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Primate Craniofacial Function and Biology

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focus on Britain, this handbook draws together a great deal of information in a single volume. I will likely use it in my future bioarchaeology courses.

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PRIMATE CRANIOFACIAL FUNCTION AND BIOLOGY. By Christopher J. Vinyard, Matthew J. Ravosa, and Christine E. Wall. New York: Springer. 2008. 496 pp. ISBN 978-0-387-76584-6. \$159.00 (hardcover).

Edited books resulting from conference symposiums can be hit or miss. Some, such as Frederick Grine's (1988) "Evolutionary History of the 'Robust' Australopithecines," become classics in the field. Others seem more like a collection of ideas that have been published elsewhere in one form or another or a hodgepodge of works in progress that lack cohesiveness and leave the reader without any real sense of the symposium's purpose or goals. I was pleased to discover that "Primate Craniofacial Function and Biology" is a "hit." This volume in honor of Dr. William L. Hylander is full of insightful analyses that leave no doubt as to the vitality of research on primate skull function. It also does a commendable job of highlighting the importance of Hylander's work as a foundation for current and future research in this area.

The breadth of cutting-edge methodological approaches presented in this volume make it a valuable introduction to the study of primate skull functional morphology. These include studies of bone strain and muscle recruitment patterns (both cornerstones of Hylander's own work), muscle scaling patterns, bone microstructure and material properties, and food mechanical properties and their relationship to tooth and jaw morphology. There are modeling studies as well as in vivo and in vitro research, and the study subjects encompass a diversity of taxa including prosimians, New World monkeys, Old World monkeys, and fossil hominins. There are even studies of nonprimates such as mice, rabbits, pigs, camelids, and marsupials, all of which present interesting comparative tests for functional hypotheses of particular primate features. For example, anthropoid primates, pigs, and camelids all fuse their mandibular symphyses. However, strain gauge experiments conducted by Herring et al. (pigs, Chapter 2) and Williams et al. (camelids, Chapter 3) conclude that symphyseal fusion likely occurred for a different reason in primates (wishboning or lateral transverse bending) than it did in either of the other groups.

Given that many of the authors worked closely with Hylander at one time or another, it is not surprising that only one chapter (Simons, Chapter 18) does not focus on the masticatory system. This may be disappointing to those wanting a more holistic view of primate skull function, but I do not feel that it is a significant detraction. The book is still full of interesting and thought-provoking research, albeit with a slightly more limited scope than the title suggests.

Useful introductions start each of the five major sections providing clear and concise summaries of the research in the subsequent pages. However, some additional effort on the part of the editors to draw connections between the studies in each section, and possibly between sections, would have been valuable. For example, Wang et al. (Chapter 8) suggest that fused cranial sutures allow the transfer of strains whereas unfused (patent) sutures do not, and this agrees with earlier chapters on the mandibular symphysis in which symphyseal fusion appears to allow the transfer of strains from balancing-side muscle action. Drawing such connections would help readers synthesize research from individual chapters and come away with a better understanding of the field as a whole.

In general, the figures are well selected and add to the reader's understanding of the research being presented. However, there are occasional exceptions. The figures in the Ross chapter (Chapter 4) have separate lines to indicate the magnitude and direction of the maximum principal strains for chewing on both the left side and right sides, but it is impossible to distinguish between the lines for the left and right sides in the figures. I must surmise that these figures were originally in color and the transfer to black and white resulted in the loss of this important information, although even varying the grayscale of the two lines likely would have been enough to make the distinction. Figure 13.2 in the Dechow et al. chapter (Chapter 13) is another point of confusion. Four boxes are depicted to show differences in directional properties, but the three boxes that are supposed to show orthotropy, transverse isotropy, and isotropy all appear to show orthotropy. Fortunately, the description in the caption is well written and one can still ascertain the meaning of these terms.

These minor points aside, I was repeatedly impressed with the quality of the work presented here, and there are very few chapters from which I did not learn something new. The diversity and quality of research in this book make it a particularly useful resource for new Ph.D. students interested in primate craniofacial biology as they struggle to identify suitable dissertation topics, although the fairly high price tag will likely keep most students from purchasing their own copies. This book would also be valuable for professors and researchers who simply want to stay up to date on the myriad approaches currently being undertaken to understand primate skull function, particularly if they have a special interest in the masticatory system. For someone not accustomed to reading about biomechanics, the terminology can get a bit dense in places, but in general the

authors do an admirable job defining technical terms, and the index is useful and quite complete.

This book is a fitting tribute to Hylander's pioneering and influential research. It quickly becomes clear as one moves from one article to the next that Hylander's influence on this field will be felt for many years to come. To the authors' (and editors') credit, Hylander's contributions are often mentioned specifically either in the body of the text or in the acknowledgments of each chapter. For example, Williams et al. (Chapter 3) provide an excellent summary of Hylander's work on anthropoid symphyseal fusion. In addition, Chapter 1 by Schmitt et al. recounts Hylander's role in answering Sherwood Washburn's call for an experimental approach in physical anthropology.

The symposium on which this volume is based took place at the 2005 meetings of the American Association of Physical Anthropologists. That was the 75th anniversary

of the AAPA, and I recall a poster from those same meetings in which over 44% of American field primatologists were found to be academic descendants of Washburn. It is clear from this book that Bill Hylander has had an equally profound influence on the study of primate skull function.

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BONES AND OCHRE: THE CURIOUS AFTERLIFE OF THE RED LADY OF PAVILAND. By Marianne Sommer. Cambridge, MA: Harvard University Press. 2007. 398 pp. ISBN 0-674-02499-0. \$42.00 (hardcover).

The Red Lady of Paviland is a partial human skeleton, missing its skull, covered in red ochre and associated with a number of possible grave goods (periwinkle shells, ivory rods, and rings). It was excavated in 1823 by William Buckland at Paviland Cave, or Goat's Hole, in northern Wales. Despite its common appellation, it is an anatomically modern male, now thought to be a Gravettian burial. In this book, Marianne Sommer, a historian of science, presents the "biography of a scientific object" (p. 3). She does not just review the history of research at Paviland Cave, but also the role of the skeleton in the construction and reconstruction of ideas about early human history. She discusses three stages in the production of this knowledge: 1) the initial discovery of the skeleton by William Buckland; 2) its reinterpretation by William Sollas in the early twentieth century, in the light of growing evidence of human biological and cultural evolution; and 3) the late twentieth century re-examination of the site by Stephen Aldhouse-Green and his colleagues.

Sommer states that what was initially important about the Red Lady was its status as the first genuinely fossil human skeleton discovered by a scientist. But its discoverer, William Buckland (1784–1856), was not your average scientist. He was the first Reader in Geology and Mineralogy at Oxford University, but he was also an Anglican churchman and eventually the Dean of Westminster. As such, he was *the* authority to whom amateur collectors of fossils and what we now recognize as Palaeolithic artifacts deferred. Since he believed in a literal biblical interpretation of history, one could make a reasonable case that he single-handedly delayed the scientific establishment of human antiquity in the British Isles by at least thirty years. For him, any human remains or artifacts associated with so-called extinct animals had to date from the Diluvial Period, that of Noah's flood, or immediately before it. On the positive side, Buckland was one of the first to emphasize the formational processes behind the fossil bones recovered from

caves and carried out experiments with African hyenas to establish their role in accumulating bones. He used these studies to dismiss the possibility that humans had a role in the accumulation of any Pleistocene bones.

For Buckland, the Paviland burial represented a genuine archaeological site. As a result, it had to be quite recent. He originally interpreted the skeleton as that of a tax collector, surrounded by his ivory receipts. Eventually, he described it as that of a female and the ochre as a "scarlet letter" identifying the woman as a prostitute or witch. He stressed its burial in a remote, forbidden place, near an ancient Romano-British camp. In this immortal phrase from his *Reliquiae Diluvianae* (1823), Buckland concluded that the camp "seems to throw much light on the character and date of the woman under consideration; and whatever may have been her occupation, the vicinity of a camp would afford a motive for residence, as well as the means of subsistence" (cited on p. 65). This is the picture that most historians of Palaeolithic research present of this find. It was a genuine fossil human burial misinterpreted by its discoverer.

Did the reinterpretation of the site and skeleton by William Sollas (1849–1936) offer a better answer? Sollas, one of Buckland's successors to the Chair of Geology at Oxford, was aware of the ever-increasing evidence of fossil humans and their artifacts. He concluded that the Red Lady was an Aurignacian male burial, a Cro-Magnon just like those that had been recovered in the Dordogne a few decades before. This is much closer to the modern interpretation but still had a number of problems. He fit the skeleton into a racial theory of humankind but eventually accepted that it represented one of the possible ancestors of modern Europeans.

The third study discussed is that of a team of researchers led by Stephen Aldhouse-Green of the University of Wales. This began in 1995 and led to a multidisciplinary monograph, published in 2000. The goal of their work was to re-examine the finding and to produce a "definitive report" on the site. They wanted to conduct new excavations but discovered that the relevant deposits had all been removed during earlier work or by subsequent scouring of the cave by the sea. But by examining the original