

## BOOK REVIEWS

DENTAL ANTHROPOLOGY: FUNDAMENTALS, LIMITS, AND PROSPECTS. Edited by Kurt W. Alt, Friedrich W. Rösing, and Maria Teschler-Nicola. Wien, New York: Springer-Verlag (hardback), 1998. 564 pp. ISBN 3-211-82974-1. \$89.95, Dm 138 (cloth).

Firmly situated in a biocultural framework, this comprehensive volume brings together an impressive diversity of subjects in dental anthropology. Thirty-three authors contributed 26 chapters to this volume, which proceeds from an historical overview of the study of teeth, through fundamentals of dental morphology, structure and evolution, to current research topics in dental anthropology. These topics include the relationship between teeth and the health, nutrition, and behavior of past human populations, the use of teeth to estimate age and sex, and geographical and familial dental variability. One of the exciting aspects of this book is that in addition to critically evaluating the present state of knowledge in their subjects, many chapter authors analyze new data, arriving at conclusions that enhance methodological rigor and refine research directions in important areas of inquiry.

The first three sections of the book establish fundamentals, setting the stage for later sections. In Section 1, which consists of an introductory chapter, editors Alt, Rösing, and Teschler-Nicola stress the interdisciplinary relevance of dental anthropology, a theme manifested throughout the book. Section 2, "Teeth in History," contains four chapters, beginning with Alt's "Johan Wolfgang von Goethe, Weimar, and Dental Anthropology." According to Alt, the idea for this volume originated at a dental anthropology symposium held in Weimar, home of Goethe, who apparently delved into comparative dental anatomy when he wasn't busy writing *Faust*. Chapter two (Alt, Brace, and Türp) traces the history of dental anthropology from its origins in classical antiquity to the development of the field of dental anthropology this century. In the third chapter of this section, Alt and Türp review various methods for designating teeth, calling for standardization using the FDI 2-digit system). In the final chapter of this section, Teschler-Nicola, Kneissel, Brandstatter, and Prossinger analyze the function of an Etruscan dental bridge (700-600 BC), pictured in color on the book's cover.

Section 3, "Dental Morphology, Structure, and Evolution," contains six chapters, covering the anatomy and morphology of human teeth (Türp and Alt), hereditary dental anomalies (Alt and Türp), enamel microstructure (Radlanski), the temporomandibular joint (Obrez and Türp), catarrhine maxillary sinus anatomy (Koppe and Nagai), and dental research in paleoanthropology (Henke). Instructive diagrams, photographs, micrographs, summary tables, and extensive bibliographies make these chapters excellent basic resources. Radlanski's chapter presents his clearly illustrated and well-supported model linking prism path, prism angulation, and enamel volume. Henke's is a concise, selective survey of current dental research in paleoanthropology focusing on comparative dental morphology, early hominid phylogenetic relationships, dietary reconstruction, and modern human origins.

The fourth section focuses on dental pathology and epidemiology. Caselitz's review of caries research traces increasing caries rates over time to increasing neolithization and improved standards of living in archaeological series worldwide. He also finds that the intensity of carious lesions in local Northern German Medieval series increases with time. With clear photographic documentation, chapters on periodontal disease (Strohm and Alt), periapical lesions (Alt, Türp, and Wachter) and jaw tumors (Strouhal) present classification schemes and outline criteria for diagnosing these conditions in skeletal remains. This section concludes with a chapter on enamel hypoplasia in archaeological samples (Schultz, Carli-Thiele, Schmidt-Schultz, Kierdorf, Kierdorf, Teegen, and Kreutz). The authors review issues of enamel hypoplasia classification, evaluation, etiology, and epidemiology.

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The fifth section of this book, "Nutrition and Human Behavior," begins with Prossinger's and Willms' review of methods for reconstructing paleodiets and nutritional status and their summary of dietary change in Central European prehistory. Grupe's chapter on trace element analysis is of special interest because she demonstrates new applications which have the potential to reveal weaning ages and migration patterns in past populations. These applications are especially useful, because, as Grupe points out, enamel is less susceptible to diagenetic trace element change than bone. Rose's and Ungar's chapter is a detailed history of advances in the studies of gross dental wear and dental microwear. Increasing standardization, technological improvements, and expansion of the modern primate comparative database have enhanced the value of microwear analysis, promising greater insight into paleodiets. This section closes with a chapter by Alt and Pichler on ways in which artificial modifications of teeth offer clues to past human behavior.

The sixth section centers on forensic objectives in dental anthropology. Liversidge, Herdeg, and Rösing review the advantages and limitations of different methods of juvenile dental age estimation, providing valuable recommendations for usage. In their review, Rösing and Kvaal argue that relatively new methods employing racemization, cementum annulation, and histological analysis provide the means for achieving greater accuracy in adult age estimation. Age-related changes in dental tissues are carefully laid out in a chapter by Solheim. In the last two chapters of this section, Teschler-Nicola and Prossinger evaluate methods of sex determination based on tooth dimensions and Prossinger offers a generalized linear regression model for reconstructing missing tooth dimensions in order to differentiate individuals by sex.

The final section of this volume includes just two chapters: one on geographic variation in tooth size (Schnutenhaus and Rösing), and one on kinship analysis using dental traits (Alt and Vach). Schnutenhaus and Rösing conclude that tooth measurements should not be used to determine modern population affinities: inter-observer error and method-dependence preclude biologically meaningful results. Alt and Vach demonstrate how dental anthropology and archaeology can work together to elucidate family relationships in prehistoric samples. These are interesting chapters, and additional articles might have better developed the focus of this section on dental variation. For example, a chapter on worldwide variation in morphological traits would have complemented Schnutenhaus' and Rösing's contribution.

In summation, the chapters in this volume attest to the many and varied areas of anthropological research that dental anthropology can illuminate. Because most chapter authors provide extensive reviews, this book could be used profitably in advanced bioanthropology courses on dental anthropology, forensics or bioarchaeology. The emphasis on improving methodological rigor and the presentation of innovative research should also make this book of great interest to dental anthropologists.

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