

# CURRENT SCIENCE

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EDITORIAL

## Paleontology: A Minefield of Controversies

Publishing scientific journals can sometimes be a hazardous exercise. A routine academic activity can be transformed into a contentious arena, when a controversy erupts over a published paper. A few months ago, this journal featured on its cover a fossil, that may have appeared fearsome to the average reader; the remains of the head of a long extinct dinosaur. I am no paleontologist, but did realize, in the final stages leading to production, that dinosaur fossils do make striking cover illustrations. In these intensely competitive times even journals of science must do all they can to attract a readership. A long standing fascination for dinosaurs, fuelled in more recent times by *Jurassic Park*, aided a quick choice of a cover figure. The paper entitled 'Skull of *Minotaurasaurus ramachandrani*, a new Cretaceous ankylosaur from the Gobi Desert' appeared especially suited for an audience of Indian readers; the dinosaur's name had a curiously South Indian ring. The description of the skull seemed detailed and comprehensive, with computer tomography providing a unique anatomical view. A cursory glance established that the skull had been purchased by the highly visible neuroscientist V. S. Ramachandran and displayed in a California museum (Miles, C. A. and Miles, C. J., *Curr. Sci.*, 2009, **96**, 65–70). At a fortnightly journal, run by academics on extra time, there is little scope for editors to recall the history of manuscripts before acceptance; publication effectively erases editorial memory. A few weeks after appearance of the paper on the Mongolian dinosaur, I received an e-mail from a paleontologist of considerable repute, who pointed out that 'there is turmoil in global paleontological circles because such specimens bought in clandestine sales will give a boost to vandalism and the commercialization of science and give scientific sanctity to specimens that have no scientific value'. This expression of concern was catalysed by a communication from a fellow paleontologist, who was 'disturbed to note that the specimen has no provenance (but thought to be from Mongolia) and was purchased at a Gem & Mineral show. There is no paper trail for where this fossil comes from or how it was obtained'. This correspondent also drew attention to a *Naturenews* report which invited readers with a characteristically provocative title, 'Paper sparks fossil fury' (Rex Dalton, 2 February 2009; doi:10.1038/news.2009.60). This news item somewhat condescendingly re-

ferred to 'an article in an Indian journal' and carried the comment of a vertebrate paleontologist who remarked that 'it is totally inappropriate to publish on this specimen; it is stolen patrimony'. Online news sites have the ability to elicit instant comments, with *Nature* exhorting readers to be 'as critical or controversial as you like, but please don't get personal or offensive'. The comments on the Mongolian fossil seemed mixed, with some readers voicing a view that seemed to support publication: 'More importantly, the origins of a fossil must not become an impediment to what we can learn'.

The criticism of the decision to publish the paper on the ankylosaur fossil prompted me to reexamine the file on the manuscript. I then noted that the paper was received on July 20, 2007. Three referees read and wrote detailed reports; all commenting on the absence of the geographical location where the fossil was found. One referee described the fossil as 'a beautiful skull of a new ankylosaur', but did express concern about the 'ownership of the specimen from Mongolia'. The reviewer also added that the specimen had 'great scientific value' and seemed reluctant to be a part of a 'fossil feud'. At this point editorial discretion might have tilted in favour of rejection to avoid a controversy. However, my ignorance of the byzantine world of paleontology pointed me along a more author-friendly route. In February 2008, a revision and responses to the reviewers comments was asked for. A revised version was received in October 2008. In addition to several changes, the authors admitted in a note to the editor: 'The skull originated in the Gobi desert, whether from the Mongolian or Chinese side, we do not know. This is consistent with the information provided by the original owner in Japan. Given the nature of the surrounding matrix, which is similar to other Gobi desert fossils that have been described, we are confident of a Gobi desert locality'. Should the paper have been published, if the origin of the fossil was not clearly established? Should a skull of a dinosaur, specially prepared for display in an American museum remain unstudied, even if useful information can be obtained? Does publication of such a paper encourage smuggling of fossils or are such activities promoted anyway by collectors and even museums? Should the skull be returned to the country of origin, if indeed that can be established? Despite the public

debate on these issues within the paleontology community, no clear consensus seems to emerge. Ironically, rare manuscripts, records and historical artifacts transported away from the country of origin have long been displayed and studied in the museums and libraries of Europe, Britain and the United States. There has been little talk of returning these records and artifacts to the 'countries of origin'. The sensitivity of the paleontology community seems to be more a result of the fact that provenance of a fossil cannot be established in such cases, resulting in loss of valuable locational information. Despite the absence of such data, much can still be learned from fossils on display. To argue that publication will encourage 'smuggling and vandalism' seems an overstatement, based on an unrealistic assessment of the value and importance of a paper in a scientific journal. Fossil smuggling is driven by the prices paid by collectors, including museums.

Paleontology is a field that fascinates the lay public whenever fossil remains of ancient animals are reported, especially if there is a link to the human lineage. The most recent example of extraordinary public interest in a fossil find is the coverage in the popular press of a paper entitled 'Complete primate skeleton from the middle Eocene of Messel in Germany: Morphology and paleobiology' (Franzen, J. L. *et al.*, *PLoS One*, 2009, 4, e5723). The fossil estimated to be 47 million years old is of an early primate, a precursor in the evolutionary branch from which apes and humans emerged. The fossil found in Messel, Germany has a 'curious history'. The authors provide a complete description of the fossil's remarkable journey to stardom: 'The fossil was apparently unearthed in 1983 by private collectors who split and eventually sold two parts of the skeleton on separate plates; the lesser plate (herein plate B) was restored and in the process fabricated to make it look more complete. This was eventually purchased for a private museum in Wyoming and then described by one of us who recognized the fabrication. The more complete part (plate A) has just come to light, and it now belongs to the Natural History Museum of the University of Oslo (Norway). When made available for study, plate A was immediately recognizable as the complete complementary and unaltered counterpart of plate B' (Franzen, J. L. *et al.*, *PLoS One*, 2009, 4, e5723). The explosion of interest in the fossil, now described as *Darwinius masillae* has been fuelled by a well-orchestrated publicity campaign that began in advance of publication in the journal. The critics seem to disapprove of excessive publicity; curiously the provenance of the fossil and its fragmentation and reunion across continents have attracted little attention. Private unnamed collectors and buyers and museums, seem an integral part in the life of paleontologists and the published literature is not always clear whether 'permits' for transport of fossils across national boundaries are always

obtained. Somewhat battered by the criticism of the Mongolian dinosaur paper, I could not help wondering if the ethical concerns of paleontologists are selectively voiced.

Paleontology is a field that is not new to controversy. There is romance and adventure in fossil hunting. The debate over the fossils of dwarf humans, *Homo floresiensis*, found in the island of Flores, Indonesia in 2004, has received a shot in the arm, with new studies supporting the idea of a new species (Jungers, W. L. *et al.*, *Nature*, 2009, 459, 81; Weston, E. M. and Lister, A. M., *ibid*, 2009, 459, 85). New hypotheses on the evolution of *H. floresiensis* are already appearing. Innocent, as I am, of the ways of paleontology, paleobiology and anthropology, I could not but be enthused by the exhortation at the conclusion of a commentary on the new papers: 'But the only way to test these and other hypotheses is to find more fossils, especially in Asia. Get out your shovels!' (Lieberman, D. E., *Nature*, 2009, 459, 41). Paleontology's many controversies bring back memories of 'The Great Piltdown Hoax', an episode in which the famous Piltdown skull, pieced together between 1908 and 1911 was shown to be a hoax in 1953, using improved methods of chemical analysis. The skull was once thought to belong to the 'dawn man' or the 'earliest Englishman' (Straus, W. L. Jr, *Science*, 1954, 119, 265). A recent report using the most recent analytical methodologies provides a new twist to another of paleontology's many controversies regarding the evolution of eukaryotes based on fossil evidence. In a paper entitled 'The controversial "Cambrian" fossils of the Vindhyan are real but more than a billion years older', a team of Swedish and Australian scientists support the claim of R. J. Azmi made a decade ago for fossils of eukaryotic organisms in the Vindhyan basin. Controversies over the age of the geologic formations led to doubts regarding these claims, with an emerging consensus that the fossils did not exist or were artifacts. The new study concludes that 'the discredited report of "Cambrian" fossils turned out to be an important discovery'. This vindication of an Indian study published years earlier does not seem to have laid the old controversy to rest. Instead, a debate on Azmi's treatment by the community of geologists and paleobiologists appears to have been sparked (*Naturenews*, 22 April 2009; doi:10.1038/news.2009.383).

Paleontology is a fertile field for controversies. While procedures for dating and analysis improve continually, fieldwork, fossil identification and integration with geochronology and anthropology require special talents and a flair for multidisciplinary work. Hypotheses sometimes run far ahead of the evidence. The problems of 'ethical' issues in papers dealing with rare and interesting fossils adds a new dimension to an area that is a minefield of controversies.

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