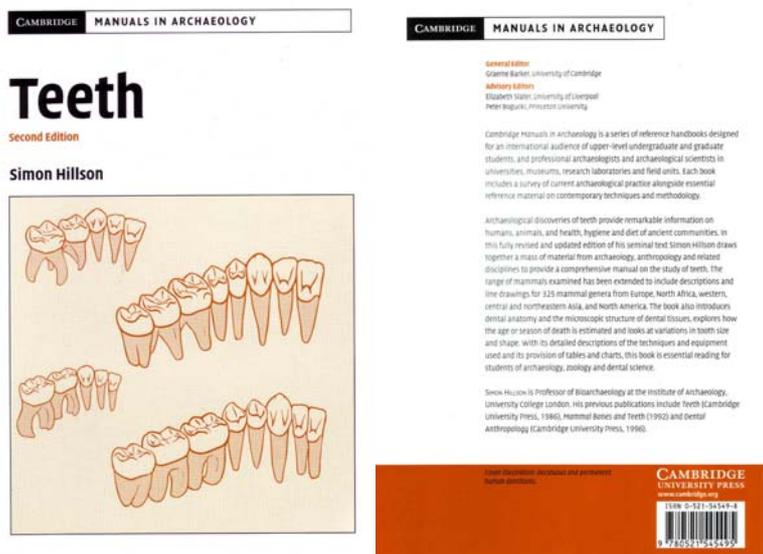


Hillson, S. 2005. Teeth (2nd Edition). – Cambridge, Cambridge University Press (Cambridge Manuals in Archaeology)

Book review by B.L. Beatty



The first edition (1986) of this book by Hillson is already a standard that is used widely by those that work with teeth in mammalian palaeontology, zooarchaeology, and palaeoanthropology. Designed with the archaeologist in mind, this book provides sound introductory material regarding teeth to the reader, including a straightforward means of tooth identification from every mammal genus of the northern hemisphere. Despite its practical introductory uses, it goes further and provides enough detail and explanation with respect to the various modern ways of studying teeth and their palaeobiology (in the latter half of the book) to whet the appetite of any die hard professional. Other great texts focus on functional analysis (Lucas, 2004), others (Teaford *et al.*, 2000) have a series of well done contributions in an edited volume that omits some subjects (such as pathology). This is one of few single-authored texts that covers such a wide array of details on mammalian teeth such as histology, ontogeny, wear, size and shape, and diseases.

Chapter 1, 'Tooth form in mammals', comprises a little more than a third of the volume, mostly with excellent figures of teeth of every genus of mammal from the northern hemisphere. Though the restriction to northern hemisphere mammals makes practical sense due to the space constraints and primary readership, if additions of all southern hemisphere mammals were further included I think this book would become a worldwide standard even more so. I was somewhat disappointed with the lack of attention to whale dentitions, though the detail given for other marine mammals, especially phocids, is top-notch. Hillson carefully describes not only the morphology and dental formulae in the context of the general natural history of the genus, but he also frequently cites details on known variation (which is of tremendous utility). With each of these genera is an accompanying clean, greyscale drawing with crisp lines and just the right amount of detail to convey the morphology (as seen on the cover). Though for space and availability considerations many are limited to illustrations of adult teeth, this chapter will still make you gasp at its breadth and clarity when you first see it.

The second chapter, 'Dental tissues', thoroughly covers the modern understanding of the biology and histology of dentine, cementum, and enamel. It covers a wide array of details of importance to palaeontologists, including root and crown resorption and tissue chemistry (a MUST see for the stable isotopes folks!). For added utility, Hillson includes several pages of discussion of tissue preparation techniques, microscopy, and imaging that is very up to date.

'Teeth and age' (chapter 3) is perhaps one of the most vital to those currently studying tooth palaeobiology because it covers all factors that affect tooth morphology throughout its wear life. This effectively works with chapter 4 in explaining the function of teeth and some other biological meaning that can be derived from their study. In chapter 3 Hillson covers a wide array of topics such as tooth wear, microwear, age estimation, circumferential layering (recording structures) and other age-related histological changes. Hillson's treatment of microwear is especially insightful and a good review of the subject as it stood when this book went to press. Since then, a new method called 'scale-sensitive fractal analysis' (Scott *et al.*, 2005) has been applied to topographic studies of microwear that is worth noting for its utility in characterizing and comparing wear surfaces, as well as eliminating inter-observer error.

Chapter 4, 'Size and shape' provides a brief look at how tooth crown morphology varies intra- and interspecifically and with respect to occlusion. This is an especially important section for vertebrate palaeontologists because of the frequency with which we ascribe new taxonomy to minute dental morphological details. From a palaeobiological or palaeopathological point of view, the short section on occlusion and malocclusion gives a nice review of the literature on how cusps fit together and how pathological conditions can modify this. Another book, also published by Cambridge, 'Colyer's variations and diseases of the teeth of animals' (Miles & Grigson, 1990) is a good resource for the details so elegantly summarized and updated in this chapter.

Chapter 5, 'Dental disease', which also summarizes and updates some of the data found in Miles & Grigson (1990), focuses on something that most other books on teeth omit from their focus: dental pathologies. With excellent, updated treatments on the current understanding of the biology of dental plaque, calculus, caries, inflammation, trauma, cysts, odontomes, tumors, and anomalies of eruption, resorption and abrasion, it is a rare resource. Though there are plenty of books on dental pathologies, they are mostly clinical. This chapter's updated treatment of dental pathology in an archaeology/palaeontology context cannot be found anywhere else, and for me works for dental palaeopathology in much the same way that other books (Rothschild & Martin, 1993) that focus on bone palaeopathology do.

The last chapter is followed by a brief appendix full of illustrations, 'Appendix A the grant dental attrition age estimation method'. This is largely the work of Annie Grant on dental wear stages in several common domesticated mammals, reproduced with permission. The original work is in a far less accessible journal and is of such utility in zooarchaeology and palaeontology studies that Hillson was very considerate in having it included.

The massive first chapter full of page upon page of large, clean illustrations of teeth and the appendix and its similar images of teeth make this book seem at first glance to be very much only a handy book for field identifications. Though useful as a handbook, these two beautiful chapters sandwich some very diverse topics of vital interest to anyone studying teeth that should not go unread. This book so uniquely encompasses a broad array of updated practical sources of information on comparative morphology and methodologies, it is no wonder it is so widely cited. If you work with teeth and do not have this book, you are suffering a needless handicap. This newly updated edition, along with other excellent texts on dental functional morphology such as the recent book by Peter Lucas (2004) also published by Cambridge, and recent papers by Alistair Evans & Gordon Sanson (Evans & Sanson, 2003, 2005), will not only overcome that handicap, but arm you to the TEETH!

Hillson, S. 2005. *Teeth* (2nd Edition). – Cambridge, Cambridge University Press (Cambridge Manuals in Archaeology). 373 pp. ISBN 0–521–54549–8. Price £30.00 (paperback).

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B.L. Beatty
Organismal Biology & Anatomy, University of Chicago
5801 South Ellis, Chicago, IL 60637
blbeatty@uchicago.edu
and
University of Kansas Natural History Museum
1345 Jayhawk Blvd.
Lawrence, KS 66045
blbeatty@ku.edu