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Peking, Piltdown, and Paluxy: creationist legends about paleoanthropology

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Abstract

Because human evolution is often a stumbling block for accepting evolution, creationist legends about paleoanthropology are persistent. Three such legends, according to which paleoanthropology is based on finds that are admittedly fraudulent (Piltdown) or unadmittedly fraudulent (Peking), or is contravened by neglected finds (Paluxy), are critically discussed.

Keywords: Teaching evolution; Paleoanthropology; Piltdown Man; Peking Man (*Homo erectus*); Paluxy "man tracks"; Creationism

Introduction

Human evolution is often a stumbling block for accepting evolution. In 1925, for example, Tennessee's Butler Act – under which John Scopes was prosecuted – banned the teaching of "any theory that denies the divine creation of man and teaches instead that man has descended from a lower order of animals" (Larson 2003, p. 54). As recently as 2010, a poll in Texas in effect tested whether human evolution was distinctively problematic. Indeed, 38% of respondents accepted "God created human beings pretty much in their present form about 10,000 years ago" while only 22% accepted "Life on earth has existed in its present form since the beginning of time" (Ramsey 2010).

It is small wonder, then, that creationist legends about paleoanthropology – the scientific discipline that investigates the evidence for human evolution – are so persistent. Three such legends that teachers are likely to encounter involve (with pleasing alliteration) Piltdown, Peking, and Paluxy. According to these legends, paleoanthropology is based on finds that are admittedly fraudulent (Piltdown) or unadmittedly fraudulent (Peking), or is contravened by neglected finds (Paluxy). None of these legends is true, of course. But they are so entrenched that it behooves teachers to be aware of the facts, prepared to respond, and ready to use the opportunity as a teachable moment.

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Piltdown

The Piltdown fossil was discovered in a gravel pit in East Sussex, England, in 1912 and was quickly hailed as a true "missing link" that proved "Darwin's theory" (Anonymous 1912). The find was regarded as confirming the brain-first view of human evolution: humans are distinctive among the apes because of our high intelligence and large brains, so the human brain must have been evolving the longest, so the first humans would have possessed large brains but otherwise ape-like features. Piltdown had a large modern skull and primitive dentition: just what the brain-first view predicted. But, as it turned out, Piltdown was a forgery composed of the skull of a human and the jaw of an orangutan, with teeth carefully filed, and the whole specimen stained to give it the appearance of antiquity. Whoever forged it knew the expectations of the scientific community and was able to ensure the wide acceptance of the hoax as genuine – especially within the British scientific establishment, where national pride played a role.

This acceptance was not shared by all scientists of the time. Early on, critics expressed skepticism that the ape-like jaw belonged to the human-like skull, and in 1937, R. M. S. Taylor (1978) criticized the find as not having a human pattern of tooth wear. But many scientists accepted Piltdown because it fulfilled the brain-first view: that the earliest humans would be distinguished from apes by having large brains and ape-like teeth. However, in 1924, a series of fossils began to be discovered in South Africa. Called *Australopithecus*, these fossils had

small, ape-sized brains, but human-like teeth – exactly the opposite of Piltdown. As more of these two-legged early humans were discovered, Piltdown became more and more anomalous and was less and less frequently included within evolutionary sequences – or done so with a question mark or other indication of confusion. Finally, the matter was laid to rest by J. S. Weiner and colleagues (1953), who demonstrated chemically that the skull and jaw belonged to two different creatures.

Creationists never tire of citing Piltdown as a supposed example of paleoanthropological gullibility and stupidity: "A modern ape's jaw and a human skull had been doctored to resemble an ape-man, and the forgery had succeeded in fooling most of the world's greatest experts" (Gish 1979, pp. 131–132). But far from being a humiliation to paleoanthropology, Piltdown is a marvelous example of how science works: the constant interplay between evidence and interpretation. The discovery of new fossils caused a revision in the way scientists understood human evolution. Fitting Piltdown into the overall scheme became more and more difficult. There was only one Piltdown (with two skulls, one found in 1917), and much contrary evidence. Eventually the idea of Piltdown as a human ancestor was abandoned. It is also important to note that it was evolutionists themselves, not creationists, who exposed Piltdown as a forgery and in so doing demonstrated the self-correcting nature of science.

Peking

The Peking remains were found at Zhoukoudian near Beijing, China, between 1927 and 1937 by a number of Western and Chinese scientists (Lanpo and Weiwen 1990). Two hundred fossils, including six near-complete skullcaps from over forty individual specimens, were discovered. They were measured, described, and photographed. Accurate plaster casts and drawings were made. The Peking remains, now technically referred to as *Homo erectus*, are clearly human, but primitive. These people walked upright, made stone tools, and were hunters of large game animals. They were humans, not apes, but they differed from modern humans in that they had smaller brains, larger brow ridges, and larger teeth. Culturally as well as biologically, they bridge the gap between early and late human fossils. Unfortunately, amid the chaos of World War II, the physical remains were lost. The casts, photographs, measurements, and other descriptive material survived the war, however, and can be studied today.

In a book originally published in 1959, Patrick O'Connell, a Catholic missionary who was in China and followed the accounts of the discovery in the newspapers at the time, not only attempted to dismiss the Peking remains as irrelevant to human ancestry, but also accused the scientists involved of engaging in fraud. He wrote, "The skulls were … destroyed before the Chinese Government returned to Peking in order to remove the evidence of fraud on a large scale"; in fact, he claimed, the skull of *Sinanthropus* (as the find was originally called) "was the skull of a baboon or monkey," and the skulls were destroyed so there would be no evidence showing that the casts, photographs, measurements, and other data were tampered with to make them look more human than the actual remains (O'Connell 1993, pp. 127, 136). O'Connell's claims were given wide circulation in Duane Gish's *Evolution: The Fossils Say No!*, which approvingly summarizes them over the space of four pages (1979, pp. 141–145).

The creationist claim of fraud is untenable. As the anthropologist Colin Groves (2000) notes in a review of the second edition of O'Connell's book, after World War II Chinese scholars continued excavation at the original Peking site, as well as in other places in China, and uncovered new remains that look just like the older finds. In fact, two skull pieces found in Zhoukoudian in 1966 exactly fit the gaps in a cast of one of the skulls found in the 1930s. Why would modern Chinese scientists go to considerable trouble to continue a fraud perpetrated thirty years before by a different group of scientists? There is no reason to doubt that the recent Chinese finds (Klein 2009, table 5.2, pp. 287–289) are genuine. Furthermore, remains of *Homo erectus* have been found in many parts of Eurasia and Africa by scientists of many different nationalities (Klein 2009, table 5.1, p. 284, and table 5.3, pp. 290–291). Both the Peking fossils themselves and the species to which they belonged are indisputably real.

Paluxy

Perhaps the most durable creationist legend about human evolution, though, is the existence of human and dinosaur tracks found together. And no site is more famous for this alleged combination of features than the Paluxy River "man tracks". Scientists have explored the region around the Paluxy River near Glen Rose, Texas, since the 1930s, finding hundreds of dinosaur tracks, including genuine sauropod tracks, previously undocumented in the scientific literature. The geology and paleontology of the area are well understood; the tracks are in lower Cretaceous limestone, over 100 million years old. Creationists have claimed that human tracks are to be found among the dinosaur tracks (Morris 1980), which if true would indeed be a revolutionary discovery. Contrary to television and cartoon portrayals of "cavemen" with dinosaur neighbors and pets, humans evolved millions of years after non-avian dinosaurs became extinct, and remains of non-avian dinosaurs and humans are never found together in the fossil record.

What about the Paluxy River "man tracks," then? Some are forgeries, carved for the tourist trade during the Depression. Some are best described as wishful projections of the hopes of creationists to see what they want to see. More interesting are the tracks that were made by feet, but not human feet: modified or eroded dinosaur tracks (Kuban 1986, Hastings 1987). When the heavy animal withdrew its foot from soft mud, the mud flowed back along the sides of the track, making an oblong impression superficially resembling a human footprint; some of the "man tracks" were formed in this fashion. A three-toed dinosaur places most of its weight on the center toe. In soft mud, the center toe print will be deeper. In some of the "man tracks" presented in creationist books, faint traces of side toes can be seen, confirming that these footprints are really just eroded dinosaur tracks. These tracks show claw marks at the "heel" of the "human" print, further indicating that the track is a misinterpreted dinosaur track.

There are opportunities for critical thinking exercises here. In at least one footprint sequence, dinosaur tracks and human footprints alternate. So did people evolve very quickly from dinosaurs and then back again? Or are the "human" tracks just indistinct dinosaur tracks? Similarly, dinosaurs and humans are not the same weight, and their legs are not the same length. But both kinds of tracks are sunk to the same depth in the mud, and the "human" prints are spaced the same distance apart as are the dinosaur prints. Also, the creationist explanation for how human and dinosaur tracks came to lie together seems farfetched. Supposedly, the creatures that made the tracks were fleeing the rising waters of Noah's Flood. Somehow, the Flood must have deposited the base rock, receded long enough for the dinosaurs and humans to run across the valley (leaving their tracks), and then covered the tracks with a layer of mud. This procedure would have had to occur numerous times, because the dinosaur tracks appear in several different layers.

Conclusion

Creationist legends do not circulate in the way that scientific work does; they have the same quality as folklore and urban legends, and are equally hard to track and dislodge. They play to cognitive prejudices: faced with the overwhelming evidence for evolution in general and human evolution in particular, it is no doubt tempting for creationists to assume that evolutionary scientists are easily fooled by hoaxes, engaged in fraud, and overlooking the obvious – and not to bother seeking out evidence to the contrary. So even though the false claims of forgery in the Peking remains are fading from the creationist literature and even though the larger creationist organizations warn their followers against citing some of the Paluxy tracks (though not going so far as to renounce them altogether), there is no prospect of these legends disappearing.

And that is why teachers need to be prepared for them. Legends like these are obstacles that prevent students from coming to understand the abundance of evidence, from multiple lines of scientific inquiry, that confirm the basic facts of human evolution: that human beings share a common ancestry with the rest of life on earth, with our lineage diverging from those of our great ape cousins about five or six million years ago; that our lineage's basic adaptation is bipedalism, preceding and enabling the use of stone tools, increased brain size, and eventually the use of fire; that modern humans evolved in Africa about 200,000 years ago and expanded their range out of the continent 50,000 to 100,000 years ago. Of all of humanity's aspirations, ascertaining our own history is surely among the highest; students deserve to know about our successes in doing so.

Competing interests
The authors declare that they have no competing interests.

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References

Anonymous. (1912). *Darwin theory is proved true* (p. 1). The New York Times.
Gish, DT. (1979). *Evolution: the fossils say no!* (3rd ed.). San Diego, CA: Creation-Life Press.
Groves, C. (2000). Review of Science of today and the problems of Genesis, 2nd ed. *Reports of the National Center for Science Education, 20*(6), 17–18. 23–24.
Hastings, RJ. (1987). New observations on Paluxy tracks confirm their dinosaurian origin. *Journal of Geological Education, 35*, 4–15.
Klein, R. (2009). *The human career: human biology and cultural origins* (3rd ed.). Chicago: University of Chicago Press.
Kuban, G. (1986). A summary of the Taylor Site evidence. *Creation/Evolution, 6*(1), 10–18.
Lanpo, J, & Weiwen, H. (1990). *The story of Peking man: from archaeology to mystery, trans. Zhigi Y*. New York: Oxford University Press.
Larson, EJ. (2003). *Trial and error: the American controversy over creation and evolution* (3rd ed.). New York: Oxford University Press.
Morris, J. (1980). *Tracking those incredible dinosaurs and the people who knew them*. San Diego, CA: Master Books.
O'Connell, P. (1993). *Science of today and the problems of Genesis* (2nd ed.). Rockford, IL: Tan Books and Publishers.
Ramsey, R. (2010). *Texans: dinosaurs, humans walked the earth at same time*. The Texas Tribune. http://www.texastribune.org/2010/02/17/texans-dinosaurs-humans-walked-the-earth-at-same.
Taylor, RMS. (1978). Appendix 6: the Piltdown paper. In *RMS Taylor, Variation in morphology of teeth: anthropologic and forensic aspects* (pp. 362–370). Springfield, IL: Charles C. Thomas.
Weiner, JS, Oakley, KP, & Le Gros Clark, WE. (1953). The solution to the Piltdown problem. *Bulletin of the British Museum of Natural History (Geology), 2*, 141–146.

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