

***Ancient Hunters and Their Modern Representatives:
William Sollas's (1849–1936) Anthropology from Disappointed Bridge
to Trunkless Tree and the Instrumentalisation of Racial Conflict***

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Abstract. During the first decades of the 20th century, many anthropologists who had previously adhered to a linear view of human evolution, from an ape via *Pithecanthropus erectus* (today *Homo erectus*) and Neanderthal to modern humans, began to change their outlook. A shift towards a branching model of human evolution began to take hold. Among the scientific factors motivating this trend was the insight that mammalian evolution in general was best represented by a branching tree, rather than by a straight line, and that several new fossil hominids were discovered that differed significantly in their morphology but seemed to date from about the same period. The ideological and practical implications of imperialism and WWI have also been identified as formative of the new evolutionary scenarios in which racial conflict played a crucial role. The paper will illustrate this general shift in anthropological theory for one particular scientist, William Sollas (1849–1936). Sollas achieved a synthesis of human morphological and cultural evolution in what I will refer to as an imperialist model. In this theoretical framework, migration, conflict, and replacement became the main mechanisms for progress spurred by ‘nature’s tyrant,’ natural selection.

Keywords: anthropology, beginning of 20th century, Britain, diversity vs. linearity, Grafton Elliot Smith, Gustav Schwalbe, Henri Breuil, human evolution, ideology, imperialism, Marcellin Boule, Neanderthal, phylogenetic trees, Piltdown, *Pithecanthropus*, race, Thomas Henry Huxley, William Sollas, WWI

Paleoanthropology Around the Turn to the 20th Century: Providing the Context for Sollas’s Work

In the mid-19th century, the acceptance of an age of humankind by far transcending the chronology of the Bible and the publication of Charles Darwin’s (1809–1882) *On the Origin of Species* (1859) paved the way for the integration of humans into an evolutionary framework. Scientists such as Thomas Henry Huxley (1825–1895) applied the theory of evolution to humans by emphasizing human morphological affinities to the apes. Just as significantly, fossil human remains were discovered and previously

made finds were re-evaluated in light of the evolutionary approach. Already in 1856, a skull and bone fragments of Neanderthal had been brought to light in the Feldhofer Grotto of the Neander Valley in Germany. Even though in Huxley's view the Feldhofer skull represented "the most pithecoïd of known human skulls,"¹ he classified it as a mere variant of the modern human type. He estimated the skullcap to be of normal cranial capacity and as much closer to the Australian Aborigine than to the ape; the Neanderthals thus might have evolved into modern human races.² Additional Neanderthal remains were discovered at La Naulette, Belgium, in 1866, and at Spy, Belgium, in 1886. Earlier finds such as the child cranium from Engis, Belgium (1829–1830), and the female cranium from Forbes Quarry, Gibraltar (1848), were now ready for re-evaluation. It became clear that rather than representing a recent pathological form, the Neanderthals were a distinct race of *Homo sapiens*.³

Towards the end of the century, another fossil that seemed to shorten the morphological gap between apes and humans was discovered, *Pithecanthropus erectus* (today *Homo erectus*). The Dutch physician Eugene Dubois (1858–1940) found the femur, calvarium and some teeth in Java, at Trinil, in 1891–1892, when visiting the Dutch East Indies as a military surgeon. After the turn to the 20th century, the German anatomist Gustav Schwalbe (1844–1916) defined Neanderthal as a separate species (*Homo primigenius*), rather than as a fossil human race, thereby enlisting it unambiguously for an evolutionary scenario of human development. He introduced a unilinear view of human evolution, according to which *Pithecanthropus erectus* had evolved into *Homo primigenius* and eventually modern humans.⁴ Such a linear model of human evolution, represented by a straight line leading from an ape ancestor via *Pithecanthropus* and Neanderthal to 'the lowest human races', was well accepted by the first decade of the 20th century.⁵

¹ From *Man's Place in Nature* (1863) in Huxley, 1894, p. 205.

² Please note that I use the term *race* and its adjectives in the way they were employed by the anthropologists under consideration. Neither its application to fossil and to recent human groups, nor the value judgments associated with it, represent my own views.

³ The secondary sources on the history of interpretations of Neanderthals are numerous indeed (e.g. Spencer, 1984). The scientific literature on Neanderthal that includes some historical overview is similarly extensive and has its roots in the second half of the 19th-century (e.g. Jordan, 1999).

⁴ Schwalbe, 1906; Spencer and Smith, 1981, p. 436. Many years previously, William King (1809–1886) had arrived at the same conclusion, and coined the species name *Homo neanderthalensis* (King, 1864).

⁵ See Model A, Appendix B.

Soon afterwards, however, many of those anthropologists who had taken on the linear view of human evolution began to change their outlook. A shift towards a branching model began to take hold in the community, in which most of the known fossil hominids represented dead-ending side-branches of the human family tree.⁶ Among the scientific factors motivating this trend was the insight that mammalian evolution in general was best represented by a branching tree, rather than by a straight line. In addition, newly discovered fossil hominids differed significantly in their morphology but seemed to date from about the same period. One of these was *Homo heidelbergensis*, represented by a fossil jaw with affinities to Neanderthal, found at Mauer in Germany and given to Otto Schoetensack in 1907. The other was the so-called Piltdown Man, remains of which were claimed to have been discovered by the local solicitor and amateur geologist Charles Dawson (1846–1919) and others in a gravel pit at Piltdown in Sussex, England. During the years of 1911 and 1912 nine cranial fragments and the right half of a mandible were reportedly unearthed. While the mandible was ape-like, the braincase was modern-looking. It supported the widespread assumption that the expansion of the brain had preceded the acquisition of a fully upright posture in the course of human evolution. The fact that already at the Pliocene–Pleistocene barrier there had been a human type of an essentially modern skull size put into question the ancestral status of *Pithecanthropus* and *Homo heidelbergensis*, which seemed to date from about the same period, but were less modern in brain anatomy.⁷ The Piltdown chimera was only proved beyond doubt to be a forgery made up of an orangutan jaw and a modern human skull in 1953.⁸

Shortly before the Piltdown affair, a nearly complete Neanderthal skeleton had been discovered in a cave in France in the village of La Chapelle-aux-Saints (department of Corrèze). The bones were given into the care of Marcellin Boule (1861–1942), director of the laboratory of palaeontology at the prestigious Natural History Museum in Paris. Drawing upon the tradition of his instructor of paleontology at the Museum, Albert Jean Gaudry (1827–1908), whose expansive studies of mammalian fossils had resulted in a view of evolution as constituted by diversification, sudden transformation, and extinction,

⁶ See Model C, Appendix B.

⁷ On the influence of the Piltdown forgery on “the shadow man paradigm,” according to which no known fossil hominids were considered as direct ancestors of modern humans, see Hammond, 1979, 1982, pp. 23–25, 1988; and Spencer, 1988, 1990, for a general discussion of the forgery’s history.

⁸ Weiner et al., 1953.

Boule applied the methods of comparative anatomy also to human phylogeny. The reconstruction of the La Chapelle-aux-Saints specimen led Boule to agree with Schwalbe that Neanderthal was a separate human species and not simply a pathological form of modern date or a fossil race of humans.⁹ However, he contradicted Schwalbe by rejecting Neanderthal as ancestor of modern humans. In this and succeeding monographs on the find published in the *Annales de Paléontologie* (Annals of Paleontology), he supported this move by emphasizing the simian traits of the skeleton, even postulating that Neanderthal Man had not carried himself entirely upright.¹⁰ Boule's main points were that the Neanderthals had differed enough from modern humans, morphologically as well as culturally, to be classified as a separate species, and that both had inhabited Europe at the same time. Although Boule did not exclude interbreeding, in his view, Neanderthal was not ancestral to us. This also put into question the ancestral status of *Pithecanthropus*, which seemed to show Neanderthal specializations even more markedly. Hominid evolution must therefore have had more than one line of descent, and the ancestors of modern humans were again unknown.¹¹

Last but not least, the archeological record began to indicate a sudden replacement of the Mousterian culture, associated with Neanderthal, by Aurignacian weapons and tools, which were found with the remains of a human race that had lived in Upper Pleistocene Europe and that was essentially modern in anatomy.¹² This put into question the gradual evolution of Neanderthal into these modern humans. A more linear development from earlier to later archeological industries was replaced by the idea of progress through distribution from a single origin through migration. This also fit the so-called Central Asia Hypothesis, according to which humans had originated on the great plateau of Asia. It was thought that the conditions there had progressively worsened and selective pressures had increased due to

⁹ Boule, 1908.

¹⁰ Boule, 1911, 1912, 1913; 1914 (1912); 1923 (1921), Ch. 7; Sommer, forthcoming. The reason for this brutish reconstruction has partly been attributed to the fact that the bones of the Old Man of La Chapelle-aux-Saints had been afflicted with osteoarthritis. Although Boule was aware of the deforming illness, it seems that he did not take it sufficiently into account in his reconstruction. For a more detailed analysis of how Boule arrived at his results see Trinkaus and Shipman, 1993 (1992), pp. 190–194. Straus and Cave, 1957, have shown that, while the pathology of the Old Man from La Chapelle-aux-Saints may well have forced him into something of a stoop, classic Neanderthal in a healthy state was fully human in posture.

¹¹ Hammond, 1982.

¹² For tables of the archaeological and geological series see Appendix A.

deforestation caused by the uplift of the Himalayas. As a consequence, successive waves of increasingly higher forms of hominids might have been forced to radiate outwards.¹³

The historians of anthropology who have brought to light the scientific changes and their causes outlined above, have invariably pointed out that these were situated in the context of imperialism and WWI.¹⁴ Direct contact with and observation of non-white races subjugated under British imperial rule and eventually the experiences of WWI had strong impacts on anthropologists' outlooks on human nature and evolution. Increasingly, racial conflict was viewed as having been or indeed as still representing a driving force in human evolution. It appeared to be in the nature of progress that some human races had to compete with and replace others 'less advanced in morphology and culture.' The notions of race and of nation were thereby not always clearly differentiated.¹⁵ Imperial expansion and national rivalry were rationalized within the framework of struggle and the survival of the fittest, even though anthropologists still adhered to alternative mechanisms for evolutionary change such as the inheritance of acquired characteristics.

In this paper, I am going to exemplify this complex shift in theory through a detailed discussion of the geologist, paleontologist, and later anthropologist, William Sollas (1849–1936). As it turns out, Sollas was among the first to enlist *Pithecanthropus* for a linear model of evolution from fossil ape via Neanderthal to modern humans. However, Sollas has attracted little attention from historians of anthropology and is mainly known for his book *Ancient Hunters and Their Modern Representatives*, which was first published in 1911 and reissued in 1915

¹³ While the idea of Asia as the cradle of humankind had a long history, the Central Asia Hypothesis drew on William Diller Matthew's (1871–1930) "Climate and Evolution" (Matthew, 1915 (1911), see especially pp. 209–214; e.g. Osborn, 1928; Smith Woodward, 1925).

¹⁴ Bowler, 1986, Chs. 2 and 4, discusses the 19th century anthropological progressionism and the turn towards the so-called pre-sapiens model within anthropology, which refers to the idea of early modern humans of superior Aurignacian culture invading Europe and exterminating the stagnating side-branch of Neanderthals. The model was associated with a hypothetical ancestor of humans that was pushed ever further back in time and distanced ever more from the known fossil hominids and anthropoids. It was also associated with the instrumentalisation of racial conflict as a mechanism of progress. On national rivalries between the German, English, and French communities, and on the role of nationalism and ideology in the reception of fossils and in theories of morphological and cultural progress through migration and struggle, see Hammond, 1988, pp. 127–130.

¹⁵ On the concept of race around the turn from the 19th to the 20th century see Stocking, 1994.

and 1924. It represented a synthesis of the new approaches in cultural anthropology and archaeology with paleoanthropology. But it was also a synthesis of the past with the present. Focusing on the central role of migrations of peoples, Sollas claimed that at least since the Middle Paleolithic, 'more highly evolved human races' had driven 'the less developed ones' from their territories. These successive replacements had ensured progress in morphology and culture in favorable regions such as Europe. And they still did so at the peripheries of the earth.

Since the new branching model of the morphological evolution of humans as a species was also associated with patterns of migrations, Sollas's scenario of the morphological and cultural evolution of the human races might have achieved synthesis also in this respect. Yet, a more detailed analysis of the successive editions reveals a surprise. It seems as though Sollas resisted the general trend towards a branching model of human evolution until the last edition. A discussion of Sollas's development as an anthropologist is thus illustrative of the changes taking place in anthropology at large, while at the same time suggesting that the shift in theory that had its beginning already in the first decade of the 20th century looked different for each anthropologist. It also highlights that an imperialistic model that saw progress as the result of contest and displacement did not need to be accompanied by a view of the evolution of the human species according to which all the known fossil hominids were on dead-ending side-branches of the family tree.

It also needs to be pointed out that the nonlinear models of morphological and cultural evolution that tended to emphasize the role of conflict were not *a priori* more or less racist than their linear predecessors that aligned the modern human races along a scale of increasing brain size. Indeed, as a closer look at the changes Sollas went through will show, the shift from a linear to a branching model of human evolution was not abrupt but gradual, and the concept of a linear axis of brain size was hard to die. Nonetheless, the progressionism of the 19th century had viewed 'primitive races' as capable at least in theory of attaining 'the higher stages of development'. The new model of physical and cultural evolution, in contrast, tended to take the geographical marginalization if not extermination of 'lower races' by 'more highly developed races' as a means of evolutionary progress. This kind of progress was seen to have been at work throughout prehistory and history, and it could still be observed in the outgrowths of present-day imperialism.

Sollas's Anthropological Beginnings: Human Evolution as Disappointed Bridge from Ape to Man

“[...] the Neanderthal and Pithecanthropus skulls stand like the piers of a ruined bridge which once continuously connected the kingdom of man with the rest of the animal world.”¹⁶

Sollas, who had made his career as geologist and paleontologist, began his forays into the territory of anthropology at an advantageous time. He was still professor of geology and mineralogy at Trinity College, Dublin, when he had the chance to study the two piers that were left of what he considered to have once been a continuous bridge between apes and humans – *Pithecanthropus erectus* and Neanderthal. In fact, Dubois had only brought his fossil back to Europe in 1895 when Sollas went right at examining it. He published a paper in *Nature* that discussed his findings. As in later publications, Sollas did not follow the majority opinion but rather took his place among the first to accept the Javanese fossil as a missing link in the chain of descent leading from ape to human. Generally speaking, the European anthropological communities had reacted negatively when Dubois published his description of the find in 1894.¹⁷ At that time, many anthropologists assumed that cranial expansion had played a central role in human evolution after the split from the ape line, and that it had preceded the acquisition of a fully upright gait. Contradicting expectations, *Pithecanthropus* combined an ape-like skull vault and a human-like thighbone, which seemed to suggest an erect-walking but small-brained creature. This led some to question whether the cranium and femur belonged to the same individual and to interpret the first as belonging to an anthropoid, such as a large gibbon, and the second as pertaining to a human. Others considered both fragments to be either those of a human being or of an ape.¹⁸ Indeed, among the many comments appearing on *Pithecanthropus* in 1895, there were only a few voices who joined Sollas in his approval of Dubois's missing link.

In Sollas's *Pithecanthropus* paper, one finds his only diagrammatic illustration of human phylogeny (Figure 1). He positioned the dots for the cranial capacities of fossil and recent genera and races of primates on a time axis. This already supported his view that *Pithecanthropus* was closer to modern humans than to the ape – man ancestor. When Sollas

¹⁶ Sollas, 1908 (1907), p. 337.

¹⁷ Dubois, 1894; Shipman and Storm, 2002, p. 110–111.

¹⁸ On Dubois and *Pithecanthropus* see also Franzen, 1994; Howell, 1994 (1991); Spencer, 1995; Theunissen, 1989.

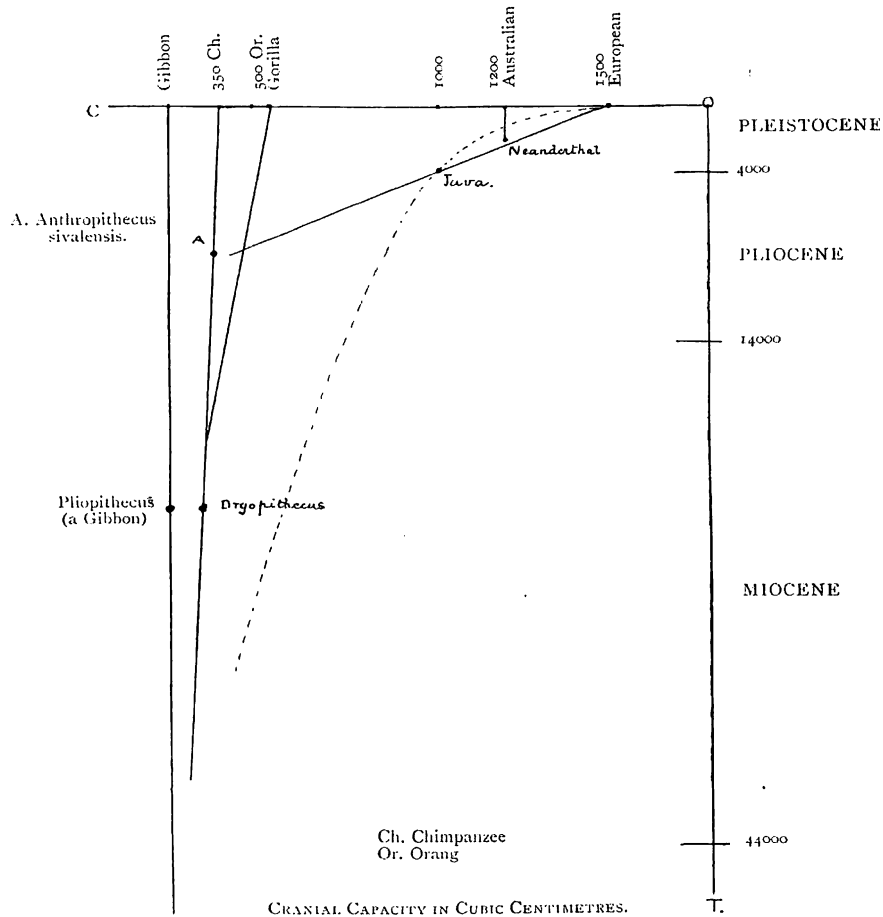


Figure 1. Diagrammatic visualization of two different scenarios of human evolution on the basis of cranial capacity. (From Sollas, William. 1895, p. 151). Reprinted by permission from *Nature* (53:150–151) copyright (1895) Macmillan Publishers Ltd.

now connected the average European brain size with that of *Pithecanthropus*, the resulting straight line passed closely by the Neanderthal point and then approached a fossil ape. This agreed with his idea of a straight line of descent from fossil ape to modern European on the basis of cranial capacities. In the latter part of the 19th century the non-human primate fossil record had not yet been synthesized and anthropologists differed in the fossil ape they chose as closest to the ape – human progenitor. Sollas here used the chimpanzee *Anthropithecus sivalensis* (today *Sivapithecus*), remains of which had been found by the British paleontologist Richard Lydekker (1849–1915) in the Siwalik. It needs to be pointed out that there was no skull of *Anthropithecus*, but

only a palate. Sollas must therefore have inserted the *Anthropithecus* dot solely on the basis of the geological layer in which it was found, which referred it to the middle Pliocene, and of its assumed ancestry to chimpanzees, the brain size of which he used as a substitute.

While the continuous line also suggested that evolution had proceeded at a uniform rate, the broken line, in contrast, was associated with an acceleration in the pace with which brain size had increased. It represented one of many other possible interpretations of the data, approaching the view of those who considered the ape – man ancestor to be much older and more primitive, such as *Dryopithecus*, or gibbon-like, such as *Pliopithecus* from mid-Miocene France. Both line and curve supported the notion that evolution could be expressed as a function of cranial capacity and time. However, Sollas was clearly in favor of the continuous straight line, which meant that humans were of a comparatively recent origin, and in which he saw one more advantage: “[. . .] it has this positive advantage, that by linking on the human to the pithecoïd stem at a high level, it saves us from the invention of a superfluity of imaginary predecessors, and all that tends to parsimony in this direction is an evident gain.”¹⁹

The fact that Sollas positioned the native Australian at the same level of cranial capacity as the Neanderthal foreshadowed his later close association of the two forms. Although he did not comment on this in the text, the vertical line connecting the Neanderthal with the Australian seems to stand for a line of descent, as in the case of the gibbons that are seen to have descended from *Pliopithecus*, and the chimpanzees and gorillas that are referred back to *Dryopithecus*. Indeed, it is not even entirely clear whether Sollas used the average brain size of all the known Neanderthal skulls or a particular skull to position the Neanderthals in the chart, or whether, as in the case of *Anthropithecus*, he simply used the cranial capacity of an Australian, or of Australians, and then moved the dot vertically down to the mid-Pleistocene. In any case, the way in which Sollas employed the brain sizes of present-day forms to stand in for their supposed ancestors created a kind of *scala naturae* of cranial capacities for the recent species and races as well. It is visualized in the top horizontal bar that connects the gibbon to the modern European as the apex

¹⁹ Sollas, 1895, p. 151. This critique was directed at attempts to link the human to the pithecoïd stem below the anthropoid level. This would have meant that the human and non-human primate lines had separated very early in their evolution and that the morphological similarities between humans and anthropoid apes were the result of parallel evolution. As Sollas mockingly hinted at, this theory advocated some hypothetical tarsioïd or lemuroid (half-ape) as the last common ancestor of the pithecoïd and human lines (e.g. Cope, 1893).

of human evolution via the intermediate stages of recent great apes and 'lower human races.' The main result of the study, so persuasively visualized, was the establishment of human evolution as a linear line from fossil ape to *Pithecanthropus*, Neanderthal, and modern humans.

In 1908, as professor of geology and mineralogy at Oxford University, Sollas published a paper that gave further support to his linear model. It also tightened the link between the Australian and the Neanderthal and cemented the claim that scales in brain size could stand for evolutionary sequences.²⁰ A craniometric study of the Neanderthal skull that had been discovered at Forbes Quarry, Gibraltar, in 1848, was preceded by measurements of Australian and great-ape skulls from the Oxford University Museum. Sollas experimented with different developmental stages and different base lines for aligning the skulls for comparison to refute Schwalbe's classification of the Neanderthals as a separate species (*Homo primigenius*). Although Schwalbe agreed with Sollas on the ancestral status of both *Pithecanthropus* and Neanderthal, Sollas disagreed with Schwalbe on the taxonomic status of the latter. Sollas claimed that Schwalbe's measurements were not reliable, that they indicated a greater difference between the Neanderthal and human skulls than there actually was, because the line Schwalbe used for adjustment was not fixed. Also, Sollas showed that cranial and facial angles may vary from skull to skull not only depending on evolutionary stage but also on developmental stage. A chimpanzee infant was in certain respects closer to an adult European than an adult chimpanzee, so that a bias may result from unknowingly comparing two skulls of individuals at different developmental stages.

The main point of the paper was to prove the close resemblance between Australian and Neanderthal skulls, when aligned correctly, and with all variables taken into account. Again, this is easily understood from the visualizations (Figure 2). Sollas thus followed Huxley, who had been his teacher at the Royal School of Mines, in classifying Neanderthal as a mere variant of the modern human type, a race of *Homo sapiens*. It was especially the native Australian that linked the Neanderthal to modern humans. However, rather than to bring Neanderthal closer to modern humans, this seems to have distanced the Australians from the Europeans. Sollas here introduced a concept that would prove central for his scenario of human evolution, i.e. that remoteness in space stood for remoteness in time and could thus indicate great distance in phylogenetic relation: "The Neanderthal race, the most remote from us in time of which we have any anatomical

²⁰ Sollas, 1908 (1907).

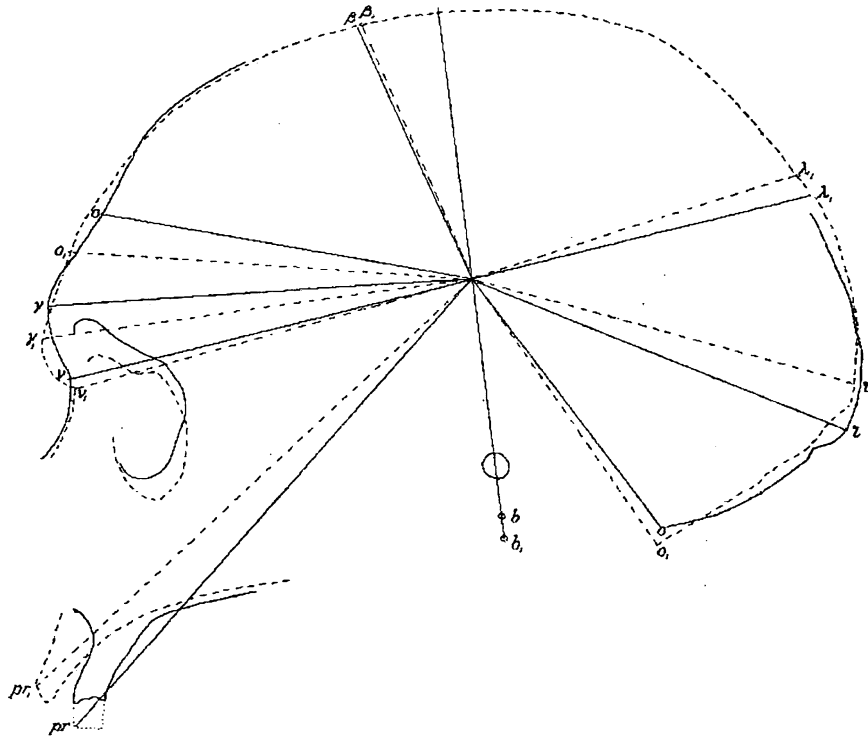


Figure 2. Diagrammatic superposition of a Neanderthal and an Australian skull in profile. (From Sollas, William. 1908 (1907), Figure 18, p. 324). Courtesy of the Royal Society of London.

knowledge, and the Australian, the most remote from us in space, probably represent divergent branches of the same original stock. In that most important of all characters, cranial capacity, the two races are almost identical.”²¹ The quote also once again shows the central role of a hierarchy of brain sizes from which an evolutionary lineage could be inferred. “In that most important of all characters, cranial capacity,” not only Neanderthals and Australians, but also Neanderthals and *Pithecanthropi* overlapped. Imagining the human lineage as a bridge across the river of time, the Neanderthals skirted the human bank, while *Pithecanthropus* stood at the edge of the pier from the ape – human ancestor’s side. Indeed, during the first and early second decade of the 20th century, many anthropologists would come to adopt a similar model.²²

²¹ Sollas, 1908 (1907), p. 336.

²² Compare Model A, Appendix B.

The exhaustive and meticulous craniological analysis, in which Sollas established new standards for comparison and a new technique for drawing profiles of skulls, earned him the respect of the academic community and he became president of the Geological Society the same year. The degree to which Sollas wanted to enter the field of anthropology can be guessed from the fact that he delivered the presidential address of 1910 to the society of geologists on the subject of human evolution.²³ In this lecture and three preceding ones he gave to the Royal Institution in 1906, which were published in 1909 in *Science Progress* under the title "Palaeolithic Races and Their Modern Representatives," Sollas lay the basis for his ideas on the evolution of the human races. These he developed further in his book *Ancient Hunters and Their Modern Representatives*, to be issued in 1911, 1915, and 1924.

Although in his presidential address Sollas was not explicit on the subject of lines of descent beyond the human species, he encountered a problem with his earlier picture, which as we have seen was to a large extent based on cranial capacities. It had turned out that the prehistoric human races had bigger brain sizes than the average of any existing civilized nation. Sollas proposed two ways around this threat to his model of linear brain increase in the course of human evolution. The Neanderthal skeletons found might all have belonged to extraordinary individuals, such as tribal chiefs, and had therefore been of more than average intelligence. It seemed even more likely, however, that brain size and intelligence were not correlated. This meant that while brain size might not present such a perfect straight line of increase, intelligence could nonetheless do so. Sollas saw this not only supported by the fact that 'the lowly Eskimo' had the largest average cranial capacity among living races, but also by the fact that geniuses varied greatly in brain size (Figure 3). While the German Iron Chancellor Otto von Bismarck (1815–1898) had conceptualized his political strategies to unite the German provinces with the aid of a large brain, the Saxon polymath Gottfried Wilhelm von Leibniz (1646–1716), who had excelled in philosophy, mathematics, and the law, had achieved the outstanding with a comparatively small organ of thought.

In the face of this problem, Sollas left the European Paleolithic races aside for the moment and showed instead how clear-cut a hierarchy of cranial capacities could nonetheless be established from ape, via *Pithecanthropus*, female Australian, male Australian, to European male. In order to arrive at the smooth continuity in brain size spectra between *Pithecanthropus* and humans, the diagram had to elevate difference in

²³ Sollas, 1910.

	<i>Cranial capacity.</i>	<i>Weight of brain.</i>	<i>Authority.</i>
Bismarck.....	1965 c.c.	1867 gms.	Waldeyer.
Kant.....	1715	.....	Kupfer & Hagen.
Bobbe (a robber and murderer).....	.....	1510	R. Wagner.
Mohl (a distinguished botanist)	1431	.....	A. Froiep.
Do.	1500	.....	Buschan-Stettin.
Gauss .....	.....	1492	Rudmeyer.
Skobelew (General)... ..	.....	1451	Sernoff.
Mommsen .....	.....	1429	Hausemann.
Liebig .....	.....	1353	
Menzel.....	.....	1298	Hausemann.
Bunsen.....	.....	1295	Do.
Leibniz.	1422	1257	His.
Gambetta.....	.....	1247	Duval.
Do. ....	.....	1160	Paul Bert.

Figure 3. Table illustrating the wide range in brain size and weight among men of genius. (From Sollas, William. 1910, p. 64). Courtesy of the Geological Society of London.

sex to the status of taxonomic difference (Figure 4).²⁴ Once again suggesting a thinking along linear brain hierarchies in a way that is reminiscent of the 18th century concept of the great chain of being, it was the female of in Sollas's view the most primitive type of modern humans who established the link to the fossil genus of *Pithecanthropus*. The link visually contrasted with the gap between *Pithecanthropus* and the ape to show that *Pithecanthropus* was closer to modern humans than to apes; it had clearly already been well on its way on the human line after the split from the anthropoid line. However, the highly developed skulls of the Paleolithic races led Sollas to adopt the concept of mosaic evolution that he could have encountered in Darwin's writings, and which meant that evolution may not proceed at the same pace in all parts of the body. This allowed him to account for the retention of more primitive traits such as a robust jaw, thick bones, a protruding snout (prognathism), pronounced brow ridges, a receding chin and frontal bone, etc., combined with a large cranium or human-like dentition.

²⁴ Stepan, 1986, pp. 262–264, has identified the analogy between gender and race as a general trope in 19th and early 20th century studies on human diversity.

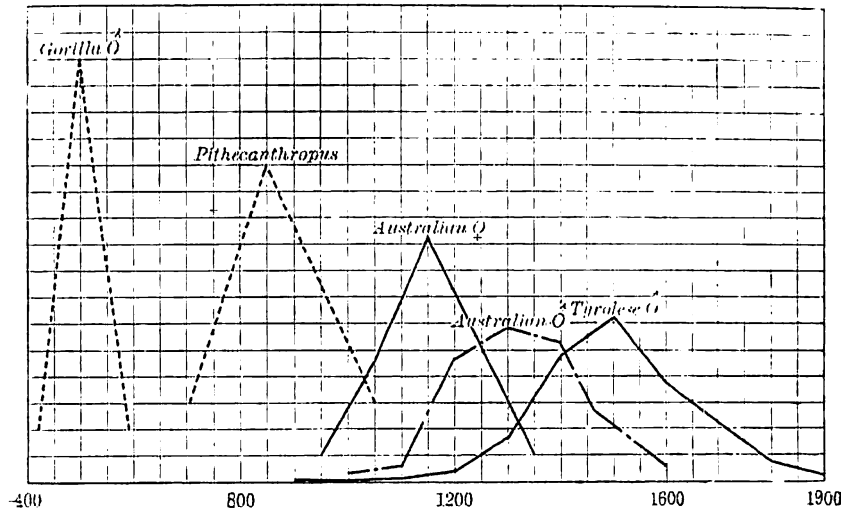


Figure 4. Diagram showing the cranial capacity range of *Pithecanthropus* compared with those in male gorillas, female and male Australians, and Tyrolese. (From Sollas, William. 1910, Figure 6, p. 70). The Tyrolese sample, which was meant to represent 'the highest existing races', was made up of 557 male skulls. The range of cranial capacity for male and female Australians was extracted from publications. The range of capacity in the gorilla was based on only 13 skulls, while the variation in cranial capacity of *Pithecanthropus*, of which there was obviously but one example, is represented by the intermediate range between the Australian native women and the male gorillas (courtesy of the Geological Society of London).

Sollas's Master Narrative of Human Evolution: *Ancient Hunters and Their Modern Representatives* (1911)

In 1911, inspired by such great British precedents as John Lubbock (1834–1913) and William Boyd Dawkins (1837–1929),²⁵ Sollas published a synthesis of cultural anthropology and archeology with paleoanthropology, entitled *Ancient Hunters and Their Modern Representatives*.²⁶ Following Huxley, Sollas divided the human species according to the structure of their hair. Thus, the lissotrichi were the straight-haired (Mongoloid), the ulotrichi the very curly-haired (Negro and Negroid), and the cymotrichi the wavy-haired (Europeans). Other criteria were the cephalic index (skull breadth relative to length), cranial capacity, and traits of morphological primitiveness. The main theory brought forward was a race succession paradigm, according to which human races had always migrated and expanded, marginalizing and

²⁵ Lubbock, 1869 (1865); Boyd Dawkins, 1874.

²⁶ Sollas, 1911.

extinguishing forms less advanced in morphology and culture. He envisioned that the ancestors of modern 'savages' had successively been driven out of Europe to the peripheries of the earth by 'more advanced invaders.'

According to this scheme, the inferior Neanderthal tribes had been driven out of Europe when they had to compete with more highly developed tribes of their own race. The lower tribes wandered as far as the Australian region. There, these Mousterian newcomers replaced the forefathers of the Tasmanians in all of Australia except in the south. The modern Australian Aborigines were not only the cultural equivalent of the Mousterian lithic industry, but they also resembled the Neanderthal physically. The Paleolithic Neanderthaloid invaders of Australia had therefore been the ancestors of the modern Australian Aborigines, to whom Sollas referred as "Mousterians of the Antipodes."²⁷ As it had been the lower Neanderthal tribes that had migrated to Australia, the "Australians [were] a lower race than Neanderthal,"²⁸ that is to say as classic European Neanderthal. The next invaders of Australia, the British, caused the final extinction of the Tasmanians, on which Sollas commented: "It is a sad story, and we can only hope that the replacement of a people with a cranial capacity of only about 1200 c.c. by one with a capacity nearly one-third greater may prove ultimately of advantage in the evolution of mankind."²⁹ The last Tasmanian had died in 1877.³⁰

In Paleolithic Europe, Sollas continued, the remaining Neanderthal tribes had been replaced by the more advanced peoples of Aurignacian industry. These had consisted of two races: there had been a Negroid race called the Grimaldi (Grottes des Enfants, Mentone) and one whom Sollas inferred to have resembled more the modern Europeans. When the Grimaldi race was driven out of Europe, they supposedly fled all the way to southern Africa, leaving behind their characteristic cave-wall paintings between the Dordogne and the Cape. Sollas identified the Bushmen as the descendents of the Grimaldi race, whom they resembled in culture as well as in bodily form. Both for example painted cave walls and made statuettes of women who were clearly *steatopygous*.³¹ Just like the Tasmanian and Australian Aborigine, in Sollas's days the Bushmen faced extinction through the invasion of their territory by 'yet

²⁷ Sollas, 1911, p. 170.

²⁸ Sollas, 1911, p. 161.

²⁹ Sollas, 1911, p. 87.

³⁰ Sollas, 1911, Chs. 6-7.

³¹ *Steatopygia* referred to 'excessive fatness of the buttocks,' as Europeans had for example met with in the famous Hottentot Venus.

a more advanced race,' the agricultural Boer.³² In contrast to the short Grimaldi type, the second race present in Europe during Aurignacian times had been tall, and the statuettes they had left behind looked more like modern white Europeans, whose ancestors, Sollas reasoned, they may have been.³³

The next chapter in Sollas story dealt with the people of Magdalenian culture who had driven the Grimaldi race out of Europe. They, too, had consisted of at least two races: the Cro-Magnon (Perigord) and the small Eskimo-like Chancelade (Périgueux). Not only the Magdalenian culture, but again also the morphology of the Chancelade race reminded Sollas of the Eskimo to a degree that he suggested blood ties, as Boyd Dawkins and the French anatomist Léo Testut (1849–1925) had done before him.³⁴ Towards the end of the Pleistocene, the representatives of the Chancelade race had in turn been driven out of their European territory to North America by the Neolithic agriculturalists; so were probably the tall Cro-Magnon, who resembled the American natives who followed the Eskimo to the interior of America. The American Indians spread over the entire American continent, only to be expelled from a great part of their territory by the arrival of highly civilized Europeans.³⁵ Sollas summarized his imperialist model of human racial distribution and evolution as follows:

If the views we have expressed in this and preceding chapters are well founded, it would appear that the surviving races which represent the vanished Palaeolithic hunters have succeeded one another over Europe in the order of their intelligence: each has yielded in turn to a more highly developed and more highly gifted form of man. From what is now the focus of civilisation they have one by one been expelled and driven to the uttermost parts of the earth: the Mousterians survive in the remotely related Australians at the Antipodes, the Solutrians are represented by the Bushmen of the southern extremity of Africa, the Magdalenians by the Eskimo on the frozen margin of the North American continent and as well, perhaps, by the Red Indians.³⁶

³² Sollas, 1911, Chs. 8–9.

³³ Sollas, 1911, p. 269.

³⁴ Boyd Dawkins, 1880, pp. 233–242; 1910, pp. 259–262; Testut, 1890; see also Sollas, 1880 (1879), 1927. On the history of the Magdalenian-Eskimo link see Laguna, 1932.

³⁵ Sollas, 1911, Chs. 10–12.

³⁶ Sollas, 1911, p. 382–383. It is confusing that Sollas in this conclusion equates the Bushman with the Palaeolithic Solutrean culture, rather than as in the preceding text with the Aurignacian stage. This kind of inconsistency makes it often hard to extrapolate his exact views.

Obviously, in Sollas's encompassing picture of human prehistory, history, and present, racial violence and imperialistic behavior were central mechanisms of progress. There seemed to be a certain orderliness if not moral authority in the view that 'higher races' inevitably replace 'lower races,' especially in regions considered more desirable, such as Europe. Sollas viewed human races as having long separate (pre-)histories and associated them closely with different fossil human races and even species or genera (e.g., Australian with Neanderthal, Tasmanian with *Pithecanthropus*). This had the effect of distancing, othering, and dehumanizing non-European races – a process which depended on an easy nature-culture link, when Sollas inferred blood ties on the basis of cultural similarity. He also confused Paleolithic cultures with biological races when he used terms such as *the Mousterians*, or *the Aurignacians*. In general, the racial categories Sollas described for the Pleistocene were based on very few fossil fragments indeed, and not even all of Sollas's Paleolithic groups had been substantiated by fossil remains. Sollas explained the cultural progress observed through successive archeological beds by each higher level being the product of 'a higher human race or races.' This did not leave much room for variation or progress within one race, which makes his model appear somewhat anti-evolutionary.³⁷

The concept of a geographical gradient from 'higher human types' in Europe to 'lower types' at the peripheries could also be applied to the evolution of humans as a species. It allowed Sollas to reconcile the possible contemporaneity of *Pithecanthropus* and the newly discovered *Homo heidelbergensis* in the early Pleistocene with his linear view of evolution. He imagined the lower form, *Pithecanthropus*, to have survived as a kind of anachronism into later times in marginal regions such as Java, since, as we have already seen in the case of the Australian Aborigine, "[i]n geology, time is equivalent to space, being represented in the stratigraphical series by a vertical line, and in geographical distribution by a horizontal line, the distance which intervenes between remote races measuring the time required for their differentiation from a common stock or their migration from a common center."³⁸ The geographical distance between the European and the Asian fossil thus indicated their phylogenetic distance: "No doubt it [*H. heidelbergensis*] was preceded by still more primitive ancestral forms, and one of these, surviving in Java after its fellows had become extinct elsewhere, is possibly represented by *Pithecanthropus erectus*."³⁹ Sollas therefore did not regard contemporaneity of higher and lower forms as being *a priori*

³⁷ Brace, 1997.

³⁸ Sollas, 1911, p. 48–50.

³⁹ Sollas, 1911, p. 50.

contradictory to a linear view of evolution, since even in modern times 'lower and higher races,' such as the native Australian and the modern European, coexisted. In other words, just as Sollas regarded the Australian as an anachronistically primitive human, a relic of a Neanderthal-like race, so had been the Javanese *Pithecanthropus*, which in more favorable, and in Sollas's ethnocentric view more central, regions had long since evolved into higher forms: "It is worth noticing that the lower form (*Pithecanthropus*) occurs in that hemisphere where the most primitive of known races of men (the Australians and Tasmanians) continued to hold exclusive possession of a large isolated territory into comparatively recent times, while the higher form, *Homo heidelbergensis*, lived in Europe, which has nurtured for a very long period the most highly endowed races of the world."⁴⁰ Sollas's strategy to substitute distance in space for distance in time might be translated into an evolutionary tree structured along the lines of the one represented under B in Appendix B. He conceptualized some of the known fossils as relics of earlier and morphologically similar forms that had their place in the line of human ancestry. In other words, graphically imagining a tree of descent, the fossil hominids were projected from their place at the end of side-branches back to where their branch had left the main stem, thereby referring them back in time. A straight lineage through the known fossils could thus indirectly be upheld, and the earlier concept of a *scala naturae* was again in place.

The Reception of *Ancient Hunters*

Generally speaking, Sollas's first edition of *Ancient Hunters* was a success, and by the end of 1911 he had sold 468 copies in England and 100 in New York.⁴¹ Although Sollas had a number of enemies among his colleagues and thus not without reason feared reviews from certain personae, the reactions were generally favorable.⁴² However, many reviewers felt that Sollas had gone too far in his identification of Paleolithic with modern races. One reviewer, apart from finding fault with the application of the term *Paleolithic* to recent humans cautioned that "[...] how far we may be justified in construing comparison into

⁴⁰ Sollas, 1911, p. 50.

⁴¹ British Library, MS Add 55222, Correspondence with Macmillan and Co., 1909–1934 (hereafter BrL), Sollas to Macmillan, 18.1.1912.

⁴² E.g., Brown, 1912.

identification is a subject that may long remain a matter of controversy.”⁴³ In spite of this, some voices excused Sollas’s approach until many years after the third and last edition had been issued in 1924. In 1955, one commentator defended the use of ‘primitive races’ as living fossils: [...] even granted that the Trobriand Islanders and the rest are not true modern representatives of ancient hunters, how much without them would we know about ‘the social purposes which items of prehistoric gear were designed to subserve.’⁴⁴

The success of the first edition can be measured by the short time within which it had run out of stock, so that Macmillan asked Sollas for a second edition already the year after its first appearance. There had been many new discoveries in France, and Sollas had spent his Easter vacation of 1912 in Paris in the attempt to catch up on the new insights. The renowned French archeologist Henri Breuil (1877–1961) helped him correct the blunders of the first edition and Sollas visited his French friends and colleagues again over Christmas.⁴⁵ Also in the production of the third edition, which as I will discuss in the next section contained significant changes indeed, Sollas was kindly accompanied by the expertise of the French savants, so that Macmillan had to send the proofs to Boule at the Natural History Museum, Botanical Garden, in Paris.⁴⁶ Sollas also visited other leading prehistorians in Paris, as well as in Monaco, Lyons, etc., to make sure that he had all the relevant information.⁴⁷ When the third edition finally appeared in 1924, it was like its predecessors strategically sent to important people and locations, from Basel, Switzerland, to the Museum in Santa Cruz on Tenerife.⁴⁸

Although some reviewers criticized the suggestion of blood lines between Paleolithic and modern races, the main thesis of the book almost immediately gained ground. This was the claim that human evolution should be seen in terms of migrations across the globe which had led to the present distribution of the races and which could explain the distribution of their prehistoric bones and artifacts. In the preface to the first edition of *Ancient Hunters* (1911), Sollas observed that this view, i.e., migration rather than indigenous evolution as the engine of change,

⁴³ Hazzledine Warren, 1912, p. 204; see also Hazzledine Warren, 1916. This is a critique that was again raised against the succeeding editions, e.g. Lowie, 1915, pp. 575–576, MacCurdy, 1915, p. 135, “Ancient Hunters and Their Modern Representatives (Review),” 1925, pp. 630–631, P., 1925.

⁴⁴ Brice, 1955, p. 9.

⁴⁵ BrL, Sollas to Macmillan, 9.5.1912, 19.10.1912. On Breuil see Houghton Brodrick, 1963.

⁴⁶ BrL, Sollas to Macmillan, 5.1.1923.

⁴⁷ BrL, Sollas to Macmillan, 20.1.1924.

⁴⁸ BrL, Sollas to Macmillan, 19.11.1926, 9.11.1933.

was generally regarded as heresy, although a similar approach was taking hold in cultural anthropology. In the preface to the second edition, published in 1915, he claimed that it had already become orthodox.⁴⁹ Sollas here referred to the work of Breuil, who argued that the cultural sequence in Europe should be interpreted in terms of migrations and interactions of peoples rather than being the result of local evolution.⁵⁰ He must also have referred to the work of the Australian-born Grafton Elliot Smith (1871–1937), professor of anatomy successively at the Government School of Medicine in Cairo, Manchester University, and University College London, who had begun to publish on a new model of human cultural evolution as early as himself.⁵¹

Elliot Smith agreed with Sollas that each new Paleolithic culture had been introduced into Europe by the invasion of a new Pleistocene race. He criticized the archeologists who believed in a necessary series of cultural steps that each race had to pass through in linear fashion, which they saw represented in the archeological series of flint industries from the ruder to the more refined and polished. Thus, the fact that the same cultures might be found as far apart as France, South Africa, India, and America had been ascribed to parallel evolution. In contrast, Elliot Smith considered it more likely that either the same people had fashioned the tools at stations of their journeys and/or that they had diffused their knowledge to other peoples and regions. Analogous to Sollas, Elliot Smith seems to have envisioned a kind of epicenter of culture, from where ever new waves of people in possession of the newest technological inventions radiated outwards. The first to reach the peripheries would have retained a culture that was long outdated at the center. So if one had traveled out from the center to the peripheries, one would have met people of Magdalenian, Solutrean, Aurignacian, Mousterian, Acheulean, and Chellean culture in succession. Since some people of an older culture might have lingered and traveled with a more advanced people, it was possible in the end to find different cultures in strata of the same time period as was for example the case in the New World.⁵²

Elliot Smith's theory of cultural diffusionism found its culmination in *Human History* (1929), where he synthesized human prehistory and history to the extent of doing away with the demarcation altogether. He therefore praised Sollas as being essentially the only one who had discussed the entire prehistory and history of the human family in terms of

⁴⁹ Sollas, 1915 (1911).

⁵⁰ Breuil, 1913 (1912); see also Delisle, 2000.

⁵¹ Elliot Smith, 1911.

⁵² Elliot Smith, 1924, pp. 97–108. Chapter two of the essay collection was originally published in the *Proceedings* of the British Academy in 1916.

their migrations and cultures.⁵³ Again, Elliot Smith contradicted the traditional model, according to which cultural innovations had been made several times in different locations due to the unity of the human psyche. He denied the necessity of a linear evolution through the known cultural stages. He argued instead that each cultural innovation had been made only once and subsequently spread to different peoples and regions, in which process it would have been modified.⁵⁴

Already in an essay of 1916, Elliot Smith had repeatedly quoted from Sollas's *Ancient Hunters* to give support to his claim of a paradigmatic shift: 'The issue raised in these quotations [from Sollas] has of late years intruded itself into almost every branch of humanistic study, ethnology and archaeology, sociology and politics, psychology and educational theory. The divergence of opinion between the so-called "historical" [meaning cultural diffusion] and the misnamed "evolutionary" school [meaning multi-linear cultural evolution] is fundamental.'⁵⁵ Evidently, Sollas had been right in 1915 with the claim that his views had become orthodoxy; the times of a linear model of human cultural evolution were coming to an end. The shift not only encompassed humanistic fields of study, however, the times of a linear or "evolutionary" model of human biological evolution were coming to an end, too.

Sollas's Anthropological Maturity: Human Evolution as Trunkless Tree

Sollas's strong ties to the French community of prehistorians, especially to Boule and Breuil, may at least in part explain why he joined the French pioneers in the new approach to archaeology and cultural anthropology, which he introduced into England with the first edition of *Ancient Hunters* (1911). On the other hand, it was not until the third edition of *Ancient Hunters* (1924) that he replaced his unilinear model of human evolution with a branching one. After all, his first publications in anthropology had been in strong support of the linear line of descent from fossil ape via *Pithecanthropus* and Neanderthal to modern humans. Nonetheless, Sollas must have felt the growing resistance to his linear view, since Boule had published his study of the La Chapelle-aux-Saints Neanderthal that led to the expulsion of the species from human

⁵³ Elliot Smith, 1929, p. 98.

⁵⁴ Elliot Smith, 1929. Elliot Smith argued particularly against Edward Tylor's (1832–1917) linear cultural evolutionism (Tylor, 1958 (1871); see also Elliot Smith, 1933, especially Ch. 4, which treats Tylor's works). On these developments in cultural anthropology see Stocking, 1995, pp. 208–220.

⁵⁵ Elliot Smith, 1924, p. 111; originally published in 1916.

ancestry in 1908, even before the first edition of *Ancient Hunters* (1911). In spite of this, the second edition of *Ancient Hunters* (1915), while providing an update on relevant finds of fossil hominids, contained no striking theoretical changes. In fact, Sollas kept quiet on the genealogical relationship between the known fossil hominids and modern humans. In the main, he only added Piltdown to his discussions of *Pithecanthropus* and *Homo heidelbergensis*. He literally simply inserted Piltdown in his concluding remarks on the now three genera, where he explained his indirect linear model in which space may substitute for time, and which I have discussed in detail for the first edition.⁵⁶ He even relegated the reference to a paper by Elliot Smith on *Pithecanthropus* to a footnote, in which *Pithecanthropus* had already been referred to a side-branch of the human family tree. Elliot Smith had argued for its expulsion from the human line on the basis of the relatively modern-looking brain of *Eoanthropus dowsoni*, as the forged remains from Piltdown were formally called.⁵⁷ Most importantly, Sollas still regarded the Neanderthals as a race of *Homo sapiens*, and not as a different species. He also stuck to his interpretation of the Australians as the descendents of some lower Neanderthal tribes.⁵⁸

It was only by the time Sollas was working on the third edition, that he felt he had no other choice than to follow suit: “The Australians are not only a different race [than Neanderthals], they are a different species, and, notwithstanding the many characters which they share in common with the Neanderthals, they can no longer be regarded as directly descended from them.”⁵⁹ Sollas turned the Neanderthal race into a Neanderthal species that had died out in the Pleistocene. Thus, more than 15 years after Boule’s expulsion of Neanderthal from human ancestry, Sollas took on his friend’s interpretation. He reproduced Boule’s brutish reconstruction of the La Chapelle-aux-Saints specimen (Figure 5). In fact, Boule’s visual juxtaposition of his reconstruction of the La Chapelle Neanderthal skeleton with an Australian skeleton was

⁵⁶ Compare Sollas, 1911, pp. 48–50, and Sollas, 1915 (1911), pp. 56–57; compare also Sollas, 1911, p. 168–169, and Sollas, 1915 (1911), p. 204. The only hint at a possible change in outlook was the shift from the phrase “a fresh discovery [*H. heidelbergensis*] was made which adds *another link to the chain of human descent*” (Sollas, 1911, p. 40, my emphasis) to “a fresh discovery was made which adds *another branch to man’s family tree*” (Sollas, 1915 (1911), p. 41, my emphasis). In the context of the entire book, and in view of the fact that Sollas’s model of human evolution was at that point an indirect linear one, along the lines of Model B, Appendix B, this minor change might not be of great significance.

⁵⁷ Elliot Smith, 1914; Sollas, 1915 (1911), p. 38, footnote 2.

⁵⁸ Sollas, 1915 (1911), p. 197.

⁵⁹ Sollas, 1924 (1911), p. 246.

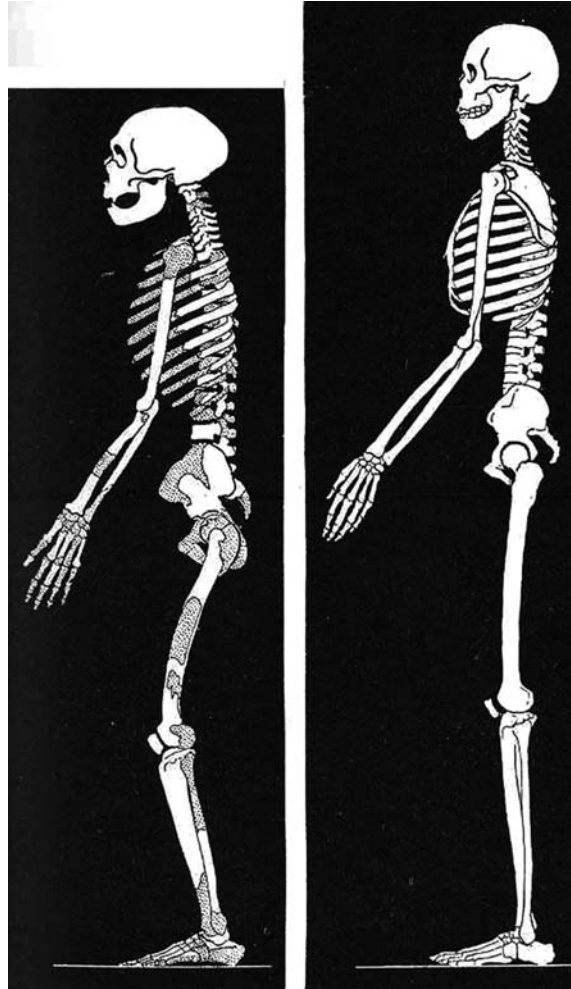


Figure 5. A juxtaposition of the reconstructed La Chapelle-aux-Saints Neanderthal skeleton with that of an Australian. Sollas reproduced the image from Boule's *Fossil Men* (1923 (1921)) (From Sollas, William. 1924 (1911), Figure 117, p. 245). Courtesy of Macmillan.

meant to render immediately apparent that even 'the most primitive human races' were far superior to the apish Neanderthal. Obviously, this message had stood squarely in Sollas's ideas on the Neanderthal–Australian relation.⁶⁰ Even in the third edition, Sollas revealed a certain

⁶⁰ The image indeed does stand squarely in the pages of the second edition, where Sollas still discussed the Neanderthal race as ancestral to Australians (Sollas, 1915 (1911), p.198).

unease about banning Neanderthal to a dead-ending branch by an attempt to cover the move in terminological confusion. Undertaking a travel backwards in time: “He [*Homo sapiens*] disappears as we approach the beginning of the upper Monastirian age [geological time of last glacial epoch], and we encounter in his place another and very different species, *Homo Neandertalensis* [...] But how are we to render the name of this older and extinct species in English? It would seem we have no alternative. We must say ‘Neandertal man.’”⁶¹ Evidently, the designation *Neandertal Man* said nothing about taxonomic status and had been used by Sollas in the previous editions of *Ancient Hunters*.

The most important find that had been made immediately after the publication of the first edition was no doubt *Eoanthropus dowsoni*, which led Elliot Smith and others to adopt a branching model of human evolution. Sollas faced the problem that both Piltdown Man and *Homo heidelbergensis* were not only likely to date from the early Pleistocene but were also from Europe. There was therefore not enough distance between the two in horizontal space to substitute for the lack of distance in vertical space, that is to signify the time necessary to allow an ancestral relationship. Sollas nonetheless tried to avoid contemporaneity by allowing for distance in the vertical dimension as inferred from geological strata: “This period [Chellean], however, was a very long one, so that it does not follow immediately that *Homo Heidelbergensis* and *Eoanthropus* were in existence at precisely the same time.”⁶²

However, in the third edition of *Ancient Hunters* (1924) there was no linear sequence of hominid fossils anymore, and neither *Homo heidelbergensis* nor Piltdown Man were direct ancestors of modern humans. Sollas even felt pressured to give up *Pithecanthropus* as human ancestor, since by then the American paleontologist William King Gregory (1876–1970) had brought his expertise in to argue against it: “The reduction of the hypocone and metacone are a result of degenerative processes in the dentition of the most advanced and presumably later races of man, and their presence at this relatively early period in *Pithecanthropus* tends to remove that genus from the line of ascent leading to later human races.”⁶³ Thus, Sollas conceded grudgingly: “[I]ts [the molar’s] precocious appearance here [great reduction in the posterior moiety] is supposed to exclude *Pithecanthropus* from the direct line of human descent.”⁶⁴

⁶¹ Sollas, 1924 (1911), p. 44.

⁶² Sollas, 1924 (1911), pp. 192–193.

⁶³ Gregory, 1920, p. 690.

⁶⁴ Sollas, 1924 (1911), p. 63. Sollas might therefore be seen as having finally adopted a model along the lines of Model C, Appendix B.

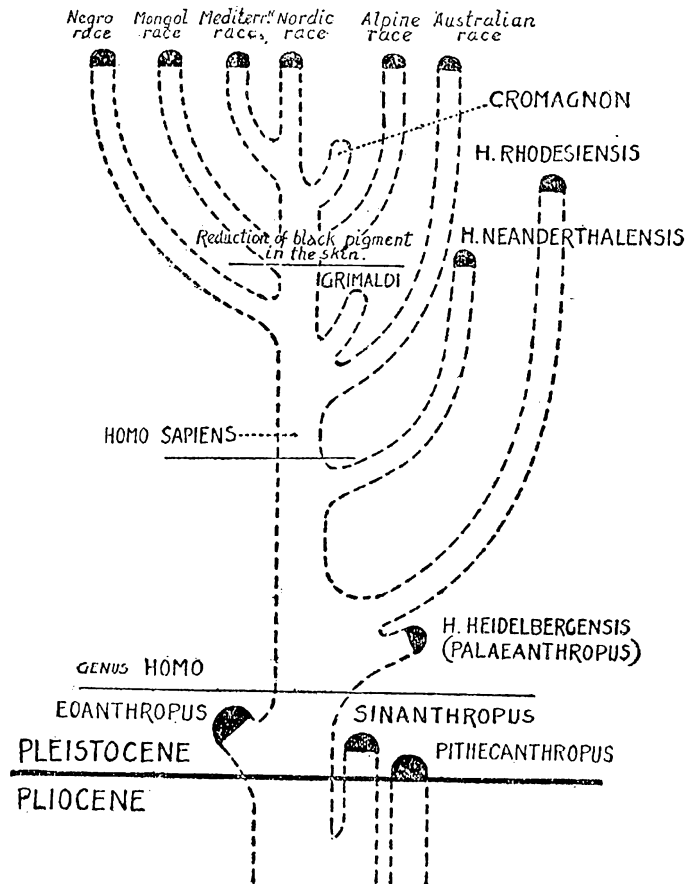


Figure 6. Human family tree by Elliot Smith, on which there is no fossil left to represent a direct ancestor of modern humans. (From Elliot Smith, Grafton. 1929, Figure 16, p. 54).

That Sollas was reluctant to give up the known hominid fossils as piers that once continuously connected the human to the animal world should not obscure the fact that the new views of cultural evolution were nonetheless related to the way morphological evolution was conceptualized. For Elliot Smith, a nonlinear, non-local view of cultural progress went hand in hand with a nonlinear, non-local view of morphological evolution. He therefore considered the “evolutionary” framework also as wrong with regards to Piltown, Heidelberg, Neanderthal, Grimaldi, and Cro-Magnon, all of whom he thought had migrated into Europe from their cradle in Africa, or somewhere between the heart of Africa and the Himalayas, rather than having evolved from each other. In the

process, they had brought along their cultures.⁶⁵ In his phylogenetic trees of 1924 and 1929, all the known hominid fossils were thus delegated to side-branches (Figure 6).

This presents a contrast to Sollas's model, in which the modern human races had their separate origins in Paleolithic races, and where up to the 1920s all non-*sapiens* fossil hominids were arranged in a line of descent. Obviously, Sollas argued for more phylogenetic continuity. He did not combine his cultural catastrophism with a similarly "non-evolutionary" model of morphological change until he felt forced to. Also, Sollas's cultural model did not go as far as that of Elliot Smith, since within the several lines of descent from Paleolithic to modern human races, "evolutionary" progress, rather than progress through replacement or cultural exchange, would have been possible. On the other hand, Sollas's vision of the human Paleolithic was darker than that of Elliot Smith, who believed in a Golden Age of peace and innocence before the invention of large scale agriculture and irrigation in the Nile and Euphrates valleys. In Elliot Smith's view, such human digressions as large-scale warfare had been the result of the corrupting effects of civilization.⁶⁶ For Sollas, to the contrary, the racial violence of prehistory could explain if not render necessary the imperialistic behaviors and nationalistic feelings of the present.

The Moral Authority of Nature and the Instrumentalisation of Racial Conflict

Sollas was not a pure materialist. He believed in some power or mind behind the workings of the world. He saw no contradiction between science and religion, even though most of the time, he kept the two strictly apart.⁶⁷ The glimpses into Sollas's spiritual beliefs are few, one of them being offered by the passages from which it becomes clear that he was not well at ease with a purely stochastic view of human evolution:

Here we are face to face with that mystery of mysteries, the problem of evolution, for which no ingenuity, however great, has yet furnished a solution. Natural selection, that idol of the Victorian era, may accomplish much, but it creates nothing. In matters of inven-

⁶⁵ Elliot Smith, 1924, p. 40; Elliot Smith, 1929, pp. 48, 85.

⁶⁶ Elliot Smith, 1924, p. 131; 1929, Chs. 5–7. On Elliot Smith see also Dart, 1974; Elkin and Macintosh, 1974.

⁶⁷ Communication with Robert Broom (1866–1951), reproduced in Findlay, 1972, p. 47.

tion, discovery, the attainment of skill, we have some experience of the inner nature of the process; it involves the mind, with its powers of observation, reflection, and imagination, and it is accompanied by a sense of effort. When the effort is light and the result appears disproportionately great, we speak of it as inspiration, and this is another mystery. If these experiences within ourselves correspond with a progressive modification of the substance of the brain, then it would seem possible that the fundamental cause in the whole process of evolution is in reality an affair of the mind.⁶⁸

Sollas thus agreed with most of his colleagues that natural selection had destroyed unfit variants in the course of evolution, but that it had not been the source of progress. Progress was seen to depend on an effort of the individual or of the race that would then feed back into the system in a Lamarckian or Spencerian way and survive into the next generation. Far from subscribing to Darwinian randomness, humans were perceived as active shapers of their destiny. A race's stage in the hierarchy of progress was therefore at least partly a result of its own neglect or achievement. Once such a hierarchy had developed in the course of evolution, the supposed disparities in intellect and in the propensity for cultural innovation between the races meant that progress depended on war-like and imperialistic behavior between them. As these behaviors would ensure the prevailing of the fitter, they thereby achieved a legitimized *qua* inevitable status. For Sollas, these notions could thus justify the marginalization and extermination of those races that did not make the best use of their potential and of their land:

What part is to be assigned to justice in the government of human affairs? So far as the facts are clear they teach in no equivocal terms that there is no right which is not founded on might. Justice belongs to the strong, and has been meted out to each race according to its strength; each has received as much justice as it deserved. What perhaps is most impressive in each of the cases we have discussed is this, that the dispossession by a new-comer of a race already in occupation of the soil has marked an upward step in the intellectual progress of mankind. It is not priority of occupation, but the power to utilise, which establishes a claim to the land. Hence it is a duty which every race owes to itself, and to the human family as well, to cultivate by every possible means its own strength: directly it falls behind in the regard it pays to this duty, whether in art or science, in breeding or organisation for self-de-

⁶⁸ Sollas, 1911, p. 405–406.

fence, it incurs a penalty which Natural Selection, the stern but beneficent tyrant of the organic world, will assuredly exact, and that speedily, to the full.⁶⁹

Sollas made clear that it was the responsibility of the race and its members to develop their potential to the fullest, whether through cultural inventiveness, militarism, or breeding. If societies did not live up to this, a more thriving race would take over, which in this case would mean only the fulfillment of natural selection. This credo could with one blow make prehistory, history, and the present continuous, naturalize imperialism and for some also war, and provide arguments for the stronger institutionalization and implementation of anthropology and its tools of race analysis and improvement.⁷⁰

Sollas's views as expressed in the above quotation make use of an age-old line of justification of imperialism combined with a fear of degeneration, so that a brief look at the immediate context in which it was written may be justified.⁷¹ The wider context of British imperialism and national rivalries in the years leading to WWI pervaded Sollas's life as a scientist. The time he spent as professor of paleontology and mineralogy at Oxford University from 1897 onwards, and into which the bulk of his work in anthropology falls, was marked by an enthusiasm towards the Empire. English gentlemen, among them many Oxonians, served in the Indian Civil Service, the Colonial Service, and the Egypt and African Services. They worked as teachers, administrators, and evangelical missionaries throughout the Empire. The Empire brought other opportunities for scientists, such as traveling as naturalists, geologists, or surgeons, and expanded networking with Canadian, South American and Australian colleagues. The British Association for the Advancement of Science frequently met outside Britain, including in its former colonies. There was also ample opportunity to enrich anthropological collections, such as the great skull series collected from all over the world for the Oxford Museum, on which Sollas relied. At Oxford, a one-year diploma course in anthropology for Colonial Office, Indian Civil Service, and Sudan Civil Service probationers was installed. This resulted in a network of exchange of information and specimens that centered in the Pitt Rivers Museum.⁷² Sollas had his own network throughout the Empire, without which his labo-

⁶⁹ Sollas, 1924 (1911), pp. 599–600.

⁷⁰ On the role of racial conflict in theories of human evolution see also Bowler, 1986, pp. 223–237, 1993, pp. 65–73; Stocking, 1994.

⁷¹ Bowler, 1986, pp. 96–98.

⁷² Symonds, 1986, pp. 10–19, Chs. 7–9, 2000.

ratory-based anthropology would hardly have been possible. He was dependent on information and specimens from all corners of the dominions, such as from Robert Broom (1866–1951), who kept him updated on his studies of the native Australians.

However, although science in general and anthropology in particular profited from the Empire and were eager to show their usefulness to the imperial project, there were also less optimistic prospects. The fin-de-siècle saw a loss of the Victorian belief in unlimited progress, and some predicted the degeneration of the white race. The technological progress from the first stone tools to modern industrialized civilizations signified at once the apex of true humanity and the threat of degeneration. If modern western societies were shielded from the effects of natural selection, they might be heading towards a state in which they could no longer compete against ‘primitive races,’ to say nothing of their closest neighbors. Such fears were intensified during the Boer War in South Africa and WWI, when a high number of British young men were found incapable of passing the physical exam that was part of the conscription for war. Many could detect a degenerative tendency even in those British young men who were examined anthropometrically before being sent to war.⁷³

Anthropologists disagreed as to the effect of WWI on the race. In contrast to the imperial project, the war represented a conflict between the master nations or races rather than ‘the simple extermination of an inferior race.’ It was therefore seen as a double-edged sword and anthropologists trying to make sense of the war within their scientific frames of reasoning faced two opposing arguments. On the one hand, the war effort seemed to rob the nation of its most able and evolutionarily fit young men, while the invalid in mind and body remained safe and sound at home and handed their defects on to the next generation. On the other hand, seen positively in an evolutionary sense, those who would survive the war would no doubt have been selected under enormous pressures and thus their fitness would be above average.⁷⁴ Moreover, according to Darwin, competition was predictably most severe between closely related groups of organisms.⁷⁵

Sollas was 65 when WWI broke out and not part of the contribution of Oxford senior geologists that were subjected to an order compelling all officers with a knowledge of geology or mining to be used in underground warfare in France (mining, tunnel building). Nonetheless, his world changed dramatically. Most current undergraduates, many fellows and staff signed up and Sollas lost many friends and colleagues.

⁷³ Bowler, 1989, in particular the epilogue on progress and degeneration.

⁷⁴ See for example Ripley, 1899, pp. 86–89.

⁷⁵ On evolution and war see Vergata, 1994.

They were replaced by soldiers, British and American, transforming Oxford into a military camp. Then there arrived the refugees from Belgium and Serbia, for whom lodgings, a toy factory, a lingerie, and a school were installed. The examination schools were converted into hospitals, and schools for military training and aeronautics were opened. Port Meadow was used as aerodrome and quarters for the Royal Flying Corps were set up. The fact that the lights had to be dimmed due to the fear of air raids added to the war-like atmosphere, and Sollas and his correspondents frequently complained about the depressing situation in which they found themselves.⁷⁶ Communication, publication, and travel were greatly impeded and if something the formation of war parties had tightened the relations between the English and French communities and enlarged the distance to German anthropology, a fact which clearly had its impact on Sollas's work.

Even though one cannot point one's finger at the exact locations at which the experiences of the present entered the ideas about the past, it seems justified to speculate that the emphasis on racial conflict in evolutionary scenarios drew on present-day practices associated with the Empire and WWI. The conception of progress as depending on struggle, combined with the idea of a race as responsible for its place in the hierarchy of types, conjured up a fear of degeneration. In a situation like that on the eve of WWI, when the lands of 'savages' had been occupied by 'civilized races' and 'civilized races' were struggling among themselves for supremacy, it seemed as though the nature and course of human evolution held the key for understanding the present, even if it was in truth the present that explained the past. For Sollas, the establishment of continuity between prehistory and history was a central incentive. The instrumentalisation of racial conflict as the arbiter of a kind of moral authority of nature provided the pessimistic means.

Concluding Remarks

The race succession paradigm, which legitimated imperialism to the extent of war and genocide, grew in a climate of general nationalism and white supremacist ideology. Drawing on earlier syntheses of archaeology with ethnology and borrowing from the new trends in cultural anthropology, Sollas synthesized the interpretation of fossil human races, the

⁷⁶ London University College, MS Add 152, T. B. Bonney Correspondence, 98719, Bonney to Sollas on 24.5.1916 and 21.10.1917. On Oxford University during WWI see Winter, 1994, and Green, 1993, pp. 70–71.

analysis of Paleolithic industries, and studies of the biology and culture of recent races into an imperialist model of human racial evolution. He argued that cultural and biological progress, rather than the result of linear local evolution, had been brought about by the migrations of new races into territories from which they displaced indigenous ‘lower races.’ He found the various Paleolithic races and industries that had successively been driven out of Europe represented by modern races and their cultures at the supposed peripheries of the earth. For the process of identification, similarity in culture suggested biological affinities.

Sollas interpreted for example the Neanderthal race as closely related to the Australian. In the latter he saw a ‘relic of a primitive human type’ that had persisted into recent times at the antipodes so as to become contemporaneous with ‘the most advanced European races.’ This concept is reminiscent of the *scala naturae* principle rather than of a conception of evolution as truly dynamic and diversifying. It also played a crucial role in Sollas’s ideas on the evolution of the human species. I have interpreted Sollas’s notion that some hominid fossils represented relics of a stage of evolution preceding the one to which they were geologically/paleontologically dated – a rather common notion in paleoanthropology at the time – as a last attempt at saving a more linear model of the evolution of the human species. His conception of space in both the horizontal and the vertical dimensions as a measure for time and thus phylogenetic distance allowed him to explain the contemporaneity of different hominid taxa within the linear framework, since relics of lower forms could survive into relatively recent times when marginalized in “forlorn” geographic regions.

To summarize, it seems that Sollas was an early proponent of a model of the biological evolution of the human species structured along the lines of Model A, and changed to an indirect linear model when confronted with the contemporaneity of certain fossils (Model B). By the time of the third and last edition of *Ancient Hunters* (1924), he felt forced by the rapid gain of support in the French and English communities for a branching tree to adopt a truly branching model in which there were no fossils on the line leading to modern humans (Model C).⁷⁷ This does not appear to have been the case for long, however. Sollas’s preference for having some fossils on the human phylogenetic line allowed him to be among the first to welcome the newly discovered australopithecines as significant missing links between ape and man,

⁷⁷ See Appendix B.

rather than as fossil apes.⁷⁸ In 1933, another of his detailed craniological studies of recent and fossil hominids led to the pronouncement that Pilttdown was “a morphological anomaly and a palaeontological anachronism”⁷⁹ – it had never fit into his linear sequence of brain development in hominids, even though it was a perfect illustration of his concept of mosaic evolution.⁸⁰

However, Sollas’s model of human cultural evolution, in which migrations and the replacement of ‘lower’ with ‘higher races’ were the reasons for the cultural progress observed in the archeological record of Europe, in fact corresponded nicely with a more diversified view of the evolution of humans as a species. As we have seen in the case of Elliot Smith, for whom all of the known hominid fossils from Europe represented successive but not ancestral invaders into this region, it could be made to encompass a “non-evolutionary” model of morphological as well as cultural progress beyond the human species. Despite the violent implications this scenario seems to have, Elliot Smith was highly suspicious of such outgrowths of modern societies as slavery and war. He nonetheless distanced non-European races on the basis of their skin pigmentation and thus regarded, for example, the Australian as further away from the European line than the Paleolithic European race of Grimaldi.⁸¹ While it appears that both Sollas and Elliot Smith accounted for the phenomena of imperialism and war in their anthropological treatises, there were thus multiple scenarios for making sense of the present by tracing out the past.

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⁷⁸ Sollas, 1926 (1925).

⁷⁹ Sollas, 1933, p. 394.

⁸⁰ Hammond, 1979, p. 53.

⁸¹ Compare Figure 6.

Appendix A: Archaeological and Geological Series. Reconstructed after the Text of *Ancient Hunters* (1911)

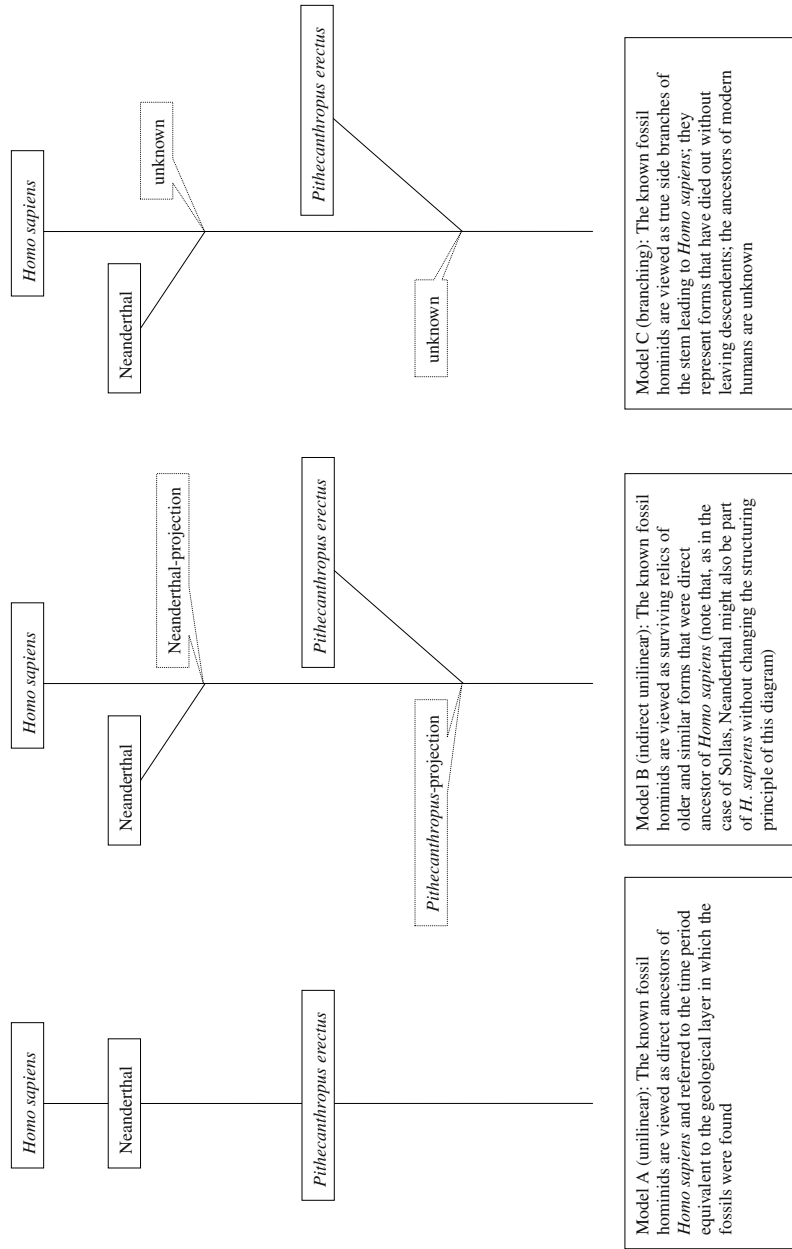
Archaeological series	Culture; distinguishing tool	Climate; distinguishing fauna	Fossil hominids
Historic record			
Neolithic or New Stone Age	Polished stone tools; domestication of plants and animals (agriculture)		
Paleolithic or Old Stone Age (flaked stone tools; hunting and gathering way of life):			
Upper Paleolithic (Age of Reindeer)	Magdalenian; point, harpoon Solutrean; arrow head, leaf point	Cold climate; northern fauna; reindeer, etc. Colder climate; mixed fauna; horse, etc.	Cro-Magnon and Chancelade races of <i>Homo sapiens</i> Ancestors of modern Europeans? and Grimaldi race of <i>H. sapiens</i>
	Aurignacian; chatelperron point, grattoir, gravette point; bone, horn, antler, and ivory begin to be used; appearance of sculpture, painting, and drawing	Warmer climate; mixed fauna; horse, bison, cave lion, cave hyena, <i>Elephas primigenius</i> (mammoth), reindeer	Ancestors of modern Europeans? and Grimaldi race of <i>H. sapiens</i>
Middle Paleolithic	Mousterian; levallois flake	Cold climate; cold fauna; <i>E. primigenius</i>	Neanderthal race
Lower Paleolithic	Acheulian; a boucher of finer workmanship	Colder climate with severe winters; mixed fauna; <i>E. antiquus</i> (elephant) and <i>E. primigenius</i>	<i>H. heidelbergensis?</i>
	Chellean; boucher	Warm climate; southern fauna; <i>E. antiquus</i>	<i>H. heidelbergensis?</i>
	Strepyan; coarse scrapers		No human remains
	Mesvinian; simple flakes as scrapers and rude knives		No human remains

Appendix A: (Continued)

Geological series	Fossil primates
Recent	<i>H. sapiens</i>
Pleistocene or Quaternary, period of Great Ice Age divided into four glacial and four interglacial epochs	Neanderthal
	<i>H. heidelbergensis</i>
	<i>Pithecanthropus erectus</i> (today <i>H. erectus</i>)
Tertiary (Age of Mammals)	Anthropoid apes
	Hominids outside Europe?
	<i>Pithecanthropus erectus</i> (today <i>H. erectus</i>)?
	Primitive anthropoid apes (<i>Dryo- and Pliopithecus</i>)
	Old world and new world monkeys and apes (<i>Propliopithecus</i>)
	Lenuroid primates

The Paleolithic corresponded roughly with the Pleistocene (see above). The Magdalenian and so forth are different stone cultures the succession of which was seen as becoming more elaborate towards the present time. However, they were often also used to designate time periods (i.e. the time of the Neanderthals might be called *the Mousterian*), and even for Palaeolithic races (i.e. *the Mousterians for the Neanderthals*). The time periods in years assigned to geological and archaeological series differed widely. So did the dating of hominid fossils and even the estimate of the first appearance of human-made tools.

Appendix B: Diagrammatic Representation of Different Views of Human Evolution



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