Cave men: stone tools, Victorian science, and the 'primitive mind' of deep time.

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Introduction: enter humans into the theatre of the world

One of the most famous series of illustrations of the creation of the world is that in Johann Scheuchzer's *Sacred Physics* of 1731. This series, accompanied by textual elaborations, depicts events described in the creation narrative of the book of Genesis, culminating in the creation of Adam and Eve. The illustration of the zenith of creation - *The Creation of Man from the Dust of the Earth* - depicts Adam, sitting in the Garden of Eden, surrounded by the beasts of the earth and communing with the divine light (Figure 1). As Scheuchzer explains, "the most noble of all creatures, the microcosm or epitome of all this great World, now makes his appearance in the theatre of the World: now that the table is fully spread, the host can be seated." As Rudwick (1995, 14) has noted, Scheuchzer was drawing on a rich classical tradition of images that stretched back several centuries, although in this case his work represents the point at which the established progressivist account of creation met the enlightenment recognition of fossils and emergence of natural history as a science.

Around the frame accompanying this illustration stand four animated infant skeletons and a number of images of foeti at different stages of development, all intended to convey the complexity of human development, and perhaps emphasise that Adam, and by extension all humanity, was a created creature. As the illustrations set around the frame are numbered, it is easy to decode the meaning behind this sequence-within-a-sequence; illustrations I to VII show prenatal stages of the foetus, while illustrations VIII to XI show neonatal infant development, culminating in an individual which coyly stares at the viewer from behind a cloth raised to its face. The profound size of the cranium is striking on the neonates (as one observes in reality), and within the composition Adam is depicted as a fully developed 'modern human' who would not, anatomically at least, be out of place

in Scheuchzer's world. Thus one sees in the illustration an intellectual link between biological ontogeny, creation, and cognitively 'modern'humans. No consideration is evident that Adam, or humans of his time, would have been primitive relative to *Homo sapiens*, or to humans of the eighteenth century. In fact, no obvious signs of the recognition that these first humans might be primitive at all are noticeable in art until perhaps the illustrations in Pierre Boitard's *Paris Avant les Hommes,* published posthumously in 1861 (Figure 2).

It is no coincidence, as we shall see below, that by Boitard's time the notion of a 'savage state of evolution' had been accepted among natural scientists; although 'modern' reconstructions of primitive humans, such as in Edouard Riou's otherwise well-informed illustrations for Louis Figuier's *Earth Before the Deluge* (1863: Figure 3), continued. The latter series effectively set the model for subsequent illustrative interpretations of Earth history well into the twentieth century (Rudwick 1995, 219), and while scenes such as *The appearance of man* contain bearded and loinclothed humans they are in all other respects anatomically modern, and, as Rudwick (ibid., 250) notes, remained "white, European and civilised in demeanour". They merely dressed as primitives and were thus "familiar and reassuring to Figuier's vast middle class western public".

This apparent dichotomy – between a world evolving through progressively complex stages on the one hand and what one might call a stage of *culmination* only during which humans *as we know them* appear - clearly derived from the progressivism that dominated natural scientific views of creation prior to the 1860s. In this view, the world was progressively 'warmed up' (by God) until it was stocked with sufficient resources to support the humans that have dominion over them (Genesis 1:24-30. 2: 19-20). Only at the point that the world was ready to support them did humans appear; thus, it is clear that a progressivist interpretation of human emergence *cannot* allow for anything other than a sudden emergence of a fully anatomically and cognitively modern human. In this way, illustrations of the appearance of humans served to convey implicit political messages about the relationship and contrast between humans and the rest of the natural world. Only after progressivist notions gave way to the uniformitarian-based evolutionary perspectives that dominated from the 1860s did subsequent editions of Figuier's work accommodate the notion of primitive humans.

Today, palaeoanthropologists recognise three to six hominin[1] genera and numerous species before *Homo,* and at least eight species of archaic members of the genus *Homo,* in all spanning at least six million years from the late Miocene down to as recently as 30,000 years ago. This sample is probably a significant underestimate. Encephalisation – the evolution of the size, shape and (one assumes) circuitry of the brain - is an essential feature of hominin evolution from the emergence of the genus *Homo* around two million years ago, and a number of sophisticated models exist to explain why and how increasingly metabolically expensive brains evolved. For much of the period that humans have been concerned with the study of hominin evolution, however, there has been little or no recognition that brains, like bodies, have evolved from the starting point of a Miocene ape some seven million years ago. We are therefore concerned here with the development of thought about the evolution of the human brain over the course of the nineteenth century, the period in which an essentially enlightenment antiquarianism gave way to a geologically-informed professionalism within the natural sciences. We concentrate on British individuals working within the scientific establishment, notably William Buckland, Alfred Russell Wallace, Charles Darwin, Thomas Huxley, John Evans, Joseph Prestwich, William Pengelly and John Lubbock; and those British individuals that might be said to be more on the periphery of 'scientific circles' but who were nevertheless well-connected with the core, notably John MacEnery and Worthington G. Smith. A hard and fast distinction between professionals and amateurs would be anachronistic for the period; a number of 'professionals' arose from amateur roots (John Evans, for example, managed a paper mill and Joseph Prestwich was a wine merchant – see Gamble and Moutsiou this volume) and, were it not for the fact some of them (i.e. Buckland, Prestwich) that they eventually took up academic positions are otherwise hardly to be distinguished from the more successful 'amateurs' of the period.

For heuristic purposes we divide the period of concern into three stages. In the first, 'core' and 'peripheral' individuals alike were concerned only with the establishment of deep time. A transition can be seen in the 1860s, in which the notion of a 'primitive' or 'savage' state of humanity is first entertained, although without much definition or exploration. Finally, only from the 1870s are attempts made to ascertain what a 'primitive state of humanity' might have been like. In terms of

[1] For the purposes of this paper, the term *Hominin* – a member of the sub-family *Homininae*- may be taken as the formal reference to extinct and extant humans. Recognised hominin genera before *Homo* are *Ardipithecus, Australopithecus* and *Paranthropus* spanning the period 5-1.5 million years ago*,* and possible hominin genera are *Orrorin, Sahelanthropus* and *Kenyanthropus* spanning the period 7-3 million years ago. The genus *Homo* currently comprises *Homo rudolfensis, Homo habilis, Homo ergaster, Homo erectus, Homo antecessor, Homo heidelbergensis, Homo neanderthalensis, Homo floresiensis* and *Homo sapiens* with pre-sapient forms spanning the period ~2 million years ago to ~30,000 years ago (Neanderthals) and ~20,000 years ago or later (*H. Floresiensis*). In terms of cranial size, shape and circuitry, with the possible exception of the Neanderthals, all of these may be regarded as 'primitive'.

the evolution of the primitive mind we refer to these stages as *nascent*, *aware*, and *exploratory* respectively.

The nascent stage and the establishment of deep time

The progressivist interpretation of natural history can be traced back to Cuvier and beyond, and spread into Regency England after the end of the Napoleonic wars when travel between France and England once again became possible. To Cuvier, Earth history could be divided into six periods, each equated with a Biblical day of creation, distinguished by relatively sudden 'revolutions' in which catastrophic change remodelled the world in progressively more advanced ways (Rudwick 1997). William Buckland's friendship with Cuvier, and his authority in British intellectual circles, was instrumental in the establishment of progressivism in British natural history and, in particular, the identification of Cuvier's last 'deluge' with the Biblical flood (Sommer 2007, 26). Buckland's progressivist stance required him to deny the possibility that human remains could share similar antiquity with other antediluvian animals, which lead him famously to reject the association of the 'Red Lady' of Paviland with Pleistocene fauna and thus assert that it was Iron Age or later in antiquity (Buckland 1923. Sommer 2007). For this reason, as Grayson (1983, 77) points out, Buckland has unfortunately come to be seen as a retrograde force, in the most extreme cases being accused of simply ignoring or even willfully suppressing well-earned and honest cave-derived evidence of deep antiquity for humanity (e.g. Weston 2008); although one would do well to remember that Buckland's truly pioneering cave research could only be accepted at intellectually conservative Oxford if it was demonstrably compatible with the university's traditional emphasis on Biblical texts (Rudwick 2005, 608). Polarised views such as these do not help us understand the complex and nuanced intellectual climate of the times (White and Pettitt 2009) and indeed, as Sommer (2007, 84) reminds us, these controversies actually had the positive effect of stimulating the investigation of cave sediments, a development in which Buckland was instrumental.

Kent's Cavern (Torquay, Devon) was central to these early investigations, and the excavations of Father John MacEnery of Torre in the cave between 1825 and 1829 epitomise the confusion of the time. Buckland and Cuvier acted as what might be called 'consultants' in MacEnery's excavations. MacEnery discovered humanly-made flint artefacts in several areas of the cave clearly stratified beneath a thick and unbroken stalagmite floor. These should have been accepted as clear evidence of deep antiquity for toolmaking, but Buckland raised the understandable objection that the stalagmite floor could have been broken, the tools inserted (intrusive, in archaeological language)

and then could have 'grown over' and sealed once more. This sensible (albeit with the benefit of hindsight incorrect) objection ensured that MacEnery recanted his views and failed to publish his work in the cave. Compare the following two statements from MacEnery, for example, the first from his original manuscript on his excavations written sometime after 1836 and intended for publication but withdrawn, the second from the posthumous publication edited by Edward Vivian: "I communicated my impressions to Dr Buckland…there is no reason why human bones should not be discovered with those of [extinct] animals…" (MacEnery, *Fasciculus A,* quoted in Pengelly 1868), and "I…have found human bones near the [cave] mouth…entombed in a pit excavated in[to] the surface of the stalagmite, indicating [a] comparatively modern sepulture – probably about the time that the skeleton of Paviland cave was inhumed – but in the decidedly diluvian deposit no human tooth or bone revealed itself…it may be concluded that man did not…co-exist in this country with the [extinct] animal population" (MacEnery and Vivian 1859). One can also glimpse in MacEnery's writing Cuvier's objections to the contemporaneity of humans and extinct Pleistocene animals: "The hyaenas of Kirkdale, says Cuvier, have not accumulated human bones – it was because they found no man in their neighbourhood living or dead" (MacEnery, *Fasciculus C,* written some time after 1831, quoted in Pengelly 1868). An anonymous poem in the *Torquay and Tor Directory* for 14th August 1846 quoted by Pengelly (1878) epitomises the controversy, with verses about Buckland , MacEnery and creationist perspectives successively:

"One great Professor still supposes,
Hyaenas, dragging by their noses,
horses and bullocks, sheep and deer,
to crack their bones and gnaw them here.

Another says 'beneath this ground
fragments of British knives were found';
proof of a kitchen 'mongst these stones,
where Britons cook'd, carv'd beef, pick'd bones.

Tor's wond'ring fishermen to me
describ'd their simple theory-
not knives, nor fangs imbrued with blood,
but scripture's life-destroying flood."

The issue did not go away, however. The same year as this poem was penned, new and very brief excavations in the cave continued to attract controversy (Pengelly 1868), and still 20 years later Charles Lyell noted that "as the...contents of Kent's Hole had…been thrown into much confusion, it was thought desirable in 1858, when a new and intact bone cave was discovered at Brixham…to have a thorough and systematic examination made of it…" (1863, 77). Excavations in Brixham Cave, across Tor Bay from Kent's Cavern, were supervised by the Torquay tutor and geologist William Pengelly. It was here that Pengelly trialled his famous system of excavation using "prisms" of 1ft x 1ft x 3ft dimension (Pengelly 1873), which although rather coarse by modern standards was highly controlled and advanced for its time. The results were clear – the excavations found evidence of human artefacts associated with extinct mammalian bones under an intact stalagmite floor. Pengelly employed the same methods during his 16 year-long campaign in Kents Cavern, which began seven years later in 1865 and which proved beyond any doubt that MacEnery had been correct in his original assertions.

In all of these discussions, which in terms of the excavation of British Caves take us from the early 1820s to the 1860s, there is no consideration of the cognitive or behavioural states of early humans. The question as to when humans enter the natural record was enough to dominate a science that was essentially constrained by progressivist thought. Only after Buckland died in 1856 did the adoption of non-progressivist views begin to spread, initially slowly, possibly because Lyell – an increasingly dominant figure from the 1830s – inherited progressivist tendencies from his teacher, Buckland. However, by the time that Pengelly began his excavations in Kent's Cavern the intellectual landscape had changed beyond recognition, owing largely to the celebrated findings of Prestwich and Evans in the Somme Valley in May 1859 (Gamble and Moutsiou this volume) and, of course, the publication that same year of Darwin's "On the Origin of Species". Caves played little part in the final resolution, but did provide the historical context under which more radical and widespread acceptance could be framed.

Awareness, 1860-1870: a savage state of evolution

The notion that humans had evolved from simpler states was thus firmly established by the early 1860s, partially through the two events noted above, but increasingly through the experience of travelling naturalists amongst modern 'savages'. The discovery of the Neanderthal remains from the

Feldhoffer cave in 1856, although initially controversial, was soon assimilated as fossil proof of primitive, pre-modern humans (Trinkaus and Shipman 1993).

From this point one can trace the origins of the notion that primitive humans were cognitively distinct from modern humans, and potentially little different to animals. Huxley believed that "[each man] is the direct descendant of some naked bestial savage, whose intelligence was just sufficient to make him a little more cunning than the fox and by so much more dangerous than the tiger" (1863, 130). The contrast between Huxley's view and those preceding possibly arose in part from his familiarity with modern 'savages' that he had experienced first hand on his travels on board the *Rattlesnake* from its arrival at Tasmania in 1847 onwards, towards whom a typical European condescension can be noted (Desmond 1998). To his friend and colleague Darwin, an evolutionary link between primitive and modern humans must have seemed obvious, as 'civilised savages' – those who could be taught table manners for example – provided evidence that the world of savages and educated Englishmen could be bridged (Desmond and Moore 1992. 145). It is interesting that Lyell, for whom savages were a threat to the 'high estate' of civilised humans and who proved to be an obstacle to the reception of human evolution, had not seen 'savages' in the flesh. Wallace - who stands apart from those workers considered here in thinking that the brain of *Homo sapiens* could not have been the product of natural selection - made an explicit statement about the relevance of 'modern savages' to the understanding of primitive humans in 1875: "What thoughts, ideas or actions are there that raise him many grades above the elephant or the ape? Yet he possesses a brain vastly superior [that] gives him, in an undeveloped state, faculties which he never requires to use. And if this is true of existing savages, how much more true must it have been of men whose sole weapons were rudely chipped flints, some of whom we may safely conclude, were lower than any existing race?" (Wallace 1875, 342).

Connections between the individuals who defined prehistoric archaeology and the natural sciences provided the complex web out of which arose the establishment of human antiquity and the development of notions of the primitive mind. John Evans, a typical Victorian polymath known for managing a paper mill but with numerous business interests and technological innovations accredited to him, came to archaeology through an early interest in numismatics (Lamdin-Whymark 2009). He was the younger and perhaps less experienced of the two Englishmen whose trip to Amiens "broke the time barrier" (Gamble and Kruszynski 2009). His partner Joseph Prestwich, although also businessman by profession, had undertaken a detailed study of the geology of the Thames Basin in his twenties, and by the late 1850s his passion for 'geologising', as he put it, demonstrated by a steady stream of scientific papers, had established him as a respected and well-

connected scientist. A chance meeting with Evans on board a train in 1857 (Gamble and Kruszynski 2009) lead to his election to the Geological Society of London, as Pope and Roberts (2009, 38) have put it "symbolically cementing the early union of geology and archaeology." In 1858 he joined an advisory committee convened by Hugh Falconer to oversee the investigation of Brixham Cave (Tor Bay, Devon) supervised by William Pengelly.

It is from the late 1850s that one can glimpse in detail the strong connections between the leading men of British natural science. Three Victorian scientific giants - John Evans, John Lubbock and General Pitt Rivers - were elected to fellowships of the Society of Antiquaries of London on the same day, and all became prominent in its leadership in the 1860s. Lubbock and Pitt Rivers have become better known for wider pioneering work in prehistoric archaeology, although their contribution to the emergent study of evolutionarily pre-modern humans should not be underestimated. Lubbock (1865, 2-3) recognised the difference between "the drift; when man shared the possession of Europe with the mammoth, the cave bear, the woolly-haired rhinoceros, and other extinct animals" and the period of polished "weapons and instruments made of flint and other kinds of stone, in which, however, we find no trace of the knowledge of any metal", coining the terms *Palaeolithic* and *Neolithic* respectively to describe these. Pitt Rivers began his professional association with archaeology by investigating the terraces of the Thames. It is his excavations of later prehistoric 'monumental' sites, particularly on Cranbourne Chase (Dorset) that have been credited with the invention of stratigraphic methods of excavation and recording, although these were being used by William Pengelly in the Brixham Cave excavations, and Pitt Rivers must have derived them from him (Warren and Rose 1994).

One of the clearest contemporary examples of deliberate networking, with the aim of influencing scientific opinion and practise - not to mention individual advancement - was the X-Club, created by Huxley in November 1864 (Desmond 1998, 327). This group of colleagues – effectively a closed-membership club modelled on the gentleman's clubs of Piccadilly - dined at 6pm on the first Thursday of every month, after which its nine (originally eight) members would walk to the Royal Society where their intention was to influence council procedures and, by so-doing, tip the balance of power (ibid., 329). Their first achievement was to secure the prestigious Copley Medal for Darwin. Lubbock and Huxley were both members from the first meeting, which also included Joseph Hooker, John Tyndall, George Busk, Herbert Spencer, the physicist Thomas Hirst, and the chemist Edward Frankland. The mathematician and printer William Spottiswood was later added to this closed membership club. As Desmond (ibid.,328) notes, although none of the group were Oxbridge

educated (nor indeed all academics), this was a scientific elite, "slim and fit after an evolutionary sauna". Formed with a strong "evolutionary axe to grind" (Desmond and Moore 1992, 560) the club is an excellent example of the mutability between individuals with academic positions and those without: Spottiswood was a printer, Spencer a writer, Lubbock a banker and MP, illustrative of the point that the terms 'amateur' and 'professional' have little meaning in the networks of Victorian science. The quotidian maintenance of network connections is ably illustrated in a letter from Huxley to Lubbock, the latter's type copy of which is curated in the Royal Society's library. Here we see in intimate detail Huxley placing his close colleagues in influential positions,

"Jermyn Street, July 17 1860

My Dear Lubbock,

Dr Wright has made me a proposition to become one of the editors of the 'Natural History Review', of which he is to a great extent a proprietor. It is to have a London publisher (Williams and Norgate) and is to become English instead of Irish. I see a great many ways in which a review, under the control of the young men with plastic minds might be of service to biological science in this country just now, and so long as I can limit my share of work to a definite amount, I am not only willing, but desirous to entertain the proposition. But we want co-editors to take their share, and I have just written to Rolleston to propose him as I now propose to you to take part in it. [illegible]

I hope Mrs Lubbock is going on well. Ever yours faithfully, T. H. Huxley"

(Typed copy made by Lubbock. Courtesy of The Royal Society & with thanks to Keith Moore.)

The influence of 'modern savages' on the thinking of the Victorian antiquarian elite about evolutionarily 'primitive' humans is apparent from this time. Lubbock made an inverse correlation between the level of advancement of modern savages and those of deep time; "The lowest races of existing savages must, always assuming the common origin of the human race, be at least as advanced as were our ancestors when they spread over the Earth's surface" (Lubbock 1865, 4th edn, 600). By contrast, however, he realised that there would be no one-to-one similarity of modern and primeval savages; "this account [on the manner & customs of modern savages]…will be found, I think, to throw some light on the remains of savage life in ages gone by" (1865, 1st edn, viii) but "the present habits of savage races are not to be regarded as representing exactly those which characterise the first men" (1865, 4th edn, 563).

Alfred Russell Wallace can only partly be regarded as part of this wider group; although of course concerned with evolution by means of natural selection he had less obvious interests in archaeology, and as noted above stood apart from the 'mainstream' view that modern human cognition could be the product of natural selection. He clearly visited Pengelly's excavations in Kent's Cavern: "Mr A.R. Wallace & Mr Field visited the caves" (Pengelly notebook, entry for Thursday September 2nd, 1869, quoted courtesy of Torquay Museum). Given his insistence that the intellect of modern humans could not be the product of natural selection it is not surprising that one can detect In Wallace's writing the notion of a *juncture* between physical and cognitive evolution:

"From the time when the social and sympathetic feelings came into active operation, and the intellectual and moral faculties became fairly developed, man would cease to be influenced by natural selection in his physical form and structure; as an animal he would remain almost stationary…but from the moment that his body became stationary his mind would become subject to those very influences from which his body had escaped…the better and higher specimens of our race would therefore increase and spread, the lower and more brutal would give way and successively die out, and the rapid advancement of mental organisation occur" (Wallace 1864, CLXIV).

This is a fascinating point in the origins of thought about the evolution of the primitive mind. Only when biological evolution had *culminated* in recognisable humans did *natural selection cease* and mental organisation advance rapidly. To an extent this is an inheritance of progressivist thinking; there is still no notion that the mind evolved alongside the body, instead the suggestion of a clear juncture, over which natural selection ceases to operate. Only after the stage of culmination was reached did the sophisticated mind arise. Lubbock expressed the same view with a concise antimetabole: "The great principle of natural selection, which in animals affects the body and seems to have had little influence on the mind; in man affects the mind and has little influence on the body" (Lubbock 1865, 491).

Thus, by the 1860s a clear recognition that the brain had evolved was in place, although this was envisaged as a disjuncture between the evolution of the body and of the mind. Despite this, the notion that the mind evolved in *pulses* is evident. "History shows that the human mind, fed by constant accessions of knowledge, periodically grows too large for its theoretical coverings and bursts them asunder to appear in new habiliments…truly the imago state of man seems to be terribly distant but every moult is a step gained and of such there have been a great many" (Huxley

1863, 72). Lyell similarly opined that: “In man, the brain represents an ascensive [sic] step in development…the superficial grey matter…attains its maximal extent in man… peculiar mental powers are associated with this highest form of brain… ” (Lyell 1863, 374), although, ironically, what these ‘peculiar mental powers’ are or were is not discussed.

By the mid 1860s the pioneering excavations of Edouard Lartet and Henry Christy in the rock shelters of southwestern France had established the authenticity of portable art of the ‘reindeer age’, what is today recognised as the Upper Palaeolithic (~35-10,000 ^{14}C years ago). Although controversy would rage over the last two decades of the nineteenth century about the authenticity of the newly-discovered cave art of Altamira (Cantabria, Spain), Lartet and Christy had accumulated a decent sample of well-stratified examples of engraved and sculpted bone, antler and mammoth ivory to warrant an influential publication (Lartet and Christy 1864). Despite the obvious achievement of ‘primitive humans’ of the time there is no obvious acquaintance of art with modern human minds in the literature of the period. To Lubbock, a “love of art” clearly revealed little in the absence of more technological achievements: “in considering the probable condition of these ancient cave men, we must give them full credit for their love of art, such as it was, while on the other hand the want of metal, pottery, of polished flint implements…the ignorance of agriculture, and the apparent absence of domesticated animals, certainly imply a very low state of civilisation” (Lubbock, 1865, 341). Clearly these are the impedimentia of agriculturalists, not the simple, albeit artistically achieved hunter-gatherers who for Lubbock epitomised simpler developmental stages.

Explorations: markers of the mind of deep time

For Lubbock and his colleagues, the separation of the modern savage from the civilised world was predicated not only by what technologies and skills they had failed to discover but also by differences in custom and morals that spoke of an inferior intellect. The differences between the various modern races was also seen as evidence that - far from representing an ancestral primitive state - these societies had each undergone change throughout their history, some attaining a higher level than others. The literature is replete with opinions about which modern race is the “lowest” form. In an effort to understand what the ancestral primitive condition may have been, Lubbock appealed to the lowest common denominator, i.e. traits that appeared to characterise the most primitive of peoples. Amongst these he found:

- No pottery

- No bows and arrows
- The rudest of boats, if any
- Houses scarcely worth the name
- No clothes (& thereby loose morals)
- No domestic animal but the dog
- No weapons but club & spear
- Inability to count to ten

Subsequent editions of *Pre-Historic Times and* Lubbock's notes reveal others, for example "Indifference to death, Men crying like children, Horrid food, Coyness of Lappland girls" (Pages entitled 'Savages' within notebook entitled 'Archaeology – Travels'. Lubbock archive, The Royal Society). Beyond these rather bald observations there is little discussion on what the primitive mind was like or how it worked, merely a statement that it was more primitive than the most primitive of modern primitives.

Local societies and their members were the thriving lifeblood of Victorian archaeology, and it is largely upon their efforts that the young discipline depended for new discoveries in the field. While most were content to describe (and not interpret) new findings, some of the better connected had by the 1880s begun to go beyond stone tools, and although few had any direct experience with 'modern savages' drew upon the writings of Lubbock, Tylor and others to add texture and context to their findings (e.g. Brown 1889; Smith 1994). This is particularly true of Worthington G. Smith, an impoverished artist and illustrator. Although well connected in scientific circles, Worthington Smith had little experience outside Stoke Newington and the Chiltern Hills, where he would cut an imposing figure in cloak and hat inspecting quarry cuttings (Roe 2009). This did not preclude him from making some of the strongest statements of the period on the primitive mind, and he was distinctively less guarded than his more prominent colleagues. Smith's opined that "by putting the known facts together and by assuming that our savage precursors of far-off times had ideas not very unlike those of savages of recent times, it is perhaps possible to galvanise the fragmentary bones of the primeval savage into life" (1894, 46). This led to a catalogue of sometimes fanciful and sometimes insightful assertions - "Men of old would dream…dreams would often lead to killing" and "Man's voice at that time was probably not an articulate voice, but a jabber…no sound of fear, or hate, or love is expressed in articulate words" (Smith 1894, 49). Also detectable in Smith's writing is

a belief that the 'primeval savage' was an unsympathetic fetishist with a limited attention span, who did not understand death but would believe that everything that moved was alive.

Smith was also greatly interested in the current state of knowledge about the anatomy of the primeval savage, and went to great lengths to describe each skull then available to him, and to comment on how best to draw them correctly. This is telling: while crania can reveal much about biological populations and affinities –a notion widespread in nineteenth century science - his reconstructions served only to illustrate technical points (Figures 4-7). Still, he did note that "great importance has been attached to the absence of {the genio-hypoglossus] tubercle the jaws on the most ancient race of men...as giving evidence of defective speech...but the faculty of intelligent speech in man must also be looked for in the structure of the brain" (Smith 1894, 23-4). Indeed this is the case, although it is surprising that this concern with the shape and metrical analysis of crania did not translate more widely into the notion that one might understand the nature of the primitive mind by such metrical analyses of the fossil materials then known.

Development of notions of the primitive mind

The stages in the development of notions of the 'primitive mind' in Britain are shown in Figure 8. While the first half of the nineteenth century is dominated by the concern with establishing a deep antiquity for Earth-life, it was the coalescence of the theory of evolution by means of natural selection (which provided a mechanism for evolution of the mind), familiarity with 'modern savages' who could be shown to 'adapt' to 'modern' life provided the necessary stimuli were in place (thereby providing a fluid link between 'savage' and 'modern' minds), and the demonstration of human antiquity (which provided proof of the deep time over which human evolution had occurred) which brought about the notion of a 'savage state of mind'. Thus, by the 1870s an interconnected group of British natural scientists were able to show that the mind was sufficiently adaptable to be 'moulted' into new states; that given enough time the mechanism of natural selection could account for such evolution; and that human antiquity did indeed provide enough time for this to have occurred. It is difficult to see how such an essentially modern paradigm about the evolution of the mind could have come about without the conjunction of these three phenomena, out of which arose the specific delineation of 'primeval savagery'.

Conclusions

In a century concerned with the developments of science and technology, within which the boundaries of science were pushed far more than ever before, it is initially surprising that so little attention to the primitive mind can be seen in British scientific circles. We have tried to elucidate some obvious reasons for this. The preoccupation with establishing deep antiquity for Earth life that dominated the first half of the century occurred within an essentially progressivist paradigm which specifically *precluded* the notion of a 'pre-modern' human and thus pre-modern mind. Even when, by the 1870s, the coalescence of Darwin's and Wallace's theory of evolution by means of natural selection, the demonstration of deep time for humans, and the existence of the 'savage mind', little elaboration of the concept of what a primitive mind may have been like is observable. Perhaps 'professionals' – or at least those individuals working in the wider glare of scientific colleagues at home and abroad – felt unable to speculate in the way that Worthington Smith was so confident in doing. Whether 'amateur' or 'professional', however, one can make several generalisations about the treatment of the primitive mind in the period:

- There was no *explicit* consideration by archaeologists of the 'primitive mind' or cognitive evolution
- Individuals claimed to be concerned with the evolution of the mind but were overwhelmingly concerned with chronological and taxonomic order
- Individuals use specific terms like 'intelligence' but with no specific meaning
- The concept of 'mind', if equated with anything, is equated with language *as known in the western world*
- Some individuals use unconscious 'props' of modern behaviour in illustrations e.g. jewellery, with no justification or elaboration
- Despite the intellectual backdrop the notion of cognitive evolution was simply absent from nineteenth century palaeoanthropology.

Acknowledgements

We are grateful to Matthew Eddy for inviting us to participate in the Royal Society conference out of which this volume arose. Felicity Henderson's organisation of the conference, and Matthew's effective chairing, created an excellent environment to discuss the primitive mind. We are particularly grateful to Keith Moore for suggesting us to Matthew in the first place, and for his

kindness and collegiality in the Royal Society's library. Clive Gamble's comments on an earlier draft have helped improve it, as have the anonymous reviewers. We gained a lot from discussion with the conference participants, both speakers and audience, formally and informally. We also thank Barry Chandler of Torquay Museum for his hospitality and helpfulness when examining the museum's archive.

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Figure captions

Figure 1. *The Creation of Man from the Dust of the Earth* from Johann Scheuchzer's *Sacred Physics* (1731). The illustrations around the edge of the frame are discussed in the text.

Figure 2. A primitive human from Pierre Boitard's *Paris Avant les Hommes* (1861). The contrast with the concept of 'primitive' humans like Adam in Figure 1 is striking.

Figure 3. One of Edouard Riou's illustrations for Louis Figuier's *Earth Before the Deluge* (1863) depicting Adam and Eve in the Garden of Eden.

Figure 4. The front cover of Worthington G. Smith's *Man the Primeval Savage* (1894) showing one of his illustrations of a primitive human. The accoutrements of the primitive derived from depictions of Herakles (the fur and club) dress an otherwise 'modern' human.

Figure 5. Frontispiece from Worthington G. Smith's *Man the Primeval Savage* (1894) showing a group of 'primitive' humans, probably a family. Note the rather informal – one might say modern' looking - attitudes.

Figure 6. Illustration from Worthington G. Smith's *Man the Primeval Savage* (1894) showing a female knapping. Note bead or shell jewellery.

Figure 7. Illustration from Worthington G. Smith's *Man the Primeval Savage* (1894) showing cooperative flint knapping.

Figure 8. The development of the notion of a 'savage state' of human evolution, and the primitive mind.