

BOOK REVIEW

Human Tooth Crown and Root Morphology. By G. Richard Scott and Joel D. Irish. Cambridge: Cambridge University Press. 2017. 332 pp., \$49.97 (paperback). ISBN 978-1-107-48073-5.

Dental Morphology for Anthropology: An Illustrated Manual. By Heather J.H. Edgar with illustrations by E. Susanne Daly. New York: Routledge. 2017. 184 pp., \$28.37 (paperback). ISBN 978-1-62958512-3.

Dante's Peak and Volcano (1997), Armageddon and Deep Impact (1998) – the universe has an odd tendency toward synchronicity. In 2017, a quarter of a century after the publication of the much photocopied Turner et al. (1991), two different manuals have been published that provide further guidance on how to score human dental morphology – Scott and Irish's "Human Tooth Crown and Root Morphology" (Cambridge), and Edgar's "Dental Morphology for Anthropology" (Routledge).

As lab manuals, both books have a similar structure, with the trait-by-trait guide providing the bulk of the pages. The "bookends" differ somewhat. In Scott and Irish, the introductory sections discuss the history of trait scoring and the ASUDAS, followed by a basic introduction to dental anatomy and terminology. The anatomy section, in particular, is absolutely essential for those unfamiliar with dentition. Without it, using the scoring standards would be difficult. As this comprises only the first nine pages it is not an exhaustive discussion. After 250 pages of the manual itself, Scott and Irish concludes with a ten page chapter on scoring concerns and analytical details followed by an appendix of comparative data from the Turner archives. These data are invaluable and should not be overlooked in assessing the merits of this book. Scott's efforts to organize these archives should be commended and will greatly impact the field in the future. A well-known standard analytical complications are also summarized: sexual dimorphism, inter-trait correlation, breakpoints and tabulation methods, wear and age effects, observer error, and a short discussion of the MMD. A sample data sheet is also provided.

Edgar's bookends have a different focus. Instead of discussing the history of the field and dental anatomy, Edgar details distinct problem orientations at different scales of analysis. Challenges of trait scoring are outlined, but with less detail than in Scott and Irish. However, Edgar provides a more thorough overview of

analytical methods, which results from her emphasis on global through individual scales of analysis that require more than MMD statistics. After 120 pages of the trait manual, Edgar's book closes with a sample data sheet, reference pages, and a glossary. Neither book is exhaustive in its treatment of the topics presented in their introductory and closing sections, but these overviews do serve to point the reader in the right direction.

Although required for context, few readers will buy the books for these extras. The value of both is in the lab manual section and its utility for trait scoring. Both use a standard structure in their tour of traits. Edgar adopts a grid system with a "two pages per trait" format that crosses the fold. For each trait the following is provided: trait name, ASUDAS plaque (if applicable), a visible guide indicating where on the tooth to observe/score the trait, and a grade-by-grade description and visualization of the different scores. For most traits, each expression grade is visually represented by a drawing with two or more images of actual teeth from varying angles. The ASUDAS plaque is not shown for each trait. The use of a grid makes sense for the purposes of standardization, but with two rows of five boxes, some trait presentations look odd due to the large amount of blank space on the page. However, the attempt to standardize the presentation is commendable and was clearly designed with an eye toward direct use in data collection. My main critique of the Edgar volume is that the images should be larger, and the drawings are really the best illustrations of the morphological variation presented.

Scott and Irish use a different approach. Individual traits receive differing levels of attention rather than a standard two-page treatment, however, a standard set of information is presented for each character: teeth observed, key tooth, synonyms, description, classification (the grades), breakpoint, potential observation/scoring complications, geographic variation, and a selected bibliography. For those traits with ASUDAS plaques, a large image is presented with arrows pointing to the key aspect of variation. I note that the plaques are shown larger than 1:1 scale in some cases.

The main difference between the two books is how each defines the goal of a lab manual. Edgar contains less supplemental text and is focused on presenting basic expression grade descriptions and a visual example of each grade. Scott and Irish uses images of ASUDAS plaques to visualize potential ranges of expression, and instead uses images of teeth as examples of specific grades and to highlight potential challenges or present particularly rare examples. My main suggestion for Scott and Irish is to move each grade description and associated reference plaque image to the same page to ensure that there are no orphaned grade descriptions.

The trait lists in each book are similar but not iden-

tical. Both books focus on the key list of ASUDAS crown features, with deciduous traits largely omitted. Scott and Irish provide descriptions of root features, while Edgar sets aside a two-page chapter with basic descriptions and a summary table of root variants. Edgar discusses uncommon traits such as lateral incisor mesial bending, tri-cusped maxillary premolars (curiously omitted by Scott and Irish despite being in Turner et al. (1991) where it is listed as extremely rare, Edgar provides two images), supernumerary teeth, and elongated mandibular premolars. Scott and Irish provide discussion of other traits such as marginal ridge tubercles of the maxillary molars and rare traits such as bifurcated hypocone and lateral incisor variants (not mesial bending) as well as ASUDAS features such as rocker jaw, torsomolar angle, and palatine and mandibular tori. In this sense, Scott and Irish remain more faithful to the original Turner et al. article (tri-cusped premolars, notwithstanding). Neither delves into more obscure anatomy too deeply. This makes sense for Scott and Irish who are more concerned with broad-scale relationships than with random anomalies that may indicate familial relationships. Scott and Irish paginate the traits within the table of contents and also number them sequentially within the text (each page has a running page number with the trait number near the top of the page). Edgar's book does not include a pagination in the table of contents, which makes it more difficult to easily find the information.

In terms of production value, the page size and paper quality are roughly the same (Scott and Irish is slightly larger than the standard 6x9 inch page size). Scott and Irish is spiral bound, which makes it easy to use because all pages open completely and the book can lay flat on the table. This is important when collecting data. Edgar's book is traditionally bound with hard boards, which makes it more difficult to see the pages without breaking the spine. The picture quality is also sharper in Scott and Irish's book. The figures are almost all photographs, whereas Edgar's book includes a mix of drawings and photographs. An important difference here is the size of the images. Scott and Irish use large format images (roughly half page) that are excellently reproduced by Cambridge. Some of Edgar's images are small and difficult to see as Routledge's image reproductions were often grainy and less than optimal. Using Hillson-Fitzgerald calipers I measured the images provided for incisor double shoveling and came up with 126.68 x 84.88 mm for Scott and Irish and 21.91 x 20.26 mm for Edgar. I initially thought Edgar was trying to show the features at a 1:1 scale, but this was not the case.

The sixty-four thousand dollar question – do these manuals replace the Turner et al. article? Probably. But there are some important considerations, and these relate to the trait descriptions provided. Neither

are exactly faithful to the terminology from the 1991 article, which begs the question of whether simply copying the same trait descriptions would violate copyright (I suspect the word count is beyond fair use). This is somewhat unfortunate because there is the potential for observer error to occur. An example, for cusp 6 Edgar specifies numerically how much larger the cusp should be for a grade of 5 (a useful addition, though absent from the Turner et al. article). Scott and Irish jettison the 3.5 grade for hypocone (but not metacone), causing a shift in the scores for those that used Turner et al. (a minor point really), but have other slight variances in their grade descriptions (e.g. Carabelli's cusp; collapsing the lower premolar trait into a simple cusp count seems logical). The grade descriptions for tuberculum dentale differ more significantly, as do those of Edgar (both omit the 5- grade, among other wording differences). In the case of winging, Scott and Irish use a completely different system that will require future researchers to be mindful of what they mean when they state that "data were scored using ASUDAS standards." It is, of course, easy enough to convert these scores in most cases, but the publication of these books does require us to be more exact in our methodology write-ups. The important point is that the joint publication of these books reflects continued researcher interest in human dental morphology. Both books help break the sense of stasis the ubiquity of the Turner et al. article created. This was not the intent of its architects, who always intended for trait lists to expand and definitions to be modified and improved, with problematic aspects of the ASUDAS discarded. This really is an exciting time to be a dental anthropologist, and both books will help propel the field in new and exciting directions. Both deserve a space on the shelves of dental anthropologists, along with well-used copies of the Turner et al. chapter.

REFERENCE

Turner C. G., Nichol C. R., and Scott G. R. (1991). Scoring procedures for key morphological traits of the permanent dentition: the Arizona State University dental anthropology system. In: Kelley MA, and Larsen CS, editors. *Advances in Dental Anthropology* (pp. 13-31). New York: Wiley-Liss.

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