



Evaluation of the hypothesis of the Monster of Troy vase as the earliest artistic record of a vertebrate fossil

Evaluación de la hipótesis de la vasija del Monstruo de Troya como la representación artística más antigua de un fósil de vertebrado

Avaliação da hipótese do vaso do monstro de Troia como a representação artística mais antiga de um fóssil de vertebrado

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Abstract

The Monster of Troy, depicted in a 6th Century BC Corinthian vase, has been proposed to be the earliest artistic record of a vertebrate fossil, possibly a Miocene giraffe (*Samotherium* sp.). The purpose of the paper was to analyze the giraffe hypothesis using four approaches: a double-blind random design in which 78 biologists compared the vase skull with *Samotherium* and several reptiles; an informed survey of 30 art and science students who critically assessed the hypothesis based on images of candidate species; an objective computerized mathematical comparison of the images; and a detailed morphological comparison of the skulls. All of the participants rejected the giraffe hypothesis. The types of eyes and teeth unambiguously discard a mammal, whether fossil or living, as the model. The model was most likely an extant carnivorous reptile of the Varanidae family.

Keywords: *Samotherium*; *Oxydactylus*; Greek art; zoological representations; ancient fauna.

Resumen

Se ha propuesto que el Monstruo de Troya, representado en un jarrón corintio del siglo VI a. C., es el registro artístico más antiguo de un fósil de vertebrado, posiblemente una jirafa del Mioceno (*Samotherium* sp.). Mi objetivo fue poner a prueba la hipótesis de la jirafa. Analicé la hipótesis de la jirafa en cuatro enfoques: un diseño aleatorio "doble ciego" en el que 78 biólogos compararon el cráneo del jarrón con *Samotherium* y varios reptiles; una encuesta informada de 30 estudiantes de artes y ciencias que evaluaron críticamente la hipótesis basándose en imágenes de especies candidatas; una comparación objetiva hecha mediante comparación matemática por un algoritmo de computadora; y una comparación morfológica detallada de los cráneos. Todos rechazaron la hipótesis de la jirafa. Los tipos de ojos y dientes descartan inequívocamente a un mamífero, sea fósil o vivo, como modelo; el modelo probablemente fue un reptil carnívoro de una especie que aún vive perteneciente a la familia Varanidae.



Palabras clave: *Samotherium*; *Oxydactylus*; arte griego; representaciones zoológicas; fauna antigua.

Resumo

Foi proposto que o Monstro de Troia, representado em um vaso de Corinto do século VI a.C., é o registro artístico mais antigo de um fóssil de vertebrado, possivelmente uma girafa do Mioceno (*Samotherium sp.*). Meu objetivo era colocar à prova a hipótese da girafa. Analisei-a em quatro abordagens: um desenho aleatório "cego duplo", no qual 78 biólogos compararam o crânio do vaso com o *Samotherium* e vários répteis; uma pesquisa informada de 30 estudantes de artes e ciências que avaliaram criticamente a hipótese com base em imagens de espécies candidatas; uma comparação objetiva feita mediante comparação matemática por um algoritmo de computador; e uma comparação morfológica detalhada dos crânios. Todos rejeitaram a hipótese da girafa. Os tipos de olhos e dentes excluem inequivocamente um mamífero, seja fóssil ou vivo, como modelo; o modelo provavelmente era um réptil carnívoro de uma espécie que ainda existe, pertencente à família *Varanidae*.

Palavras-chave: *Samotherium*; *Oxydactylus*; arte grega; representações zoológicas; fauna antiga.

Introduction

In volume 19 of the *Oxford Journal of Archaeology*, it was proposed that the Monster of Troy, depicted in a 6th Century BC Corinthian vase, was not purely imaginary, as previously believed, but the earliest artistic record of a vertebrate fossil, possibly a Miocene giraffe, *Samotherium*, with details from other animals, like insect antennae, added for effect (Mayor, 2000; Mayor 2011). Despite the nearly two decades elapsed since publication, no formal scientific articles have analyzed this idea, but paleontologists have rejected them online, including *Protoceratops* and *Dracorex* as inspiration for griffins and dragons, because they do not match chronologically, geographically and morphologically (Bosscher, 2014; Witton, 2016). Another suggestion of large fossils was also rejected, based on contemporaneous texts that clearly associated the bones with extant whales (Papadopoulos & Ruscillo, 2002).

Here, I test both the mammal-giraffe hypothesis of Mayor (2000) and the hypotheses of Bosscher (2014) who proposed that the model could have been a plesiosaur, a mosasaur, or, more probably, some species of monitor lizard.

Methodology

Double blind experiment

Software was used to present, online, several images to 78 volunteer professional biologists who were asked which skull more closely resembled the skull in the vase ([google.com/forms](https://www.google.com/forms)). To prevent bias, they ignored the nature of the study, and all skulls were redrawn as standardized anatomical outlines and presented to them in random order. The assistant who tabulated the results was also unaware of the nature of the study.

Informed experiment

Thirty college students from varied fields were explained the hypotheses and



given un-retouched photographic images of a variety of similar skulls and the vase (all kindly provided by Dr. A. Mayor).

Automatic analysis

Anatomical outlines of the skull, all in the same style and size, were compared for species that could have been known to the artist (considering time and place) with the software IMG (IMGonline.com.ua).

Morphological analysis

Eye type and dentition type were compared in photographs of the vase, the fossil giraffe and extant reptiles (Fig. 1).

All survey forms, images and raw data are available from the author upon request.

Results

In the online test, 58 biologists associated the drawing of the vase skull with the lizard *Varanus exanthematicus*, ten with *Plesiosaurus dolichodeirus*, eight with the

mosasaur *Prognathodon stadmani* and only two with the fossil giraffe *Samotherium boissieri*; the preference was highly significant (Chi-Square Test=103; Prob. <0.0001).

The informed students mostly associated the vase skull with *Oxydactylus* (an extinct North American camel that could not have been seen by the vase artist, N=15), followed by *Pakicetus* (extinct cetacean from Pakistan, N=5), and two students each with crocodiles, horses, the *Samotherium* giraffe, the lizard *Varanus exanthematicus* and the lizard *Varanus griseus* (both from Africa).

Software assigned the highest similarity score to *Plesiosaurus* (6.55%), followed by *Varanus niloticus* (6.53%) and the *Samotherium* giraffe (5.06%).

Including a sclerotic ring in the eye and sharp teeth (Fig. 1a), the eye type and dentition represented on the vase are typical of reptilian predators (Fig. 1b); while mammals lack sclerotic rings and, in the case of giraffes, have grinding molars that are completely different from the jaws in the vase (Fig. 1c).

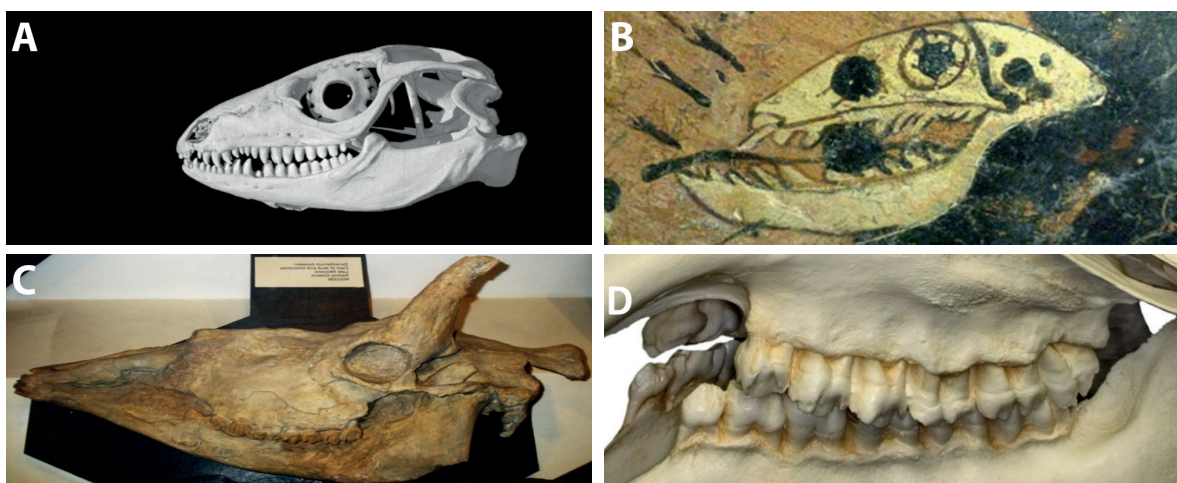


Figure 1.

A. Monitor lizard. B. Troy Monster. C. *Samotherium* giraffe. D. Detail of modern giraffe teeth. Source, A. R. Hill, reptileforums; B. J. Glazier, Flickr, C & D. Wikimedia (Ghedoghedo). <https://bit.ly/2BUZCwG>; <https://bit.ly/2BSkC6Z>



Discussion

The fact that a foreign species -that could not be known to the vase artist- was selected by the informed students, is in itself interesting and emphasizes the value of less subjective approaches used here, such as automatic computer analysis and morphological comparison.

In any case, the four tests rejected the fossil mammal/giraffe hypothesis. The eye with sclerotic ring and the teeth shape unambiguously discard a fossil or living mammal -giraffe or other- as the model (Hall-Martin, 1976; Atkins, 2014).

More probably, the model was a carnivorous reptile, like the extant giant lizards of the genus *Varanus*, which have a characteristic skull, eye and teeth shape (Delfino et al. 2011) that match the vase monster. The interpretation of the dark area as a rock and the shorter upper jaw as a broken bone is not the only possible interpretation, it can also represent a dark cave, the monster's body, or simply result from the poor skill of the artist, as shown by the wrong proportions of the Heracles arms, Hesione's misshapen face and wrongly proportioned horses in the same vase.

Paraphrasing what Witton (2016) wrote about the griffin hypothesis, even though the eroded fossil suggestion is attractive, everything in the image can be "best and entirely explained" as the representation of a skull of a living species of reptile, and "there is no need to invoke any exotic fossil anatomies".

Dr. Mayor's contribution in reviving interest in the subject must be fully recognized and appreciated. I hope her work will inspire further studies about other possible fossil influences on cultural expressions, just like it inspired this note.

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