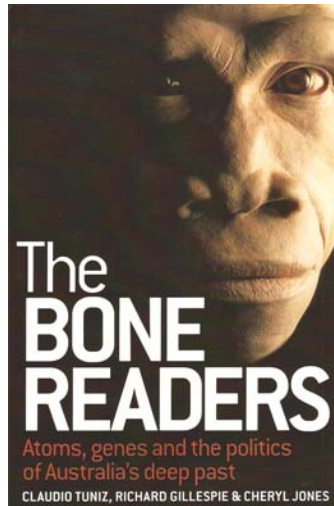


BOOK REVIEW



Claudio Tuniz, Richard Gillespie, and Cheryl Jones. *The Bone Readers—Atoms, Genes and the Politics of Australia's Deep Past*. 2009. Sydney: Allen & Unwin. ISBN: 9781741147285. 288 p.

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In this book, a team of two scientists (Tuniz and Gillespie) and a science writer (Jones) bring to our attention scientific developments of the last half century in reconstructing the past of humankind. Although discoveries of the past are often made in remote regions of the world, as soon as they are brought to museums, laboratories, and universities they are potentially open to scientific and public scrutiny. The authors focus on the problems (not only scientific) that scientists face when trying to resolve the question of the first arrival of modern humans on the Australian continent. This debate is not well known internationally; thus, the book serves to show the intricate connections between different research disciplines and the political consequences of scientific actions and statements.

Often, the “scientific” world is viewed as being ruled by different standards and facing different problems than the “real” world. This is true to some extent; however, common features of “two worlds” become apparent when conflicts and controversial issues are involved. Most current political issues and hot debates that involve the scientific community are related to global warming and ethical issues in biomedical research, or even food production. However, often anthropologists or genetic researchers are faced with the ethical problems and political repercussions of their research. In Australia, where coexistence with Aborigines is on the political agenda, the question of the origin of human population is of great importance. On the other hand, we know that each continent and island is struggling with these questions: Where did we come from and how did we arrive here? In the end, the struggle in most cases comes down to the question: When did we come here?

Here is where the “time lords” arrive on stage and the book tells us about “reading” the time of the Australian archaeological record. This is not surprising because the two leading authors, Claudio Tuniz and Richard Gillespie, were themselves involved in geochronological studies of Australia, such as the Mungo site, discovered by Jim Bowler in 1968 and dated by Henry Polach and Mike

Barbetti in the early 1970s. Gillespie, a radiocarbon specialist, worked at Mungo when he was at the Australian National University in the 1980s and since then has been involved in dating the arrival of the first Australians (Gillespie 2002). Claudio Tuniz, who is an accelerator mass spectrometry (AMS) and radiocarbon specialist, was the head of the ANSTO AMS facility in Sydney, when another key site, the Jinmium rockshelter, was dated in the 1990s.

The discovery of Mungo Lady, which was found in the sediments of the Pleistocene Willandra Lake in the 1970s, opens the book and remains a leading theme throughout. The first ages for the find were obtained using the radiocarbon method, one among many other methods that were and are involved in studies of the past Australian continent and are introduced to the readers of this book.

The wealth of methods that gets “on stage” is really impressive. The parade begins with thermoluminescence (TL) and optically stimulated luminescence (OSL) methods in the chapter “Heat and Light.” Both methods, which work on similar principles of reading the time that elapsed since the site was buried, found a very suitable and enthusiastic working environment in Australia. These were deployed to answer the question of the first arrival of modern *Homo sapiens*, i.e. to prove or disprove if the apparent age of 40 ka BP for the first modern human presence in Australia is underestimated due to the limit of the ^{14}C method. This first chapter illustrates the importance of getting the timescale right. It also shows how easily things can go wrong; how people are influenced by what they believe or what they want to see in their data. We can read about the “big news” created by the first TL ages for the Jinmium rockshelter that would place the first Australians on the continent at 100 to 200 ka. The ripple caused by the very old ages would have a global impact and could cause trouble for the “Out of Africa” scenario of the origin and migration of modern *Homo sapiens*. A cross-check of the dates with the OSL method and ^{14}C dating of charcoal found in the rockshelter (with Tuniz and his colleagues at ANSTO involved) prevented a major collapse of all anthropogenic models by showing that it was less than 100,000 yr old (Roberts et al. 1998).

The timing of colonization is bound to be a key argument in the debate over the causes of megafauna extinction on the Australian continent. As in the Americas, Europe, and Asia, numerous species disappeared towards the end of the last glacial. The proponents of the *blitzkrieg* or *sitzkrieg* theories see *H. sapiens* hunting or inducing environmental changes as the main reason for megafauna extinction. Others argue that environmental changes could have killed the beasts. Showing that the extinction preceded the arrival of *H. sapiens* or that megafauna survived for a long time after their arrival would exclude the possibility that ancestors of the Aboriginal population were “guilty” of any extermination of those species. This is important for native Australians who declare their long-lasting presence on the continent and respect for nature. But it is a challenge to determine precisely the ages for the extinction and colonization of the continent as the dates involved push the limits of the ^{14}C dating method.

Due to this limitation in ^{14}C dating, more methods have been used to secure reliable timescales, including amino acid racemization (AAR), electron spin resonance dating (ESR), and U/Th burial dating. The book introduces readers to the techniques and equipment scientists use (i.e. sophisticated mass spectrometers combined with lasers and plasma sources or the “red light” rooms of OSL). However, this should not scare away readers that are less interested in the technical side of dating methods; in fact, they will find it quite entertaining. The language is simple and witty, and the descriptions are well embedded in the storytelling, so there are no chapters that would seem “dry.” Indeed, some of the chapters are quite dense with information. The theories and scenarios, the methods, the proxies and techniques, the people involved and historical background when packed into one chapter might be a challenge to a lay reader. However, the light-handed writing combined with

the story that arrests the reader's attention is very helpful when absorbing a large amount of interdisciplinary information.

Although Tuniz and Gillespie themselves can be qualified as "time lords," the book provides insight into research realms other than geochronology. The overview of past climate change research and paleoanthropological studies around the world sets the Australian debates into a global context. For example, a discussion of sea-level changes, which are relevant to *H. sapiens* migration paths, in the chapter "Stairway to Heaven" provides an opportunity to talk about Milankovitch and glaciation theories. And when there is talk about stable isotopes in studies of eggshells of the *Genyornis newtoni* flightless bird, which disappeared 50 ± 5 kyr ago (Miller et al. 1999), the book tells us how stable isotope analysis can trace dietary changes and indirectly vegetation changes.

Still, there is no final answer to the question of what or who is responsible for the megafauna extinctions around the world. Other scenarios involve extraterrestrial impact(s) (Firestone et al. 2007), but the catastrophic theory remains quite controversial. This book does justice to each scenario and presents all with their scientific evidence. At the same time, the authors keep us aware of the heated scientific discussions that surround these studies.

The examples above are not the most controversial issues in the book, however; the second leading theme, i.e. the origin of the first Australians, is a huge subject of studies on its own. Tracing the paths of modern populations using genetic studies is one of the ways to study the past. But DNA extraction from old bones in the case of archaeological studies is not a simple matter of sampling and collecting. Preservation of DNA is problematic if the bone was not safely frozen in a permafrost environment as in the case of mammoths. Once DNA is found, another problem arises, that is, contamination of DNA from the people who handled the samples. As we learn in the final chapters, modern sampling as was done for the Human Genome Diversity Project (the "Vampire project") was not possible in Australia due to ethical issues and historical background.

As the story expands to Flores man or woman (making sure gender issues are included in the discussion as well), we can read about this strange find and bizarre scientific conduct. It is worth to note that again, timing is crucial to the whole debate. The very young age (19 ka BP) of the find based on ^{14}C ages of associated charcoal samples and its classification as a new human species *Homo floresiensis* (Morwood et al. 2004) stirred the debate between "Africanists" and "multiregionalists." The European equivalent is the debate over the coexistence of modern *Homo sapiens* and Neanderthals, which is perhaps a less heated debate but has been long lasting. Once again, no final answers are presented and the search continues. (Following publication of the book, important DNA studies on Neanderthal remains were published— see Green et al. 2010).

Apart from the great amount of information packed into this book, the anecdotal notes on science are real highlights. As one could imagine, radiocarbon is an area that gets a lot of attention. The story of the "giant" Henry Polach preparing samples of bones from the Mungo site is just one entertaining example. For all of us who constantly cite Stuiver and Polach (1977), reading about early, enthusiastic approaches to ^{14}C dating is a real treat. Other disciplines are treated equally well, which can be illustrated by the following example. In the chapter "Bison," we read about one of the leading scientists: "Cooper, who speaks with the candour once the norm in science, has now set up a rival lab—the Australian Centre for Ancient DNA (ACAD)—at Adelaide University. Like most scientists, he sees the media as a mixed blessing, and once put a futuristic-looking sandwich toaster in shot when a BBC crew was filming the Oxford lab's high-tech sequencing equipment."

The Bone Readers is about science and the scientists who live their profession with passion and dedication. It is also about the rest of the world in which science has to find a place to fulfill its mission. This is not always a simple task due to our complicated history of at least 50,000 years, and in Australia and the Americas even more so because of the very recent history and political atmosphere. This book shows the tough reality of present-day science, but also the beauty and pleasure of doing it.

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