DNA FOR ARCHAEOLOGISTS

Elizabeth Matisoo-Smith and K. Ann Horsburgh, 2012
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Reviewed by:
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The experience of many archaeologists on being exposed to claims of new DNA-based discoveries relevant to human history is first that the articles are not often found in the journals they are used to reading. What is more, information in the popular science press can be presented in ways that lack a context in anthropology, or even known history. These accounts can invite credulity. The original publications on which the popular accounts are based are, to give them credit, often better founded in the state of knowledge on human history. Still they seem too often to be driven by a world view that credits only DNA-derived histories. To a non-specialist reader both the technical language of genetics and the statistical treatments are forbidding.

Matisoo-Smith and Horsburgh set out their objectives as introducing the basics of DNA, how it is analysed, how archaeologists need to interact with potential samples and with their laboratory analysts, and the ethics of dealing with DNA. The second part of the book is a review of what DNA has already told us about the human past. As the title says, it is targeted at archaeologists, and seeks to have them as well-informed partners in teams that include molecular anthropologists. This then holds the prospect of demystifying so important a subject that is effecting a revolution in our view of the past.

On the first objective, a reader with some general knowledge of the advance of molecular genetics in the past 60 years will find an intelligible and a good, if brief, summary of what DNA is, what it does and means, and they will no doubt add to their knowledge. A primer, though, it is not, and a reader starting with little knowledge of the subject might be better to start elsewhere. Focusing on human genetics, the discussion does not assist much with the bacterial and plant genetic examples which occur in the second part of the book. Probably wisely, the authors do not attempt a primer on the statistics, rather recommending other introductory texts. Their account is largely free of unnecessary statistical terminology and is none the worse for that.

The section on ethics explores the tangled history of recent genome projects that have looked to reconstruct history from living subjects. The early misuses of material, claims to copyright of other peoples' code and breaches of consents are edifying. To archaeologists now used to dealing with human remains in ethical ways, some of the mistakes seem rather obvious, but we might forget that our arrival at proper protocols is only recent. The authors do not immediately draw the logical conclusions about proper ways of dealing with ancient DNA data, though they do so in discussing one of the case studies.

For a practising archaeologist, the section on how sampling and analysis is best undertaken is the most valuable. While they give collection advice, it is pretty clear that field involvement of the ancient DNA researchers is desirable to minimise contamination risk. Prior experience with ancient DNA and utilising dedicated laboratories isolated from other DNA amplification are also essential.

The second part of the book, on examples, has a worldwide span, but there is no shortage of examples relevant to the Pacific. The research summaries have evaluative commentaries as well and it is instructive to see how particular projects are rated by the authors. The scope of the research reported is broad, from the most recent views of the earliest common ancestor of us all, through 'Out of Africa' to the settlement of the rest of the earth that followed this. The interactions of those early humans with Neanderthals and Denisovans, the radiation within Africa, the animals and plants carried by people and bacteria and viri inadvertently carried are all explored. The authors cover domestication and extinction where knowledge of these has been revealed or amplified by DNA, and also the identification of individuals where there is some way of finding DNA matches to support other evidence.

The human DNA evidence of the settlement of Australia and of Remote and Near Oceania features, as do the studies on Pacific commensal animals, the discovery of the extinct species of hoiho – yellow-eyed penguin – and work on the origins of kiwi-feather decorated cloaks. So there is a lot of local interest. Readers struggling with the first part might be better to start here then go back.

The authors emphasise there is an ongoing technological revolution vastly reducing the cost of DNA analysis and that this will open exciting new opportunities for historical studies. This book is very timely if it encourages research on ancient DNA that is well founded in archaeology and in testing views of the past with new data. As with all science, it is best done, not because it can be done, but against hypotheses based on current received views. It is clear from what better-funded studies are achieving outside the Pacific that the potential of human DNA to amplify our knowledge of the history of settlement here is far from exhausted.

If nothing else, a reader next presented with a popular science account about how DNA analysis has 'proved' something historic will start with a better basis for their proper scepticism. But it has achieved this and more. The

authors have accomplished their goals of explaining a difficult field and seeking greater involvement of non-molecular anthropologists in DNA research. None of us can now be exclusively non-molecular and, as with other fields of science, archaeologists must have some familiarity with DNA evidence and its production.

The book has a useful glossary, but which regrettably it does not include the acronyms that are liberally used throughout, though they are generally introduced where they are first used.

FINDING OUR RECENT PAST: HISTORICAL ARCHAEOLOGY IN NEW ZEALAND

Matthew Campbell, Simon Holdaway and Sarah Macready (eds), 2013.
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Auckland, New Zealand.
226 pp. ISBN 978-0-9582977-2-1
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This impressive volume consists of ten papers dealing with historical archaeology in New Zealand and an overview paper in which Australian archaeologist Susan Lawrence discusses New Zealand's historic archaeology from a global perspective. The book is intended as a showcase of New Zealand historical archaeology, as well as a tribute to the pioneering efforts of Nigel Prickett in helping establish historical archaeology in New Zealand. The book is well produced, and the distinctive front cover created from an image of repaired blue and white transfer print is striking and effective.

The papers cover early European sites (Ian Smith; Angela Middleton), Maori sites of the 19th century (Stuart Bedford; Simon Holdaway and Rod Wallace; Harry Allen and Caroline Phillips), rural homesteads (Matthew Campbell and Louise Furey), Chinese market gardening (Janice Adamson and Hans Bader), Auckland industrial sites and the entrepreneurs (Sarah Macready, Simon Bickler and Rod Clough), and the technological development of power (Peter Petchey). There is an introduction by the editors and Lawrence's overview concludes the volume.

The collection is organised chronologically in order of period covered; thus the volume is started by a typically well-presented paper by Ian Smith discussing the ephemeral remains of early coastal exploration and contact settlements. Smith makes an interesting comment about the distinction between the essentially planned settlements of New South Wales and Tasmania and those in New Zealand. This could form the basis of some interesting comparative analysis along with the unplanned settlements and the more or less illegal settlements in Bass Strait and Victoria.

Middleton continues with a synthesis of archaeological work on missions. New Zealand seems to have been blessed with a large number of missions to the Maori, Middleton lists 67 up to 1845 which seems a lot (one wonders why the Maori were thought to be in particular need of such evangelism). Middleton points out that missionaries were, effectively, hostages of the Maori, which points to the complex interweaving of Maori and Christian ideology (especially since quite a few varieties of Christianity are represented), although there have been very few historical archaeological studies that have gone deeply into the theology behind the missions.

The next three studies deal with the historical archaeology of Maori settlements. After a discussion of the role of historical archaeology both in the archaeological pantheon and within heritage conservation in New Zealand, Bedford moves to a fascinating history of early contact in the Whangaroa Harbour area and to discuss limited excavations at Pohue Pa. Holdaway and Wallace present a detailed historical and archaeological reading of Te Oropuriri in Taranaki, highlighted by excellent archaeologically based reconstructions of the site during each phase. Allen and Phillips begin their contribution with a long history of the warrior Taraia and then focus on the history and archaeology of a locality called Opita in the Hauraki district. The relationship between the two and the nature of the archaeological work at Opita are a bit confusing to this reader (for example what are Hangi scoops?) and perhaps they will be better explained and presented in the forthcoming excavation report.

What these three reports share is a sophisticated presentation of a wide range of historical information intermingled with archaeological evidence in the form of landscape, settlements and artefacts. These papers make it clear that the contact period of New Zealand history is one of a series of complex interactions both within Maori society and with the Europeans, and it is not as simple a process as often depicted. There are some interesting methodological questions raised about historical archaeology which are not explicitly addressed in these papers but which New Zealand archaeologists have discussed elsewhere. These relate to the type and the use of historical evidence, which is highlighted in these three papers, because of the Maori tradition that exists in parallel with written documentation mostly from the invaders. How the different strains of evidence about the past can be used is an on-going methodological debate in global historical archaeology and the perspectives gained from studies like this have the potential to make a real contribution to the debate.

The following three papers in the collection turn to the period of the later 19th and 20th centuries. Campbell and

Furey demonstrate what can be obtained from excavations of two abandoned South Auckland farmhouses in reconstructing the identity of the occupants over time, focusing on the age and life cycle of the occupants. Adamson and Bader look at the archaeological remains of Chinese market gardens in Auckland. Macready, Bickler and Clough examine the role of the small entrepreneur in creating a landscape – Fraser's Phoenix Foundry and Clark's tile and pottery works both in the Auckland district. Their influences on the landscape were observed through archaeological work. Firstly in the vicinity of their works there were clearly landscape alterations for the construction and operation of the works. Then the authors considered influences on the social and economic landscape. Perhaps they could also have reflected on other landscape changes, to the air and land through the works' discharges into the environment over time?

Finally, Peter Petchey writes on a more traditional industrial archaeological subject – the development of hydro-electric power in New Zealand. This is an interesting paper which perhaps would have benefited with more contextual material linking with hydro-electric development elsewhere in the world.

Including a paper by Associate Professor Susan Lawrence, from La Trobe University, Melbourne, may on the surface seem odd, but it is in line with one of Nigel Prickett's professional practices, that of outreach particularly to the Australian historical archaeological community through participation in the Australasian Society for Historical Archaeology conferences and the Archaeology of Whaling in Southern Australia and New Zealand project. Susan Lawrence's summary makes interesting reading, placing the papers and the broader work of historical archaeology in New Zealand into a worldwide context.

These papers highlight some of the strengths of New Zealand historical archaeology. The first is the tradition of high quality field techniques and a dedication to publishing results. Secondly all the papers are not simple reportage but are set within relevant research and theoretical frameworks, which do not get in the way of the actual reporting but enhance understanding of the past. It will be very interesting to see how New Zealand historical archaeology develops over the years, particularly in light of the large salvage archaeological projects now being undertaken in Canterbury.

From the perspective of an Australian practitioner in the field, the collection has a great deal to offer. For example, I have used Adamson and Bader's work on Chinese market gardens to demonstrate that such sites might have an archaeological record despite their seemingly ephemeral nature. Campbell and Furey's paper should make Australian archaeologists think a bit more about the archaeological potential of rural houses. Petchey's work will be referred to The International Committee on the Conservation of Industrial Heritage section on hydro power which is preparing an international study on the topic.

The authors should be congratulated on their hard work and the editors for the quality of the publication. The collection is a fine tribute to Nigel Prickett's work in piop4neering historical archaeology in New Zealand.

HOME IN THE HOWLING WILDERNESS: SETTLERS AND THE ENVIRONMENT IN SOUTHERN NEW ZEALAND

Peter Holland, 2013
Auckland University Press.
254 pp. ISBN 978-1-86940-739-1. Paperback NZ$49.99

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The title says it all. Who would voluntarily set up home in a place thought of as a howling wilderness? Was that the general attitude among New Zealand colonists of the nineteenth century? This book was clearly a labour of love, a diversion from academic toil over 20 years, and yet written with professional care. Peter Holland, now Emeritus Professor of Geography at Otago University, with New Zealand's highest award for a geographer, the Distinguished New Zealand Geographer Gold Medal (2008), has taken the trouble to provide a wide audience with his analyses of 37 sets of farm diaries, letter books, correspondence and business records from North Canterbury to Southland, most of them written between 1840 and 1890.

Many years ago Holland was annoyed by an outsider, in this case the North American geographer Andrew Clark, making a broad generalisation that did not ring true to him. In the 1940s, Clark claimed that our first generation of European farmers lacked any love and appreciation of the primal New Zealand landscape (Clark 1949:158). Holland (p.2) remembered his grandparents' farm, set in an idyllic domesticated landscape, created admittedly from mostly introduced species, and decided things were more complicated than Clark suggested. He set out to review primary sources for indications that settlers were aware of the long term effects of their activities on the environment, to test whether or not settlers learnt from experience, and to discover their decision making process.

Why is this interesting for archaeologists? Here in one book is a wide range of information about how the early farmers went about their annual round, what trends might be expected in the evolving landscape, and a context in which to interpret the mosaic of introduced and indigenous grasses, shrubs and trees within the curtilage of a nineteenth century farmstead. It covers a range of economic problems and nasty surprises that the new environment flung at the early farmers, but don't expect any

descriptions of how a team of horses was harnessed up.

A chapter on the use made of Maori knowledge of local environments is a slightly simplistic treatment of the subject. The obvious reasons why settlers ignored Maori skills are valid – lack of contact and racism on the part of Europeans – but quite a range of knowledge transfers is then described, such as information about routes into unexplored areas, the attention paid to Maori predictions of common weather patterns and when Maori expected rivers to flood. Maori skills in the cultivation of introduced crops – wheat, potatoes, maize, pumpkins and other vegetables – are described for Napier, Picton, Christchurch and Arowhenua (p. 33) in South Canterbury, as though these were all culturally similar activities. In fact, anywhere in the southern half of the South Island, post-Contact Maori were doing something odd. They were growing crops for which they had no specific traditional knowledge, in a climate where previously they had never been able to grow their tropical cultivars. There is enough evidence to suggest that Maori gardeners were extremely effective, even as far south as Bluff, from where one of our first export crops was sent by the local Maoris to Sydney – a load of potatoes. How Maori adopted and learned to grow new crops would have been a whole book in itself.

Holland particularly researched the late nineteenth century use by farmers and their advisors of the growing science of plant ecology, to work out how to establish high nutrient, permanent pastures. He describes intense discussions between the farming community and agricultural scientists on the nature of succession in pastures and whether to sow simple or complex seed mixtures. Both plant ecology and Darwin's ideas about natural selection were gradually making their way into the well-read farmer's view of his world. On a nineteenth century farmstead near Dunedin that I have worked on recently, I was bemused by the retention of 52 large rimu on a small dairy farm (Hamel 2012). Why were these valuable timber trees retained over three generations? As a provision against poverty in old age? As status symbols? Or did this family actually appreciate the New Zealand primal forest? The Preston diaries, which list Darwin's *The Descent of Man* among books bought for the Kyeburn library in 1888 (p. 9), can set the archaeologist off on a whole new train of thought about the world view of farming families.

Holland skillfully brings order to this inchoate mass of material by using graphs to convey useful trends (the reader will need a photocopier nearby to increase the size of the figures, which Auckland University Press has handled very poorly). The frequency of unusually heavy snows, frosts, floods and drought (p. 86) are extracted and shown in enough detail to provide useful independent confirmation of local anecdotes, such as the collapse of the woolshed roof under heavy snow at Moa Flat or floods washing away the shearers' quarters at Totara.

Exploitation of native plants is explored by such calculations as how often native plants are mentioned on Raincliff Station in the early years compared to later – half of all plants mentioned around 1870 but only 35% in 1896 (p. 93). A table lists the numbers of dray loads of timber taken from native forest on Orari Station annually from 1858 to 1863 for fencing materials, firewood, lumber, shingles and laying on muddy tracks (p. 92). James Preston's diaries for Longlands in North Otago recorded what he paid in 1904 for 505 kowhai posts and 16 kowhai strainers (p. 95), providing context for the anecdotal information that I was given during work that I did there for the Department of Conservation (Hamel 2001: 100). I had doubted that sufficient large kowhai existed to be a significant resource.

These sorts of details provide solid evidence of the value of native trees to the first settlers as a resource to be exploited, but there was little or no evidence that the settlers of southern New Zealand saw any place for native species in the landscapes they were creating. Holland provides a thorough and depressing chapter on the effects of the wholesale transformation of lowland Canterbury and Otago vegetation from a diverse indigenous biota to monocultures of introduced grasses, crops and grazing animals. He speculates that some of the problems with pest species, such as rabbits, and increasing erosion and declining soil fertility might have been avoided if settlement had taken place 50 years later, when environmental sciences were better developed. It is a good point, given how well-read New Zealand farmers in general tended to be, but Holland has found examples showing that even by the 1880s Otago farmers knew that the 'mineral matter' in the soil must be depleted by the export of meat, wool and other products, and needed to be replaced. He gives a marvellous quote from geologist James Hector that in 1891 the mineral nutrient content of exported meat must have weighed about a million pounds (p. 191). In a chapter on farmers' social contacts and activities in the nineteenth century there is a useful analysis of the importance of Agricultural and Pastoral Shows, and how they enabled farmers to compare their animals with those from other farms.

In the end, how well did the diaries throw light on those initial questions? Surprisingly well. The nineteenth century farmers showed no awareness of long term effects of the wholesale removal of native plants and animals. They adapted well to the mosaic of climates and soils of lowland southern New Zealand, achieving short term goals of prosperity and satisfying landscapes. Most of them read widely, were sociable and intelligent, but they did see indigenous New Zealand as a 'howling wilderness'.

Holland has traversed areas of farming life that are not available from other sources. It is worth pondering how our archaeological studies of early farmsteads can continue to flesh out his conclusions. In his final sentence, he throws out a challenge, that 'a new generation of residents will learn the key lesson that sustainable and economically productive landscapes … should comprise functional managed mosaics of mostly native and largely artificial ecological systems' (p. 211). And he is not talking

about just pretty patches of native bush here and there, but whole swards of native grasses and herbs as well.

References

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