The First Australians

The debate continues

The size and shape of the Lake Mungo 3 cranial vault has been used to provide evidence of the sex of the skeleton and the origins of the first Australians. Photo: Peter Brown

Peter Brown reopens the debate over the origin of the first Australians.

When William Dampier bumped into Western Australia in 1697 he thought that the Aborigines he encountered may have originated from Africa due to their external appearance. For more than three centuries since then, European observers have puzzled over the geographic and biological origins of the first humans to populate Australia.

As the Aborigines appeared to be culturally and physically distinct from the indigenous peoples of the Pacific and Asia where had they come from? What was their relationship to human populations in the Old World and how long ago did the first humans enter Australia? What route did these colonists take, did they build watercraft, and were they responsible for the extinction of the Pleistocene megafauna?

Some of these questions have answers, while the solutions to others appears no closer than when they were asked by the explorers of centuries past. For instance, it is clear that either intentional. or accidental, use of some form of flotation device was needed to reach Australia from Asia. However, the Aborigines' role, if any, in the extinction of the megafauna remains unclear as does their relationship to the Pleistocene peoples of Asia.

In recent years there has been both heated debate and prolonged controversy surrounding issues of prehistoric settlement and Aboriginal origins. In September last year, following wide Australian media coverage, it was announced in the *Journal of Human Evolution* that a human skeleton from Lake Mungo in south-western NSW was approximately 62,000 years old.

Although published in a very reputable journal, following appropriate peer review, this date was received with some scepticism by the Australian archaeological community (*Australasian Science,* July 1999, p. 8). Incredibly if the new age estimates for Lake Mungo 3 (LM3) burial were correct it was now 20,000 years older than the previously accepted age for the layer in which it was found. The new date was also difficult to reconcile with the existing state of knowledge regarding the origins, evolution, cultural development and dispersion of our species.

At the time, Australian archaeologists were still recovering from the Jinmium rock shelter debacle where claims of an age of 116,000 were later demonstrated to be incorrect and more likely to be around 5,000 years (Mulvaney and Kaminga, 1999).

The LM3 skeleton was discovered in 1974 by Jim Bowler, a geomorphologist at the Australian National University (ANU). After prolonged rain in 1973, Bowler noticed the exposed left side of a carbonate encrusted human cranium 500m east of the Lake Mungo 1 cremation site.

Later that month the extended burial that was Lake Mungo 3 was excavated by a team from the ANU. When first published this burial had not been directly dated but Bowler and ANU palaeoanthropologist Alan Thorne argued on the basis of geomorphological criteria and stratigraphic association with the Lake Mungo 1 cremation that an age of 28,000 to 32,000 years before present (BP) was probable.

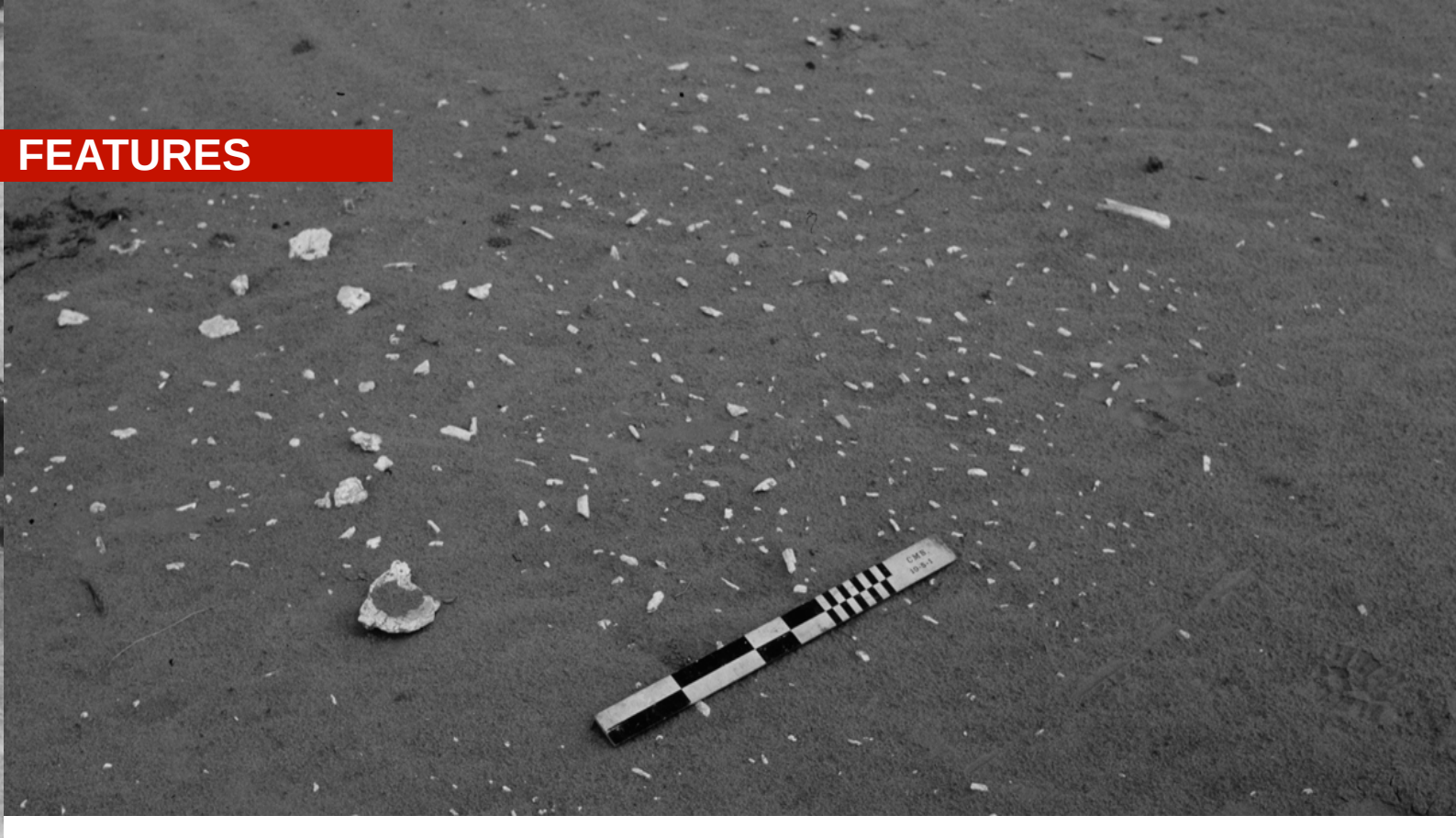
The point that should have been made more strongly at the time is that this was only a potential maximum age as the grave of LM3 must have been excavated from a higher, and therefore younger, land surface. Unfortunately, the erosion which exposed the skeleton had also completely removed overlying deposits and any information they may have contained.

In 1999 the first direct attempt to solve the difficult dating problem presented by LM3 was published by Alan Thorne, Rainer Grün and co-workers. Significant advances in dating technology had allowed a variety of new methods to be applied. These techniques were not constrained by the difficulties associated with dating bone through the radiocarbon (14C) dating method and had the potential to date remains which were too old for 14C to be reliably applied.

Thorne and his colleagues combined the results of three dating techniques to arrive at an age for the LM3 burial.

- Electron spin resonance (ESR) measures the number of electrons produced from radioactive decay captured in crystalline impurities, such as in tooth enamel. The number of electrons are a function of both background radiation and the amount of radioactive material, usually uranium, that the tooth has absorbed during the fossilisation process.
- A number of uranum isotopes become fixed in lime stone and bone. These isotopes subsequently decay, producing independent daughter elements with variable half-lives. For instance, Uranium-234 has a half-life of 244,000 years and Thorium-230 has a half-life of 75,200 years. As the decay rate of these isotopes follows a definite mathematical patern, the amount of disintegration in a particular sample can be measured and the amount of years it took for the amount of decay can be calculated.
- Optically stimulated luminsence (OSL) examines individual grains of common minerals like quartz, which

Right: The ochre-covered Lake Mungo 3 skeleton during excavation in 1974. Photo: Colin Groves



Eroded and broken 14,000-year-old human skeleton on the surface of one of the Willandra Lakes lunettes, not far from Lake Mungo. Photo: Peter Brown

absorb radiation from the sediment around them but releases this energy when erosion exposes the min erals to sunlight. Thus the amount of energy retained by these minerals indicates when they were last ex posed to sunlight. In this way OSL can determine the age of the sediment surrounding a skeleton.

The combined results from these three dating techniques indicated , was 62,000±6000 years BP. This would make LM3 at least 20,000 older than the accepted maximum date for the Mungo Horizon in which it was found, but comparable in age to archaeological sites like Malakunanja in the Northern Territory that had also been dated using OSL (Mulvaney and Kaminga, 1999).

The apparent discrepancy between the reported date for the LM3 skeleton and the accepted date for the Mungo Horizon attracted the attention of dating experts Richard Gillespie and Richard Roberts, and geomorphologists Jim Bowler and John Magee. Jim Bowler had been responsible for most of the original stratigraphic work at Lake Mungo and Richard Gillespie, an expert in 14C, has continued to refine the radiocarbon sequence for the Willandra Lakes region.

In articles just published in the Journal of Human Evolution this month they point out that:

- the claims for an age of 62,000 years for LM3 is at odds with a large number of 14C and thermoluminesence dates from Lake Mungo;
- some of the samples selected for dating were inappropriat;
- there were problems with modelling assumptions associated with dating techniques; and
- the results were not internally consistent.

Furthermore, the three dating methods used are based on a variety of assumptions to do with soil moisture through time, leaching rates and depth of deposit above the burial need to be made. It is simply not possible to measure these accurately for LM 3 given the evidence for substantial climatic variation in southeastern Australia over the last 40,000 years and the loss of deposit from above the burial. While appreciating the effort made to date LM3, Gillespie and Roberts (2000), and Bowler and Magee (2000), present very strong arguments that the LM3 burial is younger than the maximum age (43,000) for the Lower Mungo sediments in which the burial was inserted.

There are also problems with the statements made about the biological significance of the LM3 burial, regardless of how old it might be. Although remaining essentially undescribed Alan Thorne has argued that the skeleton was of a male, that it was anatomically modern and that it was particularly gracile in build compared with some other Pleistocene Australians from Kow Swamp in northern Victoria.

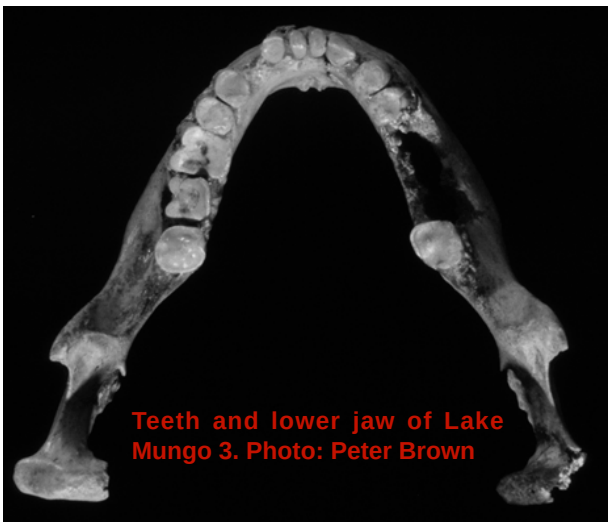
This information has been used to support Thorne's belief in the migration of two distinct groups of people to Australia during the Pleistocene. Modern Aborigines were argued to be the descendants of these two groups of Asian immigrants.

While repeated in a variety of publications, the credibility of this story has come mainly through the telling. Evidence substantiating these claims — such as a detailed descriptive and statistical comparison with prehistoric skeletal remains from Australia and Asia — has never been published.

The Lake Mungo lunette, in 1976, near where the skeletons of Lake Mungo 1 and 3 were discovered by Jim Bowler. Photo: Peter Brown

The information which has been published suggests that LM3 would have been approximately 170 cm tall, was robustly built in terms of bone thickness and skeletal dimensions, and due to poor bone preservation is of indefinite sex. In comparison to relatively large bodied people who lived in south-eastern Australia during the Pleistocene LM3 was either a tall woman or a shorter than average man. Nothing about the skeleton warrants it being placed in a distinctive gracile population and it certainly does not provide support for the notion of two separate migrations to Pleistocene Australia from different parts of Asia.

With hindsight the dates published for LM3 in 1999 would have been more convincing if the dating procedures had first been tested against a securely dated skeleton from a similar depositional environment to LM3. Similarly the unsupported claims for the biological significance of LM3, and the implications for human colonisation of Australia, should have been tested through standard paleontological methods of description and statistical comparison before publication.



Teeth and lower jaw of Lake Mungo 3. Photo: Peter Brown

In the future, the only way the debate over Australia's first colonists will be solved is through the discovery of late Pleistocene human skeletal and cultural materials in Asia. Unfortunately, the time period in which people first floated to Australia, 60,000 to 40,000 years ago, remains something of an archaeological blank page in Asia.

While remains of an earlier and probably unrelated hominid called *Homo erectus* are relatively common in Indonesia and China, modern humans similar to the first Australians, are reliably dated to only the last 25,000 years.

FURTHER READING

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