

**Reply to Signore's review on Elewa's 'Morphometrics. Applications in biology and paleontology'**

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**Abstract**

This short paper presents a reply on a book review, published for the first time in the April 2005 issue of [www.PalArch.nl](http://www.PalArch.nl) (the review can still be viewed at [http://www.palarch.nl/Non\\_scientific/bookreview.htm](http://www.palarch.nl/Non_scientific/bookreview.htm)). The editor of the book is the author of this reply.



The reviewer of 'Morphometrics. Applications in biology and paleontology', Dr Signore, admitted not to be a specialist in the field of morphometrics, unfortunately prohibiting a discussion of technical details. Nevertheless, he provided a helpful review of the book, including some valuable criticism which I present shortly:

- His emphasis that all papers are written by leading morphometricians, and are well-organised and well-written is acknowledged.
- Signore notes that the invertebrate section is the most significant as the morphometric studies give some definite conclusions.
- The reviewer states that some papers on vertebrates especially attracted his attention (*e.g.* papers on sauropod tracks, passerine birds, and molars).

However, it is worth elaborating on two important points, one being the purpose of the book and the other being the outcomes of the morphometric analyses presented within.

- Signore imagines that books on morphometrics must always aim to explain methods to the reader, regardless of whether the reader is a novice or advanced. The purpose of 'Morphometrics. Applications in biology and paleontology' is neither of these. My aim in bringing together these papers is to present examples of morphometrics applied to a wide range of problems in order to encourage quantitative thinking in morphology. I specifically did not want to provide a 'how-to' manual because several excellent examples already exist, such as Bookstein (1991) or Zelditch *et al.* (2004). Moreover, in my experience, 'how-to' books are not consulted until people see how morphometrics can be applied to questions that interest them and my intention was to do just that.
- Quantitative thinking often exposes biological issues that are not noticeable otherwise. Signore bemoans a lack of conclusions in some of the papers, yet each reaches quite specific conclusions. Because of the complexity of the biological world, the conclusions of each will be primarily of interest to scientists working in related areas, hence the diversity of papers in my book. But each paper has important, general conclusions as well. For example, Signore describes the results of Polly & Head's quantitative assessment of the identification (on species-level) of mammal skulls as "a failed attempt at using maximum likelihood to identify *Marmota* skulls", implying that their attempt failed where another might have succeeded. The 'failure' was not analytical, but biological. Polly & Head concluded (p. 217), "When only single specimens are available, the possibility of reliable identifications may remain remote, even when quantitative procedures are adopted." In other words, two closely-related species may be impossible to distinguish unless large samples of both are available because the range of morphological variation overlaps to a great extent. Yet many identifications on species-level, especially in vertebrate palaeontology, are made on the basis of isolated, fragmentary specimens. Polly & Head concluded that those identifications are inherently suspect, and they provided a quantitative assessment of precisely how suspect for their particular taxon. Moreover, Signore mentions that the two papers on human evolution give uncertain results, but in the first paper the authors are able to define an allometric relation between Neanderthals, hominids and humans. The second paper successfully distinguishes Neanderthal remains from those of modern humans.
- Palaeontology is full of assertions that have not been rigorously analysed and the papers in the book are provided to give readers a picture of how some of them might be.

In summary, I would like to thank Dr. Signore for his conclusion stating that this book is good for theoreticians and for scientists who are at the middle stage between theoreticians and fresh starters. This means that the book has successfully achieved one of its goals of appealing to scientists in the gap between theoreticians and beginners.

### Cited literature

- Bookstein, F.L. 1991.** Morphometric tools for landmark data. Geometry and biology. – Cambridge, Cambridge University Press.
- Zelditch, M.L., D.L. Swiderski, H.D. Sheets & W.L. Fink. 2004.** Geometric morphometrics for biologists. A Primer.. – New York, Elsevier Academic Press.

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