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DATE 6.30.14

UNIVERSITY OF OKLAHOMA

GRADUATE COLLEGE

THE GILDED SKULL IN ENGLAND'S CLOSET: DISPLAYING HUMAN EVOLUTION AT THE AMERICAN MUSEUM OF NATURAL HISTORY

A THESIS

SUBMITTED TO THE GRADUATE FACULTY

in partial fulfillment of the requirements for the

Degree of

MASTER OF ARTS IN HISTORY OF SCIENCE, TECHNOLOGY AND MEDICINE

By

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Norman, Oklahoma
2014

THE SKULL IN ENGLAND'S CLOSET: DISPLAYING HUMAN EVOLUTION AT THE AMERICAN MUSEUM OF NATURAL HISTORY

A THESIS APPROVED FOR THE
DEPARTMENT OF HISTORY OF SCIENCE

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For the men and women who strive to educate the public through museums,

the people who visit them,

and my family who taught me to question everything.

Interroga Omnia.

Acknowledgements

So much has gone into this work that I must take a moment to acknowledge those who have aided me throughout the process. My advisor, Dr. Katherine Pandora not only saw potential in my original ideas but also helped me take a basket full of interesting or amusing anecdotes and produce something that is leagues beyond what I believed capable. Dr. Hale has steered me historically through sources that I had only been familiar with from a scientist's perspective. Through conversations and rewrites he and Dr. Pandora have helped me use my science background as an asset to my history and not a hindrance to thinking historically. I am especially grateful to Dr. Kerry Magruder for our now innumerable lunchtime chats. In addition to working through ideas and theories he has provided much needed recharges to my academic batteries at the most opportune times which helped me push through to this thesis's completion.

My wife Jami continues to support my drive towards a Ph.D. and my science outreach museum that sometimes takes up what little time writing leaves free. Our two dachshunds Madame Curie and Miss Chloe remain a positive force in my life and are always happy to see me take a break and spend some time with them which is much needed for all parties involved. They have also served as timekeepers that remind me that midnight is a suitable household bedtime, and will come and sit by the desk or chair until I acquiesce.

Images have been essential to the argument presented in this work. The first turn at digitization into microform and microfiche preserved text at the expense of blacked out imagery. The interlibrary loan staff at the Bizzell library have worked hard in order to find original hard copies from which I was able to procure useful images. They have

also dealt with lending libraries that have had trouble telling the difference between "March" and "May" and continued the search until they found what I needed. For their help and services I am truly grateful.

I would be remiss if I failed to acknowledge Jim Davis and Jay Ward. Their animated creations *Garfield and Friends* and *Rocky and Bullwinkle* have been constant companions through long hours of edits and rewrites. Both managed to keep the atmosphere surrounding my work light, comfortable, and more or less entertaining even in the tightest crunches and largest restructuring of text.

Finally, the dear friends I have made here, Leila McNeill, who arrived at OU the same time I did, and her husband Erik Friesen have provided nonacademic outlets of relaxation with games, Medieval Fairs, and COSMOS watch parties as well as geology, science fiction, and backpacking conversations. These are the tenets of happiness.

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Introduction

Rethinking Piltdown

On December 18, 1912 in a crowded room at Burlington House in London a few broken skull fragments and a piece of a lower jaw were presented to the Royal Geographic Society. The fragments, which would barely fill a cigar box, were christened *Eoanthropus dawsoni,* or "Dawson's Dawn Man." Colloquially, the discovery took its name from the local area where it was discovered, Piltdown in Sussex. Thus with great fanfare, pomp, and circumstance Piltdown Man was born. Two of the three men who introduced Piltdown to the world were respected professionals in their respective fields of science: they were Arthur Keith, Scottish anatomist and anthropologist and Arthur Smith Woodward, preeminent expert in fossil fishes. The third, Charles Dawson, a solicitor and amateur archaeologist and collector from Sussex, was the "discoverer" of the Piltdown skull.[1]

The skull was actually pulled from a gravel pit by workmen completing a roadway. Dawson visited the site regularly to inquire whether or not the workmen had seen anything interesting. Given the rich medieval history in Britain it was not uncommon to find archaeological treasure anywhere ground was broken. In fact there are still reports of farmers' plows turning up Anglo-Saxon gold and other artifacts. One day workers showed Dawson pieces of a skull and, according to Dawson, claimed that they thought it had been a coconut and smashed it with a spade.

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[1] The fragments from Piltdown are both too small and too few to recreate an entire skull as we will see later. For brevity and ease of writing and understanding the physical fragments discovered will be referred to as the "Piltdown Skull" throughout the thesis.

The fragments were neither gold nor silver, but were something more interesting and much in vogue with the scientific debates of the time. It was human, or at least human-like. As the question of human evolution began to take shape more fully in the early twentieth century, the physical remains needed to answer that question, which had been showing up all over the European continent, specifically France and Germany, for decades. Until Piltdown, however, British scientists were stuck looking across the channel at the finds in Germany and France.[2]

Piltdown was British. Finally, here was something to compare to the primitive Neanderthal from the continent and "Java Man" (*Pithecanthropus*) from Indonesia. Over forty years of discussion and comparison came to an end when in 1953 scientists at the British Museum (Natural History) revealed that the Piltdown skull was a fake: it was not a prehistoric fossil but instead a modern human skull matched with an ape jaw, all stained to look much older than they actually were. During the skull's credible years an estimated 500 essays were written about the discovery.[3]

Following the revelation of the forgery scientists and laymen alike have all presented opinions with varying degrees of evidence attempting to identify the forger. In this din of accusation and counter-accusation, the key aspects of the Piltdown skull as an item of scientific attention in the emergent period of work in human evolution that would become institutionalized as the discipline of paleoanthropology in the post-World

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[2] For an excellent overview of the research on human evolution see Rayomen Corbey and Wil Roebroeks, eds. *Studying Human Origins: Disciplinary History and Epistemology* (Amsterdam University Press, 2001). For more on the European discoveries of Neanderthal specifically see Paul Jordan, *Neanderthal: Neanderthal Man and the Story of Human Origins* (Sutton, 2001).

[3] Ronald Millar. *The Piltdown Men* (St. Martin's Press: New York, 1972), p. 10.

War II period have been lost. In this thesis I look at the earliest years of the Piltdown discovery as simply another set of fossil remains just as did scientists like Arthur Keith, Arthur Smith-Woodward, and Henry Fairfield Osborn, the American paleontologist and director of the American Museum of Natural History. In analyzing the arguments surrounding its proper classification, how to reconstruct it, and the nature of its relationship to past theories and future practices, my intent is to demonstrate that the Piltdown skull is much more important than a simple case of whodunit. Because of the place and time of its entry into the debates over early man, the response that was generated played a significant role in the transition from one form of investigation chiefly based on the pronouncements of a small coterie of anatomical specialists to an active fieldwork-based enterprise that worked directly in the public eye.

The largest hurdle to overcome in approaching Piltdown as an ordinary scientific object is the notoriety that is attached to the case. For decades frauds and hoaxes have fallen under the label of pseudoscience. For scientists, such episodes lie beyond the realm of serious discussion,[4] in large part because they have neither the need nor the time to investigate the "dead ends" of their disciplines. This ever-forward approach leaves episodes of dissent or relatively non-productive paths to the historian of science. Luckily, such episodes of fraudulent science provide insight into moments of conceptual turmoil, theoretical re-sets, and emerging new directions of the science

[4] Pseudoscience does not lend itself easily to serious scholarly inquiry. It seems open only to those participating in fringe theories. Recently a move towards eliminating that category has taken root. *Isis*, the premier journal in the history of science discipline, has even dropped "pseudoscience" from its list of categories, as described briefly in Stephen Weldon's "Bibliography is Social: Organizing Knowledge in the *Isis* Bibliography from Sarton to the Early Twenty-First Century." *Isis.* vol 104. no. 3 (September 2013), pp. 540-550.

beyond highlighting the existence of professional malfeasance. Their very existence reveals much about the nature of the scientific world of which they were a part. When we remove the stigma of pseudoscience from them they can provide instructive roadmaps into the shaping of scientific knowledge, especially in regard to issues such as scientific authority and what is at stake in particular scientific debates.

If we pull Piltdown out of the pseudoscientific trunk of unspeakable things, we will see that it serves as a remarkably illuminating marker of tensions about the status of drawing room sciences over that of science done in the field, of intellectual tug-of-wars between the venerable status of geology vs. paleontology and archaeology as upstart disciplines, and the emerging geography of modern scientific authority. That geography goes far beyond a small gravel pit in Sussex, through the Royal Society, and into one of the largest natural history museums in the world in the American Museum of Natural History. The men involved on nearly all sides of the analysis of Piltdown are of the same ilk characterized as "gentlemanly specialists" by Martin Rudwick in *The Great Devonian Controversy*,[5] in referring to the individuals who participated in the emergent period of geology becoming a professional discipline. Although taking place at the end of the nineteenth century, the investigation of human fossil remains had a similar socio-intellectual configuration—many who would be considered specialists, but few who had full-time authorization to work as professional human evolutionists of some sort. The key players knew each other and moved within shared social and intellectual circles without comprising a professional discipline with the full-fledged trappings of

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[5] Martin Rudwick, *The Great Devonian Controversy: The Shaping of Scientific Knowledge among Gentlemanly Specialists* (University of Chicago Press, 1985). See also Roy Porter, "Gentlemen and Geology: The Emergence of a Scientific Career, 1660-1920," *The Historical Journal,* vol. 21, no. 4 (December, 1978), pp. 809-836.

institutional guidelines that separated legitimate scientists from knowledgeable amateurs.

The interest in Piltdown occurred at a time when what later would be called paleoanthropology was gaining a professional foothold in the early twentieth century. Asking more about Piltdown than who is responsible for its existence will provide us with materials that not only illuminate tensions over answers to the questions of who belongs in the scientific community, but also the geographies of scientific credibility that were under scrutiny across the globe. In addition, by following the development of paleoanthropology as a separate discipline, as well as understanding more about the beginnings of the human evolution debates and their various utilizations of and reactions to the Piltdown skull, we can gain useful insight into the effects of the early days that shaped paleoanthropology as a discipline.

Because Piltdown was unceremoniously ejected from the realm of science the skull has never undergone any change in its early classification to account for later adjustments into where it should presently fit into the history of mankind; there was no need to do so since it was a fake. This situation perhaps accounts for why, as an artifact, it has never been reclassified historically either. It exists in the same present-day status in historiography as it did in 1915 simply because little attention has been given to the Piltdown skull as anything other than the means by which professional scientists were fooled. This makes Piltdown a promising vehicle for understanding "paleoanthropological" thinking in the period before paleoanthropology existed, helping us to see what options were available in constructing paleoanthropology during the next generations. Currently, when scientists, journalists, and historians look back at the era in

which debates occurred over how to understand the Neanderthal, Java, and Cro-Magnon remains as part of the history of human evolution, the participants in these debates are referred to as paleoanthropologists or as practicing something called paleoanthropology. And, yet, the use of this terminology covers over the diffuse nature of these networks and multiplicity of approaches that existed. It also imports back an implicit sense that what we consider to be markers of the science of paleoanthropology today existed at that time. What paleoanthropology looks like today is not an inevitable outgrowth of earlier practices, and other choices could have been made. How those choices were made and why they came to define the discipline are difficult to recognize if "paleoanthropology" is presumed to have emerged in its present form full-blown. Following the Piltdown discussion can help us see this amorphous period more clearly, and begin to identify how particular pathways to the establishment of the discipline were constructed.[6]

Such difficulties stem from the individual interpretations of the Piltdown fragments which the men who analyzed them claimed as authoritative based on their disparate scientific backgrounds. In order to make sense of these strikingly different demarcations in the reconstructed skulls, and the subsequent discussions of Piltdown, we must follow the fragments themselves through historical analysis. Both Thomas Gieryn's concept of boundary-work[7] as well as Susan Leigh Star and James R.

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[6] See Donald Grayson, *The Establishment of Human Antiquity* (Academic Press, 1983).

[7] Thomas F. Gieryn, "Boundary-Work and the Demarcation of Science from Non-Science: Strains and Interests in Professional Ideologies of Scientists." *American Sociological Review*, vol. 48, no. 6 (December, 1983), pp. 781-795.

Griesemer's work on boundary objects studies,[8] can be applied to the analysis of those fragments not only to paint a portrait of the skull but of the landscape into which the skull fit. In the case of Piltdown, the fragments served to fuse the disciplines of anatomy, geology, paleontology, and archaeology into a multidisciplinary movement in order to more fully understand the origins and evolution of mankind. This ecology of the Piltdown incident is wider than is encompassed by a focus on who was responsible for duping the British scientists. If we look at Piltdown in real time as it was discovered, reconstructed, and debated, it becomes an almost ideal way to understand the problematic nature of scientific discoveries and the associated issues of authority that they contain. As Jan Sapp put the matter in his investigation of scientific fraud: "A theory of discovery should concern itself *not* with determining what makes certain discoveries happen, but with what makes certain happenings discoveries."[9] This is all the more true when certain discoveries *happen* to be fakes.

To fully understand Piltdown we must do both. In this case Gieryn's boundary-work applies to the early theories of human evolution as understood by the anatomist, the geologist, and the paleontologist or archaeologist. The boundaries between these professionals, although not entirely ideological, are revealed by their assignment of importance to particular physical remains from the Piltdown site. For one the bone

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[8] Susan Leigh Star and James R. Griesemer. "Institutional Ecology, 'Translations' and Boundary Objects: Amateurs and Professionals in Berkeley's Museum of Vertebrate Zoology, 1907-39." *Social Studies of Science*, vol. 19, no. 3 (August, 1989), pp. 387-420.

[9] Emphasis in the original. Jan Sapp. *Where the Truth Lies: Franz Moewus and the Origins of Molecular Biology* (Cambridge University Press, 1990.), p. 30; Sapp is quoting Augustine Brannigan from his *Social Studies of Science,* vol. 9, No. 4 (November, 1979), pp. 423-454; see also William Broad and Nicholas Wade, *Betrayers of the Truth: Fraud and Deceit in the Halls of Science* (Simon and Schuster, 1982).

fragments were enough, while the others studied the gravel pit more thoroughly, and another spent more time working with the primitive stone tools. Star and Griesemer's boundary objects and 'translations' model lends itself to the literal physicality in the form of the reconstructed Piltdown skull. Several versions of the Piltdown skull in its fully restored form were discussed and debated by the men involved, each pointing out the strengths of their versions (and by association their scientific specialties) as well as the defects of the others.

If you look at the pomp, circumstance, and general buzz around the discovery of Piltdown during the early decades of the twentieth century, the fact that it was revealed as a fake in the early 1950s becomes moot for understanding where it "fit" and how it was used as a piece of scientific evidence in the time period when it was accepted as a "normal" piece of evidence (all "normal" pieces of human fossil evidence being subject to skepticism and controversy as a matter of course). By bringing these more subtle debates to the surface, Piltdown can no longer be brushed away with a condescending hand wave by historians of science, who have largely ignored or failed to engage with it. We must understand that "Piltdown was not an unfortunate lapse of scientific poise in the infancy of this discipline [paleoanthropology], but was symptomatic of its operating procedure," and engage with it accordingly.[10]

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[10] Wm. R. Fix. *The Bone Peddlers: Selling Evolution* (New York: Macmillan Publishing Company, 1984), p. 55.

Figure 1. The first *Punch* cartoon depicting evolutionary theory appeared on May 18, 1861.

As an artifact Piltdown is a time capsule, a fixed moment in time that answers the question: "If those studying human origins could create the perfect missing link in accordance with the prominent theories in 1912, what would it look like?" We have writings and theories for many of the debates, but the skull fragments reveal a full representation of what a human ancestor *should* be like, at least in 1912. As a product of its time—and it was literally a manufactured object of what "should" next be found—it was the embodiment of teleological evolution powered by progress (and, as Louis

Agassiz believed, mankind represented the logical endpoint of the vertebrate type.[11]) Arthur Keith and Henry Fairfield Osborn were both students of a system of racial hierarchy that markedly influenced their results, interpretations, and beliefs.[12] Such beliefs and representations had deep roots going back to the Enlightenment. Depictions of man as ape, ape as man, or as something in between did not appear overnight as an immediate response to Darwinian theory.[13]

Historical studies have demonstrated that the general public was more familiar with the issue of evolution before the publication of *On the Origin of Species* and the notion of missing links was one form of this popular discourse. The public gained that familiarity from a variety of sources that extended beyond such texts as *The Vestiges of the Natural History of Creation* to such sites as the theatre, where "theatre and performance not only provided entertainment for the widest spectrum of the public…but were also a major form of general communication about topical issues,

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[11]The most recent biography of Louis Agassiz is Christoph Irmscher, *Louis Agassiz: Creator of American* Science (Houghton Mifflin Harcourt, 2013). Or a broad overview, see Peter Bowler. *Fossils and Progress: Palaeontology and the Idea of Progressive Evolution in the Nineteenth Century* (Science History Publications, 1976), p. 62.

[12] Much has been done on the influence of race and science during this period. The most recent on Keith is Jonathan Sawday, "New men, strange faces, other minds: Arthur Keith, race, and the Piltdown affair (1912-53)" in *Race, Science, and Medicine, 1700-1960*, eds. Waltraud Ernst and Bernard Harris (Routledge, 1999). For a book-length study on Osborn that also addresses this issue, see Brian Regal *Henry Fairfield Osborn: Race, and the Search for the Origins of Man* (Ashgate, 2002).

[13] Among the huge body of works on evolutionary theory, some that are helpful here are: Robert Richards, *The Tragic Sense of Life: Ernst Haeckel and the Struggle over Evolutionary Thought* (Chicago, 2008); Michael Ruse, *The Darwinian Revolution: Science Red in Tooth and Claw* (University of Chicago Press, 1999); Peter Bowler, *Evolution: The History of an Idea,* 3rd edition (California, 2003); and Philip Appleman, ed. *Darwin: A Norton Critical Edition* (W.W. Norton, 1979).

…[and] they [were] important indicators of the reception of evolutionary ideas."[14] Supplementary to theatre and other forms of performance, political cartoons in forums such as *Punch* magazine (Figure 1) offered a basal understanding and exposure to evolutionary ideas.[15] The idea of a "missing link" was not new to the realm of theorization about extinct man in fossil form. The eighteenth and nineteenth centuries had presented indigenous peoples who were captured and displayed throughout a myriad of traveling shows in Britain, Europe, and in the United States as "missing links" between animal species and "civilized" humans. These traveling circus ethnographies presented living "wildmen" of distant lands as the "missing link" between the races for decades before an extinct "apeman" claimed the title. The cultural ecology within which these practices were embedded both reflected and influenced the thinking of the experts and the lay public.[16]

This idea of progressive evolution and missing links was strengthened as American paleontologists began recovering numerous fossil specimens of extinct horses. In 1862 American paleontologist O.C. Marsh sent Charles Darwin a horse molar and asked that he forward it on to England's premier comparative anatomist Richard Owen, who American scientists still viewed as the foremost authority in comparative

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[14] Jane R. Goodall. *Performance and Evolution in the Age of Darwin* (Routledge, 2002), p. 5.

[15] See, for instance, *The Art of Evolution: Darwin, Darwinisms, and Visual Culture* eds. Barbara Larson and Fae Brauer (Dartmouth College Press, 2009).

[16] For a thorough analysis of early ethnographic traveling exhibitions see Sadiah Qureshi, *Peoples on Parade: Exhibitions, Empire, and Anthropology in Nineteenth-Century Britain* (University of Chicago Press, 2011).

anatomy.[17] This may be one of the most important aspects of the debates, for Darwin chose to forward it elsewhere. Following Owen's damaging review of *Origin* Darwin had, by that time, severed contact with Owen and sent the tooth to Thomas Henry Huxley instead. Marsh's work on fossil horses gave Huxley his strongest model for progressive evolution. From the earliest "dawn horse" to the modern domestic equine, there was an unbroken paleontological line. In 1888 he declared the horse fossil assemblages "demonstrative evidence of evolution."[18]

The earliest fossil horses had multiple digits whereas the modern horse only has one. As the fossils were analyzed and arranged in chronological order, it became obvious that as horses evolved they lost toes. If the earliest horse had five toes and the modern horse only had one, somewhere in the paleontological record a horse should exist with three. A three-toed horse would prove a missing link, and when such an entity in fact was discovered it seemingly sealed the authority of evolution as an undeniably linear mechanism that led straight to modern forms. Huxley and Marsh constructed their horse exhibits in diagrams that was reproduced in books, and eventually museum displays to reflect this model, and to provide physical evidence—proof—that each evolutionary change was a step on a ladder towards a modern result.

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[17] For more on Owen see Nicolaas Rupke, *Richard Owen: Victorian Naturalist* (Yale University Press, 1994) and *Richard Owen: Biology Without Darwin* (University of Chicago Press, 2009).

[18]Peter Bowler, *Theories of Human Evolution: A Century of Debate, 1844-1944* (Johns Hopkins University Press, 1986), p. 78. The quotation is cited in Adrian Desmond. *Archetypes and Ancestors: Paleontology in Victorian London 1850-1875.* (The University of Chicago Press, 1982), p.38.

The first fossil "missing link" between two different classes of animals came just one year before Marsh's horse tooth arrived in Huxley's hands.[19]

Huxley could easily extend this model onto the human form. Some of his contemporaries, even those who believed in evolution, could not make that connection so readily. Natural history was still firmly intertwined with natural theology. Combined with the exploding populations and political unrest and growing radicalism in areas like London, the very idea of evolution, which had always been political, grew increasingly more so.[20] Even within circles actively discussing evolution the debates raged between the Lamarckian theory of evolution and the newer Darwinian idea of natural selection, and the political implication of abrupt versus gradual change. Only with natural selection established as the dominant theory could Huxley move forward with his own opus, *Man's Place in Nature.* His ideas remained extremely important for nearly a century and his students became some of the most important figures in the Piltdown debates, using the basic theoretical framework that shaped all evolutionary theories at this time as linear progressions. The small, incremental changes Darwin described not only pertained to birds and tortoises in *Origin,* but also must have had an effect on human anatomy as well, as Huxley explained in *Man's Place in Nature.* For Huxley,

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[19] For more on Huxley's personal ideology see his *Evolution and Ethics and Other Essays* (Appleton and Company, 1896). See also Sherri Lyons, *Thomas Henry Huxley: The Evolution of a Scientist* (Prometheus Books, 1999).

[20] See Adrian Desmond, *The Politics of Evolution: Morphology, Medicine, and Reform in Radical London* (University of Chicago Press, 1989); and Peter Bowler, *The Non-Darwinian Revolution: Reinterpreting a Historical Myth* (Johns Hopkins University Press, 1988) and *Darwin Deleted: Imagining a World Without Darwin* (University of Chicago Press, 2013).

this process could be used to explain the wealth of similarities between humans and apes as he portrayed them in the frontispiece of the book.

Huxley was not the only one explaining diversity among humans and their shared similarities with the apes. In addition to Huxley's 1863 "view from Saturn" explanation,[21] Ernst Haeckel's 1868 *The History of Creation*'s "chain of human progenitors" and "direct human ancestors" explained exactly how apes became men.[22] These linear evolutionary changes in humans that were apparent from the perspective of another planet dominated practical applications that explained just where man had arisen and what our progenitors looked like.[23] Such classifications depended mainly on appearance and anatomical characteristics.[24] Huxley, for example, classified the human races into nine categories, and discussed them under four headings as Australoid, Negroid, Xanthocroic and Mongoloid types. These distinctions remained important points of classifications and shaped racial ideologies in Britain and the United States well into the twentieth century. These explicit racial distributions shaped the sciences of anthropology and ethnography in the decades leading up to Piltdown, and ultimately served as the authoritative voice in how the fragments were reconstructed, where

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[21] Misia Landau. *Narratives of Human Evolution* (Yale University Press, 1991), pp. 23-26.

[22] Misia Landau. *Narratives of Human Evolution* (Yale University Press, 1991), pp. 32-34.

[23] The basis for Haeckel's analogy may have stemmed from the earliest days of interaction between Europeans and non-Europeans. See Anthony Pagden, *European Encounters with the New World: From Renaissance to Romanticism* (Yale University Press, 1993).

[24] See Thomas Henry Huxley. "On the geographical distribution of the chief modifications of Mankind." *Journal of the Ethnological Society of London* (1870).

Piltdown was placed in the lineage of mankind, and how it was displayed to the public.[25]

In 1861, a slab of stone from Bavaria added fuel to the evolutionary fire. *Archaeopteryx lithographica* possessed a reptilian jaw with teeth set into sockets and a tail that was supported by vertebrae, but it also had feathers. Just two years after *On the Origin of Species*, here was a perfect example of a "missing link" between birds and reptiles, and Huxley marketed that example to the extreme. His 1868 lecture at the Royal Institution included two quite different images. One was a heavy flapping version of *Archaeopteryx* suspended overhead, while the other was a small, nimble dinosaurian bobbing its head and hopping about similar to a modern bird. His point was clear: these smaller dinosaurs had changed gradually over time, first to flightless birds, next to gliders, and then, eventually, to modern avian species.[26]

Piltdown is bookended between the evolutionary progression presumed to be evidence in the horse sequence and the hybrid nature of *Archaeopteryx* as a "missing link" between birds and reptiles. Placed within the human context, Piltdown was supposed to show a large-brained hominid that lived in England, but within its historical

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[25] For more on racial theory and its relationship to evolutionary theory see George Stocking, *Victorian Anthropology* (The Free Press, 1987) and *Race, Culture, and Evolution: Essays in the History of Anthropology* (Free Press, 1968); Douglas Lorimer, "Theoretical Racism in Late-Victorian Anthropology, 1870-1900," *Victorian Studies,* vol. 32, no. 3 (1988), pp. 405-430; and Nancy Leys Stepan, *The Idea of Race in Science: Great Britain 1800-1960* (Archon Books, 1982); and George Stocking, Jr

[26] Both Huxley and Owen published their opinions regarding *Archaeopteryx.* See Thomas Huxley, *Palaeontologische arbeiten* (London, 1861) and Richard Owen, *On the archeopteryx of von Meyer: with a description of the fossil remains of a long-tailed species, from the lithographic stone of Solenhofen* (Taylor and Francis, 1863). These are discussed in Martin Fichman. *Evolutionary Theory and Victorian Culture* (Humanity Books, 2002), pp. 107-108.

context of the evolution debates it operated as another striking example of a missing link, as did *Eohippus* and *Archaeopteryx* in the work of particular evolutionists. Piltdown was a creature that was part of a larger, all-encompassing dynamic of evolutionary change over time that men like Huxley were trying to explain.[27]

In this thesis I argue that Piltdown maintains a far more important part in the history of paleoanthropology than has recently, or ever, been addressed. Once the stigma of "pseudoscience" is removed, Piltdown becomes important in understanding how scientists developed ideas about prehuman history in the early twentieth century. Just as the great Devonian controversy was settled long before Martin Rudwick wrote about it, the status of Piltdown as real or fake is not the question we should ask if we want to know the answer to the heart of the issue which is the debates themselves.[28] Historians have dismissed Piltdown as a hoax that owed its existence to racist, nationalistic, and even sexist ideologies. Such broad dismissal has left many questions about Piltdown open. In fact, understanding the Piltdown case prior to its exposure as a

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[27] For more on fossils and the history of paleontology see: Martin Rudwick, *The Meaning of Fossils: Episodes in the History of Paleontology* 2nd ed., (University of Chicago Press, 1985); Adrian Desmond, *Archetypes and Ancestors: Paleontology in Victorian London 1850-1875* (University of Chicago Press, 1984); Ronald Rainger, "The Continuation of the Morphological Tradition: American Paleontology, 1880-1910." *Journal of the History of Biology,* vol. 14, no. 1 (Spring, 1981), pp. 129-158; and Peter Bowler, *Life's Splendid Drama: Evolutionary Biology and the Reconstruction of Life's Ancestry 1860-1940* (University of Chicago Press, 1996). Even though they are aimed at a more general audience David Rains Wallace, *Beasts of Eden: Walking Whales, Dawn Horses, and Other Enigmas of Mammal Evolution* (University of California Press, 2005) and Roger Lewin, *Bones of Contention: Controversies in the Search for Human Origins* (University of Chicago Press, 1997) are also useful sources for general paleontological background.

[28] See, for instance, William Glen, *The Mass-Extinction Debates: How Science Works in a Crisis* (Stanford University Press, 1994).

fake may help us understand how racism, nationalism, and sexism in the early twentieth century influenced the structures of a scientific discipline as it emerged.[29]

In the pages that follow I have picked up the Piltdown fragments and given them a new historical perspective. By utilizing Keith and Smith-Woodward's own interpretation of the fragments I will discuss how the debate over man's place in nature would never be solved by a single artifact, a fact that was beginning to force itself on these scientists' consciousnesses. Their letters, especially Smith-Woodward's, reveal a growing relationship with American scientists that had not been present in the earlier debates regarding prehistoric remains in Britain and Europe. American involvement and excitement over the Piltdown Man cannot be explained away by England's need for a hominid to rival remains found in France or Germany. Piltdown was not viewed as a hoax or a fake during the debates among the prominent men of science, or when it went on display in the American Museum's Great Hall of the Age of Man. Whatever Piltdown became in 1953 it already had a scientific legacy that its later lack of authenticity could never take away. In the 1920s not only had Piltdown produced more paleoanthropological and human origins discussion than any other find before it, but it helped to spur the "Central Asiatic Expeditions" which ushered in a new world of how to *do* science. England's native son became Osborn's gilded skull and the search for the origins of man has never been the same since.

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[29] See Elazar Barkan, *The Retreat of Scientific Racism: Changing Concepts of Race in Britain and the United States between the World Wars* (Cambridge University Press, 1992); Henrika Kuklick, *The Savage Within: The Social History of British Anthropology, 1885-1945* (Cambridge University Press, 1992); and Sandra Harding, ed., *The Racial Economy of Science* (Indiana University Press, 1993).

In order to highlight the shift from the passive gentlemanly drawing room science that exemplified the British search for human origins to the more active mission-directed fieldwork that became the hallmark of the new discipline of paleoanthropology, the analysis in my thesis is divided between the works of Arthur Keith and those of Henry Fairfield Osborn. Both men addressed the prehistory of mankind, but their methods were quite distinct and reveal much about the development and dispersal of human evolutionary theories, even as they addressed the same physical remains.

Chapter One looks at Keith's analysis and treatment of the Piltdown fragments in the same manner as if it were any previous non-fraudulent discovery. Even with regards to the importance he placed on Piltdown, Keith's analysis is anatomically matter-of-fact and places it as one point among many as he expands his books to encompass an ever-growing body of evidence. Even so, Keith put his model of the reconstructed fragments on the cover of his 1915 book. The Piltdown skull on Keith's *The Antiquity of Man* was represented in gold leaf which was illuminated even more by the book's dark blue binding. This literally gilded skull belied the fact that the British establishment still operated on a decades old model where an insular social world constructed closed scientific knowledge backed by pure anatomical technique and authority. At a time when this archaic scientific model should have been on the verge of collapse, the chance "discovery" of some prehistoric human fossil fragments by an amateur collector with close social ties to the British Museum (Natural History)—Dawson and Smith-Woodward—gave it a new lease on life. In contrast, Chapter Two reveals the dynamic exploitation of the Piltdown skull as an artifact hewn by many

hands from many disciplines. In addition to offering his own analysis and version of the reconstructed skull, Osborn used Piltdown to support his own theories of human evolution. Osborn's answer to Keith's *The Antiquity of Man* came in the form of the much less technical *Men of the Old Stone Age,* but he was not content to leave Piltdown within the pages of a book, even it was intended for a popular audience. Piltdown closed a gap in the line of human ancestors from Java Man to Cro-Magnon, and completed the linear model that Osborn would exhibit at the museum. Osborn took Keith's gilded skull off the cover and made it a full bronze bust on display in the museum where it became a totem to generate funding for a new way of operating, a new way of mounting scientific arguments, and a new way of sharing human evolution with the public. Osborn was able to use the celebrity of Piltdown to promote an active search for human fossils that helped solidify the necessity of science done in the field and elevate its authority. The American Museum of Natural History became a driving force in the creation of new practices in the search for scientific knowledge in the early twentieth century (Figure 2).[30]

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[30] For background on field collecting for museum display at the American Museum of Natural History, see Penelope Bodrey-Sanders, *Carl Akeley: Africa's Collector, Africa's Savior* (Paragon House, 1991); Steven Conn, *Museums and American Intellectual Life, 1876-1926* (Chicago, 1998); Donna Haraway, "Teddy Bear Patriarchy: Taxidermy in the Garden of Eden, new York City, 1908-1936," in *Primate Visions* (Routledge, 1989), pp. 26-58; John Michael Kennedy, "Philanthropy and Science in New York City: The American Museum of Natural History, 1868-1968" (Ph.D. dissertation, Yale University, 1968); and Shannon Pingenot, "Keeping Up With the Johnsons: Multi-Media Mavens of the Early Twentieth Century Safari," (M.A. Thesis, University of Oklahoma, 2011).

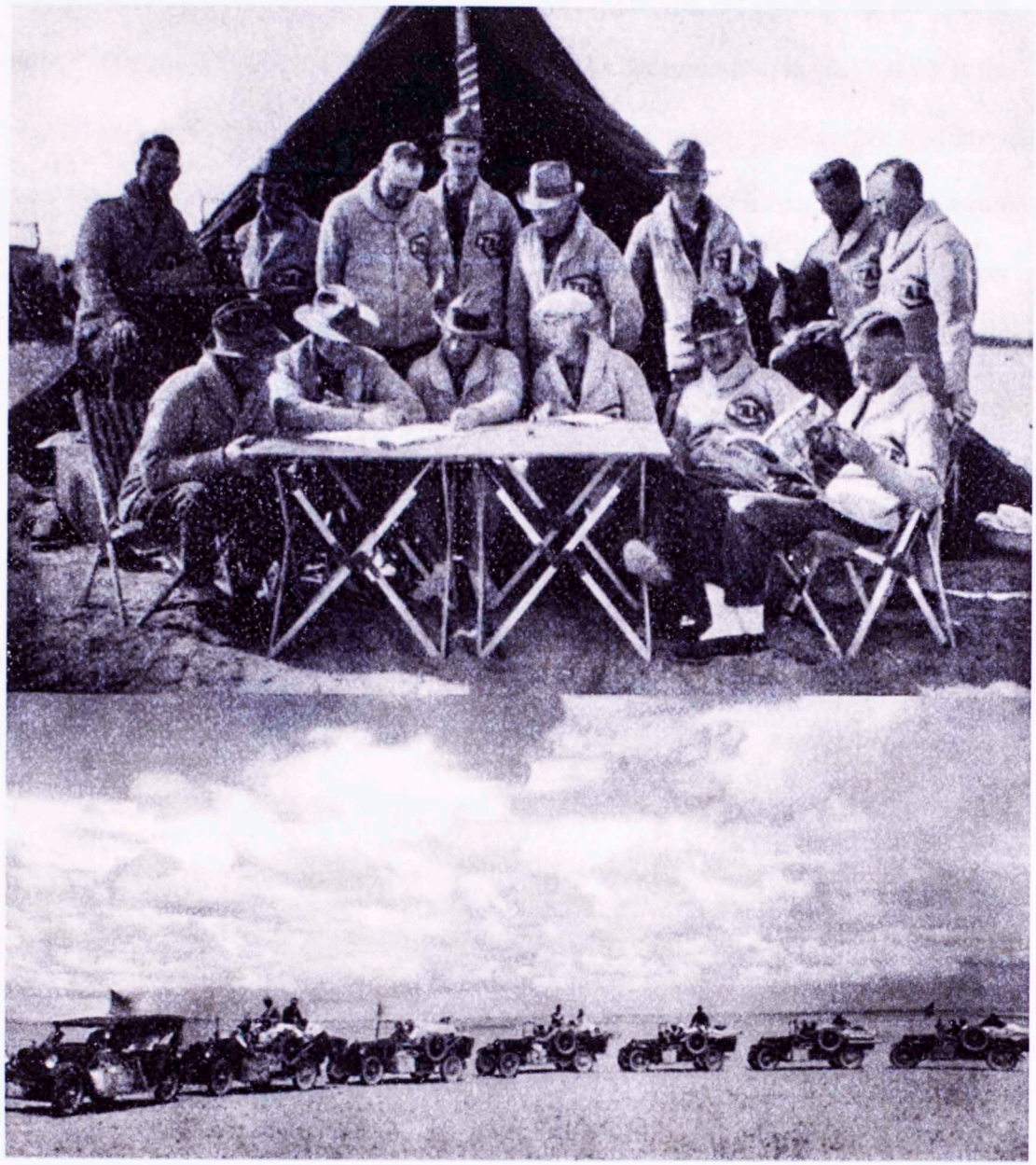

Figure 2. The "Central Asiatic Expeditions": A new approach to the search for human origins.

Before delving into how each individual shaped Piltdown it is important to note that while there were various and sundry theories regarding the steps in the process of human evolution[31] both Keith and Osborn followed the brain-first model, which is the view that the complexity and size of the human brain required that it evolve first in order for the human species to separate from the other primate forms. Another prevalent view was that the shift towards modern humanity began when human ancestors began to walk upright. The first view saw cranial capacity as the defining characteristic of what would become *homo sapiens*, and the second view posited that it ws bipedalism that first set humans apart.[32] That both Keith and Osborn placed such emphasis on the "brain making the man," make it possible to compare their logical and reconstructed outcomes from the same theoretical model. The fragments also hold a peculiar distinction of at once being exactly what theorists were predicting to find, especially in the fact that it was an "ideal" find with most of the important pieces present, and at the same time so fragmentary that it was open for the swath of interpretations presented in the various reconstructions. The best way to sum this up is to say that all those looking at Piltdown created the same forest, but each man reconstructed it with different trees.

Scientific professionalization was already underway prior to the twentieth century and the discovery of Piltdown, but institutional involvement in the form of financial backing and research support, as happened at the American Museum of

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[31] The best treatment and comparison of the array of theories and their adherents can be found in Misia Landau, *Narratives of Human Evolution* (Yale University Press, 1991).

[32] Even Darwin's view of gradual evolution was not the sole participant in debates as Lemarkians were still an active voice.

Natural History increased its pace considerably. Interestingly, what we now know as paleoanthropology is one of the few disciplines to emerge after the existence of a fully professionalized scientific community was taken for granted.[33] One consequence of this timing is that the position of the amateur collector experienced an abrupt dismissal from being on an equal footing with specialists with whom he had previously been "a member of the club." No matter how lucky of learned, an amateur would not have a place to contribute as a singular collector and analyst in the post-Piltdown world of scientific fieldwork.

Piltdown is also indicative of how the public interacted with the idea of human evolution, the "missing link," and the notion of an "ape-man." By understanding the popular culture that surrounded the Piltdown case and the subsequent discoveries and exhibits, we are able to more fully understand how the nonscientist reacted or engaged with the science and scientists. While Keith's works were aimed at a more learned contemplative popular audience, Osborn's Hall of the Age of Man was open to anyone who wanted to walk through an example of his belief that "every exhibition, every well-

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[33] For more on the professionalization of science and the mixed relationships between the professional scientists and amateurs see David E. Allen, "Amateurs and Professionals," in *The Cambridge History of Science*, eds. Peter J. Bowler and John V. Pickstone (Cambridge University Press, 2009), pp. 13-33; Ruth Barton, "'Men of Science': Language, Identity, and Professionalization in the Mid-Victorian Scientific Community," *History of Science,* vol. 41 (2003), pp. 73-119; Adrian Desmond, "Redefining the X Axis: 'Professionals,' 'Amateurs,' and the Making of Mid-Victorian Biology—A Progress Report," *Journal of the History of Biology,* 2001, vol. 34, no. 1, pp. 3-50; Jack Morrell, "Professionalisation," in Robert Olby et al, eds., *Companion to the History of Modern Science* (Routledge, 1990), pp. 980-989; and Peter Kjaergaard, "Competing Allies: Professionalisation and the Hierarchy of Science in Victorian Britain," *Centaurus 44* (2002), pp. 248-288.

arranged hall speaks for itself."[34] At the same time the theories of human origins were becoming more open to the public, the study of those origins were becoming more exclusive. The Piltdown skull closed the drawing room door on the days of the amateur sharing finds with the professional while it opened the window through which the professional could instruct a mass audience.

[34] While Osborn's Hall of the Age of Man launched American science firmly into public view it also opened up an avenue for protests and controversy. For more on the controversy see Constance Clark, "Evolution for John Doe: Pictures, the Public, and the Scopes Trial Debate," *The Journal of American History*, vol. 87, no. 4 (March, 2001) pp. 1275-1303; Constance Clark, *God—or Gorilla: Images of Evolution in the Jazz Age* (Johns Hopkins University Press, 2012); Julie Homchick, "Objects and Objectivity: The Evolution Controversy at the American Museum of Natural History, 1915-1928," *Science and Education*, vol. 12, no. 4-5 (May 2010), pp. 485-503.

Chapter 1

A Change in Practice

No one involved in the original Piltdown discovery was a paleoanthropologist.[35] The history of what would come to be named as paleoanthropology is an entanglement of early professional disciplines—chiefly anatomy, paleontology, and anthropology—vying for the most authoritative voice in the debates regarding human origins. These debates are plagued by the use of modern categories and terminology retroactively fitted onto its early participants. In its earliest guise what we now consider to be defined as paleoanthropology was a loose and shifting confederation of knowledge generated by paleontologists, geologists, archaeologists, anthropologists, and anatomists. To further confound historians, not every working discussion or debate concerning the fossil record consisted of the same distribution of specialties among the scientific practitioners who analyzed the finds.[36]

With such disparate specialist backgrounds it is no wonder that the early "authorities" on human evolution had such differing opinions on the origins of

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[35] The current third edition of the *Oxford English Dictionary* lists the first use of "paleo-anthropology" in 1908, while the previous edition and the *Merriam-Webster* dictionary both list the first known use of the word "paleoanthropology" without the hyphen as 1916.

[36] Although "towards the end of the nineteenth century, the practice of applying the terms archaeology, history, and antiquarianism indiscriminately to all and any studies of the past became noticeably less common," Charles Dawson was still referred to as an amateur archaeologist, an amateur paleontologist, and/or simply an antiquarian. Phillipa Levine. *The Amateur and the Professional: Antiquarians, Historians, and Archaeologists in Victorian England, 1838-1866* (Cambridge University Press, 1986), p. 70.

mankind. Geologists, anatomists, and anthropologists, for example, had different training, different traditions, and different ways of answering questions about fossil evidence of human origins. Even as they shared common questions the manner in which they approached those questions reflected their training as scientists in distinct fields. By the early twentieth century, these fields had developed enough from their shared origins that analysis of the same artifact generated markedly different results, theories, and reconstructions. When the occasion called for the collaboration among members of these different disciplines, as discoveries such as Piltdown did, it created a tension between the practitioners who each felt their own training and background was superior and thus able to more fully answer the questions at hand. There were no strict rules in the earliest debates regarding the prehistory of mankind and "the establishment of human antiquity was the product of a unique intellectual world that it, in time, changed beyond recognition."[37] With the establishment of human antiquity came the need for an established method of understanding it. Through the analysis of one of the most celebrated and discussed finds of its time we are able to look at the emergence in the opening decades of the twentieth century of what we know as paleoanthropology at a time when the establishment of human antiquity was still under serious debate within this "unique intellectual world," and the parameters of how this emergent discipline would be structured was still an open question.

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[37] A. Bowdoin Van Riper. *Men Among the Mammoths: Victorian Science and the Discovery of Human Prehistory* (University of Chicago Press: Chicago, 1993), p. 14.

Paleoanthropology

The development of the discipline of paleoanthropology has been referred to as a "Twilight Zone" due to the long state of flux among existing disciplines and the near impossibility for modern students of paleoanthropology to identify its origins historically.[38] During the latter half of the nineteenth century the question of humanity's place in nature received a more scientific analysis, and for the first time "traditional Western ideas about humanity's supernatural origins ceased to be intellectually respectable."[39] As a consequence of this shift from a single biblical narrative of human origins, intellectual speculation about the similarities and differences between humans and apes became more widespread and more complex. In the standard histories of paleoanthropology, mostly written by scientists, there exists an "enduring myth" of the importance and universal acceptance of the ideas presented by Thomas Huxley, Ernst Haeckel, and Charles Darwin. That myth has "created an illusion of an 'early consensus'" regarding the theories of human origins that simply did not exist.[40]

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[38] The phrase is Susan Cachel's, from her review of Robert Delisle's book *Debating Humankind's Place in Nature, 1860-2000*: "Surveying this period of time is like entering the Twilight Zone;" in *The American Journal of Human Biology* vol. 18, no. 6, (2006), p. 867. Delisle utilizes this phrase as the title for his article "Welcome to the Twilight Zone: a forgotten early phase of human evolutionary studies." *Endeavor.* vol. 36, no. 2, 2011), p. 63.

[39] Matt Cartmill, David Pilbeam, and Glenn Isaac. "One Hundred Years of Paleoanthropology." *American Scientist,* vol. 74, no 4 (July-August 1986), p. 410.

[40] Specifically Huxley's *Evidence of Man's Place in Nature* (1863), Haeckel's *Naturliche Schopfungsgeschichte* (1863), and Darwin's *Descent of Man* (1871). This quotation is used in Richard G. Delisle. "Welcome to the Twilight Zone: a forgotten early phase of human evolutionary studies." *Endeavor.* vol. 36, no. 2 (2011), p. 55. For more on the context of biological history during Darwin's lifetime see Adrian Desmond and James Moore's *Darwin* (Warner Books, 1992). For Darwin's geological training

Historians of science have produced more nuanced discussions of the complexity of evolutionary theories during Darwin's era and in later generations, but these histories of evolutionary biology have yet to influence internal historians of paleoanthropology. In turn, historians of biology have devoted little time to researching the history of paleoanthropology. Peter Bowler's 1986 *Theories of Human Evolution: A Century of Debate 1844-1944* has stood for a generation as one of the few historiographic sources to which we could turn for some context on this issue. How to reconcile the different working methods of multiple specializations with the complexity of the circumstances regarding fossil evidence of human evolution was a difficult practical problem for those working on these research questions. Historians' preoccupation with theories as opposed to practices has left much of the history of paleontology, especially paleoanthropology, unexamined.[41]

The earliest research into human origins was "grounded almost wholly in the facts of comparative anatomy,"[42] illustrated by Huxley's famous 1863 frontispiece in *Evidence as to Man's Place in Nature*, which features articulated skeletons of a gibbon, an orangutan, a chimpanzee, a gorilla, and man, arranged horizontally from gibbon to human. This iconic image "strengthened…the idea that scholars of the period had already identified all the key living forms relevant to thinking about humankind's place

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and interests see Sandra Herbert's *Charles Darwin, Geologist* (Cornell University Press, 2005).

[41] Peter Bowler. *Theories of Human Evolution: A Century of Debate 1844-1944* (Johns Hopkins University Press, 1986).

[42]Matt Cartmill, David Pilbeam, and Glenn Isaac. "One Hundred Years of Paleoanthropology." *American Scientist,* vol. 74, no 4 (July-August 1986), p. 410.

among the primates."[43] However, the comparison of extant creatures did little to solve the enigma of where humans "came from" and it would require more than comparative anatomy and modern skeletal structures to answer that question. Anatomy and biology alone were no longer sufficient to provide definitive answers.

As comparative anatomy stalled, paleontology and archaeology gained a stronger, more authoritative voice in the debates about human origin. As hominid fossils began to appear "paleontology played an increasing role in reconstructing human evolution… [and] geological concepts and methods became indispensable to the paleoanthropologist."[44] Here was the first rejoining of fields that had diverged along separate paths in the increased professionalization of scientific disciplines near the end of the nineteenth century. For example, as stone tools were discovered accompanying hominid fossils archaeological knowledge became equally indispensable because it allowed for a relative system of dating sites as older or younger than one another based on the complexity of the tools discovered. Geologic stratigraphy offered a more precise, or at least more quantitive dating technique that served as a means of independent confirmation of discovery sites as well as the ability to trace the stone tools back to a raw material parent source. In this era there was no official training in paleoanthropology, as there was yet no consensus about what methods and fields were needed to make sense of the materials under examination. Due to the fame of such skilled specialists as Cuvier, Buffon, and Owen anatomy still occupied pride of place in

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[43] Richard G. Delisle. "Welcome to the Twilight Zone: a forgotten early phase of human evolutionary studies." *Endeavor.* vol. 36, no. 2, 2011), p. 55.

[44] Matt Cartmill, David Pilbeam, and Glenn Isaac. "One Hundred Years of Paleoanthropology." *American Scientist,* vol. 74, no 4 (July-August 1986), p. 410.

grappling with the puzzles presented by fossil fragments. And yet it was becoming increasingly evident that there was no one clear-cut pathway to solving these puzzles and therefore this circumstance meant that no one discipline could definitively answer all the questions that arose with every fossil find.

In the early twentieth century anatomists, paleontologists, and archaeologists had to combine their expertise to more fully describe every fragment of fossil man, in order to maximize what they could learn, while at the same time vying for their own perspective to be recognized as the most authoritative voice in answering the questions raised by the existence of those fragments. How these radically multi-disciplinary frameworks could be brought into a working relationship was still as yet undermined. Their first common ground came in the form of conceptualizing a "missing link." It was the puzzle of these shared "gaps" in knowledge, or evidence, which granted the most harmony among the competing theories. As different specialists converged on the idea of a "missing link" and began to work out what that link actually should be, new methodologies became familiar across disciplines. The first interdisciplinary theories that would arise from these new practices shaped what would become known as paleoanthropology, even as the early concepts of the "missing link" itself were later reworked and eventually discarded. It was the idea that there was a single "missing link" that could be found to fit a precise understanding of human evolution like a missing puzzle piece that inspired some early intrepid explorers to begin searching.

The Missing Link(s)

One such man was a young Dutch anatomist named Eugene Dubois, who in the

1880s had begun to think about the origins of mankind and where the oldest human fossils could be found. There was plenty of evidence for recent prehistoric humans on the European continent, but Dubois wanted to go back farther and find the presumed "missing link" between ape and man.[45] Dubois began studying anatomy in 1877 and remained in the field for ten years. During this period there were two schools of thought on human origins. One was extremely prominent and the other was largely ignored. Most scholars were proponents of the "Out of Asia" theory; the logic for this view was that a primitive apeman would have lived where modern-day primitive man and apes live side by side, e.g. Asia. The second hypothesis was the "Out of Africa" theory, which proposed that human fossils would be found in Africa, where most of the great apes with which humans shared so many characteristics lived. Darwin himself suggested the latter, but the eye of the late nineteenth century scholarly establishment was on Asia. Prevalent racial theories regarding the degeneracy and backwardness of the African people also aided in popularizing Asia as the source for the ancestors of modern civilized mankind.

Influenced by Ernst Haeckel's books and lectures promoting the "Out of Asia"

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[45] After two nearly complete Neanderthal skeletons were discovered in 1886 in the Belgian town of Spy, Dubois spent his free time fossil hunting in Eijsden, Limburg where he was born. In 1881 in the town of Henkeput, a prehistoric flint mine was discovered and while searching there near the town of Rijckholt he discovered prehistoric human skulls. This episode is the "first...concrete evidence of Dubois' interest in the question of human prehistory." Bert Theunissen. *Eugene Dubois and the Ape-Man from Java: The History of the First 'Missing Link' and its Discoverer* (Kluwer Academic Publishers, 1989), p. 31.

theory Dubois reasoned that the origins of man must be in the tropics.[46] In 1887 he enlisted in the Dutch Army and arranged for a medic position in the Dutch East Indies (now modern day Indonesia). He moved to the colony with his wife and newborn daughter and began his search for the missing link. From 1887 to 1895 he explored the Dutch East Indies, starting in Sumatra and then moving to the island of Java searching near rivers and in caves. In 1891, near Trinil in East Java, he found the skullcap and femur of what he described as something between man and ape: he claimed that "this ancient Pleistocene ape from our island is *the first known transitional form* linking Man more closely with his next of kin among the mammals."[47] After careful consideration and further analysis he changed his classification from his original *Anthropopithecus* (man-ape) and christened the find as *Pithecanthropus erectus*—the "upright walking ape-man"—or as it became known colloquially, "Java Man." These were the first specimens of early hominid remains to be found outside Europe. More importantly, they were the first in at least a century to be discovered on purpose. Dubois' active search for, and discovery of, fossil humans led to a slow but steady change in the importance of fossil fragments in determining human origins. Before, theoretical models were the driving force behind the discussions of human origins, while the fossil fragments discovered by accident in quarries merely serving as fodder for one theory or another. Dubois had gathered all the evidence at his disposal in the late nineteenth century, drew

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[46] Dubois studied under Max Weber who had worked on Australasiatic fauna biogeography. That and the existence of Dutch colonies within southern Asia may have also influenced his ideas to search for human fossils in Java and Sumatra.

[47] Emphasis in the original. Pat Shipman. *The Man Who Found the Missing Link: Eugene Dubois and His Lifelong Quest to Prove Darwin Right* (Simon and Schuster, 2001), p. 166.

a large "X" on his human fossil treasure map, followed that map, and discovered mankind's "missing link."

For decades scientists had relied on accidental finds from quarries or pits to study in their scientific circles. This had been the custom since at least the 1840s. Dubois chose not to rely on these methods, which yielded material only occasionally, and when it did it was usually scant, and extremely fragmentary. Dubois was the first person to *actively* search for and find hominid fossils. Before Dubois' expedition "no ancient human fossil had ever been found as the result of fossil collecting in the paleontological tradition."[48] It can be said the Dubois' "Java Man" was the first hominid fossil discovered by deliberate fieldwork (although some would say it was malice aforethought). However, this was a practice that was not repeated until nearly three decades *after* his 1891 discovery of early hominid fossils in Java. As important as the find was, it did not physically represent much more than the accidental quarry finds. The money, time, and energy Dubois had exhausted yielded a skullcap, a femur, and a molar. The negative cost-benefit analysis of a Dubois-like search is one of the reasons that scientists were content with a passive relationship regarding human fossil finds. The slow pace of acquisition also allowed anatomists to maintain their theories and representations as authoritative without undue influence from other disciplines. Dubois was a singular case of a man on a mission to prove evolution. Most anatomists were not going to finance their own expeditions out of pocket or by army enlistment as Dubois had done. Nearly all had more pressing matters to attend to.

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[48] Ian Tattersall. *The Fossil Trail: How We Know What We Think We Know about Human Evolution.* (Oxford University Press: New York, Oxford, 1995), p. 31.

As physical evidence, the discovery of Java Man did not provide enough evidence to solidify any one evolutionary theory; in fact it may have made the models worse. Many anatomists disagreed with Dubois' interpretation of the remains and "the first commentaries…varied from the reserved to the extremely critical."[49] Most doubts were concerned with whether or not the individual fossils belonged to the same individual. Dubois' reports reconstructed Java Man with an apelike skull held erect by a body composed of a very modern looking femur. After examining the fossils, detractors believed that the skull was that of an ape and the femur belonged to a human, and that they did not represent some form of transitional species. Dubois wasn't unsure of his discovery, but he knew that it did not fit his own mathematical model of brain size that the "missing link" should possess. He had calculated that the one "missing link," and he believed there was only one, would have a cranial capacity half that of modern humans and twice that of chimpanzees. Java Man's brain was too large to match this perfect halfway point; for Dubois it was just "too modern" to be the one true missing link. Dubois did not handle the criticisms or doubts about his anatomical abilities well, and after arguments and accusations that the specimens did not belong to the same individual he denied other scientists access to his discovery, locking it in a chest in his home.

It is important to note that not every discovery of human-like fossil bones received placement within the human lineage. The French geologist, paleontologist, and physical anthropologist Marcellin Boule's analysis of early Neanderthal finds claimed

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[49] Bert Theunissen. *Eugene Dubois and the Ape-Man from Java: The History of the First 'Missing Link' and its Discoverer* (Kluwer Academic Publishers, 1989), p. 89.

that while the skull was "apish" in appearance its cranium size was not outside the range of modern humans' brain capacity.[50] Scientists had been familiar with pieces of Neanderthal fossils since the 1840s, but Boule's 1908 discovery of a full fossil skeleton at La-Chappelle-aux-Saints in France allowed him "a singular opportunity to solve a problem that had gripped evolutionary paleontology" since the mid-nineteenth century. Did Neanderthals represent a missing link in the progression of human evolution?[51] His analysis of the "Old Man of La Chappelle" concluded that the stooping posture and brutish characteristics represented by the fossil skeleton placed it outside the lineage of modern man and represented instead a dead-end branch of human evolution.

In light of this widely accepted finding, it was assumed that "hominid evolution must therefore have had other lines of development, and mankind's true ancestors still lay hidden in the shadows of prehistory."[52] This conclusion, based on Boule's reconstruction of the "Old Man." created a niche into which the discoveries at Piltdown would fit four years later. In fact, knowing that the Piltdown findings were fraudulent, one can state that "Piltdown Man" was created *in order to* occupy this niche, and the existence of this framework encouraged the continued acceptance of the discovery as

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[50] Huxley declared that if this was the case then the true ancestor to modern man would have to be even older than the Neanderthal remains. A. Bowdoin Van Riper. *Men Among the Mammoths: Victorian Science and the Discovery of Human Prehistory.* (University of Chicago Press, 1993), p.158.

[51] Michael Hammon. "The Expulsion of the Neanderthals from Human Ancestry: Marcellin Boule and the Social Context of Scientific Research." *Social Studies of Science*. vol. 12, no. 1, 1982, p. 1.

[52] Michael Hammon. "The Expulsion of the Neanderthals from Human Ancestry: Marcellin Boule and the Social Context of Scientific Research." *Social Studies of Science*. vol. 12, no. 1, 1982, p. 2.

plausible, even after it was removed from the direct ancestry of modern humans. Boule's conclusion that the Neanderthal race was an evolutionary dead end opened up the first alternate branches of human evolutionary theory. No longer was there necessarily one direct line leading to modern humans; other discoveries, such as Java Man, could be legitimate in age and context, but be members of another dead end lineage. However, Piltdown Man, "whose non-Neanderthal morphology clearly pointed to these other paths of evolutionary change" began as a full contender for the precursor to modern man.

Not only was Piltdown crucial in "establish[ing] the central place of the fossil record in understanding the mysterious process by which modern humans had emerged from an 'ape' ancestry," but "its role as 'missing link,' … for the first time brought the human fossil record squarely into the public eye and established it as a major source of media interest."[53] Here we see Piltdown as not only important within the scientific community, but granted a type of celebrity usually reserved for grandiose dinosaur fossil discoveries. This popular attention would become another element in creating paleoanthropology because paleontology was already an important research area, more so than anatomy. Additionally, the public appeal and interest in paleontology served to support its influence on the development of what we now call paleoanthropology. Thus, the existing public image of paleontology outweighed the closed laboratory approach of

[53] Ian Tattersall, *The Fossil Trail: How We Know What We Think We Know about Human Evolution* (Oxford University Press, 1995), p. 51.

the anatomists and the paleontological aspects of the science of human origins would be granted a prominent role. [54]

Amateurs and Professionals

The early finds of human fossils, until Dubois, all came to light by accidental discoveries at rock quarries discovered by the men who worked there. In this manner the professional scientists benefitted greatly from their relationship with quarry owners and workmen. This professional/amateur relationship continued throughout the end of the nineteenth and into the early twentieth century even as other disciplines professionalized to the point of total exclusion of the amateur. At the turn of the twentieth century the new generation of trained professional scientists coexisted with the previous generation of gentlemen scholars, antiquarians, and hobbyists. The latter's relationship to the establishment faded as new methods of discovery, research, and analysis took hold. In this view the skull discovered at Piltdown serves as a "missing link" between the old genteel sciences and the modern twentieth century professional sciences.

From the very beginning details surrounding the discovery of the fragments at Piltdown were cloudy. The publication of the official paper, "On the Discovery of a Palaeolithic Human Skull and Mandible," in the March 1913 edition of the *Quarterly Journal of the Geological Society* added few specifics. The firmest date that Charles

[54] Comparative anatomists working with dinosaur fossils had little in the way of comparison. Nothing living resembled the great beasts of the past in more than superficial ways and many were named and described by the similarities between their fossilized teeth and the teeth of living reptiles.

Dawson provided applied only to the finding of the second piece of the skull "in autumn of 1911." He noted that it was the peculiar flints from the pit that had first caught his eye "several years ago" and it was on one of his "subsequent visits" between that unspecified date and 1911 that a worker presented him with an "unusually thick human parietal bone."[55] From the associated geological material it was almost easier to pinpoint the parameters of the Piltdown Man's life than it was to pinpoint when Dawson discovered it. Here Dawson reveals his breadth of interest. He was there on official solicitor business, but noticed archaeological artifacts at the dig site first and later received a piece of bone from one of the workmen. Presented at the Royal Geologic Society, Dawson's paper places both archaeological and paleontological analysis above anatomy.

With the 1911 addition in tow Dawson presented the fragments to his close friend "Dr. A. Smith Woodward at the British Museum (Natural History) for comparison and determination." Impressed as they were with the initial, although meager, fragments Smith-Woodward took a paleontologist's approach and "decided to employ labour and to make a systematic search among the spoil-heaps and gravel, as soon as the floods abated." Since the pit was under water for five or six months each year the pair worked as much as they could starting in spring 1912 in order to sift the entire spoil pile from the pit as well as sifting portions of the undisturbed gravel that remained in the pit. Since Smith-Woodward had been appointed Keeper of Geology, his fieldwork had slowed and his earlier paleontological trips to South America were

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[55] Charles Dawson, Arthur Smith Woodward, and Grafton Elliot Smith. "On the Discovery of a Palaeolithic Human Skull and Mandible." *Quarterly Journal of the Geological Society.* Vol 60. March 1913 (Read December 18, 1912).

replaced with administrative duties and trips to the Piltdown pit. From their work the paper reported that the finds were "the greater part of a brain-case and one ramus of the mandible, with lower molars 1 and 2."[56] The brain case consisted of four pieces that had been reconstructed from a total of nine fragments. Some of the earliest public comparisons between their jaw and the jaw of a chimpanzee (as well as a recently described jaw from Heidelberg in Germany) appeared in *New York Times.* In January 1913 the paper revealed that "The New Fossil Man from Sussex…may be an extinct race." Sir E. Ray Lankester, biologist and comparative anatomist, contributed to the piece, and provided an image of the jaws superimposed over one another as well as a side-by-side comparison. From these few and disparate remains *Eoanthropus dawsoni* was born, and was almost immediately in the press.[57]

Dawson and Smith-Woodward shared an interest in fossils and an enthusiasm for ancient man. Their families also shared evening dinners, holidays, and picnics. It was their close personal friendship that provided Dawson with access into the ever-narrowing professionalized circle of scientists in the early twentieth century. This practice of passing specimens among friends was a relic of the nineteenth century collecting practices that Dawson had previously capitalized on with his other amateur archaeological discoveries, which consisted of Roman era ironworks, a Neolithic stone

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[56] Charles Dawson, Arthur Smith Woodward, and Grafton Elliot Smith. "On the Discovery of a Palaeolithic Human Skull and Mandible." *Quarterly Journal of the Geological Society.* Vol 60. March 1913 (Read December 18, 1912).

[57] Lankester worked mainly with invertebrates, but was the former director of the Natural History Museum. He had garnered quite a reputation during the years before the Natural History Museum gained autonomy from the British Museum and the British Library.

axe, and a large rough-hewn boat.[58] Dawson's list of discoveries would be impressive for a professional scientist; that he was an amateur made it even more remarkable. In the end, he was still an amateur and he deferred authority on Piltdown to his friend Smith-Woodward. Not only was Dawson a skilled antiquarian, but the close connections with the professional world, in the form of Smith-Woodward, may have helped extend the working relationship between amateur and professional longer than it would have existed otherwise.

By the time the whispers among those inhabiting the privileged circles privy to the unofficial details had ended and official announcements of the Piltdown discovery began, it was apparent that awareness of these fragments was going to reach a much larger and international, professional audience than Dawson and perhaps even Smith-Woodward had anticipated. The two men attempted to shape and control the discussion by authoring descriptions in both the professional and popular presses. In 1913 Dawson published a short magazine article, "The Piltdown Skull (*Eoanthropus dawsoni*) in *Hastings and East Sussex Naturalist II*, in which he outlined his discovery at Piltdown and revealed that it was official solicitor business that had first led him there, "just at the end of the last century," which implied that he had no other reason to be at Piltdown until the peculiar flintwork caught his attention. He directs readers who wish to know more about Piltdown to purchase Smith-Woodward's illustrated guide to *The Fossil Remains of Man* from the British Museum for fourpence. He stressed that this text was written specifically for a popular audience; for those seeking a more fully scientific

[58] For more on Dawson's discoveries prior to Piltdown see Miles Russell's *Piltdown Man: The Secret Life of Charles Dawson* (Tempus, 2004).

treatment of the discovery he recommended their account in the *Quarterly Journal of The Geological Society*.[59]

The Piltdown fragments were not all discovered at the same time. After Dawson received the shattered piece of cranium from the pit workmen, he then made a more thorough investigation of the surrounding area. He ultimately succeeded in finding the mandible which, when paired with the skull fragments revealed a large-brained prehistoric human with primitive apelike molars. This was the mix of traits they had been searching for and their paper read at the Royal Geologic Society made special note that the skull's apelike traits "may prove the existence of the 'missing link,' or the most important of several missing links in the chain of evolution of man." Smith-Woodward went so far as to say that "Anything earlier, if found, will prove to be almost entirely ape."[60] In the progressive line of human evolution, it was important to find the distinguishing characteristic between modern civilized man and the apes, and Smith-Woodward's analysis provided evidence that it was indeed brain-size that separated man from beast. Arthur Keith would reconstruct the skull; his reconstruction possessed an equally large cranial capacity. Even still the Piltdown fragments were a mixture of human and apelike characteristics, just as had been Dubois's Java Man. Here was another discovery that showed a transition between something fully apelike and something fully human: another "missing link." However, just as with the Java Man claim critics argued that this find was *not* a "missing link." It would not be known until

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[59] Charles Dawson. "The Piltdown Skull (*Eoanthropus* dawsoni). *Hastings and Sussex Naturalist II*, 1913.

[60] "Man Had Reason Before he Spoke," *New York Times*. December 20, 1912, p. 6.

later that what it represented instead was, in fact, a literal mixture of fragments from a modern human and an ape.

Not everyone in England was convinced that the skull and the mandible should even be reconstructed together. In the November 13, 1913 edition of *Nature* David Waterston, anatomist at King's College, University of London wrote, "Of the molar teeth, I need only say here that not only do they approach the ape form, but in several respects are identical with them." His ending sentiments conclude: "it seems to be as inconsequent to refer the mandible and the cranium to the same individual as it would be to articulate a chimpanzee foot with the bones of an essentially human thigh and leg."[61] This short analysis was curt and to the point: the pieces were fine separately as pieces for scientific study as separate organisms, but they did not belong to the same species, much less to the same individual. For Waterston, the Piltdown fragments represented different species of extinct fauna and in no way represented a prehistoric human that would match Smith-Woodward and Dawson's description.

The following month at the Royal Geological Society Smith-Woodward and Dawson read a "Supplementary Note on the Discovery." The paper included information on geology as well as reported the existence of associated and seemingly random mammal remains, such as the teeth from a rhinoceros, a stegodon, and a mastodon as well as a canine from a beaver. The most important addition to the Piltdown finds, however, was the discovery of a canine tooth that they argued belonged to the Piltdown jaw. The supplement indicated that little excavation remained to be done at Piltdown and assured readers that, with regards to the cranium and the tooth,

[61] David Waterston. "The Piltdown Mandible." *Nature.* vol. 92, no. 2298 (November 13, 1913). p. 319

"there is nothing in their mode of occurrence to favour the idea that they may have belonged to different individuals." The supplement was not in print until April 1914, and even though there was little excavation left to do at Piltdown the team returned to the pit during the 1914 dry season. Dawson and Smith-Woodward updated the Royal Geological Society again on December 2, 1914 and explained that "No human remains were met with; but a large piece of bone evidently worked by man compensates for much disappointment, and proves to be so singular that it is worthy of special description."[62] The bone in question was carved from an elephant femur and was discovered from a geological stratum that made it the earliest known human-worked bone. They offered no theories as to the probable use of the implement, but the Appendix records discussions describing similar, although younger objects, seemingly used as clubs, as well as possible evidence that a leather thong had been attached to it.[63] The December 1914 update was the last time Dawson's voice was heard in the official sources regarding the Piltdown fragments.[64] As Dawson's influence disappeared, so too did the working relationship between the amateur and the professional scientist. The

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[62] Charles Dawson, Arthur Smith-Woodward. "On a Bone Implement from Piltdown (Sussex). *Quarterly Journal of the Geological Society*. Vol 71 1915. (Read December 2, 1914).

[63] As interest in Piltdown increased this one particular artifact would become indelibly linked to the Piltdown. With international tensions mounting and The Great War beginning in July 1914, the Piltdown Man became a strong symbol of English Nationalism and the worked bone implement with its broad flat side and apparent handle became something quintessentially English in the minds of the public—Piltdown Man had a cricket bat.

[64] Charles Dawson, Arthur Smith-Woodward, Grafton Elliot Smith. "Supplementary Note on the Discovery of a Palaeolithic Human Skull and Mandible of Piltdown (Sussex). *The Quarterly Journal of the Geological Society of London.* Vol LXX April, 1914 (Read December 17, 1913).

Dawson/Smith-Woodward connection is more than an amateur/professional relationship; their personal friendship and shared interests opened a line of communication between them that had not been seen since the nineteenth century. With Dawson's death in 1916 the authoritative voice of the amateur scientist, no matter how skilled, or lucky, was silenced.

By this time the Piltdown fragments had moved into the hands of another professional: Scottish anatomist Arthur Keith. Keith and Smith-Woodward were, by all accounts, colleagues and on amenable terms. Keith was also acquaintanced with Dawson, but they did not dine together as the Dawsons and the Smith-Woodwards were wont to do. By the time Keith began reconstructing the Piltdown fragments he was the head of the Royal College of Surgeons in London and the foremost anatomist in the United Kingdom. His reconstruction of Piltdown, based on his anatomical background, was starkly different from Smith-Woodward's.

Keith produced a more modern looking version of Piltdown that showed very few apelike characteristics. He rejected Smith-Woodward and Dawson's *Eoanthropus dawsoni* and contended that the Piltdown Man fell into the modern genus *Homo*. For Keith, it was obvious that modern humankind, or a variation of it, had been in England for quite some time. The differences between the paleontologist's *Eoanthropus dawsoni* and the anatomist's *Homo piltdownensis* were obvious even to the casual observer and they continued the debate on a mostly equal footing until the discovery of the canine. While the apelike canine supported Smith-Woodward's reconstruction of the Piltdown Man in contrast to Keith's so-called *Homo piltdownensis*, Keith refused to concede the

argument and remained certain of the centuries-old authority of anatomy over the conclusions of a fish paleontologist and a solicitor.

Arthur Keith: a Professional Analysis

Dawson and Smith-Woodward's analysis of the Piltdown fragments was not the final word on the matter. Even the discovery of the canine tooth that supported Smith-Woodward's more apelike reconstruction did not end the debates on the nature of the Piltdown Man and his appearance. The paleontologist and the amateur archaeologist had presented Piltdown to the Royal Geological Society, but the anatomist at the Royal College of Surgeons had a much different opinion of what Piltdown looked like, and where it fit into mankind's family tree.

Keith's work on human ancestry began the year before Piltdown discovery was announced. Keith's earliest works were on anatomy but in 1912 he published *Ancient Types of Man* aimed at a broader readership than his anatomy colleagues.[65] This small 150-page book was a "popular" book in that it presented the information without overly technical analysis but it was still a type of specialty literature aimed towards literate gentry with a specific interest in human ancestry. The book addressed the discovery of Java Man, the Neanderthal, and the recent jaw from Heidelberg. In his introduction that was signed September 1911, Keith concluded that: "Whether or not we have found the

[65] Peter Bowler discusses Keith and other authors' forays into more popular literature in *Science for All: the Popularization of Science in Early Twentieth-Century Britain* (University of Chicago Press, 2009)

remains of Pliocene man is a question still open for debate."[66] By the end of 1912 the Piltdown discovery thrust the debate into new realms of discussion, and Keith's brief compendium of ancient man would swell into multiple editions and expanded volumes in a work that spanned decades. Piltdown first appeared in Keith's writings in his 1915 *The Antiquity of Man*. Keith's chosen title was a nod to Charles Lyell's *Geological Evidence for the Antiquity of Man* that had been published over fifty years earlier in 1863 and "told the story of the antiquity of man from a geologist's point of view." Keith lists Lyell's successors as "official historian[s] of ancient man" which included Sir William Boyd Dawkins' *Cave Hunting* (1874) and *Early Man in Britain* (1880), Professor W.J. Sollas's *Ancient Hunters* (1911), Dr. G. Frederick Wright's *The Origin and Antiquity of Man* (1913), and Professor James Geikie's *The Antiquity of Man in Europe* (1914).[67]

The Antiquity of Man first appeared as a single volume filled with, what was then, the most current knowledge of human ancestry. Released during the Great War Keith added a note to the original preface even before the first edition went to print. Keith reflected that "we[68] have burst suddenly into a critical phase in the evolutionary

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[66] The Pliocene was the geologic age that preceded the Ice Age period from which came most of the European prehistoric hominid fossils. Arthur Keith. *Ancient Types of Man.* (Harper and Brothers, 1912), p. xiii.

[67] Keith's 1925 *Antiquity of Man* was published simultaneously in the United States by Lippincott Company in Philadelphia, Pennsylvania and in Great Britain by Williams and Norgate Limited based in London, England. Both the American and the British copies that I have used here have the golden skull adorning the cover. Sir Arthur Keith. *The Antiquity of Man, Vol. I* (J.P. Lippincott Company: Philadelphia, 1925), p. xx.

[68] "We" most likely is a philosophical reference to mankind in general. It could also refer specifically to the countries at war in Europe.

progress of mankind," and that places such as "Liege and Namur, which figure in this book as the sites of peaceful antiquarian discovery, have become scenes of bloody war."[69] Progress indeed. *The Antiquity of Man* was received well enough to go through four impressions by 1920 and for Keith to revise, update, and expand it with a second edition in 1925. On the ten years of paleoanthropological advancement between editions Keith observed: "Much has happened since then."[70] Much had happened; Keith's phrasing was a huge understatement. The pace of discovery of prehistoric man was increasing at a rate no one could have predicted. While much of the ten years between Keith's first and second editions of *The Antiquity of Man* were filled with war, public interest kept the work in multiple reprints and eventually led to an enlarged, revised, and expanded edition.

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[69] Sir Arthur Keith. *The Antiquity of Man, Vol. I* (J.P. Lippincott Company, 1925), p. xxiii

[70] Sir Arthur Keith. *The Antiquity of Man, Vol. I* (J.P. Lippincott Company, 1925), p. v.

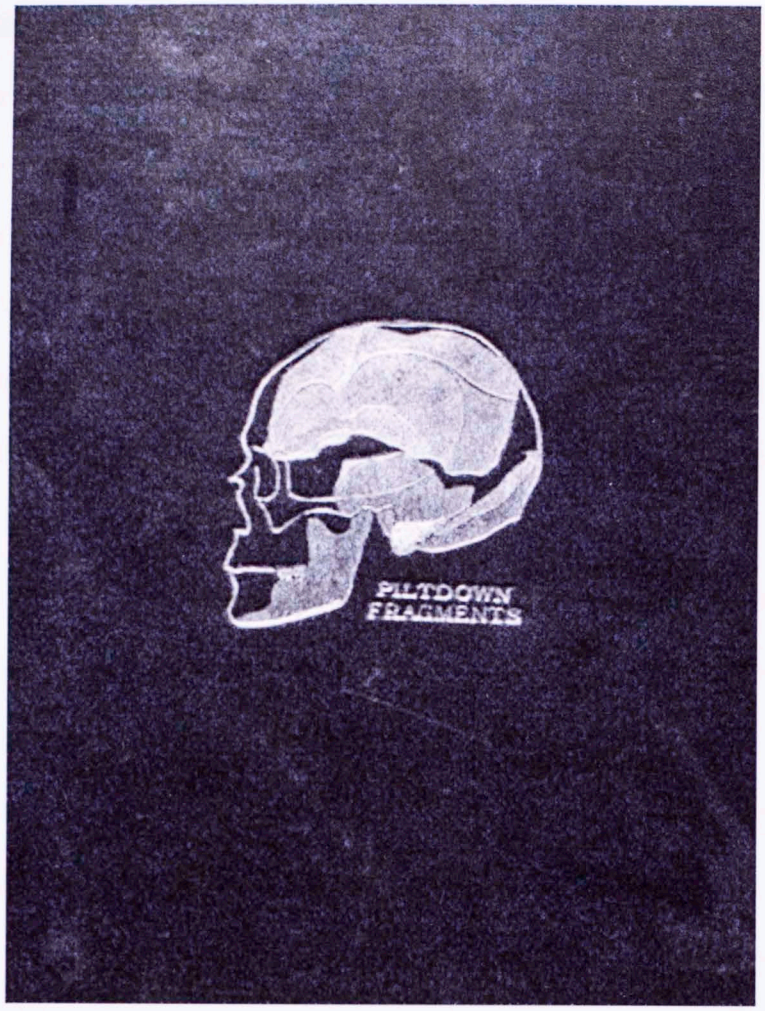

Figure 3. Cover of Arthur Keith's 1925 edition of *The Antiquity of Man* (author's collection).

Varying degrees of fossil human remains had been discovered in Crete, Egypt, Mesopotamia, England, France, Germany, Malta, South Africa, Rhodesia, Australia, Java and even North America. For each find Keith recorded its geographic location, its affinities shared with existing fossils, and its differences. In his customary conservative style Keith methodically analyzed each with comparative schematics and measurements between the new discoveries and existing fossil fragments as well as specimens from living "primitive" cultures from around the empire, including Australian aborigines, and African bushmen.

Piltdown still held pride of place among the fossil ancestors. So much so that the two-volume sets of the 1925 editions *The Antiquity of Man* published in London still prominently displayed a gold leaf schematic of the "Piltdown Fragments" emblazoned on the cover. Not surprisingly the version chosen to adorn his books was his own (Figure 3). With regards to Piltdown Keith wrote in the preface of the 1925 edition that "No discovery of recent date has had such a wide-reaching effect… [and]…a very considerable part of this book is devoted to the significance of that specimen of humanity."[71] Nearly seventy-five pages cover Piltdown specifically, and another forty-two use it as evidence in general discussions on reconstructions and the reliability of fragmentary discoveries. Keith devotes an entire chapter to "The Difficulties of Reconstructions" which is a point-by-point comparison of his version of Piltdown and the reconstruction provided by Smith-Woodward. The chapter immediately following reveals the state of discussion within Keith's own discipline. He opens the chapter by stating: "If I were free to choose I would not inflict the reader with further dry and technical details concerning the Piltdown skull. The sharp controversy, however, which sprang up amongst anatomists in 1913, and which still continues abroad as well as at home, makes a plain and simple narrative impossible."[72] Piltdown's "very considerable" portion of the 1925 *Antiquity of Man* consists of ten of the sixteen chapters in the second volume. A full one-third of the entire work is either directly about the Piltdown discovery or indirectly uses it for comparative or explanatory purposes.

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[71] Sir Arthur Keith. *The Antiquity of Man, Vol. I* (J.P. Lippincott Company, 1925), p. xxii.

[72] Sir Arthur Keith. *The Antiquity of Man, Vol. II* (Williams and Norgate, 1925), p. 558.

Keith's books on ancient man, from the 1912 *Ancient Types of Man* through his 1930 *New Discoveries Regarding the Antiquity of Man*, all follow the same format. They are arranged geographically and he moves through each of the larger areas where discoveries have been made. The 1925 *Antiquity of Man* does not stray from this model. It begins in Kent, before circumnavigating the globe and arriving back to the Piltdown case closer to home. Piltdown received four specific chapters in total. Three chapters are collected in tandem: one on its discovery, another on its antiquity, and the final on *Eoanthropus dawsoni* proper. A chapter titled "The Piltdown Mandible" follows the chapters that explain the difficulties of reconstructing skulls and the difficulties of explaining human origins with such fragmentary specimens, and serves to further establish the authority of professional anatomists. Each chapter was similar to the versions in Keith's first edition except for the addition of the finds at Piltdown after 1915 and how those new finds changed the reconstruction of Piltdown.

The first chapter, "The Discovery of the Piltdown Skull" examined and narrated Dawson's history in and around Sussex and his subsequent discovery of the skull, jaw, and the later discovery of the canine. Here Keith sums up and combines the original papers and all the supplemental notes on the Piltdown discovery read at the Royal Geologic Society meetings. Here he also addresses the use of geological knowledge to determine the true age of the Piltdown finds as well as archaeological evidence indicating the state of "progress" that the Piltdown species had achieved. He compares the worked tools of ancient man to fashion and style—each distinct to a particular time period. Evoking the multitude of architecture around London he wrote: "It is not difficult to distinguish a house built in the time of Queen Elizabeth from one built in the

time of her great successor—Queen Victoria." The stone implements of our ancestors are as distinct, easy to recognize, and are readily discernible from one another as homes built in the Elizabethan and Victorian periods.[73]

The following chapter, "The Antiquity of the Piltdown Race," discussed the associated geologic and archaeological material that was described separately from the skull fragments themselves. Most importantly it revealed that after:

> the various fragments of the skull had been pieced together; the missing pieces filled in;…it was quite plain to all assembled that the skull as reconstructed by Sir. A. Smith Woodward was a strange blend of man and ape. At last it seemed, the missing form—the link which early followers of Darwin had searched for—had really been discovered.[74]

Here, then was Keith's assertion that the reconstructed Piltdown fragments represented the "missing link." He ends the chapter with remarks on the few additional fossil fragments Dawson discovered two miles away from the original pit that matched the age and style of the original finds. These additional pieces provided more confidence that the Piltdown specimen was not a singular aberrant form, but something unique and was "the Earliest Englishman we know of as yet."[75]

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[73] Sir Arthur Keith. *The Antiquity of Man, Vol. II* (Williams and Norgate, 1925), p. 489.

[74]Sir Arthur Keith. *The Antiquity of Man, Vol. II* (J.P. Lippincott Company, 1925), p. 503.

[75]Sir Arthur Keith. *The Antiquity of Man, Vol. II* (J.P. Lippincott Company, 1925), p. 503.

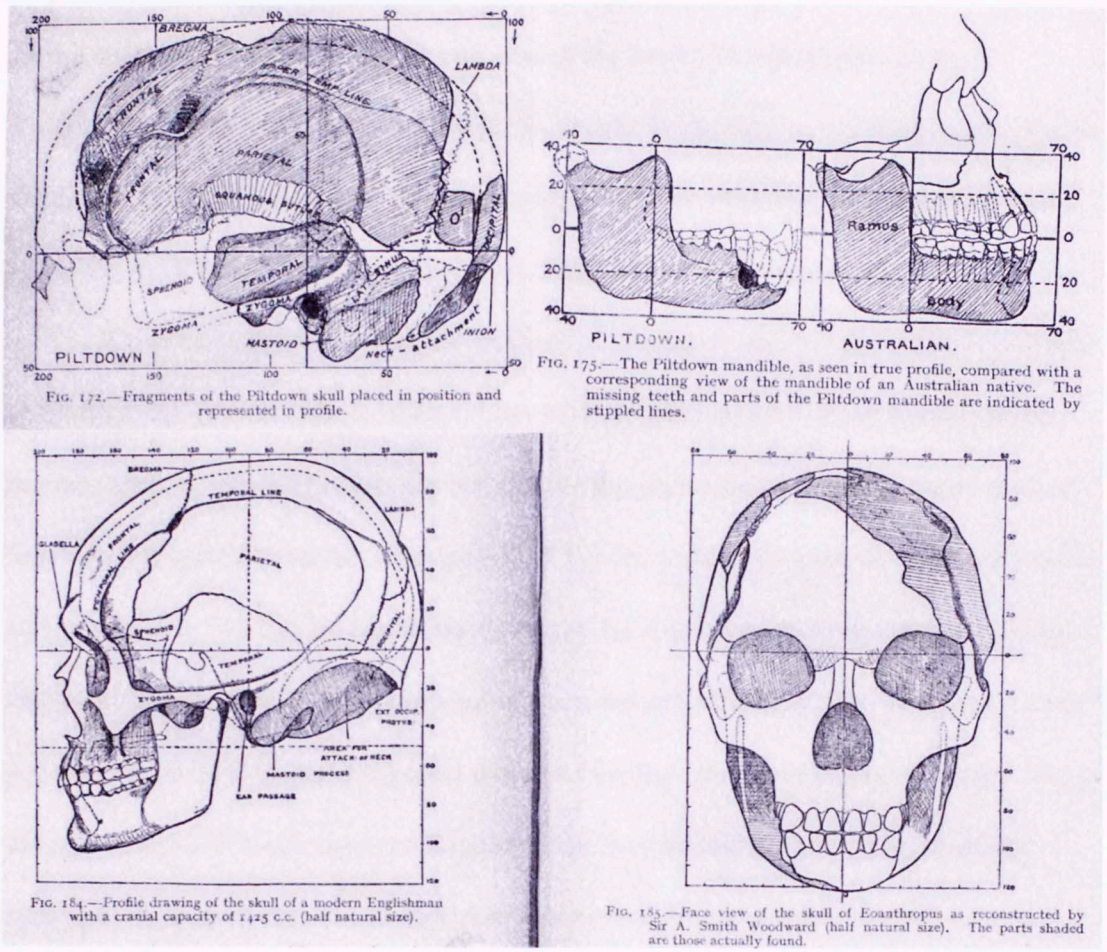

FIG. 172.—Fragments of the Piltdown skull placed in position and represented in profile.

FIG. 175.—The Piltdown mandible, as seen in true profile, compared with a corresponding view of the mandible of an Australian native. The missing teeth and parts of the Piltdown mandible are indicated by stippled lines.

FIG. 184.—Profile drawing of the skull of a modern Englishman with a cranial capacity of 1425 c.c. (half natural size).

FIG. 185.—Face view of the skull of Eoanthropus as reconstructed by Sir A. Smith Woodward (half natural size). The parts shaded are those actually found.

Figure 4. Keith's schematic illustrations in *The Antiquity of Man.*

The chapter on *Eoanthropus dawsoni* contained fourteen figures highlighting the skulls' reconstruction, comparisons between extant ape and human skulls, and a variety of orientations including profile, frontal, and from above. The mandible chapter does likewise with eight figures comparing the mandible to modern humans, extinct humans, and modern apes. These figures are visual representations of Keith's mind's eye regarding comparative anatomy (Figure 3). In one instance he reconstructs the tongue, lip, chin muscles, and even the hyoid bone in order to compare the lower jaw of a modern man to that of a chimpanzee. Keith's analysis of missing fleshy bits was taken a

step further when, after piecing the fragments together, Smith-Woodward cast the inside of the cranium to reveal the shape and size of the brain. The mold was given to Professor Elliot Smith, the leading brain anatomist in the nation, and Keith recorded his verdict in closing: "Taking all its features into consideration, we must regard this as being the most primitive and most simian human brain so far recorded."[76]

Every comparison revealed a mixture of characteristics; some of the fragments resembled the modern pieces while others still looked primitive. Even Keith's more modern looking reconstruction did not change the endocranial cast that Smith studied. Keith was concerned that all these technical figures took away from the story of man's antiquity and wrote that he had wished to omit the schematic reconstruction drawings and technical chapters from his second edition, but after "seeing how little some of my professional brethren have fathomed the art of setting cranial fragments together I have thought it wiser to leave them untouched."[77] In fact, he added more with an entire technical chapter on the Rhodesian man, and the chapter immediately following the Piltdown chapters specifically addressed the difficulties involved in setting cranial fragments together. Such decisions expose just how visual the nature of explaining human origins was. Even if Keith believed they slowed the narrative of his history of mankind, he still included, indeed added, them to his subsequent volumes because they so perfectly illustrated what his prose could not. Even in this medium, between a truly popular account as expressed in newspapers and magazines and the non-technical but

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[76] Sir Arthur Keith. *The Antiquity of Man, Vol. II* (J.P. Lippincott Company: Philadelphia, 1925), p. 535.

[77] Sir Arthur Keith. *The Antiquity of Man, Vol. I* (J.P. Lippincott Company: Philadelphia, 1925), pp. xviii-ix.

learned readership, Piltdown had to be constructed as an object and only then could it be placed within the existing theoretical framework on human origins.

Keith's two-volume *Antiquity of Man* contained everything that was known about human evolution in 1925 and was accessible to an educated public which was as general an audience as Keith wished to address. Keith expressed his theories and understanding of mankind's ancient past with a mix of narrative and technical analysis. Here was an attempt to harness the romance of Lyell's works and team it with the new discoveries and precision analysis that would help shape the discussion and reveal the true authority an anatomist possessed on questions of early man. Books were still the chosen mode of authoritative knowledge transfer at the time, and Keith's background and training capitalized on the industry. However, the serious book for a knowledgeable reader was no longer the only means of sharing information. A new form of mass science communication had developed. With the decrease in printing costs and the ability to reprint illustrations newspapers and periodicals quickly commandeered science communication and brought it to the masses. Keith tried to contain the entire field of what would become paleoanthropology within the pages of his books. In the end it was a fruitless task and only served to make the British analysis of human antiquity look more internal than it actually was. The containment of something as popular as Piltdown was not possible in the new age of mass printing. During Keith's days as a student most information was distributed through books in the appropriate circles, but this nineteenth-century model simply could not work effectively in the twentieth century.

Indeed, discoveries of prehistoric human fossils continued at such a pace that even Keith's expanded two-volume set was no longer a sufficient showcase for man's antiquity, although he attempted to cope with the volume by increasing the page count, while still maintaining the sum total of ancient human knowledge within a single work. In this spirit he updated the title of his 1930 *New Discoveries Relating to the Antiquity of Man* merely by adding words. In 500 pages Keith packed in all of the discoveries and any changed analyses that had occurred since his previous edition. He opens by devoting thorough attention to the new find in South Africa. Raymond Dart's Taung Child[78] specifically takes the first six chapters, while chapter seven looks at the various, and few, types of ancient man found in South Africa. The small skull Dart described in *Nature* in 1925 possessed a mixture of human and simian traits just as early finds had—only with one rub, they were the exact *opposite* features as the ones in the Piltdown skull. Taung Child had a small brain and modern-looking teeth. In addition to this mix of features Dart's discovery was almost a complete skull with an entire face and a natural brain cast made of sandstone. Here was an almost fully complete skull that required none of the guesswork involved in reconstructing Piltdown. Here all the problems of reconstructions Keith had lamented in his book were moot. The Taung skull was pulled from rock that was much, much older than the gravel at Piltdown. Taung's age was the largest hindrance to its claim as a human ancestor; it was just too old given contemporary theories. Taung was obviously one of those errant branches of hominid evolution that Boule had relegated Neanderthal in 1908.

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[78] For more on Raymond Dart, his colleague Robert Broom, Taung Child, and fossils discoveries in Africa see Roger Lewin, *Bones of Contention: Controversies in the Search for Human Origins* (University of Chicago Press, 1997).

Bookended between Taung in South Africa and the London skull, both of which were discovered shortly after Keith's 1925 editions were in print, is another parade of 'men' and their geographies: Fish Hoek Man, man in East Africa, Galilee skull, Cave men of Palestine, caves of Mount Carmel, Egypt and Babylonia, Ancient China, *Sinanthropus,* Java, Australia, America, the Ehringsdorf skull, Neanderthal children at Gibraltar and La Quina, Neanderthal in Spain, Italy, and Russia, mammoth hunters in Moravia, English caves, and the earliest inhabitants of Scotland and Ireland.[79]

A few maps and illustrations of geological strata (but nothing that would be considered "art" or "illustration" in that sense) are peppered among the throngs of those analytical anatomical schematics of skulls and teeth that Keith wished he did not have to include. His frontispiece is reworked to add the new branches of the human family tree which he had first included in the 1915 and subsequent reprints of *The Antiquity of Man* (Figure 4). These trees reveal his informed opinion, if not a general consensus, of how the human evolutionary tree should look with respect to all the discoveries of fossil man being included.[80] From the common stem of man and ape Keith shows the two earliest branches in the Eocene leading to first, the new world monkeys, and then the old world monkeys. The next branch leads off eventually to modern day gibbons and

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[79] Arthur Keith. *New Discoveries Relating to the Antiquity of Man* (W.W. Norton & Company, Inc., 1931), pp. 5-6.

[80] Jonathan Sawday gives a thorough comparison of Keith's early and reworked family trees in "New Men, Strange Faces, Other Minds: Arthur Keith, Race, and the Piltdown Affair (1912-1953) in *Race, Science, and Medicine, 1700-1960* eds. Waltraud Ernst and Bernard Harris. (Routledge, 1999), pp. 259-288. Here he focuses on how Keith's changing notions of race influenced his interpretation of the evolutionary trees without addressing how the fossil finds shaped those notions or how the images were received by Keith's audience. Nor is there mention of how Keith's ideas compared with other interpretations of mankind's evolutionary tree.

siamangs. The final large fork splits between the "Great Anthropoid Stem" and the "Human Stem."[81]

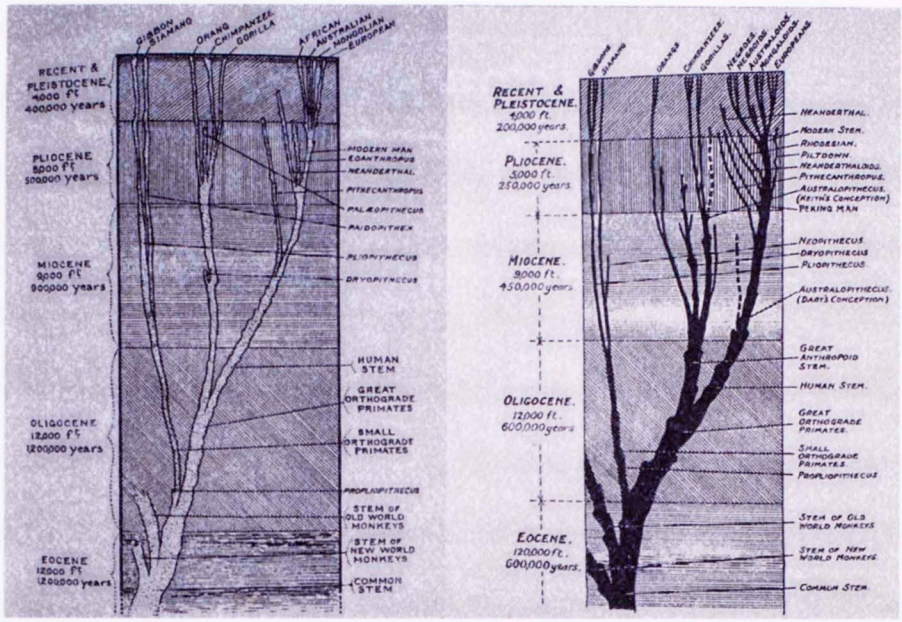

Figure 5. Keith's Hominid Family Trees from the two editions of *The Antiquity of Man.* (1915 and 1925), left and *New Discoveries Relating to the Antiquity of Man* (1930). Not only had more fossils been found, but the ages of the geologic periods had been reworked.

This "Human Stem", according to Keith's interpretation, shows that the first offshoot of the line that led to modern humans was Dubois's Java Man—*Pithecanthropus.* Neanderthals and Piltdown split at nearly the same time and in opposite directions. This could be simply an artist's choice due to the layout of the diagram, but the Piltdown line is also noticeably less straight than the others. Given the level of perfectionism in Keith's other illustrations, this was clearly intentional. Rhodesian Man is the last split before the "Modern Stem" gives rise to the separate races that were seen by most

[81] Arthur Keith. *New Discoveries Relating to the Antiquity of Man* (W.W. Norton & Company, Inc., 1931), frontispiece.

anthropologists of the day as all separate species. This notion of races as separate species also greatly influenced the placing of the fossil hominids along dead-end branches that split from the same stem, instead of their occupying varying positions along the main trunk of human evolution.

The diagram is labeled vertically with time, but contains no explicit hierarchy from left to right. That hierarchy is there, implicitly, and readily noticeable to anyone who had more than passing interest in paleoanthropology; it also explains why Piltdown branches to the right. The modern species that are all listed across the top of Keith's chart increase in perceived anthropological complexity as they go from the gibbons and siamangs on the left to the Europeans on the far right. Each species gets slightly more "modern," and "civilized," as they reach the point where time and evolution intersect. Gorillas are more like modern man than chimpanzees, and chimpanzees are closer still than the orangutans. There is a gap before Keith picks up the Negroes, Negroids, Australoids, Mongoloids, and Europeans. The gap between gorillas and the Negroes on Keith's chart is the direction towards which every branch but Piltdown "grows." Neanderthal, Java Man, Peking Man, and even the modern looking Rhodesian Man branch on the *opposite* side of the modern stem than does Piltdown.[82] With every new find, Keith had to find a place for it on his family tree, and they all fell opposite of Piltdown.[83]

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[82]Arthur Keith. *New Discoveries Relating to the Antiquity of Man* (W.W. Norton & Company, Inc.: New York, 1931), frontispiece.

[83] Robert Delisle's brief analysis of the Piltdown discovery in *Debating Humankind's Place in Nature 1860-2000: The Nature of Paleoanthropology* (Pearson Prentice Hall, 2007) indicates that Piltdown fit within existing theoretical models of human evolution but fails to explore how the find was used to demonstrate and display those theories

Keith's scientific analysis used more exact detail than any other scientist in Britain. He did so in an attempt to keep the breadth of human evolution bound not only within his anatomist specialty, but also within his books, which were intended for sober reflection by serious readers. But the fact is that from its introduction the Piltdown fragments appeared in both specialist and generalist literature accessible to professionals and laymen alike. Outside the finely bound covers of Keith's *Antiquity of Man* a more boisterous discussion of missing links and hominid fossil evidence was becoming available to a wide audience. Keith's version of the Piltdown "apeman," whether he credited it or not , was in competition with other portrayals of apemen in literature—portrayals that would influence not only lay conceptions of human origins, but the nature of paleoanthropology itself as a discipline that would become indisputably scientific yet inescapably public property as well.

Popular Media

The first rumblings of Piltdown as the "missing link" and the "Earliest Englishman" were not as a product of just the small fragments from Sussex as much as they had already existed for generations in the minds of the earliest followers of Darwin

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either in books or museums. He claims that "the assumed impact of the Piltdown discovery on the development of the field [paleoanthropology] by the modern observer is more the product of their current commitment to a particular view of human evolution than a historical reality" (146). While he believes the physical remains are less important than theory, he does not address the fact that the parameters of what we would now consider to be paleoanthropology did not exist in their current form, which did not occur until after World War II. Within this early framework there was a struggle for scientific authority on ancient man and every fossil hominid discovery had an impact on the discussion of human evolution. Even if the theoretical impact was minimal, Piltdown had a profound impact on how those theories were presented to the public, both general and specific.

and, thanks to increased circulation of popular books, newspapers, and magazines, a wider public.[84] The mix of modern human traits and apelike characteristics gave Piltdown claim to the "missing link" title that fit into the prevalent linear model of evolution. In addition to fitting the scientific model, Piltdown's status as not quite man and not quite ape fit within prevalent portrayals of an "apeman" in literature. While the earliest proponents of evolution "emphatically denied that any link was missing… [in] journalism, fictions, poetry, cartoons and popular entertainment the idea took hold."[85] Portrayals of early man in the nineteenth century followed biblical tradition with man and woman appearing in their modern shapes with stone axes and animal skin clothing. Even after Darwin and numerous early hominid fossil finds, works of nonfiction such as Louis Figuier's *Earth Before the Deluge* (sixth edition, 1867) portrayed mankind "outside their cave confront[ing] hostile nature across a defensive gully that symbolically divides the human world from the nonhuman."[86] Representations of early man remained essentially modern man projected into the past. Figuier published his first edition the same year as Huxley's *Evidence as to Man's Place in Nature* (1863), but

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[84] For more on the popularizers of science proper, and not just science fiction, see Peter Bowler, ""Popular Science" in *The Cambridge History of Science*, ed. Peter J. Bowler, (Cambridge University Press, 2009), pp. 622-633.

[85] Gillian Beer. "Forging the Missing Link: Interdisciplinary Stories." *Cambridge University Inaugural Lectures* November 18, 1991, p. 8.

[86] Martin Rudwick's analysis of the early illustrative works used to explain the history of the Earth reveals that the backdrop and importance of illustration had already been established and that mankind's prehistory was just an eventual extension of these previous representations. Once those representations became more geological and less biblical, prehistoric man became a more integral part of the landscape, less an active conqueror than a passive participant. Martin J.S. Rudwick. *Scenes from Deep Time: Early Pictorial Representations of the Prehistoric World* (University of Chicago Press: Chicago, 1992), p. 208.

showed nothing of the kind of similarities with apes that Huxley emphasized in words and imagery. From the 1870s on, Figuier and others portrayed ancient man through the various "ages" such as the 'polished stone Epoch' with only the technology changing, not the human form[87]

Fiction writers had much more freedom to speculate and popular books opened up new avenues of discussion and speculation that were not allowed in Huxley's bound lectures.[88] In 1895 H.G. Wells published a novella titled *The Time Machine.* It chronicles a hero, known only as the Time Traveler, projected over 800 centuries into the future. In this distant future human beings have evolved into two distinct entities: the leisured classes have become the childlike and frugivourous Eloi, while the downtrodden working classes have become the apelike light-fearing, subterranean Morlocks. Wells' political commentary via his fictional vehicle had further counterparts in other popular discussions in which changing ideas of human evolution were

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[87] Stephanie Moser's *Ancestral Images: The Iconography of Human Origins* (Cornell University Press, 1998) analyzes the rich history of prehistoric humans in illustrations as teaching and persuasive tools from the biblical accounts, early modern "wild men," and up through the modern museum display. Her research is indispensable to anyone interested in the history of human evolution and how such theories are presented and displayed.

[88] For the relationship between science fiction and the history of science see Katherine Pandora, "Science Fiction and Hidden Histories of Science" in *Sense of Wonder: A Century of Science Fiction,,* ed. Leigh Ronald Grossman (Wildside Press, 2011). An overview of Victorian science fiction can be found in Paul Fayter, "Strange New Worlds of Space and Time: Late Victorian Science and Science Fiction," in *Victorian Science in Context.* Ed. Bernard Lightman (University of Chicago Press: Chicago, 1997), pp. 256-280. The influence of science fiction on the popular interest in science during this time period is explored in more detail in Martin Willis. *Mesmerists, Monsters, and Machines: Science Fiction and the Cultures of Science in the Nineteenth Century* (Kent State University Press, 2006).

prominent beyond experts and had many influences on the public in this era.[89]

Then, as now, evolution and politics could not be separated.[90] Mankind changes, and if the future is dependent on the systems in place today, as the Time Traveler saw, what systems had been in place in the distant past that gave rise to the existing parameters of humanity in the present? These were the kinds of questions that those who studied human evolution sought to answer in the early twentieth century. If mankind had not appeared fully formed in its modern guise, then what would prehistoric man look like? The prevailing linear evolutionary ideas from the scientific community and that existed within popular science fiction indicated that prehistoric man should look something like Piltdown.

The same year that Piltdown was announced, another piece of literature explored the nature of ape-like people by depicting a human presence in deep time. From April to November 1912 *The Strand Magazine* ran a popular serial by Arthur Conan Doyle featuring a field expedition to find living dinosaurs in South America. Modern man had

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[89] An excellent overview of Wells' interest in early man can be found in Richard Pearson. "Primitive Modernity: H.G. Wells and the Prehistoric Man of the 1890s." *The Yearbook of English Studies*. vol. 37, no. 1, From *Decadent to Modernist: And other Essays* (2007), pp. 58-74.

[90] From its very beginnings the theory of evolution has had leanings and support in what were termed "radical" individuals and institutions. Adrian Desmond's aptly titled *The Politics of Evolution: Morphology, Medicine, and Reform in Radical London* (University of Chicago, 1992) explores the early nineteenth century relationship between medical school students and pre-Darwinian evolution against the changing backdrop of London society. A century later the discussion of human evolution remained radical talk even as many accepted the broader notion of Darwinian evolution. See also James Secord's *Victorian Sensation: The Extraordinary Publication, Reception, and Secret Authorship of Vestiges of the Natural History of Creation* (University of Chicago, 2003) for analysis of the popularity of evolutionary writings during the pre-Darwinian period.

discovered lost worlds of dinosaurs in early literature, most notably Jules Verne's 1864 *Journey to the Center of the Earth*, but Doyle's serial-turned-book *The Lost World* contained something that *Journey to the Center of the Earth* did not: primitive humans and apemen.[91] This is evidence that something had significantly changed with scientific discussions in the forty-eight years since Verne published *Journey to the Center of the Earth.*[92] By 1912, the reading public was familiar enough to understand Doyle's references to apemen and primitive tribes in a way they were incapable of doing when Verne was publishing. Doyle's Professor Challenger and company are confronted with a "living missing link" they could potentially bring back to London in support of evolutionary theory and the idea of a "missing link."

In order to answer these questions human evolution, in addition to the rejecting Lamarckism, had to become part of the deep time which had already been very much a part of the discussions among geologists and paleontologists for the last half of the nineteenth century. It was up to the emerging professionals who would come to be regarded as paleoanthropologists to make sense of these new methods and models. In the linear theories of Haeckel and Huxley as well as in the pages of popular fiction human beings were the result of the natural laws of evolution but somehow operating under those laws differently, or at least at a different rate of speed.

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[91] A concise analysis of Doyle's use of evolutionary themes can be found in Stefan Lampadius. "Evolutionary Ideas in Arthur Conan Doyle's *The Lost Word." Der Andere Conan Doyle: Internationale Tagung am 20. Un 21. Mai 2011 in Leipzeg.* (Peter Land, 2012), pp. 68-97

[92] For more on the treatment of prehistoric life in Verne's work see Allen A. Debus. "Re-Framing the Science in Jules Verne's 'Journey to the Center of the Earth.'" *Science Fiction Studies*. vol. 33, no. 3 (November, 2006), pp. 405-420.

Scientific articles were not enough to settle debates about the nature and appearance of the Piltdown Man and those involved took to a new means of argument in the newspapers: the use of images. Not only has "the visual language of human


THE ILLUSTRATED
LONDON NEWS.

No. 3878. VOL. CXLIII. SATURDAY, AUGUST 16, 1913. SIXPENCE.

Figure 6. Arthur Keith's more modern looking reconstruction of the Piltdown Man took pride of place in *The Illustrated London News.*

origins … inherited pictorial attributes from a vast range of different visual traditions,"[93] but it has also been quick to apply modern techniques and technologies in order to remain at the forefront of popular culture. An early important example appeared in August 1913 with an illustration of Piltdown reconstructions featured on the cover of *The Illustrated London News*. Keith's larger more human like version is prominently displayed while Woodward's version is presented in a smaller inset (Figure 6). The text indicated that both men had recently completed reconstructions and that their differences had led to "a keen controversy between two most able men." In one corner was Dr. Smith-Woodward, the Keeper of the Geological Department of the British Museum, and in the other was Professor Arthur Keith, the Conservator of the Museum of the Royal College of Surgeons. At stake in these images were arguments about the very nature of the Piltdown find as an ancestor in the human line. According to *The Illustrated London News* Smith-Woodward was adamant that it was a "missing link" that was half man and half ape. Keith, on the other hand, gave Piltdown a large brain and labeled it "*Homo piltdownensis.*" An entire page spread compared both scientists' reconstructions of the skull and jaw.[94]

That summer the *Manchester Guardian* ran an austere single column about the debate. "The Battle of the Skull: Piltdown Discovery on Trial" pointed out how Keith's larger and more modern looking reconstruction differed from "what may be called the 'official' reconstruction," that is, Smith-Woodward's. Scientifically there was no

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[93] Stephanie Moser. *Ancestral Images: the Iconography f Human Origins.* (Cornel University Press, 1998), p. 168.
[94] "Ape-man or Modern Man? The Two Piltdown Skull Reconstructions." *The Illustrated London News*. August 16, 1913, p. 245.

consensus on any "official" reconstruction, but the newspapers, at least the *Manchester Guardian,* had come out in favor of Smith-Woodward's more primitive apeman.[95] Keith responded to the discussion by "maintain[ing] strongly that there was *no room* for difference of opinion." According to Keith, Smith-Woodward's reconstruction flew in the face of "elementary anatomical fact"—Smith-Woodward's Piltdown man could neither eat nor breathe and that was "an absolutely impossible condition." Nor was this all; Keith minced no words in arguing that "If Dr. Smith Woodward is approximately right," the paper quoted, "we have to look for the origin of man at the middle of the Pleistocene period. If he is right everybody else is wrong. There is all the difference in the world between this idiot, the dream of a diseased imagination, and the other model constructed according to the laws of anatomy."[96] Keith remained adamant about differences between the two men's interpretations of the evidence and the effect that these conclusions had on the proper placement of Piltdown within the human lineage.

Professor Elliot Smith appears to be the attempted peacemaker of the situation. Not only was Smith a leading authority on brain anatomy but he possessed a seemingly limitless interest in archaeology, particularly Egyptology. Like Smith-Woodward who was specifically a fish paleontologist who dabbled with his friend Dawson in the archaeology of early Britain, Smith held a dual interest and saw the benefits of looking

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[95] While discussing the differences between the reconstructions "one of the delegates" visiting South Kensington's Department of Geology "expressed skepticism as to whether the extremely ape-like mandible and the comparatively human skull could be part of the same remains." In response Dawson pointed out that all the pieces were recovered within a yard and one- half of one another. "The Battle of the Skull: Piltdown Discovery on Trial." *Manchester Guardian*. August 12, 1913, p. 8.

[96] Emphasis is *The Guardian*'s. "The Battle of the Skull: Piltdown Discovery on Trial." *Manchester Guardian*. August 12, 1913, p. 8.

at ancient man through more than one lens.[97] He believed there was no question as to the remote age of the fragments or the mixed features. He asserted that the human cranium and the simian mandible were "not so astonishing" and that they were "in accordance with what other observers had stated that the growth and perfection of the brain must have come before refinement of the features took place." It was clear that Smith was trying to remain a neutral party in the debates by not "expressing a definite opinion on the point of the accuracy of the earlier reconstruction [Woodward's original]." The paper continued, "Professor Smith said he was convinced that some modification of the first model had become necessary." The debate might have been interesting, but it had been far from marking a definitive winner with hearty reactions to both the "supporters of *Eoanthropus dawsoni* and the advocates of *Homo piltdownensis.*" In conclusion, the reporter lamented, "The ignorant outsider came away with only conviction—that the Piltdown man lived a long while ago."[98] It was obvious that hard answers were not coming from the Piltdown debate among scientists anytime soon.

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[97]Elliot Smith published his own account of prehistoric man in a collection of essays in 1924 titled *The Evolution of Man.* At scarcely over 150 pages it does nothing to rival anything of Keith's but provides another avenue to access the evolutionary debates in the 1920s. An Australian by birth, Elliot Smith quickly made a name for himself in medical and anatomical circles with his work on the human brain. He became one of the foremost "authorit[ies] on human evolution, and a renowned, if controversial, amateur archaeologist/anthropologist"; David Paul Crook. *Grafton Elliot Smith, Egyptology and the Diffusion of Culture: A Biographical Perspective.* (Sussex Academic Press, 2012), p. vii.

[98]"The Battle of the Skull: Piltdown Discovery on Trial." *Manchester Guardian*. August 12, 1913, p. 8.

American Analysis

The celebrity of the Piltdown skull quickly outgrew the drawing room of the Royal Geological Society, and once the reconstructions were created the skull became the literal object of everyone's interest. Once there were casts of the original fragments, and full reconstructions that could be manipulated in three dimensions, the hard schematic analytics in Keith's books became less authoritative. As the analysis of the Piltdown Man became more object-focused, the door was opened for professionals from more diverse backgrounds than anatomy to weigh in on the matter. In this new system of interdisciplinary *and* international analysis of physical objects, either real or as casts, Keith's interpretations were no long allowed to stand as solely and wholly authoritative results, let alone the interpretations of an amateur like Charles Dawson. Once Piltdown left England's drawing rooms and comparative anatomy laboratories it ceased to be an endpoint of human evolution and became but one point among many.

Dawson's earlier archaeological discoveries had stayed safely within the discussions of British drawing rooms and related societies. The Piltdown fragments had an implication far beyond the little village of Sussex and in addition to a growing body of diverse professionals—paleontologists, anatomists, and geologists—weighing in on the Piltdown remains scientists from American institutions were analyzing the find. Where earlier discoveries were seen and debated within a single, and often small, group of specialists, Piltdown quickly transcended local museums and archaeologists and fell prey to a host of archaeologists, anatomists, and paleontologists who all brought enormously different tool kits with which they analyzed the skull. The discussion went beyond Sussex, England, and even Europe. When it reached the United States there was

no means left to control the debate in any semblance of practical, respectable drawing room fashion.

In May 1914 the American Museum of Natural History updated its members on the progress of Piltdown. William King Gregory's "The Dawn Man of Piltdown

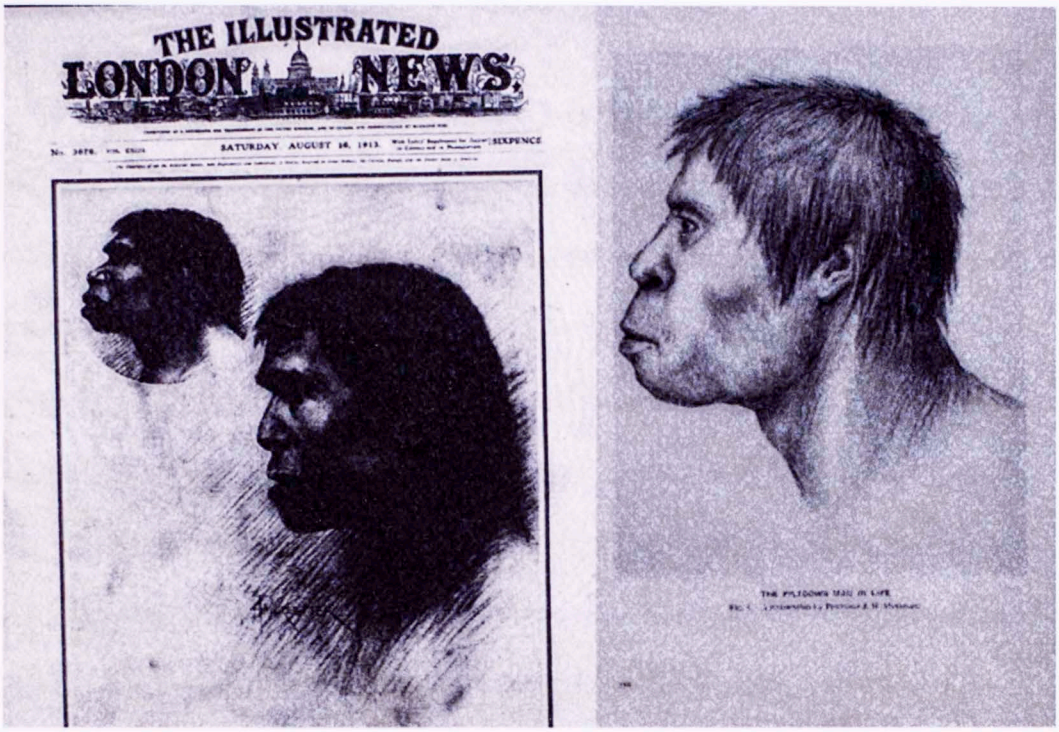

Figure 7. The reconstructions of the Piltdown Man. Smith-Woodward's (inset) and Keith's reconstructions of the Piltdown man in the August 16, 1913 *Illustrated London News* and McGregor's version in the American Museum Journal's "The Dawn Man of Piltdown."

England" devoted 12 pages to explaining the discovery, analysis, and announcement of Piltdown. Gregory highlighted the finer points of the Piltdown discovery, taking an ambivalent stance in describing some of the points about which scientists had disagreed, such as the original skull and mandible association and whether the canine tooth

belonged with the jaw. In the end, assuming the associations to be genuine, Gregory chose Smith-Woodward's reconstruction over Keith's "highly questionable" version. Piltdown was, according to Gregory, "a man in the making," and the artistic representation that Gregory chose for his version was from a restoration by Professor J. H. McGregor was a conspicuous intermediary between Woodward's version and that of Keith (Figure 7).[99]

George Grant MacCurdy came out early in favor of Smith-Woodward's reconstruction in the April-June edition of *American Anthropologist.* He noted that "It was the reconstruction of the cranium" that Smith-Woodward and Elliot held at odds. The mandible and the teeth were key supports for Smith-Woodward's vision of the Piltdown skull. MacCurdy concludes with a note to those in doubt: "Those who might have objected to the use of the name *Eoanthropus*...can no longer deny its appropriateness when applied to the lower jaw, especially since the finding of the canine tooth." His opinion on the skull/mandible association is high if guarded. "All probabilities," he wrote, "are all in favor of the three parts belonging to one and the same individual."[100] Here was another vote in favor of all the fragments at Piltdown not only belonging to the same species, but the same specific individual.

Gerrit S. Miller Jr.'s analysis, published in the *Smithsonian Miscellaneous Collections,* agreed with Waterston's earlier sentiments in *Nature*. On the nature of the

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[99] William King Gregory. "The Dawn Man of Piltdown, England." *The American Museum Journal*. Ed. Mary Cynthia Dickerson. (American Museum of Natural History, 1914) May, pp. 188-200.

[100] George Grant MacCurdy. "The Man of Piltdown." *American Anthropologist*, vol. 16 no. 2, April-June 1914, pp. 331-335.

discovery Miller wrote, "The fossils are so fragmentary that their zoological meaning will probably remain a subject of controversy."[101] Miller lamented the deplorable condition of the fragments found in the gravel pit as well. "Deliberate malice could hardly have been more successful than the hazards of deposition in so breaking the fossils as to give free scope to individual judgment in fitting the parts together."[102] Miller went even further than Gregory. Not only did Miller not assume that the finds were all from the same individual, but he even went so far as to suggest a name for the British Pleistocene chimpanzee obviously represented by the jaw from Piltdown—he suggested the name *Pan vetus.*[103] He also included a nine-page bibliography on Piltdown that excluded "newspaper articles of a popular nature."

Miller clearly did not see the popular press as a legitimate vehicle for scientific discussion in 1915, but its effect cannot be ignored. More people had become familiar with Piltdown from the sources that he excluded than from the ones that made his official list. In fact, newspapers had gone far to shape popular opinion regarding the find and the subsequent debates surrounding its reconstruction and place in the human family tree. It is likely that more people had seen full artistic reconstructions of the Piltdown man with skin, hair, eyes, and culture than had seen the visual representations of the skull or fragments. Smith-Woodward and Keith had both used newspapers to

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[101] Gerrit S. Miller, Jr. "The Jaw of the Piltdown Man" *Smithsonian Miscellaneous Collections* vol 65, no. 12. November 24, 1915, p. 65.

[102] Gerrit S. Miller, Jr. "The Jaw of the Piltdown Man" *Smithsonian Miscellaneous Collections* vol 65, no. 12. November 24, 1915. p 1.

[103] Gerrit S. Miller, Jr. "The Jaw of the Piltdown Man" *Smithsonian Miscellaneous Collections* vol 65, no. 12. November 24, 1915. p 19.

voice their views on the Piltdown case as well as present illustrated reconstructions based on their respective viewpoints. Smith-Woodward seemed more amenable, or at least more readily accessible, to the newspapers. His frequent interviews and closer relationship with the press may have led to the *Manchester Guardian* awarding his reconstruction "official" status back in 1913. Keith was more secluded within the Royal Medical College and appears to have spoken only with journalists when they approached him specifically.

Three months later MacCurdy had switched sides in the Piltdown debates and had evidently changed his analysis dramatically. His article in *Science* "The Revision of *Eoanthropus dawsoni,*" sounds nothing like his earlier "Man of Piltdown" in the *American Anthropologist.* MacCurdy's new stance claimed that the "dazzling combination" of the jaw, tooth, skull, geology, flints, and animal remains have "blinded their discoverers and indirectly some of their colleagues even at a distance."[104] He writes that all the cranial fragments from Piltdown are human and that there is complete "lack of harmony" between the skull and the mandible. Of other associated remains he is hesitant to make any strong claims given that they did not come from a cave deposit or a prehistoric campsite.

MacCurdy was not only critical of the skull and mandible, but with the entire Piltdown locality itself and his ending remarks offer a glimpse into the mind of those still involved in the debates in 1916. He concludes:

> As for the Man of Piltdown, he still exists and is quite ancient as he was before the revision, which is saying a good deal…The only thing missing is

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[104] George Grant MacCurdy. "The Revision of *Eoanthropus dawsoni*." *Science.* vol. XLIII., no. 1103 February 18, 1916, pp. 228-231.

> *Eoanthropus,* and since he was never there anyway, the loss is small; besides we can well afford to continue our search and live in the hope that he may be caught next time. Meanwhile the restorations by Woodward, McGregor and others may still serve a more or less useful purpose as substitutes for *Eoanthropus* until he shall have been found.[105]

Piltdown was still part of the human story, but he was no longer an important part. What was missing, in MacCurdy's view, was that singular and specific "dawn-man," but the different reconstructions served as a good representation until that man could be found.

More Skulls

Discoveries of human fossils around the world showed no sign of slowing and finds continued around southern England in the mid-1930s and were described in much the same manner as the discovery at Piltdown, only with much less excitement. An amateur would find a piece of bone, and, if it was human looking, contact the British Museum, or more often search out Sir Arthur Keith or Sir Arthur Smith-Woodward for an expert opinion. This scenario played out again and again, with varying degrees of success before the world was again plunged into an all-encompassing war. Amateur fossil collectors of any sort never regained prominence after the war and for all historical purposes disappeared.

One of the last finds that brought discussion among the Piltdown Gang was the Swanscombe skull found by Alvan Marston, a dentist in Kent. After consulting Keith, Marston eventually sent the skull to Grafton Elliot Smith. Smith was now Sir Grafton—knighted in 1934 some years after Smith-Woodward and Keith—considered the

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[105] George Grant MacCurdy. "The Revision of *Eoanthropus dawsoni*." *Science.* vol. XLIII., no. 1103 February 18, 1916," p. 231.

Swanscombe skull "although suggestive of the Piltdown" to be "definitely more primitive" than *Eoanthropus.*[106]

Marston wrote letters to Smith-Woodward and Keith claiming that Piltdown would have to be revised in light of the new skull that he had discovered and that he was now working with Smith to bring to publication a piece that would completely overthrow Piltdown. "If you could bring with you the scale contour lines of your Piltdown reconstruction," he wrote to Smith-Woodward, "you would then see for yourself the differences as well as the similarities between it [*Eoanthropus*] and Swanscombe. There can be little doubt that the status of Piltdown will have to be revised; including the question of the Canine tooth."[107] Smith-Woodward had neither the time, energy, nor desire to bring Marston anything. This alone is evidence of the special place Dawson, even as an amateur, held in the scientific circles of Smith-Woodward and Keith. They had worked closely with Dawson, but they would not extend the same opportunity to Marston.

Smith-Woodward and Keith were bothered enough when they had to argue their points with each other and their respected colleagues, that they were now faced with justifying their opinions to a dentist had to be beyond ludicrous. The two men were old

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[106]Frank Spencer. *The Piltdown Papers 1908-1955: The Correspondence and other documents relating to the Piltdown Forgery.* (Natural History Publications, Oxford University Press, 1990), p. 174.

[107]Smith fell under ill health and was unable to complete his end of the analysis and contacts for any publications. Faced with setbacks and Smith's illness Marston abandoned plans of a joint publication and began writing up a report that he would submit himself. Frank Spencer. *The Piltdown Papers 1908-1955: The Correspondence and other documents relating to the Piltdown Forgery.* (Natural History Publications, Oxford University Press: London and New York, 1990), p. 176.

and tired, and Grafton Elliot Smith was ill; events were coming to a head for paleoanthropology and everyone involved with Piltdown. The personal friendships that allowed amateur collectors like Dawson to become successful or famous in the early twentieth century were on their way out as well. Dawson's relationship with Smith-Woodward and Keith served as his ticket to the drawing room table as the days of the gentlemen scientist were waning. Marston had no such relationship with either man, nor was he blessed with any of Charles Dawson's affability. When Marston's ally Smith died in 1937 it left him, a professional dentist but amateur scientist, facing an aging system that no longer supported renegade collecting.

Increased professionalization in the scientific fields of paleontology, archeology, and what would become paleoanthropology no longer supported a network of gentlemen scientists who searched for fossils or flints as a hobby. Smith-Woodward and Keith were the only two left in England with ties to the Piltdown discovery. There they watched, and Keith recorded, as a world of specialized scientific fieldwork proved not only invaluable, but also necessary in the search for the origins of man. The Swanscombe debacle was the final nail in the coffin of drawing room science. In 1938 a carved monolith was placed on its grave. It said nothing of its demise, but marked the hallowed ground where the beginning of its end was pulled piece by piece from the earth in 1912. Financed completely by private subscriptions, the epitaph was simple: "Here in the old river gravel Mr. Charles Dawson, F.S.A., found the fossil skull of Piltdown Man 1912-1913. The Discovery was described by Mr. Charles Dawson and Sir Arthur Smith Woodward in the Quarterly Journal of the Geological Society." In an even more ironic twist, the man who oversaw the largest collective professional field

expedition for fossils, specifically human fossils, submitted the first £5 pound subscription in 1925. Henry Fairfield Osborn killed the amateur gentleman scientist and helped pay for his tombstone (Figure 7).

Figure 8. Arthur Smith-Woodward at the unveiling of the Piltdown Monument in 1938. Source: Frank Spencer. *The Piltdown Papers,* p. 180.

The finds at Piltdown brought together an expanse of professional scientists from different disciplines. Each bit of evidence was analyzed by someone who was now a specialist in flint tools, geologic strata, or anatomy. Gone were the days of one or two people presenting an authoritative view on something as complex as the finds at Piltdown and their associated artifacts and context. For the first time archaeological evidence was used to confirm initial geological and paleontological theories in a debate

on prehistoric man. The Piltdown debates mark one of the first and strongest crossovers between what had been separate professional scientific disciplines. Archaeology had rejoined paleontology and the early debates shaped the nature of paleoanthropological inquiry for the next three decades. It was the various unknowns and disagreements that surrounded Piltdown Man that opened the door for the American scientific voice to authoritatively weigh in on something that, twenty years before, would have been an entirely British problem. Soon a different version of Piltdown would go on display in an American museum along with his tools and geology. This is one of the first instances that the debate over human origins had moved across the Atlantic. For decades France and Germany were the richest areas for prehistoric human fossils; Dubois had worked in Java, but that was a European colony so it was still under that political influence. No sooner than England had their contender for the missing link did the study of human origins enter a new age and they now had to defend their slipping authority from scientists who did not even have their own prehistoric human remains to study.

Evolving Visuals

Representations of the earliest humans remained static through the mid-nineteenth century. Artistic license offered few variations on the biblical theme of creation. Mankind arrived fully formed in their present modern guise sans clothes, but otherwise as complete *Homo sapiens.* Illustrations of Adam and Eve's banishment form the Garden of Eden and subsequent punishment of toil and labor are an approximation on our earliest ancestors, with stone tools and animal skin clothing. After Darwin, some

artists began to question what the precursors to Adam and Eve looked like.[108] As Darwinian theory began to open up interpretations to sources other than the Christian Bible, prehistoric mankind began to slowly change in appearance within scientific books and newspaper articles. Once scientists discovered how powerful imagery could be in support of their case they began to utilize illustrations of human origins in ways that other disciplines had been using art. Piltdown's impact and influence is evident in both the professional scientific community and the popular press of the early twentieth century.

With Piltdown especially, the scientists were no longer arguing only in words, they were employing images and they were distributing them to a wider reading public than had anyone previously. Imagery was nothing new to the sciences. In fact "the science of paleontology has always been inextricably tied to art…[and] since it has always been impossible for scientists and the public to see every fossil, visual representations of fossils have always been essential."[109] Art, and artistry, is another attribute that paleontology brings to the study of hominid fossils. From the very beginning, paleontological artwork and sketches differed from those of the medical profession. In fact, they operated in reverse; while anatomists had to envision and reveal what was hidden under a specimen's skin, hair, and organs paleontologists had to work from within in order to envision and illustrate those very attributes from the fragments

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[108] For more on the late eighteenth and early nineteenth-century representations of the history of the Earth, see Martin Rudwick. *Worlds Before Adam: The Reconstruction of Geohistory in the Age of Reform* (University of Chicago, 2008).

[109] Jane Davidson. *A History of Paleontology Illustration* (Indiana University Press, 2008), p. xi. .

of fossilized bone. The explosion of cheap printing and the ability to recreate full images within newspapers brought that artwork to even more people interested in the history of life on earth. As art historian Jane Davidson asserts: if "we can say with certainty that …paleontology is inextricably bound to art and illustrative representations" and that "there is no paleontology without imagery, except in the strict sense of looking at the specimens in museums or the field,"[110] we must also say the same thing about paleoanthropology for, after all, paleontology has lent a great deal to the development of that discipline.

As with paleontology as Stephanie Moser has shown, "archaeology is an explicitly visual science." The field is filled with charts, graphs, schematics, layouts, and other "abstract pictorial reconstructions." While "illustrations rendered realistically are generally thought to be peripheral to the substance of archaeological arguments."[111] While scientists were more interested in the abstract schematics that could be found in Keith's works, newspapers and the general public were enjoying the more realistic representations of prehistoric families in their natural settings. Archaeological illustrations added another layer to that of the basic paleontological imagery with their attention to cultural interactions and "humanness." The two worked methods were the same up to the point where the subjects began to stake claim on human ancestry. Implicitly such illustrations drove public feeling and opinion towards their ancestors

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[110] Jane Davidson. *A History of Paleontology Illustration* (Indiana University Press, 2008), p. 183.

[111] Stephanie Moser. "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. Brian S. Baigrie (University of Toronto Press, 1996), pp. 184-185.

and it was a "visual language…[of] fast emerging iconography in which human-like and ape-like attributes were compiled and juxtaposed in order to denote whether the species in question was entitled to be labelled a 'human' ancestor."[112] The stronger the resemblance the subject possessed to modern humanity the stronger the connection between it and the viewer. The power of the illustrations of our early ancestors cannot be overstated. The artistic influence that archaeology added to the already solid illustrative foundation of paleontology provided a lasting impact upon the study of human evolution in the early twentieth century and how that research has been shared with the public ever since.

Museums in the early twentieth century—especially in the United States—were just coming out of their storehouse and entertainment phase and into something more dynamic. No longer were they dusty collections of antiques and curiosities that special visitors could marvel upon, they were now tools of education. Museums as tools to teach the public, while still a novel enterprise, had been taken up and quite nearly perfected by 1920 when Keith's second edition of *The Antiquity of Man* arrived. In America, Henry Fairfield Osborn had taken all the human fossil discoveries, and all the technical drawings and analysis off the page and placed it behind glass or on the wall. If Keith's work was the literary pinnacle of evolutionary knowledge, Osborn's Great Hall of the Age of Man was the physical. In the American Museum of Natural History Osborn took the schematic and technical drawing of skulls and mandibles and placed them under skin with human expressions and onto large commissioned murals. The

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[112] Stephanie Moser. "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. Brian S. Baigrie (University of Toronto Press: Toronto, Buffalo, London, 1996), p. 193.

comparative aspect was still there, but the subjects were portrayed in their fully intact forms, dynamic and full of life. Bronze busts replaced Keith's line drawings of the differences between extinct races and glass display cases full of artifacts replaced hard cloth binding and golden skull cover art. If Keith's model seemed to internalize the study, Osborn's exhibit was external.

Their works were directed at two completely different audiences, not just an American audience and a British one, and not just a museum going public and a reading public. Osborn sought to teach the laypersons: that was, after all, the usefulness in the Museum. Keith's work, although it was pitched at a learned public, remained markedly more technical than almost anything Osborn had written. Keith was looking to still, and maybe convert, his critics in the scientific circles with logic and attention to detail while Osborn was going to drown out his among the din of museum patrons. Books were more authoritative and had a greater potential geographic range than a museum, but it is likely that more people visited Osborn's Great Hall than read either Osborn's or Keith's works. This was a new form of mass science communication that was aimed not only at a learned public, but the entire public. The Piltdown discovery should have been a straightforward scientific inquiry, but the constantly changing dynamic between those who were analyzing and reconstructing the fragments and the voracious public appetite for conclusions made it anything but straightforward. Even as Keith tried to maintain control of the celebrity of Piltdown controlled, Henry Fairfield Osborn was building a stage in the American Museum of Natural History from which it could shine.

Figure 9. Sir Arthur Keith. 1886-1955.[113]

[113] UCL Research Department of Vell and Developmental Biology. "History of CDB. http://www.ucl.ac.uk/cdb/about/history/keith (Accessed November 12, 2014).

Figure 10. Charles Dawson, 1864-1916.[114]

[114] Natural History Museum. http://www.nhm.ac.uk/nature-online/life/human-origins/piltdown-man/field_a_04.html (Accessed October, 23, 2013).

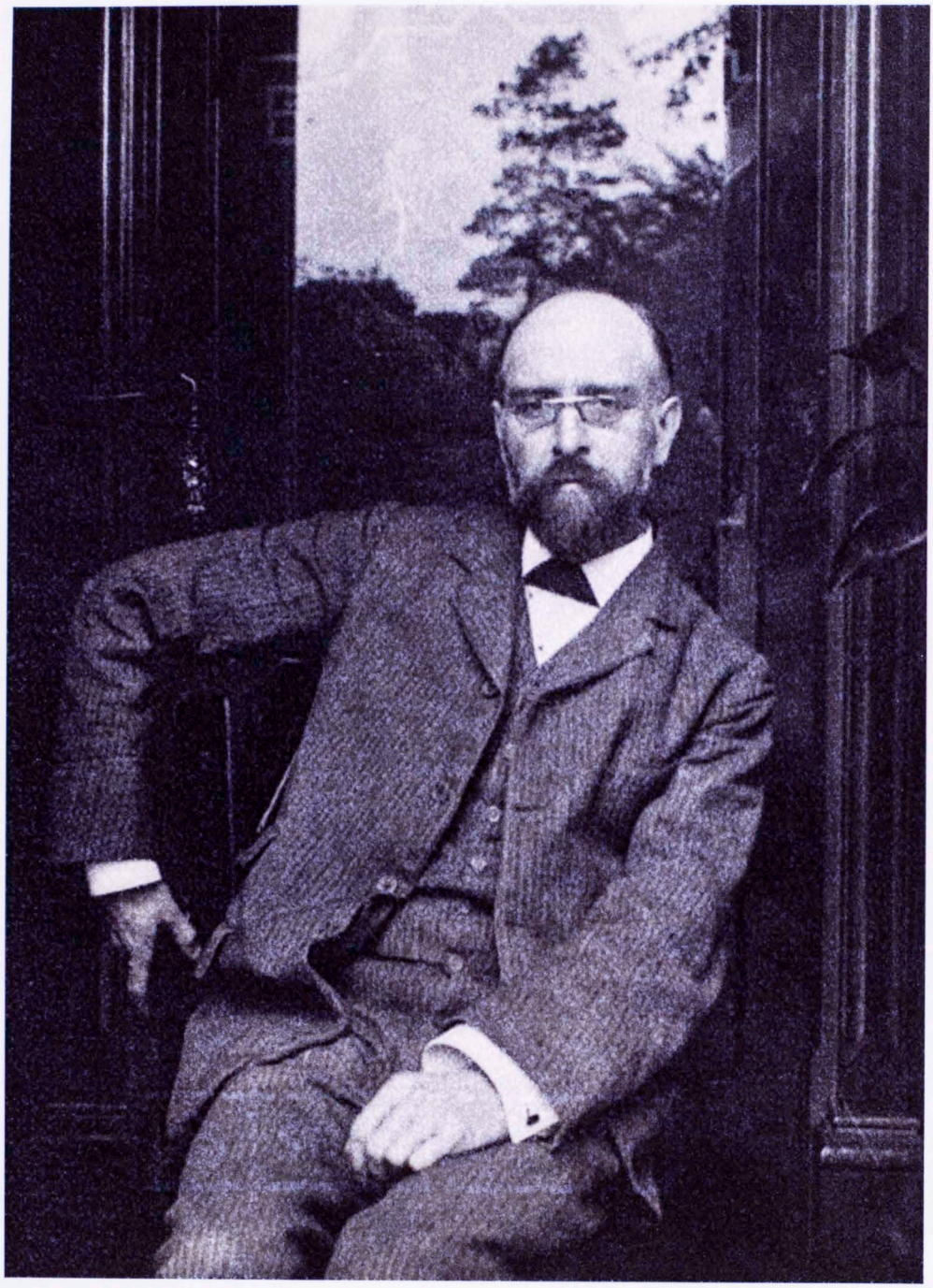

Figure 11. Sir Arthur Smith-Woodward, 1864-1944.[115]

[115]Natural History Museum: http://www.nhm.ac.uk/natureplus/servlet/JiveServlet/showImage/38-3316-60762/fossil-fish-img2-woodward.jpg (Accessed May 15, 2014).

Figure 12. Photography (top) and Postcard of Arthur Smith-Woodward (seated) and Charles Dawson working at the Piltdown Gravel Pit.[116]

[116] Frank Spencer. *The Piltdown Papers 1908-1955: The Correspondence and Other Documents relating to the Piltdown forgery.* (Natural History Publications, Oxford University Press, 1990), pp. 30-31.

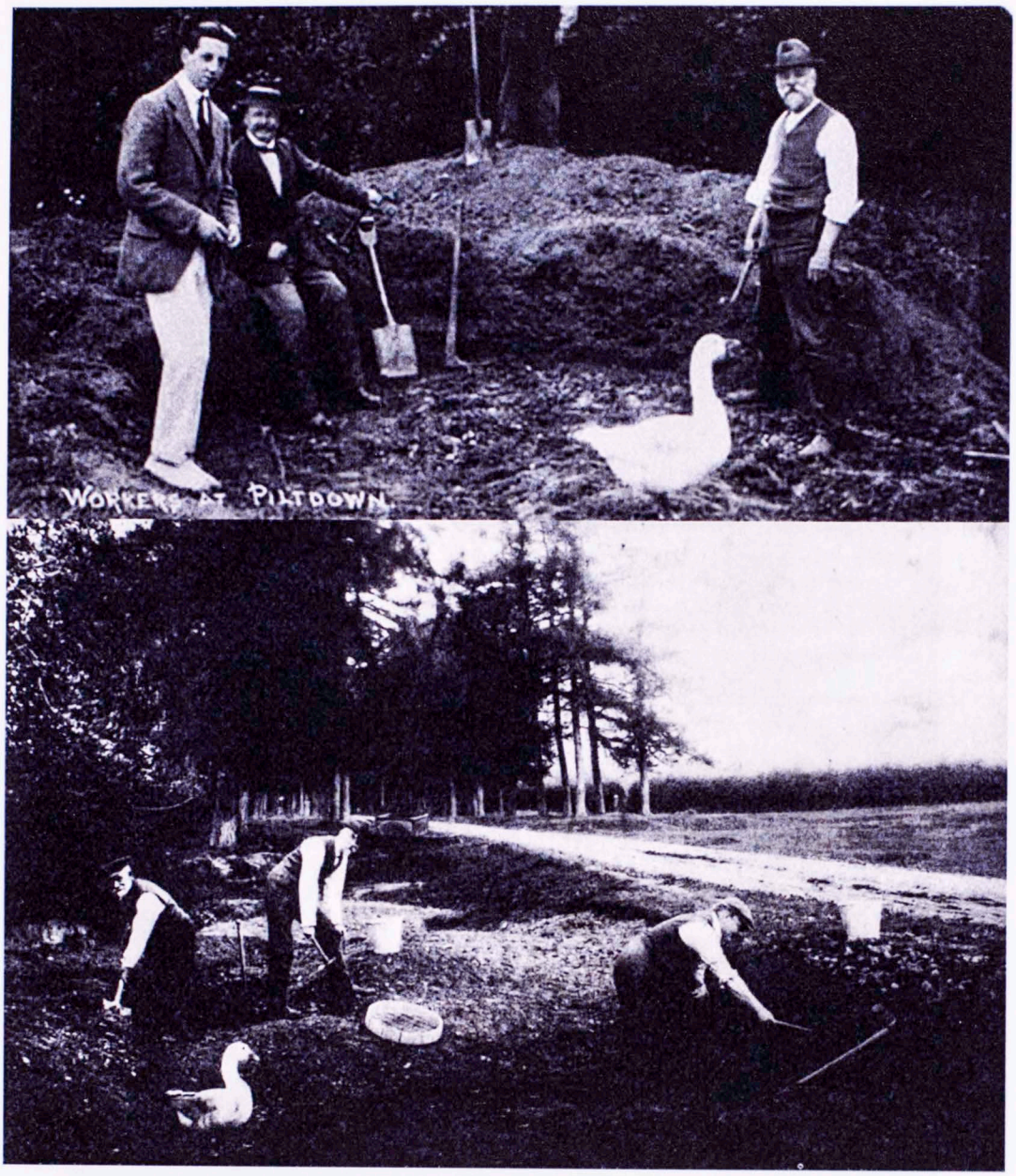

Figure 13. More Work at the Piltdown Pit by Smith-Woodward, and other workers from the British Museum (Natural History) and "Chipper" the goose.[117]

[117]Christ Stinger. " Palaeontology: The 100-year Mystery of Piltdown Man." *Nature* 492, 177-179 (December 13, 2012*)* Published online. http://www.nature.com/nature/journal/v492/n7428/full/492177a.html (Accessed December 12, 2013).

Figure 14. Henry Fairfield Osborn, 1857-1935.[118]

[118] Image Source: Edward O'Reilly, "Redwoods and Hitler: The Link Between Nature Conservation and the Eugenics Movement," *New-York Historical Society and Library blog,* September 25, 2013). http://blog.nyhistory.org/redwoods-and-hitler-the-link-between-nature-conservation-and-the-eugenics-movement/ (Accessed May 20, 2014).

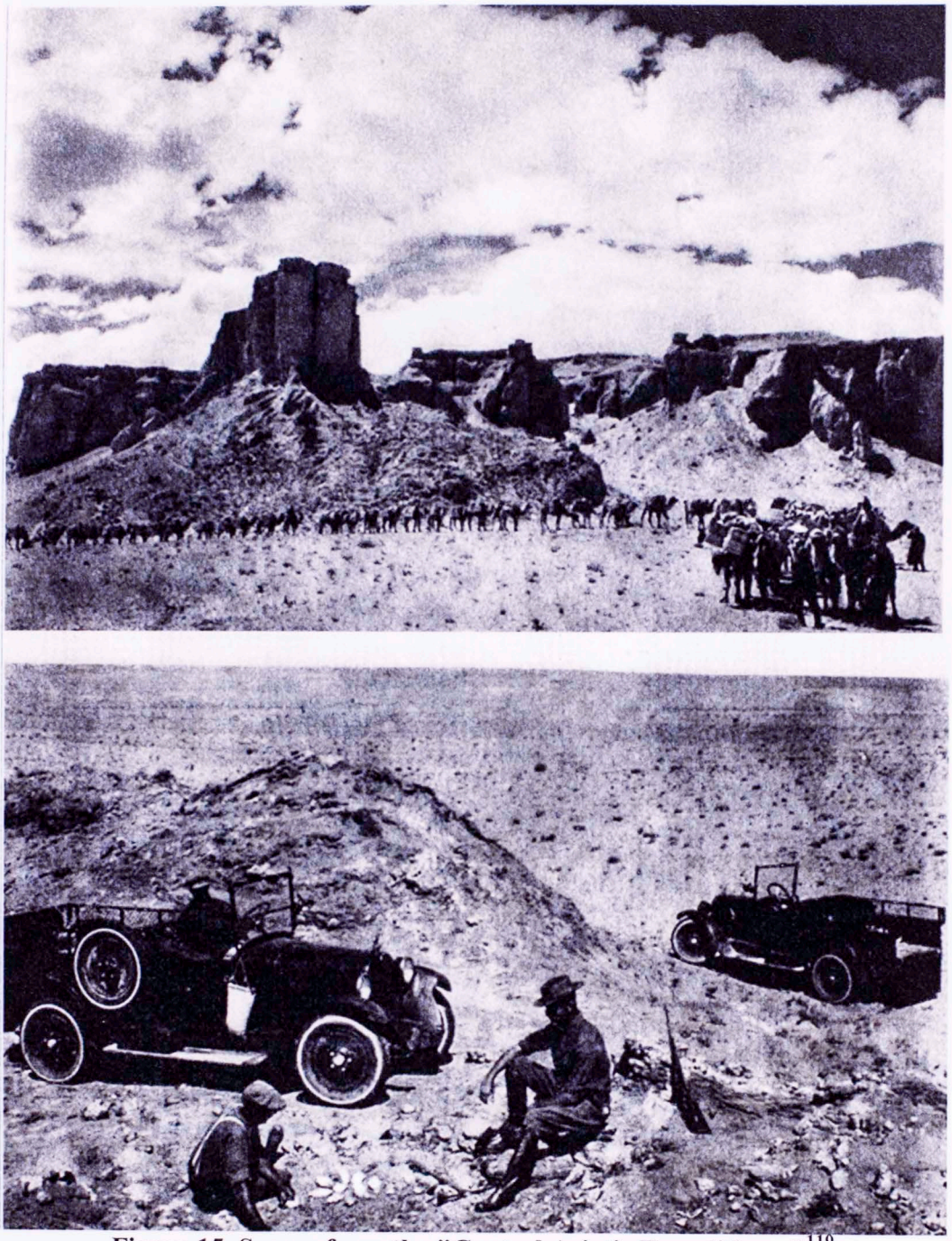

Figure 15. Scenes from the "Central Asiatic Expeditions."[119]

[119] The American Museum of Natural History—Second Asiatic Expeditions led by Roy Chapman Andrews, MonGolaiaTravels.com. http://mongoliatravels.com/blog/2012/04/the-american-museum-of-natural-history-second-asiatic-expeditions-led-by-roy-chapman-andrews/ (Accessed May 21, 2014).

Figure 16. Scenes from the "Central Asiatic Expeditions."[120]

[120] The American Museum of Natural History—Second Asiatic Expeditions led by Roy Chapman Andrews, MonGolaiaTravels.com. http://mongoliatravels.com/blog/2012/04/the-american-museum-of-natural-history-second-asiatic-expeditions-led-by-roy-chapman-andrews/ (Accessed May 21, 2014).

Chapter 2

Osborn's Gilded Skull

In addition to its popularity in England, the skull from Piltdown held a special place in American science during the early twentieth century. Americans, at least those living in New York, New Haven, and Washington D.C., had long enjoyed exhibits featuring dinosaur and extinct mammal fossils discovered and recovered from the still untamed American west.[121] The Piltdown claim provided the impetus for Henry Fairfield Osborn to produce an exhibition featuring human history modeled on these past successful exhibit halls which outlined as much of prehistoric life on earth as was then known. Osborn was aware of Java Man, Neanderthal Man, and the Cro-Magnons well before the announcement of Charles Dawson's discovery, but something about Piltdown Man and his associated tools and geology stirred Osborn into action on another Great Hall at the American Museum. If the timing of the Piltdown discovery was fortuitous for a British model explaining the history of man, it was even more so for Osborn and his desire to put that history on display in America.

Journalists from the daily newspapers constructed the earliest popular American relationship with the Piltdown discovery. By covering the early debates as an interested party looking at Piltdown more from abroad, rather than framing it as a scientific

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[121] This is especially true for these areas housed in the American Museum of Natural History, the Peabody Museum of Natural History, and the Smithsonian Institution but many museums were clamoring to put dinosaurs on exhibit. The largest hindrance for many was the cost associated with collecting and display. "Americans" in this sense refers to the public that may have been specifically engaged with the American Museum in New York, its exhibits, Osborn's books, and newspapers that covered the Piltdown events. For more history and analysis of the American Museum's early exhibition halls, especially the dinosaur exhibits, see Lukas Rieppel, "Bringing Dinosaurs Back to Life: Exhibiting Prehistory at the American Museum of Natural History." *Isis* vol. 103 no. 3 (September 2012), pp. 460-490.

wonder, it at first seemed as if it would be little more than a British curiosity. The initial press reports did capitalize on the earliest debates in England regarding what the Piltdown Man would have looked like as evidenced in *The Washington Post's* Piltdown piece, which featured an enormous image of early humans fighting a mammoth. The image took up more space than the text of the article and was captioned "The Extraordinary Picture of a Time Many Thousands of Years After that of the 'Piltdown Man.'" In essence and substance it had absolutely nothing to do with the skull reconstruction debates, but it *looked* marvelous. The *Post* reported in the title that it was an "Inch that 'Rattles' England.'" The outcome of the debate between Smith-Woodward and Keith would determine whether the most ancient ancestor to the "proud British" were "Ape Men or Real Men." The article mockingly compares the British to the "haughty Spanish" for their obsession with the "incomparable dignity that goes with 'family' with ancient lineage."[122] The outcome to the British debates that played out in the press was nothing less than the face of mankind's "missing link." Smith-Woodward and Keith presented very different looking reconstructions. Smith-Woodward's idea of Piltdown maintained that the prehistoric man was decidedly more ape-like while Keith's more modern version could have been easily recognized as someone seen on the streets of London.

American readers, or at least American journalists, were apparently less worried about whether Piltdown was ape or man since no effort was put into answering the question by consulting and local authorities—they enjoyed the scientific bickering that

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[122] "The Inch that 'Rattles' England." *The Washington Post.* September 28, 1913. p. MS5

played out in and sold newspapers.[123] By way of describing the two reconstructions to its readers, the *Post* noted that Dr. Woodward's narrow skulled version of Piltdown much resembled the Honorable William A. Sulzer, an American lawyer, former Congressman, and the current Governor of New York. On the other hand, Keith's additional "rattling" inch presented a broad and capacious skull, it was suggested, like that of Colonel Roosevelt.[124] This restored inch proved that this ancient Briton was a man and not an ape. That wasn't the final word on the matter in Britain, for there were still scientific doubts according to the *Post*, and "the English hate to be in any doubt about their ancestry."[125] Until 1925, when the Piltdown skull would be featured in Osborn's Hall of Man, this was the extent of the general American public's involvement and association with Piltdown. A few followers of Osborn's work may have read *Men of the Old Stone Age* or some articles or other technical non-specialist literature, but a

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[123] This was not the first time that the American press had profited from giving space to airing a scientific feud. In the 1890s the *New York Herald* ran a scientific squabble that turned to decidedly personal attacks between two American paleontologists. Several accounts analyze the press coverage of the Bone War between Edward Cope and O.C. Marsh: see, for instance, David Rains Wallace, *The Bonehunter's Revenge: Dinosaurs, Greed, and the Greatest Scientific Feud of the Gilded Age* (Houghton Mifflin, 1999); Tom Rea, *Bone Wars: The Excavation and Celebrity of Andrew Carnegie's Dinosaur* (University of Pittsburgh Press, 2001); and Mark Jaffe, *The Gilded Dinosaur: The Fossil War Between E.D. Cope and O.C. Marsh and the Rise of American Science* (Crown, 2000). Url Lanham, *The Bone Hunters*: *The Heroic Age of Paleontology in the American West* (Columbia University Press, 1973; re-released by Dover, 1991) examines the larger context of field exploration beyond the Cope and Marsh episodes.

[124] Here *The Washington Post* may have been referring with a bit of artistic license to the then common practice of phrenology in order to not only highlight the differences in the Piltdown reconstructions, but also the more or less degeneracy of the Governor.

[125] "The Inch that 'Rattles' England." *The Washington Post.* September 28, 1913. p. MS5

few articles mocking the earliest debates that centered on just how the Piltdown fragments should be pieced back together were the extent of popular notice in America.

American Analysis

Osborn had been the director of the American Museum of Natural History for four years when Piltdown was discovered and he followed the progress in England more closely and less jeeringly than the press.[126] Debates over inches had plagued Piltdown reconstructions from the beginning. As early as 1914, William King Gregory's "The Dawn Man of Piltdown England" devoted twelve pages to explaining the discovery, analysis, and announcement of Piltdown in order to update the American Museum of Natural History on Piltdown's scientific progress. Gregory highlights the finer points of the Piltdown discovery, and adopts an ambivalent stance on whether the original skull and mandible should be associated and whether the canine tooth belonged with the jaw. If it turned out that the associations were genuine, Gregory chose Woodward's reconstruction over Keith's "highly questionable" version. For Gregory, Keith's model was just too modern-looking to display all the characteristics that such an association of fragments would have required. Otherwise, Keith's version of Piltdown was, according to Gregory, "a man in the making," and the artistic representation Gregory chose for his report is from a reconstruction by Columbia professor J. H.

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[126] For a more thorough background on Osborn's life see Ronald Rainger, *An Agenda for Antiquity: Henry Fairfield Osborn and Vertebrate Paleontology at the American Museum of Natural History, 1890-1935* (University of Alabama Press, 1991, reprinted in 2004). A more recent account that deals with the influence racial ideologies had on Osborn see Brian Regal, *Henry Fairfield Osborn: Race, and the Search for the Origins of Man* (Ashgate, 2002).

McGregor—a conspicuous intermediary between Smith-Woodward's version and that of Keith possessing the apelike, brutish figures softened by a larger skull and more modern features.[127]

As soon as the news broke within scientific circles, Smith-Woodward was flooded with requests for reprints of his paper as well as casts of his restored *dawsoni.* It is unclear who in America had possession of the first casts, but they were in New York sometime before February 1914. In a letter to Smith-Woodward, William Diller Matthew, a paleontologist at the American Museum, wrote: "The Piltdown skull was the storm-centre of a lively discussion at the last meeting of the Ecological Section of the New York Academy of Sciences."[128] From the Academy of Sciences, the center of the storm moved and settled over the American Museum where Osborn's continued correspondence with Smith-Woodward kept it more or less tempestuous for the next fifteen years, fueled by the fact that Osborn's selected versions of Piltdown belonged to neither Smith-Woodward nor Keith.

Sometime in 1914 Smith-Woodward sent some casts directly to the American Museum. Osborn wasted no time in getting these to James Howard McGregor, his zoology and anthropology colleague at Columbia. McGregor had been hired in 1897,

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[127] William King Gregory. "The Dawn Man of Piltdown, England." *The American Museum Journal*. ed. Mary Cynthia Dickerson. (American Museum of Natural History, May, 1914), pp. 188-200.

[128] Matthew revealed that a Dr. Williams had brought the casts to the meeting. There are strong indications that this was Leon Williams, an American dentist who lived in London. Correspondence between Williams and Keith indicate that he was working with Keith on the Piltdown question. Frank Spencer. *The Piltdown Papers 1908-1955: The Correspondence and other Documents Relating to the Piltdown Forgery.* (Natural History Publications, Oxford University Press, 1990), p. 102.

six years after Osborn, and at the height of his career he had achieved "international renown for his restorations of the skulls of prehistoric specimens."[129] On January 12, 1915 Osborn wrote to Smith-Woodward that he was "preparing for you especially three recent models made by Professor J. Howard McGregor…the Piltdown skull and jaw, the Piltdown brain, from the interior of the reconstructed skull, the Piltdown head showing professor McGregor's method of modeling, [and] the Piltdown head complete."[130] Osborn described McGregor to Smith-Woodward as "a man who combines I think exceptional artistic skill with what may be called strong imagination in comparative anatomy." Osborn admitted to Smith-Woodward that his work "affords a somewhat different interpretation from that reached by the modelers of your direction." He also proudly exclaimed that McGregor's results would be published in Osborn's forthcoming book *Men of the Old Stone Age* and promised to send Smith-Woodward a copy as soon as it was published.[131]

Since *Men of the Old Stone Age* was in print before the end of 1915 and Osborn included full-page images of the full Piltdown reconstruction in it, McGregor must have

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[129] Robert M. Bleiberg. "James McGregor, Zoology Professor, Columbia's Mr. Chips, has taught since 1897." *Columbia Spectator*. vol. LXV, no. 44 Thursday November 27, 1941.

[130] These "fleshed out" reconstructions were nothing new. The first fully reconstructed casts of a human ancestor was Java Man as a fully erect, standing body reconstruction for the 1900 Word's Exhibition in Paris. What is new with Piltdown is the actual fragments were cast, reproduced, and sent to other scientists studying the Piltdown case. Frank Spencer. *The Piltdown Papers 1908-1955: The Correspondence and other Documents Relating to the Piltdown Forgery.* (Natural History Publications, Oxford University Press, 1990), p. 120.

[131] Frank Spencer. *The Piltdown Papers 1908-1955: The Correspondence and other Documents Relating to the Piltdown Forgery.* (Natural History Publications, Oxford University Press, 1990), p. 120.

begun work on the casts as soon as Osborn received them from Smith-Woodward. The following month Osborn acknowledged Smith-Woodward's reply and indicated that he was going to present the collection of McGregor's models to the British Museum. He listed the complete set again as head and jaws along with the complete head restoration and the intracranial cast. McGregor had by this time completed *Pithecanthropus* (Java Man), and Neanderthal models, and was then currently working on a Cro-Magnon reconstruction. Osborn knew that McGregor was "prepared to dispose of reproductions" and noted to Smith-Woodward that he believed McGregor took $100 for a whole set which he thought was "a very modest amount."[132]

After a short vacation to see to his wife's health, Osborn returned to work on April 5 where he reviewed a revised reconstruction of Piltdown that Smith-Woodward had sent to him and compared this new version to McGregor's that very afternoon. Osborn requested that Smith-Woodward kindly give the date of his revision because he believed it predated McGregor's finished model which was completed no later than press time for *Men of the Old Stone Age*'s first edition in 1915. If Smith-Woodward's version predated McGregor's, this is an indication that the British were working on reconstructions nearly as soon as the fragments arrived from Piltdown. The speed with which these reconstructions began is indicative of the new importance that such three dimensional objects had over regular illustrations in terms of their persuasive power, and in terms of the possibility they held for more impressive museum exhibits.

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[132]Frank Spencer. *The Piltdown Papers 1908-1955: The Correspondence and Other Documents Relating to the Piltdown Forgery.* (Natural History Publications, Oxford University Press, 1990), p. 121.

Osborn stated that his placement of Piltdown was later in the Pleistocene than Smith-Woodward had suggested based on the skull's association with the flints with which it had been found and subsequently associated.[133] In this manner Osborn placed Piltdown even closer to modern man than had Smith-Woodward. By contrast, Keith was adamant that Piltdown was both more modern looking than Smith-Woodward suggested and yet existed even further back in time.

Osborn's theory that Piltdown man was even younger than what Smith-Woodward suggested most likely exasperated Keith, because his expert anatomical reconstruction and his personal ideologies in no way supported a human ancestor so primitive-looking living so temporally close to modern humanity. Smith-Woodward believed that the Piltdown Man was a primitive-looking relatively recent prehistoric version of man, while Keith's model and date placed a strikingly modern-looking man earlier in humanity's geologic past. Osborn's theories twisted both of Britain's leading authorities on the Piltdown fragments into something else entirely. A human ancestor with a mix of primitive and modern characteristics that had survived nearly until the beginning of history was the "missing link" that fit Osborn's theory of humanity's origins.

Osborn's analysis was strongly informed by the associated finds around the Piltdown pit, including flints and geological deposition—the significance he gave to such evidence was in line with his paleontological training. Smith-Woodward was a fossil fish expert and had a similar paleontological background; this likely accounts for

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[133] Frank Spencer. *The Piltdown Papers 1908-1955: The Correspondence and Other Documents Relating to the Piltdown Forgery.* (Natural History Publications, Oxford University Press, 1990), p. 125.

why their versions of Piltdown were more similar to each other than either was to that of Keith. Keith, because of his training as an anatomist, placed the greatest weight on the skull fragments themselves: it was the bones that mattered. It was the bones that had always mattered. The most prestigious anatomists of the previous century had derived great authority, and celebrity, by explaining the past with just the bones of creatures collected by explorers. Cuvier and Owen received bones, and usually only bones, in their laboratories and set to work describing and reconstructing them to the world. Few, besides Cuvier, questioned or concerned themselves with anything associated with the bones. In 1915 Keith operated under the same auspices as his predecessors. This tradition had prevented any meaningful interdisciplinary engagement between the anatomists, geologists, anthropologists, and archaeologists. This disciplinary seclusion was no longer possible after the discovery of the Piltdown fragments. The Piltdown case all but forced the reconfiguration of this intellectual field. In order for the old models to shift, the balance of authority had to change as well. This new identity was shaped not only by the means in which knowledge was brought to the forefront, but also in what was deemed worthy of study.

It was this extra analysis that gave Osborn, and other geologists, a broader view of prehistoric Sussex than the anatomy that Keith saw in the Piltdown skull could provide. Osborn was in almost constant contact with Smith-Woodward throughout the reconstruction process and wrote again in July restating his promise to donate the American models to the British Museum, which finally arrived there in October. In the interim, Smith-Woodward wrote to Osborn with a lament that Dawson had been left out of the Piltdown conversation, and that Osborn had not offered to send him a

reconstruction of his "dawn man." Osborn replied that he would be very glad to have Smith-Woodward give Dawson one of McGregor's models and that he would endeavor to secure one and send it immediately. He expressed regret that Dawson believed that he "had not received enough honor and credit" throughout the discussions and debates. "I think," Osborn wrote to Smith-Woodward, "you have gone out of your way and have treated him most magnanimously in every respect, in fact, you could not possibly have done more than you have both in describing and naming the specimens."

Dawson, of course, was not disappointed with Smith-Woodward, but with the Americans. After years of working closely with Keith and Smith-Woodward, Dawson took the absence of such attention from Osborn as a slight. To add further insult, after the initial complaint Dawson did not even receive the model directly from Osborn; it arrived via his friend Smith-Woodward.[134] The relationship between the amateur and the professional was quite different in America than it was in England. Dawson, as discoverer of the first Piltdown fragments, was still involved in nearly all aspects of the debates going on in England. He was at the very least present at any of the large meetings and gatherings that would address his discovery. That was not the case in the United States. There was no need for Osborn to correspond with an amateur like Dawson, no matter how respected, when it was Smith-Woodward and Keith who did the actual scientific work of record. Dawson's personal relationship with Smith-Woodward gave this amateur access to professionals due to a similarity in social background;, this status as something of a gentlemen collector meant little to Osborn.

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[134] Frank Spencer. *The Piltdown Papers 1908-1955: The Correspondence and other documents relating to the Piltdown Forgery.* (Natural History Publications, Oxford University Press, 1990), p. 128.

The farthest Osborn went was sending the reconstruction to Smith-Woodward to give to Dawson and that was only to appease Dawson's ego in the case these hard feelings might impinge on Osborn's relationship with Smith-Woodward.[135]

By the time the American models arrived at the British Museum, Father Teilhard de Chardin, a Jesuit priest and amateur paleontologist who visited and worked at the Piltdown site for just a few days, had discovered a canine tooth. While the tooth fit with Smith-Woodward's reconstruction that held that the jaw and skull belonged together—and solidified support of that version of the skull reconstruction—it created a problem for others. For example, George Grant MacCurdy, a noted American anthropologist teaching at Yale, noted, "it was the reconstruction of the cranium" that had originally set scientists at odds with one another. The mandible and the teeth were key supports to Smith-Woodward's vision of the Piltdown skull and it solidified MacCurdy's support for this model. He concluded with a note to those in doubt: "Those who might have objected to the use of the name *Eoanthropus*...can no longer deny its appropriateness when applied to the lower jaw, especially since the finding of the canine tooth." With the canine in place, Piltdown looked just as Smith-Woodward had concluded, and if his reconstruction was taken as correct, then his associated theory on the age of the find was accepted as well. MacCurdy's opinion on the skull/mandible association is high if guarded: "All probabilities are all in favor of the three parts

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[135] Osborn and others were involved in many dealings with amateurs and non-scientists in the American West, but not in any real authoritative sense comparable to the Smith-Woodward/Dawson relationship. A good account of this early relationship between institutions and the lay population is Jeremy Vetter, "Cowboys, Scientists, and Fossils: The Field Site and Local Collaboration in the American West." *Isis.* vol. 99, no. 2, (June, 2008), pp. 273-303.

belonging to one and the same individual."[136] Osborn was not as certain and sent a "very frank," short report to Smith-Woodward in on October 27, 1915 expressing doubts about Smith-Woodward's placement of the new tooth and informing him that his assistant William K. Gregory was currently studying the "question of the canine."[137] The tooth would prove to be another discrepancy between the American and the British models, in addition to the more subtle mixture of ape and human features and median brain size. Osborn was certain the American placement was correct since their analysis was both multidisciplinary and checked by multiple professionals in each field.[138]

Gregory was not simply Osborn's assistant, but was regarded as one of the most brilliant functional and comparative morphologists and experts on mammalian dentition in the United States.[139] As a trusted colleague well studied in not only paleontology but also in primatology, his findings would be given great trust by Osborn, even if they contradicted the conclusions of Smith-Woodward—which they did. Gregory's final conclusion on the canine question was that it belonged in the upper jaw and not the

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[136] George Grant MacCurdy. "The Man of Piltdown." *American Anthropologist*, vol. 16 no. 2, April-June 1914, pp. 331-335.

[137] Frank Spencer. *The Piltdown Papers 1908-1955: The Correspondence and other documents relating to the Piltdown Forgery.* (Natural History Publications, Oxford University Press, 1990), p. 131.

[138] It is likely that Osborn's confidence in the American model of Piltdown was correct due in part to his belief that their analysis was superior to that of the English, especially since there was no nationalistic bias surrounding the American analysis of Piltdown. In the end, Osborn trusted his team of scientists and had more than a moderate dose of self-assurance.

[139]William King Gregory was nineteen years Osborn's junior but another Columbia American Museum zoology colleague. Edwin H. Colbert. "William King Gregory". *Biographical Memoirs V.46. National Academy of Sciences* (NAS, 1975). pp. 97–106.

lower jaw of the Piltdown skull. Osborn, almost apologetically, assured Smith-Woodward that he would investigate the matter further, but reasserted that they had made "a most exhaustive study before we reached the conclusion that it belonged to the upper jaw." Not wanting to completely alienate Smith-Woodward, Osborn concluded the letter by stating: "Naturally the original specimen is far better material for study than even the most excellent cast which you sent."[140] Osborn was certain that Gregory's findings were correct, but he was ever the diplomat when dealing with Smith-Woodward. Having not seen the originals, Osborn could keep the professional relationship together by offering justification for the vast differences between American and British reconstructions and conclusions citing the lack of access to the originals. It is highly likely that, in addition to keeping on friendly terms, Osborn was fishing for an invitation to see the original specimen fragments. This episode reveals the limitations surrounding the usefulness of casts and reconstructions in the early twentieth-century, even as advanced as casts had become during that time.

Osborn's letters to Smith-Woodward during this period reveal a slow but steady increase in Osborn's certainty in the American model of Piltdown. Why was he in constant contact with Smith-Woodward while all but ignoring Keith and Dawson? Smith-Woodward had the original fragments in his care at the Natural History Museum and Osborn wanted access to them. Had the pieces of the Piltdown skull been held at the Hunterian Museum where Keith worked it is likely that there would be as many correspondences between he and Osborn as there are between Osborn and Smith-

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[140] Frank Spencer. *The Piltdown Papers 1908-1955: The Correspondence and Other Documents Relating to the Piltdown Forgery.* (Natural History Publications, Oxford University Press, 1990), pp. 130-131.

Woodward. As the new evidence slowly modified or solidified the various British theories, Osborn was biding his time before he released any news of his planned exhibit highlighting mankind's prehistory. At first the letters were the only place where Osborn really pointed out his differences with Smith-Woodward and Keith's interpretations, but while he was writing letters he was also working on his books. With the release of *Men of the Old Stone Age* Osborn's contestation of the English analysis of the Piltdown Man became available to a targeted audience—the public. When he finally opened the Hall of the Age of Man in 1925 his version of Piltdown and other human ancestors were readily available to anyone who visited the museum.

Men of the Old Stone Age

In 1915 Osborn released *Men of the Old Stone Age: Their Environment, Life, and Art,* the same year that Keith's first edition of *The Antiquity of Man* was published. While Keith's focus was on the physical traits of prehistoric humans Osborn instead spent much more time analyzing their culture. He is even careful to include "The Rise of Anthropology," "The Rise of Archaeology," and "Geologic History of Man" as sections in his introduction to illustrate the multi-faceted nature that his analysis would take. Where Keith works to describe differences between the upper palate and the jaw of fossil humans and their modern counterparts, Osborn highlights the glacial periods, interglacial stages, and the multitude of stone tools that defined each of the "ages" of mankind. Even though both men were analyzing the prehistory of mankind their approach, tone, and execution were markedly different. The most noteworthy difference between *Men of the Old Stone Age* and *The Antiquity of Man* is the near absence of

schematic-type analytical drawings in Osborn's work—the very same drawings that Keith had wished he did not need to include in his.[141]

In *Men of the Old Stone Age* Osborn dedicated fifteen pages to "The Piltdown Race," including three images of McGregor's reconstructions. The pair of skull reconstructions which compared Smith-Woodward's original 1913 reconstruction to McGregor's updated 1915 version that included the newly discovered canine tooth and nasal bone reveal the striking differences in the respected reconstructions. The bronze bust of the Piltdown Man received pride of place with a single page image. Osborn's book represented an "American opinion" and detailed more of the data than did the British version: in addition to including the new fragments from the Sussex gravel pit, the American model attempted to account for the geological, paleontological, archaeological and anatomical facts and fully incorporate them all into the final result. This multidisciplinary reconstruction as put forth in Osborn's text was not simply "Piltdown" as Dawson, Smith-Woodward, and Keith understood it: it was a new and improved version of Piltdown argued for in images for anyone to see and clearly discern for themselves (Figure 17).

Contrary to Smith-Woodward and Keith's accounts of Piltdown, Osborn does not recount the discovery story, with its praise of Dawson. Instead, he delves right into

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[141] Osborn was no stranger to publishing. In addition to his monographs on fossil mammals in the American West some of his most famous works concern human origins and the theories of how mankind has changed through time. His works on mankind's prehistory span from well before Piltdown; see, for instance, *From the Greeks to Darwin: an Outline of the Development of the Evolution Idea* (Macmillan and Company, 1894) and continue throughout the rest of his life including, *The Origin and Evolution of Life, on the Theory of Action, Reaction, and the Interaction of Energy* (Scribner's and Sons, 1917); and *Man Rises to Parnassus: Critical Epochs in the Prehistory of Man* (Princeton University Press, 1927).

the geology of Sussex and the descriptions of the flints discovered in the surrounding areas. Osborn does mention Dawson once in regard to his paper describing his find and his postulation that his "dawn man" lived in a warming instance between past glacial periods—although this single instance of a mention is in order to contend that Dawson's theory was incorrect once the geological deposits associated with the Piltdown skull are taken into account.[142]

[142] Smith-Woodward related the book to Dawson in a letter stating that "it was very good (apart from the canine) though rather stodgy as usual" and contained beautiful reproductions of Dawson's figures of the associated implements. There is no evidence that Dawson read *Men of the Old Stone Age.* His health was failing and he died not long after Osborn's book was published. Here is further proof of Osborn's view on Dawson's contribution and importance to the Piltdown discussion. Smith-Woodward's kind regards and concern for Dawson's health in the letter about Osborn's book and Miller's article were the first indications that Dawson's health was failing. Frank Spencer. *The Piltdown Papers 1908-1955: The Correspondence and Other Documents Relating to the Piltdown Forgery.* (Natural History Publications, Oxford University Press, 1990), p. 154.

Figure 17. Representations of the Piltdown Man from Osborn's *Men of the Old Stone Age.* McGregor's bronze bust (left), Smith-Woodward's original 1913 reconstruction, without the canine (top right), and McGregor's skull reconstruction with the canine (bottom right).

As promised, Osborn sent Smith-Woodward a copy of *Men of the Old Stone Age*; which Osborn hoped he would observe that he had "set forth very fully your observations on the Piltdown man and give little space to American opinion." He ended the letter reminding Smith-Woodward that they still differed on the Piltdown analysis and included a friendly request for Smith-Woodward to write a review of *Men of the Old Stone Age,* if he had the time and noted that he welcomed "candid and even severe criticisms."[143] *Men of the Old Stone Age* was not the only thing that Osborn sent to

[143] Frank Spencer. *The Piltdown Papers 1908-1955: The Correspondence and Other Documents Relating to the Piltdown Forgery.* (Natural History Publications, Oxford University Press, 1990), p. 133.

Smith-Woodward; he also forwarded a copy of Gerrit S. Miller's recently published Smithsonian article, "Jaw of the Piltdown Man." In regard to the Miller article, Osborn noted that the Piltdown discussion was not yet over, and that important questions existed that the current fragments just could not answer.

Osborn's book brought forth no immediate response from Smith-Woodward although Miller clearly hit a nerve in separating the Piltdown skull and jaw as belonging to different species, as well as classifying and naming it as a new European chimpanzee. In a rare candid letter to Dawson that accompanied the Miller article Smith-Woodward minced no words: "I have just sent on to you the latest ROT from the U.S.A., by an enthusiastic but light-headed friend of mine in Washington. I am surprised the Smithsonian will print such nonsense."[144] Osborn saw the discussions in a different light and referred to the problems surrounding the varying interpretations and Piltdown reconstructions of Smith-Woodward, Elliot Smith, and Arthur Keith as "one of the *cause célébres* of anthropology."[145] Osborn's preface was cordial to his "friend Dr. A Smith Woodward" who had sent him the casts of Piltdown that McGregor used in creating his bronze busts. In regard to anatomy, Osborn does not mention Keith, but expressed that he had "especially profited by the co-operation of… Professor J. Howard

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[144] Emphasis in the original. Frank Spencer. *The Piltdown Papers 1908-1955: The Correspondence and Other Documents Relating to the Piltdown Forgery.* (Natural History Publications, Oxford University Press, 1990), p. 138.

[145] Henry Osborn. *Men of the Old Stone Age: Their Environment, Life, and Art.* (Scribner and Sons, 1915), p. xi.

McGregor…who has shown great anatomical as well as artistic skill in the restoration of the heads of the four races of *Trinil, Piltdown, Neanderthal*, and *Cro-Magnon.*"[146]

Smith-Woodward replied to Miller himself in a letter on the same day he forwarded the piece to Dawson. His reaction was more reserved than in his letter to Dawson. He reminded Miller that his chosen dedication of *Eoanthropus dawsoni* was solely based on the mandible and that the name should survive "whatever fate befel [sic] the skull." In January 1916 Miller responded apologetically but requested that Smith-Woodward supply the reference for the naming instance in question. Keith had seen Miller's paper and did not think he showed "at all an intimate knowledge of the anthropoid world." While certain that there was evidence for seemingly ill-fitted associations of bones in modern apes that gave the pieces of the Piltdown jaw the benefit of doubt with regards to its status as a single unit, Keith was cautious. He wrote to a friend, "You may be quite sure if I had a leg to stand on that I would fight: but when you fight you keep an eye not on your contemporaries but on the men that come after you and me—I would rather be right with them than with my contemporaries and you will find—that [in] spite of many boyish blunders—Smith-Woodward's general conclusions hold true."[147] Far from settling any debates, the "rot" paved the way for even more hypotheses regarding Piltdown's apelike or human characteristics, with scientists on both sides of the Atlantic coming out in favor of one theory or another

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[146] Henry Osborn. *Men of the Old Stone Age: Their Environment, Life, and Art.* (Scribner and Sons: New York, 1915), p. xii.

[147]Frank Spencer. *The Piltdown Papers 1908-1955: The Correspondence and Other Documents Relating to the Piltdown Forgery.* (Natural History Publications, Oxford University Press: London and New York, 1990), p. 138.

regarding the tooth, the jaw, the skull, or even the entire collection of Piltdown fragments.

Over the next few years Miller's analysis and those that supported it gave Keith and Smith-Woodward a common enemy. In the face of American arguments, the differences between Smith-Woodward and Keith's reconstructions were minor. As a result, they began to work more in tandem against the American "nonsense" even as Osborn wrote to Smith-Woodward defending Miller as a "high-minded, conscientious investigator" in response to Smith-Woodward's thoughts on Miller's article, Regardless of Osborn's praise, Miller's version of the Piltdown discovery continued to upset British sensibilities throughout the early 1920s and kept Keith and Smith-Woodward working together even in the face of their differing opinions.[148]

In the end, the American analysis, championed by Osborn, became too much to simply ignore and it forced Keith and Smith-Woodward to make an uneasy anatomical bargain. Keith's version maintained a larger cranial capacity but the canine tooth supported Smith-Woodward's original model. In an effort to try and pool authoritative power this new version of Piltdown Man not only exhibited a mixture in the characteristics of ape and man, but also a mix of characteristics described by the anatomical interpretations of the two scientists in Britain. Questions of appearance were not the only pressing matters that those involved with Piltdown were addressing. Where this "dawn man" fit into the evolutionary family tree was just as important, and

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[148] Immediately following the announcement of the Piltdown II discovery of 1918 Osborn expressed interest in both the newly discovered tooth and Smith-Woodward's upcoming paper. Frank Spencer, *The Piltdown Papers 1908-1955: The Correspondence and other documents relating to the Piltdown Forgery.* (Natural History Publications, Oxford University Press: London and New York, 1990), 154.

just as contested. Osborn included a hominid family tree in *Men of the Old Stone Age* and the placement of Piltdown reveals his position on the question of where Piltdown belonged with respect to the lineage of modern humans. (Figure 18).

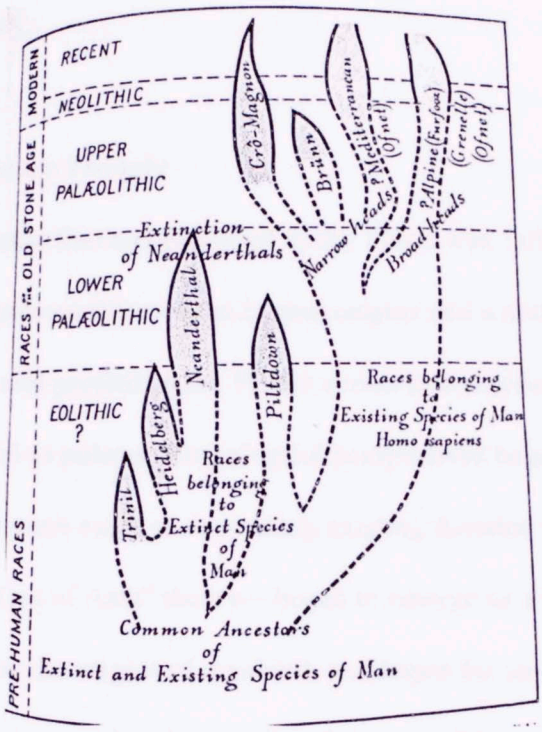

Figure 18. Osborn's evolutionary family tree from *Men of the Old Stone Age.* p. 491.

Unlike a casual attachment to the Neanderthal discoveries and the more recent Cro-Magnon Osborn's interest in the Piltdown Man never waned. Piltdown was more apelike than modern humans, but was not that long from the earth. Not only did the Piltdown Man fit Osborn's model of how the earliest link toward modern humans would look, but it also fit onto Osborn's timeline. Piltdown had the correct anatomical mixtures and the correct associated geological strata and archaeological evidence. The Piltdown skull fragments may have been forged to match a British theory of a "missing link" in the chain of human evolution, but that skull, in association with the area where

it was planted and with the accompanying stonework fit the evolutionary theory of a man thousands of miles away and his adherence to its place in the human family tree helped shape the way human evolution was displayed to the public in the American Museum of Natural History.

The Evolution of Evolutionary Thought

More than any decade that had preceded it, the 1920s was full of fast-paced discussions, ideas, and representations about human origins and a shifting set of scientific areas, methods, and professionals. Public events and practices were being used debated, and modified as paleoanthropological perspectives began being stabilized.[149] Great strides were made in supporting existing theories with fieldwork, an oft-ignored theory—the "Out of Asia" theory—began to emerge as a legitimate contender in accounting for the origins of mankind, and hopes for an American hominid were exalted and dashed with rapidity. In actuality the seeds of these prominent moments had been sown years before; it was the new forms of presenting these ideas that appeared abruptly, challenging older ways of managing the flow of information and how it was interpreted.

Osborn followed teachers and mentors such as Huxley, Haeckel, and Cope in believing that mammals originated in Asia. Given that humans were mammals, Osborn reasoned, they also would have arisen there. These theories were not new; Osborn published a general statement of this hypothesis in a paper in 1900. He also believed

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[149] "Paleoanthropology" began to be used to describe those who were studying human origins at least semi-exclusively. Although in use, it would be another two decades before scientists were trained exclusively as paleoanthropologists and paleoanthropology appeared in its recognizably modern state.

that a thorough exploration of areas in Asia would prove quite useful to the search for human ancestors. In 1925 Osborn was heralding his 1900 paper as a "paleontological prophecy." In one sense it was prophetic, if only because it was a self-fulfilled prophecy. In the mid-1920s the search for early man was underway in Asia, just as Osborn had written in 1900, and it was under his direction at the American Museum of Natural History. What was truly prophetic in 1900 was the idea of a "thorough exploration" of an area in search of human origins. The notion of a systematized and full-scale search for hominid fossils based on plausible theoretical scenarios was revolutionary, and reflected the model of Eugene Dubois more than the traditions of English contemporaries.[150] In the decade leading up to the twentieth century Dubois had actively searched for fossils on the islands of Java and Sumatra based on the theories of the same men who had inspired and taught Osborn. While the British were still content to while away the hours discussing theories ensconced in drawing rooms, Dubois instead went out into the world to look for fossils that would support those theories, and at the turn of the century all those theories pointed to Asia as the likeliest place to find the fossils of prehistoric humans. It was not that prehistoric humans of some sort were not expected to have been in Europe, but it was the identification of the earliest version of humans that they were interested in. They wanted to discover what came *before* prehistoric Europeans.

In fact, if the "Out of Asia" hypothesis were true it would be expected that if there were any hominid ape finds in North America these would predate those in

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[150] Brian Regal. *Henry Fairfield Osborn: Race and the Search for the Origins of Man.* (Ashgate Publishing, 2002), p. 90.

Europe due to geographical proximity between the two regions in that era. In the years before continental drift theory migration patterns hinged on positing the previous existence of land bridges, large swaths of continent that connected now separate geographical areas. Ernst Haeckel had maintained there was a lost continent, Lemuria, which had served as an enormous land bridge connecting Asia and Africa. Osborn presumed that a smaller land bridge had connected North America to Asia and had therefore offered a convenient means of gradual migration for mammals out of Asia and into America. In early 1922 Osborn had his own "Piltdown moment," one which would strengthen his commitment to the "Out of Asia" hypothesis. In February he received a letter from Harold Cook, a consulting geologist in Agate, Nebraska. Cook described a molar tooth he had discovered and explained that as he was aware of Osborn's "particular interest" in the nature of human origins he would send it along. The tooth arrived safely in New York on March 14, 1922 where Osborn immediately began his investigation. "It looks one hundred per cent anthropoid," he wrote excitedly to Cook. "We await, however, Dr. Gregory's verdict…we may cool down to-morrow, but it looks to me as if the *first anthropoid ape of America* had been found."[151] Anthropoid ape did not mean human, but it was a first step in finding one, and Cook was a geologist, not an amateur antiquarian or amateur archaeologist, so at least Osborn could be sure of reliable information regarding the tooth's associated geological material.

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[151] Emphasis in original. Italicized genus and species name are in the original per standard taxonomic nomenclature. Osborn recounted these correspondences in the official announcement of *Hesperopithecus hardoldcooki* in *Science.* Dr. Henry Fairfield Osborn. "Hesperopithicus, the first anthropoid primate found in America. *Science.* vol. LV, no. 1427, May 5, 1922, pp. 463-465.

Osborn was careful not to venture into the realm of human ancestry with the tooth. After all, the experts agreed it was closer to *Pithecanthropus* than other anthropoids, it was nonetheless still an exciting find. Having apparently learned nothing from the furious naming battles fought between his mentor Cope and O.C. Marsh, Osborn repeated a mistake that both men had perfected: he named an entirely new genus and species from a single, tiny, and well-worn piece of evidence. Thus, *Hesperopithecus hardcooki*, "Harold Cook's ape of the western world," was born. From the outset Osborn was careful and exact with his explanations and conclusions. In a *New York Times* article from September 1922 Osborn reiterated that, regardless of the article's headline, he had "never stated that *Hesperopithecus* was either an ape-man or in the direct line of human ancestry." In fact the article is as explicit as Osborn in stating that, "It is not the contention of Professor Osborn or of any of the eminent scientists who have studied the Nebraska tooth independently of his researchers that this bit of evidence is from the jaw of a creature that was progenitor of man." Regarding the anthropoid characteristics of the Nebraska tooth he refers to the "true Piltdown Man" teeth that closely resembled those of the chimpanzee.[152]

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[152]Osborn sent reprints of some of the earliest *Hesperopithecus* notes to Smith-Woodward, who thanked him and acknowledged that he had been following the discussion and was skeptical about the classification. Like Gregory, Smith-Woodward hoped that "before long there will be something more to decide whether or not my skepticism is justified." Although skeptical he admitted that "it would be splendid" if it were true. It would be splendid for at least two reasons: it would give more evidence to fill out the bare tree that was paleoanthropology, and it would give the Americans something to focus on instead of Piltdown. Smith-Woodward likely held the latter as more hopeful. He concluded his letter to Osborn by voicing his regret that, "I have very little time left this year for Piltdown. Still hope to spend a few days there." Frank Spencer. *The Piltdown Papers: The Correspondence and Other Documents relating to the Piltdown Forgery.* (Natural History Publications, Oxford University Press, 1990), p. 158. Dr. Henry Fairfield Osborn. "Hesperopithecus, the first anthropoid primate found

William Gregory continued to work on the tooth, comparing it with other anthropoid specimens in the collections. These included fossil teeth as well the teeth of John Daniel, was a recently deceased gorilla from the Ringling Brothers Circus whom the American Museum, Gregory in particular, had secured for anatomical study. Another comparative analysis of the *Hesperopithecus* tooth and modern gorilla teeth, again John Daniel, was performed by Dr. Milo Hellmann, an orthodontics specialist, and it agreed with Gregory and Osborn.[153] Gregory began publishing in January of 1923 with an initial update that was simply a more thorough discussion of the tooth and its similarities and differences with existing anthropoid apes and ancient hominids, namely *Pithecanthropus*. The second report, dated December 4, 1923, revealed that the paleontologist and anthropologists were divided on whether it more resembled humans or apes, but concluded that the "exact generic diagnosis of *Hesperopithecus* must await further discoveries."[154]

It soon became abundantly clear that the entire analysis of human origins could benefit from further discoveries. Until this period, scientists studying the prehistory of mankind had to rely on mostly chance opportunities to gain access to fossil fragments of prehistoric humans. Accidental finds were rare and many times arrived damaged by a quarry worker's shovel. In this sense the study of human evolution was a passive

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in America. *Science.* vol. 55, no. 1427, May 5, 1922, pp. 463-465. "Nebraska's Ape Man of the Western World." *New York Times*. September 17, 1922, p. 91.

[153] "Nebraska's Ape Man of the Western World." *New York Times*. September 17, 1922, p. 91.

[154] William K. Gregory. "Hesperopithecus Apparently not an Ape nor a Man." *Science.* vol. 66, no. 1720, December 16, 1927, pp. 579-581.

enterprise overly dependent on armchair linear models based on racist attitudes that shaped assumptions regarding "non-civilized" and "primitive" cultures. This reliance on the current ethnological understandings proposed by those living in colonially dominant cultures in order to project culture onto prehistoric mankind simply reinforced existing racial ideologies and failed to move the study of human origins forward. To move human evolution out of this vague hypothetical realm those seeking to understand mankind's earliest ancestors required more data, and that meant more fossil remains of early humans. There was only one way to get the "further specimens" that scientists needed to fill in the holes in prehistory: fieldwork. Simply passively receiving accidental finds could no longer keep pace with the rapid influx of theories vying for authority. The method for gathering scientific knowledge regarding human origins was on the verge of a major shift, one that would have lasting consequences on the field of paleoanthropology and beyond.

Osborn recognized and respected the importance of fieldwork.[155] His mentor Cope spent as much time in the field as possible. Osborn himself had limited experience in the field outside of two post-graduate excursions with a Princeton expedition: one to Colorado in 1877 and another to Utah in 1886.[156] In the subsequent decades he traveled

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[155] A rich history of proper fieldwork and amateur bone collecting predates Osborn, and even Cope. For a general overview of this history and specifics regarding paleoanthropology both before Piltdown and after see Peter C. Kjaergaard, "The Fossil Trade: Paying a Price for Human Origins." *Isis.* vol. 103, no. 2 (June 2012), pp. 340-355.

[156] Osborn was a co-author on reports from both expeditions. See Osborn et al, *Paleontological Report of the Princeton Scientific Expedition of 1877* (S.W. Green printer, 1878) available online at http://pds.lib.harvard.edu/pds/view/10590294?n=3&imagesize=1200&jp2Res=.25&printThumbnails=no and William Berryman Scott and Henry Fairfield Osborn, "Preliminary

back and forth between America and Europe studying the fossil collections in Germany and England and co-authoring evolutionary papers with Cope, before taking jobs at Columbia University and the American Museum of Natural History. He knew from Cope's dedication and determination that fieldwork and collecting were essential in science, especially paleontology, and the need was greater still if resolution to the question of human origins was to move forward. As historian of science Mary Winsor observed, one of the key reasons scholars should examine Osborn's work carefully is that he "translate[d] his conviction that paleontology ought to address evolutionary questions into a substantial and continuing research enterprise."[157] The continuing research enterprise was the creation of major fieldwork expeditions that would take the study of human evolution out of the drawing room.

Central Asiatic Expeditions

Osborn's personal fieldwork experience was stifled for a key reason: as director of the American Museum of Natural History, he had a museum to run, overseeing the day-to-day operations of the museum, in addition to his other plans. Even though Osborn did not have the log of field hours that Cope had obtained, as director of the American Museum of Natural History he brought the most audacious field expedition in

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Report on the Vertebrate Fossils of the Uinta Formation, Collected by the Princeton Expedition of 1886." *Proceedings of the American Philosophical Society,* vol. 24, no. 126 (July – December, 1887), pp. 255-264.

[157] Mary P. Winsor, review of Ronald Rainger, *An Agenda for Antiquity: Henry Fairfield Osborn and Vertebrate Paleontology at the American Museum of Natural History, 1890-1935.* In the *American Historical Review.* vol. 98, no. 4 (October, 1993), pp. 1330.

the history of paleontology into existence: the Central Asiatic Expeditions[158] were the largest, boldest, most logistically complex, and expensive fossil collecting expeditions ever undertaken by a museum. They represent a decisive shift in the manner in which paleontological fieldwork was conducted.[159] Known today for the vast wealth of dinosaur and mammalian fossils recovered from Mongolia, the Central Asiatic Expeditions were originally intended to find human ancestors to substantiate the "Out of Asia" hypothesis and were spurred on, in part, by Osborn's interest in the Piltdown Man find in Sussex, England. On the surface, the most successful paleontological field expeditions of the twentieth century have little to do with a few hominid skull fragments pulled from a gravel pit in the south of England. The success of the expedition as it is seen today is due to the surprising nature of the discoveries that were excavated from the deserts of central Asia, such as dinosaur eggs, and scores of complete dinosaur fossil skeletons. The expedition's original goal, however, was to discover the root of mankind's family tree. They were a paleoanthropological failure, but the fantastical trove of dinosaur and mammal fossils obliterated this failure from view. As well-known

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[158] At the museum Osborn oversaw many field expeditions, but none that saw the popularity or price tag of the *Central Asiatic Expeditions*. Although they did not match Andrews' level of showmanship they were just as important to the museum's collections and many involved explorers and adventurers who could rival Andrews' field stories. For an overview of such fieldwork see Donna Haraway's "Teddy Bear Patriarchy: Taxidermy in the Garden of Eden, New York City, 1908-1936." pp 26-58 in her landmark book *Primate Visions,* (Routledge, 1989).

[159] The best overview of the *Central Asiatic Expeditions*—as well as what biography exists on Roy Chapman Andrews—is Charles Gallenkamp, *Dragon Hunter: Roy Chapman Andrews and the Central Asiatic Expeditions* (Viking, 2001).The forward for *Dragon Hunter* was written by Michael Novacek, then curator of paleontology at the American Museum of Natural History. Fitzhugh Green, *Roy Chapman Andrews: Dragon Hunter* (Putnam, 1930) was a biography of Andrews for a juvenile audience.

as the Central Asiatic Expeditions are, few know that they took place in order to search for human ancestors.

When Osborn took over the directorship of the museum in 1908, Roy Chapman Andrews had already worked as an assistant in the taxidermy department for two years and had firsthand experience of how popular a good exhibition could be. The year before Osborn became director Andrews and a team of museum preparators built a life-sized replica of a blue whale in the Hall of the Biology of Mammals.[160] Soon after he was collecting whale specimens on Long Island, and in 1909 was sent on a whale-collecting expedition to Asia. He returned in 1913 with a bolstered reputation as an intrepid explorer. That same year he completed his master's degree in mammology at Columbia University under William King Gregory. Sometime during his Asiatic whale-collecting Andrews began drawing up plans for an expedition to Asia; the idea first struck him while on an expedition in 1912, the same year that Piltdown was announced, but it was 1915 before Andrews approached Osborn with his plan for a series of expeditions over a period of ten years to collect zoological specimens. The *First Asiatic Expeditions* of 1916-17 explored the borders of Tibet and Burma and the little-known Yunnan province in southwest China. The expeditions not only returned with splendid specimens for the American Museum but they also produced a popular account in 1918, *Camps and Trails in China: A Narrative of Exploration, Adventure, and Sport in Little-Known China*, written by Andrews and dedicated to "President Henry Fairfield Osborn as an Expression of Gratitude and Admiration." The book is noteworthy for its singular

[160] Michael Rossi. "Fabricating Authenticity: Modeling a Whale at the American Museum of Natural History, 1906-1974." *Isis,* vol. 101, No. 2 (June 2010), pp. 338-361.

opening sentence that set up the rationale for what would be the largest paleontological expedition to search for early man ever financed: "The earliest remains of primitive man probably will be found somewhere in the vast plateau of Central Asia, north of the Himalaya Mountains."[161]

Andrews rode out the Great War in China and when it ended he cabled Osborn for permission to carry out further zoological expeditions. The *Second Asiatic Expedition* consisted of Andrews spending six months in northern Mongolia collecting mammals and, more importantly, undertaking an official reconnoiter. When he returned to New York in 1920, he had the full scale of the future expeditions mapped out—all he had to do was to convince Osborn that the Herculean task was worth it. Andrews wanted to lead the most interdisciplinary, multifaceted expedition ever created with geologists, botanists, paleontologists, climatologists, and archaeologists from every part of the American Museum under his command. He also wanted to modernize scientific expeditions with automobiles to supplement traditional camel caravans for the large expanse of desert.[162]

What happened after that discussion secured Osborn's agreement for the museum to oversee Andrews's directive distinguishes the American approach to finding hominid

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[161]Roy Chapman Andrews. *The New Conquest of Central Asia: a Narrative of the Explorations of the Central Asiatic Expeditions in Mongolia and China, 1921-1930.*, (The American Museum of Natural History, 1932), p. 4. Roy Chapman Andrews, *Camps and Trails in China: A Narrative of Exploration, Adventure, and Sport in Little-Known China* (Appleton and Company, 1918), p. 1.

[162]Andrews's expedition was specially outfitted with a number of Dodge automobiles. Not only did the use of motor vehicles modernize an expedition it was a field test for the durability of an American-built brand of vehicle. The product placement was not lost on the public. Brian Regal. *Henry Fairfield Osborn: Race and the Search for the Origins of Man.* (Ashgate Publishing, 2002), pp. 137-138.

fossils from England's—and the rest of Europe's—approach. Not only was the scale of the logistics something novel, but the very question of funding and staffing such an expedition was far beyond anything a British, German, or French museum could support.[163]

The task was more than any one American museum was capable of on its own yearly budget. If this extravagant plan was to come to fruition Osborn and Andrews would require hundreds of thousands of dollars; that kind of money would require the participation of individuals outside the American Museum. The American Museum only pledged $5,000 a year, although they also supplied most of the experts for the expedition—the rest would come from philanthropic funding. J.P. Morgan, the banking magnate, wrote Andrews a $50,000 check as his official contribution to the expedition as well as another personal $50,000 donation on the side. Over the next year Andrews received similar pledges from John D. Rockefeller, Childs Frick, Sidney Colgate and E.H. Gray of US Steel, and George Baker, president of the First National Bank. These "robber barons" were not only worth more than any real English Baron, but they were more apt to lean toward philanthropy, either out of genuine interest or at the very least to improve their civic image as a public relations move. Andrews's original plan for a

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[163] Germany had proven its ability to financially back large scale expeditions to the Middle East. Exhibits such as the Ishtar Gate and the Pergamon Altar attest to nearly unparalleled logistics in reconstructing enormous architecture as a museum exhibit. One key difference between Pergamon and the *Central Asiatic Expeditions* is that in Pergamon and Ishtar the altar and the gate were present and waiting. The *Central Asiatic Expeditions* were generated on theory alone—the proverbial "X" marking the spot in the Asian desert. It is one thing to finance the collecting of artifacts—even if they are enormous—that are known and evident. It is quite another to attempt to fund a search for artifacts that may or may not even exist.

five-year expedition at the cost of $250,000, swelled to a staggering $600,000 investment in a ten-year expedition.[164]

For the first time a large team of professional scientists were converging on a single geographic location in order to completely survey, research, search, document, and retrieve as much scientific information as they could about prehistoric remains. In addition to collecting the raw materials for study this model for research also paved the way for the concept of blockbuster exhibits at the museum which required similarly deep pockets, grand ambitions, and a multidisciplinary team of experts. The already popular wildlife dioramas at the American Museum were going to be considerably scaled up to display the finds from Mongolia as well as Osborn's theories on human origins.[165]

Evolution on Display

Shortly after Osborn sent Andrews on his way, he returned to his plans at the museum. Osborn saw the American Museum as an integral tool with which he could teach evolution, and with the opening of the "Hall of the Age of Man" it became a tool that he wielded well, especially to promote his particular ideas of human evolution that

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[164] Roy Chapman Andrews, *The New Conquest of Central Asia: a Narrative of the Explorations of the Central Asiatic Expeditions in Mongolia and China, 1921-1930.*, (The American Museum of Natural History: New York, 1932), 5. Brian Regal. *Henry Fairfield Osborn: Race and the Search for the Origins of Man*. (Ashgate Publishing: England & Vermont, 2002), pp. 138-139.

[165] Andrews and his crew of scientists, photographers, and Dodge automobiles remained in Mongolia throughout the 1920s. Their basecamp was the regal palace in Peking, and the tales of marauding nomads, sandstorms, and great extinct creatures that appeared in magazines, newspapers, and later popular books delighted the public.. Charles Gallenkamp, *Dragon Hunter: Roy Chapman Andrews and the Central Asiatic Expeditions*. (Viking, Penguin Group, 2001).

he had highlighted in *Men of the Old Stone Age*.[166] For Osborn, the museum existed to bring culture and science to the masses, and he saw this particular Hall as "a sequel to the halls of the Age of Mammals and the Age of Reptiles."[167] Books were one form of public communication, but with a museum exhibit he was able to present his argument in three dimensions with accompanying stone tools, geology, and other fossils.[168] With the public engrossed with the news about Andrews's exploits and the *Central Asiatic Expeditions,* timing to open a new exhibit could not have been better. McGregor's reconstructions, including the Piltdown Man, presented the story of mankind's progress in a way never before undertaken by museum exhibits.

Osborn needed an outlet to generate a buzz for the upcoming exhibition and his new hall so he turned to the popular press. In 1920 Osborn published a short preview for the hall in the American Museum's magazine *Natural History.* As the hall completion date drew nearer in the spring of 1923 Osborn and Gregory released an

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[166]For a source discussing the importance of museum displays as teaching tools—and Osborn's powerful manipulation of exhibits at the American Museum of Natural History—see Sally Gregory Kohlstedts' essay review, "Museums: Revisiting Sites in the History of Natural Sciences" in the *Journal of the History of Biology*. vol. 28, no. 1 (Spring, 1995), pp. 151-166.

[167] Henry Fairfield Osborn. "The Hall of the Age of Man in the American Museum." *Natural History* vol. 20, no. 3 (May-June 1920), pp. 229-245. p. 229.

[168] The museum's other halls and habitat dioramas served as a model for Osborn's plans for the Hall of the Age of Man. A discussion of the creation and influence of those halls can be found in "Teddy Bear Patriarchy: Taxidermy in the Garden of Eden, New York City, 1908-36," Donna Haraway, *Primate Visions* (Routledge,1989), pp., 26-58. For a more general analysis of such museum exhibits across the world see Karen Wonders' doctoral thesis from Uppsala University: *Habitat Dioramas: Illusions of Wilderness in Museums of Natural History* (Acta Universitatis Upsaliensis: Figura Nova Series 25, 1993).

"authorized" interview with Hugh Weir, a journalist from *McClure's Magazine.* Perhaps it was *McClure's* reputation as a slightly radical press outfit that led Osborn to work with them,[169] but the interview was a more detailed, less stuffy form of a press release that would result in a museum pamphlet that guided visitors through the exhibit. The interview foreshadowed an entirely new gallery at the museum dedicated to the "Age of Man." Weir filled his interview, titled "Our Earliest Ancestor—The Dawn Man" with hyperbole and promised that the exhibit, many years and thousands of dollars in the making, was "one of the most significant accomplishments in the history of American science and the most conspicuous contribution yet made to the world's knowledge of the dawn of creation."[170] Osborn certainly thought it was, and he aimed to make sure the public thought so as well. The very title of the article reveals Osborn's relationship with the Piltdown fragment. *Eoanthropus dawsoni* was literally the "dawn man" and Osborn was situating it as "our earliest ancestor." In Osborn's mind the interview would do at least two things: it would present his earlier images of prehistoric humans from his 1915 book *Men of the Old Stone Age* and it would place mankind within the context of nature—mammoths, mastodons, giant sloths, etc.—displayed around the "Evolution of Man" exhibit cases.[171]

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[169] See, for instance, Robert Ernest Christian Jr., "'McClure's Magazine,' 1893-1903: A Study of Popular Culture" (Ph.D. diss., Ohio State University, 1958) and Harold Stacy Wilson, "McClure's Magazine: An Intellectual Study of Reform Journalism" (Ph.D. diss., Emory University, 1966).

[170] Henry Weir. "Our Earliest Ancestor—The Dawn Man." *McClure's Magazine*. vol. 55, no. 1, March 1923.

[171] Henry Fairfield Osborn. "The Hall of the Age of Man." *The American Museum of Natural History Guide Leaflet Series.* No. 52, Fifth edition, October, 1929.

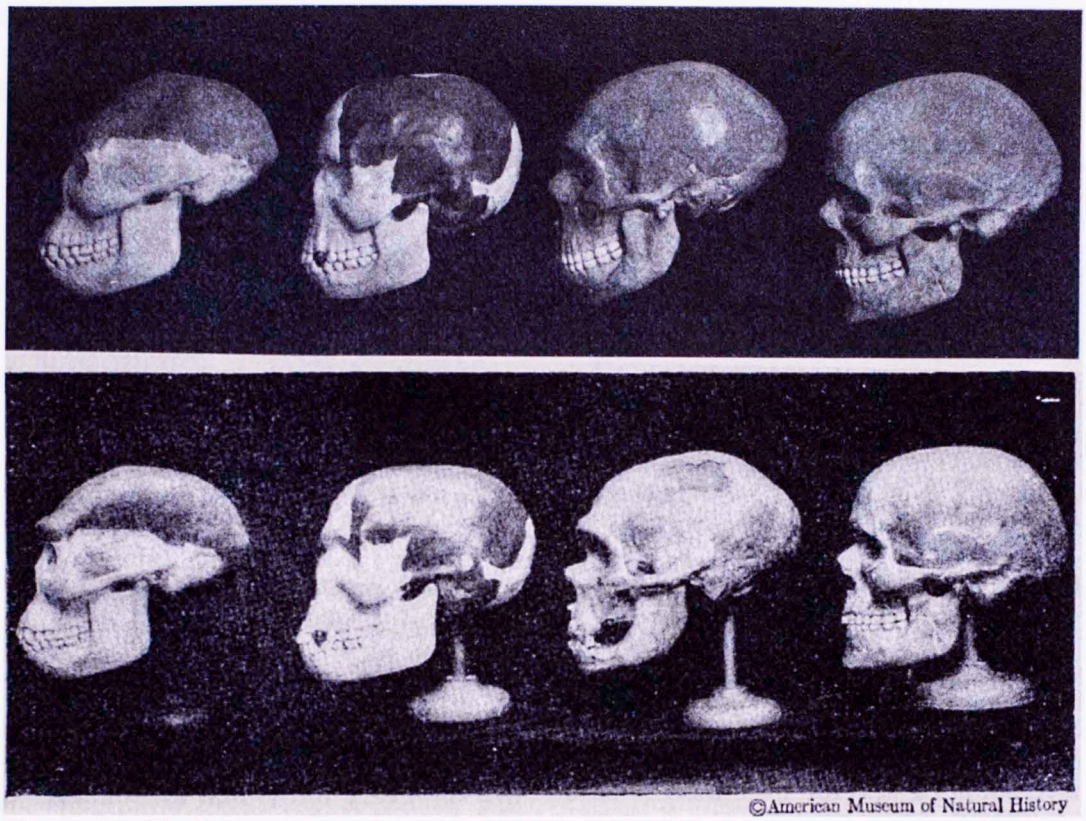

Figure 19. Skull reconstructions pictured in Osborn's Exhibit Hall pamphlet (top) and in the *McClure's Magazine* article.

I believe that Osborn was drawn to *McClure's Magazine* not only because of its radical leanings that fit with the controversial notion of human evolution, but also due to the magazine's ability and desire to publish images.[172] The article features two nearly full-page drawings done by the American Museum's mural artist Charles R. Knight specifically for the interview. Since the mid-1890s Knight's name had been synonymous with prehistoric reconstruction and artwork, but it was "through his work

[172] This new form of popular communication had impacts beyond the study of human origins as seen in Katherine Pandora, "Knowledge Held in Common: Tales of Luther Burbank and Science in the American Vernacular." *Isis,* vol. 92, no. 3 (2001): p. 493.

at the AMNH that the artist achieved worldwide fame."[173] Three figures are half-page spreads and the remaining five occupy about a quarter of a page. In addition to Knight's murals, the set of three-dimensional reconstructions that McGregor had completed were prominently displayed.

Figure 20. Full set of McGregor's bronze bust reconstructions (Piltdown is second from left) as published in *McClure's Magazine* March 1913.

The complete set was comprised of four representative samples of early man: the Ape Man of Java (Eugene Dubois' discovery); Dawn Man (from Piltdown); The Neanderthals (found in Germany); and the most chronologically recent link in the human chain, the Cro-Magnon (From France) [(Figures 19 and 20)].

The interview was an indication that the new gallery would be a visual banquet of the environments where early human ancestors lived, and in fact, these murals and other forms of Knight's works exerted a huge influence on popular conceptions of early

[173] "In fact, Osborn considered his share in Knight's paintings to be considerable, so considerable that he spoke of the images as Osborn-Knight restorations." Marianne Sommer. "Seriality in the Making: The Osborn-Knight Restorations of Evolutionary History." *History of Science*, 48(3/4), pp. 461-482.

humans for decades to come.[174] A year later the American Museum made good on the promises previewed in the *McClure's* article and unveiled an ostentatious gallery display showing the march of human evolutionary progress in the world. Not only did the Hall of the Age of Man guide the public through the eons of human evolution in the same manner as had Osborn's books, but it proved that Osborn's claim that the gallery would present empirical evidence of mankind's evolutionary process was true. The gallery was filled with models, casts, and/or originals of nearly every known fossil representative and their artifacts. This was, however, Osborn's view of human evolution and it fell to Gregory to explain and edit some of his less mainstream ideas in the accompanying published museum gallery guide.[175] Osborn also concluded that each of the races of mankind was a different species that showed a marked spilt from the main evolutionary line leading to Cro-Magnon and modern, white, humans. Piltdown remained far enough distant to arise *before* the racial split, and therefore was truly the

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[174] The most recent collection and analysis of portions of Knight's work is Richard Milner, *Charles R. Knight: The Artist that Saw Through Time* (Abrams, 2012). See also Charles Knight, *Life Through the Ages* (A. A. Knopf, 1946 reprinted commemorative edition Indiana University Press, 2001). Knight's early murals for the museum had galvanized popular perception of the lives of the dinosaurs, and his work on early humans was no different. His representations formed the basis for almost everyone's understandings of the identity, behavior, and lifestyles of these early humans and they did so for decades. Some modern dinosaur imagery still borrows from Knight's earliest work even in the face of new scientific evidence that contradicts those early twentieth century images; the same is true for some of his mural depictions of prehistoric humans, albeit a smaller number.

[175] Osborn's singular view of human evolution regarding the timescale and the appearance of prehistoric humans was not accepted by many of the scientific community. See, for instance Ronald Rainger, *An Agenda for Antiquity: Henry Fairfield Osborn and Vertebrate Paleontology at the American Museum of Natural History, 1890-1935* (University of Alabama Press, 1991, reprinted 2004) and Brian Regal, *Henry Fairfield Osborn: Race, and the Search for Human Origins* (Ashgate, 2002).

"Dawn Man" of all living modern races, no matter where they were placed within the hierarchy displayed at the end of the line. Since Piltdown was ancestral to all living races and not just one, arguments regarding its place in the family tree were less affected by the current racial politics and ideologies. Piltdown was nothing less than a "man in the making," as Gregory had described, and part of the basal link from which all modern human races arose.

Osborn's human family tree was one of the half-page figures. There was a definite ascending trend that showed a relatively unbroken line that began with a small mammal in the Cretaceous, through the earliest split between ancient hominids and the modern anthropoid apes in the Oligocene, which was illustrated as a descending trend. The instance where *Pithecanthropus* split in the Pliocene reveals, in an upward trend, the various splits of *Eoanthropus* leading to Cro-Magnon and through them to modern man, while Heidelberg Man trends towards the Neanderthal. This drawing became the basis for an enormous shadowbox diagram arranged by Gregory in Osborn's Hall.[176] This direct, progressive "line" was the basis of all of evolutionary thought at the time and it was especially powerful regarding human evolution. Huxley may have been gone but the specter of his teachings and the teachings of those like him were dominating the presentation of prehistoric research findings (Figure 21).

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[176] Henry Weir. "Our Earliest Ancestor—The Dawn Man." *McClure's Magazine*. vol. 55, no. 1, March 1923. Henry Fairfield Osborn. "The Hall of the Age of Man." *The American Museum of Natural History Guide Leaflet Series.* No. 52, Fifth edition, October, 1929, p. 34.

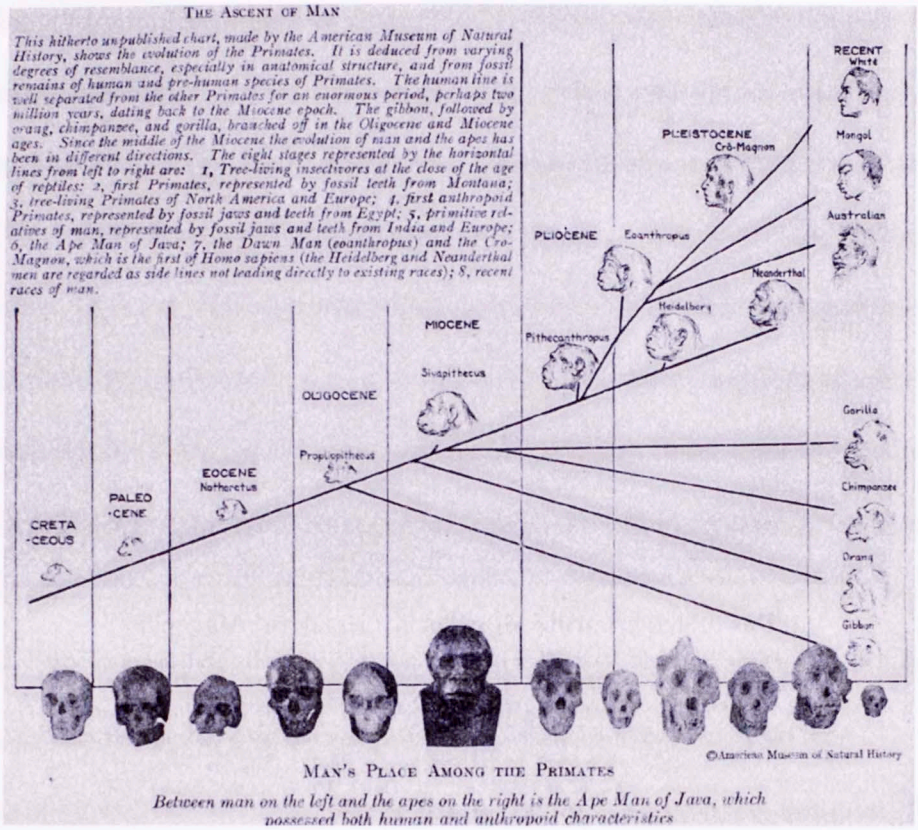

Figure 21. Osborn's human evolutionary tree first published in *McClure's Magazine* (March 1923).

When looked at schematically, the human family tree resembled the family tree of nearly any other group of animals, but it most closely resembled the evolutionary tree of the horse and its relatives. This linear theory went farther than just images, however, as Osborn summed up in the interview: "The human race as we see it to-day," he said, "is a definite product of evolution, an ascending evolution which established the predecessors of modern man as well as his immediate ancestors."[177] Osborn and

[177] Osborn introduced his layout for the Ascent of Man family tree in the *McClure's* article as well as reiterated, and summarized, his early positions from *Men of the Old Stone Age.* Henry Weir. "Our Earliest Ancestor—The Dawn Man." *McClure's Magazine*. vol. 55, no. 1, March 1923.

Gregory even used the evolution of the horse as a comparison to explain human evolution. Osborn offers a similar example of evolution often cited by Gregory—that of the existing families of equines (including horses, zebras, and asses)—explaining that it was apparent that the horse had descended from the rhinoceros or the tapir, or *vice versa*. This "from one, many" scenario pervaded theories of evolution throughout this time period. Gregory explained that while these groups of animals were now separated by large structural differences, they also provided living representations of surviving fragments of what makes up and stemmed from the larger, basal order of perissodactyls, or odd-toed, hoofed animals. Following this model back through time, it was possible for scientists to theoretically pinpoint the common ancestor of large groups of living animals. Osborn and others extrapolated from this theory and working back through the meager prehistoric human fossil remains pinpointed the Piltdown Man as a representative member of that common species ancestral to all living humans.[178]

With the question settled as to Piltdown's position within the family tree, how similar was it to modern humans? Gregory mentioned the ongoing debate regarding Piltdown's ability to speak, but concluded that Piltdown could have been "classed as perhaps the most conspicuous example of a 'man in the making'… [and] was undoubtedly an early branch of those sub-men from the recesses of time which had

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[178] Osborn spent years researching the extinct perissodactyls in the American West and worked on an opus of evolution explained by this very model. It was published shortly before his death and never reached the monumental status for which he had hoped. Henry Weir. "Our Earliest Ancestor—The Dawn Man." *McClure's Magazine*. vol. 55, no. 1, March 1923.

achieved a low human stage of brain and brain-case in the process of evolution."[179] Piltdown was still firmly on the pathway of the ascent to modern mankind, but somewhere closer to the original missing link that Dubois had discovered with *Pithecanthropus* than it was to the Neanderthal or the modern British scientists who described it. For Osborn Piltdown was not only the perfect representative of mankind's earliest ancestor, but it was also the perfect specimen to present his ideas on how fossil human discoveries should be analyzed. On display with the reconstructed skull and bronze bust of the Piltdown Man were the associated geological and archaeological finds. Osborn's "Piltdown Case" (Figure 22) was representative of the multidisciplinary nature of the study of human origins. It was a hallmark of paleoanthropological analysis and a microcosm of his collection of specialists that had been sent on the *Central Asiatic Expedition.* Not only would visitors see the results of the detailed analysis, but they would also be aware of the vast wealth of information used in that analysis beyond the few bone fragments pulled from the pits. The other cases in the Hall of Man were arranged accordingly and they presented two distinct claims: this is our scientific conclusion on these prehistoric humans, and this is the multitude of information we used to reach those conclusions.

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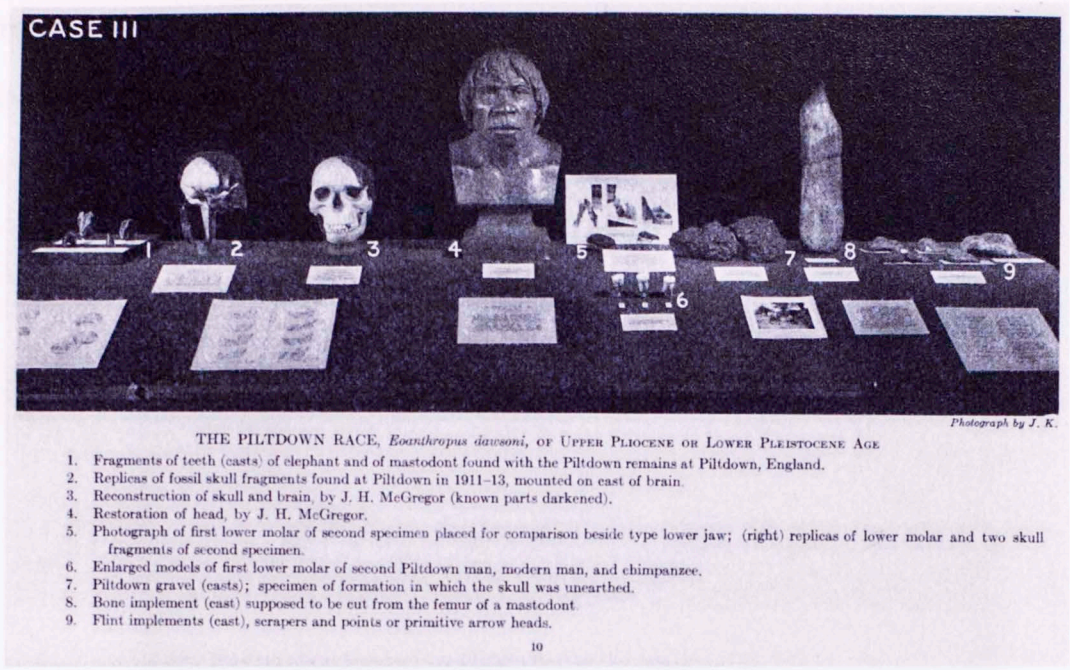
[179] Henry Weir. "Our Earliest Ancestor—The Dawn Man." *McClure's Magazine*. vol. 55, no. 1, March 1923.



Photograph by J. K.

THE PILTDOWN RACE, *Eoanthropus dawsoni*, OF UPPER PLIOCENE OR LOWER PLEISTOCENE AGE

1. Fragments of teeth (casts) of elephant and of mastodont found with the Piltdown remains at Piltdown, England.
2. Replicas of fossil skull fragments found at Piltdown in 1911–13, mounted on east of brain.
3. Reconstruction of skull and brain, by J. H. McGregor (known parts darkened).
4. Restoration of head, by J. H. McGregor.
5. Photograph of first lower molar of second specimen placed for comparison beside type lower jaw; (right) replicas of lower molar and two skull fragments of second specimen.
6. Enlarged models of first lower molar of second Piltdown man, modern man, and chimpanzee.
7. Piltdown gravel (casts); specimen of formation in which the skull was unearthed.
8. Bone implement (cast) supposed to be cut from the femur of a mastodont.
9. Flint implements (cast), scrapers and points or primitive arrow heads.

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Figure 22. Osborn's Piltdown Case in the Hall of the Age of Man.

Outside of the designated "Piltdown Case," the Human Family Tree exhibit prominently displayed the line of ancestors "based on information of 1924," with Piltdown straight in line with the modern Caucasian race indicating a direct link to modern (white) man.[180] This particular display may not have been as prominent, or even included, had Osborn not visited the gravel pit at Piltdown personally. His original drawing put Piltdown at the base of the tree, ancestral to all races, but after seeing the original fragments and their provenance, Osborn became one of the strongest advocates of Piltdown Man's more recent genealogy, not least due to the fact that such a discovery

[180] "Based on information of 1924" is significant because in early 1925 Dr. Raymond Dart discovered a small hominid skull in South Africa, and at the time the museum exhibit went public the human family tree was undergoing another pruning. Henry Fairfield Osborn. *The Hall of the Age of Man.* (American Museum of Natural History: New York), 1927. See, also, Roger Lewin, *Bones of Contention:Controversies in the Search for Human Origins* (University of Chicago Press, 1997)

matched his theory of human progression almost exactly and it thus secured its new location within Gregory's finished tree (Figure 23).[181]

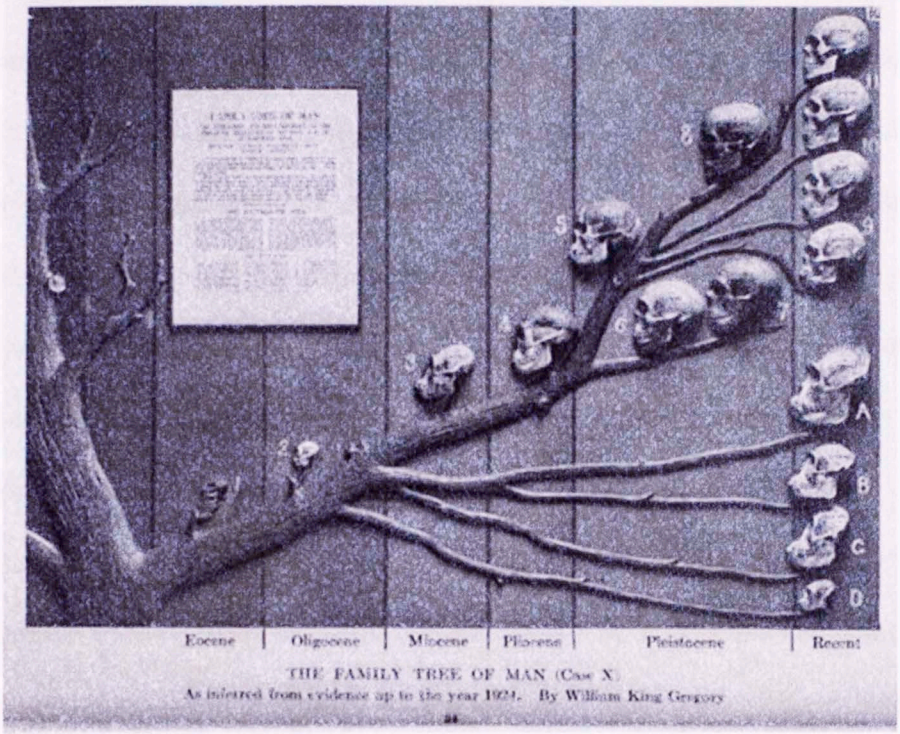

Figure 23. The Family Tree of Man from Osborn's Hall of the Age of Man.

With Piltdown and its world in full view it became possible to illustrate entire ecosystems with smaller and smaller fragments of fossils. The reconstructed face and humanity of Piltdown on display in bronze and paint at the American Museum

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[181] On a subsequent visit to the U.K. James McGregor visited Piltdown and wrote to Osborn that Keith "pointed out 'the exact historic spot where Osborn recanted'" his original position on Piltdown. Osborn replied he was delighted that McCregor was able to visit Piltdown and such a historic spot as his place of recantation. In his letter dated December 28, 1925, Osborn indicated that he had contributed £5 toward the purchase and erection of a monument to Piltdown man. At the end of the year Osborn still had heard nothing about the preparation or setup for the monument. In fact, it took another 13 years before private donors, the sole contributors to the commission, finally raised the funds to purchase and erect the Piltdown monument in 1938. Frank Spencer. *The Piltdown Papers 1908-1955: The Correspondence and other documents relating to the Piltdown Forgery.* (Natural History Publications, Oxford University Press, 1990), p. 162.

reinforced the idea of large-brained ancestors taming the southern wilds of England. These illustrations featured entire family units of the ancestors living within their prehistoric environment. These early interpretations served as models and backdrops for environmental portrayals of post-Piltdown discoveries. After Osborn announced his North American hominid *Hesperopithecus*, artistic portrayals of what the media dubbed "Nebraska Man" appeared quickly and looked very similar to earlier Knight works and other Piltdown recreations. Even as discoveries were revised and relocated (from ape to pig in the case of *Hesperopithecus*) such images continued to shape the way scientists and by extension the public saw prehistoric man. Osborn's exhibit and its press coverage were the first full images the American public had of Piltdown and its importance.

Piltdown was not relegated to the two dimensions offered by ink and paint. Numerous casts of the actual fragments were made, and Woodward and Keith both worked to produce a full three-dimensional example of their respective versions of a full Piltdown skull. The full skulls were then reproduced in kind and the skull casts and smaller fragments were soon being traded among prominent men of science on both sides of the Atlantic. Once in New York, Osborn had a Columbia colleague take the reconstructions a step further and sculpt flesh to cover the Piltdown skull. McGregor's series of four extinct hominid constructions, highlighted in the *McClure's* article and included in Osborn's Great Hall of Man, also sit proudly on the cover of the accompanying brochure for his exhibit.

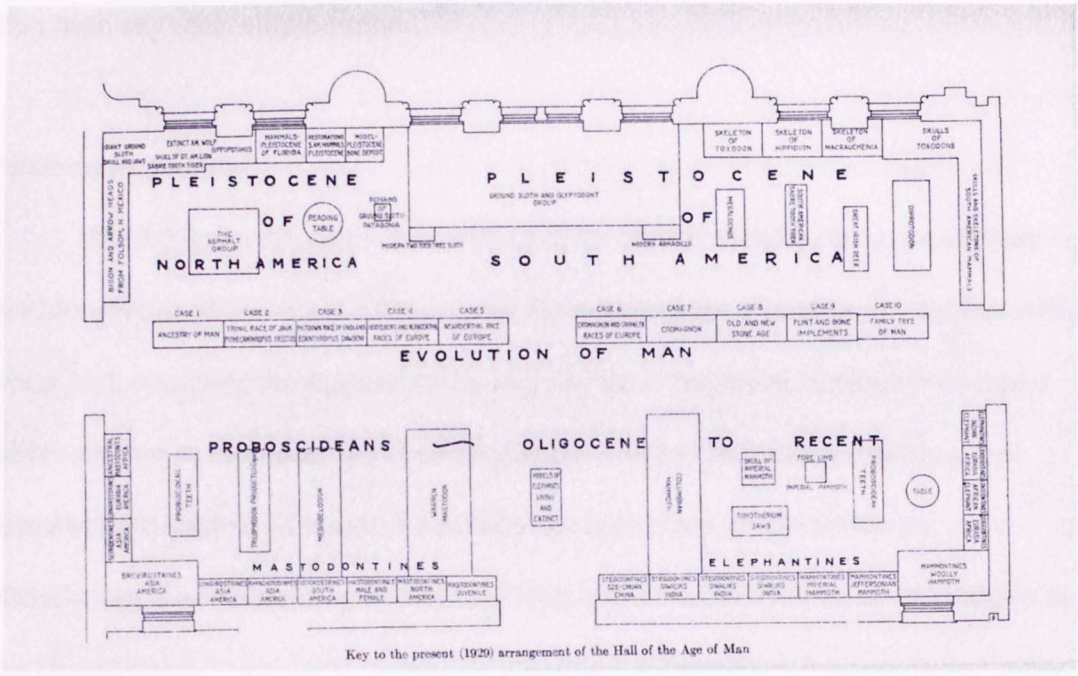

Figure 24. The 1929 layout for Osborn's Hall of Man. Note the central position of the "Evolution of Man" exhibit surrounded by other paleontological halls.

Osborn's Great Hall included much more than Piltdown (Figure 24), but Piltdown was presented as an essential step in the progression toward modern man. Osborn's ideas of evolution, biogenesis, and eugenics have blinded some to his contribution to the public understanding of larger principles of evolution and how those principles are presented to the public via museum media. It is important to remember that Piltdown was a major part of, and possible motivation for, the building of the Great Hall. That importance cannot be understated, as historian Charlotte Porter explained: "In New York City alone, two generations of Museum visitors and their children filed past the Hall's displays with the probable result that more Americans derived their

notions about prehistoric man from the joint efforts of Osborn, Knight, and McGregor than from any other single source."[182]

Piltdown in America

The Piltdown discovery first arrived in the United States in the popular press. Articles such as the one in the *Washington Post* derided the scientists for arguing over a single inch regarding the reconstruction of a few skull fragments. England now had a native son just as Germany had Neanderthal and France claimed Cro-Magnon, but something developed differently with Piltdown than it had for the other two. Neanderthal, Cro-Magnon, and even Java Man never received the levels of attention in the United States comparable to the celebrity that Piltdown Man attained. In just a few short years Piltdown Man went from a newspaper curiosity from across the Atlantic to a star attraction in the largest existing museum exhibit to trace the evolution of mankind.

Piltdown's legacy in the United States through Osborn's role in pursuing its significance is at least twofold: it inaugurated a high-profile, high-stakes form of collaborative scientific fieldwork as human paleontology; and it served as a pivotal icon on which to introduce a multidimensional form of scientific communication and augmentation in an area of research marked by rapid change and controversial speculation (as opposed to displaying well-attested conclusions in the manner of an introductory textbook). The former is evidenced by the *Central Asiatic Expeditions*

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[182] Charlotte Porter's article discusses Osborn's evolutionary theories at length, and it provides an interesting analysis of the creation, implementation, and legacy of Osborn's Great Hall from a museum studies perspective. Charlotte Porter. "The Rise of Parnassus: Henry Fairfield Osborn and the Hall of the Age of Man." *The Museum Studies Journal*. vol.1, no. 1. 1983, pp. 26-34, p. 31.

formed and carried out under Osborn's directorship of the American Museum. While not solely the result of the Piltdown skull, the discovery of a prehistoric large-brained hominid in the south of England strengthened Osborn's resolve and faith in the "Out of Asia" theory, and when presented with a plan to explore there in search of humanity's missing link he quickly agreed. Osborn shifted the balance of the American Museum of Natural History from being on the receiving end of materials for research to that of an active patron seeking to generate scientific breakthroughs in the field. This model challenged the institutional priorities of other major natural history museums, and introduced a scale of research activity that contributed to increasing the amount of materials available for scientific study, which would continue to delegitimize the linear model as scientists sought to make sense of an increasingly diverse set of specimens across space and time.

When the presentation of Piltdown Man went on display in Osborn's Hall of the Age of Man, it bolstered the American Museum's status as a bridge between science and the public. Exhibits and displays were no longer mere curiosities to marvel at during a visit; they were intended as active inventions in the circulation of contemporary scientific knowledge to the general public in a form that turned the multi-media experience possible in the exhibit hall into a means to foreground "questionable" knowledge rather than waiting to house settled facts in its display spaces. That the Piltdown finds were later found to be fraudulent invalidated "Piltdown Man" as a scientific fact after the 1950s, erasing its hold as evidence of human evolution from the scientific record going forward. That Piltdown Man was later found to be a fiction, however, did not invalidate these consequences of the remains being taken as legitimate

in the earlier twentieth century. Following Piltdown's early career in this respect allows us to focus in on a period of time—circa 1910 to 1930—that seems relatively insignificant in the development of what would be seen as the discipline of paleoanthropology in the second half of the twentieth century. It demonstrates how the power of "missing link" ideation contributed to changing inquiries regarding human origins out beyond small specialist circles dominated by anatomists into a cross-disciplinary framework that would become inextricably interwoven with extensive publicity of its work in nearly real-time in popular media. Regardless of the subsequent scientific validity of Piltdown, the ripples of its discovery reverberate through museum and fieldwork culture still.

Osborn's innovation in pursuing his own theories was to move beyond the display of fossils, but to reconstruct them as individuals embedded within their environments. It is one thing to look at an assemblage of bone to see the framework of an extinct horse or rhinoceros, but it is another thing entirely to see it poised for action, with skin, horns, and hooves.[183] Through murals and models the American Museum was able to not only add context to their animal displays, but they added humanity to the evolution of man. Museum visitors looked not into the hollow eye sockets of Smith-Woodward's Piltdown skull, but into the eyes of McGregor's full reconstruction—

[183] This type of reconstruction ideology has been evident since the mid-nineteenth century when the first reconstructed dinosaurs went on display in The Crystal Palace Park in England. See Steve McCarthy and Mick Gilbert, *The Crystal Palace Dinosaurs: the Story of the World's First Prehistoric Sculptures* (Crystal Palace Foundation, 1994).

indeed, they looked into the past and saw themselves.[184] Osborn, armed as he was with these commissioned reconstructions—and an overwhelming mouthpiece in the form of the American Museum—put Piltdown on display as a single individual and as a legitimate link in mankind's chain of being. He quickly mastered the newfound power of paleoanthropological reconstructions and England's native son became Osborn's gilded skull.

[184] I have yet to uncover evidence that the completed set Osborn sent to Smith-Woodward was displayed together in the Natural History Museum in London, or that anything comparable to the Great Hall of the Age of Man was created there at this time.

Conclusion

Looking Forward Through the Past

December 18, 2012 marked the centenary of Woodward and Dawson's Piltdown announcement at the Royal Geological Society. British news agencies covered the anniversary with little interest from the United States. They discussed the find, the monument, the revelation, and the fallout. Headlines, just as books on the subject, are indecisive regarding whether Piltdown was the greatest hoax in archaeological, paleoanthropological, or paleontological history. The more brazen will even label it the greatest hoax in *scientific* history. Not a single argument was or is given for anything positive from the Piltdown episode. When pressed, some might suggest that it served as a warning to scientists to keep up their guard. Piltdown discussions remained surprisingly newsworthy throughout the following year as November 21, 2013 marked the sixtieth anniversary of the announcement that marked Piltdown as a forgery. Here again was a chance to reopen the dialogue about Piltdown and its place in history; just as before, reports only focused on trying to ascertain the identity of the perpetrator, rehashing old theories.

The term "paleoanthropology" came into use during the early life of the Piltdown debates. Even then, it was not as if the anatomist Keith came in with a new title on his door in 1916. Even when scientists began to think paleoanthropologically no one person was being trained as a paleoanthropologist. The Piltdown discovery helped shape how that training would eventually proceed, with heavy and nonequal parts of paleontology, archaeology, anthropology, and anatomy being adopted. Archaeology and

paleontology may both have split from the early studies of the history of the earth, but the nineteenth and twentieth centuries saw them taking more and more disparate paths. Only through the birth of paleoanthropology did the two come back together for an uneasy coexistence, one which would necessitate cognizance of ideas from geological fieldwork and biological comparative anatomy lab work as it went a step further and required knowledge of human, or hominid, material culture. The early evolutionary debates regarding human fossils had proceeded in as fragmentary a fashion as the material remains themselves. Precise details were often hard to come by, there was hoarding and even withholding of data, contextual excavation information was often missing, and the ability to navigate geological time was still rudimentary. The intense hold of the linear model—along with the small number of hominid specimens—constrained flexibility in theorizing, making it difficult to conceptualize a branching lineage for prehistoric human species. Until a robust multidisciplinary approach became standard, the early debates over human evolution were unable to produce useful scientific results even as recognized by the participants who could not come to agreement.

In the case of ancient man, archaeological discoveries proved as important as physical human fossils: as Peter Bowler notes, "Archaeology was crucial to the establishment of human antiquity and of a progressionist view of early human history because the stone tools gained wide acceptance by the scientific community much earlier than the handful of fossil remains available in the mid-nineteenth century."[185]

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[185] Peter Bowler. *Theories of Human Evolution: A Century of Debate, 1844-1944* (Johns Hopkins University Press: Baltimore and London, 1986), p. 31

These stone tools, which progressed from primitive to more complex through time, provided independent confirmation of progressive evolution in man, but it also had a deeper impact of British field collecting. While archaeology "took a great deal of its early inspiration from geology" the nature of paleontological fieldwork quickly became vastly different from that undertaken by archaeologists.[186] The stone tools were soon surpassed by early tools made of naturally occurring metals, and as the Stone Age rapidly gave way to the Iron and then Bronze Age, British scientists and museums found themselves swamped in ever growing piles of younger and younger artifacts. During the early debates on evolution Britain was so fully involved with its local recent past and their exploration of Egypt's ancient past it was not overly concerned with the few fossil collectors calling on the comparative anatomists.

In times of change historians look for instances that can serve as high water marks within the grey area that exists between what participants and scholars designate as the old and the new. Certainly professionalization of the study of human origins had begun before Piltdown, and certainly there were important amateur discoveries after, but it is the Piltdown era that sees the beginnings and ends of these respectively. When Piltdown was announced there was still an aura of Old World science in the United Kingdom. James Cook's oil painting of all the major figures in the Piltdown world, commissioned in 1915, harkens back to Rembrandt's *The Anatomy Lesson of Dr. Nicolaes Tulp* painted nearly 300 years earlier in 1632. The same number of men gather around the table in each painting, with Keith the anatomist and teacher in Cook's

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[186] Peter Bowler. *Theories of Human Evolution: A Century of Debate, 1844-1944* (Johns Hopkins University Press: Baltimore and London, 1986), p. 21

Piltdown Gang demarcated by a white lab coat, while those present are all in black in a grouping reminiscent of the famous Rembrandt painting.[187] These instances may have initially been simply artistic nods from Cook to Rembrandt, but they turned out to be even more symbolic of the state of science in the twentieth century connecting with the state of science in the seventeenth, perhaps the last instance when drawing room science could be depicted as the cutting edge of scientific knowledge (Figure 25).[188]

Piltdown Man is a link to the swansong for drawing room science, and a death knell for amateur antiquarians in a progressively professionalizing scientific world. As a field of inquiry the study of prehistoric human origins could no longer rely only on chance discoveries and a nineteenth-century reverence for anatomical feats of reconstructions from fragments to produce usable knowledge. The debates surrounding Piltdown reveal some of the earliest gulfs that existed among paleontologists, anatomists, archaeologists, and anthropologists who had yet to recognize how they would need to work together in order to answer the questions that existed on human origins—a process that is perhaps still difficult to achieve today. It highlights the beginnings of the struggle for work done in the field to find equal merit to work done on the examination table.

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[187] In Rembrandt's painting the lecturer is the only one wearing a hat.

[188] Jonathan Sawday offers a completely different interpretation of the painting in "New Men, Strange Faces, Other Minds: Arthur Keith, Race, and the Piltdown affair (1912-53)" in *Race Science and Medicine, 1700-1960* (Routledge, 1999). Here he looks at the painting at first as a singularity in 1915, and again readjusts the analysis to fit the post 1953 feeling, once again focusing the attention on the forgery or the "crime." Image credit: http://www.rembrandthuis.nl/en/rembrandt/belangrijkste-werken/de-anatomische-les-van-dr-nicolaes-tulp (Accessed May 21, 2014) and http://blog.geolsoc.org.uk/2012/12/13/a-tale-of-three-meetings/geological/ (Accessed May 21, 2014).

The Piltdown case highlights just one instance of change during the first three decades of the twentieth century. If the foundations of paleoanthropology were not as stable in the beginning as we have previously thought, other scientific outcomes may not have been inevitable either. We must look not only at the results of the scientific expeditions during this period, but also look more closely at the expedition practices themselves as well as the changing role that institutions—especially natural history museums—played in those practices. Philanthropy and private funding of expeditions by organization such as the National Geographic Society is yet another facet of science in the field that emerged during this time. The role of popular media should be researched beyond its obvious influence in disseminating information and creating spectacular episodes, but as being part of co-producing the science of paleoanthropology, by providing funding and rationales and significance to the work. Beyond being just a feature of the Piltdown case, popular media sources allowed the public to follow expeditions, discoveries, and debates in near real time, unlike other disciplines in which scientists were able to work behind closed doors.

The recalibration of anatomy, paleontology, geology, archaeology, and anthropology specifically addressing the questions of human evolution is another avenue in need of further research. The study of the history of geology, the history of anthropology, and others as single entities distorts our understandings of not only "interdisciplinary sciences" themselves, but how they worked together in order to form those disciplines in the earliest debates. This is true especially for the discipline of paleoanthropology which arrived as a mindfully constructed inter- and multidisciplinary science relatively recently. When historians address paleoanthropology it is usually by

seeing it after the fact as a coherent entity and it is more difficult to see what possible configurations of the discipline were lost—or how they might have been reconfigured—if we do not clearly understand what the mix looked like before energy was put into its coalescence. By following the Piltdown fragments as they were being reconstructed by scientists through these different specialties, I have sought to highlight the differences and similarities in their approaches to understanding the lives of our prehistoric ancestors by drawing back the curtain on the development of a new manner, method, and approach to unraveling the history of human origins (Figure 26).

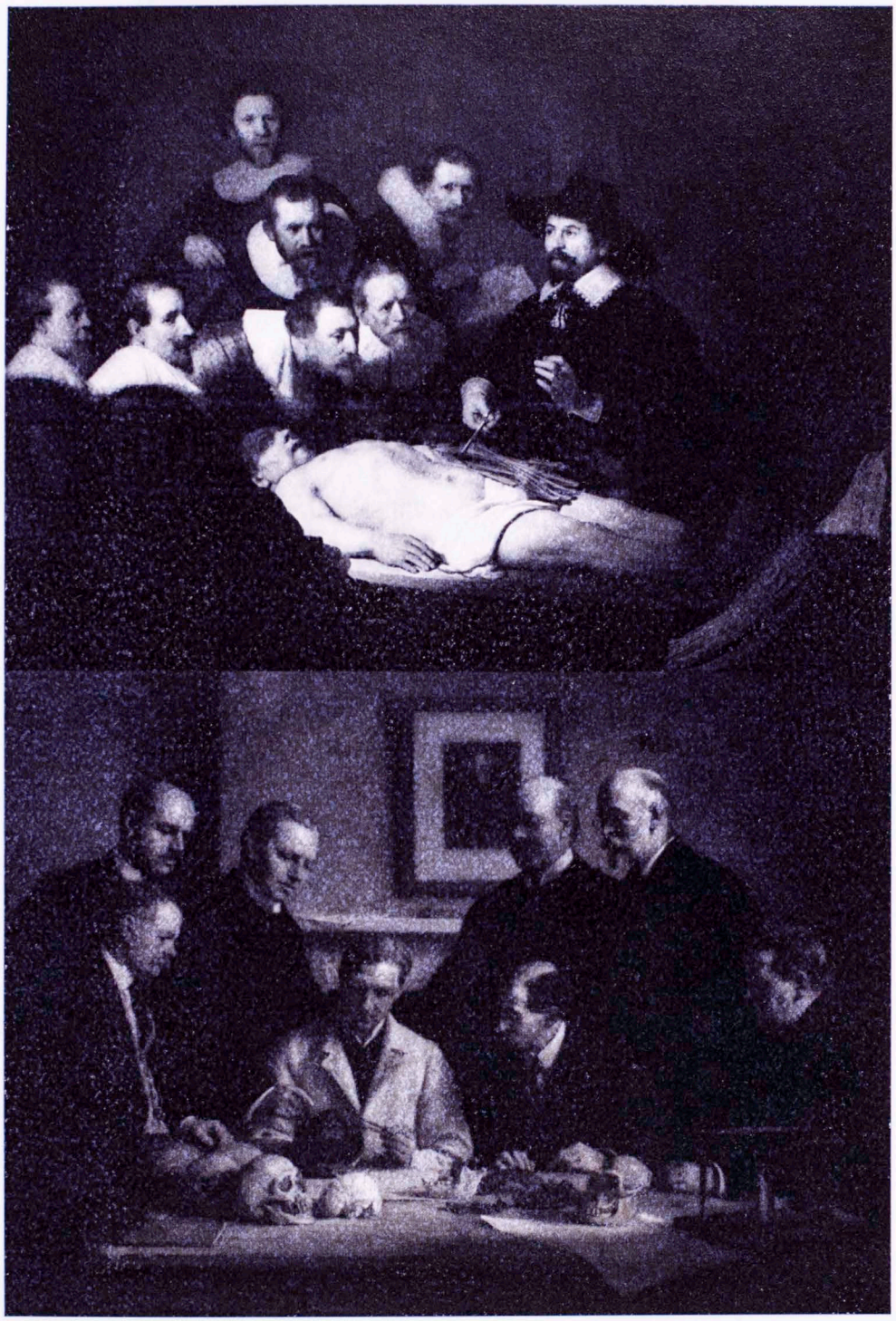

Figure 25. ***The Anatomy Lesson of Dr. Nicolaes Tulp*** **(top; Rembrandt, 1632) Source: Rembrandt House Museum and** ***A Discussion on the Piltdown Skull (Piltdown Gang)*** **(John Cooke, 1915); Source: Geological Society of London.**

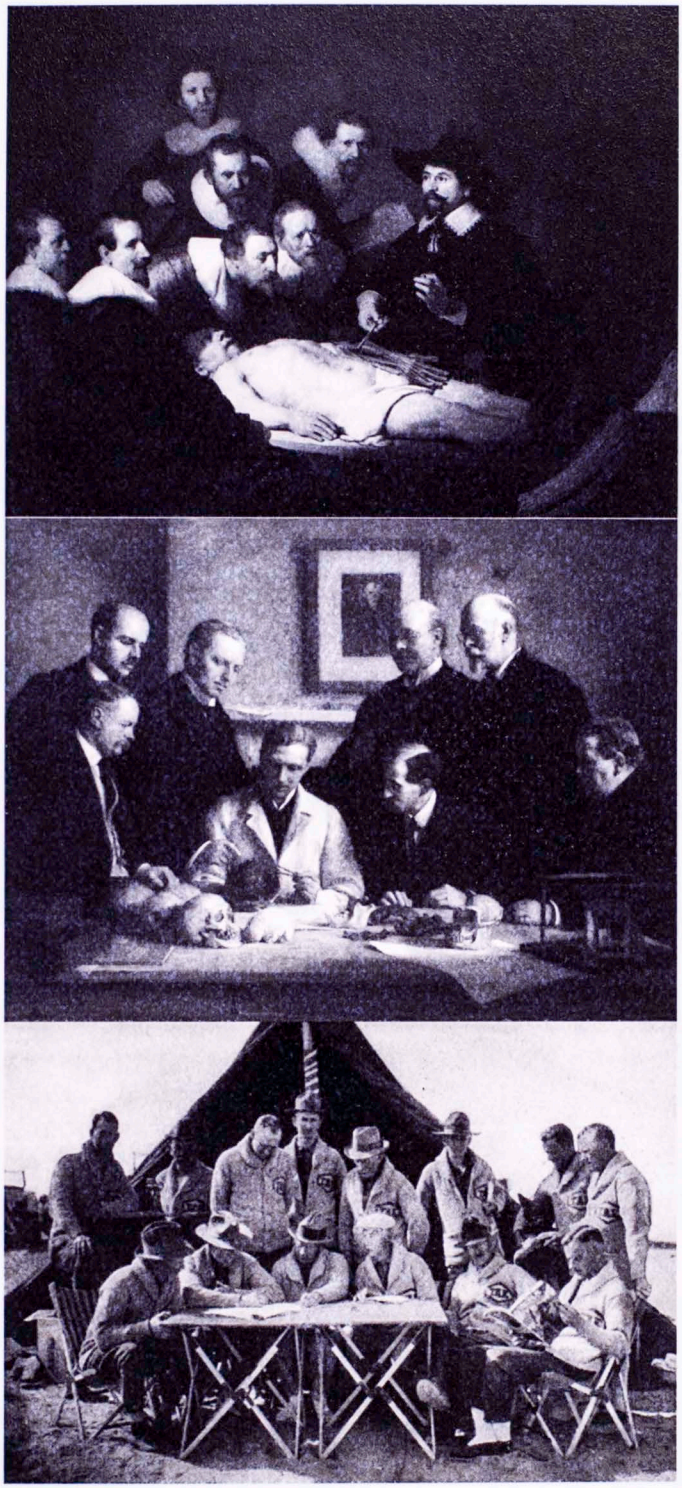

Figure 26. By the 1920s the search had become as important as the specimen. Roy Chapman Andrews's photographed crew was nearly twice as large as those in the paintings, and a map has replaced the cadaver and skulls. They are also outdoors, in front of an expedition tent in the Mongolian desert.

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