

New palaeozoogeographical evidence for the settlement of Madagascar

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The settlement of Madagascar

The island of Madagascar split from the African mainland some 50 million years ago, considerably prior to the evolution of humans and indeed primates. Its isolation permitted the evolution of a complex endemic flora and a fauna dominated by lemurs, whose nearest relatives are the lorises and galagos on the African and Asian mainland. Some 35% of the flora and 90% of the fauna are endemic, occurring nowhere else in the world. The absence of human populations for virtually all of this period permitted the development of 'naïve' species, susceptible to both predation from humans and competition from other animals, wild and domestic.

However, at first European contact, Madagascar had already been settled by an agricultural population and was fully integrated into long-distance Indian Ocean trading networks. In the early eighteenth century, the Dutch scholar Adriaan van Reeland recognised the relatedness of Malay, Malagasy and Polynesian, and concluded that Madagascar had been settled by speakers of an Austronesian language¹ (Relandus 1708). As a consequence, the origin of the peoples of Madagascar and the date of their arrival has long been a subject of interest.

One potential source of information are the early records of the East African coast. These date from the classical period, although are often difficult to interpret (Horton 1990; Wrigley 1997). The main sources are; *On the Erythrean Sea* by Agatharchides of Cnidus (Burstein 1989), the *Periplus of the Erythraean Sea* (Casson 1989), the *Natural History* of Pliny (Rackham 1942) and the *Geography* of Claudius Ptolemaeus (Stevenson 1932). Needless to say, the dating of these is controversial (Mathew 1975) but the scholarly consensus would order them as follows:

Table 1: Classical sources for the Indian Ocean

Book	Date	Source
On the Erythrean Sea	< 100 BC	Burstein (1989)
Periplus	AD 40-70	Casson (1989)
Natural History	AD 77	Rackham (1942)
Geography	AD 150	Stevenson (1932)

¹ 'Malay' or 'Indonesians' in earlier sources. Beaujard (2003) notes that the dictionary of Dutch by Houtman (1606) also makes the same connection.

The *Periplus of the Erythraean Sea* (Casson 1989), a first century seaman's guide to the coast, may suggest Graeco-Roman mariners or their contacts had some knowledge of Madagascar, which perhaps makes an appearance in the text as the 'Great Island of Menuthias', a source of 'mountain tortoises'. For the author of the *Periplus*, Menuthias has 'no wild animals' except crocodiles and is inhabited by people who use dugouts and sewn boats and who catch fish in wicker traps. Menuthias was said to be some 300 *stades* from the mainland (a Ptolemaic *stade* was 222 m and this distance would then be ca. 67 km). The distance from Madagascar to the mainland at the closest point is 400 km, somewhat further, making the Pemba-Zanzibar archipelago another more likely possibility. Casson (1989: 140) argues strongly for Pemba or Zanzibar; the rivers point to Zanzibar and the 'crocodiles' might be monitor lizards, although Madagascar has both crocodiles and large tortoises. Beyond Menuthias is the port of Rhapta, named for its sewn boats and its 'big-bodied men, tillers of the soil (*orator*²)'. The identity of the communities is a puzzle; evidence for agriculture in this region at this date remains controversial. Rhapta might be in the region of Dar es Salaam or further south, depending on the identification of Menuthias. The Geography of Ptolemy was probably first compiled around AD150, but was added to in successive centuries as new data became available. The text that has come down thus probably represents the geographical knowledge of Byzantium in the fourth century. For Ptolemy, Menuthias is certainly Madagascar, since it was east of Prason [=Delgado?], a promontory south of Rhapton, itself south of Rhapta (Freeman-Greville 1962: 4).

This picture of thriving coastal activity in the Mozambique Channel would appear to contradict existing archaeological evidence. Archaeology in Madagascar has so far uncovered no site earlier than the fifth century AD and even that is a single date that has not been replicated (Dewar 1994, 1997). It is generally assumed that these early sites represent primary incursions by trans-Oceanic populations from insular South-East Asia, and that markedly 'African' features of Malagasy culture, such as ruminant keeping, were a consequence of subsequent trade or other contacts with the mainland. But recent evidence for the palaeozoogeography of Madagascar together with vegetational change and the identification of cutmarks on numerous bones of extinct species all point to the presence of low-density hunter-gatherers from about 4-300 BC onwards. Anthropogenic rat introductions also suggest outside contact prior to established Austronesian settlement although the source of these may be different. This paper reviews the evidence from palaeozoogeography and its implications for the early settlement of the island. The argument is that a fresh model of the peopling of Madagascar and early trade and migration on the East African coast must be developed.

New evidence from palaeozoogeography

Despite the recalcitrant archaeology, as early as 1986, studies of vegetation change on Madagascar suggested possible human impacts significantly earlier than the fifth century AD (Burney 1987a,b,c; 1993; Burney *et al.* 1997; Burney *et al.* 2003; Burney *et al.* 2004). Indeed, the most recent synthesis states bluntly 'multiple lines of evidence point to the earliest human presence at ca. 2300 ¹⁴C yr BP (350 cal yr BC)' (Burney *et al.*

² This translation has been questioned by Horton (1990) and Wrigley (1997).

2004: 25). The core support for this statement is the prevalence of human-modified (i.e. butchered) bones of extinct animals, the appearance of pollen of the introduced *Cannabis/Humulus*, 'sudden increases in microscopic carbon particles above background values' and increases in ruderal pollen (*op. cit.* p. 32).

A relationship between the loss of megafauna and human incursions in prehistory has been argued for North America and Australia and has long been suspected for Madagascar (Martin 1984). However, it is since the 1980s that the scale of extinction on the island has become clear. Godfrey *et al.* (1997) summarise our knowledge of lemur extinction; at least sixteen species disappeared in the Holocene, of which only three have extant relatives in the same family. The remainder belonged to families distinct from those of any living lemur. In addition to the lemurs, pygmy hippopotami, giant tortoises, ratites and other species died out in the same period. The authors identify habitat destruction, particularly forest fragmentation, as the most likely cause, although, as they point out, the elimination of widespread species present in diverse habitats requires further elucidation. As research has progressed, it has become clearer that these disappearances may be linked to active human predation.

As long ago as 1991, a modified hippo bone from Ambolisatra on the south-west coast of Madagascar was dated to 1970±90 yr BP, implying pre-Austronesian human activity (MacPhee & Burney 1991). Since then, identifications of bones with cutmarks have increased exponentially. Perez *et al.* (2005) state, 'In total, 10 of the 28 specimens of extinct lemurs that we examined microscopically, and 77 of the 269 specimens of extant lemurs, show definitive signs of butchery in the form of cut and/or chop marks'. Godfrey & Jungers (2003) illustrate the cut-marks on an undated left distal humerus of the extinct lemur *Palaeopropithecus ingens* from the site of Taolambiby in south-west Madagascar. In the case of a right proximal radius of *Palaeopropithecus ingens* that had conspicuous butchery marks, 'collagen extracted from this bone yielded an age of 2,325±43 years BP'. (Taolambiby is an inland site, so if this is acknowledged as evidence for human settlement, this must have been still earlier.) A caveat that must be entered is that the bones are from existing collections, not stratified sites, and some are clearly the result of blows from metal (i.e. iron) implements and are therefore almost certainly post-Austronesian³. At this point it is difficult to imagine what other explanation could account for these finds, apart from human settlement of Madagascar significantly earlier than previous dates derived from archaeology. Lemuroid families became extinct either through habitat destruction or human predation and particular families presumably were preferentially lost because they were easiest to kill.

Burney (box 5 in Godfrey & Jungers 2003) summarises the sequence of extinction as it now appears. Following the initial arrival of humans, large herbivores were intensively hunted, reducing their density and leading to an increase in plant biomass. This increased the incidence of fires (and hunters may also have intentionally set fires to drive animals into the open as they do all over Africa today). This would reduce the diversity of habitats, in particularly extending anthropic grasslands, hence the catastrophic loss of megafauna.

Part of the evidence for vegetation change is the earliest occurrence of *Cannabis/Humulus* pollen in the central highlands at Tritrivakely, at an interpolated age of 2200 cal

³ Although if iron-working Bantu-speakers were on the coast around 0 AD and there was some flow of trade across the Mozambique channel it is conceivable that small quantities of iron tools were reaching Madagascar at this early period.

yr BP (Burney 1987a). More directly linked to megafaunal extinctions is the decline in incidence of the spores of the coprophilous fungus *Sporormiella*, a proxy for megafaunal density (Burney *et al.* 2003). The most secure date for this change is 1720±40 yr BP (230–410 cal yr AD) but a less certain earlier date of 1990±50 yr BP (100 cal yr BC–110 cal yr AD) has been recorded. These events precede a rise of microscopic carbon particles, a sign of extensive, possibly anthropic, fires. The hypothesis that the present vegetation of central Madagascar evolved from setting fires goes back to Humbert (1927) although at that time it was impossible to set a credible date for these events. The most reasonable interpretation of this phenomenon is that early human settlement and intensive hunting led to higher densities of biomass, thereby increasing the likelihood of natural fires. However, people probably also set fires in highland areas, thereby creating a characteristic upland derived savanna and destroying specialised lemur habitats, combined with the selective predation of megafauna. All indications are that this process began in the south-west of Madagascar and spread northwards, over several centuries.

Another intriguing change in the zoogeography noted by various authors is the spread of Eurasian rodents. Both *Rattus rattus* and *Mus musculus* are common on the island today and have penetrated even remote forest areas, where they are able to out-compete endemic small mammals (Ganzhorn 2003). Hingston *et al.* (2005) proposed a reconstruction of the process of colonisation of southern Madagascar. They observe that the closest relatives of the specimens they studied are the rats of the Indian subcontinent, but that more sampling is required to draw any definitive conclusions. Vasey & Burney (2007) show that at Andrahomana Cave (in the southeast) between 2480 and 1760 BP proportions of endemic mammals such as *Macrotarsomys petteri* in bone assemblages decrease dramatically while both *Rattus rattus* and *Mus musculus* rise sharply. Although there has been 'some stratigraphic mixing, a clear pattern of faunal turnover still emerges'. They claim that 'data presented here show that these taxa were introduced prehistorically by the earliest human settlers' but this is unlikely. A probable source would be either the Graeco-Roman traders or other players in the Arabian end of the Indian Ocean network, who were certainly active during this period. It is even possible such ships were trading with the resident populations rather than picking up tortoises directly. There is some uncertainty about the identification of *Rattus* and it remains a possibility that *Rattus exulans* (the Polynesian rat) is present, which would indeed be striking evidence for early trans-oceanic contacts. Another species of potential interest is the Asian house shrew, *Suncus murinus* (Hutterer & Trainier 1990). Endemic in South Asia as far west as Pakistan, it now occurs throughout Madagascar and the Indian Ocean islands. The extent of its embedding in the fauna in remote areas in Madagascar suggests an ancient introduction, but further evidence from stratified sites is crucial to identifying dates and sources.

Another possible early import to Madagascar is the feral bush-pig. There are feral pigs, *Potamochoerus larvatus*, on Madagascar and the Comoro islands (Vercammen *et al.* 1993; Garbutt 1999). These pigs have undergone some adaptive radiation and show signs of semi-domestication, even though there is no evidence for traditional rearing of *P. larvatus* on the mainland. Some zoologists⁴ divide these *Potamochoerus spp.* into two subgroups;

Potamochoerus larvatus larvatus from Mayotte (Comoro Is. and western Madagascar);
Potamochoerus larvatus hova from eastern Madagascar.

⁴ Described by Jori at http://pigtrop.cirad.fr/fr/petits_curieux/SV_Potamochoere_Mada.htm

but the evidence for this is disputed. The Malagasy bush-pigs appear to be most closely related to the southern African form *P. l. koiropotamus*, which currently ranges from mid-Tanzania southwards. This suggests that they originally came from somewhere between the central Tanzanian coast and the Cape. If this is correct, then the translocation of wild pigs from the African mainland to Madagascar must have taken place in this region and apparently at a considerable time-depth. Strangely, these pigs are named *lambu* in Malagasy which is a Malay term for 'cattle' (Adelaar 1995b; Blench in press a). It seems as if the Austronesian migrants who populated the island encountered feral pigs already in residence and were sufficiently struck by their size to name them after small Sundaic cattle rather than the domestic pigs with which they were presumably familiar. Beaujard (pers.comm.) also suggests that as the migrants arrived without cattle, they may have applied the term *lambu* to the only species appropriate for sacrifices. Only archaeology will provide greater clarity as to the era of the introduction of these pigs but the possibility that they were introduced by early foragers should not be discounted. Animal translocation between the islands of Oceania in the early period of colonisation was a common practice (Spriggs 1997).

If Madagascar was colonised by pre-Austronesians, who were they?

This evidence creates in a major interpretative problem. If there were human incursions in south-west Madagascar by 2300 BP, who were the migrants and why did they leave no very conspicuous archaeological traces? It is evident that they were not sedentary Neolithic populations such as were flourishing in the Austronesian world at this time, or their settlements would be more obvious. Bantu-speaking populations had not yet reached the coast in their expansion across equatorial Africa. Cushitic-speaking pastoralists, who would certainly have been on the mainland during this period, are unlikely candidates. However, there is a clue among the modern-day populations of Madagascar.

Scattered among the Malagasy live groups of hunter-gatherers variously known as the Mikea or Vazimba⁵ (Birkeli 1936; Molet 1960; Dina & Hoerner 1976; Fanony 1986; Yount et al. 2001; Tucker 2003). These peoples are small in stature, and darker than the neighbouring farmers and herders (although this may be simply the consequence of their way of life). In general they have a tendency to assimilate to agricultural communities, and all speak varieties of Malagasy. However, there is evidence for a lexical substrate distinct from both Bantu and Austronesian. Johnston & Birkeli (1920) describe some groups and give samples of the languages of the Vazimba and Ba?si [=Beosy] languages. The few lexical items they record do not apparently resemble any other known language. Stiles (1991, 1998) was later able to confirm at least some of the Birkeli material. Anthropologists have typically argued that the Mikea are *not* the descendants of 'Vazimba' foragers but fugitive or reinvented groups of existing populations (e.g. Yount *et al.* 2001; Tucker 2003). Blench (1998) has argued that this is the case for pygmoid groups of the Central African rainforest. It is true that the traditions of the Mikea might be spurious, as accounts of resident 'small' populations are also common on the African mainland,

⁵ The literature is confusing on the name of these people. In some sources they are treated as the same, in other they are distinguished, the Vazimba being the semi-mythical inhabitants of the island and the Mikea their present-day descendants.

but Malagasy traditions do refer to them as already in place at the period of the first migrations. The outcome for the Mikea has been mixed; in practice they exist as marginal outgroups. However, where they are no longer present among the Merina, they became transmogrified into spirits or mythical kings whose domains the Austronesians inherited. A very similar process has taken place in Twa-Tutsi relations in Burundi. Although in reality the Twa represent an outgroup which has been discriminated against (Lewis & Knight 1996), in traditional histories of this part of Central Africa, they are either chiefs or legitimate chiefs (Schadeberg 1999). A split solution is also possible; some Mikea share a common origin with the Malagasy while others represent the traces of the primary forager incursions argued for in this paper, as is true, for example, among the 'travellers' and gypsies in England.

If the evidence for biotic change begins in the southwest, then it is possible that African mainland foragers crossed the Mozambique Channel some 2300+ years ago and began the low-density colonisation of the island. Although the Mozambique coast has long been occupied, we have no evidence for the type of population inhabiting it at the relevant period. However, it seems unlikely the migrants were Khoesanoids, as such peoples are well-known archaeologically and their distinct physiognomy would surely have left more phenotypic traces. More credible candidates are the Hadza-type populations, presently surviving only in encapsulated groups in Tanzania (Blench 2006). The Hadza, the Sandawe and other peoples further north such as the Dahalo and Ongota and the hunting castes among the Somali represent the remaining evidence for non-Bantu hunter-gatherers in this region. Their languages are either isolates or else only tenuously related to Khoesan of southern Africa and they retain a quite distinctive physical type.

Although there is no synchronic ethnographic evidence, it is possible they could they have crossed the Mozambique Channel at an early date. Evidence from Oceania shows that sophisticated voyages out of sight of land were being undertaken as much as 30,000 years ago (Spriggs 1997). The types of craft in use at this period are unknown, but it is possible that large rafts were being developed. Elaborate trade networks are possible using rafts, as the 1000-mile voyages up and down the coast of pre-Hispanic Peru and Chile have demonstrated (Heyerdahl 1996). As Heyerdahl points out, we know about these remarkable networks entirely from early written records (and archaeological evidence also supports their existence) as these boats had disappeared without physical trace within fifty years of Spanish incursions. A quirky piece of evidence pointing to early but unknown trade networks along the East African coast is a copal pendant found in the Akkadian settlement of Eshnunna, dated to the 'proto-Imperial' period (2500-2400 BC) (Meyer *et al.* 1991). Analysis revealed that the resin is typical of the Zanzibar-Madagascar-Mozambique *Trachylobium* species (although this is rejected by some; Phillips 1997: 437). Quite what type of trade network might have been responsible for such long-distance trade at this era is unknown, although 'hand-to-hand' amber networks are also known in prehistoric Europe. The point, however, is that even at such an early period, hunter-gatherers were probably engaged in exchange with external populations; it is at least conceivable that they might eventually explore the open sea in parallel with their oceanic counterparts.

Another intriguing piece of evidence, although it will probably appeal only to musicologists, is that the Mikea have very distinctive music, quite unlike their Malagasy neighbours. OCORA (1997) shows that the music is typified by vocal polyphony, hocket techniques and falsetto voicing. This type of musical structure is characteristic of the pygmy or Twa populations of Central Africa and to a certain extent, the Khoesan (Olivier

& Fürniss 1999) and quite atypical of the Malagasy, whose Austronesian type music is monodic. The likelihood of such similar music evolving by chance is minimal, in world terms, and provides another pointer to an origin with mainland forager populations.

Assuming the ancestors of the Mikea did migrate from present-day Mozambique, it seems pertinent to ask why is there no more direct evidence of their presence. There are two possible contributory explanations; insufficient survey of cave sites and a failure to recognise the tools that are to be found. Despite the strictures of Dewar (1994), hardly any caves in the highlands have been the subject of well-ordered excavations with appropriate stratigraphic control. However, more intriguing is the possibility that only very lightly shaped tools were in use and that these are difficult to recognise. Excavations at Kuumbi cave on Zanzibar from c. 5000-3000 bp contexts have turned up fractured nodules of quartz with very few formal tools which are therefore not easy to recognise (Sinclair pers.comm. and in press). Above this layer at Kuumbi there is a crystalline lime stone flake assemblage also characterised by few formal tools. If the Mikea were using such tools and otherwise shaped wood implements, such as the fire-hardened wooden arrow-points used by the Hadza (Woodburn 1970), as well as fanning out at very low densities, then their campsites might well be difficult to recognise.

Two types of scepticism have been expressed in relation to the hypothesis of the early settlement of Madagascar. Dewar (1997) believes that the indirect evidence cited here can all be explained by alternative hypotheses. However, the accumulation of indicators from different directions amassed by Burney and his colleagues has yet to be convincingly refuted. On a more humorous note, the very category of scientific evidence has already excited opposition from the post-modern establishment, for whom claims based on empirical data are further proof of the imperialist nature of Western science. Klein (2002) presents a 'counter-narrative' for deforestation in which he points to 'the political nature of the deforestation narrative as an explanation for its hegemonic position'. As he says, this is an 'attempt to investigate the epistemological implication of a social constructivist approach to environmental discourses in Third World settings'. Indeed.

The Austronesian colonisation

The East African coast may have been visited by Austronesian mariners from an early period, probably prior to 0 AD (Adelaar 2006; Blench 1996, in press b; Beaujard 2007). The description by Pliny (*Natural History*, Book XII: cap. 42) of the Troglodytae, who buy cinnamon from their neighbours and 'carry it over vast tracts of sea, upon rafts', is a reasonable approximation for an outrigger. Moreover, 'they choose the winter season, about the time of the equinox, for their voyage, for then a south easterly wind is blowing; these winds guide them in a straight course from gulf to gulf', a fair description of the use of the equatorial counter-current for seasonal travel.

Archaeological evidence indicates that the maritime cultures of the Indian Ocean had begun to reach the islands off the East African coast much earlier than previously thought. Chami (1999a,b) has reported evidence for Graeco-Roman trade with finds of Roman beads in the Rufiji Delta, providing confirmation of the reports in the *Periplus*. But if there had been significant settlement on Madagascar at this period, it would surely be more evident in the archaeological record. So it is likely that the present-day populations of Madagascar do derive from migrations during the fifth to seventh centuries.

Although Malagasy is an accepted member of Austronesian, its precise genesis has been much debated. It is generally considered to belong genetically to the Barito languages, today spoken in south-east Kalimantan (Dahl 1951, 1991; Simon 1988). However, it has clearly undergone considerable influence from Malay, whence it draws many nautical and other technical terms (Adelaar 1989, 1994, 1995a, 1995b, 2006, in press). Blust (2005) has presented evidence that the Sama-Bajaw languages of the sea-nomads in the south-west Philippines form part of the Barito/Maanyan cluster of languages spoken in south-east Borneo first described in Hudson (1967). Kemp Pallesen (1985) first demonstrated that the Sama-Bajaw languages form a unity, dispersing relatively recently. Their maritime culture may well have been an indirect consequence of the expansion of the *r̥*-*vijaya* Malay in the seventh century. However, Barito-speakers were originally a river people with no experience of the open sea, and their movement out from Borneo could be a result of interaction with the sixth/seventh century expansion of the *r̥*-*vijaya* Malay. This would be in line with current archaeological dates for settlement in Madagascar which fall within the period fifth to seventh centuries AD.

The Malagasy language might be expected to testify to this nexus of interaction through loanwords and etymologies within key areas of its vocabulary. Malagasy is divided into numerous dialects, the most important of which are Merina, Tanala, Betsileo, Tandroy, Antankarana, Tsimehety and Sakalava. These have a large amount of common core vocabulary, but also a significant corpus of 'rogue' lexemes whose source is yet to be identified. The origin of these is probably to be found either in the language of the Mikea groups or in the coastal languages (cf. Simon 1988 for early pointers in this direction). Apart from its core Austronesian lexicon, Malagasy has picked up substantial amounts of Malay from different eras and areas (Banjar and Sumatra), Javanese and South Sulawesi languages (Beaujard 1998, 2003).

A clue to the process of transformation of Barito society into present-day Malagasy is the presence of Malay terms for cardinal directions⁶ and other nautical terms (Adelaar 1994; Beaujard 2003). This suggests either that the Barito travelled in Malay ships as crew or perhaps a separate migration of a Malay-speaking population, a possibility considered by Beaujard (2003). Whether the Barito were crew by their own choice or were ensnared in some way remains to be determined, but their previously non-sea-going culture suggests the latter, as does the presence of various socially-sensitive Malay loanwords in Malagasy, arguing that the Barito were the not in control of the migrations (Adelaar pers.comm.). This complex of borrowing may well indicate that the peopling of Madagascar occurred in 'waves' rather than representing a single migration event. Beaujard has attempted to establish a stratification of Austronesian arrivals in Madagascar through loanwords, although his attempts have met with some scepticism, from Adelaar (2006, in press), for example.

In addition to Austronesian inherited vocabulary, Malagasy has a considerable number of terms of demonstrably Bantu origin, but their exact source within the Bantu domain has never been properly identified. The most comprehensive attempt to consider this issue is by Beaujard (1998), whose rich dictionary of Tanala contains many etymological speculations. Recent observations on the historical origins of Malagasy make it possible to develop a more definite model for the origin of Bantu loanwords. Blench (in press a) focuses on the terminology for domestic and translocated animals, and considers some

⁶ Albeit turned around 90°

other areas of vocabulary in less detail. Another element in the Malagasy lexicon is the development of vocabulary to reflect a wholly unfamiliar natural environment. Walsh (pers. comm.) has recently studied the Malagasy terms for wild animals and it appears that the great majority derive, not from Austronesian, but from Bantu languages. As with livestock names, almost all are from Swahili and languages of the Sabaki group, not, for example, from the Bantu languages nearest to Madagascar, those in Mozambique.

This is somewhat contrary to expectation. Historical accounts of the formation of the Malagasy population, such as that of Kent (1970), point to intensive interaction with Mozambique coastal peoples. However, it seems that the earlier interaction of Malay/Barito crews with their coastal interlocutors must have been much more than casual trade. We know, for example, that the East African coast was considered important enough for the 'Waqwaq' raiders and traders from Sumatra to mount a raid on Qanbalu [an island on the coast as yet unidentified, although associated by Mack (this volume) with the Comoros] in 945 AD (as recounted by Buzurg ibn Shahriyar in the *Book of the Wonders of India* (Freeman-Grenville 1981). The Waqwaq seem also to have settled on the Sofala coast, where al-Mas'udi mentions them in the early tenth century (Freeman-Grenville 1962: 14). To explain the dominance of Sabaki languages in the Malagasy lexicon, it must be that substantial numbers of coastal Bantu were carried to Madagascar, and were primary observers of the natural world. This might be because they were engaged to herd livestock or were captured and set to work to produce food. Whatever the explanation, this points to intensive interactions between the Malay/Barito and the precursors of the Swahili *prior* on the coast to the settlement of Madagascar proper. The discovery of an increasing number of Malay nautical terms borrowed into Swahili (Walsh pers. comm.) independently suggests external influences played an important role in the evolution of Swahili maritime culture.

Synthesis and conclusions

The conventional view of the peopling of Madagascar is that it was settled in the fifth to seventh centuries AD by Austronesians from the region of south-east Borneo. However, beginning as early as 400 BC, vegetational changes in Madagascar point to earlier human presence in the south of the island. Numerous bones with cutmarks, and subsequent faunal extinctions, indicate human presence from about 4-300 BC onwards. Indirect evidence from increases in charcoal particles also suggests that the forest was being burnt off at unprecedented rates. Despite this, there is no archaeological evidence for early settlement; nonetheless, low-density hunting-gathering populations probably did cross the Mozambique Channel and begin to exploit the Malagasy environment. Such populations would probably have been physically like the present-day Hadza of Tanzania rather than Khoesan speakers. It is likely that these survive in the present-day Mikea/Vazimba populations; although today they speak Malagasy dialects, there are clear cultural and linguistic traces of a distinct origin. The absence of archaeology is partly due to a low density of sites especially on the west coast of Madagascar and, to judge by evidence from Zanzibar, a toolkit that is hard to identify without specialised excavation.

There is evidence for a distinct, much earlier Austronesian contact with the East African coast, but by the sixth century, the peoples of island South-East Asia had developed an expansionist raiding and trading empire and had begun voyages directly across the

Indian Ocean, possibly in vessels crewed by captured Barito speakers. Although the occupation of the coast by Bantu speakers made long-term settlement an imprudent option, Madagascar, would still have been 'empty' save the precursors of the Mikea hunter-gatherers. They were assimilated culturally by the well-armed and purposive Austronesians in the same way as the *negrito* populations of the Philippines (who survive phenotypically but have lost their languages).

At the same period, the Austronesians transported numerous Sabaki speakers who worked in rural areas and thereby contributed significantly to the Malagasy lexicon used to describe the natural world. Although all the populations of Madagascar speak Malagasy today (except for Swahili enclaves in the north-west) there is a phenotypic separation of populations, with more 'Indonesian' types in the highlands and more 'African' types in the lowlands. The most likely explanation for this is the differential impact of disease, particularly malaria. The migrants from South-East Asia would have had limited resistance to African *Falciparum* malaria and would have thus tended to stay in upland areas. The same would have been true for the zebu cattle that are culturally central to the Merina; the disease challenge would have been significantly decreased in the high anthropic grasslands. By contrast, the Sabaki speakers from East Africa would have better resisted endemic disease and would therefore have been able to colonise the lowlands. This suggests that they either escaped servitude or simply migrated to lowland areas, depending on the nature of their relationship with the migrant Austronesian speakers.

Conventional narratives of the occupation of Madagascar have been increasingly at odds with new indications from a variety of disciplines and a fresh approach is required. The model advanced here attempts to account for these but only more intensive archaeology in targeted sites will provide the type of physical evidence required to refute or enrich these hypotheses.

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