

Book Review of *Our Ancient Youth: A Perspective on Evolutionary Phylogeny and Ontogeny*

Robert C. Vannucci and Susan J. Vannucci

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For the past two centuries, the attention of paleoanthropology has focused primarily on the anatomy of fossils of adult hominins, and distinguishing population-level adaptation to changing climates from speciation events has been considerable, with significant difficulties remaining in reconstructing hominin phylogeny. Largely missing from this effort has been the placement of infant, juvenile, and subadult remains within the evolutionary context. Though Haeckel (1897) produced the first comprehensive survey of the role of ontogeny in phylogenetic analysis, his efforts were limited by the relatively young fields of comparative physiology and paleontology. Zollikofer and Ponce de Leon (2010) defined this deficiency in our research in an important examination of the problem. Now, more than 120 years after Haeckel wrote, both fields have benefited from extensive new studies, increased sample sizes, systematics and DNA analysis. Therefore, a new book by the Vannuccis (2025) is both timely and a brilliant reflection of this new research.

The foundation of this work has been laid by the wave of research in life history (fetus, child, juvenile, subadult, and adult) similarities and differences among mammals. One of the most difficult and elusive aspects of human evolution, however, is the late appearance of complex society and technology. The authors address the evolution of hominins from the organization of physiology with reference to behavioral characteristics. Their first chapter summarizes general evolutionary concepts. Chapter 2 confronts primary elements of hominin adaptations such as bipedalism, dentition, and the expansion of the brain. With the brain as a preadaptation, with complex language, the idea of human created environments takes hold that minimizes the conditions necessary for the development of eusocial conditions. The authors refer to theories related to this process as in the expensive brain theory and Wrangham's (2009) argument that the use of fire to cook food provided early hominins with richer foods than previously.

The evolution of social complexity and behavior have been attributed to ontogeny (Wilson 2012) and therefore the Vannuccis' book allows an intimate examination of this possibility. The Vannuccis also keep to the fossil evidence and generally avoid the confused mass of conflicting species that the hominin line has been divided into. Many of these species designations are proposed without reference to population-level theories of variation and adaptation, and few schemes agree even in the weighting of traits in

cladistic analyses, thereby weakening claims for clearly distinct species (Caldararo 2016, 2018). This problem is noted deftly by the authors.

This book is an undertaking in the study of human ontogeny and evolution that has been attempted before, but in collections of essays. In *Our Ancient Youth*, the Vannuccis bring their extensive experience with clinical and laboratory research of the developing brain along with the focus on the number of subadult, juvenile, and infant hominin fossils, creating a comprehensive picture of comparative anatomy. Here, reference to dental patterns of growth and development rates are brought into alignment with fossil evidence and genetics, though with an eye to the caveats described by Zollikofer and Ponce de Leon in their 2010 paper. One criticism is their use of data from small samples or unique populations, as in body size where small bodied humans fall outside the averages they used and the same is true of brain sizes, e.g., an average of 1350cc when many modern humans have cranial capacities well within the range reported for *Homo erectus* (Allen et al. 2004; Reardon et al. 2018).

The tendency to consolidate differences—the so-called “lumper” approach in anthropology—joins together many traits not considered relative to species designation. On the other hand, the “splitter approach” is due to a long history of identifying specific fossils as “types” and then joining all those similar to it as if the type was a kind of pre-existing eternal unit. But species are compromises based on the best interpretations of often fragmentary and distorted remains. As Ernst Mayr (1963) once put it, “objects vs populations.” But the authors address issues of developmental variations by reference to genetic influences in ontogeny. They address variations in development, comparing other primates in context with fossils, such as *Sahelanthropus*, *Orrorin*, *Ardipithecus*, and the Australopithecines, with later groups of fossils as the Paranthropines and early *Homo*. By carefully matching fossil evidence of development in infant, child, and juvenile remains with subadult and adult characters, they make clear distinctions from a number of difficult resemblances, for example, facial growth differences, possible use of teeth in processing leather, and elements of cold adaptation in Neandertals. This is true also with more fragmentary fossils and comparisons with the ancient DNA data for Neandertals and Denisovans. While they consider the *Homo floresiensis* and *Homo naledi* fossils, they stay within a strict analysis of the materials without speculation.

A few minor criticisms are in order. There are a number of authors' works missing from the references but cited in the text. These omissions would ideally be corrected in a future edition. Chapter 7 is much too long at 97 pages. However, one of the great works in physical anthropology, Hooton's *Up From the Ape*, published in 1946, had a penultimate chapter containing 240 pages, and was a marvel of clarity and information. Finally, as I recognize that this book was written as a monograph in a medical tradition, its topic is that of paleoanthropology and therefore the audiences that will be drawn to it will expect a typical "confirmation of the thesis" conclusion as is found in most anthropological works on this subject.

I recommend this book to interested general readers, as well as to students in anthropology and biology seeking a comprehensive analysis of the fossil evidence for human evolution in a developmental and neurobiological context.



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