Was there once a Zone of Vegeculture Linking Melanesia with Northeast India?

Roger Blench[1]

Acronyms & Conventions:
PAN = Proto-Austronesian; PMP = Proto-Malayopolynesian; # = quasi-reconstruction; * = regular reconstruction

Introduction

The ancient vegecultural systems of Melanesia and the rice-dominated agriculture of mainland and island SE Asia presently appear to be worlds apart. In particular, models of the Neolithic on the mainland are dominated by our understanding of the dates for the appearance of rice in the archaeological record (Higham *et al*., 2011). But new research in Arunachal Pradesh and Borneo is beginning to challenge this understanding. It now appears that, apart from the pseudo-grain Job's tears, all types of cereal agriculture in NE India are relatively recent, as are domestic animals other than the semi-wild mithun. The basis of subsistence for many societies was the yams and aroids as well as bananas, sugar-cane, sago and the cabbage of tree-ferns. A key part of the management of the environment was the exploitation of bamboos and rattans, many of which have anthropic distributions. In addition, foraging continues to play a major role in subsistence. The use of sago is particularly striking, since it remains dominant in parts of lowland New Guinea and is still an important staple for some populations in Eastern Indonesia (Ellen 2004) and Borneo (Barker *et al*., 2011). Despite a single find of early rice in Borneo, such cereals are broadly of recent introduction.

This paper will argue that the 'Neolithic package' model which has dominated archaeological thinking concerning the evolution of subsistence in island SE Asia is fundamentally misconceived. Not only was Melanesia a major centre of agricultural innovation, but its innovations were carried westwards at some time well prior to the appearance of the Austronesians by processes that can currently only be a subject for speculation. These innovations were largely vegecultural or arboricultural, i.e. yams and other tubers, palm product processing, *Musa* spp. and sugarcane, and are thus significantly more difficult to pick up in the archaeological record. In the opposite direction, there was a flow of arboricultural techniques, including the processing of bamboos and rattans. The spread of these innovations must have had some demographic element, but cultural diffusion was probably more important. One consequence would be that the populations of island SE Asia during this period would not have been a uniform negrito phenotype from the Pleistocene human expansion, but rather a much more mixed range of physical type. Donohue and Denham (2010) have expressed similar dissatisfactions with the standard model, although coming from a different perspective.

However, this transmission from the east did not end with the islands but continued into the mainland. As far as NE India, particularly Arunachal Pradesh, there are striking similarities with Melanesian culture, in addition to actual analogous systems of subsistence. These have recently been disguised by the spread of rice cultivation, which is strongly promoted by governments for reasons which have to do with an expression of cultural dominance rather than environmental suitability. Evidence for this link is marked by striking similarities in social and material culture, which have been largely overwritten by the later expansion of the classic Neolithic throughout much of mainland SE Asia. Arunachal Pradesh and neighbouring regions are thus 'islands' which retain elements of this archaic culture, as did much of Melanesia. Once a richer model of prehistory for the region is developed it will be possible to put tentative dates to this process and begin the process of re-interpreting existing sites from a fresh perspective.

The idea that the original agricultural system of SE Asia was tuber-based has a long history among agricultural ethnographers and Spriggs (1982: 12) collected references to this idea going back to the 1940s. However, this paper makes the specific claims that;

a) There is an 'arc of vegeculture' characterised by tubers, Musaceae, sago exploitation and sugar-cane which stretches between Melanesia and Eastern Nepal which is now only discernible in areas where it has not been displaced by cereal agriculture, particularly rice cultivation

1 Kay Williamson Educational Foundation, 8 Guest Road, Cambridge CB1 2AL, United Kingdom

b) There are the beginnings of archaeological dates for these systems, attested in Ille Cave on Palawan, in Borneo and perhaps in Thailand

c) There is a suite of material culture items which show related distributions and which may well be correlated with an early corridor of diffusion of ideas and subsistence practice

d) There is some linguistic evidence for this, as terms which have been reconstructed for particular language phyla show wide distributions and may well be taken up from substrate lexica

e) Across this region there is intensive management of bamboos and rattans, which although non-domestic, have anthropic distributions due to their exploitation for subsistence

f) That this arc correlates with the distribution of the 'extended Hoabinhian' a pattern of flaked, cobble artefacts or non-formal stone tools which occurs from Nepal to Australia, which were 'tools to make tools'.

g) That these non-formal tools are thus a technotype, spreading by stimulus diffusion as much as by migration, and their use in processing plants explains both their variable typology and their patchy distribution

Recent research has now demonstrated the use of sago-palms, bananas, freshwater roots and tubers and job's-tears from 3,350–2470 BC from the site of Xincun, on the southern coast of China (Yang *et al.* 2013).

Evidence from crops and managed plants

Sago

Sago, the pith of *Metroxylon sagu*, remains a staple of much of the lowlands of New Guinea and is grown as a reserve food in many swampy areas of the South Pacific (Barrau 1959; Lie 1980; Stanton and Flach 1980; Rauwerdink 1986). It is managed, but not usually formally grown, and remains a highly productive plant, if not very nutritious (Rhoads 1981). The palm trunk contains a starchy interior which can be processed as a staple food once the tree is cut down. In a region with a low human population density and dense forest, this is quite an attractive subsistence strategy and requires considerably less work than conventional agriculture. Although found wild or as an escape on many islands of Indonesia, it is a significant element of diet on islands such as Seram (Ellen 2004) as well as among peoples such as the Melanau in Western Borneo (Morris 1991). Other *Metroxylon* spp., such as *M. salomonense*, are widely scattered across the Pacific islands (McClatchey et al. 2005) but have not spread westwards to any significant degree. Sago is still esteemed for certain dishes in countries such as Malaysia, where it is used for *kerepok lekor*, 'fish sausage', but this now requires the import of sago starch in large quantities as it is no longer produced locally.

The only other region where it is exploited extensively is in NE India, where the Puroik [=Sulung] of Arunachal Pradesh still process it (Stonor 1952; Deuri 1982; Sharma 1984; Gangwar and Ramakrishnan 1990). Peoples such as the Milang prepare it to feed to pigs but will no longer eat it for everyday consumption (Modi 2008), although it is acceptable as a famine food (Photo 1). Peoples such as the Idu also recount the processing of sago in the recent past (Bhattacharjee 1983: 57). As far as can be judged from Stonor's detailed description, the steps for processing sago are very similar to those practised widely in New Guinea.

Photo 1

The sago palm may not be the only species exploited in this way. Another important palm is the tasse or fishtail palm, *Wallichia* [illegible]*cha*, widely exploited in NE India (Tassar n.d.). Apart from the uses of plant parts in subsistence, the inner pith is extracted and processed in a manner extremely similar to sago and used for human food, *saring*, as well as to feed to pigs. In addition, the 'cabbage' of the tree fern can be cooked and eaten. All these arborescent plants are part of a complex arboricultural system; not domesticated in the genetic sense, but manipulated as an element in managing the environment for subsistence. In relation to Borneo, Huw Barton (*pers. comm.*) says 'The starch I have managed to extract from the stone pounders found in the [Kelabit] Highlands, again prehistoric but no secure dates, has palms (a granule that could be either *Eugeissonia* or *Caryota* and some very clear starches from *Arenga undulatifolia* as well as palm type phytoliths). So I am utterly convinced that we had some form of palm-based swiddeners in the Highlands of Borneo by at least 6,500 [BP] and who knows how much earlier?' The processing of starch from *Arenga* sp. palms in Borneo has ethnographic parallels in NE India into the present.

Edible starches can be extracted from tree ferns, *Cyatheales*, and cycads. The sago cycad, *Cycas revoluta*, is a slow-growing wild or ornamental plant, commonly called the sago palm, although it is of course not a palm. Despite its extreme toxicity, processed starch is made from this and other cycads. Sachs (1997) describes the distressing neurological condition, Lytico-bodig, which affects the Chamorro of Guam, through consumption of bats which

eat the cycad seeds. Both tree-ferns and cycads are exploited across this region but the documentation is too weak to be certain they are processed in comparable ways and thus form part of this pattern.

Taro

The origin of taro, *Colocasia esculenta*, is a complex story. There was certainly a domestication in New Guinea, which is of considerable antiquity and which probably spread westward into island SE Asia (Fullagar *et al.* 2006). However, it is likely there was a separate domestication in MSEA, which travelled eastward to Borneo along with the actual word *taro* and its cognates (Blench 2011a, b). Taro is embedded in the Austroasiatic language phylum (Blench 2012a) and was certainly spread as its individual branches diversified. However, words for domestic taro in the languages of NE India and Eastern Nepal resemble neither Austroasiatic nor one another, which suggests that this was an important early centre of secondary diversification. Photo 2 shows offerings of taro at a shrine in the central square of Bhaktapur, in the Kathmandu valley. Taro is also an important crop in Yunnan, but the linguistic and biological evidence for its domestication and spread there remains weak. However, it is reasonable to conclude there was an arc of taro spreading from Arunachal Pradesh to Melanesia, with ensembles of cultivars radiating outwards from at least two and possibly more domestication nuclei.

Photo 2

Blench (2012a) gives extensive lexical data on names for taro, and this is summarised here. In SE Asia there is a widespread term, *#traw?* which has reflexes throughout Austroasiatic, which suggests that taro played an important role in the early expansion of its speakers. Diffloth (2005) has pointed out the strong correlation between subgroups of Austroasiatic and river valleys. There are two main complexes of terms within Austronesian, **talɛʃ* and **ma*. Dempwolff (1938:128–9) reconstructed **talət* for proto-Austronesian, but his evidence includes neither Formosan nor indeed any languages near Taiwan. Wolff (2010:7, 993) gives evidence that **tali* is widespread in Austronesian languages of Taiwan (Table 1). However, he regards these forms as a secondary loan due to their irregular relationships.

Table 1. *'Taro' in Formosan languages*

Language	Attestation	Gloss
Thao	*ɬari*	taro, *Colocasia esculenta*
Atayal	*cai?*	taro
Sediq	*sari?*	taro
Rukai	*tái*	taro
Maga	*a-tée*	taro
Bunun	*tai?*	taro
Amis	*tali*	taro, tuberous food

Source: adapted from Wolff (2010)

Wolff treats the Proto-Malayo-Polynesian with the final affricate (*talec* in his transcription) as a regular reconstruction, yet he cannot cite evidence from any language north of Palawan, in other words this is virtually absent from the Philippines. This suggests that Austronesian speakers borrowed taro from Austroasiatic speakers during an early phase of contact and it subsequently spread northwards. Austronesians were almost certainly originally cereal cultivators, but during their expansion they switched to vegeculture. The English term 'taro' is an eighteenth century borrowing from a Polynesian language.

The **ma* root seems to originate in Papuan and to have spread westwards into Austronesian. Pawley (2005:101) quotes a Trans-New Guinea phylum (TNG) reconstructed form **mV* for taro. Hays (2005: Map 3) shows the distribution of this root in Irian Jaya, although he does not provide actual forms. The TNG includes a large number of Papuan languages along the central spine of the island of New Guinea and has outliers on Timor and other offshore islands. The lexical diversity of the TNG suggests that it may have originated as much as 10,000 years ago (Pawley 2005:97). The stimulus for the expansion of the TNG is unknown but the proposal is that it was vegeculture and arboriculture. It is thus credible that this reconstruction is linked to a Papuan centre of domestication and that TNG speakers spread the earliest cultivated taro in this region. However, there is no evidence for the *mV-* root for taro west of Timor. Many Oceanic languages attest a root for taro which has been reconstructed as **mʷapo(q)* (Ross *et al.* 2008). However, the reflexes in many actual Austronesian languages are much shorter. Pawley (2005:101) states unambiguously that Austronesian borrowed the TNG term.

The overall situation with taro thus seems to be that there are three important nuclei of domestication and spread. Whether these are primary or secondary remains to be determined. One of these is on the Melanesian mainland, whence taro spread westwards into ISEA. A second nucleus appears to be in the Austroasiatic-speaking area of MSEA. Sidwell & Blench (2011) propose that this was on the Upper Mekong, allowing different subgroups to spread west,

east and south. However, there may be a further nucleus of domestication or diffusion between Arunachal Pradesh and Yunnan, as the lexical evidence shows no evidence for contact with the Austroasiatic zone.

Dioscoraceae

The true yams are the Dioscoraceae and there are ten major species of domestic yam across the world as well as a host of minor local domestications. Determining the region of origin of yams is difficult because of their tendency to outcross with their wild relatives. In even an up-to-date source such as Lebot (2009), there are at least three species which have an 'indeterminate' SE Asia/Melanesia origin, *Dioscorea alata, D. esculenta* and *D. nummularia*. Yams are a staple of most populations in lowland New Guinea, particularly *Dioscorea alata*, the greater yam. Yams are cultivated sporadically throughout island SE Asia, and there is growing evidence that they were cultivated well before the Austronesian expansion. Ille Cave, on the island of Palawan (which would have been connected to Borneo by land prior to the rise in sea level) has provided crucial evidence for cultivation prior to 8000 BP. Barker *et al.* (2011: 6) say;

> The presence of parenchyma identical to those of the modern domesticated yam at Ille Cave in secure stratigraphic contexts provides extremely strong evidence that it was being intensively exploited by people in Palawan thousands of years before the supposed Austronesian expansion.

Yams are still significant in the cuisine of some islands of the Philippines, and a popular dish, *ube halaya*, made from grated *Dioscorea alata*.

Yams have little economic importance in any region on the mainland except in NE India, where they constitute a staple for many montane populations (Photo 3). Some highland populations in Laos and Thailand also cultivate yams but the ethnobotany of many types remains hardly described. Taylor (1953) undertook to map the distribution of staple crops in SE Asia through an extensive literature search and his map shows a concentration of yam and taro in arc through from NE India to Laos. The map is inaccurate in not showing more taro cultivation in other parts of SE Asia, but it remains indicative of the general point.

Photo 3

The linguistic evidence for yams is hard to interpret. Austronesian *(*q*)*ubi* is attested in forms as far north as Yami, but not in Formosan proper.[1] There do not seem to be any widespread linguistic roots on the mainland, but the evidence is confused by authors who record forms for 'sweet potato' (a New World introduction) as 'yam', following American vernacular usage. As with 'taro', no widespread roots were recorded in the languages of NE India.

Musaceae

It is now generally accepted that New Guinea constitutes one of the major foci of domestication of bananas. In the case of the bananas, the genetic evidence has recently been reviewed by Kennedy (2008) and the linguistic evidence by Denham & Donohue (2009). Although there is a proposed reconstruction, *#pu(n)ti*, for 'banana' in the Austronesian literature, originating with Dempwolff (1938) it seems highly unlikely this can actually be reconstructed to PMP level as it has only a few scattered occurrences in the Philippines and is almost absent from Java and Sumatra. Wolff (2010: 945) notes that *puti* 'banana' is recorded in the extinct Formosan languages Basay and Trobiawan but these few attestations and absence from synchronic Taiwanese Austronesian points to borrowing.

Although they remain poorly described, the Musaceae in the jungles of Arunachal Pradesh are of considerable importance. Various types of bananas are consumed as starchy staples, but there are also a great variety of wild or feral types which are exploited for food. Photo 4 shows a typical hand of bananas such as occur in the Tani-speaking area.

1 Wolff (2010: 967) shows that the furthest north this root appears is in the Philippines.

Photo 4

As Denham & Donohue (2009) suggest, *#pu(n)ti* can credibly be interpreted as an eastern term which has spread west. Large, starchy triploids remain an important part of diet there and in many islands of Indonesia. Smaller, sweet diploids have replaced the staple types in many parts of SE Asia, but again, NE India is an important focus for large starchy Musaceae. Regrettably, these have hardly been investigated botanically, but most peoples cultivate a variety of different types. Basic lexemes for 'banana, plantain', as for taro, are highly diverse and do not resemble one another, which similarly argues for great antiquity.

Denham & Donohue (2009) have compiled a very extensive dataset for Pacific banana names, and one root in particular, *#kVlV*, is attested from West Papua (where it is borrowed into Papuan), across to SE Asia and into NE India, where there are cognates in Indo-Aryan languages. Table 2 shows the extension of this term in SE Asia and beyond.

Frankly, it hard to tell where this term originated, as it is present in so many different language phyla. Its restriction to western ISEA suggests that it is a borrowing *into* Austronesian and may thus represent a domestication on the mainland of SE Asia and to have spread both east and west from its nucleus. Within Austronesian it presumably is in competition with the *#pu(n)ti* root diffusing out from Melanesia. Its attestation in Tani in NE India (as with sugar-cane - see below) points again to the vegecultural substrate in this region.

Sugar-cane

Sugar-cane, *Saccharum officinarum*, is likely to have been domesticated in New Guinea and certainly spread westwards, as well as to Polynesia. Brandes (1956:727, 731, 733) argued that *S. officinarum* was domesticated from *S. robustum* Brandes & Jeswiet which grows wild in New Guinea, a view which is still generally accepted (Grivet *et al.* 2004).

Table 2. *Reflexes of #kVlV 'banana' in SE Asian languages*

Phylum	Branch	Language	Attestation	Comment
Sino-Tibetan	Karenic	Kayah Li	dīklwí	
Sino-Tibetan	Tani	Proto-Tani	*ko-luŋ	wild banana
Sino-Tibetan	Luish	Cak	ca `u (`si)	
Austroasiatic	Palaungic	Shinman	kaʔ^{4} mual̥^{2}	
Austroasiatic	Palaungic	De'ang	klɔi^{51}	< Zhuang?
Austroasiatic	Vietic	Thavung	kuay	
Austroasiatic	Khmuic	Khabit	kəltiʔ	
Austroasiatic	Khasian	War Jaintia HKL	kaḭt	
Austronesian	Philippines	Tboli	kelutay	
Austronesian	Sulawesi	Kaili	loka	
Austronesian	Sulawesi	Mandara	loka	
Austronesian	Sumatra	Batak	galo	
Austronesian	Maluku	Muna	kalei	
Austronesian	Maluku	Asilulu	kula	
Austronesian	Bima-Sumba	Wewewa	kalowo	
Austronesian	Bima-Sumba	Kambera	kalú	
Austronesian	Bima-Sumba	Komodo	kalo	
Papuan	W. Papua	Saweru	karei	
Papuan	TNG	Damal	kelo	
Daic	Kam-Tai	Maonan	la:k^{8} coi^{3}	
Daic	Tai	Lu	kuəy^{13}	
Daic	Tai	Dai	koi^{3}	
Daic	Tai	Zhuang	kloi^{3}	
Daic	Tai	Bouyei	ɣok^{7} tɕuai^{3}	
Daic	Tai	Thai	kluay^{3}	
Daic	Tai	Lao	kûay	
Daic	Tai	Shan	koj^{3}	
Daic	Tai	Aiton	kui^{3}	
Indo-European	Indo-Aryan	Bangla	kola	
Indo-European	Indo-Aryan	Marathi	kelã	
Indo-European	Indo-Aryan	Nepali	kera	
Indo-European	Indo-Aryan	Pashto	kela'h	

The canes of North India and China which were traditionally used to make sugar may result from local natural hybridisation with *S. spontaneum* L. which resulted in *S. barberi* Jeswiet and *S. sinense* Roxb. respectively. The original cultivated sugarcane in ISEA may not have been *S. officinarum*, but *S. sinense*, and this was the species transported by Austronesians (Daniels & Daniels 1993). *S. sinense* and *S. officinarum* are closely related, and either could have developed from the other, whereas *S. barberi* is quite distinct, and a separate North Indian development (Daniels & Daniels 1993: 5–6). This suggests that the sugar-cane spread by the Austronesians was the separately domesticated *S. sinense* and not *S. officinarum*, which has now replaced it over all its range. Arnaud *et al.* (1997), Mahdi (1998) and Ross *et al.* (2008) have compiled extensive evidence for the reconstruction of a root *#təbuS*. Reflexes of **təbuS* 'sugarcane' occur widely in Taiwan (Li 1994: #8) which is somewhat puzzling if indeed sugar-cane was domesticated in New Guinea. Wolff (2010: 1003) thinks that the forms with a final fricative are a secondary spread in Formosan languages and that a reconstruction to PMP is credible. Blust (n.d.) reconstructs **CebuS* for PAN on the basis of,

Hoanya	sibus	sugarcane
Rukai	coboso	sugarcane (Tona)

with a doublet **tebuh* in PMP. However, it turns out that this root is spread more widely still, occurring in Austroasiatic as 'millet', in the Tani languages of Arunachal Pradesh and even in Nepal (Table 3).

If the persistence of reflexes in Arunachal Pradesh and Nepal is a genuine survival from the earliest period of vegeculture, it is a remarkable testimony to the longevity of these vernacular names. The proto-Tani must presumably have picked these up from a substrate language, as Tani is too recent an expansion to be directly implicated in the arc of vegeculture (Sun 1993). The final –t in proto-Tani looks as if may well correspond with the final fricative (-ʃ) in Formosan. Mahdi (*pers. comm.*) argues that the presence of the Austronesian root in NE India derives from later contact, although if so, it is curious that cognates only show up in remote inland languages.

Bamboos and rattans

Bamboos and rattans form a key part of the natural and human environment in SE Asia (Dransfield & Widjaja 1995; Flach & Rumawas 1996; Wong 1995, 2004). Although more biodiverse in the tropical regions, various genera also extend into temperate zones. Their biodiversity has been mapped in some detail in Bystriakova *et al.* (2003). Map 1 shows the generic richness or species diversity in SE Asia extending to Northern Australia and Japan. NE India is particularly notable for the high species diversity of the bamboos.

Map 2 shows the generic richness of *Dendrocalamus*, on the of the key rattan genera in SE Asia.[2] As with *Bambusa*, MSEA is the nucleus of diversity.

There are two aspects of synchronic ethnography relevant to this; the wide use of bamboo tools for hunting, extracting and processing food and the importance of basketry in SE Asian culture. Bamboos and rattans are widely used throughout the region, but particularly in the region between NE India and western Melanesia. Indeed this led Narr (1966) to characterise the prehistory of the whole

2 The absence of NE India on this map is curious and must be a reporting lacuna. *Dendrocalamus* is essential to subsistence throughout the region.

Table 3. *The #təbuS root for 'sugarcane' in SE Asian languages*

Phylum	Branch	Language	Gloss	Attestation
Sino-Tibetan	Newaric	Newar	sugar-cane	tu
Sino-Tibetan	Tani	Galo	sugar-cane	tabə
Sino-Tibetan	Tani	proto-Tani	sugar-cane	*ta-bat
Austroasiatic	Monic	Old Khmer	millet	tvau
Austroasiatic	Bahnaric	Stieng	millet	bɔu
Austroasiatic	Bahnaric	East Bahnar	millet	tᵊbɤ:u
Austroasiatic	Aslian	Kensiw	? < Malay	təˈbuʔ
Austronesian	Formosan	Saisiat		ka-tbuʃ
Austronesian	Formosan	Kanakanabu		təvásə
Austronesian	Formosan	Amis		təvuc
Austronesian	Formosan	Rukai		cubúsə
Austronesian	Formosan	Paiwan		tjevus
Austronesian		PMP		*tebuh
Austronesian	Micronesian	Chamorro		tupu
Austronesian	Micronesian	Kusaie		tuh
Austronesian	Philippines	Tagalog		tubo
Austronesian	Philippines	Cebuano		tubu
Austronesian	Philippines	West Bukidnon		təvu

Table 3 *continued.*

Phylum	Branch	Language	Gloss	Attestation
Austronesian	Barito	Ngaju		tɛwu
Austronesian	Chamic	proto-Chamic		*təbɔw
Austronesian	Barrier islands	Nias		tovu
Austronesian	Malayic	Malay		təbu
Austronesian	Malayic	Old Javanese		təbū
Austronesian	Sarawakan	Bintulu		tebau
Austronesian	Sumbawan	Sundanese		tiwuʔ
Austronesian	Sulawesi	Uma		towu
Austronesian	Sulawesi	Buginese		təbbu
Austronesian	Maluku	Soboyo		tofu
Austronesian	Maluku	Kai		tɛv
Austronesian	Maluku	Yamdena		tɛfu
Austronesian	Flores	Sikka		tewwu
Austronesian	Flores	Roti		tefu
Austronesian	Timor	Kisar		keu
Austronesian	Bomberai	Arguni		tof
Austronesian	Bomberai	Onin		tepi
Austronesian	Oceanic	P-Oceanic		*topu
Austronesian		Minyaifuin		top
Austronesian		Kaniets		tof
Austronesian	Huon Gulf	Kaiwa		tov
Austronesian	Huon Gulf	Yabem		te
Austronesian	Ngero Vitiaz	Kove		tou
Austronesian	Meso-Melanesian	Nakanai		tobu
Austronesian	Papuan Tip	Kiriwina		tou
Austronesian	Papuan Tip	Sinaugoro		tobo
Austronesian	Papuan Tip	Dobu		tou
Austronesian	Papuan Tip	Motu		tohu
Austronesian	SE Solomonic	Gela		tovu
Austronesian	SE Solomonic	Arosi		ohu
Austronesian	SE Solomonic	Iapa		tou
Austronesian	SE Solomonic	Ulawa		ohu
Austronesian	N Vanuatu	Aulua		tif
Austronesian	N Vanuatu	Uripiv		top
Austronesian	N Vanuatu	Mota		tou
Austronesian	N Vanuatu	Way		tovu
Austronesian	N Vanuatu	Valpei		tobu
Austronesian	Fijian	Mbau		ndovu

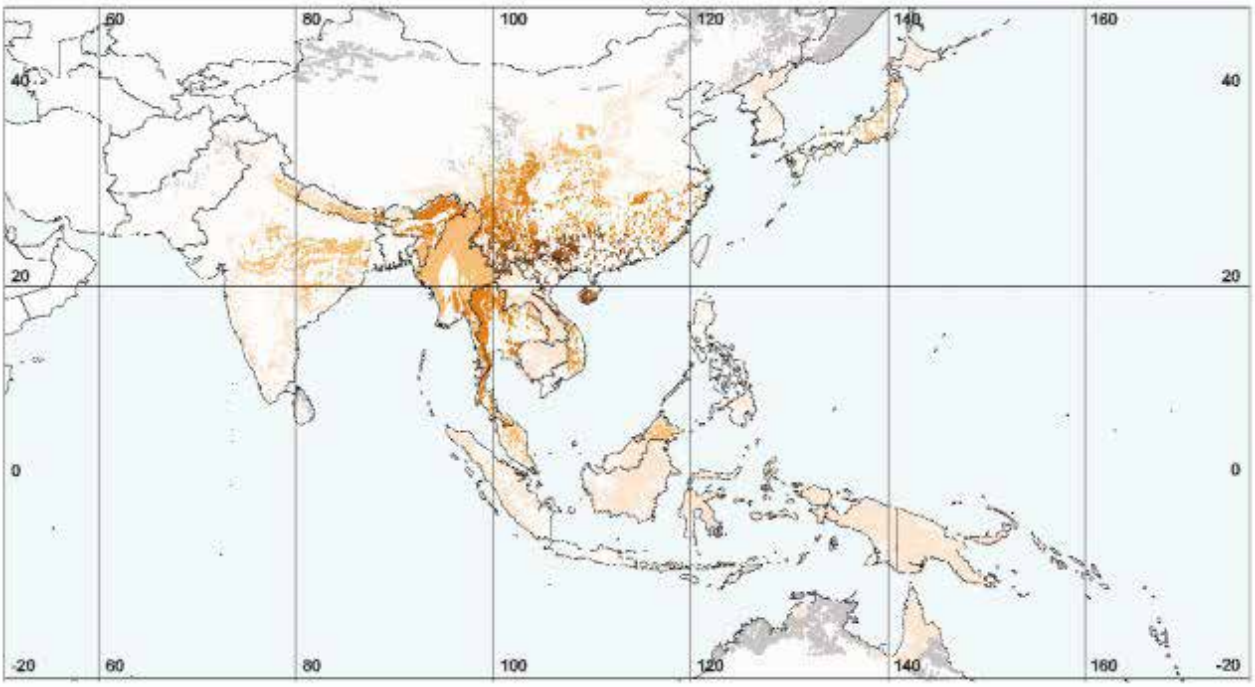
Sources: Austronesian forms mainly from Mahdi (1998)

zone as *Holzindustrie*, a term equivalent to 'lignic'. The comparative ethnography of basketry is more difficult to characterise in the absence of quantitative studies, since basketry is virtually worldwide. However, individual societies, for example in Arunachal Pradesh or the Northern Philippines, have up to forty different baskets for highly specific usages, which is far more than most other societies around the world. As will be suggested below this is probably the reflection of a new approach to stone tool production.

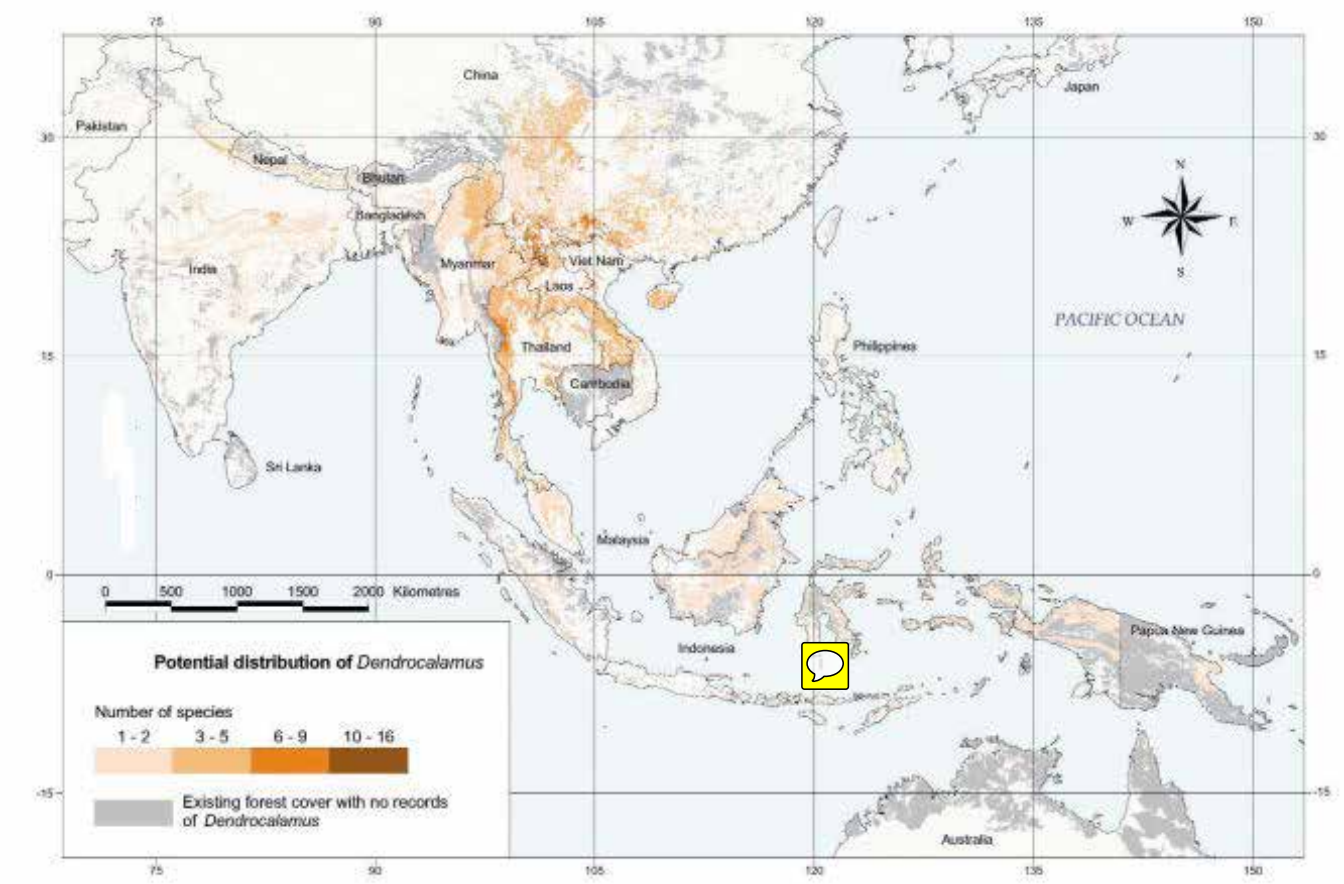
The Ti tree

The *ti* tree, *Cordyline fruticosa* (Photo 5), is found in a large part of the Indo-Pacific almost exactly corresponding to the arc of vegeculture, from Eastern Nepal, through South China to remote Polynesia (Simpson 2000; Whistler 2009). It is usually cultivated and its distribution is thought to be strongly anthropic. It is used in ceremonial contexts almost throughout its range but is also a very common

3 I judge this by museum collections, for example, the Don Bosco museum of NE India in Shillong and the Kiangan Museum of Ifugao culture in Luzon. See also Lane (1986)



Map 1 about here



Map 2 about here

leaf used to wrap cooked food (Yen 1974). It is regarded as a food plant in parts of Polynesia, the root being slowly baked in earth ovens. Its exact area of adoption into the arboricultural system is unknown but it shows strong signs of being distributed by human movement, combining a striking appearance with a range of uses.

Synchronic Material Culture

General

The comparison of ethnographic material culture is not much in favour these days, being deemed an outmoded

Photo 5

enthusiasm of German *Kulurkreislehre* theory. Nonetheless, there are striking similarities in specific items at the far ends of the 'arc of vegeculture' which point to a transmission of ideas and culture along this corridor. Some of these have no parallels elsewhere in the world and as ethnographic rarities they may be significant. Similarities can always be dismissed as independent invention, although for some reason archaeologists do not generally use this argument for pottery.

Links between NE India and Melanesia

Slit-gongs

The slit-gong, *garamut* in New Guinea, is a large hollowed log, with a longitudinal slit along the upper surface. Slit-gongs are known from all continents, but the manufacture of very large ones is confined to limited regions of the world, including Central Africa, Melanesia and NE India. In NE India they are typical of the Naga groups; see for example the Nocte instrument in Photo 6. However, strikingly, they are played by multiple players simultaneously, with the sticks held vertically, rather than horizontally, which is the pattern elsewhere in the world (*cf.* illustrations in Saul 2005:96). The only other region where this playing technique is used is in New Guinea (Gourlay 1975; Maclean 1994). However, as Maclean (1994:55) points out, the distribution of these slit-gongs is limited to coastal areas and islands such as New Britain and New Ireland, as if they were being distributed by a seagoing people. However, they have no particular association with Austronesian languages. It is suggested there that they were indeed being moved around by sea but in an era prior to the Austronesian expansion; and were carried to the SE Asian mainland where they now survive only in NE India (and possibly Yunnan).

Photo 6

String bags

One of the more well-known traditional manufactures of New Guinea is the string bag, or 'bilum bag' (Photo 7). These have become well-known in recent years as a minor tourist artefact. Although a string bag may seem to be an obvious item to make in fact it is not; such bags are quite unknown in the traditional repertoire of SE Asia, where basketry dominates. However, the other part of the region where these *are* made is in NE India (Photo 8).

Placing the dead on platforms

One of the features of New Guinea culture that caused much consternation to early patrol officers was the custom of placing the dead on platforms in the middle of settlements, usually in the centre of the main thoroughfare. As the corpses were left to putrefy, this was considered unhygienic and the practice was forbidden, despite opposition from traditionalists. Globally, this is highly unusual, as burial, burning and various types of excarnation are

Photo 7

Photo 8

predominant. However, the one other place in the world where it is recorded is in NE India, among various Naga groups. Indeed since the practice is still current in some areas, the same health issues as in New Guinea are currently under discussion.

The plumes of paradise

One of the most striking products from New Guinea, apparently traded over long distances from an early period, are the feathers of the birds of paradise (Swadling 1996). Ethnographically, they were the subject of a lively trade from Melanesia at the period of first European contact. They are hard to document in the archaeological record, but as soon as they enter the historical record they were already being traded far and wide. When the Portuguese first reached SE Asia, bird of paradise skins were being carried as far Persia and Turkey. Indeed, Swadling (1996: Plate 9) illustrates their plumes being used for ceremonial headgear in Nepal. Trade items like this can never constitute proof of an ancient cultural corridor, but they do illustrate the long distances valued and relatively light items could move even prior to the Austronesian expansion.

Links between Borneo and Arunachal Pradesh

Longhouses

One of the most distinctive architectural patterns characteristic of Borneo is the longhouse, an architectural pattern whereby a number of families establish houses in a continuous joined row with a common verandah (Photo 9). Similar houses are also known from some Austronesian-speaking minorities in Vietnam, for example the Sedang (Đặng Nghiêm Vạn 1998). Photo 10 shows a reconstruction of an E De longhouse at the Hanoi Museum of Ethnology. A longhouse exceeding 10[illegible] has been excavated at the Neolithic site of Hemudu in SE China (Yan Wenming 2005). Globally, longhouses are vanishingly rare, although structures with a common entrance were known in early northern Europe and North America. An apparent

Photo 9

Photo 10

Photo 11

longhouse is constructed by the Teribe in Costa Rica and Panama[4] but otherwise global parallels are vanishingly rare. The only other place in the Indo-Pacific region where these structures are still constructed is Arunachal Pradesh, among the Idu Mishmi and related peoples (Bhattacharjee 1983). Photo 11 shows a Minyong longhouse in Arunachal

4 http://www.ticopedia.de/Naso. Thanks to Waruno Mahdi for this parallel.

Pradesh, with structural characteristics almost identical to Borneo longhouses.

A recent thesis on the otherwise almost unknown Bangru people of Sarli circle in Arunachal Pradesh illustrates the current use of longhouses very clearly (Ramya 2012).

Hornbills and raptors

One of the more intriguing aspects of the bones found in Borneo archaeological sites such as Niah, is the high percentage of bird bones among the wild fauna, particularly hornbills and raptors (Stimpson 2009; Piper & Rabett 2009). This is rather unusual, as these are not common food species. Hornbills are symbolically very important today but any reason for such a preponderance of raptors is less obvious. However, both of these can be interpreted in the light of the ethnography of NE India.

Hornbills, Bucerotidae, are found in both Africa and Asia, but only in Asia do they seem to play a significant role in religious symbolism and artistic. Borneo is well-known for the importance attached to hornbills, indeed they have been declared the state bird of Sarawak. Photo 12 shows stylised hornbill figurations created by Iban craftsmen for the roof of the Sarawak Museum in Kuching. However, hornbills have similar importance among many peoples in Arunachal Pradesh and it is also the symbol of that state. Among the neighbouring Zeme Naga they play an important role in mythology (Stonor 1965). Photo 13 shows an example of the type of ceremonial hat built from hornbill beaks found in many places in NE India. Hornbills also appear in the iconography of New Guinea although they do not appear to taken on the same importance. In New Ireland, for example, they appear among a variety of bird species featuring in the dramatic carving styles of that island (Spiegel 1973).

Raptors are not usually considered ideal species to hunt and while some may be killed if they predate domestic poultry, they are largely left alone, globally. Not so in Arunachal Pradesh, where killing and eating raptors is a

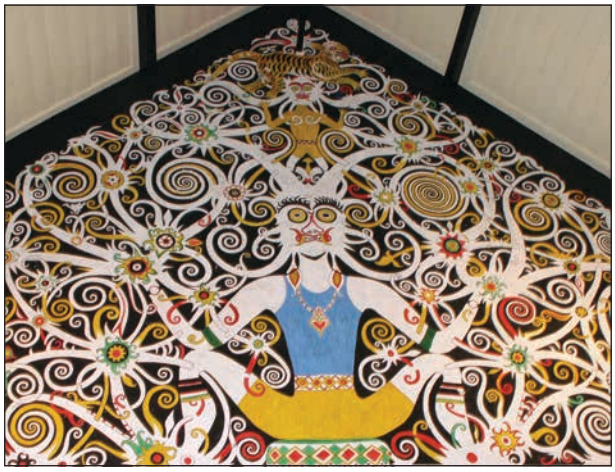


Photo 12

Photo 13

virtual obsession. Photo 14 shows a newly shot hawk hung up to become gamey before being eaten [illegible] Pasighat, the Adi-speaking area. The preponderance of raptors in Borneo midden sites may well be evidence of related practice in a period when these regions were more closely linked.

Linguistic Evidence: substrates and erosion

Should we expect there to be any linguistic evidence in support of this claim? It is unlikely, since the known diver-

Photo 14

sity of languages in western Melanesia and in Arunachal Pradesh is such that it is hard to relate neighbouring languages to one another, let alone to retain common lexicon after ten thousand years. Curiously, there is a claim of this nature, published in an otherwise respected journal, *PNAS*, to the effect that Kusunda, a language isolate of Nepal can be connected, *inter alia*, to Tasmanian (Whitehouse *et al.* 2004). Blench (2008) is highly sceptical of this speculation, and of the general argument for Indo-Pacific, though Pawley (2009) argues for a more restricted acceptance of some of its claims.

However, it would be more reasonable to imagine that the Austronesian languages spoken in ISEA and adjacent Pacific regions might well retain evidence for prior substrates (Blench 2012b). Blust (2009) points out the difficulties of relating much of the lexicon of some Austronesian languages to the core reconstructions, particularly in the case of the Whiteman group of New Britain languages, as well as Drehu and Nengone in New Caledonia. In a subsection of a review of a book synthesising current knowledge on Oceanic languages, Blust (2005:552) makes some points concerning Papuan/Austronesian interactions. His observations are worth quoting *in extenso*:

> Undoubtedly the greatest missed opportunity in TOL [*The Oceanic languages* Lynch et al. 2002] is the failure to consider in greater depth the mismatch between linguistic typology and genetic relationship in areas where Papuan languages are not present, and the implications this misalignment has for Pacific prehistory. In some ways this takes us back to issues discussed by writers such as Ray (1926) and Capell (1943), who … concluded, based on the evidence of divergent language structures, reduced cognate densities, physical anthropology, and cultural differences, that the Austronesian languages of Melanesia had originated as pidgins when An speakers from various parts of insular Southeast Asia established trading colonies among linguistically unrelated groups in Melanesia. … What has gone almost completely unappreciated in this history of changing scientific paradigms is the typological evidence from language, which suggests that Papuan languages were much more widely distributed in the Pacific during the early phases of AN contact than they are today.

Blust analyses the quinary systems of Oceanic languages, and points to their likely origin in Papuan languages. However, he highlights the problem that in some places, notably the Solomons, Vanuatu and New Caledonia, there were no prior populations that would be the source of such a substrate. Blust is certainly correct to point to the mismatch between linguistics and archaeology that this implies and speculates that this may be the result of lacunae in the archaeology. This is unlikely; these islands are now well surveyed archaeologically and it is extremely improbable that there is evidence for significant earlier populations that has been missed. But if the present scenario contains elements of truth, then this is unnecessary; Austronesians would certainly have encountered Papuan-type vegeculturalists on a wide variety of islands west of their distribution today, enough to account for both quinary systems and other anomalies in lexicon and syntax, such as the numerals of Kokota on Santa Isabel, which show very limited evidence for inherited Austronesian forms.

Can this be correlated with the archaeological record?

The suggestion made here is that well prior to the spread of 'Neolithic' rice cultivation in SE Asia, vegecultural systems were practised together with a suite of characteristic cultural practices in an arc from Melanesia to NE India. Vegeculture is extremely difficult to track in the archaeological record, especially if you are not expecting it. Most traces of this, both in terms of crops and cultural practices, occur today at the far ends of the arc as later expansions, particularly of speakers of Austroasiatic and Austronesian, drove a wedge through the centre of the region. Nonetheless, it is reasonable to ask what sort of sites and dates would constitute evidence for the existence of such as system.

We know that vegeculture and arboriculture are initiated by 10,000 BP in New Guinea and that there is evidence for a westward flow of innovation. Pleistocene sea-voyaging in near Oceania has been well-documented, but evidence is now surfacing for similar movements in ISEA. Ono *et al.* (2009) document the successive occupation and abandonment of the Talaud islands (which require a 100 km. voyage across open sea) from 35,000 BP onwards. Various writers (e.g. Yen 1977; Spriggs 1993; Rabett & Barker 2010) have wondered whether it is possible there was horticulture during the Pleistocene. The *D. alata* parenchyma from Ille Cave on Palawan cited above may be the sole piece of hard evidence outside Melanesia. We have no clear evidence for the subsistence strategies of pre-rice societies in mainland SE Asia, apart from the foraging economies represented by sites such as Da But (Bui Vinh 1991). Da But, in the coastal region of Thanh Hoa province of Vietnam, is an early Neolithic cemetery and shell midden, radiocarbon dated to 5085 BC (Nguyen Viet 2005).

The stone tool industries of SE Asia remain problematic. Many of them fall into the category of 'non-formal' i.e. they do not appear to be fully shaped compared with the sophisticated implements found in much of the rest of the world. Indeed this has led earlier accounts of world prehistory to characterise them as 'non-progressive' (e.g. Clark & Pigott 1965). There is every reason to think this view is seriously mistaken; what happened instead is a completely different approach to lithics, which switch to becoming 'tools to make tools'. This switch occurs because of the ready availability of a ligneous material quite unlike those of Africa and western Eurasia, namely the bamboos and rattans.

Debate on the identity of lithics in SE Asia has typically generated more heat than light. Different papers radically diverge on the definition and distribution of even the most common named types. The most well-known

named technocomplex is the Hoabinhian. Hoabinhian culture (*Văn hóa Hòa Bình*), named for the type-site in Vietnam, describes stone artefact assemblages in Southeast Asia with flaked, cobble artefacts, ascribed to the period 10,000–2000 BC in earlier sources (Matthews 1964, 1966; Gorman 1971; Anisyutkin & Timofeyev 2006). Bacsonian [named for the excavations of Madeline Colani] is often regarded as a variation of the Hoabinhian industry characterised by a higher frequency of edge-ground cobble artefacts, produced by direct percussion with hard hammerstone, dated to c.8000–4000 BC. However, more recent reviews have considerably extended its temporal and geographical range. White (2011) considers it confined to MSEA, but other archaeologists argue that there are stone tools displaying Hoabinhian elements in Nepal, South China, Taiwan and Australia (Moser 2001, 2012; Bowdler 2006, 2008). The western limit of the Hoabinhian may be in NE India (Sharma 1984, 1990) and East-Central Nepal (Corvinus 2007; Gaillard *et al.* 2011) although Gaillard *et al.* (2012) also include the Siwaliks of NW India. Strictly defined, Hoabinhian tool types are virtually absent from ISEA, except for the famed 'Sumatraliths' in NE Sumatra (Forestier *et al.* 2005).

Moser (2012) expresses perplexity at the absence of any hard and fast definition of Hoabinhian technological characteristics and agreed distribution. I would like to suggest that this is because this class of lithics is defined by absence; by what it is not. The makers themselves had a much looser sense of the features of their final output as long as it functioned to process ligneous materials. As a consequence, the variability will always be such as to have rough regional tendencies but no distinct feature-based definition which result in unambiguous assignment of individual finds. The exception to this are the uniface sumatraliths, which are more clearly shaped; it only remains to establish their function.

In the light of this, Map 3 shows the approximate distribution of the broader class of non-formal stone tools in the Indo-Pacific region. Within that, the region of Hoabinhian tools according to conservative measures (Forestier 2010) is marked. Superimposed on the map are the flake and blade industries of Eastern ISEA. Question marks in New Guinea, India, Japan and China represent claims for 'Hoabinhian' stone tools, for example from Bowdler (2008).

<< Map 3 about here>>

Much of the debate around the Hoabinhian centres on the type of subsistence with which they might be correlated (Bowdler 2008). Shellfish processing or nut-cracking has often been suggested and the type of sites referred to as Hoabinhian in Vietnam certainly have abundant remains of wild nuts (Nguyen Viet 2008). The problem with this is that Hoabinhian tools are found in a wide variety of ecologies and are associated with very different subsistence systems. The suggestion by Narr (1966) of a *Holzindustrie* has been taken up by a number of authors (e.g. Forestier *et al.* 2003, Forestier 2010; see also reviews in Xhauflair *et al.* 2012). More specifically, river-cobble tools are thought to have been used for working or maintenance of bamboo and rattans (White 2011) and possible other woody species. The use of large flake tools, retouched and unretouched, has been subject to experimental archaeology in Palawan (Xhauflair *et al.* 2010), with generally successful results. Overlaying maps 1 & 2 of bamboo and rattan diversity on the distribution of non-formal stone tools suggests this hypothesis neatly explains why the apparent regression of lithic technology is in fact a major advance.

If so, then this would explain a number of things. Hoabinhian artefacts would be spread through stimulus diffusion from one foraging/vegeculturalists group to another, as effective tools to process giant grasses (including sugarcane) and rattans. They would take on slightly different shapes according to both materials and the actual species exploited in different environments, hence the difficulties of characterising them absolutely, and disputes between archaeologists concerning their typology. Cobble tools are thus a technotype, locally adapted for a specific task. Far from being evidence of Pleistocene conservatism, they must have been very efficient at processing their target material to be so persistent in the archaeological record and to have such a broad distribution. In addition, the absence of any typologically related tools in the Amazon Basin[5], the other part of the world where bamboos are very diverse, but where they play a much more limited role in culture and subsistence, suggests that this is an interconnected innovation characteristic of the Asia-Pacific region.

The 'swamping of Sundaland' may have played an important role in creating these distribution patterns (Mahdi 2010). We know that sea levels throughout ISEA rose some 10,000 years ago submerging a vast area of land and creating islands in places which were once corridors. Throughout most of the late Pleistocene, most of the shallow Sunda continental shelf that now lies under the South China Sea and the Gulf of Thailand was exposed (Hope 2005: 28). The lower sea level meant that throughout the late Pleistocene, continental MSEA included Sumatra, Java, Borneo, and many other land areas. The Southeast Asian post-LGM (last glacial maximum) sea level rise inundated more than two million square kilometres of lowlands, much of it alluvial plain (Sathiamurthy and Voris 2006: 3). As climate and sea-level changed over the millennia, the distribution of vegetation would change, leaving 'islands' of characteristic tools in the archaeological record.

If so, prior to the irruption of a rice-based Neolithic in MSEA, there was a corridor of transmission of ideas corresponding to vegecultural practices, including the management of bamboo and rattans, spread between Melanesia and inland SE Asia, as far as Nepal. The Australian region would be problematic for vegeculture, but less so

5 As I read the literature, Amazonian stone tools are very diverse, ranging from tools with few formal characteristics, to sophisticated microlithic arrow points, found in different geographical regions.

for bamboos, which are widespread in the tropical regions. The claim is not that all users of characteristic Hoabinhian artefacts would have been committed vegeculturalists, but that this was a potential subsistence strategy and extended to foragers processing giant grasses and rattans. The associated material culture in perishable materials would leave no trace in the archaeological record, but remains strongly marked in synchronic ethnography.

Conclusions

NE India, Borneo and Melanesia share isolated cultural similarities and subsistence patterns which are difficult to explain on the basis of current models of a late Neolithic diffusion of agriculture. It is proposed these similarities are evidence of a much older connection between these regions, which reflect a common strategy of vegeculture. The basis of this are crops currently considered to have been domesticated in Melanesia, but which clearly also have ancient centres of diversification in MSEA. It is further suggested that this pattern of vegeculture can be loosely correlated with the 'expanded Hoabinhian' or non-formal stone tool technocomplex which has usually been associated solely with foraging. The absence of formal stone tools reflects a switch to bamboo and rattan processing, as MSEA is a centre of biodiversity for these genera. Dates for this remain uncertain, but the conventional appearance of the Hoabinhian at 10,000 BP would not be unreasonable. Moreover, the adoption of vegeculture and arboriculture would transform regional societies it would not be as visible in the archaeological record as cereal cultivation.

None of the ethnographic similarities highlighted in this paper in themselves constitute proof and archaeological evidence remains sparse. Nonetheless, the widespread assumption that the key transition on the mainland was from foraging to rice agriculture may be erroneous. Evidence for opportunistic vegeculture may be much harder to uncover archaeologically, especially if it is not the focus of investigation. Nonetheless, these are striking technologies; sago processing in particular is highly idiosyncratic and worth broader consideration.

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