

The Austronesians: an agricultural revolution that failed

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The paradigm of agricultural expansion, migration and language phyla I

- ❖ One of the most persuasive narratives in prehistory has been the irreversible changes effected by agriculture. Seemingly, humanity spent millennia in the dead end of foraging, to be transformed by the discovery and spread of agriculture.
- ❖ Associated initially with Gordon Childe and the archaeology of the Near East, this schema has gradually taken on global application.
- ❖ And clearly it has a great deal to recommend it; populations of agricultural societies *are* strikingly more dense than foragers, they do support large cities and infrastructure, whereas foragers have gradually been driven into increasingly remote locations.

The paradigm of agricultural expansion, migration and language phyla II

- ❑ However, it may be that we have been misled by the current situation in reading it back into the past. Hunter-gatherers in the present are encapsulated by large, pluralistic societies, and require desperate efforts by NGOs to retain even a toehold in their ancestral lands.
- ❑ In the process of their assimilation the arrow only points in one direction. Archaeologists, seeking to model forager societies in the past, inevitably turn to the Hadza, the Khoisan or indigenous Australians.
- ❑ But in reality, these are the last peoples we should be looking at when attempting to model prehistory. Recent times have provided a mounting body of evidence for the dynamism of hunter-gatherer societies, especially in the area of language.

But it seems that foragers..

- Similarly, the notion that the characteristic pattern of forager social organisation is the scattered band is becoming increasingly untenable. Göbekli Tepe in Turkey, some 12,000 years old, and thus prior to agriculture, shows that hunter-gatherers could apparently mobilise labour on a scale large enough to construct monumental ritual centres.

Göbekli Tepe in Turkey



The existing paradigm of Austronesian I

- ❑ The Austronesians are often treated in the existing literature as a type-society for demographic expansion, with agriculture the underlying engine of growth.
- ❑ This is in increasing disaccord with the archaeology of the region, and this paper will suggest that the explanation is almost its inverse, that they succeeded precisely because they strategically reverted to foraging.
- ❑ The archaeology of ISEA and Oceania increasingly points rather to a pattern of rapid dispersals and then pauses, periods of consolidation.
- ❑ This is in line with linguistic understanding of the internal structure of Austronesian, where the 'tree' features a series of bottlenecks or choke-points characterised by an array of difficult to classify co-ordinate branches, only one of which is the source of the next major expansion.

The existing paradigm of the Austronesian expansion

- ❑ Such a pattern is linked to advanced maritime technology and the geography of islands; with fast and effective boats, expansion can be in an explosive manner, heading off in different directions simultaneously, seeking new subsistence resources or trading partners.
- ❑ The paper explores recent thinking about the internal structure of Austronesian and the correspondence with revised archaeological dates
- ❑ It suggests that we may have an inverted understanding of Austronesian subsistence; that there may have been a strategic reversion to fisher/foragers/traders in key phases
- ❑ And proposes an explanation for the pulsed expansions based on Austronesian material and religious culture

WHERE AUSTRONESIAN IS SPOKEN TODAY



TYPICAL AUSTRONESIANS



Background to the Austronesian paradigm I

- ❑ The first major linguistic advocate of an origin in Taiwan was Robert Blust who currently considers Austronesian to have nine primary branches there
- ❑ This view has basically triumphed with the last dissenters giving in (or dying)
- ❑ The 'out of Taiwan' hypothesis was then picked up by Peter Bellwood and transformed into a major migration and demographic expansion hypothesis
- ❑ Opponents of this view, for example, Solheim and Meacham on the archaeological side and Oppenheimer on the genetic side, have not been very convincing because they fail to account for the linguistic situation

Background to the Austronesian paradigm II

- ❑ Which is not to say there have not been challenges by archaeologists and to a certain extent linguists
- ❑ Many of the challenges by archaeologists have been somewhat local, complaining that the diversity of material culture doesn't fit the demographic expansion model
- ❑ Donohue & Denham have mounted a much larger-scale challenge (*CA* 2010)
- ❑ But the problem is that these contrary views don't really explain why the Austronesian hypothesis is so attractive or provide a convincing alternative account
- ❑ Hence...

Why the Austronesian paradigm seems persuasive I

- ❑ Austronesian languages are spoken *everywhere* in island SE Asia with the sole exception of the Andamans. Only their encounter with the Papuan quasi-phylum presents a significant linguistic alternative
- ❑ If Austronesian *were* the sort of trade language envisaged by Solheim's Nusantao and similar hypotheses it would have completely different characteristics
- ❑ There seems to be remarkably little substrate vocabulary in near ISEA, as if resident Pleistocene populations underwent wholesale language shift

Why the Austronesian paradigm seems persuasive II

- ❑ Reconstructions of Austronesian vocabulary seem to fit with the proposed demographic expansion remarkably well
- ❑ We can apparently reconstruct 'pig, 'dog', chicken' in either PAN or PMP as well as variety of important crops including 'rice', 'yam', 'millet', 'banana', 'sugar-cane' etc.
- ❑ At the point where the Austronesians reach remote Oceania, they are certainly expanding demographically and clearly are agriculturalists
- ❑ In areas such as the northern Philippines, an assumed early stopping point, they have elaborate rice agriculture today

Luzon rice terraces



But, but, but..

- ❑ It has been suggested that there were multiple migrations making up the populations of Taiwan
- ❑ Linguistically this is ridiculous. No responsible linguist has ever shown evidence for a significant substrate from any mainland (or island) language
- ❑ No linguist has ever proposed a credible model whereby a large number of populations could switch language without the movement of at least some charismatic individuals
- ❑ Vague talk of a 'trade language' just shows how little they know of trade languages

On the other hand..

- ❑ The reconstructions of crop and livestock names in PMP were made quite early and the evidence was at best sketchy
- ❑ With the online publication of the Austronesian Comparative Dictionary we can see just how problematic these reconstructions are
- ❑ In a detailed consideration of words for 'taro' the evidence now seems to suggest two separate domestications, one on mainland SE Asia, the other in western New Guinea
- ❑ The old root for 'taro' in Austroasiatic, *tɔrw* or similar appears to be borrowed into Austronesian and then borrowed onwards into Philippines languages

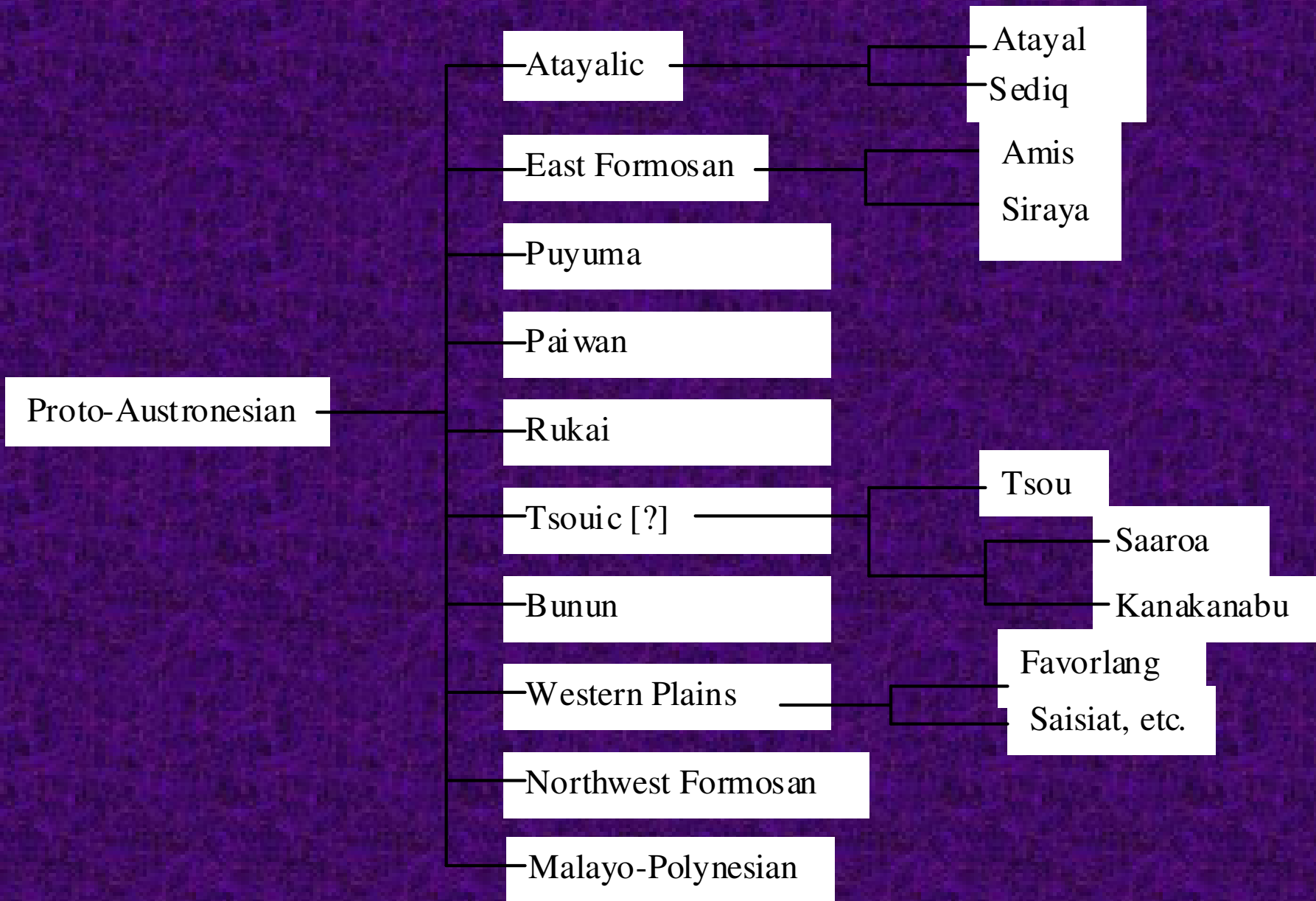
On the other hand..

- ❑ Similarly, the apparent reconstruction for 'chicken' is probably the old word for 'bird' which underwent a semantic shift
- ❑ And so on. We have to rethink these proto-forms based on actual data, not what we think might be true.
- ❑ At the same time there is the 'regular correspondences' narrative. When Austronesianists are trying to 'sell' the topic they underline the easily discerned relationship between, say Malay and Hawai'i.
- ❑ But there are also languages which have very few correspondences with notional PMP or proto-Oceanic such as Utupuan, Vanikoro and Enggano
- ❑ These probably represent the pre-Austronesian languages
- ❑ Where there was no resident population, regular correspondences and retention of PAN roots is more common

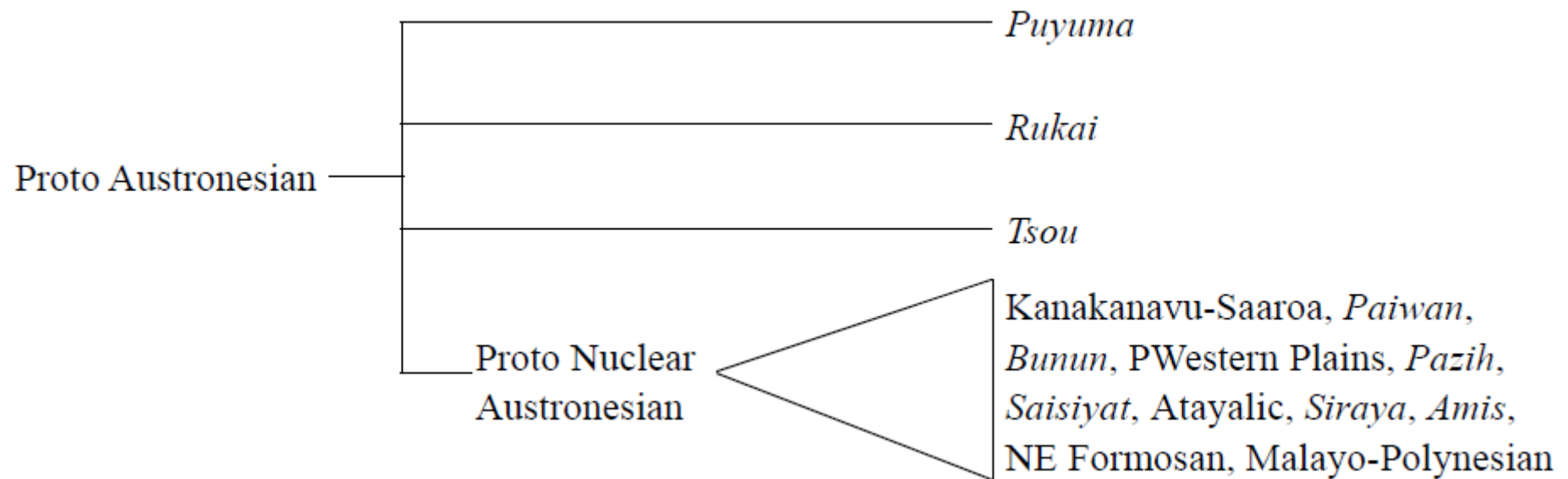
Flat arrays within Austronesian

- ❑ Earlier models of the internal structure of Austronesian envisaged complex nested structures
- ❑ However, almost all recent models suggest that at key points the tree lacks bifurcations and has to be treated as a flat array
- ❑ These are;
 - ❖ Proto-Austronesian
 - ❖ Proto-Malayopolynesian
 - ❖ Proto-Oceanic
 - ❖ Proto-Eastern Polynesian
- ❖ The charts map current thinking in this area

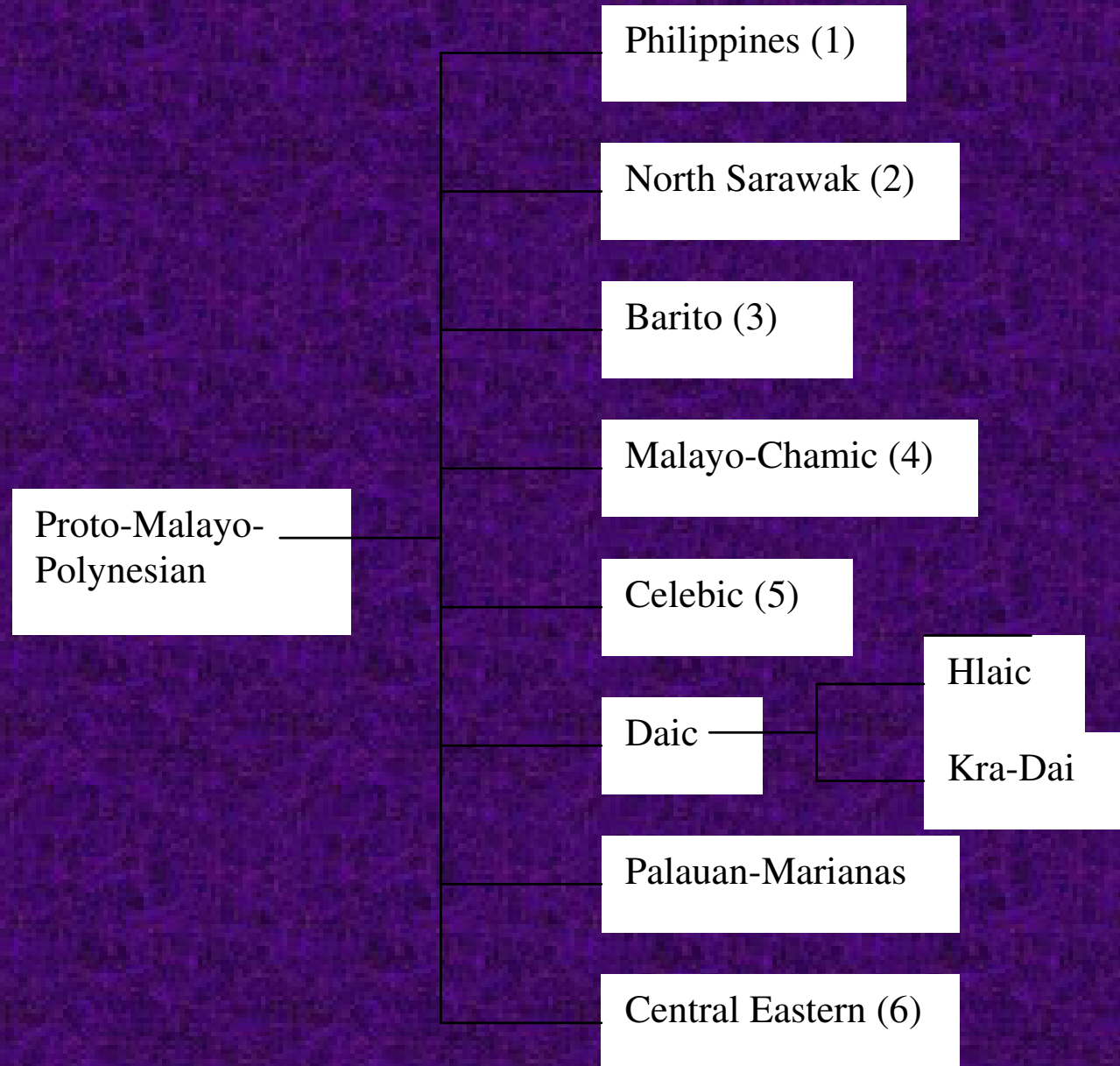
Primary subgroups of Austronesian



Primary subgroups of Austronesian according to Ross (2012)



Primary subgroups of Proto-Malayo-Polynesian



The Daic-Austronesian argument

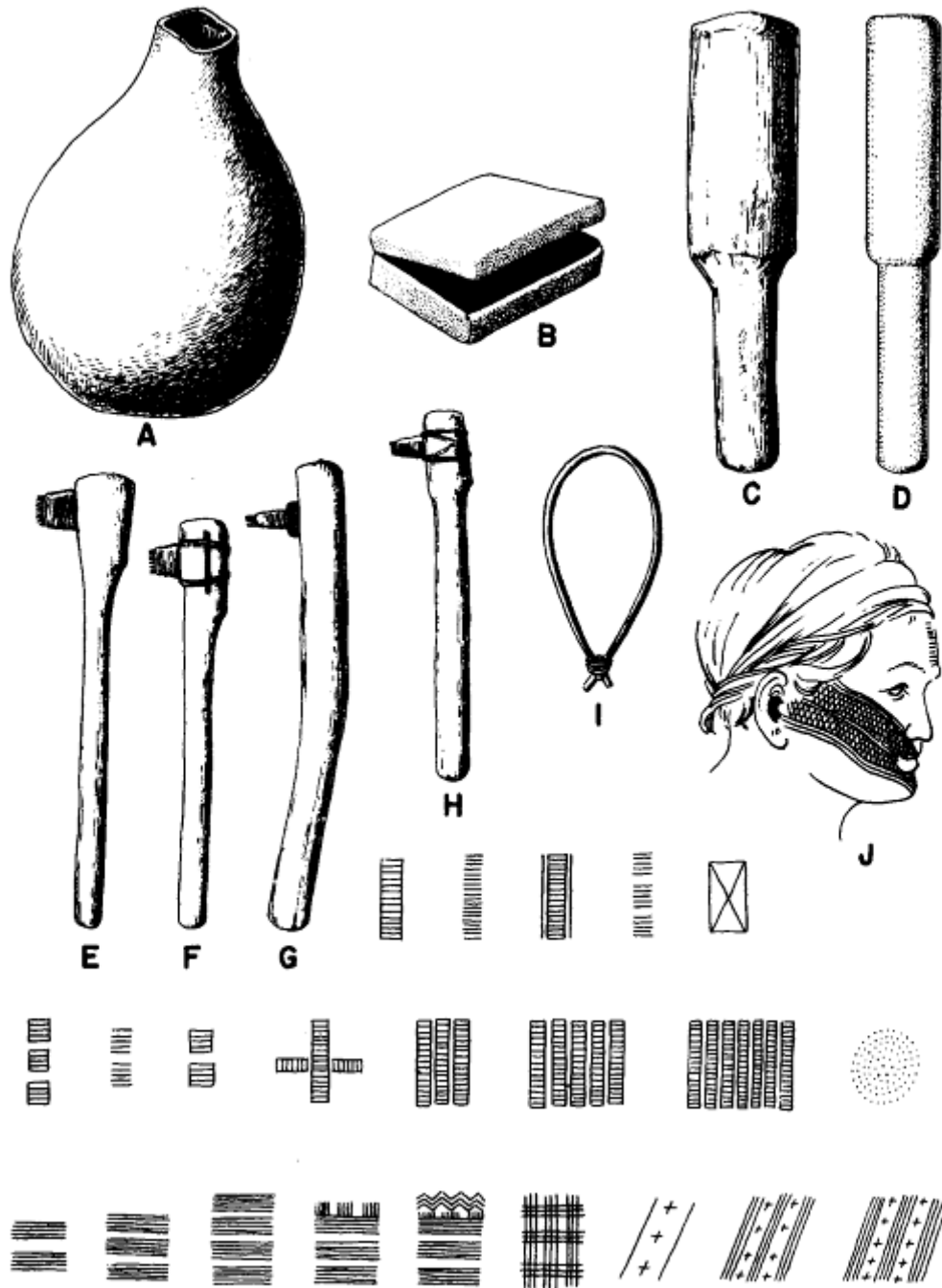
- ❑ It has long been noticed that there was a relationship between Austronesian and Daic (Tai-Kadai)
- ❑ However, Ostapirat (2005) supports a genetic affiliation with regular sound-correspondences
- ❑ Norquest (2007:413) points out that the Hlai branch of Daic shares some striking lexical items with proto-Austronesian which do not occur in the other branches.
- ❑ Blench (2012) argued that beyond the linguistic argument there are significant cultural similarities, including dental evulsion, tooth-blackening, jews' harps
- ❑ My guess is there was a back-migration to the mainland at the point at which PMP split off

Proposed pathways of Daic expansion



Tattooing in Taiwan

Atayal tattooing equipment and designs



Face-tattooing in Taiwan and Yunnan

Terracotta head,
excavated in Yunnan
representing face-
tattooing



Dulong woman in 1994

Dental evulsion

- ❖ Dental evulsion/ablation is the taking out of the teeth, most notably the two front teeth but often others as well
- ❖ It is not in use generally in island SE Asia but is common on Taiwan (and incidentally associated with the millet harvest in some groups) as well ethnographically and archaeologically in South China (and some sites in North China)
- ❖ It is illustrated in Chinese 'ethnographic' albums of the 'savage' tribes of Yunnan

Dental evulsion

Tsou woman
photographed in
the 1930s



Excavated
skulls from
South China
showing dental
evulsion



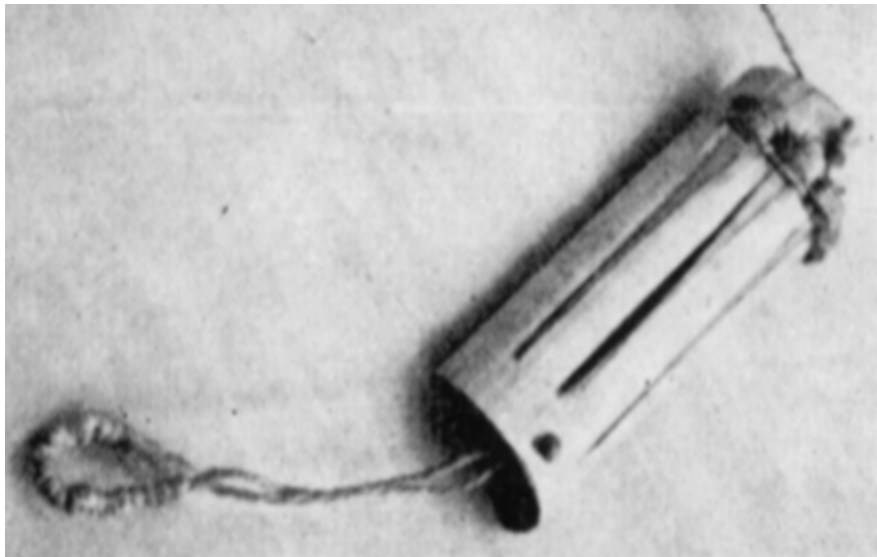
Present-day Tai-speaker
showing dental evulsion

Multi-tongue Jews' harp

- ❑ The Formosan peoples developed some unusual types with multiple tongues, which made possible various types of speech-imitation.
- ❑ In particular it is also widespread in South China, where these same multi-tongue Jews' harps are found. Presumably the multi-tongue Jews' harp was first developed in south China and spread across the straits to Taiwan.
- ❑ However, these instruments were then simplified after the Austronesians left Taiwan since only single-tongue Jews' harps are known thenceforth.

Four-tongue Jews' harp

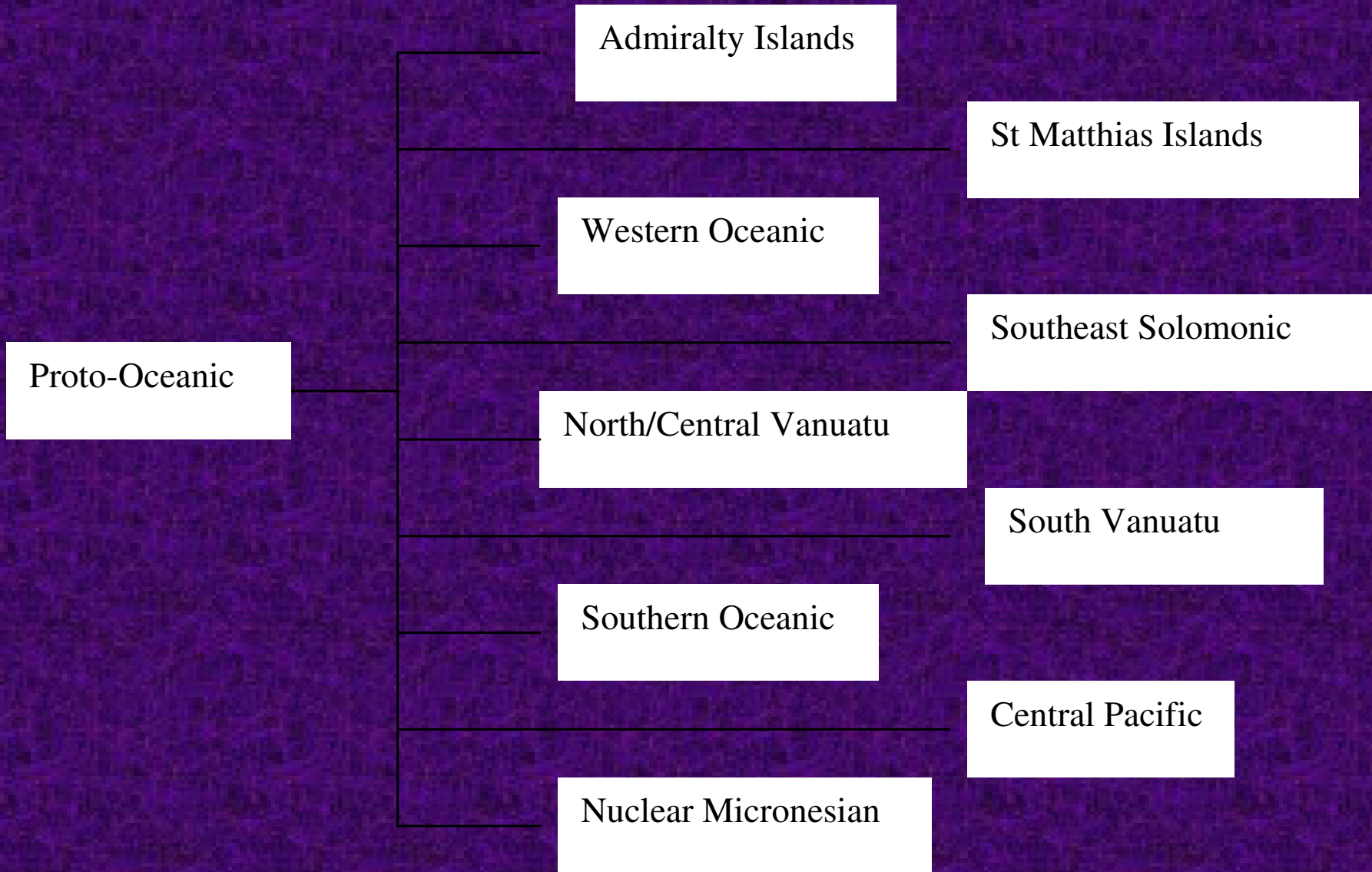
Yunnan multi-tongue jews' harp



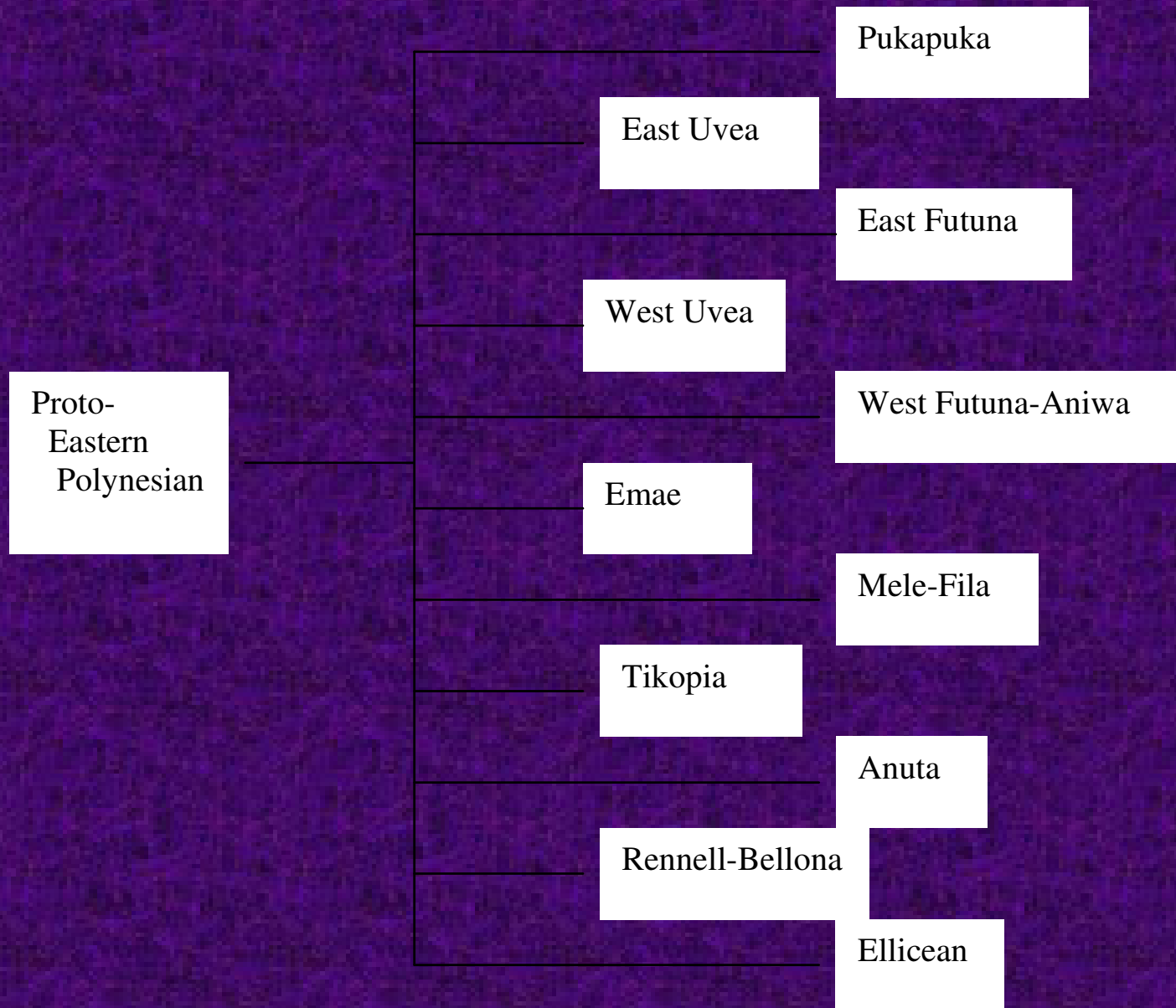
Atayal four-tongue
Jews' harp



Primary subgroups of Oceanic



Primary subgroups of Eastern Polynesian



Does this fit with the archaeology?

- ❑ The archaeological correlate of these flat arrays should be a near-simultaneous dispersal in all directions, leading to consolidation of different subgroups in isolation
- ❑ This is a pattern we are unlikely to see on large land masses, because populations move shorter distances and generally stay in touch with their ancestral areas
- ❑ Unless, like Austroasiatic or Arawakan, the dispersal was river-borne
- ❑ The archaeology of mainland Taiwan is unclear, but for PMP, Spriggs (2011) has presented a picture of near-simultaneous dates for ISEA after 4000 BP
 - ❑ 'The spread of Neolithic AN-speaking cultures across much of ISEA is a similar phenomenon, in terms of its rapidity, to the Lapita expansion beyond the Bismarck Archipelago between about 3100 and 2900 BP'

Does this fit with the archaeology?

- ❖ The Oceanic language dispersal is usually identified with the dispersal of Lapita pottery.
 - ❖ After reaching Western Polynesia there seems to have been a long pause, during which Fiji, Samoa and Tonga were colonised.
 - ❖ However, around a thousand years ago, there was a new burst of colonisation of Eastern Polynesia.
 - ❖ Wilmshurst et al. (2011) have undertaken a re-evaluation of the radiocarbon chronology for eastern Polynesia, which has dramatically shortened the estimated settlement time.
 - ❖ Proto-Nuclear Eastern Polynesian is now dated to 1000 BP, with the final canoes reaching New Zealand by as late as 1200 AD.
- Pointing to a good match between the linguistics and archaeology

**The first stage
of the
Austronesian
migrations**

terra australis 40

**4000 Years of Migration and
Cultural Exchange**

The Archaeology of the Batanes Islands, Northern Philippines

Peter Bellwood and Eusebio Dizon (eds)



E P R E S S

Problems of Austronesian research

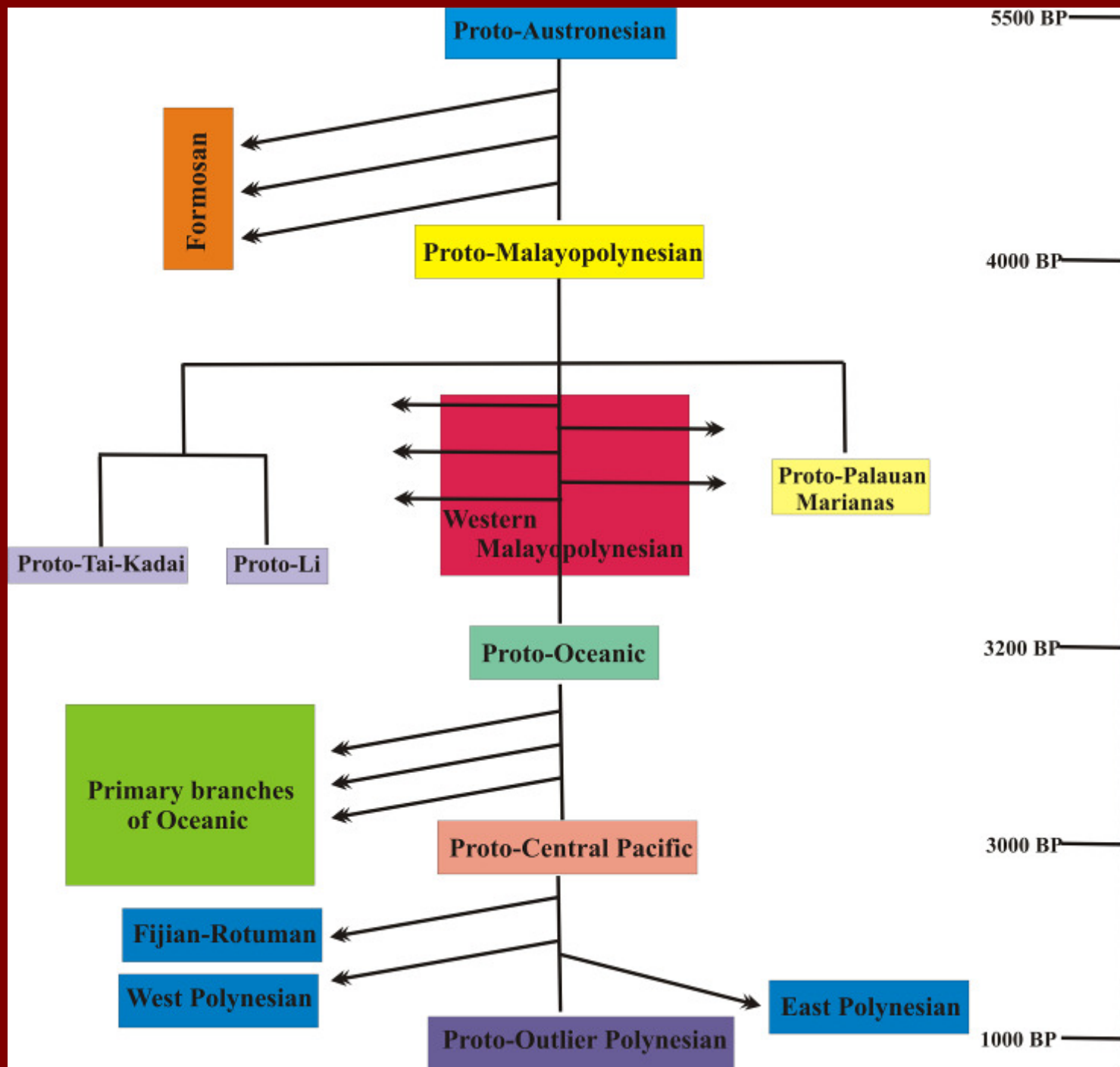


Characteristic Lapita pottery sherd



Archaeology and linguistics map against one another

- ❑ Blust's models had nested language trees which would be congruent with a slow expansion and the previous scatter of archaeological dates could fit a variety of scenarios
- ❑ The series of 'flat array' dispersals, i.e. nodes at which the proto-language divides into 9-12 simultaneous subgroups
- ❑ The remarkable confluence of linguistics and archaeology suggests that Austronesian underwent a series of pulsed expansions and periods of consolidation
- ❑ The figure shows a synthesis of the two



However...

- ❑ The same pattern recurs; after a period of consolidation, one branch of Austronesian undergoes an explosive dispersal, reaching numerous locations within a very short period
- ❑ Similar to the punctuated equilibrium of Stephen J. Gould
- ❑ The question then is what pattern of subsistence does this reflect and why the recurrent explosive dispersals?
- ❑ It may seem evident that the established agricultural economy of Taiwan was carried on to ISEA and thence to the Pacific
- ❑ But there are strong reasons for questioning this

In Taiwan

- ❑ Archaeobotanical evidence for cereals in Taiwan suggests that some, foxtail millet and mountain rice go back to the earliest wave of settlement from the mainland
- ❑ and that Taiwan was a centre for indigenous domestications and early adoptions of 'foreign' crops esp. cereals but also pseudo cereals such as *Chenopodium* spp.
- ❑ The recently identified *Spodiopogon* is an example of a cereal only grown in Taiwan
- ❑ And that they were enthusiastic adopters of incoming cereals, such as sorghum and finger-millet
- ❑ The 'small millets' are characteristic of the montane spine of the island; Amis for example, do not grow most of these cereals (though they do have a surprisingly wide range of other useful plants)

Cereals currently grown in shifting cultivation in Taiwan

People	Village	Species
Atayal	Urai	rice, foxtail millet, maize
	Riyohen	rice, foxtail millet, maize, common millet
	Piyanan	rice, foxtail millet, maize, common millet
Thao	Galawan	rice, foxtail millet, maize, common millet
Bunun	Tahun	foxtail millet, maize, common millet, finger millet, sorghum, coix, <i>Spodiopogon</i>
Rukai	Budai	rice, foxtail millet, maize sorghum, coix, <i>Spodiopogon</i>
Paiwan	Pakuhyo	rice, foxtail millet, sorghum, <i>Spodiopogon</i>

Cultivation and use of millets in Taiwan

Varieties of millet grown
by the Rukai



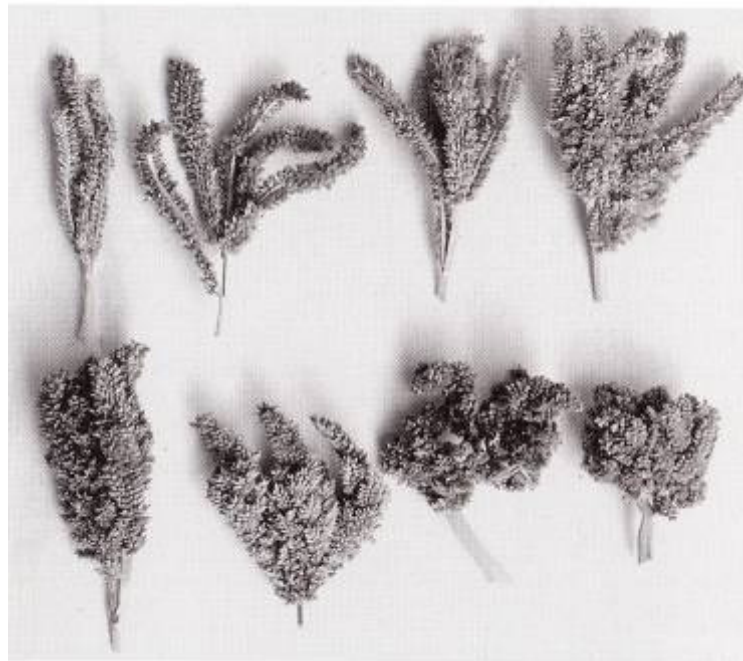
Sorghum and Coix (Rukai and Paiwan)



Two subspecies of *Coix lacryma-jobi* :
Left : subspecies *ma-yuen* (edible)
Right : subspecies *lacryma-jobi*



Eleusine grown by Bunun



Photograph by Segawa (Yuasa 2010)



Herbarium specimen collected
in Japanese occupation period

Upland rice and Spodiopogon (Bunun)



However...

- ❑ The archaeological record is full of lacunae, most notably the absence until much later, of domestic pigs (south of the Northern Philippines), dogs (unclear) chickens (absent) (Phil Piper p.c.)
- ❑ Even though there *are* pigs and dogs in the Batanes by around 3500 BP, there seems to be no evidence for an agricultural economy
- ❑ Most of the pigs, dogs and chickens in ISEA have been shown to derive from different sources and to spread, probably from southern Việt Nam along a southern corridor.
- ❑ The vegeculture of Melanesia (taro, yams, bananas, sugar-cane, sago, pili-pili nuts and other managed trees) were well-diffused across ISEA prior to the Austronesian expansion

Then..

- ❑ This acts to almost exactly invert the agricultural expansion hypothesis
- ❑ Far from agriculture being the engine of demographic growth and demographic spread, it allowed the mountain populations of Taiwan to stay at home and watch television
- ❑ Austronesian thus spreads in the hands of small populations who move fast and are flexible and most importantly, appear to have an ideological advantage over the peoples they encounter.
- ❑ But do they spread demographically or by cultural assimilation? Should we seek a better parallel in the Vikings than the Bantu?

Strategic reversion to foraging

- ❑ The notion that a culture should revert to foraging once they have developed agriculture seems counterintuitive
- ❑ But if resources are sufficiently rich, this makes perfect sense
- ❑ We know the Maori of South Island New Zealand and the Moriori of Chatham island made this transition
- ❑ And there are examples in the Amazon such as the Sirono
- ❑ Archaeologically, there is a good example of the Ertebølle culture of Southern Scandinavia (ca. 5300 BC – 3950 BC), foragers and fishermen, pottery-making culture dating to the end of the Mesolithic period. Although pottery-making and in regular trade contact with grain-producers, the Swifterbant culture, they persisted with exploiting only wild resources, presumably because those resources were so rich.

The PMP bottleneck

- ❑ When the Austronesians leave Taiwan their culture undergoes a massive bottleneck (or gateway in recent terms)
- ❑ Much of the material culture of Taiwan is lost and many new items are adopted or invented
- ❑ This is particularly clear with musical practice. The classic polyphony of Taiwan is linked to the polyphony of South China
- ❑ But once they cross the strait it is lost and monody is the Austronesian rule
- ❑ Many new practices, musical and otherwise develop
- ❑ Suggesting that the ancestors of PMP speakers undergo a cultural constriction and rediversification

Aquatic dispersals in prehistory

- ❑ Maritime or aquatic expansions in prehistory are persistently underestimated.
- ❑ A fascinating parallel to the Austronesian story is that of the Vikings. The Vikings also had rapid boats, a powerful religious ideology and a 'raiding and trading' strategy. Within a period of about three centuries they founded settlements from Newfoundland to Central Asia, and, like the Austronesians left a characteristic material culture everywhere they touched.
- ❑ In the New World, a comparable example is the Arawakan expansion, usually thought to have begun somewhere in northeast South America about 5000 kya. The scattered nature of Arawakan languages suggests their primary means of dispersal was along rivers and they were not driven by a search for agricultural land so much as new trading partners.
- ❑ Whether the Arawakan expansion included a religious component remains uncertain but there is a broad correlation with the 'Timehri petroglyphs' which may be a partial reflection of spiritual beliefs.

If so..

- ❑ Then what happened on Taiwan was an agricultural revolution that failed
- ❑ Almost all the crops domesticated, adapted and adopted by the indigenous Austronesians of Taiwan were seemingly never present or dropped in the Philippines (except scattered *Setaria* which could be a reintroduction from the mainland)
- ❑ This must be because the Austronesians that actually left the island were a very small subset of the population focused on fishing and trading and not the cereal growers
- ❑ This points to the Amis or other now disappeared lowland groups

What would a fisher-forager culture look like?

- ❑ As it happens, we have a pretty good model for a fisher-forager culture, the Samal, Bajaw or Orang Laut found all across the Indonesian archipelago
- ❑ These 'sea nomads' who probably reach Madagascar as well, move seasonally between fishing grounds, acting as smugglers and traders, living on their boats.
- ❑ Because there remains a strong market for extra-legal goods transfers and fish, they have survived into the 21st century.

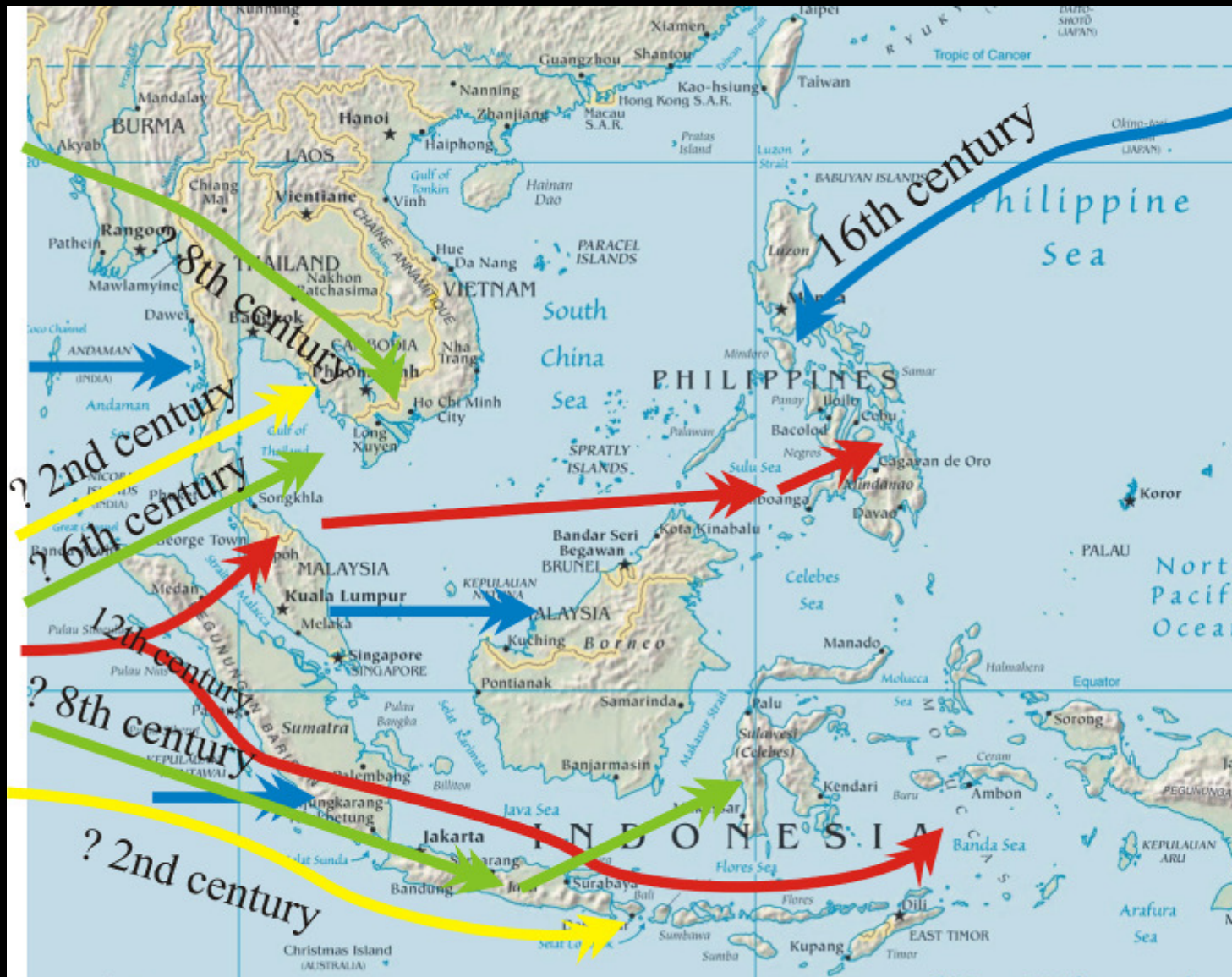
Sama Bajaw







What drove the explosive dispersals?

- ❑ A useful model of periodic explosive dispersals is that driven by religion, for example, Islam (not necessarily linguistic)
- ❑ Islam spreads westward along the North African coast and eastward into the Near East in a string of fundamentalist reform movements
- ❑ Although religion often functions according to the Judaeo-Christian model, it does not need to be so structured. In the Austronesian world, we find a strong common pattern, from Taiwan to New Zealand, which underlies the basic belief system of every society, until displaced by Hinduism, Buddhism, Islam and more recently Christianity.
- ❑ Widely known as *adat* in Indonesia and it may be an appropriate term to cover Austronesian religious practice. *Adat* is no longer a coherent set of practices in Indonesia, but an island whose importance is persistently under-rated is Sumba.

External religions in the Austronesian world



-  Buddhism
-  Hinduism
-  Islam
-  Christianity

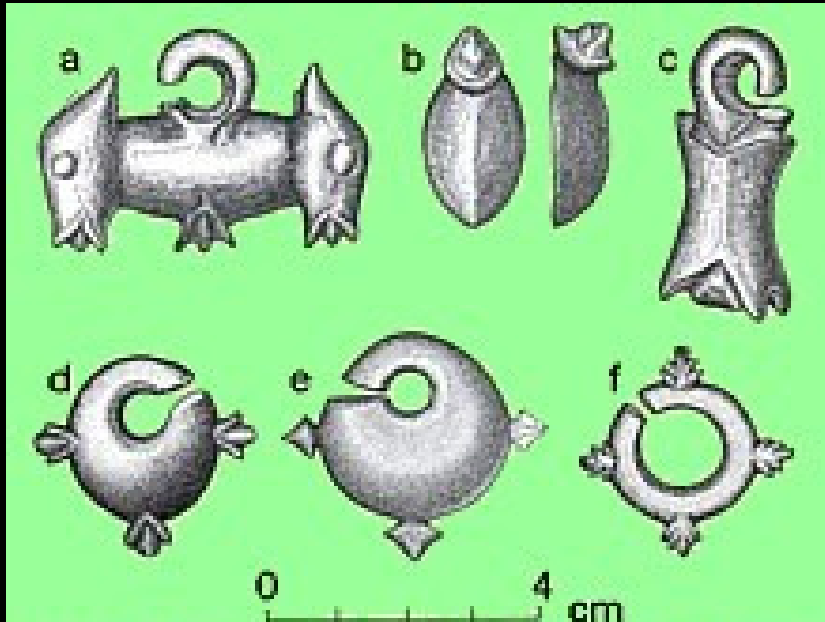
What drove the explosive dispersals?

- Building on Sumba and other records of religious practice, the following aspects can be ascribed to Austronesian religion;
 - Strong hierarchical social structure, with caste-like elements
 - Priestly caste or group, with esoteric knowledge and ability to recite ancestral chants often in archaic language
 - Strong attention to genealogy, with reference to semi-mythical founder ancestors
 - Lack of focus on a single over-arching deity
 - Reincarnation
 - Reinforcement of belief system through persistent and stable iconography

Austronesian iconography

- An aspect of Austronesian culture is the persistence of common iconographic elements across its entire range
- In world terms this is highly *uncharacteristic* of language phyla which tend to show iconographic diversity (cf. African language phyla)
- Iconographic elements associated with religious practice be useful as indicators. Compare the spread of images of saints in Catholicism
- Typical imagery is the *bulul* figure, the *linglingo*, the split-crotch figure with bent knees and many others which show up in multiple media most of which do not survive archaeologically
- The slides present a glimpse of some of these icons

Some ling-ling-o



Mga hikaw na batong ihada (jade) mula sa mga yungib sa Tabon 2,190 taon ang tanda. Tipong lingling-o ang d, e at f.

Artefacts from the Tabon Caves: (a-f) ear pendants of jade - (d-f) are of the lingling-o type. From Fox 1970.



Fengtian jade deposits in Eastern Taiwan (Hung et al. 2007)

Tabon caves

The *Bulul* figure I

- The *bulul* figure is most typically associated with the Ifugao people of Northern Luzon
- On the internet this is pretty much its exclusive association
- But related figures occur at least as far as the Aru islands off the south coast of New Guinea

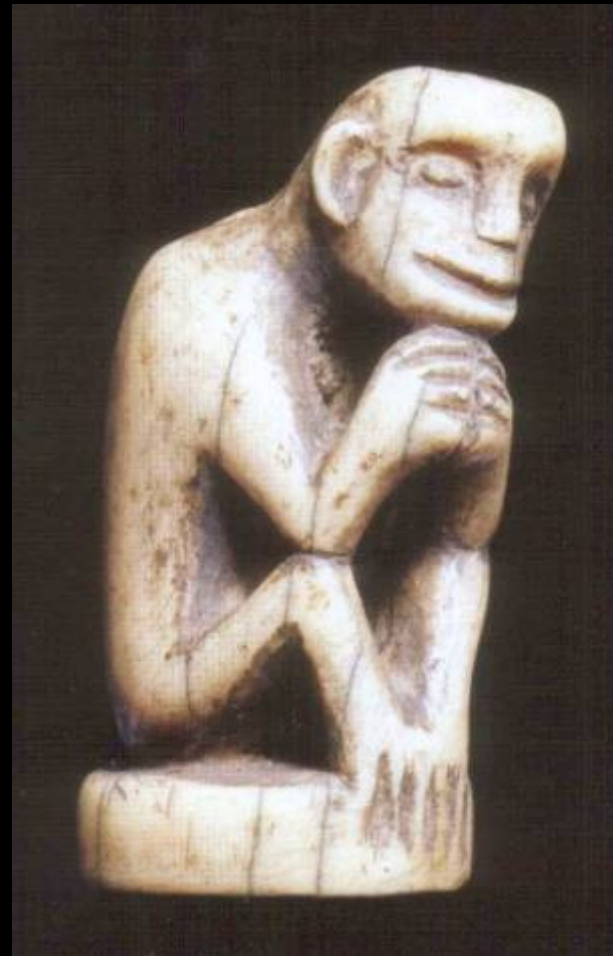


Bulul in Borneo

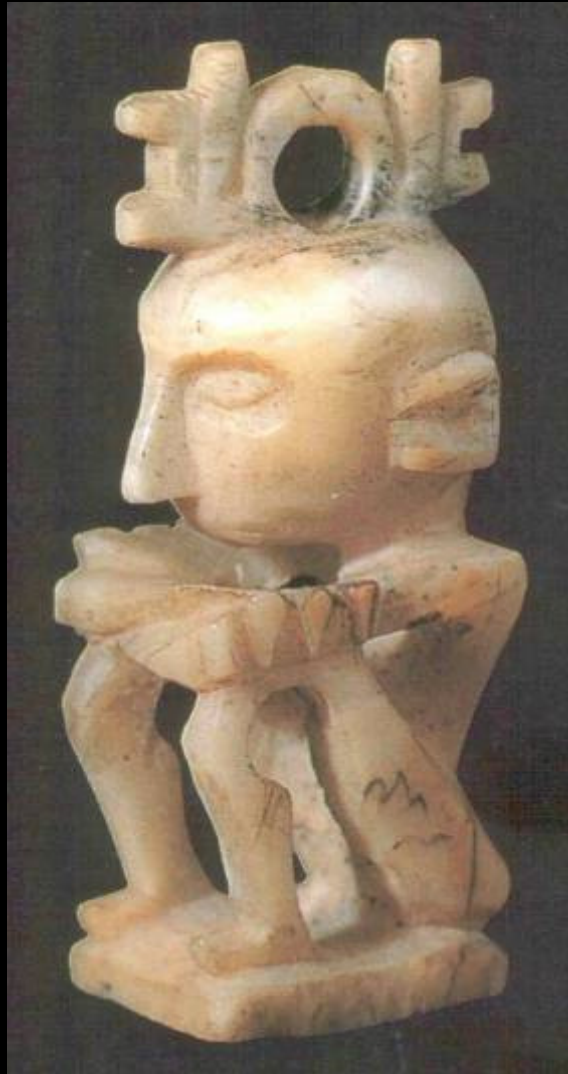
- The monkey is an Iban *pentik* figure

- To the right is an Iban *tugal*

- Miscellaneous figures, Muzeum Etnologi, Kuching



The *Bulul* figure from Leti



***Bulul* figures from Maluku Tenggara**



Bulul figures reinvented in Tanimbar



● and Buin

***Bulul* figures elsewhere**

- **Korwar figure, Cenderawasih Bay**



- **Giarai ancestor figure, Vietnam**

Approximate distribution of *bulul* figures



Other correlates of the Austronesian expansion

- 🌐 Headhunting, the taking of heads for ritual purposes, is recorded globally in the ethnographic record as well as archaeologically.
- 🌐 However, it has a very patchy distribution in ISEA and Oceania and there is every reason to think it is associated with the Austronesian expansion

Approximate distribution of headhunting



Other correlates of the Austronesian expansion

- An Austronesian culture trait which shows a remarkable match to the version of Austronesian history given here is the warp *ikat* weaving tradition.
- There are strong similarities in both motifs, technical construction and place in the ritual system associated with these textiles.
- In addition, prior to the introduction of cotton into the region, they depended entirely on locally available fibres. There is thus no reason to think *ikat* is not of considerable antiquity.
- The map shows the distribution of *ikat*, which corresponds to the Austronesian world, but including both Hainan Island and the Tai area, suggesting strongly these were diffused with the breakup of PMP.
- There is no parallel for these traditions in Taiwan, hence this is an innovation which must have developed subsequent to the departure of the early PMP speakers.

Ikat weaving



What can we conclude from this?

- The Austronesians spread far and fast, hardly typical behaviour for an agricultural expansion
- Although the Austronesians on Taiwan had a vibrant and innovative agriculture, this was *irrelevant* to their expansion
- Instead this was driven by advanced nautical technology and subsistence base on fishing, foraging and trade, typical of a highly mobile population
- As a consequence, Austronesian speakers underwent an 'explosive' dispersal spreading very rapidly to numerous islands in SEA, hence the close window of post-Taiwan dates

What can we conclude from this?

- The agriculture and livestock we see today is not an inherited subsistence strategy but was put together from an assortment of techniques developed by resident populations *who were already practising vegeculture and arboriculture*
- These strategies originate both from Melanesia and MSEA
- The rice, pigs and chicken systems are relatively recent constructs; Borneo for example, almost certainly switched from sago etc. to rice under Malay influence
- Rice is bound up with nationalist rhetoric and we have been manipulated into overvaluing it
- This therefore implies that many purported PMP reconstructions of livestock and crops are misleading; either they are a complex texture of loanwords or they are just errors (this can be demonstrated for taro)
- Austronesians are best thought of as strategic foragers, post-Taiwan, who re-adopt agriculture.

But...

- We also have to account for the ethnolinguistic pattern seen today, i.e. the complete dominance of Austronesian languages; mobile fisher-foraging would not be adequate by itself to account for this
- Hence the possibility, suggested by pervasive iconography, that the key to Austronesian expansion and assimilation of resident populations was religious
- As with other world religions, periods of missionary expansion and proselytisation are interspersed with periods of consolidation
- Except in the case of Austronesian, this has unusual linguistic consequences
- A useful parallel with the Pama-Nyungan expansion in Australia about the same time, which may be linked to the song-cycles

Religious conversion and language expansion

- Pama-Nyungan languages cover 90% of Australia but probably only expanded in the last 4000 years (approx.)
- Clearly the continent was well-populated prior to this, so there must have been a large element of cultural conversion
- Interestingly confirmed by the remarkable longevity of oral traditions which date to the period before Pama-Nyungan
- The introduction of a new system of song-cycles is argued as one major factor in the spread of the language

And...

- Developing a coherent narrative for the development of Austronesian requires linguistics, archaeology and anthropology to work together
- Which are in accord with the archaeological picture
- The comparative ethnography of Austronesian societies is the piece of the puzzle which explains the pattern emerging from historical linguistics.

THANKS

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- To a wide variety of scholars for discussions over the years especially to Phil Piper, Andy Pawley, Peter Bellwood, Emiko Takei, Nick Evans and Matthew Spriggs

