Palaeoanthropology is a relatively recent science when its history is compared to that of other natural sciences, but it has grown to become a prominent field of study that has produced many remarkable discoveries and important theories. It has constructed a professional identity and formed its own institutions, while still retaining close links with other natural and social sciences. Most significantly, it has revolutionized our understanding of human origins and prehistoric human culture. This paper is a historiographical study of recent scholarship in the history of palaeoanthropology and other sciences involved in human origins research that will attempt to outline some prospective new areas of enquiry as well as some promising ways of examining that history. Historically palaeoanthropology grew out of a number of different sciences and today it still encompasses a range of problems and sub-disciplines, and therefore in this paper I include within its scope human evolution, hominid palaeontology, and prehistoric archaeology, while acknowledging other fields that have contributed to the study of human origins. Indeed, examining this conception of palaeoanthropology is one of my objectives.

The dramatic changes that have occurred in palaeoanthropology in recent decades have led some practitioners to become interested in the history of their discipline and a number of recent works examine the major discoveries and theoretical developments of palaeoanthropology in the twentieth century. This is not the first time that palaeoanthropologists have taken a retrospective look at their past in order to assess the current state of their field following a period of rapid growth and upheaval. During the middle of the last century, just when palaeoanthropology was emerging as a distinct discipline, scientists and popularizers of science published historical surveys of the emergence and development of human origins research that usually begin with Darwin, evolutionary theory, and the first discoveries of human fossils in the nineteenth century. Most of these early works portray the history of palaeoanthropology as consisting of a series of hominid fossil discoveries and models of human evolution that changed over time as the fossil evidence and biological theories changed. Only occasionally was the history of palaeoanthropology situated within the broader developments that were taking place in the other natural sciences, and rarely do they discuss the external social factors that helped shape the history of human origins research.

Despite the prominent accomplishments of palaeoanthropology and its growing stature as a science, few general histories of modern science even mention
palaeoanthropology and historians of science have only recently begun to write on the subject. This reflects the relative lack of interest in the history of anthropology and archaeology among historians of science. This situation is changing, however, as an increasing number of historical works are beginning to investigate aspects of the history of palaeoanthropology from the perspective of social history, the history of science, and the philosophy of science. As a result, entirely new questions and problems are being raised about the scientific study of human origins and prehistory. Many of these recent works examine specific aspects of the history of palaeoanthropology that are directly connected to developments in a particular natural science such as geology, palaeontology, or biology. These works have expanded our knowledge hugely, but they often do not address the bigger picture of how specific problems or theories in palaeoanthropology extend beyond disciplinary boundaries. We have begun to acquire some fragments of the history of palaeoanthropology, but what is needed is a more comprehensive view of what the history of palaeoanthropology is and perhaps some suggestions for how to investigate that history. Thus, one objective of this paper is to propose some ideas about what the history of palaeoanthropology encompasses and how a new generation of scholars might build upon the work that has already been done. This paper will argue that the most productive perspective of the history of palaeoanthropology is one that recognizes the interrelationships between developments in geology, palaeontology, evolutionary theory, archaeology, and physical anthropology. An additional weakness of some recent scholarship is that historians who approach the history of palaeoanthropology from the natural sciences can tend to diminish the role of developments in the human sciences, while historians of anthropology and archaeology equally can misjudge the significance of developments in the natural sciences. I hope this paper can help bridge the gap that sometimes appears to exist between the history of the natural sciences and the history of the human sciences.

Another central argument I wish to make is that a more nuanced and complex picture of modern human origins research will emerge if the ideas, methodologies, and theoretical perspectives that have arisen within the discipline of science studies are applied to analysing the history of palaeoanthropology. Examples of this kind of scholarship are already beginning to appear. Some scholars have begun to explore the metaphysical foundations of human origins research, challenging the assumptions employed by its practitioners, the methodology of the various sciences contributing to this research, and the social and cultural motives that have led scientists to try to understand and explain human biological and cultural evolution. Studies of gender in history and feminist scholarship have led some researchers to investigate the role of women in palaeoanthropology and the ways that gender has influenced theories of human biological and cultural evolution. Others have raised questions about the way palaeoanthropologists have conceptualized or portrayed women in prehistory, from simply excluding women from accounts of human origins to recent theories that emphasize the role of women and women’s activities. The growing interest among some historians of science in the history of scientific illustration and the role of images in communicating knowledge has influenced some
provocative recent studies of illustrations and reconstructions of human prehistory and of hominid species. This research has investigated the way assumptions about human evolution or the phylogenetic status of hominids such as the Neanderthals or the australopithecines have influenced the way they are depicted in illustrations. Illustrations of human prehistory are, therefore, a resource that historians can use to analyse the theories and presuppositions of palaeoanthropologists. Meanwhile, other scholars have borrowed techniques from textual analysis and literary studies in order to examine the narratives constructed by palaeoanthropologists in their theories and scenarios of human evolution, which have offered insights into the role that mythical and literary formulations still play in accounts of human origins.

For all of these reasons the time is ripe for a comprehensive look at what has been accomplished by scholars investigating the history of palaeoanthropology and the other sciences related to human origins research, at what still needs to be done, and what ideas and perspectives might be employed to further that research. It will also serve as an opportunity to examine what palaeoanthropology is today and how it emerged as a discipline, as well as an opportunity to examine its place in modern science and modern culture. And finally, it will allow us to explore the place of the history of palaeoanthropology within the history of science.

CONTRIBUTIONS OF ARCHAEOLOGY AND GEOLOGY IN THE NINETEENTH CENTURY

Difficulties arise since palaeoanthropology as a term and as a discipline only appears in the twentieth century, but it emerged directly out of problems and discoveries extending back into the early nineteenth century. Many histories of palaeoanthropology consider the beginnings of the modern scientific study of human origins to have begun in the nineteenth century at the earliest and most of their research only extends back to this period. For this reason I will treat the history of human origins research during the last two centuries only. However, it is important to recognize that many important developments in the sciences and scholarship generally in the seventeenth and eighteenth centuries provided a foundation for subsequent ideas about human origins. Geologists and palaeontologists had dramatically extended the history of the earth and had begun to outline the history of life on earth. Zoologists such as Carl Linnaeus had begun to examine the anatomical and taxonomic relationship of humans with other animals and the European voyages of exploration were confronting researchers with the problem of how the expanding variety of human populations, increasingly defined as distinct races, were related to one another. Furthermore, antiquaries were just beginning to unearth the material artifacts of prehistoric peoples, thus extending European history into ever deeper periods into the past, while philologists were exploring the connections between human languages, which was also suggesting a far longer history for humans than the biblical chronology permitted. And pervading all early inquiries into human origins was the fact that these new discoveries and theories deviated more and more from the biblical account of human origins. While many scientists were unconcerned with the religious implications of their ideas, many religious leaders and members of the public were. Thus human
origins research emerged from a wide array of problems and scientific investigations, so the task before us is to show how in the nineteenth and twentieth centuries these distinct problems and sciences grew into new problems and a new discipline that we call palaeoanthropology.

Archaeology has been a primary means by which human prehistory has been investigated and during the nineteenth century it was undergoing dramatic change as it became professionalized and archaeologists formulated a rigorous scientific methodology. Collectors accumulating archaeological artifacts in private museums and in large public institutions provided an important impetus to the study of prehistory, and the objects contained in these collections posed challenging questions about the earliest periods of human history. Museums became centres of research and for the education of the public and were critical to the development of prehistoric archaeology, but the history of institutions devoted to the study of prehistory remains largely unwritten.

During the first half of the nineteenth century prehistoric archaeology was transformed when Scandinavian archaeologists, led by Christian Jurgensen Thomsen (1788–1865) and Jens Jacob Asmussen Worsaae (1821–85), proposed the Three Age System. On the basis of excavations in Denmark and later throughout northern Europe they argued that prehistoric sites could be organized chronologically into three successive periods: a Stone, Bronze, and Iron Age. Historians of archaeology have argued that this idea revolutionized the study of prehistory by suggesting an order and a structure to prehistory as well as establishing a schema within which to interpret prehistoric artifacts. Underlying these developments were the relationships that existed between the practices and objectives of archaeological fieldwork and natural history fieldwork at this time and the ways archaeology and natural history museums organized and displayed specimens in order to communicate a narrative of the history of the earth and of life on earth.

While archaeologists were investigating recent human prehistory in Europe, geologists were beginning to discover troubling evidence of an even greater human antiquity. Much has been written about the discovery of flint implements found with the fossils of extinct mammals between 1820 and 1860 and the role these discoveries played in convincing a sceptical scientific community that humans had been in the world far longer than the six thousand years permitted by biblical chronology. The discovery by the English palaeontologist William Buckland (1784–1856) in 1823 of a human skeleton in a cave among the bones of extinct mammals has attracted attention from historians since it was one of the earliest cases that suggested humans had coexisted with animals from a geologically remote period in the past, yet Buckland was able to explain away this interpretation by suggesting the remains were an intrusive burial of a Roman period Briton. Similar attention is given to the excavations of Philippe-Charles Schmerling (1791–1836) at Engis, near Liège in Belgium, where human remains and stone artifacts were found in cave deposits with large quantities of extinct mammal bones. Discussions of Schmerling’s work have rightly emphasized the fact that he was one of the first palaeontologists to argue for a great human antiquity. Unfortunately, many of the studies of Schmerling take a
limited biographical approach to his research and do not situate it within the context of palaeontological and archaeological research at the time.\textsuperscript{15}

The greatest attention is given to excavations conducted in France and Britain in the 1840s and 1850s since these decades are seen as the pivotal period when the study of human origins was revolutionized. Some consider the researches of Jacques Boucher de Perthes (1788–1868), a customs official who amassed an immense collection of flint artifacts from deposits containing extinct mammal fossils in the Somme River valley, to be the beginning of modern prehistoric archaeology.\textsuperscript{16} Many authors consider Boucher de Perthes to be important because he recognized the meaning of these flint implements earlier than did many others and because his collection assumed a new significance after excavations in Britain led to similar conclusions. Recent studies have discussed other aspects of his scientific life such as the role of geological theory and of Jean-Baptiste de Lamarck’s transmutationist biology in his thinking, or have examined his broader scientific and literary aspirations.\textsuperscript{17} Other historians have emphasized instead the excavations conducted at Brixham Cave, in Britain, by members of the Geological Society of London in 1858 and 1859 as a critical event that led geologists to reassess the evidence for an unimaginable human antiquity.\textsuperscript{18} In all these cases we see geological, palaeontological, and archaeological discoveries confronting religious, historical, and philosophical ideas regarding human origins in ways that produced resistance and debate over the meaning of human artifacts found in geological deposits containing extinct animals. This debate extended well beyond the realm of science, but once the debate ended new research problems and a radically different conception of human origins arose.

The publication of Charles Lyell’s \textit{Geological evidences of the antiquity of man} (1863) has come to mark the point at which the debate over human antiquity began to be settled and attention turned toward exploring a whole new set of problems.\textsuperscript{19} Geologists began in the 1860s to search for other sites containing human artifacts associated with extinct mammals in order to determine just how deep in the geological strata they could find evidence of human presence, while archaeologists tried to understand how the crude flint implements found with extinct animal fossils related to the less ancient and less controversial Stone Age tools identified earlier in the century. Several interesting studies have been published recently on the contributions of the English archaeologist Sir John Lubbock (1834–1913) and the Scottish archaeologist Daniel Wilson (1816–92) to the history of prehistoric archaeology.\textsuperscript{20} Lubbock’s \textit{Pre-historic times} (1865) was one of the first works to provide a comprehensive survey of research in prehistoric archaeology and it introduced the idea that the Stone Age needed to be divided into two distinct periods, the Palaeolithic represented by crudely chipped flint implements and the Neolithic represented by more finely crafted tools from later more advanced peoples.

Both Lubbock’s \textit{Pre-historic times} and Daniel Wilson’s \textit{Prehistoric man} (1862) mark the emergence of a new discipline, prehistoric archaeology, and the use of the term ‘prehistory’ in English. Several writers have subjected the origins and formulation of the concept of prehistory to scrutiny, noting that various terms were invented in
different European languages to designate this new idea that encompassed a new set of facts that required investigation within a new science.\textsuperscript{21} This raises interesting questions about discipline formation and much remains unknown about how prehistoric archaeology laid claim to research domains that previously resided partially within geology and partially within archaeology. Central to these developments were the establishment of professional societies and journals devoted to prehistoric archaeology in the nineteenth century, and historians are only beginning to examine how prehistoric archaeology developed differently in different countries.\textsuperscript{22}

Geologists and prehistoric archaeologists during the second half of the nineteenth century discovered numerous Palaeolithic sites in Britain and France that offered new insights about when humans first appeared on earth and what those original humans were like. While there were a large number of researchers and discoveries during this period, historians have tended to focus on only a few major figures and their accomplishments. Scholars note the excavations of the French palaeontologist Édouard Lartet (1801–71) at Aurignac and in the Dordogne regions of France as representing a significant advance in the development of Palaeolithic archaeology,\textsuperscript{23} as was the subdivision of the Palaeolithic by the French archaeologist Gabriel de Mortillet (1821–98) into the successive stages of the Chellean, Acheulian, Mousterian, Solutrean, and Magdalenian — each represented by its own distinct stone tool industry. De Mortillet’s ideas about the evolution of culture, his role in developing institutions for the study of prehistory, and his political and social activism make him an influential figure in the history of palaeoanthropology,\textsuperscript{24} but a great deal remains unknown about the contributions of many other geologists and archaeologists of that generation throughout Europe.

The so-called eolith controversy, which raged around the turn of the century, demonstrates the enthusiasm and uncertainty that existed at the limits of prehistoric archaeology during this time. Historians have examined how the debate over eoliths, naturally fractured flint flakes that some archaeologists thought were the earliest stone tools, was eventually resolved, while others have focused on the reasons archaeologists believed such artifacts should exist and how eoliths were used to justify certain views about human origins.\textsuperscript{25} The doubts and confusion surrounding eoliths paled in comparison to the debates that arose among European prehistorians after the excavation of carved bone and stone figures in cave deposits, followed by the surprising discovery of prehistoric cave paintings at Altamira, in Spain, in 1879. These examples of “prehistoric art” generated considerable controversy and posed challenging questions about the cultural and intellectual abilities of prehistoric humans. Indeed, it was not until additional cave paintings were found in the caverns of Trois Frères and Lascaux in the early twentieth century that prehistoric paintings were even taken seriously by most anthropologists. Very little historical scholarship exists on the debates over the meaning of prehistoric art,\textsuperscript{26} which is unfortunate since they raise interesting questions about the preconceptions anthropologists had of prehistoric humans, as well as questions about what was considered to be a credible archeological artifact.
EVOLUTION THEORY AND THE HOMINID FOSSIL RECORD

In a coincidence of history, at the same time that excavations at Brixham Cave in Britain and the reassessment of Boucher de Perthes’s discoveries in France were thrusting the idea of the geological antiquity of humanity before European scientists, Charles Darwin published *On the origin of species* (1859). Darwin’s theory of evolution by natural selection, with its implications for the problem of human origins, is a critical event in the history of palaeoanthropology. An immense quantity of scholarship exists on Darwin and evolution theory and there are many resources that discuss this literature. Therefore, I will discuss only those works that focus on the ways evolution theory was applied directly to the question of human evolution. The French naturalist Jean-Baptiste de Lamarck (1744–1829) had already proposed a theory of the transmutation of species in his *Philosophie zoologique* (1809) that situated the origin of humans within the context of a biological theory of species change. Darwin’s theory of evolution by natural selection transformed the study of human origins by suggesting that humans had arisen from an apelike ancestor at a remote period in the geologic past. It implied that humans were closely related to the existing primates and that much could be learned about human evolution by studying modern apes and monkeys. This resulted in primatology becoming a science that made valuable contributions to palaeoanthropology. Darwin’s notion of common ancestors and the role of palaeontology in providing fossil evidence of evolution led to the notion that the fossil record should contain creatures ancestral to modern humans, the so-called “missing links”. Darwin did not address the implications of evolution theory for human origins until 1871 in his *Descent of man*, but immediately upon the publication of the *Origin of species* debate began among scientists and the public over the implications of evolution for the nature and origins of humans.

Evolution had implication for other disciplines related to human origins research as well. Victorian physical and social anthropology were profoundly affected by evolutionary theory. Archaeological theory was also influenced by evolution well into the twentieth century. After Darwin, palaeontology and biology assumed a new importance in human origins research, whereas earlier in the century archaeology, geology, and physical anthropology were the more relevant sciences. Thomas Henry Huxley (1825–95) produced important anatomical comparisons of humans and the anthropoid apes as well as an influential examination of the original Neanderthal fossils, all within the context of evolutionary theory, and the application of Darwin’s theory to the problem of human evolution by Huxley in Britain and Ernst Haeckel (1834–1919) in Germany led researchers to construct hypothetical phylogenies representing the evolutionary history of humans back to our primate ancestors, and in the process anthropologists addressed in new ways the question of a monogenist or polygenist origin of the modern human races and the relationship of humans to the apes. But perhaps the most significant impact of evolutionary theory, especially coming on the heels of the geological evidence that suggested to many a considerable geological antiquity for mankind, was the impetus it created to search for the fossil evidence that humans had indeed evolved.
The twentieth century produced a long succession of spectacular discoveries of increasingly older hominid fossils, the ancestors that inhabit the human evolutionary family tree. The importance of these fossils for palaeoanthropological theory and the dramatic nature of the fossils themselves have meant that some accounts of twentieth-century palaeoanthropology are little more than summaries of how and when each famous hominid fossil was discovered. While hominid palaeontology is a major component of palaeoanthropology, it is only one element of a much more complex story of the history of palaeoanthropology in the twentieth century. A great deal of the historical research conducted to date tends to focus on the fossil discoveries, but some of these works do an exemplary job of describing how each major hominid fossil was found, how they were interpreted, and their contribution to palaeoanthropological theory during the late nineteenth and the twentieth centuries.

The search for the fossil remains of prehistoric humans had already begun by the time Darwin’s theory was becoming accepted. The discovery of archaeological artifacts with extinct animals had led some people to seek the skeletal remains of the people who made them, but human palaeontology assumed a new importance after Darwin. Great uncertainty and controversy surrounded the discovery of portions of a fossilized skeleton by quarry workers in the Neander valley in Germany in 1856. Many historians have written about the discovery of this first Neanderthal specimen, the debates these fossils sparked in Germany and elsewhere in Europe, and the impact they had on the fledgling science of human palaeontology and human evolution. Several interesting works have analysed the debates that arose in Germany over the significance and meaning of the fossils, while other works have examined the impact this and subsequent Neanderthal fossils had on theories of human evolution. However, enough uncertainty surrounded the anthropological and evolutionary significance of this specimen that it was not until the end of the nineteenth century that the Neanderthals became a major subject of study. The discovery of human skeletal remains at Les Eyzies, in the Dordogne region of France, in 1868 was significant primarily because they represented the makers of the Palaeolithic tools and as such were very ancient humans, but they were fully human and did not represent an apelike human ancestor. Perhaps this is the reason why few historians have explored more fully the significance of this discovery and its relationship to other discoveries at the time.

Excitement over the possibilities of human palaeontology rose considerably around the turn of the century as the result of a quick succession of surprising fossil specimens. Between 1890 and 1892 Eugène Dubois (1858–1940), a Dutch physician who had gone to Southeast Asia to search for the missing link that was hypothesized by Darwin and Ernst Haeckel, discovered a skullcap and a femur on the island of Java in geological deposits that contained Pleistocene mammals. The apelike morphology of the skull and the humanlike femur led Dubois to announce in 1894 that he had found the evolutionary link between apes and humans, a creature that he named Pithecanthropus erectus. A number of excellent works discuss the background to Dubois’s excavations and his interpretation of Pithecanthropus as a direct human
ancestor, as well as the factors that induced the majority of his European and American colleagues to reject Dubois’s interpretation of the specimen.

Attention soon turned away from Dubois’s remarkable but ambiguous discoveries in Java when new specimens of fossil humans were found in Europe. The German palaeontologist Otto Schoetensack (1850–1912) published an account of a fossil human jaw found by quarry workers in 1907, which he thought belonged to a primitive human that he called *Homo heidelbergensis*. The following year a Neanderthal skeleton was discovered near the French village of La Chapelle-aux-Saints and sent to the palaeontologist Marcellin Boule (1861–1942) at the Muséum National d’Histoire Naturelle in Paris. Although several Neanderthal skeletons had been found at Spy d’Orneau in Belgium in 1886, historians consider Boule’s analysis of the La Chapelle-aux-Saints Neanderthal to be a definitive event that shaped attitudes about the Neanderthals for over half a century. This is an interesting episode for scholars because it unites questions of the role of scientific institutions, Boule’s methods for analysing Neanderthal anatomy, the role of his views on evolution, and the impact of bias in scientific research, as well as the social context within which Boule conducted his study.

It is only recently that historians have begun to acknowledge the equally significant researches conducted by the German-Croatian palaeontologist Dragutin Gorjanović-Kramberger (1856–1936). Between 1899 and 1905 Gorjanovic-Kramberger excavated artifacts and a substantial number of Neanderthal specimens from a site near the Croatian village of Krapina. Palaeoanthropologists took a renewed interest in these specimens in the 1970s and this led researchers to reexamine the work of Gorjanovic-Kramberger, which proved to be innovative for its time. Much research remains to be done not only on Gorjanovic-Kramberger and his influence, but also on palaeoanthropological research in Germany and eastern Europe during the early twentieth century, a subject about which we know very little.

Neanderthal fossils were not the only early human remains turning up in Europe, however. Tremendous interest and excitement developed around the discovery by Charles Dawson (1864–1916) of a cranium and part of a mandible excavated from a gravel pit at Piltdown Common, in Sussex, England, between 1908 and 1912. Dawson, a lawyer and amateur palaeontologist, brought his specimens to Arthur Smith Woodward, Keeper of Geology at the British Museum (Natural History), in 1912, and soon thereafter they announced a new species of early human, *Eoanthropus dawsoni* or Piltdown Man. The large humanlike cranium and apelike jaw fitted many anthropologists’ model of human evolution and the Piltdown fossils influenced the study of human origins for decades until 1953, when it was shown to be a hoax. A voluminous literature surrounds the history of this, now notorious, specimen. Much of the scholarship continues to focus upon the question of who perpetrated the hoax and how it was done. More recent scholarship has examined the Piltdown episode within the broader context of human origins research at the time, showing that there were archaeological and evolutionary reasons for expecting that a creature with the anatomical features of the Piltdown fossils would be found in Plio-Pleistocene deposits. Moreover, there were social reasons why British scientists were eager to accept
the Piltdown Man found on British soil. This recent scholarship also begins to draw much needed attention to the events surrounding the exposure of the Piltdown fossils as fraudulent. The reasons why the Oxford anthropologist Joseph Weiner, the Oxford anatomist Wilfrid Le Gros Clark, and the palaeontologist Kenneth Oakley became suspicious of the specimens and the process by which they were able definitively to demonstrate that they were a hoax still needs to be studied in more detail. The Piltdown affair could also be fruitfully examined within the framework of studies of fraud in science generally.

New models of human evolution emerged after the discovery of *Pithecanthropus*, the Neanderthals, and Piltdown. In the United States, the physical anthropologist Aleš Hrdlička (1869–1943) proposed the Neanderthal phase hypothesis, which argued that modern humans had evolved directly from the Neanderthals. By contrast a number of anthropologists, exemplified by Arthur Keith (1866–1955) and Henri Vallois (1889–1981), supported the Pre-sapiens hypothesis, which rejected the Neanderthals as direct human ancestors and argued instead that anatomically modern humans had appeared already by the Pliocene. This diversity of opinion about human evolution may be grounded in the fact that evolutionary theory itself had fragmented into several different forms depending upon whether one supported Darwin’s mechanism of natural selection, neo-Lamarckian mechanisms, or some form of orthogenesis. This schism within evolutionary theory also influenced conceptions of human evolution, and many versions of human evolution during the first half of the twentieth century relied upon non-Darwinian models of how evolution operated. Theoretical ideas coming from biology, physical anthropology, hominid palaeontology, and even archaeology all interacted to help shape ideas about the process of human evolution, models of hominid phylogeny, and the interpretation of specific hominid specimens, but to date scholars have studied only portions of this complex component of twentieth-century palaeoanthropology.

HOMINID DISCOVERIES IN ASIA AND AFRICA IN THE TWENTIETH CENTURY

A profound change occurred within palaeoanthropology in the 1920s and 1930s when excavations in Asia and Africa opened new territory for exploration and produced new hominid specimens to consider. Scholars have written about the excavations of the Canadian anatomist Davidson Black (1884–1934) at Zhoukoudian, near Beijing in China, that produced a substantial collection of artifacts and numerous fossils belonging to a species of hominid that Black named *Sinanthropus pekinensis* and that the press called Peking Man. More recently, historians have also begun to consider the contributions made by Black’s Chinese colleagues and to investigate the history of palaeoanthropological research in China during the last half-century. Less scholarship exists on the excavations conducted by the German palaeontologist Gustav Heinrich Ralph von Koenigswald (1902–82) in Indonesia during the 1930s, which produced a number of new *Pithecanthropus* specimens that were instrumental in convincing European anthropologists to reconsider Eugène Dubois’s original interpretation of *Pithecanthropus*. 
While the discoveries of hominids in Asia generated considerable interest and anthropologists generally accepted the idea that these hominids were the evolutionary ancestors of modern humans and that Asia was the probable cradle of humanity, fossils unearthed in Africa during this period faced a very different fate, at least at first. When Raymond Dart (1893–1988), professor of anatomy at the University of Witwatersrand in Johannesburg, South Africa, published in 1925 his description of a humanlike ape that he called *Australopithecus africanus*, the specimen was greeted with interest but general scepticism. Scholars have identified a number of reasons for the cool reception that faced Dart’s claim that he had found the link between apes and humans and they have examined the process by which palaeoanthropologists gradually came to change their minds about the australopithecines. Attitudes toward the australopithecines changed during the 1940s largely as a result of the efforts of Robert Broom (1866–1951) and his assistant John T. Robinson (1923–2001), who collected a number of australopithecine specimens from cave sites in South Africa during the 1930s and 1940s. Broom and Robinson argued forcefully that the australopithecines were the direct ancestors of modern humans, but historians have also noted the critical role that Le Gros Clark played in the reassessment of the australopithecines.

While South Africa continued to be an important centre of palaeoanthropological research through the remainder of the century, by the 1950s another centre of research opened in East Africa. The excavations carried out at Olduvai Gorge by Louis S. B. Leakey (1903–72) and Mary Leakey (1913–96) resulted in numerous fossil hominids, including *Zinjanthropus boisei* in 1959 and *Homo habilis* in 1960, as well as some of the oldest known artifacts, called Oldowan tools. The International Omo River Expedition, which began excavations in Ethiopia in 1967, and the Koobi Fora Research Project, initiated by Richard Leakey (1944–) in 1968 along the shores of Lake Turkana in Kenya, mark the beginning of large-scale international interdisciplinary research projects in palaeoanthropology. While historians have written about the fossils found during the last half-century in East Africa and the theoretical debates these discoveries have created, it is only recently that scholars have begun to investigate the social and political factors that have risen to prominence as palaeoanthropological research has become an expensive, logistically complex, and politically and institutionally prestigious activity. The spectacular success of large excavation projects is reflected in the work at Hadar where Donald Johanson (1943–) discovered *Australopithecus afarensis* (Lucy) and in the prodigious quantity of fossils unearthed by the Middle Awash Research Project.

**INTERDISCIPLINARY NATURE OF MODERN PALAEOANTHROPOLOGY**

Palaeoanthropology underwent a revolution during the second half of the twentieth century but that revolution was not solely the result of the explosive increase in the number and geographical distribution of different hominid species discovered, although this is often the focus of histories of palaeoanthropology. New ideas in biology were imported into palaeoanthropology that changed the way human evolution
was understood and the way hominin fossils were classified. Population genetics and the Modern Evolutionary Synthesis were applied to the problem of human evolution beginning in the 1950s, while at about the same time cladistics was utilized to interpret hominid phylogeny and the taxonomic status of individual hominid species. At the end of the century, the theory of punctuated equilibria proposed by Stephen J. Gould and Niles Eldridge began to influence the thinking of some palaeoanthropologists. Historians need to investigate more thoroughly the impact competing biological theories have played in explanations and models of human evolution, since there has been a complex and important relationship between biology and palaeoanthropology over the last century. The dramatic research using molecular biology to study the phylogenetic relationship existing between humans and primates as well as between different populations of humans is another area that has only begun to be explored historically. This has played a role in the debate between the supporters of the Out of Africa hypothesis and the Multiregional hypothesis, which is not simply a scientific debate but one that possesses political and racial implications that hark back to the debates between monogenists and polygenists.

Developments in geology during the twentieth century have also contributed greatly to the way palaeoanthropologists interpret the age of fossils based on stratigraphy, as well as in the reconstruction of palaeoenvironments, yet little research exists on the role of geologists in large palaeoanthropological expeditions or in the way geological theories have been utilized by palaeoanthropologists. More attention has been given to the development of absolute dating methods, including dendrochronology and radioactive dating methods such as carbon-14 and K-Ar dating. The ability to date artifacts or geological deposits was a major breakthrough in prehistoric archaeology and palaeoanthropology, but few studies have examined the impact dating methods had on specific models of human evolution or on the relationship between anthropologists using this information and the specialists from physics or chemistry who were responsible for producing the dates.

The picture of human origins research that emerges from the many books and articles that examine its history over the last two centuries is one of a science that is involved in a broad range of research problems. It emerged at the beginning of the nineteenth century from numerous independent disciplines and in the course of its history it has continued to make use of ideas and techniques drawn from fields such as archaeology, geology, palaeontology, and biology. The process by which palaeoanthropology established its own professional identity has still not been fully investigated and we are only beginning to analyse the role that the natural and human sciences have played in human origins research. Even less is known about the way that philosophical, political, and religious factors have influenced human origins research. The biblical account of human origins was modified or simply abandoned by many researchers in the face of the new evidence accumulated by geologists, naturalists, anthropologists and archaeologists. Some researchers, however, expended great energy to harmonize recent scientific ideas with Christian doctrine, while religious thinkers vigorously attempted to respond to what they perceived as a challenge to
traditional religion. The response of creationists to the idea of human evolution and the evidence supporting it is one prominent example of the religious response to palaeoanthropology, but Christian doctrine has influenced the discussion and investigation of human origins in many ways. The pre-Adamite theory reflects one way that religion has played a role in theories of human evolution, but there are many aspects of the interaction of religion and human origins research that still need to be examined. In addition to religion, human origins research also possesses some inherently political features to it as well. Theories of human evolution impact on the concept of race and ethnicity. Political ideology has also employed human origins research for social and political ends. The implications of European and American researchers conducting excavations and removing hominin fossils from Asian and African countries during and following the colonial period is another subject that remains largely unexplored. Moreover, almost no studies have discussed the creation of palaeoanthropological institutions in Asian and African nations or the success over the last quarter-century in training researchers from these countries.

Historians, philosophers, and sociologists of science have a great deal to contribute to a better understanding of the development of palaeoanthropology as a science and to the impact it has had on modern culture and society. Professionals in the domain of science studies have a sophisticated collection of tools and approaches that they can apply to the history of human origins research, and these can supplement in important ways the very useful research that has already been conducted by archaeologists and palaeoanthropologists, who have examined the history of their discipline from the perspective of their own pedagogical, intellectual, and professional concerns. We will not only achieve a fuller understanding of why palaeoanthropology and related disciplines developed in the way they have, but historians of science will also have an opportunity to see the ways in which human origins research has had an impact on other sciences. Equally important, palaeoanthropology may serve as a bridge that will highlight the historical links that exist between some natural sciences and the human sciences — such as comparative linguistics, physical and cultural anthropology, or evolutionary psychology. The history of human origins research, like the history of many other human sciences, is still largely in its infancy and there are huge opportunities for researchers to make significant contributions to this subject. The literature discussed in this paper and the rough outline of the history of human origins research and of the major research problems deserving attention will hopefully motivate a new generation of scholars to examine the history of a science that is transforming our understanding of human origins and of what it means to be a human being.

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6. Stephanie Moser has published widely on these subjects. Her works include “The visual language of archaeology: A case study of the Neanderthals”, Antiquity, lxvi (1992), 831–44; “Picturing the prehistoric”, Metascience, iv (1993), 58–67; and “Visual representation in archaeology: Depicting the missing-link in human origins”, in Picturing knowledge: Historical and philosophical problems concerning the use of art in science, ed. by Brian S. Baigrie (Toronto, 1996), 184–214. See also Martin Rudwick, “Encounters with Adam, or at least the hyaenas: Nineteenth-century visual representations of the deep past”, in History, humanity and evolution: Essays for John C. Greene, ed. by James R. Moore (Cambridge, 1989), 231–51. This research also intersects the issue of gender when depictions of prehistoric women are considered, as in Melanie G. Wiber, Erect men, undulating women: The visual imagery of gender,“race” and progress in reconstructive illustrations of human evolution (Waterloo, 1997). Other scholars have analysed the development of archaeological illustration, technical drawing, and representations of prehistoric archaeological sites by artists. On this see Serge Lewuill{on}, “Archaeological


8. A vast literature exists on all these subjects, but to see how these subjects relate to the history of human origins research see Matthew R. Goodrum, “Prolegomenon to a history of paleoanthropology: The study of human origins as a scientific enterprise. Part I. Antiquity to the Enlightenment”, *Evolutionary anthropology*, xiii (2004), 172–80, and “Part II. Enlightenment to the twentieth century”, *ibid.*, 224–33, both of which contain extensive references to the relevant scholarly works on these subjects.


15. An exception is Grayson, *The establishment of human antiquity* (ref. 12).


22. For some works that address aspects of this subject see Nathalie Richard, “L’institutionnalisation de la


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44. Brief discussions of the Pre-sapiens theory are scattered through a number of general histories (see ref. 27), but also see the discussion in Milford Wolpoff, “Vertsszőllös and the presapiens theory”, American journal of physical anthropology, xxxv (1971), 209–16.

45. A prominent proponent of an orthogenetic theory of human evolution was the American palaeontologist


61. David Livingstone has published several insightful works on this subject including The Preadamite theory and the marriage of science and religion (Philadelphia, 1992) and Adam’s ancestors: Race, religion, and the politics of human origins (Baltimore, 2008).

62. Some of these issues are raised in Robin Dennell, “Progressive gradualism, imperialism, and academic fashion: Lower Paleolithic archaeology in the 20th century”, Antiquity, lxiv (1990), 549–58.