

1. Neanderthals revisited

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Abstract

Neanderthals are the best represented and most studied group in the fossil human record. The relatively large number of Neanderthal fossils and their good preservation offers the possibility of robust inferences about their evolution and paleobiology. Nevertheless, debate still continues on important issues, and this suggests that deeper theoretical and methodological differences lie at the root of the lack of consensus. Such disagreements are not likely to be resolved by additional fossil findings, but rather require critical re-evaluation of the evidence at hand and the application of novel techniques and perspectives. This is the premise and main goal of this volume. The major debates in Neanderthal research are re-examined with the use of innovative state-of-the art methods and exciting new theoretical and conceptual approaches. The diverse contributions presented here offer fresh insights and advances that move us closer to reaching a consensus.

As the contributions to this volume illustrate, the Neanderthals are the best represented, most comprehensively studied, and most thoroughly understood group of fossil hominins. The wealth of specimens currently available to the scientific community, including dozens of relatively complete crania and partial skeletons from across a broad geographic range, affords scholars the opportunity to develop well-informed and robust inferences about

the anatomy, phylogenetic relationships, taxonomy, and paleobiology of the Neanderthals. Equally importantly, we know a great deal about their archaeology, paleoecology, paleoenvironment, and zoogeography, all of which offer key evidence for interpreting their paleobiology in a broader environmental, behavioral, and phylogenetic context. Paleoanthropologists studying earlier parts of the human fossil record are less fortunate,

having to work with taxa that are much more poorly represented, and in some cases known only by a few fragmentary specimens. It is certainly an enviable position to be in, one in which most vertebrate paleontologists, who universally lament the shortcomings of the fossil record as an impediment to resolving key problems, would be most content to find themselves.

Nevertheless, despite the quality and weight of the evidence, there continue to be major debates (that have lasted for 150 years) about a number of contentious issues, especially whether or not Neanderthals should be included in the same species as anatomically modern humans, and what is the precise phylogenetic relationship between these two forms. Our inability to agree on these fundamental questions is a matter of serious concern for paleo-anthropologists: it leads to the inevitable conclusion that if we are unable to come to a decision about the nature of the relationship between Neanderthals and modern humans, how can we have confidence in our ability to resolve relationships in the earlier, much more scanty, fossil human record. However, the lack of unanimity is unrelated to the quality of the material. It is more a consequence of deeper theoretical and conceptual issues that relate to how different researchers analyze and interpret the anatomical and genetic evidence, and to the manner in which these are ultimately situated in the broader context of how biological systems operate in the natural world. If this is the case, then it will take some time before a consensus can be reached, regardless of the amount of fossil material available for study. One way forward is to explore new methods and theoretical approaches in order to better understand the paleobiology and phylogenetic relationships of Neanderthals.

The main theme of this volume is to revisit the major debates concerning the place of Neanderthals in human evolution. How morphologically distinct are the Neanderthals from modern humans, and what do these distinctions

mean in terms of their paleobiology and phylogeny? How genetically distinct are Neanderthals from modern humans, and what does this mean for interpreting the population dynamics, taxonomy and phylogenetic structure of Late Pleistocene hominins in Europe? Were Neanderthals and modern humans capable of interbreeding, and can they be considered the same or different species? What were the paleoenvironmental and paleoecological contexts of Neanderthals, and how did this impact on their paleobiology, evolution, and extinction? All of these issues are tackled head-on in this volume. By presenting new evidence, using innovative and state-of-the art techniques and methods, and exploring exciting new theoretical and conceptual approaches, the contributors gain fresh insights into these issues, and ultimately succeed in edging the debate closer to a consensus. However, we leave it up to the reader to decide just how far we still have to go in order to attain a satisfactory solution to some of these long-term problems.

As editors of this volume, our aim was to assemble a collection of papers written by leading international researchers who have tackled many of these important questions using a variety of novel approaches. Equally importantly, as can be discerned from the chapter titles and the content of this volume, we have also tried to accommodate a diversity of opinions and perspectives that reflect the plurality of viewpoints among contemporary scholars. The range of topics covered include phylogeny, taxonomy, speciation, development, lifeways and adaptation, population genetics, extinction, paleoecology and archaeology, while the methods adopted include morphological analyses (i.e., traditional comparative morphology, dental anthropology, developmental biology, unilinear measurements, and three-dimensional geometric morphometrics), genetics (i.e., mtDNA, microsatellite data), experimental modeling, and computer imaging.

This volume is not organized in formal sections, but rather it follows the logic of the