

DNA for Archaeologists, by Elizabeth Matisoo-Smith & K. Ann Horsburgh, 2012. Walnut Creek (CA): Left Coast Press; ISBN 978-1-59874-680-8 hardback US\$94.00 & £68.50; ISBN 978-1-59874-681-5 paperback US\$32.95 & £23.95; ISBN 978-1-61132-482-2 eBook US\$32.95; 233 pp., 17 figs.

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DNA is playing an increasingly important role in many areas of archaeology. At individual archaeological sites, ancient DNA can provide information on the biological sex of skeletons, their kinship relationships and their broader population affinities. Studies of DNA samples from living people can reveal aspects of human evolution such as our deep ancestry in Africa and the routes taken by humans as they migrated through Asia, Europe and the Americas. Ancient DNA is revealing features of extinct hominins including the intriguing possibility that modern humans interbred with Neanderthals and Denisovans. DNA ancient and modern is contributing to our understanding of animal and plant domestication, disease in the past, and to some aspects of prehistoric diets and technology. Few archaeologists can afford to ignore DNA any more than they can ignore radiocarbon dating or geophysical survey. Most would agree, however, that the engagement between archaeologists and DNA remains superficial, despite the first tentative steps towards union being taken as long ago as the 1980s. A large part of the problem is the seeming complexity of the genetical context within which DNA studies are performed and interpreted, not helped by the impression given by some geneticists that unless you have twenty years experience of Bayesian modelling then you simply will not understand DNA so leave it to the experts. *DNA for Archaeologists* makes a brave and successful attempt to address these problems by providing an easy-to-read, up-to-date and straightforward introduction to, as it says on the cover, DNA for archaeologists. This is not the first attempt to present DNA in this way, but previous books have either included DNA as simply one part of archaeological science or biomolecular archaeology (Brothwell & Pollard 2001; Brown & Brown 2011), or when specific to DNA have contained more technical detail than needed by archaeologists (Hummel 2003). *DNA for Archaeologists* therefore fulfils a definite need and will be valuable not just for archaeologists but also as a textbook for university students.

The nine chapters of the book take the reader seamlessly from an explanation of why DNA is important, through the methods used to study DNA, and finally to the applications of ancient and modern DNA in different areas of archaeological research. The authors do not attempt to provide a detailed handbook for an archaeologist wishing to carry out DNA studies, and instead assume, probably correctly, that for the foreseeable future DNA studies will remain collaborative ventures. The emphasis is therefore on explaining what DNA can and cannot contribute in archaeology, and, importantly, making clear the pitfalls that

can complicate the DNA side of a project. The problems caused by contamination of archaeological samples with modern DNA are well known, but still too often ignored. A commendable aspect of this book is the unambiguous way in which the authors describe experiments that prove that contamination is an invidious and substantial problem, and lay down the standards by which ancient DNA research should be judged. The reader is given clear guidelines about how to decide if an ancient DNA project has been conducted properly, and is advised in no uncertain terms to ignore any paper in which adherence to those guidelines is not made explicit. Less well-appreciated are the limitations inherent in the methods used to make evolutionary comparisons between DNA sequences, and the danger of over-interpreting the results of such studies when making inferences about population histories and migrations. Again the authors provide good advice to help archaeologists judge the veracity of published reports.

The authors define themselves as molecular anthropologists 'interested in understanding and explaining human diversity, be it biological, linguistic, or cultural'. This background forms the template for the chapters describing the applications of DNA in archaeology, where the emphasis is very much on human DNA. The first of these chapters is on 'Hominin Origins and Relationships' and describes the gradual development of our knowledge of the Neanderthal genome and the recent discovery of Denisovans, a type of hominin known only from their DNA. The results of these studies have far-reaching implications within palaeoanthropology and underline the need for closer collaboration between researchers using different approaches to study the human past. The next, and longest, chapter gives a detailed description of the studies that over the last twenty years or so have built up a detailed narrative of the origins of *Homo sapiens* in Africa and the migration of our species out of Africa and throughout the Old and New Worlds. Although largely based on human mitochondrial and Y-chromosomal sequences, the need to include autosomal markers in future studies is explained, and there is a particularly useful section on proxies for human migrations, such as domestic animals and plants and the gut bacterium *Helicobacter pylori*. 'Human Impacts' is then used as the theme within which to describe domestication of animals and (rather briefly) plants, and the trade and exchange of biological products such as feathers. Finally, 'Individualization and Other Applications' covers the use of ancient DNA in sex identification and kinship studies, and in studies of historic individuals such as Thomas Jefferson. Palaeodisease is also included in this chapter, although rather briefly and with focus mainly on the difficulties inherent in this area of ancient DNA research. As the authors cite one of my papers as a source of information on these difficulties I should perhaps not be too critical, but this is such an 'alluring area of research' that it really deserves a rather broader treatment, particularly in view of the recent application of new sequencing techniques to *Yersinia pestis* DNA from plague victims.

The authors state that the objective of their book is to 'introduce archaeologists to the basics of DNA, so that they can understand both the powers and pitfalls of genetic data and the application of such data to issues of interest to

them'. They meet these objectives admirably. I only have one quibble. The publishers have done the authors no favours by choosing a cover illustration depicting a helical structure that one presumes is intended to be DNA, but isn't. The shape is wrong and the rungs of the ladder are spaced incorrectly. A quibble, perhaps, but a book called *Archaeology for Geneticists* that had a cover image of Stonehenge, but with the stones in the wrong places, would probably attract unfavourable comment among archaeologists. Leaving that aside, *DNA for Archaeologists* is readable, up-to-date, informative and accurate, and recommended for all archaeologists.

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References

- Brothwell, D.R. & A.M. Pollard, 2001. *Handbook of Archaeological Sciences*. San Francisco (CA): Wiley-Blackwell.
- Brown, T. & K. Brown, 2011. *Biomolecular Archaeology: an Introduction*. Chichester: Wiley-Blackwell.
- Hummel, S., 2003. *Ancient DNA Typing: Methods, Strategies and Applications*. Heidelberg: Springer.
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