HUMAN TOOLS OF THE EUROPEAN TERTIARY? ARTEFACTS, BRAINS AND MINDS IN EVOLUTIONIST REASONING, 1870–1920

by

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This essay explores evolutionary reasoning and notions of progress at the turn of the twentieth century by focusing on the various interpretations used to understand eoliths. These ‘dawn’ (Greek eos) ‘stones’ (Greek lithos) were contested objects and I focus on three geographic episodes in which they were used to support scientific, and sometimes socially inspired, accounts of human origins. Particular attention is paid to the work of Gabriel de Mortillet (1821–98), James Reid Moir (1879–1944) and Henry Fairfield Osborn (1857–1935).

Keywords: eoliths; mental capacity; fossil hominids; evolutionism; race; stone tools

We tend to think of evolutionism—the belief in a progressive biological, cultural and mental, or even cosmic, development—as a nineteenth-century paradigm. Within anthropology we associate it with the notion of human evolution as following a linear succession of more or less predetermined but certainly upward-moving steps, each of which marks a particular level of development in body, culture and mind. Towards the turn of the twentieth century, this model began to crumble. Not only did progress seem less self-evident, but the very linearity of the evolutionary process was also called into question when the anthropological communities internationally turned towards a view of human evolution as branched, with but one line surviving into the present. A relatively modern human anatomy was expanded much farther back in time, and the then-known hominids seemed too primitive to be direct human ancestors. These ‘dawn-man theories’ may even seem anti-evolutionary, particularly because they project a present state back in time, rather than bringing development to the fore.1 To count as an ‘anatomically modern man’, a human-like brain and, by inference, human-like intelligence was of particular importance, and some anthropologists thought of hominization as having been triggered by encephalization (‘brain-first’ approaches).2

However, in this essay I should like to qualify these points by looking at the important role of so-called Eolithic tool cultures from the late nineteenth century onwards in evolutionary scenarios. The status as artefacts of these ‘tools of Tertiary Europe’ was very

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controversial, and many archaeologists and geologists brought forward arguments against their human workmanship. These included the lack of functionality, the general abundance of what they believed to be geofacts, questions of stratigraphy, and, finally, the unlikelihood of the presence of such early hominids in Europe. Rather than in these specialized debates, I am interested in how ‘eolith believers’ placed the tools in the service of gradual interpretations of human evolution. It is certainly true that the phylogenetic diagrams of the time often did not feature fossils serialized on a long line leading from some anthropoid or simian ancestral stock to modern humans. However, in the minds of anthropologists, these lines were occupied by ancestors that were undiscovered yet inferred from, among other things, progressive steps in tool culture. The ties between stages of anatomy (or ‘race’, mind, behaviour or culture) were not immediately severed by critiques such as the one issued by Franz Boas in his famous manifesto ‘The mind of primitive man’ of 1901. Indeed, well beyond the turn of the twentieth century, the series of tool cultures that were spread through different geological layers were used to support the assumption of a corresponding progress in anatomy and mind.

For many, the foregoing inference seemed to be corroborated, especially if the process of production of one kind of Eolithic tool led through Eolithic types of supposedly earlier cultural stages, and if the younger eoliths could be evolutionarily linked to well-established Palaeolithic cultures. Thus, eolith proponents engaged in the experimental production of Eolithic tools, whereas eolith opponents tried to show how similarly shaped stones could be produced without the least help of human intentionality—most notoriously by a cement-mixing machine! From a less technical perspective, the interpretation of successive stone cultures continued to rely on the comparative method; that is, the arrangement of living ‘primitives’ and archaeological cultures in ladders of progress. Similarly, the development of an individual human being from boy to old man retained its power as an analogical and narrative device to frame the story of ascent, and increasingly also of a present, or at least imminent, decline. Finally, the series of tools that was displayed to the scientific observer, and arranged for the lay museum visitor—even if rarely done in purely typological fashion as advocated by Pitt-Rivers—had not lost its persuasive strength at the outset of the new century.

In general, the grand narratives were far from disappearing. The early decades of the twentieth century witnessed a wave of publications on the history of humankind understood as a development from our evolutionary origins into recent epochs. Within these grand schemata, the fates of individual ‘races’ and nations were played out and were reconstructed on the basis of what were now often seen as national Palaeolithic, and supposedly Eolithic, monuments. These stories were also increasingly put on display in museums. Notably, the highpoint in the success of European Eolithic tools as evidence for Tertiary hominids of relatively modern anatomy and mental capacity occurred when the President of the American Museum of Natural History, Henry Fairfield Osborn, ordered a series of such stone tools from an English amateur archaeologist by the name of James Reid Moir in 1921. Osborn wanted the people of New York City to learn about the latest wisdom from his pet science. Like the British Museum, the great American museum should hold the proof of the earliest tool-workmanship, especially the rough implements found in presumably Tertiary deposits in Great Britain. These supposed tools were to set the stage for instruction in the progress of technology and culture from the dawn of man in the Tertiary period to the civilized humans of the current metropolis.
Osborn’s thinking about human evolution—even though he turned towards a ‘Dawn Man model’—the eoliths served as a basis for speculation about the early evolution of manual dexterity. In the absence of the fossil remains of Dawn Man, the ‘dawn tools’ could provide insights into the mind of their shaper.

Before looking at this American situation, however, we need to find out how the eoliths became implicated in some of the foregoing issues discussed above by following the archaeological traces of ‘Tertiary Man’ in Europe, and by explaining the French, British and American narratives of human, ‘racial’ or national (pre)history that framed them. In doing so, I will mainly limit my discussion to a few important eolith personalities: Gabriel de Mortillet in France, James Reid Moir in Great Britain, and Osborn in the USA.

**Eoliths in France: A Grand Exposition of Universal Progress**

At the 1859 meeting of the British Association for the Advancement of Science in Aberdeen, and after decades of struggle, the scientific establishment reached a consensus and accepted a great antiquity for humanity. Once the conservative Biblical timeframe for the age of humankind had been rejected, vast spaces of time seemed to open up for investigation. In France, the second half of the century witnessed the controversy surrounding the eoliths, supposedly human-made flint tools from Tertiary deposits. Gabriel de Mortillet (1821–98) of the École d’Anthropologie in Paris was the most prominent supporter of the dawn tools and the creator of the term *Éolithique*, the ‘Dawn Stone Age’, which for him referred to the Tertiary period. By the time he integrated the supposedly Eolithic stone tool cultures into his archaeological series, de Mortillet had already developed a framework of universal progress. This becomes evident in the prehistoric section that he organized for the 1867 Universal Exhibition in Paris. The exhibits on the history of industry (*l’histoire du travail*) were arranged chronologically and according to nation. On the subject of prehistory, the visitors were presented with artefacts from the Palaeolithic, Neolithic, Celtic, Gaul and Gallo-Roman periods. In the visitor’s guide, de Mortillet included other galleries on the colonies of France and of other European nations that displayed the material cultures of ‘savages’. He believed that these threw light on the subject and he emphasized that the exhibits were meant to acquaint the visitor with the laws of human evolution (which were also linked to the law of human progress), the law of similar developments in all human races, and the great antiquity of humankind. This universal progress referred to the evolution of industries and to the parallel evolution of the human mind.  

To arrive at classifications of Palaeolithic artefacts, late-nineteenth-century prehistoric archaeologists analysed museum and private collections and often visited the sites. De Mortillet was in a particularly favourable position in this respect because he worked with large collections of prehistoric artefacts during the Universal Exhibition and he had helped to organize the Musée des Antiquités Nationales in Saint-Germain-en-Laye. He established a classification system that partly remains in use today. He subdivided the Palaeolithic period into the following cultures named after French cave sites: (1) the Chellean (also Acheulean), the oldest Palaeolithic culture, consisting of tools made by chipping off small flakes to put a sharp edge on the original core of the flint; (2) the Mousterian, referring to tools made from the flakes rather than the core; (3) the Solutrean, showing beautifully shaped blades of chipped stone; and (4) the Magdalenian, the last
Palaeolithic culture, corresponding to Edouard Lartet’s Reindeer Period and being characterized by a sophisticated artistry in bone. In *Le Préhistorique; Antiquité de l’homme* (1883), de Mortillet described this method as a conscious import from geological practices into Palaeolithic archaeology: ‘Following an excellent method applied in geology,—one is not to forget that paleoethnology is directly derived from geology,—I have given each period the name of a very typical site.’ Thus, the geological series literally became the series of cultural stages. The designation ‘paleoethnology’ for the new science had been introduced as an alternative to the somewhat clumsy ‘prehistoric archaeology’ at the foundation meeting of the International Congress of Anthropology and Prehistoric Archaeology (La Spezia, 1865). Thus, ‘paleoethnology’ was understood in a very broad sense as the study of human origins and evolution antedating written documents, but it also seemed to do justice to the wide use of the comparative method. As de Mortillet repeatedly insisted, great similarity could be found between contemporary savage and prehistoric primitive cultures.

In *Le Préhistorique*, de Mortillet presented his grand view of human evolution. More specifically, he incorporated eoliths into this vision of cultural and morphological progress, which he assumed had taken place in Europe. The book provided an overview of the supposed European Stone Age periods. To this purpose, not only did de Mortillet describe the human industries and their distribution from the *Éolitique* to the *Néolithique*, but he also gave an account of the geology, fauna, flora and anthropology (that is, of possible fossil human remains) for each epoch. Lacking fossil evidence of hominids that could have fashioned the coarse Eolithic stone tools, de Mortillet invented a connection between the highest anthropoid ape and the lowest savage. This missing link was *Anthropopithecus*, later called *Homosimius*. He created different species of *Homosimius* and named them after the three people who claimed to have discovered major eoliths cultures in Europe: *bourgeoisii* after the Abbé Louis Bourgeois, who found Oligocene eoliths in Thénay, southern France, in 1867; *ribeiroi* after Carlo Ribeiro, who discovered Upper Miocene eoliths near Madrid in 1871; and *ramesii* after J. B. Rames, who also claimed to have unearthed Upper Miocene tools at Puy Courny, near Aurillac, France, in 1877. De Mortillet suggested that the eolith shapers had evolved into Neanderthals and then eventually into Cro-Magnons in a morphological progression that mirrored developments in material culture. Following this line of reason, he allowed for only one invasion into Europe: the immigration of the Neolithic agriculturalists from the East. These immigrants had brought with them the seeds of religion and had diluted the autochthonous Cro-Magnons to the degree found in the morphology of the recent European population. For de Mortillet, this invasion had a negative connotation for his own times. As a staunch opponent of established religion, he perceived the religious mind as an anti-progressive force.

In general, de Mortillet’s political views were strongly interwoven with his grand scenario of a linear human evolution from *Homosimius* via Neanderthal to modern humans. On the basis of the universal law of biological, cultural and mental progress, palaeoanthropology became a political weapon for radical and socialist aims. Striving for progress in a humanist sense, de Mortillet reasoned that the political left would eventually prevail by necessity. He predicted an inevitable succession from the reign of the nobility, to the reign of the bourgeoisie, and, finally, to the reign of the socialists. But this was not how it turned out. On the contrary, the data from various emerging disciplines led to several competing prehistoric frameworks. The understanding of progress as the relatively
exclusive result of repeated prehistoric and historic migrations and replacements of physically, culturally and mentally deficient species by more advanced ‘races’ presented an alternative to the model of local evolutionism à la de Mortillet. Obviously, this did not mean the end of progress, but simply a different mechanism for it. At the same time, the linear hominid genealogy was increasingly abandoned as more fossils were discovered. This meant that the straight line of progress was being replaced with a branching model.\(^{16}\) Despite these transformations, eolith proponents persisted in their attempts to integrate Tertiary tool cultures into established archaeological series. They also continued to link such cultures to hominid remains, to use comparative methods of interpretation, and to mobilize various objects for political causes.

### Eoliths in Great Britain: Production of a Series and Serial Production

The cause of the Tertiary tools was taken up in Great Britain just as the question of eoliths seemed to fade in France. Two key players in this initiative were James Reid Moir, an Ipswich archaeologist, and Ray Lankester, the former Oxford zoologist and director of the British Museum of Natural History (1898–1907).\(^{17}\) During the initial decades of the twentieth century, Reid Moir and Lankester discovered and described eoliths from the Crag strata, a geological formation located below Upper Pliocene marine deposits covering a considerable part of East Anglia. Lankester classified the eoliths into scrapers, hammer-stones, picks, massive implements of several shapes, and small borers. He named the most common tool ‘rostro-carinate’, referring to its boat-like shape. He imagined that the rostro-carinates had been used in the cleaning and dressing of skins, or in the picking and breaking open of wood, bone, soil and ice. He referred to the shapers of the rostro-carinate eoliths as ‘Icenian’, that is, a term taken from the Roman name for the people who lived in the area where the tools were found. Like the term ‘Mousterians’ (the French term used for Neanderthals), this kind of naming practice carried cultural connotations. In this case there were strong connections between race and culture. With the use of rostro-carinates, Lankester linked various East Anglian sites, as well as English eoliths, to other sites in mainland Europe. Although the English eoliths were of late Pliocene age, an examination of the collection from Puy Courney, near Aurignac (Auvergne), in which Lankester recognized three rostro-carinates, suggested to him the possibility that the Icenians had already existed in the Upper Miocene.\(^{18}\)

Like Lankester, Reid Moir integrated the eoliths into the established archaeological succession of industries. He classified the Suffolk eoliths into five groups according to patination (colour from blue to white), type (eoliths, rostro-carinates, hand-axes, scrapers, choppers, Aurignac-likes, cleavers, burins), technique (thickness, angle of edge-flaking) and condition (rolled, unrolled, striated). He claimed that these represented a succession of industrial phases that occurred at different epochs before the laying down of the Suffolk Bone Bed. At the lower end of his scale he connected the Suffolk eoliths to the Upper Miocene deposits of France and even to the supposedly older eolith beds in Belgium. Regarding the upper end, Reid Moir believed that the rostro-carinates had evolved into the Chellean pointed type and later Acheulean implements, yielding a succession of cultures from the pre-Crag eoliths to the palaeoliths. But Reid Moir also recognized evolutionary development in the process of manufacture within one culture, so that a partly finished Acheulean hand-axe was of the rostro-carinate form. This discovery
of what was perceived to be a workshop containing different stages of the tool-shaping process convinced the great French archaeologist Henry Breuil of the human workmanship of these tools, leading to an increase in eolith adherents in Europe and the USA during the 1920s.19

Aware that he needed the bones of Tertiary Man to prove the human origin of his eoliths once and for all, Reid Moir was not content with the introduction of fossil-less taxa, but set out to find the remains of an eolith maker. As early as October 1911, he thought his wish had come true when a partial human skeleton was found beneath the Chalky Boulder Clay near Ipswich. Reid Moir sent the bones to no less an authority than the anatomist Arthur Keith, conservator of the Museum of the Royal College of Surgeons. Although Keith found that the bones were of a modern anatomy, unfossilized and still containing a comparatively high percentage of organic matter, he concurred with Reid Moir’s ascription of the skeleton to the Pliocene.20 The anatomical features fitted into the growing belief that hominids of a relatively modern body existed much earlier than so far suspected. However, Keith and Reid Moir’s views on the close relationship between the Ipswich Man and eoliths soon received competition. This came in the form of a most spectacular discovery made in a late Pliocene (or early Pleistocene) deposit at Piltdown, Sussex, in 1911 and 1912. Piltdown Man, as the discovery was called, was eventually shown to be a forgery, but it took decades to expose the bones as that of a modern human skull and an orang-utan jaw.21

Piltdown Man was named *Eoanthropus dawsoni*, with the prefix ‘eo’ coming from the same Greek word (*eos*) as the ‘eo’ in eoliths. This was therefore a possible ‘Dawn Man’ who had made the ‘dawn’ tools. This being so, Lankester described a flint found within 10 yards of the jaw of *Eoanthropus*. He classified the specimen (‘the Piltdown batiform’) as a transition from rostro-carinates to the Mousterian type of tool generally associated with the Neanderthals. However, Lankester did not think that a hominid with the cranial anatomy of *Eoanthropus* could have fashioned the tool: ‘To me it seems improbable that Eoanthropus had anything to do with flint implements at all, though more likely that he suffered from them rather than that he benefited by their use.’22 In contrast, with regard to the Piltdown eoliths, H. P. Blackmore remarked, ‘There is no doubt, in my mind, that these forms are due to human agency, probably a Piltdown race who lived in the Norfolk district during the pre-Crag [that is, Pliocene] period’ (he distinguished the hacked eoliths from the chipped palaeoliths on the one hand and the flaked neoliths on the other).23

Once the ‘tool status’ of eoliths gained in general acceptance—especially through the at least partial agreement of the French experts—speculations about their shapers intensified. Some, like the geologist-anthropologist William Sollas, reasoned that the Tertiary cultures (which he compared to the material culture of the Tasmanians) could have been created by hominids similar to *Pithecanthropus erectus* (today’s *Homo erectus*, found by Eugene Dubois at the end of the nineteenth century at Trinil in Java). Employing estimates used to interpret the refinement of the Tertiary tools, researchers imagined their makers as more or less big-brained. However, as sources of inference about body and mind, the tools also allowed assumptions about the manual dexterity of early hominids:

The foregoing conclusions, should they be sustained by future inquiry, make us acquainted with the existence in Late Miocene and Middle Pliocene times of an Hominid possessing considerable intelligence, whose hands, preserved or liberated from special functions, were perfected as a universal instrument. . . . Possibly such a being was not far removed from Pithecanthropus.24
The story of eolith makers continued into the 1920s, especially when another
*Homo erectus* skeleton was unearthed near Beijing (formerly Peking) in 1927. The species was named *Sinanthropus pekinensis* and was found in the Pliocene–Pleistocene barrier. On the basis of this location, Reid Moir considered it to be too primitive to have fashioned Pleistocene tools. However, although no tools had been found with *Sinanthropus*, he thought it likely that the creature had fashioned something in line with the most primitive eoliths. Although *Sinanthropus, Pithecanthropus* or Piltdown-like races were proposed as having inhabited Pliocene England, ‘Ipswich Man’ never gained general acceptance as of significant antiquity. In fact, in 1916, Reid Moir retreated from the claim that Ipswich Man could be linked with the Tertiary age, thereby eliminating the skeletal evidence of a possible maker of the Suffolk eoliths. In his book *The antiquity of man in East Anglia* (1927), he linked succeeding archaeological cultures to extant fossil hominids. This move de- emphasized the evidence for Tertiary races in East Anglia as well. Reid Moir’s book also associated supposedly Tertiary tool cultures with a particular scenario of human evolution. He proposed a straight line of progress:

So far as actual evidence of man’s former presence goes, we have in East Anglia, as those who have read these pages will, I think, agree, a wonderfully complete record of nearly every stage in human progress from the earliest and most primitive flint implements, to the advanced types made at the close of the Stone Age. Thus, it is possible, that what is now England was the home of the earliest men, and there can be little doubt that if a tithe of the money spent upon researches in other parts of the world were expended upon archaeological work in Eastern England, still further and more important discoveries, bearing upon the question of man’s origin, would be made.

The progressive series of archaeological cultures through geological layers intimated the existence of a series of ‘races’ that must have gradually improved in anatomy (that is, become more modern). That such a success story had taken place on the soil of his home country made the discipline of English archaeology seem a patriotic duty. However, such interpretations of local series were contested. In fact, it was especially this aspect that had been strongly opposed by eolith sceptics such as the famous French palaeontologist Marcellin Boule. As a result of their migratory model of human evolution, opponents had no problem in accounting for the sudden appearance of a relatively sophisticated culture in Europe, the Chellean, without any precedent. They had no need of eoliths and derived forms. In his ‘L’origine des éolithes’, Boule made this very clear:

With regards to this question... great consideration must be given to a phenomenon that has played an important role in the history and development of all groups of fossil beings, the phenomenon of migrations. Nothing proves that the evolution of the human species or the human genus, as you like, has taken place locally. In contrast, Arthur Keith, who eventually became Reid Moir’s collaborator, held that the search for the remains of modern Englishmen in Pliocene deposits was embedded in the idea that each modern human race had evolved a long time ago in the area where it was now found. To Keith, the eoliths postulated in mainland Europe made it plausible that human antiquity in Europe had to be expanded even to the Miocene or Oligocene, to 2 million years or more, according to his timescale. The different Eolithic cultures also suggested something about their shapers, so that the English artefacts allowed inferences about ‘the hands and brain of Pliocene man’. Keith expected the average brain size of
this Pliocene tool-maker to have been at least 1000 ml, a size reached by _Eoanthropus dawsoni_ and _Homo sapiens_ but not _Pithecanthropus erectus_ (today’s _Homo erectus_). This had consequences for possible models of human evolution. It suggested that there were very old species with brains at least as large as those of contemporary humans. More primitive remains such as _Pithecanthropus_ thus came to be seen as relics of earlier types of hominin that had survived into comparatively recent times in peripheral regions of the Earth, where even now more primitive forms of modern man, such as the native Australians, seemed to exist. This model effectively expelled Neanderthals from human ancestry. Joining forces, Keith and Reid Moir argued that, in England, the Mousterian culture had been fashioned not by Neanderthals but by a modern human type that had already mastered the art of pottery. One may speculate that they envisaged such pre-dawn humans to have eventually evolved into anatomically modern ‘Englishmen’, thereby leaving behind the Suffolk eoliths and all succeeding industries and bypassing _Homo neanderthalensis_, this being a form more primitive in morphology and culture that never reached England.

Although the evolutionary scenarios that emphasized migration often drew direct parallels to historical and contemporary processes of imperialism, Keith might well have been motivated by a desire to distance the ‘European races’ from non-European ones and, ultimately, the English from the rest of the inhabitants of Europe. He did this by providing them with long parallel evolutionary lines. During World War I, Keith began to develop the theory that human evolution had been driven by racial conflict, going so far as to suggest that current nations were in a race-formation process. In a similar vein, Lankester seems to have envisaged the shapers of the eoliths as being related to the Nordic master race. In his 1912 paper he speculated that the Tertiary tools of Suffolk and Kent were made at a time when England was still connected to Scandinavia by a land bridge. The Pliocene races might thus have reached England from the very north of the European continent. Even so, the idea of a Tertiary toolmaker in England flattered British national pride: ‘There is, perhaps, no other part of the world richer in remains of our remote ancestors than that of Suffolk and Norfolk.'

**EOLITHS IN THE USA: A PROGRESS FREE FROM APISH STAIN**

When the eoliths began to travel to America, the palaeontologist and President of the American Museum of Natural History, Henry Fairfield Osborn, became so enthralled that he supported Reid Moir’s research financially. This move coincided with the summit of the tendency of thinking of modern human anatomy in terms of a great antiquity. However, this did not come without cultural resistance. In the USA, evolutionary theories were attacked by William Jennings Bryan and by an upsurge of like-minded religious fundamentalists. The bulk of the spite was directed at the ‘ape theory’ of human origins. Much has been made of how Osborn fitted into this context and how he used his Dawn Man theory both as a strategy to soften religious protest and as a tool to gratify his own desire for the compatibility of religion and evolution. In other words, it was for religious and political reasons that Osborn freed human ancestry from the stain of the ape and the primitive. However, when approached in the light of the previous sections of this essay, it becomes clear that Osborn’s extreme Dawn Man theory was the apotheosis of preceding international tendencies rather than an altogether local and idiosyncratic
phenomenon. It was, moreover, in line with a group of theories that located the origin of the hominid branch in Eocene lemuroids or tarsioids. The specific American religious context certainly is important for an understanding of Osborn’s evolutionary views, but there are also scientific developments that need to be taken into account. For instance, Osborn did not immediately embrace the English eoliths and the Piltdown fossils. In fact, he did not change his mind on either of these points until the early 1920s. In *Men of the Old Stone Age* (1915), he included only a quick note on the tools found in Europe that were claimed to be of Tertiary age, indicating that he shared the doubts of many leading archaeologists. Nor could the Piltdown finds of 1911 change his sceptical attitude towards Tertiary Man in Europe. He followed the American anatomist Gerrit Smith Miller in his calling into question the association of the modern human braincase and the ape-like jaw.

By the time Osborn changed his mind on the supposedly Tertiary European bones and tools, several developments had converged. He had become aware of a quasi-modern horse in the Pliocene, a find that, because Osborn liked to draw inferences from the evolution of the horses, alerted him to the possibility of a modern human anatomy of greater antiquity. Furthermore, in 1917, bone fragments of a second Piltdown Man had been discovered that swayed general opinion in favour of acceptance. Osborn went to examine the Piltdown specimens in the British Museum in 1921. In the summer of the same year, he visited sites in East Anglia and Suffolk. Flints from Foxhall finally did their part in convincing him of the existence of Tertiary humans, ‘[men] of sufficient intelligence to fashion flints and to build a fire, before the close of Pliocene time’. On his return to New York, Osborn made this conviction public in the journal *Natural History*. Soon thereafter, the two great French archaeologists Breuil and Louis Capitan offered similar views. From this point forwards, acceptance grew and the East Anglian tools found their way into the exhibits at the British Museum and into the Hall of the Age of Man and the Archaeological Hall at the American Museum of Natural History. Osborn eventually published newspaper articles to create a stir among those who still clung ‘fondly to the ape ancestry theory’.

After his trip to England, Osborn considered it possible that the East Anglian Tertiary Man was represented by the human remains from Piltdown, a conjecture he impressed upon Reid Moir. But Osborn was particularly intrigued by the story of the Foxhall jaw. He set his wife on the trail of the mystery. It was certainly a romance to Osborn’s liking, because the jaw that originated from a find by a common physician went through the hands of the most prominent geologists and anatomists in France and Britain (including Richard Owen and Thomas Henry Huxley). Most of all, the mysterious jaw, which also had a prominent chin, was seen as possibly being the remains of the maker of the Foxhall eoliths. In other words, it was of a more modern anatomy than the Piltdown fossils.

However, at about the time that Osborn helped to turn the East Anglian eoliths sites into national monuments of the most famous spots in the early history of Great Britain, he also produced ‘evidence’ for the first anthropoid primate in America. He argued that *Hesperopithecus*, the Pliocene western ape from Nebraska, was documented by a tooth and fossil bone implements. He considered the tooth to be more human than anthropoid and he cautioned against attributing it to an ancestor of the living apes. His British colleague, Grafton Elliot Smith, however, welcomed the remains as those of a human ancestor. In an article in the *Illustrated London News*, the artist Amédée Forestier visualized the creature as much more human than anthropoid. Following Smith’s estimate
that *Hesperopithecus* might be a predecessor of *Pithecanthropus*, Forestier took the latter as a model.⁴⁴ Although Osborn was rather upset by this daring claim (and its visualization), he also included *Hesperopithecus* as a side branch on the hominid tree in his 1927 diagram and he suggested that the tools intimated ‘a middle-Pliocene bone-tool age in America’.⁴⁵

When Osborn expelled the ancestors of the great apes from the hominid line, there was a long branch leading to modern humans without any fossils to occupy it. However, this did not amount to the suggestion, sometimes made, that there had been no evolution.⁴⁶ There was no a priori ‘creationist’ motivation in this move. As we have seen, anthropologists searched for such fossils and used non-ancestral hominids as models for ancestral ones of a more distant age. Most importantly, the eoliths and their evolution were the strongest, if not precariously, ‘evidence’ for Dawn Man and his ascent. The fact that progressive change was at the centre of concern is also demonstrated in the continuing role of analogies from human development and so-called savage minds and cultures. Such use of analogies characterized Reid Moir’s reasoning, who perceived human evolutionary history as a steady progress in mind, body and behaviour, with some human groups having lingered behind and still showing the superstitions that he associated with children. Even among what he perceived as the most advanced white races, regressions could be found here and there (a point evinced in the contemporary spiritualist movement). The fact that, in his diatribe against this kind of mental regression, Reid Moir used the notion of an evolution towards a ‘saner mind’ also suggests a role of the insane in these correlations.⁴⁷

The missing link between the stages of anatomical and behavioural–mental evolution in human (evolutionary) history was technology. In Osborn’s view, progress had proceeded from an age of wood, to an age of wood and bone, to the age of flint and then of metal:

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\text{During this enormously long period, which we must now reckon in millions of years, tool-designing and tool-making, the adaptation of tools to certain purposes and needs of life, the use of these tools in offense and defence, in the chase, and in the preparation of food and of clothing laid the foundations of the intelligence of mankind.}^{48}
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So, for Osborn, it was the creativity and manual dexterity associated with the perfecting of tools and their fitting to certain functions that pushed the evolution of human intelligence. With the Eolithic tools, the story of human evolution therefore needed to be rewritten. Most of all, there seemed to have been many more acts in the drama of human ascent:

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\text{The Age of Man, or the Pleistocene, can no longer be regarded as Act I of the prehistoric human drama, but rather as the final act, because at the very beginning of the Pleistocene we find the human race well-established and widely distributed over the earth. Act I of the Age of Man is during Tertiary time in what may be known as the ‘Dawn Man’ stage and the ‘pro-human’ stage.}^{49}
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Osborn’s extreme version of the Dawn Man theory was an extrapolation from the kind of curious and alert mind that must be inferred from the capacity needed to make, use and improve tools. It was the tool-creating mind that seemed to distance the Hominidae so clearly from the sluggish, tool-less Simiidae.⁵⁰ Similarly, the psychology of the different hominid races could be inferred from their brain morphology and from the kinds of tool they left behind. The Neanderthal races were all characterized by low, retreating foreheads, with a corresponding low, broad type of brain, especially with low forebrains (in contrast with the relatively high forebrain of the Piltdown specimen and of living
humans). For Osborn, this inferior brain was mirrored in a series of tool cultures that lacked great innovations and in the fact that the hand-axe could be traced over a long period:

The psychology of this race is further revealed by the prevailing type of flint implement, of offense and defense, of the chase and in the preparation of food. The first of these great Neanderthal flint types is found in the Cromer [i.e. Eolithic] deposits in East Anglia—tremendous flint implements used largely in combat. Over an enormously prolonged period these implements passed through Cromerian [still Eolithic], pre-Chellean, Chellean, Acheulean and, finally, Mousterian stages, wherein they begin to show decadence and loss of virility, together with invasion of other types of implements.51

Note that Osborn here tells an entire story of evolution—a ‘drama’, to use his own term—on the basis of archaeological cultures. The tools and weapons that the Neanderthaloids left behind from the Tertiary into the Pleistocene reveal a fate of relative cultural stagnation that even ended in decline. This ‘decadence’ and ‘decline of virility’ seem to be associated in Osborn’s mind with the mixing with other ‘races’, signified by the ‘invasion of other types of flints’. Here again, then, cultures stand in for ‘races’, and the fortune of cultural lines can be translated into the faring of hominid types. Furthermore, Osborn describes these developments in ontological terms that seem to suggest a certain predetermination.

There is yet a link missing, however, because as becomes clear from the quotations above, the development of tools strongly depends on the needs of the hominids; in other words, there were demands made by the environment that any given culture had to answer. The environment of the Neanderthal race, for example, had been marked by fertile lands, river soils and abundant forests that sustained plentiful game: ‘there was relatively little struggle for existence, hence there was little incentive to the development of a diversified flint industry. Superior intelligence was not demanded.’52 The Neanderthals were eventually replaced by invading higher races that had acquired their superior culture and intelligence under entirely different conditions of life. On the high central plateau region of Asia, the struggle for existence had been much more severe and greater demands were made on ‘the native wit of man to overcome natural difficulties by invention and resourcefulness.’53 Osborn placed the race of the Cro-Magnons at the summit of this process of positive feedback loops that alternated between a demanding environment, the innovation of tools to cope with it, and the steady increase in brain capacity. He placed them there because their spectacular diversity and the richness of their material culture and art required enormous stretches of time. Neither the known Neanderthal fossils nor the Piltdown race from Pliocene times could be on the line of progress to the Cro-Magnons, or to living humans. Osborn here read not only the mixing of types but also entire genealogies—or the lack thereof—from the patterns of tools and cultures.

Furthermore, the persistence in Osborn’s feedback model of the analogy from non-European cultures and from human ontology may be illustrated with his interpretation of the *Pithecanthropus erectus* remains. Osborn referred to the hominid as ‘a case of arrested development’,54 as an atavistic pre-Dawn Man: ‘Pithecanthropus is another instance of the survival of a very primitive type of mammal in a primitive forested environment where food was plenty, there was little need of clothing, and safety was assured by concealment or flight rather than by combat with weapons.’55 For Osborn, as for his European colleagues, this phenomenon had its equivalent in the distribution of modern racial types across the globe: ‘This survival of a primitive type of man shut off from competition with
more vigorous types is by no means a unique occurrence, because we still find many very primitive types of humanity living in remote and isolated parts of the earth, such as the Tasmanian natives. As long as such inferior types are shut off they may fare well; it is with the ‘invasion’ of a superior type—be it the Cro-Magnons into the Neanderthals’ Europe, or the modern British into the Aborigines’ Australia—that signals their extinction.

The analogy could be taken one step further: as the savage mind was associated with the child-like, the irrational, the prehistoric hominid must have been similarly mentally disposed. When William Diller Matthew introduced the pithecanthropi to the American public in Natural History, Osborn’s curator of vertebrate palaeontology (who left for the University of California, Berkeley, in the year of that publication) invented a seemingly anecdotal account about a day in the life of the hominid. In Matthew’s vision, the pithecanthropi had a rude language, an immense curiosity and restlessly inquisitive minds. These traits led him to describe groups of pithecanthropi as ‘small boys’. He linked this childlike nature to the use of tools, and to the possibility that the ‘ape-men’ used sticks and stones to torture and hunt other animals. These traits, however, also led him to describe a mischievous incident in which a gang of Pithecanthropus boys were eaten by a crocodile: ‘The pool henceforth is a haunted spot, a place of horror, to be avoided in the future by all the tribe and their descendants until its evil genius can be propitiated by gifts from the wise old patriarch of the clan.57 Thus, in addition to linking the minds of pithecanthropi with the minds of children, Matthew associated the collective mind of the prehistoric horde with the collective mind of the twentieth-century ‘savage tribe’; that is, one structured along a belief in magic.

For Osborn, where the mind of prehistoric man was concerned, tools were the best indicators. They allowed insight into his psychology—insight superior to that from anatomy, even if there had been more than vicarious evidence:

In the first place, over an incredibly long period of time the Dawn Men have been tool-makers, of high adaptability and wonderful technique. We have then a biped, a being with a hand capable of grasping and controlling tools, a tool-maker with as fine a sense of touch as that of any of the present-day etchers, engravers and artists. In my opinion, the pro-Dawn Man psychology, leaving out the evidence of anatomy and morphology, is certainly that of a Dawn Man and not of an ‘ape-man’.58

This double analogy between children and ‘savages’, however, was interpreted differently. For Matthew, the quality of the hominid mind at the ‘ape-man’ stage suggested the use of tools and weapons out of impulse and curiosity. For Osborn, the creative development of tool technologies removed our earliest ancestors from the ape-lines in culture, anatomy and psychology. As late as 1930, Osborn considered the fact established ‘that even in the Upper Pliocene man was an extremely adept flint worker, with deft hands and fingers guided by an imaginative and intelligent forebrain.’59

FINIS: MAN RISES TO PARNASSUS

Osborn’s Man rises to Parnassus: critical epochs in the prehistory of man (1927) was designed as another edition of Men of the Old Stone Age, first published in 1915. However, because ‘our knowledge of the rise of intelligence in man is advancing with such rapid strides that it is difficult for even the trained anthropologist and archaeologist...
to keep pace with it’, and because in East Anglia Osborn had ‘witnessed proofs of the existence of intelligent man and his flint culture over 1,250,000 years ago’, a new title seemed in order. The new title also alluded to the fact that he was mainly concerned with the spiritual, intellectual and moral character of prehistoric races. Osborn explicitly called his Dawn-Man theory post-Darwinian in the sense that it did not contain the notion of an ape-man ancestor in Africa that was halfway between the later hominid and anthropoid families and was most probably arboreal. But even in Osborn’s theory, in which the higher social mammals and primitive humans were not as closely related to modern civilized man as had once been thought, animals still rendered insights into the moral equipment of early hominids, which most probably included social behaviours such as

[T]he safeguarding of the family, protection and careful upbringing of the young, protection of the chastity of women, inculcation of absolute integrity both in word and deed, communal and tribal cooperation for the general welfare, reverence for higher supernatural powers, love of decoration, of beauty and of art.60

The opinion expressed in this quotation—which goes a long way in explaining my decision to maintain the authors’ own use of the masculine form for the various prehistoric ‘men’—indeed brings them close to Osborn’s early twentieth-century Presbyterian ideals. However, just as anthropologists had shown that not all primitive races exhibited all of these fine traits, Osborn conjectured that not all of the fossil human races had been equally advanced:

All human races, fossil or living, demand our sympathetic understanding . . . . We need not deny to our Stone Age ancestors moral traits which we observe among primitive peoples today. By prolonged and intensive research we have discovered that the lower Stone Age men are the equals in brain power of some of the primitive existing peoples, and that some of the higher Stone Age men are actually superior to some of the higher existing races. Thus we are venturing into the new and fascinating but little trodden field of the gradual rise of the higher powers of man. It is true that we cannot progress very far, but it will be admitted that our psychic theme transcends in interest even the greatest triumphs of human and comparative anatomy.61

Osborn went on Palaeolithic and Neolithic tours—as he called them—to all the important sites. He undertook travels in time just as the anthropologist and explorer of the current time and space ventured into unknown regions and studied foreign primitives. His research was also guided by a similar ethos. In contrast with missions in anthropology, the palaeoanthropologist could not improve the people he studied, but he could improve our image of them. The Eolithic cultures were central pieces in this endeavour—even more central than ‘human and comparative anatomy’.

Osborn’s conception of human evolution was so processual that—as we have seen in his description of human evolution as a drama in acts—it was theatrical. As I have tried to show, Osborn, like many of his colleagues in the early decades of the twentieth century, attempted to reconstruct the grand scheme of human history; and it was surely a story of progress. Osborn chose Aeschylus’s description of the steady development of human reason, language, and the practical arts and sciences in ‘Prometheus Bound’—his account of man’s gradual rise to Parnassus—as a motto for this ascent.62 For good reason, the book is not entitled Man’s rise to Parnassus, but Man rises to Parnassus. Its form imitates the Greek drama, including prologue and epilogue. The rising of man towards the top of
Parnassus takes place in front of the reader’s eyes, and is driven by demigods such as Prometheus, by the pioneers and innovators of humankind.

Thus, far from postulating a ‘big brain *ex nihilo*’ approach, Osborn suggested a gradual increase in intelligence in a process that co-evolved with tool technology. He traced the insights into the role of a trained hand in mental development back to Anaxagoras:

> Expressed in modern terms, manual training is one of the modes of mental training. In this sense the use of the hand becomes one of the causes of the development of the brain. In my own observation, in the enormously long period of the Stone Age the working of flint tools was the chief stimulus to the working of the mind. So there is a strong prehistoric argument for this thought of Anaxagoras.63

Obviously, this is where the Tertiary tools from East Anglia came in; indeed, they were now given a full chapter. In Osborn’s scheme, they proved ‘that man almost from the beginning was a great traveller, hunter and explorer’ and that ‘even in the inconceivably remote past man was a relatively superior being, walking erect, and with very capable tool-making hands guided and directed by a very superior order of brain.’64 The link between hand and brain, between tool and spirit, was made visually evident when the region responsible for tool making was inscribed into a brain cast of *Pithecanthropus erectus*. In comparison with that of an Australian Aborigine, the brain of *Pithecanthropus* showed that the fossil remains were those of a Dawn Man. It was this species, and not an Ape Man (as suggested by Matthew) that had had a tool-making brain.65 That *Pithecanthropus* was of an early Pleistocene date did not interfere with this argument, because, as we have seen, the fossil was interpreted as a survivor of an earlier type in remote regions of the world. In other words, it could stand in as a model for the state of hominid development at an earlier time.

Osborn’s rehabilitation of prehistoric humans and his advocacy of their manual dexterity and correlated mental prowess was itself a spiritual quest. The long search for the bones of the perfect, large-brained Dawn Man, to fill the void created by the Eolithic cultures in our direct ancestry, was never achieved. But there was hope in his shadows:

> On Sunday morning, July 24 [1921], after attending a most memorable service in Westminster Abbey, the author repaired to the British Museum to see the fossil remains of the now thoroughly vindicated Dawn Man of Great Britain [i.e. Piltdown Man]. The few precious fragments of one of the original Britons, which had been preserved in a steel fireproof safe from the bombs thrown by German aviators and which will probably be thus guarded from thieves for all future time, were taken out and placed on the table by Smith Woodward, so that full and free opportunity was given for the closest comparison and study.66

This scene of worship at both the religious and the scientific altar represents the climax of Osborn’s quest for the origin of human spirituality. The scene at once makes clear that his religion and science were not at odds and that his scientific search for truth was inspired by a belief in God. But his scientific truth was not obstructed by religious fundamentalism, or by enemies of civilization such as the Germans, and certainly not by common thieves. The scientific fetish presented to Osborn on the museum’s altar is palpable evidence of the victory of scientific reason over religious superstition and human barbarism. The relic of Tertiary Man, with his large braincase, suggested the noble history also of the direct human line, of man’s steady rise to Parnassus. The house in which this
view was worshipped was a house of science that stood for equal opportunity, openness, and democratic exchange in a common search for knowledge. But in Parnassus there is also a warning: would the human races continue rising each to its own capacity? Or would the inbreeding of types, the lack of struggle in the modern environment or the puncture of this tranquillity in the brutality of war continue to sap man’s virility, as foreign influence had degraded Neanderthaloid culture, as the lush jungle habitat had once kept back the apes, and as some prehistoric tribes had been extinguished by others?

From the times of de Mortillet, eoliths had been incorporated into pre-existing notions of technological progress, celebrated for example at the great expositions. They were transferred from a very controversial status to a short life as scientific facts in the hard work of English palaeontologists and archaeologists who gave them strength through incorporation into various types of geological, cultural and genealogical series. These progressions were transfused by the notion of linear progress in culture, body and mind. The role of this kind of progress in structuring the history of life, and human life in particular, lost some of its power towards the end of the century. Simultaneously, scenarios of human evolution began to take the shape of ‘trees’ with many dead-ending branches. In the dawn-man theories there were no fossils to animate the long surviving line. This did not mean that, in the minds of those who adhered to them, nothing took place in this increasingly long period. Rather, as with Osborn, inferences could be made from Eolithic cultures, from younger fossils that could stand in as models for earlier ones, and also still from ‘primitive living humans’ and children. Such inferences allowed him to imagine a steady progress propelled in a mutual catalysis between environment, tool invention, tool fashioning, motor skills, intelligence and psychology. Finally, from their beginnings, eoliths were not purely epistemic but were also political objects. They became enmeshed in views of the prehistoric past that carried various but strong lessons for the present. I have intimated this throughout this essay, but their connection to the rise of socialism, the history and identity of competing European nations, the evils of inbreeding and the negative consequences of modernization is particularly noteworthy. They were, in short, both cultural and scientific objects.

ACKNOWLEDGEMENT

This research was financed by the Swiss National Science Foundation.

NOTES

4 Many different Tertiary cultures and tool types were described and named; some of their describers even rejected the term eoliths. For reasons of simplicity, I will nonetheless apply the term to all of the industries and implements claimed for Tertiary Europe in the period under concern.
Nick Hopwood, Simon Schaffer and James Secord have conceptualized a series of workshops on the importance of ‘seriality’ in the history of science. For the author’s contribution to their first volume see M. Sommer, ‘Seriality in the making: the Osborn–Knight restorations of evolutionary history’, *Hist. Sci.* **48**, 461–482 (2010).

Sommer, *op. cit.* (note 3).


See, for example, Marcellin Boule, *Les hommes fossiles* (1921); Arthur Keith, *The antiquity of man* (1915 and 1925); Hermann Klaatsch, *Der Werdegang der Menschheit und die Entstehung der Kultur* (1920); Eliot Smith, *Human history* (1929); and William Sollas, *Ancient hunters* (1911, 1915 and 1924); but also H. G. Wells, *The outline of history* (1920) (on these authors and works see M. Sommer, *Bones and ochre: the curious afterlife of the Red Lady of Paviland*, part II (Harvard University Press, Cambridge, MA, 2007)).

American Museum of Natural History, Special Collections Library, Henry Fairfield Osborn Papers, correspondence with J. Reid Moir, Box 15, Folder 15–17.

‘Nous trouvons la plus grande analogie, la plus grande similitude entre la civilisation élémentaire des sauvages et la civilisation primitive des temps préhistoriques. On peut dire que partout, dans le temps comme dans l’espace, l’homme a suivi la même évolution d’ensemble dans son développement industriel et moral.

Ainsi:

**LOI DU PROGRÈS DE L’HUMANITÉ,**

**LOI DU DEVELOPPEMENT SIMILAIRE,**

**HAUTE ANTIQUITÉ DE L’HOMME,**


‘Suivant une excellente méthode adoptée en géologie,—il ne faut pas oublier que la paléoethnologie découle directement de la géologie,—j’ai donné à chaque époque le nom d’une localité bien typique’ (G. de Mortillet, *Le Préhistorique; Antiquité de l’homme* (Paris: C. Reinwald, 1883), p. 29; my translation in the main text).

Herbert de Mortillet, *op. cit.* (note 12), pp. 2 and 16.

Ibid., pp. 103–106 and 628–629.


Sommer, *op. cit.* (note 9), pp. 121–140; on Gabriel de Mortillet see also C. Cohen, ‘Searching for the “missing link” at the turn of the 19th century: Mortillet’s “Anthropopithèque” and Bourgeois’ “Tertiary Eoliths”’, paper read at the Summer Academy of the Max Planck Institute for the History of Science on Human Origins (Berlin, 2001).

For a discussion of the earlier British controversy around Benjamin Harris’s ‘eoliths’, see R. Ellen and A. Muthana, ‘Classifying “eoliths”: how cultural cognition featured in arguments surrounding claims for the earliest human artefacts as these developed between 1880 and 1900’, *J. Cogn. Cult.* **10**, 341–375 (2010).


Human tools


27 ‘Il faut dans cette question... tenir grand compte d’un phénomène qui a joué un rôle important dans l’histoire et le développement de tous les groupes d’êtres fossiles, le phénomène des migrations. Rien ne prouve que l’évolution de l’espèce humaine ou du genre humain, comme on voudra, se soit faite sur place’ (M. Boule, ‘L’origine des éolithes’, Anthropologie 16, 257–267 (1905), at pp. 266–267; my translation in the main text; my emphasis).


29 See also A. Keith, The antiquity of man, 2nd edn (Williams & Norgate, London, 1925); for a more detailed discussion of these models see Sommer, op. cit. (note 9), part II.

30 Reid Moir and Keith, op. cit. (note 20).

31 Sommer, op. cit. (note 9), pp. 197–212.

32 Reid Moir, op. cit. (note 26), preface.

33 American Museum of Natural History, Special Collections Library, Henry Fairfield Osborn Papers (hereafter AMNH, Osborn Papers), letter from J. Reid Moir to H. F. Osborn, 21 April 1922, Box 15, Folder 15.


38 The reconstruction of these and the following events is based on AMNH, Osborn Papers, correspondences with J. Reid Moir (Box 15, Folders 15–17), N. Nelson (Box 16, Folder 11), G. E. Smith (Box 20, Folders 15 and 16) and A. Smith Woodward (Box 23, Folder 31); for the quotation, see letter from H. F. Osborn to J. Reid Moir, 1 February 1927, Box 15, Folder 16. Reid Moir did not agree that his discoveries contradicted a common ancestry for apes and humans (5 February 1927).

39 AMNH, Osborn Papers, letter from J. Reid Moir to H. F. Osborn, 21 April 1922, Box 15, Folder 15. Reid Moir also disliked the use of the term eoliths, which he would have liked to reserve for the previous discoveries in Britain by Benjamin Harris, whereas Osborn took issue
with the classification of the Cromer tools as Chellean. Osborn believed the Cromer Forest bed to be of Pleistocene origin, so that the Cromer flints were, in his view, of Pleistocene age, but the Foxhall flints were from Pliocene times (letter from Osborn to J. Reid Moir, 8 June 1922, Box 15, Folder 15).

40 This was described by the American physician R. H. Collyer, but the specimen has since been lost. R. H. Collyer, ‘The fossil human jaw from Suffolk’, Anthropol. Rev. 221 (1867).

41 AMNH, Osborn Papers, correspondence with Grafton Elliot Smith, Box 20, Folders 15 and 16; here letter from H. F. Osborn to G. E. Smith, 22 April 1922.

42 Osborn, op. cit. (note 37).


45 H. F. Osborn, ‘Recent discoveries relating to the origin and antiquity of man’, Science (n.s.) 65 (1690), 481–488 (1927), at p. 482.

46 Bruce, op. cit. (note 1).

47 J. Reid Moir, Disembodied spirits: a short essay on spiritualism (W. E. Harrison, The Ancient House Press, Ipswich); offprint in AMNH, Osborn Papers, Box 15, Folder 17.


49 Ibid., p. 482.

50 Ibid., p. 485.

51 Ibid., p. 487.

52 Ibid., p. 487.


55 H. F. Osborn, ‘Note on geological age of Pithecanthropus and Eoanthropus’, Science (n.s.) 69 (1782), 216–217 (1929), at p. 216. This was all the more apparent because the age of Pithecanthropus had been revised from late Pliocene to early Pleistocene, which made this most primitive form younger than Eoanthropus, to which Osborn gave a Pliocene age.


57 W. D. Matthew, ‘The ape-man of Java. Does this fossil prove that a creature which was in a halfway stage between man and ape, lived about a million years ago?’, Nat. Hist. 577–588 (1928), at p. 581.

58 Osborn, op. cit. (note 45), 488. Osborn placed our arboreal ancestors as far back in time as the Eocene, and conjectured that in the Oligocene—from 16 million years ago—there had existed pro-men, perhaps in Mongolia, and then, in the Miocene and Pliocene, there were true Dawn Men.


60 Osborn, op. cit. (note 56), pp. viii–ix.

61 Ibid., p. ix.

62 Ibid., ch. 1.

63 Ibid., p. 11.

64 Ibid., p. 23.

65 Ibid., p. 70. Osborn wrote the foreword to the work from which he took the brain cast studies: F. Tilney, The brain from ape to man. A contribution to the study of the evolution and development of the human brain (P. B. Hoeber, New York, 1928). Tilney was a friend and correspondent, but remained a convinced ‘brachiator’ (AMNH, Osborn Papers, correspondence with Frederick Tilney, Box 21, Folder 23).

66 Osborn, op. cit. (note 56), pp. 52–53. Smith Woodward was keeper of palaeontology at the BMNH and a strong promoter of Piltdown and eoliths.