor of mathematics in the secondary school (gymnasium) at Novém Jičíně in 1878, but he had already become interested in prehistory and worked with the Bohemian paleontologist and archaeologist Jindřich (Heinrich) Wankel. In 1879 Maška began excavating Šipka Cave, and over the next few years he identified three successive periods of human occupation, as evidenced by a sequence of three stratigraphic layers containing hearths and charcoal, stone tools, and animal bones that in some instances bore cut marks. Maška described the stratigraphy of the cave and identified the animal species found in each layer, assigning the strata to alternating glacial and interglacial periods. Significantly, he noted that the artifacts differed from one occupation level to another, with the older “culture layer” (Culturschichte) containing only crude implements while the more recent levels contained more sophisticated artifacts. Given the geological and paleontological evidence from the cave strata, as well as the archaeological sequence of cultures indicated by the three culture layers, Maška argued that humans had lived in Šipka Cave for a large part of the diluvial period: the earliest humans had occupied the cave in the early glacial if not the preglacial period, while the later occupations occurred during interglacial periods.

In August 1880 Maška unearthed what he considered the most important discovery, a human mandible located in the oldest culture layer, which contained a Pleistocene fauna, stone knives and arrowheads, and worked reindeer antler. He stressed that the mandible was fossilized and did not differ in appearance from the animal fossils found in the same strata. From the development of the teeth Maška estimated that the jaw belonged to a child between eight and ten years old. The jaw attracted considerable interest and was examined by Maška’s mentor Jindřich Wankel as well as two leading figures in German anthropology who had been deeply involved in the debate over the Neanderthal skeleton, Hermann Schaaffhausen and Rudolf Virchow. As to the anthropological interpretation of the jaw, Maška cites Robert Baume, a German dentist who examined the jaw and compared it with the La Naulette jaw discovered by Dupont in Belgium. Baume concluded that the Šipka jaw belonged to a member of an inferior human race from the diluvial period, a race lower than any existing human race. These anthropological speculations occupy only a few pages of a lengthy and detailed report on the excavations that, like those we have examined from France and Belgium, focused on the geology and fossil fauna found in the cave deposits and on the artifacts associated with each stratigraphic layer. The human jaw was certainly an exciting and valuable discovery, and Maška clearly understood its significance, but his training and research prepared him only to interpret the geological age of the fossil. As also happened with the French and Belgian fossils, Maška turned his mandible over to anthropologists who possessed the training necessary to examine and interpret it properly.

Three years after Maška’s discovery of the Šipka jaw, workmen in the town of Podbaba, near Prague, unearthed mammoth, rhinoceros, and reindeer bones from diluvial deposits. Then, in November 1883, they found a human skull in the same deposits. They brought these fossils to Anton Fritsch (or Fric), professor of zoology at the Czech University of Prague. Fritsch had previously conducted paleontological research, and he knew that

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35 Ibid., pp. 70–72, 80–82, 83–84.
while collecting fossils from diluvial deposits one often encountered human skeletal material deriving from more recent Stone or Bronze Age burials. Thus it was essential to ascertain whether the Podbaba cranium dated from the Pleistocene or was more recent, so Fritsch traveled to the site where the skull had been found in order to examine the geologic context. The condition of the skull, when compared to the undoubted Pleistocene animal fossils from the deposit, supported the interpretation that it dated from the same period. Fritsch was aware that human fossils from the diluvium were extremely rare, so he described the fossil in great detail. The skull consisted of the frontal, left parietal, right temporal, and part of the left temporal bones. Fritsch regretted that the partial nature of the skull did not permit him to make the kind of measurements desired by anthropologists, but he did estimate some of these characteristics by extrapolating the likely shape of the missing portions of the skull. In particular, he noted the prominent eyebrow ridges. He acknowledged that he was not a craniologist by profession, and so he sent a plaster cast of the cranium to Hermann Schaaffhausen for examination. Once again we see a researcher who has found human fossils recognizing that he lacked the training necessary to examine that material properly and sending it to either an anatomist or an anthropologist.

Fritsch closes his paper by addressing the central issue for all these cases of purported Pleistocene human remains. He returns to the question of the geologic age of the skull and assures his readers that there is no doubt that the cranium and the extinct animal fossils all came from the same stratigraphic layer and thus were truly Pleistocene in origin.36

Some important patterns emerge from this examination of the reports published by researchers who discovered human fossils in Pleistocene deposits, often in association with Paleolithic artifacts. Most of these researchers were trained as geologists or paleontologists, and many were specifically interested in the problem of human prehistory. Successful excavations generally produced only animal bones and some Paleolithic artifacts, so the discovery of human bones was scientifically extremely significant. However, the primary concern among these excavators was to demonstrate convincingly that those human fossils actually dated from the Pleistocene and were not instead more recent material that had become mixed, either in the course of interment or through geological processes, with much older artifacts and animal fossils. The debate over the geological antiquity of the human species was still being resolved, and there was skepticism among some scientists over these purported Pleistocene humans. But it is evident—and many of them acknowledged the fact—that the discoverers did not possess the training necessary to examine human fossils properly. In all cases the human bones were turned over to anatomists and anthropologists who subjected the material to very specific kinds of analysis with particular scientific questions in mind.

III. ANTHROPOLOGY, CRANIOMETRY, AND FOSSIL HUMAN RACES

While human fossils and Paleolithic artifacts found in Pleistocene deposits were generally discovered by geologists or prehistoric archaeologists, they almost always eventually came to be examined by anthropologists. Like archaeology, anthropology was also undergoing significant change as a discipline during the nineteenth century in terms of its methodology, research interests, and professionalization. Since most of the human fossils discussed above came to be studied by French anthropologists, it will be useful to inquire

into the state of anthropology in France during the late nineteenth century. Although anthropology often meant the study of humans in the most general sense, by the 1860s anthropology in France increasingly meant physical anthropology, while ethnology was the study of the culture and customs of different human groups.\footnote{On the differentiation of anthropology from ethnology in France during this period see Topinard, \textit{Éléments d'anthropologie générale} (cit. n. 9), pp. 148–167.} An important step in establishing anthropology as a professional scientific discipline in France was the formation of the Société d'Anthropologie de Paris in 1859 by a group led by Paul Broca. Joy Harvey has shown that the early members of the society were medical men who promoted polygenism, positivism, and, often, materialism.\footnote{Joy Harvey, “Evolutionism Transformed: Positivists and Materialists in the Société d’Anthropologie de Paris from Second Empire to Third Republic,” in \textit{The Wider Domain of Evolutionary Thought}, ed. David Oldroyd and Ian Langham (London: Reidel, 1983), pp. 289–310.} Their dedication to positivism led the members of the society to emphasize measurement and the accumulation of factual data while avoiding theory. In practice this led Broca and his colleagues to focus on methods such as anthropometry and, particularly, craniometry in order to gather statistics on the various human races.

Craniometry was a method of measuring the ratio of the length to the width of human skulls in order to calculate what was called the cephalic index. The Swedish anatomist Anders Retzius developed the method in the 1840s, and from his investigations he distinguished two dominant skull forms, dolichocephalic (long heads) and brachycephalic (broad heads). (See Figure 5.) Broca later modified Retzius’s methods and expanded his classification scheme, but the use of craniometry and the facial angle to identify the anatomical features of the living human races was central to French anthropology in the late nineteenth century.\footnote{Anders Retzius, “Om formen af nordboernas kranier,” \textit{Förhandlingar vid de Skandinaviske Naturforskarnes Tredje Möte}, 1842, 3:157–201; and Paul Broca, “Sur la classification et la nomenclature craniologiques d’après les indices céphaliques,” \textit{Revue d’Anthropologie}, 1872, 1:385–422. Claude Blanckaert has examined these topics in several works, including \textit{De la race à l’évolution} (cit. n. 4), pp. 211–232; “L’indice céphalique et l’ethnogénie européenne: A. Retzius, P. Broca, F. Pruner-Bey (1840–1870),” \textit{Bull. Soc. Anthropol. Paris}, 1989, N.S. 1:165–202; and “Les vicissitudes de l’angle facial” et les débuts de la craniométrie (1765–1875),” \textit{Rev. Synthèse}, 1987, 108:417–453.} These methods formed the basis of the examinations of fossil
humans conducted by French anthropologists. The overarching concern of French, and to a considerable extent European, anthropology was the study of human racial types and the use of methods such as craniometry to identify and classify the different human races. As a result, early paleoanthropology—as it emerged and came to be defined during this period—shared these objectives and methodologies with anthropology. This was reflected in the definition of paleoanthropology promoted by Paul Topinard, but we need to see whether the anthropological examinations of geologically ancient human fossils during this period display these interests and methodologies.

As fossil human remains began to be recovered from Belgium and France, these bones almost immediately came to the attention of two leading Parisian anthropologists, Paul Broca and Franz Ignaz Pruner-Bey. Pruner was German and studied medicine at the University of Munich. In 1831 he left for Paris to continue his studies, but soon thereafter he joined an expedition led by Karl von Hügels to the Levant. It was during this expedition that he became interested in anthropology. When the expedition ended Pruner stayed in Egypt, where he served as a physician and received the honorary title Bey; hence in his later published papers his name appears as Pruner-Bey. After he returned to Paris in 1860 he became a member of the Société d’Anthropologie de Paris, serving as its president in 1865. Paul Broca also studied medicine, at the University of Paris, and after internating at a number of hospitals where he conducted anatomical research with prominent surgeons he was offered a position as prosector of anatomy at the University of Paris Medical School. Besides having a successful career in medicine and brain science, Broca was lured into anthropological research in 1847 when he served on a commission to report on excavations conducted in the cemetery of the ancient church of the Celestins in Paris. Broca soon became instrumental in expanding and institutionalizing anthropological research in France, establishing the first anthropological laboratory, at the École Pratique des Hautes Études, in 1858 and then forming the Société d’Anthropologie de Paris a year later.

These first anthropological studies of fossil humans reflect the intense interest in what most researchers believed were the actual remains of the people who had manufactured the Paleolithic implements only recently identified by archaeologists. Broca published a short report on the Equisheim cranium found by Faudel in Germany where he stressed that the bone was truly fossilized like the fossilized animal bones found associated with it, thereby defending the authenticity of the cranium as indeed dating from the deposition of the diluvium (Pleistocene). Broca was disappointed because the fragmentary nature of the skull did not allow him to take the measurements that he wanted, but he did note that the skull shared a number of features with the skulls found at Engis by Schmerling and with the Feldhofer Neanderthal cranium.40

This brief report on the Equisheim fossil was followed by a flurry of papers that appeared after the discovery of the Cro-Magnon humans. Broca saw the Cro-Magnon fossils as powerful additional proof that humans coexisted with the extinct fauna of the Pleistocene, and he again reassured readers that there was no doubt about their geological antiquity. Like Lartet, Broca was as intrigued by what the skeletons and artifacts from the Cro-Magnon period could tell us about the customs and culture of the “troglodytes of Périgord” as he was with the Pleistocene humans finally being discovered. However, Broca’s attention soon turned to examining the bones themselves and comparing them

with other modern and fossil humans as well as with chimpanzee and gorilla skeletons. He provided a detailed description and analysis of the Cro-Magnon skeletons, noting that they differed from the humans recovered from the Belgian caves by Dupont as much as modern human races differ from one another. The Cro-Magnon skulls were dolichocephalic like the Neanderthal and the Belgian skulls, but they also possessed other features that were quite different, which convinced Broca that they belonged to a completely new and unknown prehistoric race. Broca argued that some of the features found in the Cro-Magnon skulls are found in modern “civilized races,” but there were other features that indicated a violent and brutal race, while some traits were simian. Broca was left with the “picture of a race that in some of its features attained the highest and noblest stages in human morphology, and in other traits descended below even the lowest of the anthropological types at present existing.” The Cro-Magnon cave dwellers were “savages”—as were all geologically ancient humans, Broca argued—and their skeletons betrayed the difficult conditions of their existence, but their skulls displayed their intelligence and the ability to improve.41 (See Figure 6.)

Pruner-Bey examined the Cro-Magnon fossils soon after their discovery, and his description was published alongside Lartet’s original account of them. His interpretation of the remains was informed by his earlier studies of modern human races and his interest in the Aryan hypothesis and the origin of the European races. His report described the preservation of the bones and their morphology, noting that the skull was dolichocephalic, with a large cranial capacity. Just as paleontologists examine extinct animal fossils in order to determine what genus and species they should be assigned to, so too Pruner-Bey wanted to analyze the Cro-Magnon skeletons with the same objective in mind. A critical part of this analysis was not only measuring the bones but also comparing them, particularly the skulls, with those from existing human races from around the globe. What Pruner-Bey noticed most in the Cro-Magnon crania were what he considered their Mongoloid features. This indicated, he believed, that the Cro-Magnon cave dwellers belonged to the Estonian branch of the Touranian racial group that was represented by the brachycephalic Lapps from northern Scandinavia.42 However, unlike these groups, the Cro-Magnon humans were dolichocephalic and their skulls in some ways resembled the fossil humans from Belgium discovered by Dupont. Seeking to resolve this inconsistency, Pruner-Bey noted that there were Siberian peoples who possessed large dolichocephalic skulls but had Mongoloid features.

What we see in the reports of Broca and Pruner-Bey is characteristic of what we will see in the anthropological examination of prehistoric human fossils through the 1880s. Unlike the geologists and archaeologists discussed above, who offered only cursory descriptions of the bones but devoted considerable attention to the stratigraphy, artifacts, and animal fossils found with human remains in order to establish the geologic provenance of this material with certainty, Broca and Pruner-Bey subjected the bones to detailed examination, making careful measurements, particularly, of the cephalic index and the facial angle and comparing the bones (particularly the skulls) with skeletons from modern

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human races and with other newly discovered prehistoric human fossils. The primary objective was to determine what race these prehistoric humans belonged to and what relation they bore to existing races. This pattern is evident in the anthropological studies conducted in France of human fossils found in the 1870s.

Broca followed his study of the Cro-Magnon fossils with an analysis of the human skeletons found by Massénat at Laugerie-Basse. He measured the cephalic index of the three skulls, which proved to be dolichocephalic, and calculated their cranial capacity, noting that they had larger brains than modern humans.43 Broca was approached at this time to examine a large collection of human skeletons recovered during excavations at the

French site of Solutré. This site was discovered by Henry de Ferry and Adrien Arcelin in 1866, and their early excavations unearthed stone tools and thousands of horse and reindeer bones. Arcelin conducted extensive excavations at Solutré from 1873 to 1895: he found not only hearths and stone tools but also human skeletons apparently dating from several prehistoric periods, ranging from the Reindeer Age to the Neolithic. Indeed, there was considerable disagreement among prehistorians about the age of the human remains from Solutré and whether they were truly prehistoric or, in particular, Paleolithic at all.

Broca analyzed these skeletons, measuring the cephalic index of the skulls in order to determine their race. The skeletons from the oldest deposits at Solutré belonged to a dolichocephalic race, which corresponded well with skeletons found at other Paleolithic sites. Broca noted that some skeletons apparently dating from the Reindeer Age were also dolichocephalic but that some of the human remains belonged to a brachycephalic race. The presence of more than one “race” in the collection led Broca to suggest that it was likely that the fossil humans from Solutré belonged to two very different epochs in prehistory, a Paleolithic dolichocephalic race and a more recent brachycephalic race that probably dated from the Neolithic or perhaps the Reindeer Age. The uncertainty over the age of the humans from Solutré prompted Broca to address the relative responsibilities and objectives of archaeologists and anthropologists, which further illuminates the context within which paleoanthropology came to be defined as a science. Broca argued that only archaeological methods could determine the relative age of human fossils and assign them to a prehistoric period. But he also adamantly defended craniometry as a scientific method that produced results as precise and certain as any others in anatomy and natural history. According to Broca, craniometry could determine the “type craniologique” (craniological type) of a human population, even if this population had been extinct for a long time and we know of them only through the “revelations of prehistoric archaeology.” Craniometry could examine human crania from different places and from different times but still reach valid and useful conclusions about their race. Hence, Broca argued, craniometry provides facts that supplement the discoveries and ideas furnished by ethnology and archaeology. But that does not mean that craniometry should stand on its own or substitute its methods for those of ethnology and archaeology. He is clear that its usefulness lies in determining the physical characteristics of ancient populations lost to history and only rediscovered through archaeological excavation.44 Thus, Broca was already thinking about the roles of anthropology, ethnology, and archaeology in the study of prehistoric humans and was offering ideas about their proper relationship by the early 1870s.

At this time several new actors entered the domain of the anthropological study of prehistoric humans in France. Jean Louis Armand de Quatrefages studied medicine at the University of Strasbourg, but in the 1840s he began to pursue research in invertebrate zoology under the French naturalist Henri Milne-Edwards. Gradually his research interests turned toward anthropology, and in 1855 he was appointed to the chair of anthropology at the Muséum National d’Histoire Naturelle in Paris. Jules Ernest Théodore Hamy obtained his medical degree from the University of Paris in 1868 and soon thereafter became an assistant to Broca in the anthropological laboratory at the École Pratique des Hautes Études. In 1872 he transferred to the Muséum National d’Histoire Naturelle, where he worked under Quatrefages. Thus, like Pruner-Bey and Broca, Hamy and Quatrefages were trained in medicine before becoming involved in the study of fossil humans.

In 1871 Hamy published an analysis of two human crania and two mandibles excavated from Engihoul Cave in 1860 by Constantin Malaise. Schmerling first found human remains in the cave in the 1830s, and the English geologist Charles Lyell’s visit to Belgium in 1860 to examine the Belgian evidence for Pleistocene humans prompted Malaise to conduct new excavations at Engihoul. Hamy is clear that his reason for studying these crania anew was to correct what he saw as problems in the way human fossils were studied and interpreted. There were, he argued, significant gaps in the study of fossil human races, particularly the Cro-Magnons. The study of fossil humans all too often left out the very interesting issue of the history of human races, and in order to correct this omission it was crucial to compare all known human fossils with one another and with modern human races. Hamy planned to go beyond the studies of the Cro-Magnon fossils conducted by Pruner-Bey and Broca by analyzing the fossils anew, but also to compare them with other human fossils, especially those from Belgium. Since the anthropological methods for studying prehistoric humans and determining their ethnicity had improved significantly since Malaise published his first report on the Engihoul crania and mandibles, Hamy decided to begin by reexamining these fossils. He noted strong morphological similarities between one of these mandibles and the mandible of the old man from Cro-Magnon. After comparing the Engihoul crania with the Neanderthal, Cro-Magnon, and other prehistoric human crania, Hamy concluded that the Engihoul fossil resembled the Cro-Magnon fossils most, which suggested to him that the Cro-Magnon race had extended from Belgium to France during the diluvial period. In a significant statement of how he perceived the relationship between the anatomical/anthropological and archaeological studies of prehistoric humans, Hamy closed his paper by proclaiming that anatomy had now confirmed what archaeology had previously demonstrated.

The next step in Hamy’s project of reconstructing the history of human races by analyzing and comparing prehistoric human fossils was a study of a partial human cranium found in 1871 near the Bohemian town of Břeš. The calotte was dolichocephalic; and after comparing it with the Neanderthal skull, the Eguisheim skull found by Faudel, and the so-called Canstadt skull (discussed below), Hamy concluded that it was intermediate in morphology between the Neanderthal cranium and the Canstadt cranium. But once again he addressed the issue of the relationship between the anatomical/anthropological analysis of prehistoric human bones on the one hand and ethnological and archaeological studies of prehistoric humans on the other. He argued that through the cooperation of these disciplines, but especially through the anatomical study of these prehistoric humans’ racial characteristics, the history of human races in Europe and Asia would be illuminated.

Hamy then examined the human skeleton discovered at Menton by Rivière with the same objectives in mind. He concluded that the Menton skeleton belonged to the same race as the humans from Cro-Magnon. But in the midst of his discussion of the anatomy and racial identity of this skeleton, Hamy was prompted to comment on the relationship that existed between anthropological and archaeological investigations of prehistoric humans. Gabriel de Mortillet had recently proposed a new chronological subdivision of

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the Paleolithic into four periods (Acheulean, Mousterian, Solutrean, and Madgalenian) that rejected the widely held idea of a Reindeer Age. Hamy replied that archaeological differences in nomenclature and periodization of sites were of minimal importance for the anthropologist concerned with anatomy. In 1873 Hamy turned his attention next to the large collection of human skeletons from Solutré, inspecting them with the objective of attaining new insights into the “races primitives” of France. Increasingly Hamy conceived of his research as contributing to human paleontology, but it remained clear that the method he used was the anatomical examination of skeletons and, especially, skulls, guided by the principles of Broca’s anthropology—which meant interpreting fossil humans in terms of their racial characters and the insights they provided to the history of prehistoric races in Europe.

These aims are most visible in a series of comprehensive studies conducted by Hamy and Quatrefages of the prehistoric human remains from across Europe, which culminated in their two-volume *Crania ethnica*, published in 1882. In 1873 they published the first of a series of papers on “fossil human races.” The very titles of their papers reflect the prevailing focus of the anthropological and anatomical studies of fossil humans during this period. Hamy and Quatrefages approached the study of fossil human races from within the framework of a broader investigation of living human races. Basic to their methodology was the use of craniometry and the idea that skull morphology was an indicator of racial identity. Their first paper in this series focused on what they referred to as the Canstadt race. The best-known representatives of this prehistoric human race were the Neanderthal cranium found in 1856 and the Canstadt skull. The latter was a human skull unearthed in southern Germany in 1700 during excavations ordered by Duke Eberhard-Ludwig von Württemberg, but it was not properly studied at the time and came to the attention of prehistorians only as the debate over the geological antiquity of humans became an issue a century and a half later. Hamy and Quatrefages were allowed to examine the skull in June 1870. Like the Neanderthal cranium, the Canstadt skull was strongly dolichocephalic but possessed additional characteristics that led them to categorize it as dolichoplatycephalic. After comparing the Canstadt skull with other fossil humans they found that the crania from Eguisheim, Neanderthal, Bruix, and several other sites all shared these same traits. Moreover, there were Neolithic and even medieval skulls from tombs in France that bore these same features, which led Hamy and Quatrefages to suggest that this prehistoric race had not become extinct but, rather, had become mixed with later races that entered France.

The evidence suggested that there had lived in Europe at a very remote period in time a particular “race humaine paléontologique” (paleontological human race) that they called the Canstadt race. But this was not the only race inhabiting Europe at this time. In their next paper Hamy and Quatrefages contrasted the Cro-Magnon humans with the Nean-

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47 Gabriel de Mortillet, “Classification des diverses périodes de l’âge de la pierre,” *Congrès International d’Anthropologie et d’Archéologie Préhistorique Comptes Rendus*, 1872, pp. 432–459. Mortillet was not only rejecting Lartet’s epochs of the cave bear, elephant, reindeer, and auroch but was also arguing that the best means for constructing a chronology for the Paleolithic was to examine the changes in the form and types of tools from different sites, thus utilizing typology rather than paleontology as the basis for prehistoric chronological systems.


derthal and Canstadt fossils. They identified human fossils from several sites that resembled the Cro-Magnon skeletons from Les Eyzies and argued that there existed a Cro-Magnon race that extended from Belgium and northern France to Italy during the Pleistocene and down to the Neolithic, even appearing in Iron Age cemeteries in some locations in France. They argued that there had existed a prehistoric Cro-Magnon race just as there had existed a prehistoric Canstadt race. Both races possessed dolichocephalic skulls, but otherwise the morphology of their skeletons differed in significant ways, which they outlined in detail in a separate paper.51 Besides the Canstadt and Cro-Magnon races, there were also other prehistoric races represented by human fossils from sites across Europe. They identified four prehistoric races that were to varying degrees brachycephalic or intermediate between brachycephalic and dolichocephalic. As in their previous papers, they carefully described the morphology of the bones and particularly the skulls that characterized these prehistoric races.

From the geological and archaeological material found with all these fossils Hamy and Quatrefages argued that the Canstadt race appeared to be the oldest, followed by the Cro-Magnons and finally by brachycephalic newcomers represented by human remains discovered in Grenelle, near Paris, in 1867.52 All of this was achieved through the comparative anatomical analysis of the growing collection of fossil humans discovered throughout Europe. Hamy and Quatrefages scrutinized the morphology of the bones and employed craniometry in an attempt to determine the racial characters of fossil humans. These techniques and objectives were well established in French anthropology, but Hamy and Quatrefages took the study of fossil humans one step further, comparing the palaeontological material collected during the 1860s and 1870s and using their results to identify specific prehistoric human races. They not only described their morphological characteristics but also used the geological and archaeological evidence obtained by archaeologists to determine the geographic distribution of these races and to construct a chronological sequence of their occupation of Europe during prehistoric times. But because they were anthropologists interested in fossil humans, their research interests and methods differed significantly from those of the geologists and archaeologists discussed in the previous section.

A pattern emerges in these anthropological studies, just as there were patterns in the discussion of human fossils by geologists and archaeologists. Pruner-Bey, Broca, Hamy, and Quatrefages were all trained in medicine, and their examination of fossil humans was essentially anatomical. They measured and took particular note of morphological differences, but they relied especially on craniometry. While Broca expressed an interest in ethnological questions regarding the culture and customs of prehistoric humans, he and the others were predominantly concerned with the central anthropological problem of identifying races, in this case prehistoric human races. Their colleagues in geology and archaeology were concerned instead with establishing the geological antiquity of their discoveries and examining the artifacts found with human remains. As we have seen, some geologists and archaeologists admitted the importance of an anatomical analysis of newly discovered fossil humans but acknowledged that they did not possess the requisite

skills or training for such analysis. Equally, the anthropologists frequently relied on the
geological and archaeological data collected by their colleagues, but their primary concern
was with establishing the racial characteristics of the newly discovered fossil humans and
relating these prehistoric races to contemporary European and other Old World races.
Royer’s and Topinard’s efforts to define a new science of paleoanthropology must be
understood within the context of these archaeological and anthropological studies.

IV. EXCAVATIONS AT SPY VIEWED WITHIN THE CONTEXT OF THE EMERGENCE OF
PALEOANTHROPOLOGY

One of the best-known excavations that led to the discovery of human fossils was
conducted in the Grotte de Spy in Belgium. Maximin Lohest and Marcel de Puydt began
their excavations of the rock shelter in August 1885. Lohest studied geology at the
University of Liège and in 1884 he began teaching geology at the university as an
assistant, which eventually led to his becoming a professor of geology there in 1897. De
Puydt was a lawyer and amateur archaeologist interested in Belgian prehistory. The
deposits in the Spy rock shelter contained flint implements and charcoal along with
mammoth, rhinoceros, cave bear, and hyena bones. In June 1886, in the lowest stratigra-
phic layer of the cavern, they discovered two human skeletons. At this point Lohest
and de Puydt brought Julien Fraipont into the project, assigning him the task of studying
the human remains. Fraipont was professor of “animal paleontology” at the University of
Liège, where he had studied zoology and paleontology. The result was a remarkable
collaboration that produced a coordinated geological, archaeological, and anthropological
analysis of the Spy material.

As for the excavations discussed in Section II, above, Lohest and de Puydt described the
stratigraphy of the Grotte de Spy and the animal fossils each layer contained, giving
special attention to the layer containing the human skeletons. They assured their readers
that there was no doubt about the geological antiquity of the human remains. They
described the artifacts found with the skeletons, using Gabriel de Mortillet’s classification
scheme to identify the artifacts as Mousterian while also noting that the bone and flint
implements Mortillet classified as Chellean were absent from these deposits. The deposits
lying above the skeletons contained a wider variety of stone and bone implements, which
indicated a succession of increasingly sophisticated industries as one proceeded from the
oldest deposits to the most recent ones in the cavern. Given the potential significance of
the human skeletons, Lohest and de Puydt were careful to show that these were entombed
in the lowest bed of the cavern and dated from the same period as the artifacts and animal
bones found with them, rather than being intrusive burials from a more recent period.
They stated that the breccia layer lying above the skeletons showed no sign of being
disturbed, which would have been visible if this had been a more recent burial.

Fraipont examined the skeletons, describing each bone and its morphology. He
subjected the skulls to a detailed analysis, noting that one was dolichocephalic while the other
was almost sub-dolichoplatycephalic. Both skulls strongly resembled the Neanderthal
cranium from Germany and as such represented the most complete specimens of the

53 Julien Fraipont and Max Lohest, “La race humaine de Néanderthal ou de Canstadt en Belgique: Recherches
ethnographiques sur des ossements humains, découverts dans des dépots quaternaires d’une grotte à Spy et
Canstadt race. Fraipont and Lohest frequently cited the anthropological researches of Broca, Pruner-Bey, Hamy and Quatrefages, and Topinard, but they also refer to the publications of Virchow, Schaaffhausen, and Thomas Henry Huxley on the Neanderthal specimen. Like Hamy and Quatrefages, Fraipont examined each bone from the Spy humans and compared them with the descriptions of other prehistoric fossil and living human races. He concluded that the Spy humans belonged to a race that was of smaller stature than modern Belgians but similar to modern Lapps. The remarkable robustness of the bones indicated that these people were muscular. Most significantly, they belonged to a race that was dolichocephalic and more or less prognathous (having a protruding jaw); they were robust and stocky with short arms and legs and were in their overall features “neanderthaloid.”55 Indeed, much of Fraipont and Lohest’s paper dealt with a broader examination of the prehistoric Canstadt race identified by Hamy and Quatrefages, as well as the French, Belgian, and German literature on the Neanderthal and other ancient human fossils.

What is important, in my view, about the collaboration of Lohest, de Puydt, and Fraipont is that it embodies the ideal being espoused by Paul Topinard at just that time. Topinard called for researchers trained in anatomy or zoology to be involved from the start in the excavation and analysis of prehistoric human fossils. Training in geology and archaeology was essential to excavations of this kind, since the stratigraphy, animal fossils, and prehistoric artifacts found were essential elements in determining the antiquity of the artifacts and human remains discovered. But it was also becoming increasingly apparent that scientists trained in human anatomy and anthropological methods were essential in the analysis and interpretation of prehistoric human bones. We have seen how excavations in the 1860s and 1870s were conducted by geologists and archaeologists, while analysis of human fossils was conducted by anatomists and anthropologists. The collaborative research undertaken by Lohest, de Puydt, and Fraipont (a geologist, an archaeologist, and a zoologist and anatomist) was not only unique; an argument could be made that it represents the first truly paleoanthropological research project, as defined by Topinard in 1885–1889.

V. CONCLUSION

Paleoanthropology emerged within the context of the growing archaeological evidence from the late 1850s and early 1860s for the presence of humans in Europe during the Pleistocene. There continued to be skepticism and debate over the interpretation of the evidence for such extreme human antiquity among some scientists well into the 1870s, and there was considerable uncertainty and even opposition to the idea on the part of other intellectuals and the public at large. To satisfy these concerns and to answer many of the significant questions still remaining about human prehistory, ever greater numbers of prehistoric archaeologists began to undertake excavations throughout Europe, and on other continents as well, in order to strengthen and expand the evidence for Pleistocene humans. Most of that evidence continued to be in the form of stone implements and other kinds of artifacts found in geological contexts that supported the claim that humans truly had lived among mammoths during the great glacial epoch, as they called it. But once

55 Ibid., pp. 600–608, 660.
As is proper in science, there was concern among many scientists that the human fossils being found associated with a Pleistocene fauna and Paleolithic artifacts might not belong to these deposits but instead be the remains of intrusive burials from the Neolithic or even more recent periods, which in fact were common and well recognized during this time. As a result, the geologists and archaeologists who excavated and described human fossils and Paleolithic artifacts from Pleistocene deposits (the diluvium) devoted a great deal of effort and care to marshaling the evidence to assure the genuine antiquity of the human bones they unearthed. Moreover, the fact that these researchers were largely trained in geology or archaeology influenced the way they examined and interpreted the geological, paleontological, archaeological, and fossil human material produced by their excavations. From the cases examined in this essay, it would appear that Topinard was correct in identifying the training of these excavators as being an important factor influencing the way they treated human fossils, but it also appears that Topinard may have been somewhat unfair in his criticism of those whom he described as mere amateurs and excavators who were only concerned with finding artifacts and ignored human fossils. A fairly significant number of fossil human bones associated with a Pleistocene fauna or Paleolithic artifacts (and often with both) were either discovered through such excavations or, when discovered by accident, were first recognized and investigated by geologists and archaeologists interested in human prehistory. These researchers played an important function, therefore, in recovering fossil human remains and, even more important, in establishing their geological antiquity through geological and archaeological investigations of the sites they came from.

From the cases discussed in this essay, Topinard appears to have been justified in his complaint that the excavators who discovered human fossils did not subject these bones to the kind of anatomical and anthropological examination that professional anthropologists at the time would have considered adequate and necessary. Topinard’s call for the creation of a new discipline, paleoanthropology, reflects the particular interests and objectives of anthropologists of the late nineteenth century. Whereas the geologists and archaeologists unearthing artifacts and human remains in Pleistocene deposits were primarily concerned with assuring the geological age of these discoveries and perhaps with establishing a relative chronology for human prehistory, anthropologists were concerned with an entirely different set of issues. They were utilizing anthropological techniques and making measurements such as the cephalic index and the facial angle used in craniometry, as well as measurements and examinations of the morphology of the bones, in order to determine the racial characteristics of these prehistoric humans—just as these techniques were used to study living human races. Paleoanthropology as it came to be defined and practiced in the later twentieth century—as the study of human evolution and of extinct hominid species—is markedly different from how paleoanthropology was defined and practiced at its inception at the end of the nineteenth century. Royer and Topinard defined paleoanthropology as a science that studied prehistoric human remains and prehistoric races, which required training in zoology or anatomy—just the kind of training most anthropologists of this period possessed. And as we have seen, those scientists most active in studying human fossils in the 1860s and 1870s in France were in fact anthropologists originally trained as physicians or naturalists.

A final point should be made. This study has explored the origin of paleoanthropology as a science, how it was defined by its creators, and the broader context of research from
which it emerged. We can see from this account how from a very early point a particular relationship was established between prehistoric archaeology and paleoanthropology, which continued to influence the way human prehistory was studied into the twentieth century. Further research will uncover interesting ways in which that relationship changed over time. But it is also particularly interesting, given the development of paleoanthropology after 1890, to note the place occupied by the idea of human evolution in the definition and practice of paleoanthropology at the end of the nineteenth century. The Société d’Anthropologie de Paris held a formal debate about evolution (often called transformism in France) in 1869 and 1870, and human evolution was a subject of discussion among anthropologists throughout Europe, especially in the years following the publication of Thomas Huxley’s *Evidences as to Man’s Place in Nature* (1863), Karl Vogt’s *Vorlesungen über den Menschen* (*Lectures on Man* [1863]), and Charles Darwin’s *Descent of Man* (1871). But given the emphasis on the study of race among anthropologists, the ability to account for the anatomical features of fossil humans within the racial variability of humans, and the absence of clearly “prehuman” transitional forms before the discovery of *Pithecanthropus erectus* in Java in the early 1890s, it was possible to study fossil humans without interpreting them within an evolutionary framework. This situation changed dramatically by the early decades of the twentieth century, and as a result paleoanthropology changed as well.

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