

## SHORT COMMUNICATION

### HOVERING ON THE BRINK: NEARLY BUT NOT QUITE GETTING TO AUSTRALIA

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#### Abstract

Human beings have been on the brink of Australia for much of the Pleistocene: in Flores for nearly 700,000 years, and in Java for upwards of a million years. Humans - presumably *Homo erectus* - appear to have entered Flores as part of a faunal movement. As the terrestrial vertebrate fauna of Flores even today bears Oriental affinities, not Australian, it is perhaps no surprise that until the advent of fully modern people (with associated technologies) in the Late Pleistocene humans failed to enter Australia but remained hovering on the brink.

*Key words: Flores, Australia, Pleistocene faunal movements*

#### Introduction

The Australia-New Guinea region (Sahul to archaeologists, Meganesia to zoogeographers) has no indigenous non-human primates; the human inhabitants therefore had to have come from elsewhere. So, where did they come from, and when did they come?

The Meganesian mega-continent is separated from other land by substantial distances across deep water, so that at no time in the past could people have crossed dry-shod between Meganesia and any other of the world's land areas. The nearest part of the continuous Afro-Eurasian landmass is Sundaland, the subcontinent that was exposed completely at times of low sea level in the Late Pleistocene. To reach Meganesia from Sundaland, people would have had a choice of two routes: a northern route from Borneo to Sulawesi, then to the Moluccas, then to the Bird's Head peninsula (Cenderawasih) of New Guinea, or from Bali to Lombok, and a southern route along the Lesser Sunda (Nusatenggara) chain via Timor to the Kimberley coast of Australia.

#### When Did They Come?

Kershaw (1994) notes that in the pollen diagram from Ocean Drilling Program (ODP) Site 820, on the edge of the continental shelf opposite Cairns, there is a marked spike of sclerophyll pollen at about 30m depth, ie, somewhere between 150 and 120 thousand years ago (kya), reproducing an apparently similar phenomenon at sites on the Atherton Tableland; he suggests that this could mark the onset of human-induced changes, caused by burning the vegetation. While this may be so, the evidence is at best indirect, and it should be noted that a similar spike in sclerophyll pollen can be seen (Kershaw, 1994, fig 5) at a much earlier point in the diagram, at about 350m depth, inferentially well into the Lower Pleistocene (I thank Dr RG Roberts for drawing my attention to this). It would be unsafe, on this evidence, to claim human occupation in Australia by 120 kya.

Roberts *et al* (1990, 1994a) have found, at two archaeological sites in the Northern Territory, that the earliest artifacts appear abruptly above deep sterile layers at between 53 and 60 kya. This suggests to them that human occupation began about 60 kya (Roberts *et al*, 1994b), which stands at present as the earliest tangible evidence for humans in Meganesia.

### Pleistocene People in Sundaland

For most of the Pleistocene, the human inhabitants of Java - which is all that we know of Southeast Asia during this period - belonged to the species *Homo erectus*; several other taxa have been described, but their distinctiveness has not been clearly demonstrated, though some local evolution seems likely (Groves, 1989).

It has been claimed that the earliest specimens from Java are of the order of 1.8 million years old (Swisher *et al*, 1994); but it has also been claimed that the stratigraphic association of these early dates with the fossils is unclear (de Vos and Sondaar, 1994). If the 1.8 million year old samples are not in fact relevant, the earliest date for *Homo erectus* in Java would be 970 kya (Hyodo *et al*, 1993).

The latest *Homo erectus* specimens are from Ngandong ('Solo Man'), and there has been much debate about their age. Bartstra *et al* (1988) gave Uranium-series dates for different levels at Ngandong, increasing from  $45 \pm 5$  kya at 1.1m to  $101 + 12 / - 10$  kya at 2.5m. It is unclear which of these ages applies to the 'Solo Man' remains; if they were only 45,000 years old, then *Homo erectus* was still there when *Homo sapiens* was in Australia!

The earliest specimen of *Homo sapiens* in Sundaland is generally thought to be the Niah skull (Sarawak); the date of 38 kya, said to be associated with it stratigraphically, may however be too early if the specimen is a burial as suggested by Bellwood (1985). The Southeast Asian record is in fact so poor that we still do not know when *Homo sapiens* arrived (or emerged?) in the region, nor what the earliest members of the species looked like.

While Thorne and Wolpoff (1981) argue that Javanese *Homo erectus* is the ancestor of modern Australoid people (Aboriginal Australians and Melanesians), a different approach is taken by Groves and Lahr (1994), who note that *Homo erectus* has its own uniquely derived (autapomorphic) character states, while lacking those which the contemporaneous species *Homo heidelbergensis* in Africa and Europe shares with *Homo sapiens*. Among modern populations, Australoid peoples as a whole are plesiomorphic; cranially, they strongly resemble the earliest well-represented series of *Homo sapiens*, the approximately 80-100 thousand year old specimens from Skhul and Qafzeh, in Israel (Groves, 1994); in all essential features they are *Homo sapiens*, and there is no reason to postulate a genetic contribution from *Homo erectus*.

### The Route to Australia

The discovery, in 1970, of human artifacts with remains of the extinct elephant-like *Stegodon* in Flores, in the Lesser Sundas, was sufficiently intriguing to warrant reinvestigation. Sondaar *et al* (1994) sampled two sites, Mata Menge and Tangi Talo, confirming the associations and adding further data. At Mata Menge, stone artifacts (which they ascribed to *Homo erectus*, because no other human species is known for the region at that time) were discovered in association with remains of the large *Stegodon trigonocephalus florensis* (only subspecifically different from the Pleistocene stegodon of Java), just 3m above a layer of reversed-to-normal magnetism, presumed to be the Matuyama-Bruhnes transition at 730 kya. At Tangi Talo giant tortoise fossils were found associated with pygmy stegodon (*Stegodon* cf

*timorensis*) and a giant rat (*Hooijeromys nusatenggara*), but no artifacts, at the presumed reversed-to-normal transition. Sondaar *et al* (1994) explain this by proposing that a faunal turnover occurred shortly after 730,000 years ago, in which *Homo erectus* entered Flores and large stegodons replaced pygmy ones.

How did *Homo erectus* get to Flores? Between Bali, the southeasternmost extension of the shallow water Sunda Shelf islands, and Lombok there is a deep-water strait; another deep water strait separates Lombok from Sumbawa; a third separates Sumbawa from Flores. Did these straits exist in the Early and Middle Pleistocene? We do not know, but there are some inferences we can make.

The strait between Bali and Lombok marks the southernmost extension of Wallace's Line, the eastern extent of the Oriental fauna; to the north, this line goes between Borneo and Sulawesi, demarcating what for mammals at least is a very marked transition indeed between the typically Oriental fauna of Borneo and the endemic (but 'archaic Oriental') fauna of Sulawesi. But recent investigations of the Lesser Sundas tell a different story. The bird taxa of Lombok and Sumbawa are predominantly Oriental; what happens at Wallace's Line is a habitat change, allowing the relatively small number of Australasian species to be much more abundant (Lincoln, 1975). Kitchener *et al* (1990) were surprised to find much less difference in the mammal fauna between Lombok and Bali than they had expected; some of the species could have been introduced by human agency, but some (langur, leopard-cat, muntjac deer, shrews, for example) are unlikely to have been. They suggest that the deep channel between Bali and Lombok is of recent origin, and postulate the existence in the Pleistocene of a land link between them.

Musser (1981) surveyed the extant and extinct mammal fauna of Flores, and concluded that only rodents, bats and shrews are actually indigenous. The rodents (all murids) divide into three groups:

- Group I comprises the Australasian Old Endemics (a concept which includes most of the murids of Australia, New Guinea and the Moluccas, and the extinct rodents of Timor). There is only one representative (the extinct *Spelaeomys*) on Flores; and the only members occurring anywhere else are on Sulawesi. These may represent a back-dispersal from a centre of diversity in Meganesia.

- Group II comprises the *Rattus*-like group, of Oriental affinities. Most of the Flores rodents belong to this group, which is also represented on Sulawesi. One of them, *Hooijeromys*, is the only murid so far known from the Pleistocene (see above); one (*Floresomys* [correctly *Paulamys*]) is recently extinct; two (*Papagomys* and *Komodomys*) are still extant. Since Musser's monograph was published, Kitchener *et al* (1991) discovered that *Paulamys* likewise still lives on Flores; moreover, it is actually a representative of the otherwise Sulawesi genus *Bunomys* (Kitchener *et al*, 1991; Corbet and Hill, 1992).

- Group III is the genus *Rattus*, widespread throughout the world but originally from Southeast Asia. Endemic species of this genus (or assigned to it, rightly or wrongly) live on Australia and New Guinea, but the Flores rats belong to common commensal species.

Flores also has an endemic species of shrew, *Suncus mertensi*, whose relationships are of course ultimately with Sundaland. Two other species on Flores are the partly commensal *Suncus murinus*, which may have been spread by human agency; and the wild-living *Crocidura maxi*, which is found from Bali east to Alor.

The bats presently living on Flores (Kitchener *et al*, 1994a,b; 1995) include four species found as far west as Sundaland (Java or at least Bali), and three which are evidently Nusatenggara endemics. Eastward, their distributions generally extend only to Pulau Alor, rarely to Timor. The problem of subspecies is significant because it makes a statement about

barriers to gene-flow; in the case of the Nusatenggara bats and shrews there is no regularity in the location of subspecific boundaries, which may be placed either east or west of Flores.

As far as we know them, therefore, the Flores mammals represent an ancient differentiation almost entirely from an Oriental baseline. But how ancient? One of the endemic murids, *Hooijeromys*, is known from deposits at the Matuyama-Brunhes boundary level (Sondaar *et al*, 1994), associated with the pygmy stegodons and giant tortoises which were replaced by the incoming large stegodon fauna. The species-level endemics may have been part of the new fauna; the genus level endemics (all murids) may equally have been part of it, or may precede it. *Homo erectus* was part of this same 'new fauna'; only with the spread of *Homo sapiens* were cultural advances sufficient to override zoogeography and permit dispersal across wide sea barriers.

## Conclusions

I see no reason to worry about *Homo erectus* hovering on the brink of Australia and New Guinea for 600,000 years or more without making it across. *Homo erectus* was part of an Oriental fauna which spread along the Lesser Sunda chain, becoming as it spread eastwards more and more depauperate, perhaps for climatic reasons. It may not even have reached Timor, although there is no reason why it could not (both pygmy and large stegodons are known from there); investigations are needed to test this point.

So far there is no evidence to challenge the proposition that maritime technology, such as was needed to enter the Meganesian region, was part of the cultural package that was the global Late Pleistocene "sapiens explosion" (Jones, 1990).

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