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Forgeries in Paleontology

Paleontological research faces a persistent challenge: distinguishing genuine fossils from skillful forgeries – a task crucial for maintaining the scientific rigor and historical credibility of the discipline.

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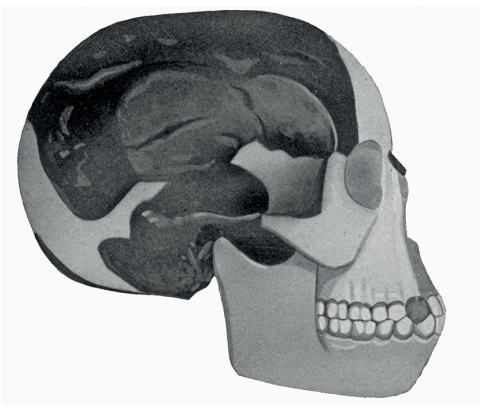
Paleontology is a natural science in which the theme of "authenticity" is especially pertinent. The concept resonates at various levels, including both the object of study – the fossils themselves – as well as to the scientists studying them. Paleontologists often experience a particular sense of straddling across a divide, working as they do at the intersection of biology and geology, as well as at the confluence of experimental and historical science. Unfortunately, this rift can sometimes give rise to irregularities that run counter to the ideals of authenticity. Fossils, which are not infrequently precious, one-of-a-kind objects that represent potentially groundbreaking discoveries for understanding the history of life on Earth, are objects of great desire for both scholars and collectors, as they can bring significant fame and sometimes fortune to their discoverers. This opens up the temptation for certain unethical practices, including attempts to "adjust" nature so that fossils will better dovetail with prevailing and fashionable theories and hypotheses.



J. ARTHUR THOMSON, *THE OUTLINE OF SCIENCE*, 1922, PUBLIC DOMAIN, VIA WIKIMEDIA COMMONS

Reconstruction of the "human" skull of the Piltdown man – parts derived from different skulls are shown in different shades of gray

The fossil record

The allure of fossils certainly extends far beyond scientific interest, attracting collectors and traders alike. All too often, the potential for significant financial gain tempts unscrupulous individuals to fabricate forgeries. At fossil markets, amidst all the genuine and intriguing specimens on offer, one can sometimes also find well-crafted fakes. While these forgeries typically mislead only amateurs, even seasoned scientists have occasionally been taken in.

Interestingly, the forging of fossils has been going on almost as long as there has been scientific interest in them. A infamous example is the case of eighteenth-century German Professor Johann Beringer, who "discovered" fabricated fossils at the sites he was studying. In fact, scientists in conflict with Beringer had purposefully planted them there in order to discredit him. Not realizing the hoax, he wrote an exten-

One of the present authors, Tomasz Sulej, at a meeting with local residents of Miedary, held at an excavation site

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sive treatise on these now-famous "Lying Stones." When the truth emerged, he unsuccessfully tried to buy up the entire print-run of his newly published work. The case ended up in court, and the creators of the forged fossils faced unpleasant consequences for their actions – something that is unfortunately nowadays rare in cases of fossil forgery. Today, Beringer's book is an antiquarian rarity, and the forged fossils described in it (including carved representations of plants and animals, as well as depictions of the sun, stars, comets, and Hebrew letters) now figure in the collections of several museums. Deceptions of this crude kind were possible back in those times, because paleontological knowledge and understanding of the nature of fossils were at a fairly early stage of development.

One of the most spectacular recent cases is the story of a chimera that made the cover of the prestigious *National Geographic* magazine in 1999. A Chinese fossil-collector had glued the tail of a *Microraptor* dromaeosaur to the skeleton of a bird from the genus *Yanornis*, masking the differences in the rocks containing these fragments so well that the buyers did not notice (both fragments came from the same rock formation). The authors of the article even ventured to name the new alleged genus *Archaeorap-*

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Some of the fake fossil specimens "found" by Beringer, now on display at the Senckenberg Naturmuseum in Frankfurt

Reconstruction of the chimera ("patchwork" specimen) of the alleged species *Archaeoraptor liaoningensis*

ENTELOGNATHUS, CC BY-SA 4.0, VIA WIKIMEDIA COMMONS

tor. Fortunately, in this story, all the scientists who had examined this "specimen" had blocked it from being published in prestigious journals. The main blame in this case – apart from the perpetrator of the hoax – therefore lies with the editors and authors at *National Geographic*.

Forgeries for fame

There have also been forgeries and mistakes resulting from excessive ambition, overconfidence, and even ill-will on the part of scholars, negatively impacting the overall picture of fossil research. The Piltdown man case was one that had an exceptionally detrimental effect on the course of research into our species' origins. This incident, meticulously analyzed in numerous studies, demonstrates how ambition, a desire to gain fame and to fit in with the prevailing scientific views of the time, as well as prejudice and racist beliefs, all led to one of the greatest forgeries in paleontology. Found in an English gravel pit at the beginning of the 20th century, the Piltdown skull was purported to belong to the "oldest Englishman." It also seemed to confirm the then-prevailing views that human's large brain had evolved first, followed by the visceral cranium, and that modern man arose in Europe, not Africa. It took forty years to finally arrive at the truth: that nothing like this genuinely existed in nature, that the specimen was a hodge-podge made of parts of a human cranium, an orangutan jaw, and chimpanzee teeth. But during those decades, the Piltdown man greatly muddied the waters of research into human origins and slowed down progress in the field.

Another fascinating story touching upon authenticity is that of the Indian paleontologist Vishwa Jit Gupta, who authored many publications about fossils, mainly from the Himalayas, in journals including *Science* and *Nature*. He took photos of fossils from paleontologists he met at conferences, then slightly modified them (such as by mirroring them), and submitted them as images of his own alleged specimens from India. Reviewers, of course, were unable to determine whether his specimens were actually from the Himalayas. Interestingly, even after the exposure of his numerous forgeries and after facing an internal enquiry at his university, he was still retained there on staff as a lecturer.

The forged fossil of the alleged specimen *Archaeoraptor liaoningensis*

JONATHAN CHEN, CC BY-SA 4.0, VIA WIKIMEDIA COMMONS

Doctored specimens

There have also been erroneous reconstructions of authentic fossils that "improved upon" nature, unfortunately affecting the understanding of phylogeny and having a long-lasting impact on the course of research on a particular group. The well-known Indian paleobotanist Birbal Sahni "corrected" a specimen of the

Permian conifer *Buriadia*, which he had described, for exhibition purposes – to such an extent that it exhibited features (such as seeds formed not in cones, but directly on shoots between normal leaves) unknown in any other conifers. Since it did not contradict the general views of the evolution of early gymnosperms, his interpretation held up for quite a long time, but was nevertheless quite problematic for other paleobotanists studying early conifers. It was not until the original specimen was re-examined in the early twenty-first century that the truth became clear. The juxtaposition of seeds situated adjacently to branches was in fact the product of a "creative" fossil reconstruction, and *Buriadia* turned out to be a coniferous plant rather similar to others from the Permian – rather than one turning the conifer phylogeny upside-down.

Fake or real?

Sometimes authentic fossils have been mistaken for fakes – most often by people from outside the scientific community. During public science-themed events, we ourselves have frequently encountered individuals who firmly insist that the authentic fossils we showed to them were in fact fabrications. Similar skepticism is sometimes exhibited by indigenous communities living near excavation sites – even showing the locals clearly identifiable, partially exposed bones often fails to convince them that these are not simply the remains of cows or horses buried by local residents years ago.

As these examples serve to show, authenticity is a crucial attribute in scientific research, both for the objects studied and the researchers themselves. It significantly influences the quality and credibility of scientific work – especially in paleontology, where a single fossil can serve as the foundation for important theories about the evolution of species and the history of life on Earth. The falsification of fossils stands as a prime example of how authenticity can be compromised in scientific research, adversely impacting the public's perception of evolutionary theory. ■

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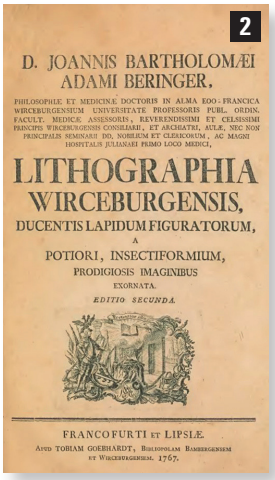
JOHN COOKE, PUBLIC DOMAIN, VIA WIKIMEDIA COMMONS

Fig. 1
Reproduction of a painting showing a team of scientists examining the skull of the Piltdown man – one of them is the scientist considered to be the initiator of the hoax



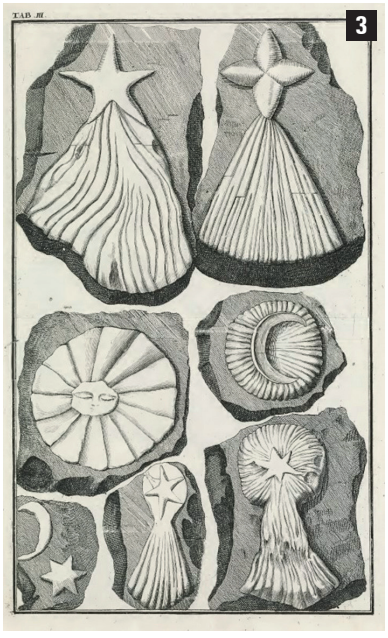


Fig. 2, 3, 4
The cover of Beringer's treatise and two illustrations from it showing examples of the now-famous "Lying Stones"

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