Current portrayals of Island Southeast Asia (ISEA) over the past 5,000 years are dominated by discussion of the Austronesian “farming/language dispersal,” with associated linguistic replacement, genetic clines, Neolithic “packages,” and social transformations. The alternative framework that we present improves our understanding of the nature of the Austronesian language dispersal from Taiwan and better accords with the population genetics, archaeological evidence, and crop domestication histories for ISEA. Genetic studies do not demonstrate that the dispersal of Austronesian languages through ISEA was associated with large-scale displacement, replacement, or absorption of preexisting populations. Linguistic phylogenies for Austronesian languages do not support staged movement from Taiwan through the Philippines into Indo-Malaysia; in addition, the lexical and grammatical structure of many Austronesian languages suggests significant interaction with pre-Austronesian languages and cultures of the region. Archaeological evidence, including domestication histories for major food plants, indicates that ISEA was a zone of considerable maritime interaction before the appearance of Austronesian languages. Material culture dispersed through ISEA from multiple sources along a mosaic of regional networks. The archaeological evidence helps us to shape a new interpretative framework of the social and historical processes that more parsimoniously accounts for apparent discrepancies between genetic phylogenies and linguistic distributions and allows for more nuanced models of the dispersal of technologies and societies without reference to the farming/language dispersal hypothesis.

The Current View of Austronesian Dispersal across Island Southeast Asia

Current portrayals of Island Southeast Asia (ISEA) over the past 5,000 years are dominated by variants of the Austronesian dispersal hypothesis (e.g., Bellwood 1984–1985, 1997, 2005; Bellwood, Fox, and Tryon 1995; Blust 1995; Diamond 2001; Diamond and Bellwood 2003; Shutler and Marck 1975). The Austronesian dispersal is cited as an archetypal example of a purportedly global phenomenon, the farming/language dispersal (Bellwood 2005; Bellwood and Renfrew 2002; Diamond and Bellwood 2003). Other panregional examples include the spread of Indo-European-language speakers across Eurasia (Ammerman and Cavalli-Sforza 1984; Renfrew 1987) and that of Bantu-language speakers across sub-Saharan Africa (Ehret 1998). In each case, an inclusive historical interpretation of demic expansion, or the movement of farming peoples together with their languages and cultures, accounts for and links together present-day language distributions and human population genetics and the transformation and diffusion of material culture through time. Although the consonance of languages, genes, and cultures is increasingly qualified (Bellwood 2005, 2007), general correspondences among multidisciplinary data remain a central tenet of the farming/language dispersal hypothesis and underpin its explanatory power.

According to conventional wisdom, Austronesian languages, along with their speakers and associated technologies, dispersed from Taiwan into the Philippines and Indo-Malaysia and, after largely bypassing New Guinea, moved into the Pacific. The dispersal of these peoples is presumed to have been accompanied and enabled by agricultural technologies, primarily based on rice but including other plant domesticates and a suite of domesticated animals (pigs, dogs, and chickens), and other “Neolithic” cultural traits, including pottery and
polished stone adzes (Bellwood 1997, 2005; Diamond 2001; Diamond and Bellwood 2003). Rice-based agriculture and other technologies are considered to have enabled the Austronesians to colonize and, to varying degrees, replace pre-existing hunter-gatherer populations occupying ISEA (Bellwood 1997, 2005; Diamond 2001). Linguistic reconstructions have been matched to archaeological chronologies to variously argue for staged and sequential migration from Taiwan to the Philippines beginning ca. 4,500–4,000 years ago, to eastern Indonesia by ca. 4,000–3,500 years ago, across the north of New Guinea to the Bismarck Archipelago (but largely excluding mainland New Guinea) by ca. 3,500–3,300 years ago, and to the Solomons and Vanuatu by ca. 3,100–3,000 years ago (Bedford 2006; Bellwood 2005; Blust 1995; Spriggs 2003, 2007). After this expansion, Austronesian speakers colonized uninhabited islands over a vast area, including all of Micronesia and Polynesia in the Pacific (Kirch 2000), areas that show no clear evidence of prior human settlement.

Detractors of the Austronesian hypothesis of regional prehistory as it applies to ISEA have speculated on alternatives but have been unable to address all aspects of the evidence usually cited to support that hypothesis or to provide a viable interpretation that sufficiently accounts for the multidisciplinary lines of evidence—including genetics, linguistics, archaeology, and plant domestication histories—separately. The noncongruence of the multidisciplinary lines of evidence offers a strong critique of the farming/language dispersal hypothesis and similar models of Neolithic spread (Spriggs 2003, 2007) as they apply to the past five millennia of ISEA history. We find that the evidence, not only in aggregate but also when examined discipline by discipline, points to a mid- to late-Holocene history for ISEA that is very different from that portrayed by the conventional Austronesian dispersal hypothesis. These findings are of global importance because Austronesian dispersal has been promoted as an archetype of the farming/language dispersal hypothesis; the lack of fit of the farming/language dispersal hypothesis to ISEA severely undermines its relevance as a global model to account for major language groupings and the diffusion of agriculture.

In the latter part of the paper a new historical framework is proposed to account for the observed multidisciplinary phenomena in ISEA during the Holocene. This alternative historical interpretation is a radical departure from conventional portrayals. It emphasizes the mosaic of regional networks and the social processes prevalent in ISEA before and during the spread of Austronesian languages and cultural influences from Taiwan.

**Human Population Genetics**

Bellwood (2002:17) asserts that “early farmers . . . frequently colonized outwards from homeland regions . . . in the process spreading foundation trails of material culture, language, and genetic distinctiveness.” To what extent is there a distinctive genetic trail among the current human populations of ISEA indicating that an Austronesian, or “out-of-Taiwan,” colonization event occurred? This is not a simple question, since different genetic markers carry their own tales, and there are even questions about the extent to which we might expect a genetic trail, or cline, to persist (e.g., Excoffier and Ray 2008).

Care must be taken in the evaluation of genetic studies, particularly to ensure that more than one marker is used, that the historical implications of different genetic markers are properly understood (Hurles 2002), and that sampling coverage of regional populations is sufficient as a basis for the conclusions (e.g., consider the limited representation of samples from ISEA in Friedlaender et al. 2008). Under the Austronesian dispersal hypothesis, which invokes the migration of colonizing farmers tracing their origins to Taiwan, the human genetics of ISEA populations might be anticipated to reflect a Taiwanese genetic inheritance, potentially as a distance-decay effect, or cline, away from that island.

Although some of the genetic variation among human populations in ISEA can be attributed to Taiwanese influence, the proportion does not by any means represent the wholesale replacement or absorption of preexisting populations (Oppenheimer 2004; Oppenheimer and Richards 2002). Maximally 20% of Y chromosome variation (Capelli et al. 2001) and at most 20% of the mitochondrial DNA (mtDNA) variation (Hill et al. 2007) in ISEA populations can be explained by an out-of-Taiwan hypothesis. At the same time, approximately the same number of genetic markers in these same ISEA populations, representing most of the diversity found, are best explained as having been present in situ since the colonization of the area by modern humans during the Late Pleistocene (Soares et al. 2008). Hill et al. (2007:38–39) consider it likely, on the one hand, that “about a fifth of the modern inhabitants can trace their maternal ancestry back to the first anatomically modern settlers of ISEA” and, on the other, that “if a mid-Holocene migration did occur, it was—on the maternal side at least—demographically minor, contributing, at most, only a fifth of the modern ISEA mtDNAs.”

Furthermore, the degree of genetic inheritance does not exhibit a clear pattern from Taiwan across ISEA and beyond. For example, a paternal genetic signal does persist from (eastern) Taiwan to Polynesia (e.g., Kayser et al. 2008), the easternmost limit of Austronesian migration, showing that at least some genetic markers were not lost in migratory “surfing” (following Excoffier and Ray 2008). However, this same genetic signal is not prominent in ISEA.
Even more problematic for hypotheses involving a large-scale human migration is that Taiwan represents an endpoint, rather than a source, of numerous genetic phylogenies (Soares et al. 2008). The evidence from several genetic markers suggests that the net flow of genes has been from south to north (e.g., Cavalli-Sforza et al. 1988; Hill and Serjeantson 1989; Oppenheimer 2004; Su et al. 1999), again perhaps reflecting more ancient population dispersals of modern Homo sapiens than those assumed under most accounts of Austronesian dispersal. It is likely that some of the approximately 20% of Y chromosome or mtDNA variation will turn out to have spread before the mid-Holocene, reducing their values as markers of an Austronesian dispersal.

Furthermore, Austronesian language–speaking populations tend to mimic, genetically, any non-Austronesian populations with which they are in contact, rather than presenting starkly contrasting genetic histories. This is true of all areas in which there are both Austronesian-speaking and non-Austronesian-speaking populations, including Madagascar, Southeast Asia, and Melanesia (Chow et al. 2005; Hurles et al. 2005; Li et al. 2008). This implies that the genetic history of Austronesian speakers, in whichever region they are found, implicates the preexisting populations of these regions as much as any putative migration out of Taiwan. The arrival of Taiwanese genes, rather than replacing earlier populations, was associated with gradual blending and gene flow between the populations.

In sum, multiple studies demonstrate that the Taiwanese contribution to the genetics of ISEA populations, both Austronesian and non-Austronesian, is relatively minor. There is no genetic evidence of a mass migration of farmers out of Taiwan who replaced or absorbed populations across ISEA. The majority of genetic markers, both paternal and maternal, in ISEA populations reflect Pleistocene colonization movements by modern humans and “dispersals across the region of Austronesia throughout the early to mid Holocene” (Hill et al. 2007:40). Conversely, events from the mid-Holocene onward play a relatively minor role in the genetic history of most of ISEA. The failure of most genetic studies, especially those focused on paternally inherited markers (Friedlaender et al. 2008; Kayser et al. 2008), to differentiate between the speakers of what are distinct linguistic groupings indicates that “biological genetic features have geographically based rather than linguistically based distributions” (Nichols and Peterson 1998:612). There is at best a weak correlation between language and genes in ISEA (pace Cavalli-Sforza et al. 1988 but in accordance with Sokal 1988 and numerous other studies). There is no “genetic distinctiveness” in ISEA that suggests that a mid-Holocene out-of-Taiwan population movement is especially privileged in determining the genetic makeup of the present populations in the area. Rather, we find a complex range of signals, with no single origin dominating the genetic history of ISEA.

Reassessing Austronesian Linguistics

Bellwood (1984–1985:109) states, “The question of Austronesian origins is basically a linguistic question,” and while the question is no longer exclusively a linguistic one, “Austronesian” is still essentially a linguistic construct. The Austronesian family comprises more than 1,000 languages spread over a vast area between Madagascar and Easter Island. Overwhelming linguistic evidence shows an origin for the Austronesian languages on Taiwan (Blust 1995), and we do not dispute this. On the other hand, we question the nature of the linguistic “dispersal” out of Taiwan and into ISEA. We should note that the “Austronesian dispersal” might better be termed a “Malayo-Polynesian dispersal,” since nine of the 10 primary subgroups of Austronesian are attested to only on Taiwan and only the Malayo-Polynesian branch has members outside Taiwan (and none on mainland Taiwan). Therefore, we hereafter refer to “Malayo-Polynesian” rather than “Austronesian” where the former is more appropriate.

The standard version of the Austronesian linguistic phylogeny is very hierarchical, with bifurcations corresponding to inferred movements from Taiwan (the Proto-Austronesian [PAN] homeland, where nine of the 10 first-order subgroups are found) through ISEA (the various languages designated as Western Malayo-Polynesian, including groups that have since moved to the Southeast Asian mainland and Madagascar) and eastern Indonesia (Central Malayo-Polynesian), across northern New Guinea (the South Halmahera–West New Guinea branch of Eastern Malayo-Polynesian), and finally into the Pacific (Oceanic, including Polynesian and Micronesia; e.g., Blust 1995; Tryon 1995; see fig. 1A).

In recent years, this Austronesian phylogeny has been shown to be flatter at multiple levels (fig. 1B). Linguistic subgrouping and the consequent construction of a layered hierarchy rely on the sharing of innovations in the inherited linguistic signal to define phylogenetic subgroups. For instance, the Malayo-Polynesian subgroup, comprising all of the Austronesian languages spoken outside Taiwan, can be defined as a valid subgroup on the basis of a number of shared innovations, both regular and irregular (see table 1, abbreviating material in Blust 2001). However, it is recognized that the same is not true of Western Malayo-Polynesian, in which languages show the Malayo-Polynesian innovations but nothing unique relative to Malayo-Polynesian languages to the east, namely, those assigned to Central-Eastern Malayo-Polynesian (e.g., Ross 1995). The Central-Eastern Malayo-Polynesian branch contains the Central Malayo-Polynesian and Eastern Malayo-Polynesian subgroups and comprises the Austronesian languages of eastern Indonesia and northwestern New Guinea, as well as those of Oceania. Problematically, the evidence for the Central Malayo-Polynesian and Central-Eastern Malayo-Polynesian subgroupings is not conclusive, since many of the innovations that have been proposed for each of these subgroups (e.g., Blust 1993) are present in languages in the Western Malayo-Polynesian area and, in some cases,
Figure 1. Representations of the Austronesian phylogeny. A, Earlier phylogeny (from Pawley 2007, after Blust 1995); B, revised phylogeny (following Donohue and Grimes 2008 and Ross, Pawley, and Osmond 2008). Earlier representations of the Austronesian family (A) have a very hierarchical structure, but recent revisions (B) show a flatter structure with multiple starbursts.

As a result, while we can group the “extra-Formosan” languages together as Malayo-Polynesian against those groups that did not migrate from Taiwan, we cannot justify any large subgroupings that would link the languages of the Philippines and western Indonesia together, as opposed to the languages spoken near and east of New Guinea. This fact represents a major challenge to computational models that claim success in replicating large subgroups within this nonexistent clade (e.g., Gray and Jordan 2000) and weakens their conclusion that linguistic evidence supports the so-called express-train model of a rapid Austronesian dispersal.

Further, there are very few large interisland subgroups in the Malayo-Polynesian area west of New Guinea; most subgroups are confined to single islands or adjacent islands (fig. 2A, based on Adelaar 2005a and Ross 1995). Notable exceptions are Malagasy, which migrated relatively recently from southeastern Borneo, and Malayo-Sumbawan, which includes Malay and the languages of several islands east of Java (Adelaar 2005b). Since there is no known structured phylogeny among the Western Malayo-Polynesian languages, we cannot say that the northern Malayo-Polynesian groups represent higher branches on the tree and that the southern groups are farther (phylogenetically) from the source. On the contrary,
the evidence suggesting that, for instance, Nias in the
southwest is any closer to or, importantly, any farther from,
cladistically, Proto-Malayo-Polynesian (PMP) than are any of
the languages of the Philippines. Consequently, the impression
of a graduated dispersal of Malayo-Polynesian languages south
from Taiwan does not hold up and must be rethought. If we
restrict our inquiry to the linguistic evidence alone, there was
a rapid, multidirectional, and multimodal propagation of
Malayo-Polynesian languages across most of ISEA, from southern
Indonesia to the Batanes Islands in the north, without
direction or hierarchy (see fig. 2B; Ross 2005). Can we ascertain
a center for the dispersal? On purely linguistic grounds, the
answer must be no. It is true that the presence of nine of the
primary subgroups of Austronesian in Taiwan unambiguously
indicates that Taiwan is the homeland for the language family
and that, ultimately, the Malayo-Polynesian languages are the
southern branch of the higher Austronesian node, but this says
nothing about the internal relationships, dispersals, and later
history of Malayo-Polynesian. From the presence and location
of the proposed Central-Eastern Malayo-Polynesian subgroup,
which is seen as the eastern split of Malayo-Polynesian, as well
as the presence of more proposed subgroups in the south than
in the north, we can deduce that the center of dispersal was
in central or eastern Indonesia, using the standard historical
linguistic principle of “least moves” (e.g., Anttila 1972; Joseph
and Janda 2003). Indeed, on linguistic grounds, Blust (1995)
considers a location not far from the Sulu Sea, on the Phil-
ippines/eastern Indonesia border area, to be the logical land-

Table 1. Innovations defining Malayo-Polynesian (selection only)

<table>
<thead>
<tr>
<th>Proto-Austronesian</th>
<th>Proto-Malayo-Polynesian</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>-mu “2pl genitive”</td>
<td>-mu “2sg genitive”</td>
<td>Irregular development</td>
</tr>
<tr>
<td>‘pandaN “pandanus”</td>
<td>‘pandaN “pandanus”</td>
<td>Irregular development</td>
</tr>
<tr>
<td>‘S</td>
<td>‘h</td>
<td>Regular change</td>
</tr>
<tr>
<td>‘Siwa “nine”</td>
<td>‘siwa “nine”</td>
<td>Irregular development</td>
</tr>
<tr>
<td>‘eS</td>
<td>‘ah</td>
<td>‘e and ’a are otherwise distinct</td>
</tr>
<tr>
<td>‘C ≠ ‘t</td>
<td>‘C and ‘t merge as ‘t</td>
<td>Regular merger</td>
</tr>
<tr>
<td>‘N ≠ ‘n</td>
<td>‘N and ‘n merge as ‘n</td>
<td>Regular merger</td>
</tr>
</tbody>
</table>

there is no evidence suggesting that, for instance, Nias in the
southwest is any closer to or, importantly, any farther from,
Figure 2. The distribution of Austronesian languages of ISEA. A, Subgroupings within Malayo-Polynesian (MP) languages from figure 1A. B, Major subgroups of MP, from figure 1B. The subgroup of Austronesian languages south of Taiwan (i.e., MP) shows 30–40 different primary subgroups in A, with the only claimed subgroupings being found in eastern Indonesia and East Timor (Central MP and Eastern MP) and in the Pacific (Oceanic group). Non-Austronesian languages within the area of the Austronesian dispersal are shown in yellow; their substratal effects are obvious in many southern Austronesian languages (Capell 1975; Donohue 2007b; see fig. 5). There is no Austronesian presence anywhere in Australia, and mainland Asia has only peripheral and recent Austronesian-speaking populations.
Figure 3. Proportion of Proto-Malayo-Polynesian vocabulary retained in individual languages. Austronesian languages show remarkable conservatism in their lexicons, except near New Guinea (especially eastern New Guinea), where the languages display neither the grammatical structures (fig. 5) nor, overwhelmingly, the lexicon of their more conservative relatives in, for example, western Indonesia or the Philippines. Only in the area enclosed by the dashed line is the average retention rate less than 30%; the area enclosed by a solid line has a less than 20% average retention rate.

jective judgements from assessments of “conservatism.” The mean lexical cognacy found between modern languages in a family can be determined and then evaluated in terms of the “minimum centuries” (mc) that would be expected to have elapsed to result in this level of diversification, assuming that 2% of the “basic” lexicon of a language will change per century, a value that is taken as standard (e.g., Swadesh 1950, 1952, 1955; for Austronesian, Dyen 1965, though see Blust 2000b).1 When this metric is applied to families for which documentation is adequate (Wichmann’s results are summarized in table 2), large language families, those with more than 100 member languages, show an average mc value of 93.5, implying that we expect the initial divergence to have taken place ca. 9,000 years ago (a clearly inflated date, but we are interested in relative values, not absolute ones). The only exception in this group is Austronesian, with an mc value of 35. Regardless of the faith we place in glottochronological methods, this low figure indicates that Austronesian shows the profile of a family with fewer than 50 languages, such as Iroquoian (10 languages), Na-Dene (47), Plateau Penutian (4), Mixe-Zoquean (16), or Karićan (29), rather than that of a family with more than 1,000 languages. From the degree of retention of common vocabulary, we can state that Austronesian, at least the Malayo-Polynesian branch that has migrated beyond Taiwan, does not exhibit the characteristics expected of a large, ancient language family.

The lexical conservatism of Austronesian languages, when examined in detail, does not uniformly extend to reconstructions of PAN. There is no evidence of a Taiwanese origin for much of the basic vocabulary that is cited as characteristic of the Austronesian dispersal, such as terms for maritime technology and many of the food plants that have been associated with the Austronesians (cf. Blust 1984–1985; Pawley 2007). Rather, the etymologies for the majority of the plants and maritime technologies that are found in the Pacific can be found in PMP, the generic ISEA entity, and not in PAN, the Taiwan-anchored, reconstructed protolanguage. The linguistic evidence suggests that, having left Taiwan, the Austronesians were exposed to an influx of new material-culture items that were already present in ISEA and were adopted into the expanding Malayo-Polynesian culture(s). This explains why

---

1. Note that this method does not ascribe a glottochronological age to a family but merely evaluates the internal diversity of the family in terms of the lexicon.
Table 2. Measures of lexical diversity in families (from Wichmann, forthcoming)

<table>
<thead>
<tr>
<th>Language family</th>
<th>No. languages</th>
<th>Minimum centuries (mc)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austronesian</td>
<td>1,262</td>
<td>35</td>
</tr>
<tr>
<td>Niger-Congo</td>
<td>1,489</td>
<td>100</td>
</tr>
<tr>
<td>Yeniseian</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>Xincan</td>
<td>4</td>
<td>10</td>
</tr>
<tr>
<td>Plateau Penutian</td>
<td>4</td>
<td>42</td>
</tr>
<tr>
<td>Caddoan</td>
<td>5</td>
<td>33</td>
</tr>
<tr>
<td>South Caucasian (Kartvelian)</td>
<td>5</td>
<td>40</td>
</tr>
<tr>
<td>Chukotka-Kamchatka</td>
<td>5</td>
<td>40</td>
</tr>
<tr>
<td>Moseten-Chon</td>
<td>5</td>
<td>51</td>
</tr>
<tr>
<td>Barbakóan</td>
<td>7</td>
<td>33</td>
</tr>
<tr>
<td>Iroquoian</td>
<td>10</td>
<td>35</td>
</tr>
<tr>
<td>Totonakan</td>
<td>11</td>
<td>26</td>
</tr>
<tr>
<td>Eskimo-Aleut</td>
<td>11</td>
<td>30</td>
</tr>
<tr>
<td>Mixe-Zoquean</td>
<td>16</td>
<td>36</td>
</tr>
<tr>
<td>Salishan</td>
<td>27</td>
<td>45</td>
</tr>
<tr>
<td>Hokan</td>
<td>28</td>
<td>88</td>
</tr>
<tr>
<td>Káriban</td>
<td>29</td>
<td>37</td>
</tr>
<tr>
<td>Khoisan</td>
<td>29</td>
<td>111</td>
</tr>
<tr>
<td>Hmong-Mien (Miao-Yao)</td>
<td>32</td>
<td>40</td>
</tr>
<tr>
<td>North Caucasian</td>
<td>34</td>
<td>60</td>
</tr>
<tr>
<td>Uralic</td>
<td>38</td>
<td>60</td>
</tr>
<tr>
<td>Aléic</td>
<td>40</td>
<td>30</td>
</tr>
<tr>
<td>Quechuan</td>
<td>46</td>
<td>15</td>
</tr>
<tr>
<td>Na-Dene</td>
<td>47</td>
<td>35</td>
</tr>
<tr>
<td>Uto-Aztekan</td>
<td>62</td>
<td>48</td>
</tr>
<tr>
<td>Altai</td>
<td>65</td>
<td>77</td>
</tr>
<tr>
<td>Mayan</td>
<td>69</td>
<td>42</td>
</tr>
<tr>
<td>Tai-Kadai (Daic)</td>
<td>70</td>
<td>30</td>
</tr>
<tr>
<td>Tupian</td>
<td>70</td>
<td>55</td>
</tr>
<tr>
<td>Dravidian</td>
<td>75</td>
<td>40</td>
</tr>
<tr>
<td>Otomanguean</td>
<td>172</td>
<td>60</td>
</tr>
<tr>
<td>Nilo-Saharan</td>
<td>199</td>
<td>150</td>
</tr>
<tr>
<td>Australian</td>
<td>258</td>
<td>95</td>
</tr>
<tr>
<td>Sino-Tibetan</td>
<td>365</td>
<td>60</td>
</tr>
<tr>
<td>Afro-Asiatic</td>
<td>372</td>
<td>113</td>
</tr>
<tr>
<td>Indo-European</td>
<td>443</td>
<td>70</td>
</tr>
<tr>
<td>Trans-New Guinea</td>
<td>552</td>
<td>100</td>
</tr>
</tbody>
</table>

Note. The correlation between number of languages and internal lexical diversity, measured in mc, is significant ($r = 0.35$), but it increases to $r = 0.50$ if Austronesian is omitted.

In contrast to lexical conservatism, we find a “plethora of different systems” of grammar in different modern Austronesian languages outside Taiwan (Ross 1995:64; recent quantifications in Wichmann and Kamholz 2008). No grammatical traits are common to all Austronesian languages (figs. 4, 5); further, grammatical interrelationships between Austronesian language groups follow geographical rather than phylogenetic-subgroup boundaries (Donohue 2007b). A remarkable diversity characterizes the Malayo-Polynesian languages at all levels of their grammar, including phonology, morphology, and syntax; this diversity almost certainly reflects early contacts with pre-Austronesian languages (Adelaar 1995; Capell 1975; Donohue 2004, 2005, 2007b). These contacts show their strongest effects south of the Philippines. Figure 6 shows the locations of different isoglosses defined by contact-induced change in Austronesian languages. Note that, despite the clear boundaries that emerge in this examination of structural similarities, there are no major phylogenetic breaks between the northern languages and the southern ones or between the eastern languages and the western ones. The early recognition of more “Papuan” characteristics in the east of the Indonesian archipelago was stated clearly in the nineteenth century (Brandes 1884:187):

One can distinguish a western and an eastern division in the Malayo-Polynesian languages in the archipelago. The border between the two is a line drawn between Savu and Rote, Flores and the Solor islands, east of Buton, west of the Sula islands, east of Minahasa, the Sangir and Talauld islands, and (east of) the Philippines. 2

Brandes’s division, which closely approximates the heavy dashed line in figure 2A, is based on the then-current understanding of the relative order of the possessor and possessum in a construction such as “the man’s house.” In this phrase, “man” represents the possessor (or “Genitive”), and “house” the possessum (or “N,” in the literature). This English example shows a GenN order, the same order that dominates in Melanesia and surrounding “eastern” areas in Indonesia and East Timor. West of the line, an NGen order is found, as in the Indonesian translation of the same phrase, shown in figure 7. Figure 6 marks the distribution of this typological feature with the green line and shows additional features that evidence the Papuan influence on Austronesian languages in the approach to New Guinea and (less obvious in this map) the Austroasiatic influence on the southwestern languages, as well as the existence of a significant north-south divide in the typology of the languages that cannot be explained phylogenetically.

Contact-induced changes such as these, resulting in the geo-
Austronesian language elements form substrates across wide regions in areas now dominated by Malayo-Polynesian languages, primarily near New Guinea (fig. 1) but also including Borneo, the Malay Peninsula, and Sumatera in the west (Adelaar 1995). The acquisition of Malayo-Polynesian languages by Negritos in the Philippines may provide a model for the adoption of Malayo-Polynesian languages across much of ISEA (e.g., Reid 1994).

Language families, like bacteria or bdelloid rotifers (Arkhipova and Meselson 2000), can form because of the convergence of originally unrelated taxa (e.g., Dagan and Martin 2007). As people abandon their original language and adopt a new one, they preserve some aspects of their original linguistic code as a substrate, creating innovations in different aspects of the grammar of their new language (Bakker 2000; Capell 1975; Dutton 1995; Nettle 2000; Ross 1994; Thurston 1987). During the initial expansion of Malayo-Polynesian, linguistic affiliation derived as much from recruitment of speakers of other languages as it did from “normal” linguistic diachrony involving organic changes and splits. For those languages that owe their Malayo-Polynesian affiliation to shift rather than to generic linguistic evolution, we can identify numerous substratal traces of their earlier linguistic affiliations in their phonologies, such as the presence of implosive stops or gaps for /ŋ/.

Such a process might be likened to the development of regional varieties of a creole, although we do not suggest that this can account for all of the divergence in Austronesian languages, even among the so-called aberrant languages (Pawley 2006). However, the
great numbers of typologically disparate Austronesian languages are consistent with the mechanisms of language shift and abnormal transmission.

Archaeology of the “Austronesians”

We have seen that the genetic and linguistic phylogenies for ISEA are demonstrably discordant. There is insufficient evidence to suggest large-scale replacement, punctuated or otherwise, of preexisting hunting and gathering populations by farming-voyaging immigrants from Taiwan or anywhere else. Although a clearly defined cline may not be anticipated for human dispersal across an archipelago, as opposed to across a continental land mass, multiple molecular markers provide highly variable evidence of the Taiwanese contribution to the genetic makeup of the present-day inhabitants of ISEA. There is no genetic evidence for large-scale population replacement, displacement, or absorption such as that originally postulated for hunter-gatherers by farmers across ISEA (after Bellwood 1997); rather, the evidence is more suggestive of prolonged interaction and mixing among populations across ISEA. Furthermore, there is no clear directionality in the frequency and nature of molecular markers through ISEA away from Taiwan. The same region, however, has witnessed massive language replacement, effected by the dispersal of Malayo-Polynesian languages originating on Taiwan seemingly within the past few thousand years. Archaeological data can potentially shed light on the processes that gave rise to the genetic and linguistic discordance across ISEA, and they will be considered with specific reference to the farming/language dispersal hypothesis proposed for the region (Bellwood 1997, 2005; Diamond and Bellwood 2003).

An initial caveat in considerations of the archaeology of ISEA during the mid-to late Holocene concerns radiometric dating of sites and derived materials. Despite efforts at chronometric hygiene, namely, a method to restrict historical interpretation to those sites and artifacts associated with more
reliable dates (Spriggs 1989), the chronologies of ISEA archaeology are severely limited. Even the most systematic attempts to develop robust chronologies for the occurrence and dispersal of material-culture items, such as pottery (Spriggs 2003, 2007), are plagued by chronological uncertainties. These include a high reliance on material types that can be highly problematic for radiocarbon dating, including bone, marine shell, and artifact residues; evidence of disturbance and mixing; and selective arguments for the rejection or retention of dating evidence (Spriggs 2007). The resultant chronologies for the dispersal of material-culture items across ISEA are problematic and fragile; indeed, they are bedeviled by many of the same uncertainties that have discredited claims for pre-Lapita pig and pottery at sites along the north coast of New Guinea (Spriggs 1996).

There is extremely limited evidence supporting the idea that East Asian farming practices from Taiwan diffused across ISEA approximately 4,000–3,500 years ago, that is, during the initial period of purported Austronesian expansion. Very little suitably aged and taxonomically specific archaeobotanical evidence exists for the domesticated plants that are hypothesized to have dispersed with farming from Taiwan, especially rice (Oryza sativa) and foxtail millet (Setaria italica), or for associated farming technologies and landscape transformations. There is an almost complete lack of domesticated rice dating to 4,000–3,000 years ago in archaeological contexts associated with food processing and consumption across the whole region, except as inclusions in pottery:

All in all, in Island Southeast Asia, there are 23 sites where archaeobotanical sampling has been applied. Only one, Gua Sireh, has reported rice phytoliths from the matrix of the
English  the man’s  house  
Indonesian  rumah  orang  
Tukang Besi  te wunua  nu mia  
Palu’e  ata  nua-n  
Lani  aap  kuname  
Skou  keangku  pâ-kéke  
Kanum  yrye-ne  mwa

Figure 7. Expression of the genitive (i.e., order of elements in possessive phrases) in English and six representative languages of Indonesia. In each case “man” is shown in red and “house” in black. The English phrase codes the possessor before the noun (N) and so shows a GenN order, the same order that dominates in Melanesia and surrounding “eastern” areas. West of Brandes’s line, an NGen order prevails, as in the Indonesian translation of the phrase rumah orang, literally “house-man.” Note that in addition to the overwhelming majority of Papuan languages (such as the unrelated Lani, Skou, and Kanum), eastern Austronesian languages, such as Palu’e, also show the preposed genitive. In addition to the order of the words, different languages also employ other coding strategies, such as marking a noun as being the possessor (green; English’s, Tukang Besi nu, Kanum -ne) or marking features of the possessor on the possessed noun (Palu’e -n, Skou -kéke), approximately signaling “his.”

site. There are at least 36 sites with reported rice inclusions in pottery fabrics; one in Luzon, one in Negros island, one in Sabah (Bukit Tengkorak) and the rest in Sarawak. (Paz 2002:279)

The situation has changed little since Paz’s review, except for recently noted rice remains at Ulu Leang on southern Sulawesi, which may date to ca. 4000 cal BP (Paz 2005:112, 113). The basis for this age has not been fully reported, but it may help resolve chronological uncertainties regarding other putatively early rice remains at this site (Glover and Higham 1996:436–437; Paz 2002:277, 2005:112). At present, the two most reliable and best-dated sites for early rice in ISEA are a charred rice grain inclusion in a pottery sherd at Gua Sireh, western Sarawak, dated to before 4000 cal BP (Paz 2002:277), and organic materials in association with pottery at Andersen, Luzon, that likely date to ca. 3700–3500 cal BP (based on information in Paz 2002:277).

Rice cultivation was well established on Taiwan by at least 4,000 years ago (Bellwood 2005), and numerous words for the plant and associated processing and storage practices have been reconstructed to PAN (Blust 1984–1985; Pawley 2007). Rice cultivation cannot, however, be heavily implicated in the early phases of Malayo-Polynesian language dispersal as conventionally portrayed. Only two sites in ISEA provide potentially early evidence for rice, aside from inclusions in pottery, and only one of these, Gua Sireh, is reliably dated. On the contrary, rice seems more clearly associated with pottery than with agriculture, implying that many of its archaeological occurrences could be derived more from extralocal trade than from local food production (Paz 2002). Significantly, the age of the Gua Sireh finds and the site’s location on Borneo suggest that domesticated rice may have initially entered ISEA from mainland Asia, before its putative dispersal from Taiwan. Furthermore, and arguably, rice became an important staple crop across ISEA only after the advent of open-field farming there, which occurred in the past 2,000–1,500 years (Anshari, Kershaw, and van der Kaars 2001; see Barton and Denham, forthcoming) and potentially much later on some islands.

Similarly, there is a near absence of relevant archaeobotanical evidence for the dispersal of other crop plants likely to have been domesticated on the Asian mainland. An exception is a reported grain of foxtail millet (S. italica), noted as post-dating 3000 cal BP, from Timor (Ian Glover’s research in Bellwood 1997:231). Even taking into account the low level of confidence for this identification (Paz 2002:279), this cereal grain postdates the putative period of early Austronesian expansion into this region; it certainly does not provide supporting evidence for the claimed introduction of an agricultural economy to Timor approximately 4,000 years ago (Bellwood 1997:231).

Evidence for the dispersal of agricultural technology with early Malayo-Polynesian-speaking voyagers is similarly weak. There are examples of farming implements in ISEA with Taiwanese or Chinese affiliations, such as the waisted hoe at
Torongan cave and other stone hoe fragments from the Batanes Islands (Bellwood and Dizon 2005:8, 11). However, the ages of these artifacts are not clearly determined; as reported for the Batanes materials, some are likely to be much more recent on the basis of inferred associations with Iron Age sites on Taiwan (Bellwood and Dizon 2005:11).

Furthermore, there is no clear paleoecological signal of the environmental transformations that might be anticipated to accompany the dispersal of agricultural populations through ISEA between 4000 and 3500 cal BP. Such signals have been discerned for the emergence and transformation of agriculture in the highlands of New Guinea (Haberle 2003). Across much of ISEA, large-scale anthropic disturbance of vegetation is more recent (e.g., Dam et al. 2001; Suparan et al. 2001; van der Kaars et al. 2001) or much earlier, including from ca. 6500 cal BP at Niah on Borneo (Hunt and Rushworth 2005) and from at least 7000 cal BP on Sumatera (Flenley 1988). The interpretation of the human contribution to paleoecological data over the past 5,000 years, however, is complicated by the intensification of El Niño–Southern Oscillation (ENSO) events during this period (e.g., Anshari et al. 2004). Increased ENSO variability, rather than the expansion of agricultural economies, has been cited as the primary cause of increased burning, as well as of the maintenance of the diversity of tropical rain forests, in Indonesia and New Guinea over the past 5,000 years (Haberle, Hope, and van der Kaars 2001).

Given that there is no solid evidence that either farmers or farming spread across ISEA in toto from Taiwan approximately 4,000–3,500 years ago, there is similarly no good reason to assume that the history of the dispersal and adoption of Malayo-Polynesian languages between islands, along coastlines, and later penetrating inland corresponds to the spread and adoption of an associated “cultural package” of new technologies (Denham 2004). Over the past 30 years, archaeologists and linguists have repeatedly revised down, or “unpacked,” the size of the material-culture package that purportedly spread from Taiwan with the dispersal of Malayo-Polynesian languages (compare claims in Pawley and Green 1973 with those in Bellwood 2005 or Pawley 2007). Recent incarnations of the Austronesian-dispersal orthodoxy restrict the Taiwanese material-culture package to pottery, polished stone adzes, shell artifacts, tattooing chisels, and domesticated animals (pigs, dogs, and chickens; Bellwood 2005). Importantly, none of these material-culture types are necessary or unique markers of farming or, perhaps more accurately, horticulture in ISEA. From the emerging archaeological record, however, even this smaller set of remaining elements is not a secure and exclusive archaeological marker of Taiwanese influence or Malayo-Polynesian language dispersal (Anderson and O’Connor 2008).

The earliest records of pottery across ISEA are suggestive of multiple incursions into the region by at least two different styles and traditions, one from mainland Southeast Asia and at least one from Taiwan. Current portrayals suggest that a red-slipped pottery tradition originating on Taiwan dispersed south of the Philippines between ca. 4,000 and 3,600 years ago and then spread eastward to eastern Indonesia (Bellwood 2005; Shutler 1999; Solheim 1964; Spriggs 1989, 2003, 2007). An earlier “cord or baskety-wrapped paddle impressed” pottery tradition appears to have spread from mainland Southeast Asia to Borneo, and potentially other islands, before Taiwanese influences are discerned (see Spriggs 2007). Sparse archaeological evidence and chronological uncertainties suggest that ISEA was a region into which multiple pottery traditions were introduced at different times, although the archaeological record does not yet provide sufficiently high-resolution geographical and temporal information to map the spread and transformation of each pottery tradition through time.

In the absence of historical detail, however, red-slipped pottery is still presumed to be a reliable and verifiable chronological marker that provides a likely maximum age for the influence of Malayo-Polynesian speakers in the region (Spriggs 2007) as well as the precursor of the Lapita pottery tradition in Melanesia from ca. 3,500 years ago (Kirch 2000).

In terms of other claimed components of a Taiwanese cultural package, a range of shell artifact types from Wallacea and Melanesia, including fishhooks, shell beads, and shell adzes—and presumably the technologies required for their manufacture—predate the period of presumed Malayo-Polynesian expansion into those regions (O’Connor 2007; O’Connor and Veth 2005; Swadling et al. 1989; Szabó 2004; Szabó, Brumm, and Bellwood 2007). Of particular significance are Tridacna shell adzes, together with edge-ground stone tools and a fully ground triangular stone “chisel,” from contexts dated to at least 7200–5000 cal BP at the Pamwak rock shelter on Manus Island in Melanesia (Frederiksen, Spriggs, and Ambrose 1993; Golson 2005). Recent genetic characterizations of pig (Sus spp.) populations indicate a spread from mainland Southeast Asia, a region that has been proposed as a center of pig domestication (Hongo et al. 2002), to eastern ISEA before and independent of the arrival of Malayo-Polynesian speakers (Dobney, Cuuchi, and Larson 2008; Larson et al. 2007). Similar trajectories of eastward diffusion were followed at different times by at least one pottery tradition (Spriggs 2003) and, potentially, by rice (see above) and the chicken from their center of domestication in mainland Southeast Asia (Dobney, Cuuchi, and Larson 2008, after Liu, Zhu, and Yao 2006).

On the basis of the archaeological evidence, there was no “cultural package” of technologies that originated on Taiwan and was exclusively—or can necessarily be—associated with the dispersal of Malayo-Polynesian languages in ISEA. Most elements that have been presumed to have diffused with Malayo-Polynesian speakers were already present in ISEA before the appearance of uniquely Taiwanese influences in the archaeological record of that region. Certainly, some cultural items can be sourced to Taiwan, such as nephrite (jade) artifacts, and they are a reliable marker of that island’s incorporation into trade networks to the Philippines from possibly ca. 4000 cal BP, with a much later and wider distribution.
through ISEA from ca. 2500 to 1500 cal BP (Hung et al. 2007). However, different material-culture items and traditions have singular histories of emergence, dispersal, and transformation that do not conflate into a unitary, or even semiporous, cultural package. Consequently, there is no historical imperative to invoke a material-culture package, or Neolithic cultural complex, that was exclusively associated with the dispersal of Austronesian languages from Taiwan.

ISEA was already integrated into exchange networks with neighboring regions before Taiwanese influences, which have been presumed to mark Austronesian language dispersal, become apparent in the archaeological record. Indeed, there is no reason to presume that early Taiwanese influences in the archaeological record of ISEA are necessarily associated with Malayo-Polynesian language dispersal; they may simply represent the incorporation of Taiwan, like parts of mainland Southeast Asia and Melanesia, into a mosaic of exchange networks that stretched across ISEA. The trajectories of Malayo-Polynesian language dispersal may have a separate temporality. Rather than representing the introduction of a new cultural package, the arrival of Malayo-Polynesian speakers in ISEA was more likely to have been associated with, either suddenly or gradually, a new social context that revolutionized the ways in which the mosaic of interaction across the archipelagos operated. Through time, preexisting exchange networks were intensified and expanded, bringing about, in turn, an increasing standardization of traded items and the semblance of a cultural package.

Crop Domestication Histories

In addition to rice (discussed above), the history of Austronesian language–speaking peoples has been intimately associated with a range of plant domesticates. In a seminal paper, Pawley and Green (1973) considered a whole suite of domesticated crop plants to be reconstructible to PAN, including bananas, breadfruit, coconut, rice, sago palm, taro, and yam. However, more recently (Blust 1984–1985; Pawley 2007), the linguistic reconstructions to PAN (Blust 1984–1985; Pawley 2007), the list reconstructed for a Taiwanese PAN has been revised down to include only rice, sugarcane, and giant taro (*Alocasia indica*), reflecting an increasingly sophisticated understanding of the Austronesian phylogeny. These linguistic revisions mirror those unfolding from genetic research into the histories of domesticated crop plants.

Evaluating the data from studies of plant genetics suggests that several staple crops underwent initial, or separate, domestication in the New Guinea or eastern Indonesian region, including bananas (*Musa* ssp.; Carreel et al. 2002), sugarcane (*Saccharum officinarum*; Grivet et al. 2004), taro (*Colocasia esculenta*; Lebot et al. 2004), greater yam (*Dioscorea alata*; Malapa et al. 2005), and sago (*Metroxylon sagu*; Kjær et al. 2004). The early and mid-Holocene processes of use and domestication for these plants remain largely unknown (Denham 2005; Denham et al. 2003; Fullagar et al. 2006), but their histories of domestication and diffusion can be reconstructed in broad terms from a combination of plant genetics, the limited archaeobotanical evidence available to us, and historical linguistics (Kennedy and Clarke 2004).

The unusual genetics of bananas—whereby chloroplast DNA (cpDNA) and mtDNA are inherited maternally and paternally, respectively—enable the lineages and contributions of subspecies and species to be easily tracked for banana cultivar groups, shedding light on the history of their domestication and spread (Carreel et al. 2002; De Langhe and de Maret 1999; Kennedy 2008). For example, several different groups of bananas, including Pacific plantains (Lebot 1999), Western and Central African plantains (AAB), and an East African AAA cultivar (Carreel et al. 2002), trace part of their ancestry to the New Guinean *Musa acuminata ssp. banksii*. Significantly, the two groups of African bananas show different temporal-geographic domestication pathways (Carreel et al. 2002), with the diffusion of plantains to West Africa documented to at least 2,500 years ago (Mbida et al. 2001) and that of a banana to East Africa to ca. 5,000 years ago (Lejju, Robertshaw, and Taylor 2006). Although the archaeobotanical evidence for the identification of bananas in Africa is contested by some (Vansina 2003; cf. Mbida et al. 2004), these findings clearly demonstrate a pre-Malayo-Polynesian time depth for the westward dispersal into ISEA of bananas from the New Guinea region (Denham and Donohue 2009; Kennedy 2008).

A similar scenario, initial domestication in New Guinea with subsequent diffusion and multiple interspecific hybridizations on mainland Asia, has been invoked for sugarcane (Grivet et al. 2004). A term for sugarcane, *CebuS*, reconstructs to PAN (Blust 1984–1985; Pawley 2007), and, like rice, the crop was seemingly on Taiwan before the languages dispersed ca. 4,000 years ago. If the linguistic reconstructions are valid and sufficiently specific chronologically, then we must suppose that sugarcane also moved westward from its home in New Guinea before the Malayo-Polynesian language dispersal into ISEA. This can have been possible only if some pre-Malayo-Polynesian seafarers brought the sugarcane north and west to Taiwan, that is, if the dispersal of food crops across ISEA was not reliant on Austronesian speakers.

In sum, the initial stages of banana and sugarcane domestication, with subsequent diffusion westward, occurred before the appearance of Malayo-Polynesian languages in ISEA. Other relevant food plants of the region reflect varying historical processes despite the absence of great amounts of archaeobotanical information. The genetic characterizations of taro suggest separate domestication events in mainland Southeast Asia and Melanesia, with only limited gene flow between the two regions until recently (Lebot et al. 2004), and so do not provide any evidence for a dominating spread from either the west or the east (and certainly none for a spread from the north). By contrast, the greater yam is thought to have undergone domestication in the New Guinea region, with subsequent widespread anthropic diffusion of cloned cultivars through ISEA, mainland Asia, and Africa (Malapa et al. 2005). Sago palm (*M. sagu*) is similarly thought to have originated.
and been domesticated in Melanesia, with a subsequent westward spread (Kjær et al. 2004).

Importantly, all these staples underwent initial domestication in New Guinea. As with different types of material culture, the variability in the geography of subsequent diffusion indicates that they did not spread together, along the same paths, or at the same time. Specifically, these domesticates did not spread westward from New Guinea across ISEA as part of a single agricultural or cultural package. The successful onward movement of domesticates was dependant on social groups along the relevant exchange networks having some knowledge of the plant-specific husbandry, cultivation, and processing techniques. As plants such as bananas and sugarcane were exchanged and moved across ISEA, they were transformed through intra- and interspecific hybridization and through incorporation into cultivation practices that were widespread, albeit variable, across the region before Malayo-Polynesian language dispersal.

**Disconnecting Genes, Language, and Material Culture**

A recurrent failing of successive portrayals of Austronesian dispersal or origins has been the presumption that the histories of genetics, language, and material culture should to any large degree correlate and follow the same trajectory (as discussed in Terrell 2000b). The consonance of these lines of evidence for ISEA over the past 4,000 years is, at best, unclear; in some cases, there are clear disparities (i.e., between genetic and linguistic evidence) and asynchronies (i.e., for different types of material culture and many domesticated plants). Even the value of red-slipped pottery as a marker of Austronesian language dispersal across ISEA is, on the basis of current evidence (Spriggs 2007), a poorly corroborated claim. Despite several attempts, the isochrones of pottery dispersal are yet to be fixed across ISEA. Even after the chronology of diffusion is determined, red-slipped pottery may mark only the incorporation of Taiwanese influences into the maritime exchange networks of ISEA rather than a large-scale demic, farming, language, or Neolithic dispersal.

In contrast to theories of Austronesian farming/language dispersal, as well as critiques of (Oppenheimer and Richards 2001b) and commentaries on (Anderson and O’Connor 2008) them, we suggest that there was not a single homeland, a single migratory route, a single cultural package, or a single mode of language transmission that spread through ISEA. Equally, complexity cannot be ascribed to two homelands, two migratory routes, or two cultural packages. A radically different type of hypothesis must be considered to account for the observed phenomena.

The linguistic and archaeological records, as well as plant domestication histories, are suggestive of considerable complexity in parts of ISEA before and during the dispersal of Malayo-Polynesian languages from Taiwan; the directionality and chronology of diffusions are unclear or contradictory. Although general regions of origin are largely known, most types of artifact, animal, plant, and technology demonstrate distinctive histories and geographies of diffusion. Consequently, diffusion, which refers to the cumulative movement of ideas and things, must be assumed to have been multidirectional across space, and this diffusion yielded net eastward and westward movements just as much as net southward ones (fig. 8). An interpretation other than one that seeks to identify the homeland is now needed to understand the social and historical processes that account for the widespread adoption of an intrusive language family by, and the variable appearance of material-culture elements among, the widespread and diverse cultures that must have existed in ISEA before the appearance of the Malayo-Polynesian-speaking peoples.

**Maritime Interaction in ISEA during the Holocene**

A long history of maritime interaction can now be reconstructed for ISEA and adjoining regions, including the Asian mainland and Melanesia. Patterns and continuity of interaction similar to those now emerging for ISEA during the early to mid-Holocene are well attested to for the variable interisland movement of people, marsupials, plants, obsidian, stemmed tools, and the enigmatic “mortar, pestle, and figurine complex” in the circum–New Guinea region during the Pleistocene and Holocene (e.g., Araho, Torrence, and White 2002; Summerhayes 2003; Summerhayes and Allen 1993; Swadling and Hide 2005; Torrence and Swadling 2008; White 2004). Given the absence of wholesale population movements (as suggested by the lack of any genetic evidence for replacement), the diffusion of ideas and things must have occurred through socially mediated exchange networks over predominantly short (terrestrial and maritime) and less frequently long maritime distances (after Hughes 1977; Irwin 2008). These exchange networks were probably not continuously operational in either time or space, but they certainly existed in varying forms before, during, and after Austronesian language dispersal from Taiwan (Solheim 1984–1985).

Across ISEA, different peoples had been exchanging, adopting, and transforming various plants, animals, and technologies since the early Holocene, including (1) localized translations of the Sulawesi warty pig (Sus celebensis) to Flores (Dobney, Cucchi, and Larson 2008) and of a marsupial (Phalanger orientalis) from New Guinea to East Timor (White 2004); (2) widespread diffusion of the domesticated pig (Sus scrofa) from mainland Southeast Asia to eastern Indonesia (Dobney, Cucchi, and Larson 2008); (3) widespread diffusion of bananas and sugarcane from the New Guinea region westward to mainland Asia (Denham and Donohue 2009; Kennedy 2008); and (4) potential diffusion of pottery from mainland Southeast Asia to Borneo (Spriggs 2003, 2007). Some movements were idiosyncratic, others more general. Some things, such as taro and some yams (e.g., Dioscorea bulbifera; Lebot 1999), did not move, presumably because they were
Two related topics are keys to understanding how Malayo-Polynesian speakers and some elements of their distinctive material culture became incorporated into preexisting networks of maritime-facilitated exchange in ISEA: the origins of voyaging technology and the rapid appearance of red-slipped pottery across the northeast fringe of the region between 4,000 and 3,600 years ago.

There is nothing uniquely Taiwanese about the outrigger canoe, the technological artifact currently most famously associated with Austronesian dispersal. Linguistically, the term does not reconstruct to PAN (Blust 1984–1985; Pawley 2007), and the vessel has long been presumed to have originated in Wallacea or, potentially, Melanesia (e.g., Horridge 1995). There were maritime movements of material culture, plants, animals, and technologies to, within, and from ISEA and Melanesia before Austronesian language expansion from Taiwan, and it is not unreasonable to assume that the canoes, or their precursors, were used in this exchange. Maritime exchanges also occurred between Taiwan, China, and nearby islands from potentially 4,500 years ago, thought to have been facilitated by bamboo rafts (Rolett, Chen, and Sinton 2000).

The rapid spread of red-slipped pottery, a manufacturing style considered to have spread through ISEA southward from Taiwan, clearly indicates the incorporation of Taiwan into some ISEA exchange networks from ca. 4,000 years ago (Spriggs 2003, 2007). These preexisting exchange networks indirectly linked vast areas and may well have initially remained under the control of non-Austronesian peoples after contacts between ISEA and Taiwan. Without a significant cultural disruption, the existing networks would have enabled the widespread distribution of any new prized item, such as a new pottery style.

Through time, perhaps millennia, more and more parts of these previous maritime networks came to be increasingly dominated by Malayo-Polynesian languages, probably initially in scattered coastal enclaves. Just as different technologies were variously adopted and adapted in ISEA, so too did different peoples in different locales take up an intruder language, to different degrees, as the larger societies in which they participated were increasingly dominated by Malayo-Polynesian speakers.

On the basis of DNA evidence and sexual roles in modern societies, we propose that a small group (or groups) emigrated from Taiwan and intermixed with indigenous populations, leaving an inconsistent genetic trace. The domination that these immigrant groups enjoyed over the preexisting populations was neither numerical nor accompanied by large-scale population movements or replacement. It is unclear why Malayo-Polynesian speakers came to dominate, but an “elite dominance model” (e.g., Best 2002; Spriggs 2003), whereby small groups of politically important men leave a greater genetic signature than their numbers would suggest, can be invoked. Social dominance, as well as the continuation, intensification, and extension of trade networks through time, is linked to control over new trade goods in the network,
perhaps such as red-slipped pottery and some types of polished stone adze, as well as over the knowledge to make them.

The continuation and intensification of exchange through maritime networks and the subsequent ubiquity of items give the illusion of a standardized “Neolithic” cultural package at archaeological sites, despite the disparate sources of many of the items implicated in this “package.” After decades or centuries of increasing exchange and social interaction, numerous items, practices, and kinds of knowledge that may have been locally restricted within or around ISEA became more common, both across space and in their co-occurrence. Thus, dispersed occurrences of “early” artifacts in ISEA and neighboring regions are not archaeological anomalies that require methodological, as opposed to historical, explanation. Similarly, a Taiwanese cultural package, whether Austronesian or Neolithic, is illusory for ISEA as a whole; it did not originate in one place and disperse outward but formed through the increasing co-occurrence of used and traded items by people across ISEA, who were increasingly connected through an expanding network of exchanges.

Social and Historical Contexts of Exchange

Trade is not just about use or exchange value; it occurs between people and establishes or reinforces social relationships (e.g., Mauss 1990). The arrival of people with new material culture, language, technologies, and worldviews can have dramatic impacts on societies; under the right conditions, these impacts can confer a high status on the new arrivals. History is replete with examples of powerful groups dominating larger indigenous populations, with language transfer and the variable adoption of cultural items and practices. The period of European colonial expansion over the past 500 years is simply the most recent and, perhaps, most visible example.

The nature of some of the social processes involved can be illustrated with reference to a historically well-documented example: the arrival of Europeans in highland New Guinea in the 1930s (Connolly and Anderson 1987; Leahy 1991). Small, disparate groups of newcomers were able to dominate much larger indigenous populations through the manipulation of now greatly expanded trading networks and worldviews, reinforced by the use of violence (Swadling 1996). Several items of European introduction to Melanesia had differentially spread through local exchange networks ahead of direct contact, in some cases by centuries, including items of high value and prestige, such as steel axes (Hughes 1977) and a widely adopted staple crop, the sweet potato (Ipomoea batatas; see papers in Ballard et al. 2005). Some intermixing occurred between indigenous populations, Europeans, and accompanying lowland Melanesians. People soon began to learn Tok Pisin, a largely English-lexified creole language that serves as a lingua franca in much of Papua New Guinea (Baker and Mühlhäusler 1996; Laycock 1982; Mühlhäusler 1996), where fewer than six million people still speak more than 800 languages (Lewis 2009). Through time, some local languages have become less important and increasingly replaced by what had previously been a secondary language. Indeed, the increasing use of this language of wider communication in Papua New Guinea has compromised the future of many languages, which are now endangered, prompting educational support in community schools and academic efforts to document them.

Social change in the New Guinea highlands over the past 75 years is not directly comparable to the maritime landscape of ISEA in the mid-Holocene, but the comparison is useful insofar as it highlights some of the social processes that may have occurred in ISEA during the Holocene. In both cases, a small incoming group effected major linguistic and cultural changes without leaving a major genetic signal. Genetically, most populations remained in place, except for a minor overlay derived from newcomers and intermixing reflecting new movements, social interactions, and lifestyles. For instance, the expanded role of Malayo-Polynesian speakers in the trade networks of ISEA may have initiated or intensified exchanges among other social groups and may have been accompanied by a new sociocultural milieu. During the mid- to late Holocene, new material-culture items and associated technologies diffused differentially through exchange networks and were variably incorporated into preexisting practices. Through time, exchanged material-culture items became more widespread and co-occurred with greater frequency, producing the semblance of a cultural package. Also through time, the original languages of ISEA were increasingly replaced by versions of the Malayo-Polynesian lingue franche that were variably adopted by local populations in order to participate in a new social world. Language replacement was effected not by population replacement or absorption but by changing social contexts and practices (Mufwene 2001).

The model of maritime interaction and social transformation in ISEA advanced here accords with the observed data better than other hypotheses, including that of Austronesian farming/language dispersal. Further, we have shown that the various lines of evidence, both individually and taken together, require us to suppose a series of viable networks connected by maritime technology, trading a range of commodities and ideas. Given that we must posit these technologies and innovative exchanges in ISEA before the advent of the Malayo-Polynesian-speaking peoples, considerations of parsimony require us to question the need to posit a Taiwan-initiated advance in food, material, and maritime technologies. The continued transformation in social contexts during the late Holocene furthered linguistic and cultural homogenization through the maintenance and intensification of maritime exchange networks, the spread of Indic civilizations, and later Islamization and European colonialism (e.g., Reid 1995; Supomo 1995).

The “Austronesian dispersal” cannot be considered to have been a single expansionary process from Taiwan through the islands to its south, let alone east to Polynesia (contra Dia-
We have proposed an alternative historical framework that focuses on the ways that Taiwanese, mainland Southeast Asian, and Melanesian influences, as well as those from within ISEA, were transformed through time and across space. The social dynamics underlying Malayo-Polynesian language dispersal through previously inhabited regions of ISEA and Melanesia (Green 2000) were almost certainly fundamentally different from those driving the colonization of uninhabited islands in the Pacific.

Of broader significance, the Austronesian dispersal has been promoted as an archetype of the farming/language dispersal hypothesis. Our discussion demonstrates the inability of that hypothesis to account for the distribution of genes, languages, and material culture across ISEA over the past 4,000 years. We have proposed an alternative, more complex hypothesis drawing on the distinctive histories of each line of evidence and the social contexts of exchange across ISEA. Consequently, the presumed consonance of genes, language, and material culture, and the suitability of the farming/language dispersal hypothesis to other historical and geographical contexts, such as the Bantu expansion in sub-Saharan Africa, should be progressively challenged.

Acknowledgments

Thanks are due to Huw Barton, Geoff Hope, Peter Kershaw, David Mitchell, Andrew Pawley, Victor Paz, Martin Richards, Malcolm Ross, and Matthew Spriggs for answering queries and to the Centre of Southeast Asian Studies at Monash University for providing an opportunity to present our research. We also thank four Current Anthropology referees for constructive criticism of earlier drafts and Kara Rasmanis, Uri Gilad, and Kay Dancey for their help preparing our figures.

Comments

Peter Bellwood
School of Archaeology and Anthropology, Australian National University, Canberra, Australian Capital Territory 0200, Australia (peter.bellwood@anu.edu.au). 21 V 09

This “nuanced” but misinformed paper denigrates the farming/language dispersal hypothesis by associating it with imagined concepts of “wholesale replacement,” “large-scale human migration,” and “mass migration,” concepts not required by the clinal models of population dispersal that I prefer (Bellwood 1997, 2005; the authors quote both books but appear to have read neither with due attention). The genetics discussion is dominated by haploid molecular clock–based assumptions, ignoring current criticisms (Cox 2005, 2008). The statement that only 20% of modern mtDNA and NRY (non-recombining Y chromosome) variation reflects Austronesian dispersal in ISEA is guesswork in the absence of ancient-DNA analysis and any reliable molecular dating method for the Holocene (Ho et al. 2007). Austronesians do not “mimic, genetically, any non-Austronesian populations with which they are in contact.” There are no such populations beyond peripheral regions of Vietnam, peninsular Malaysia, Near Oceania (especially New Guinea), and Madagascar.

In terms of linguistics, the Malayo-Polynesian (MP) “tree” has long been observed to be a rake (Pawley 1999), indicative of rapid multidirectional dispersal, thus explaining why Proto-MP cannot be sourced to any specific extra-Taiwan region. The authors offer no new insight here. Subsequent high levels of interaction between MP-speaking populations in ISEA have led to high levels of lexical retention. Austronesian beyond Taiwan results from a recent, rapid, and multidirectional dispersal, mostly within the past 3,500 years, or Wichmann’s (forthcoming) 35 minimum centuries. Why should it be expected to “exhibit the characteristics expected of a large, ancient language family,” when it is not ancient at all?

The suggestion that MP languages spread by “varying degrees of linguistic shift,” with new lexicon grafted onto pre-existing non-Austronesian languages, is grossly overdone. Why are there not far more non-Austronesian enclaves surviving in ISEA, as there are in western Island Melanesia, where such a language shift is implied by the higher levels of lexical diversity? “Elite dominance” simply does not work and lacks historical analog. The recent spread of Tok Pisin in Papua New Guinea is due to imposition of a language in colonial and modern circumstances in which hundreds of mutually unintelligible languages are spoken. At least two millennia of precolonial trade and interaction in New Guinea, famous to anthropologists since Malinowski and before, led to no significant lingua franca formation. Were language shift to be the true explanation, then surely all the peoples of New Guinea would have shifted to MP languages 3,000 years ago.

The archaeological records for Taiwan and the northern Philippines, unquoted by these authors, are rich in artifactual (but not yet economic) detail, assisted by large numbers of 14C dates (Bellwood and Dizon 2008; Bellwood et al., forthcoming; Hung 2008). There is no network of preceramic interaction hiding here or in the Moluccas, Borneo, or Sulawesi. Excepting claims for Timor Leste, there is no good evidence (and the authors offer none) that cord-marked pottery, shell fishhooks, cut-shell beads, and shell adzes predate Malayo-Polynesian arrival in ISEA, given the widespread use of old shell for making artifacts and the propensity of these artifacts to migrate through or be cached within cave strata (Bellwood 2009). Pigs did not spread from mainland Southeast Asia before they spread from Taiwan into the northern Philippines (Piper et al. 2009). The authors lack knowledge of the archaeologies of Vietnam, Borneo, and certainly Taiwan, where the gradual development of red-slipped pottery as a dominant style was well established between 4500 and 4000 BP, long before such pottery appeared to the south (Hung 2008). The Taiwan “cultural package” is certainly not illusory in the northern Philippines (Bellwood and Dizon 2008).
Bemoaning the “lack of domesticated rice dating to 4,000–3,000 years ago,” the authors fail to note the lack of searching with appropriate techniques. Little phytolith or starch research has yet been done in ISEA, and the archaeology is dominated by caves, reluctant locales for food production. Coastal Neolithic village sites in ISEA are likely to be buried beneath many meters of redeposited sediment (Bellwood et al. 2008). Lack of evidence in circumstances lacking suitable recovery techniques cannot be proof of absence.

The Austronesian cognate vocabulary for food production and increasing numbers of reports of rice in pottery and as phytoliths, even when identifiable charcoal macroremains are absent, leave little room for any nonfarming argument for early MP-speaking colonists. Suggestions that bananas, sugarcane, greater yam, and sago might have been domesticated in Melanesia, especially New Guinea, are not here disputed, but the only “archaeological evidence” presented for their early domesticated occurrence in ISEA consists of a controversial claim for banana phytoliths in a site in Uganda.

The paper finishes by denigrating the ability of the farming/language dispersal hypothesis to account for the distribution of genes, languages, and material culture across ISEA over the past 4,000 years. But this hypothesis remains the best explanation for the observed situation (Bellwood 2009). The MP language spread occurred mainly as a result of population movement (Ross 2008), not elite dominance.

**Murray P. Cox and J. Stephen Lansing**

Institute of Molecular BioSciences, Massey University, Palmerston North 4442, New Zealand (m.p.cox@massey.ac.nz)/Department of Anthropology, University of Arizona, Tucson, Arizona 85721, U.S.A. (lansing@santafe.edu). 28 V 09

As the influential statistician George Box once noted, “all models are wrong, but some are useful” (Box 1979:202). This statement is not mere semantics: models are by necessity simplifications of the real world; they can be considered useful only if they tell us something new. While Donohue and Denham rightly warn about the dangers of entrenched views, their own model of Indo-Pacific prehistory is neither new nor simple, nor, more importantly, is it particularly useful.

Despite claiming differences of opinion, Donohue and Denham’s idea that “material culture [and language and genes] dispersed through ISEA from multiple sources along a mosaic of regional networks” is remarkably similar to earlier themes. As far back as 1988, John Terrell advocated a related outlook: that Indo-Pacific prehistory revolved around “interlocking, expanding, sometimes contracting and ever-changing set of social, political, and economic subfields” (Terrell 1988:647). Such general concepts have understandable appeal: they capture the complexity of human society in a way that simple models do not. Unfortunately, such generalities are not necessarily right, and, more importantly, they are not often very useful.

A good model should be simple (i.e., reduce the complexity of the world), explicit (i.e., use stable, well-defined concepts), and, most importantly, testable (i.e., have clearly defined outcomes). These ideals are not readily apparent in Donohue and Denham’s work, primarily because concepts like a “mosaic of regional networks” are not sufficiently concrete. Did Indo-Pacific populations interact equally across geography and time? (Greenhill and Gray [2005:34] would call this a “maximally interconnected network.”) Or, as we suspect Donohue and Denham intend instead, did Indo-Pacific populations interact in very specific ways at very specific times in very specific places? If so, when exactly were those times, and what exactly were those places?

Herein lies the rub. The out-of-Taiwan model is so easy to criticize precisely because it is relatively simple, explicit, and testable. It has clear expectations: we can distinguish when data fit the model and when they do not. Conversely, Donohue and Denham’s model is sufficiently imprecise that it cannot readily be evaluated. The charge leveled against Terrell’s earlier incarnation applies: such an “anything goes” model risks being “vague to the point of uselessness” (Lum’s comment in Terrell, Kelly, and Rainbird 2001:116).

By way of example, the out-of-Taiwan model is commonly criticized for its insistence on correspondences between interdisciplinary data sets (such as genetics and language). Amusingly, the initial stimulus behind this now-lengthy debate (Terrell and Fagan 1975) was the finding of just such a statistical association between \(\gamma\)-immunoglobulin diversity and language affiliation in New Guinea (Giles, Ogan, and Steinberg 1965). However, this discovery was no mere fluke: over the past 40 years, similar associations have been found on geographical scales both large (e.g., Cavalli-Sforza et al. 1988) and small (e.g., Lansing et al. 2007).

The latter case is particularly informative: the study examined genetic and linguistic diversity in 532 men from eight small communities on Sumba, an island in east Indonesia less than 200 km across. Under the out-of-Taiwan model, we might expect a rapid Austronesian expansion to have left specific signals in modern communities: they should carry some Asian contribution and have a mid-Holocene origin, and we might also observe remnants of shared linguistic/genetic heritage. This is exactly what we find. Around a quarter of Sumbanese men carry Asian Y chromosome lineages; Bayesian coalescent inference, a particularly robust form of molecular dating, indicates that their villages are less than 5,000 years old; and the proportion of male Asian ancestry correlates significantly with villages’ retention of Proto-Austronesian cognates. Expectations under Donohue and Denham’s model are much less clear, but it seems unlikely that long-standing regional networks could produce a combination of patterns quite like these.

For those who dislike the tenacity of the out-of-Taiwan model, the reason seems obvious: there is no meaningful al-
ternative. Clearly, some early ideas were wrong (any expansion did not result in complete replacement), but equally clearly, some ideas were right (several genetic markers do trace back to Taiwan). Rather than yet another personal take on Pacific prehistory, what we need now are good alternative models: simple, explicit, and testable. What expectations do these produce for Sumba? How do expectations differ between models? No matter if these new models turn out to be wrong: in the meantime, it would at least be very helpful if they were useful.

Waruno Mahdi
Fritz Haber Institute of the Max Planck Society, Faraday-weg 4-6, D-14195 Berlin, Germany (mahdi@fhi-berlin.mpg.de). 9 VI 09

Donohue and Denham present a challenging reappraisal of the Malayo-Polynesian dispersal, also reexamining the role of non-Austronesians in ISEA culture history and reinspecting the farming/language dispersal hypothesis. The Malayo-Polynesian dispersal hypothesis adapted repeatedly to newer insights: a successively developing “out-of-Indochina” model (Heine-Geldern 1932; Kern 1889; Schmidt 1906) gave way to the “out-of-Taiwan” (Chang, Grace, and Solheim 1964) model currently under discussion. The dispersal is a baffling subject, having been linear in neither its linguistic, genetic, nor cultural aspect. However, if the manifestations and consequences of that nonlinearity previously remained inadequately appreciated, the present treatment perhaps oversimplifies them.

Modern humans inhabited ISEA long before the Holocene, but the rising sea (14,000–10,000 BP; Dunn 1970) caused migrations from inundated lowlands. Besides increasing population diversity and density (encouraging plant domestication) at both ends, Indochina and New Guinea, retreating populations would often be trapped on temporary islands; only those who learned to cross the sea survived (Mahdi 1988). The authors thus rightly stress early to mid-Holocene development of maritime interaction and the resulting diffusion of cultural artifacts and irregular distribution of genetic markers. Equatorial populations of inundated regions also reached Taiwan, implying that the later Malayo-Polynesian dispersal included their descendants. Whether genetic traces of this southward movement are discernible before the background of their earlier northward migration is unclear.

In terms of former racial concepts, ethnologists distinguished darker-skinned “Proto-Malays” and lighter “Deutero-Malays,” as having, respectively, a greater and a lesser equatorial admixture (cf. Bylmer 1943). A similar distinction was made by the Malayo-Polynesians, with two distinct protoforms for “person” (Mahdi 1994b). Intensive contacts emanating from western ISEA since 2000 BP could explain why distribution of genetic markers linking Polynesia with Taiwan “is not prominent in ISEA.” Nevertheless, indigenous Taiwanese are reported to be genetically closer to the population of ISEA and Oceania than to that of the mainland (Lin et al. 2005).

Language subgrouping based on exclusively shared innovations requires that the considered cognate sets include only inherited forms (not borrowings). But Malayo-Polynesians are notorious for long-distance contacts, and there was, moreover, a systematic source of noise. Malay-speaking seamen spanned ISEA since 200 BCE–200 CE (Solheim 1980)—transporting spices from Maluku to the Malayan Peninsula, India, and China—and sailed through the Philippines to China before 300 CE (Mahdi 1994a, 1999a, 1999b). This resulted in borrowings across group boundaries and in misleading secondary sound correspondences, with fateful consequences for eliciting a structured phylogeny of Western and Central Malayo-Polynesian. Until this is conclusively resolved, it inevitably creates a misleading impression of “propagation of Malayo-Polynesian languages . . . without direction or hierarchy.”

Borrowing also camouflages the separate status of Central-Eastern Malayo-Polynesian: several “almost-exclusive” innovations have cognates only in Sulawesi and the Philippines, but their distribution suggests that they represent a remnant substratum of the former southward movement of Central-Eastern Malayo-Polynesians (Mahdi 1994b). Malayo-Polynesian is only one of several highest-level branches of Austronesian, and a “significant break between PAN and PMP” is relevant only if demonstrated to be substantially greater than those between PAN and Atayalic or between PAN and Proto-Tai-Kadai (grouped under PAN; Sagart 2005). So altogether, the apparent inconsistencies in the linguistic picture do not disprove an out-of-Taiwan dispersal.

With regard to the material-culture record, equatorial climatic conditions required significant adaptations. The daily photoperiod was too short for japonica rice (Grist 1959), while Zimmermann (1992) concluded that rice-cultivating “Proto-Malays” settled the highlands because of the more suitable soil (Mahdi 1994b). Adapting the rice variety to the tropics and littoral immigrants to a highland habitat required time. Malayo-Polynesians of the first wave depended on locally available staples, learning from the indigenes they encountered. The authors correctly stress the role of the latter in domestication and distribution of the cultigens but perhaps underestimate the adaptive ability of Malayo-Polynesians.

Farming by Malayo-Polynesians as well as by indigenes must have been the decisive factor underlying maritime contact and exchange. Thus, stressing the role of indigenes and the importance of contact and exchange does not dismantle the farming/language dispersal hypothesis altogether but modifies it, by appreciating the reciprocal role of indigenous farming.

Watercraft likewise gained central importance, but the outrigger canoe was not the original Malayo-Polynesian watercraft. That was the double canoe (Doran 1981; Mahdi 1999a; also Mahdi 1988, 1994b). A distribution area, beginning in China (Mahdi 1994b, 1999a; Needham, Wang, and Lu 1971), stretches over ISEA to Oceania and also to India and Sri Lanka
(among others, Doran 1981, fig. 40; Mahdi 1999a, fig. 5.4). But this too apparently involved exchange, even of actor identities. Thus, seafaring Sama-Bajau and Orang laut were typically Negritos, and Malay speakers were described in Chinese sources as “black and naked” (Mahdi 1999a; Pelliot 1925). Meanwhile, there are hunter-gatherers of distinct Mongolid appearance in the interior of Kalimantan (Sellato 1994; Sercome and Sellato 2007). Therefore, Donohue and Denham rightly modify the farming/language dispersal hypothesis in a second way, by allowing for interchange of immigrants and indigens in various roles.

The linguistic data do not contradict a Malayo-Polynesian language dispersal from Taiwan, but the authors’ genetic and culture arguments indeed strongly indicate a more active role of indigens in that process.

Stephen J. Oppenheimer
Institute of Cognitive and Evolutionary Anthropology,
School of Anthropology, Oxford University, 64 Banbury Road, Oxford OX2 6PN, United Kingdom (stephen .oppenheimer@anthro.ox.ac.uk). 5 VI 09

Paradigms, especially old ones, die harder than Bruce Willis. (James Adovasio 1999)

The “express train to Polynesia from Taiwan” paradigm has a contentious 34-year history (Shutler and Marck 1975). Donohue and Denham, like Shutler and Marck a linguist-archaeologist team, without directly challenging the arguments for an Austronesian linguistic homeland in Taiwan, question its whole relevance to Southeast Asian and Oceanic demography, culture, and prehistory. What is new, and what will hopefully have most impact in shifting the logjam in the field, is that now there is a linguist leading the challenge.

Why should a single discipline matter so in what is necessarily a multidisciplinary field? Simply because the archaeologist paradigm-champions made it so. Donohue and Denham aptly quote Bellwood’s tautology “the question of Austronesian origins is basically a linguistic question”; this is more malapropism than tautology, based on the conviction that languages, genes, and culture move hand in hand to invade and replace (Diamond and Bellwood 2003). Combined with the oft-stated stricture that only linguists and like-minded archaeologists are qualified to comment on Austronesian (AN) linguistics, this idea has locked the issue up from objective review by anyone but an inner circle for well over a generation. For these arcane reasons, voices from the humanities guilds of linguists and archaeologists doubting the adequacy of the emperor’s old clothes will resonate better than any number of raggedy dissenters from other disciplines, however objective and informed their critiques.

Donohue and Denham commence their linguistic reassessment with the old dissenters’ truism that “the ‘Austronesian dispersal’ might better be termed a ‘Malayo-Polynesian [MP] dispersal,’ since nine of the 10 primary subgroups of Austronesian are attested to only on Taiwan and only the Malayo-Polynesian branch has members outside Taiwan (and none on mainland Taiwan)” and then proceed, with evidence, to collapse the hierarchical MP tree, also removing its north-south, west-east directional nature, questioning even the validity of the Central-Eastern- and Eastern-MP branches. The MP tree thus increases from 25 to 30–40 primary branches, of which Proto-Oceanic may be one, and ends up looking less like a tree than a scatter bomb with no identifiable point of dispersal, although their evidence points geographically to eastern Indonesia (pace Dyen 1965). By showing that “the impression of a graduated dispersal of Malayo-Polynesian languages south from Taiwan does not hold up and must be rethought,” they kick out the language support from the archaeolinguistic orthodoxy and puncture recent lexicostatistical claims to reproduce and date those stages in a multitiered hierarchy (Gray, Drummond, and Greenhill 2009).

Taking another dissenters’ leaf, they point out the fact that “there is no evidence of a Taiwanese origin for much of the basic vocabulary that is cited as characteristic of the Austronesian dispersal, such as terms for maritime technology and many of the food plants that have been associated with the Austronesians.” This observation is not new, also applies to faunal terms, and long ago was shown as a hole (e.g., Oppenheimer and Richards 2001a) in the cognate lists of Blust’s seminal homeland paper (1984–1985), where less than a third of any PMP cognates reconstruct in Taiwan. This back-to-front linguistic picture fits with their cited archaeological and genetic evidence that the same items are prior Southeast Asian innovations, again already reviewed in the literature (e.g., Oppenheimer 2006). However, their linguistic perspective also implies a massive influx (up to 68%) of borrowed lexicon in Island Southeast Asia if Taiwan was the true homeland. This perspective is not taken account of in their characterization of Austronesian as a lexically conservative family, although they have made this estimation for the effect of similar non-AN borrowing in Melanesia. For instance, of Blust’s (1984–1985) cognate set, only 32% of those that reconstruct in Taiwan survive in Proto-Oceanic, by contrast with the 56% survival for PMP cognates (88% in Blust [1993:245]), making only PMP conservative.

A couple of flies buzz around this excellent paper. The authors claim that their reconstructive approach to the issue is new, which it is in respect of the illuminating linguistic perspectives, but their claim that dissenters “have been unable to address all aspects” is disingenuous, since most of the rest of their archaeological and genetic arguments, though sound, are extensively discussed and prefigured in their cited dissenting literature (see also Oppenheimer 2004, 2006; Oppenheimer and Richards 2001a, 2002). They claim novelty for several insights, such as the importance of maritime networking, effectively omitting full acknowledgement of Solheim’s seminal work (2006), and the complexity of interactions, previously stressed by Terrell (1988) and caricatured by
his opponents as “confused.” Even the claim that dissenters were too concerned with the relevance of language and homelands is overstated (e.g., Oppenheimer 2004; Oppenheimer and Richards 2002). That was the orthodox camp. Finally, they seem ambivalent about the linguistic significance of red-slipped pottery, acknowledging the absence of a clear link but sometimes relying on it as evidence.

I thank Martin Richards, John Terrell, Mark Donohue, and Tim Denham for helpful comments on mine.

Victor Paz
Archaeological Studies Program, University of the Philippines, Diliman, Quezon City, Philippines (victor.paz@up.edu.ph). 1 VI 09

Donohue and Denham address head-on an ongoing discourse on early Island Southeast Asian (ISEA) history and propose an alternative way of looking at the state of knowledge in three fields. The paper engages the dominant farming and language dispersal hypothesis (FLDH) as represented in the Austronesian dispersal, which explains the processes involved in the transformation of culture within a time depth of about 5,000 years by using data from linguistics, archaeology, and genetics. The authors review the latest studies and find the Austronesian expansion hypothesis wanting in answering the complexities of past human cultures around the mid-Holocene in ISEA. My own views on the topic have close affinity with the spirit behind the article. I agree with the authors on some points, differ on others, and have more sympathy for the Austronesian-spread hypothesis than they do.

There are strong arguments in the paper. It presents how complicated are the dynamics between the various data sets used to answer questions about the human past—clearly showing that these data sets are more often than not hard to whip into cadence—while still underscoring the importance of pursuing multiple disciplinary lines of inquiry. I also agree that the default thinking for understanding cultural history in ISEA should not be that cultures developed in isolation before interacting; it should rather be that cultures developed while interacting with other cultures from the very beginning.

It is significant to me that the authors did not strongly challenge the historical linguistic conclusion on the Austronesian homeland, concentrating instead on the nature of the spread and eventual dominance of this language family across ISEA and the Pacific, which they then use to question the reasoning of the FLDH. This tells me that it is still a relevant challenge to know the sequence of language formation, especially within the Malayo-Polynesian languages. The genetics data review highlights the significance of the small percentage of Taiwan-based markers found in the current ISEA population. It is, however, not clear to me whether this conclusion was due to sampling strategies or to methodological limitations of modern population genetics in revealing fine-grained images of past populations. I also have reservations about the view that interaction without population movement is sufficient to change languages. In the Philippine experience, for example, the power and prestige in the hands of a few native speakers of Spanish or English did not change the languages of the Philippines from Austronesian to Indo-European in the past 400 years; this may have something to do with the small population size of native speakers. If we assume that cultures were already interacting at the very beginning, the possible advantage of the Austronesian-speaking cultures over others may be based on a suite of cultural and technological know-how that island populations saw fit to adopt at various points in a long series of interaction.

The seeming simplicity of the FLDH may be misleading to critics. It has been expounded on and transformed by advocates, especially in its ISEA application, in response to new data and in engagement with basic research. For example, from a main hypothesis that cereal agricultural was the engine for population movement and culture spread, Bellwood (1995:108–110) has postulated at least seven interrelated explanations as to why people moved, including a possible role for an early form of marcher culture.

The claimed “new historical framework” for understanding the nature of culture change in the mid-Holocene in ISEA is not necessarily new. The emphasis on “the mosaic of regional networks and the social processes” has already been articulated in a way very close to the description presented here (see Meacham 1984–1985, 1995; Solheim 1969, 1990, 2006). The approach is fresh, however, in that it works within the same methodological frame in which the dominant FLDH is based and not just in a dominantly single-discipline data set.

I see the discourse on the nature of mid-Holocene ISEA culture as married to the very problematic archaeological period label “Neolithic.” A serious assessment of what “Neolithic” means in ISEA is much needed, and this work is a contribution in that direction. For starters, I think that Austronesian-speaking cultures did not simply encounter small bands of hunter-gatherers as they moved through the landscape. There is a small but growing data set from my own research and that of colleagues that seriously suggests the possibility of a pan-ISEA existence of much more complex societies that, at least, were maritime, had a developed suite of shell material culture, perhaps had non-cereal-based agriculture that had existed before and had interacted with Austronesian-speaking cultures.

I posit that the early spread of Austronesian-based cultures may not necessarily be well represented in observed ISEA cultures. I am also looking at the possibility that the more significant pattern coming from the twinning of data sets reflects much later interactions and confluences, perhaps from around the time of population movements of Austronesians with developed rice agriculture, metallurgy, and intricate pottery production. Much is yet to be reflected on and learned, making basic research in our region ever more exciting.
The core of the paper is a new and stimulating treatment of the linguistics of ISEA. The treatments of genetics and archaeology seem built on much flimsier foundations. In part, this is because trying to catch a “moment” in historical genetics is almost impossible, given that there are frequent revisions of interpretation and continuing problems of inadequate sampling of relevant populations.

Historical genetics presents a very immature disciplinary profile compared to both archaeology and linguistics for the region. Thus, we can have the “origin of the Lapita complex” solved by a study of people in the East Sepik region on the north coast of Papua New Guinea (Vilar et al. 2008), a population that almost certainly derives from a westward Austronesian expansion that, on archaeological evidence, arrived only sometime around 1,700–1,500 years ago! Similarly, Friedlahender et al. (2008) “contribute to a resolution of the debates over Polynesian origins and their past interactions with Melanesians” by choosing, almost without exception, populations in the Bismarcks from areas where there is either no evidence of Lapita occupation or clear evidence of post-Lapita catastrophic vulcanism and subsequent population replacement. The modern populations are thus almost completely irrelevant in consideration of the problem they are seeking to resolve: the ISEA contribution to the settlement of the Pacific.

Problems of interpretation do not stop there. Donohue and Denham quote a most interesting paper by Excoffier and Ray (2008) to explain the apparent link between indigenous Taiwanese and Polynesians as being due to genetic “surfing,” where originally low-frequency alleles can reach high frequencies during rapid population expansion. But the paper makes clear that there is a major equifinality problem in the interpretation of genetic data in historical terms. The equally plausible explanation for the link is, of course, that the original “signal” of the expansion remains clear in both Taiwan and Polynesia but has been obscured by later population replacement or mixing in areas in between.

This is, in fact, exactly what seems to have happened linguistically as well, and again current situations may be poor guides to past ones. But Donohue and Denham do not seem to draw the obvious conclusion. There may be much mixing and substratal influence in ISEA Austronesian languages, but this has likely occurred over the past 3,000-plus years, after the population wave had passed through to the east en route to Polynesia. Delineating such influence is interesting, but it is again irrelevant to the problem they are seeking to address, which is primarily about the conditions under which Austronesian languages and putatively associated sets of material culture spread across the region in the second millennium BC. Their view could be tested by comparing the structures of reconstructed protolanguages for slightly later-settled areas to the east, such as Proto-Oceanic (POc) or later subgroups in the island Pacific beyond any possible direct substratal influence. There is also another underutilized resource: the two remotest ISEA Austronesian languages, those of the Marianas and Palau, settled from ISEA simultaneously with or even slightly earlier than Lapita in the Bismarcks and presumably not subject to a great deal of later Southeast Asian linguistic influence. Do they show the required substratal influences? I doubt it. So genetic support is fickle, and the early Malayo-Polynesian (MP) languages that were involved in subsequent spread into the Pacific were neither near-creoles nor MP-lexically-but-something-else-structurally, as Donohue and Denham portray them.

For the archaeology, the immediately pre-Neolithic period in ISEA is critical, as they suggest, but at present the evidence of the long-distance preadapted exchange networks that their model requires is lacking. The diffusion of crops of New Guinean origin to the west in pre-MP times doubtless took place, but it may have done so over a long period and with initially no great implications for the societies involved. It was the combination of plants and domestic animals that was revolutionary, along with a developed boat technology that we know must have existed in ISEA for the 3500 BP or earlier open-ocean crossing to the Marianas. Add in the pottery, polished stone adzes, distinctive shell artifacts, and tattooing chisels noted by Donohue and Denham—and one could add other features, such as the jar burial complex (Bedford and Spriggs 2007)—and it still looks like a “package” to me.

There are many positive aspects of the paper, too. The flattening of MP linguistic subgroups between Proto-MP and POc better explains the almost instantaneous archaeological dates for Neolithic spread across much of ISEA around 3800 BP than does Blust’s (1995) earlier subgrouping: I wish I had had this paper in front of me when I last considered the relationship between Austronesian spread and archaeology across its range in a paper written in 2006 (Spriggs, forthcoming). Contrary to their hope, however, there may still be a need for an Eastern MP or at least some node between PMP and POc, as there is a pause between the earliest Neolithic dates for the Philippines, Sulawesi, and the Lesser Sundas, at about 3800 BP, and dates for the earliest Lapita sites in the Bismarcks, at around 3350 BP.

John Edward Terrell
Field Museum of Natural History, Chicago, Illinois 60605, U.S.A. (terrell@fieldmuseum.org). 30 V 09

If a generation is taken to be 25 years long, then two generations of archaeologists working in the Pacific have been working with, or under, the same interpretative paradigm. This abiding source of inspiration has been comparative historical linguistics, a field of intellectual expertise with a lengthy
pedigree in Western scholarship that effectively reached the university scene in Hawai‘i, New Zealand, and Australia after World War II, concurrently with the arrival of academically trained archaeologists at the same universities.

There is no doubt that research done on Pacific prehistory over the past 50 years, inspired by the formulae and logical procedures of comparative historical linguistics, helped jump-start modern archaeological work in Oceania after the war. It is no secret, however, that I think this paradigm outlived its effectiveness years ago.

Instead, I have been preaching (I am sure this is how some have seen my own contributions to this journal, written with several of my colleagues) that the ancient Pacific, seen in human terms, is an “interlocking, expanding, sometimes contracting and ever-changing set of social, political, and economic subfields” (Terrell 1988:647), a playing field, so to speak, where people have taken up different positions, at different times, traveling different distances, and perhaps from different directions to play often similar although somewhat different games.

Critical to this perspective is the idea that isolation between settlements, islands, and even archipelagoes has rarely been so absolute that new rules, discoveries, fashions, inventions, or genetic traits could not be shared, passed along, traded back and forth, or, for that matter, stolen if thought worthy, wonderful, pleasing, or desirable. Also important is the idea that the people involved in each instance could have come from down the road, across the bay or valley, or from just over the hill. They did not have to be people who lived far away in some unknown homeland in southern China or Taiwan.

The metaphor of a playing field only partly captures this interactive perspective on the past, which is why more than 20 years ago I also suggested, borrowing a metaphor from Darwin, that Pacific prehistory could be seen as an “entangled bank” (Terrell 1988), a suggestion since then widely misunderstood and often maligned (Terrell 2000a). Therefore, while it may be just wishful thinking, I am delighted to find Donohue and Denham saying much the same thing when they write about “prolonged interaction and mixing among populations across ISEA,” and emphasize “the mosaic of regional networks and the social processes prevalent in ISEA before and during the spread of Austronesian languages and cultural influences from Taiwan.”

I would, however, quibble somewhat about their choice of wording. A “mosaic” is a tessellated picture or pavement. Opting for this metaphor could be read as saying that human diversity is a jigsaw puzzle of different entities (“societies,” “cultures,” and the like) rather than “an interlocking, expanding, sometimes contracting and ever-changing set of social, political, and economic subfields.”

Nor do I think that using the word “mimic” to describe why it is that neighboring Austronesian and non-Austronesian speaking communities are often genetically similar is likely to be helpful. This word choice makes it sound as if what has been at play, genetically speaking, is some form of Batesian mimicry rather than love and marriage or the commonplace but less sanctioned—although still highly interactive—alternatives to either or both.

I also have a substantive quibble. Was Taiwan the Proto-Austronesian homeland because this is “where nine of the ten first-order subgroups are found”? Taiwan is a beautiful island, and not a small one as islands go. But until someone explains why there are so many top-notch subgroups there (and why not all of them, pray tell?), I will be skeptical. Why did this degree of diversity develop there? Why has it been maintained there for so many millennia? Why should this diversity, however highfalutin, be seen solely as a sign of great age rather than as a sign also that there is something noteworthy about Taiwan as a social, ecological, and political realm?

Nonetheless, Donohue and Denham have given us a data-rich, compelling, and radical reinterpretation of prehistory in island Southeast Asia. I never thought I would live to see the day when a linguist and an archaeologist working in the Pacific would team up to write jointly, for example, “language families, like bacteria or bdelloid rotifers, can form because of the convergence of originally unrelated taxa.” I do not think that even George Grace would go this far, and shockingly few Pacific archaeologists have ever seriously challenged the historical truth value of the methodological simplifications that are built into the comparative method and have for far too long provided too many with easy and compelling but implausible reconstructions of Pacific prehistory.

Robin Torrence
Anthropology Department, Australian Museum, 6 College Street, Sydney, New South Wales 2010, Australia
(robin.torrence@austmus.gov.au). 20 V 09

First impressions gained during European expansion have heavily influenced research agendas for Pacific and ISEA archaeology that underlie models for the spread of Austronesian languages. This welcome and convincing critique of the pervasive Austronesian farming-language dispersal model overcomes many, but not all, of these biases. First, Cook (and successors) was especially taken by the Polynesians, with their fair skin and hierarchical society (“just like us”), but was horrified by the unruly Melanesians. Since then, scholars have been obsessed with human colonization of the remote reaches of Polynesia and uncomfortable with imagining how the seemingly less sophisticated Melanesian cultures could have contributed to the achievements of their eastern cousins. This focus also meant that archaeologists have sought a single explanation for Polynesia, one that involves simple, directional change, and have been less concerned whether it was equally applicable to the enormous and highly diverse region encompassed by Austronesian languages. Several commentators noted that the “Polynesian tail wagging the dog” (e.g., Allen 1991) prevented new ideas about the peopling of the Pacific
and the spread of Austronesian languages, but the farming-
language dispersal model ("one size fits all") has continued
to dominate research and thinking, even for ISEA.

The second consequence of European exploration is an
assumption that since New Guinea was always separate cul-
turally from its ISEA neighbors, the movement of Austron-
esian language/ceramics/pigs/etc. required a singular, one-
way event. This misguided view also derives from historical
circumstances. After Europeans took control of the Spice Is-
lands, long-term contacts to the west were significantly dis-
rupted, creating an unusual period of isolation of ISEA from
New Guinea and beyond. As the Donohue and Denham re-
results now make brilliantly clear, modern international bound-
daries did not operate in the past (cf. Swadling 1996).

Two of the authors’ approaches are integral for their suc-
cessful overhaul of the language-farming hypothesis. First,
independent studies of the genetic, linguistic, and archaeo-
logical data using distinct and specific methods relevant to
each field of study have efficiently unpacked the model. Since
their analyses show that genes, languages, agriculture, and
technologies moved at different speeds, directions, and tim-
ings, it is clear that social processes were the key motor. This
is an important theoretical shift from the vague notion of
"progress" underlying agriculture as a prime mover. Second,
they note that seemingly directional changes can accrue over
long time periods. Their paper makes it abundantly clear that
a supra-island social entity fueled by frequent communication
and exchange was built up slowly. This diffuse nest of social
networks was not coterminous with a single language/genetic
group. Its existence has been overlooked because of the as-
sumption that cultural groups were isolated and because it
operated on a greater spatial scale than is generally studied
by linguists and anthropologists.

Donohue and Denham’s effective criticism of the language/
farming dispersal model encourages reinterpretations of ISEA
and Melanesian prehistory that consider supraisland social
networks. Their use of Australian colonization of the New
Guinea highlands as an analogy for the spread of Austronesian
language and the Neolithic cultural package, however, shows
that there is still a need to shed Eurocentric biases. Their
thinking is flawed because it uses landlocked groups, like the
original Renfrew dispersal theory they dispute, in contrast to
the maritime universe that they stress fits ISEA. The Donohue
and Denham model also suffers because it is fundamentally
based on notions of power relations between visitor and local
communities derived from recent colonial society in New
Guinea. In this highly risky and unstable environment, where
natural disasters (volcanoes, tsunamis) are frequent and wide-
spread, the maintenance of external links was essential for
continual reproduction of small groups. Since transport was
easy and quick but potentially perilous, people could achieve
prestige by returning safely from beyond the horizon with
mates, resources, and "wealth" (Renfrew 1993) that might
stimulate the adoption of novel ideas/languages/objects. Over
the long run, a semblance of homogeneity could be generated
across a region.

A brief example will highlight the potential for new inter-
pretations of prehistory that follow Donohue and Denham’s
identification of a supra-aisland social entity. My focus on peo-
ple actively seeking innovations to bring back home might
explain the rapid distribution of red-slipped pottery within
ISEA and the Bismarck Archipelago. It echoes Allen and
White’s (1989:142) proposal that “the craft of pot making
was first acquired by some aceramic voyagers” rather than
introduced by foreigners. More recently, Torrence and Swad-
ling (2008; cf. Torrence et al. 2009) argued that wide-scale
social networks of the sort implied by Donohue and Denham
provided the structure through which the practice of red-
lipped ceramics could have spread initially. The concept of
“adventurers,” driven by competition for status, who return
novelties to their home communities rather than impose them
on others, adds the missing process from previous ideas. With
Eurocentric biases removed, prehistory in ISEA and the Pacific
has a bright future.

Reply

The comments on our paper are thoughtful, diverse, and well
received; they variably offer criticism, lend support, and sug-
gest new lines of inquiry. Inevitably, our response focuses on
criticisms. However, we acknowledge the predominantly pos-
itive reaction of most commentators and look forward to
pursuing some of their thought-provoking suggestions.

Foremost, we do not claim to be the first either to critique
the farming/language dispersal hypothesis in the Austronesian
context or to propose an alternative metanarrative focused
on maritime social networks within ISEA. Our arguments
follow and augment but are different from those made pre-
viously by Solheim, Meacham, Terrell, Oppenheimer, and
Richards. As Paz notes, ours is a “head-on” multidisciplinary
assault on and revision of ISEA history during the Holocene.
The strengths of the argument derive from our examination—
in disciplinary isolation and in multidisciplinary combina-
tion—of the historical implications of genetic, linguistic,
archaeological, and crop plant data for ISEA during the Ho-
locene. Ours is a new synthesis intended to provoke a new
challenge.

We do not question the hypothesis of a Taiwanese origin
for the Austronesian languages; indeed, recent work adds fur-
ther credence to the idea that this island was the most likely
homeland of Austronesian languages (Ross 2009). We ques-
tion the extent to which the dispersal of Austronesian lan-
guages from Taiwan can be linked to the demic dispersal of
farming or a "Neolithic revolution" across ISEA. Explicit or
implicit assumptions of linkages between genetics, linguistics,
and archaeology are pervasive in "Austronesian culture his-
tory” and continually lead to problems of interdisciplinary circularity.

Some commentators demonstrate a continual slippage between archaeological evidence and linguistic interpretation to present an inclusive historical metanarrative. The two lines of evidence are continually deployed in self-referential and interchangeable ways for mutual support. There is no explanation of why agriculture, the purported “Neolithic” package, and Malayo-Polynesian languages necessarily spread together; they are merely assumed to have spread together. Our argument, by contrast, has been carefully crafted to ensure that different lines of evidence are neither conflated nor used interchangeably. We consider each line of evidence separately and then compare them to assess accordance or discordance.

Illustrating the problem of slippage, Spriggs suggests that an Eastern-MP subgrouping should be retained because of “a pause between the earliest Neolithic dates” for ISEA and the earliest Lapita sites in the Bismarcks. His use of archaeological evidence to justify a linguistic interpretation is predicated on a major assumption, namely, that an archaeological artifact (effectively, red-slipped pottery) can be used to closely track language dispersal in the past. The veracities of this particular link, as well as of overarching conceptions of farming/language dispersal and Neolithic spread, are left unexamined. In our article, we open these assumptions up to examination and find them wanting.

As several commentators note, there are major problems with the application of historical genetics in ISEA. These include the absence of “any reliable molecular dating method for the Holocene” (Bellwood, contra Cox and Lansing), the “methodological limitations of modern population genetics in revealing fine-grained images of past populations” (Paz), and disciplinary immaturity and equifinality (Spriggs); all conspire against a unified picture. Our review highlights the lack of clear and significant genetic clines from Taiwan across ISEA. Indeed, no unequivocal reconstructions of human migrations within ISEA during the Holocene emerge from the human genetics of contemporary populations; various studies detect different signals and reach different conclusions, depending on geographical scale of analysis, locale, molecular marker, and interpretative stance. At best, genetic signals across ISEA are “fickle” (Spriggs).

There is general agreement on the need to revise current interpretations of the phylogeny of Austronesian languages (see Mahdi, Oppenheimer, and Spriggs), although several minor linguistic issues are raised. Spriggs suggests that the non-Taiwanese features of the grammars of Malayo-Polynesian languages may be due to borrowing rather than substratal influences. We note that substratal properties might reflect borrowing early in the history of a language or language shift. Given the nature of the properties we discuss and the massive replacement of vocabulary (see our discussion of Wichmann’s measure and the replacement rates highlighted in Oppenheimer’s response), we tend toward the language-shift hypothesis. Following Spriggs’s comments, we confirm that Chamorro and Palauan, the Austronesian languages of the Marianas and Palau, show evidence of substratal influences that must have been acquired before their migration east from the Philippines area (Donohue 2007b). Similarly, while we agree with Spriggs that Proto-Oceanic is well-established within Malayo-Polynesian, it is defined by a series of irregular changes and has a strongly “Papuanized” grammar, indicating nonorganic developments in its history.

We reiterate that the genetics of Austronesian-speaking populations need not be different from those of non-Austronesian-speaking populations in regions of contact (Mona et al. 2009). Bellwood circumlocutiously concurs by implying that such populations occur in several peripheral regions, namely, all of those places in which Austronesian and non-Austronesian speaking populations are juxtaposed. As Terrell notes, the word “mimic” implies an intentional act, whereas we intended to characterize unforeseen, cumulative effects.

Cox and Lansing reaffirm the purported correspondence between genetics and language in ISEA at both large and small scales. Given the problems outlined above, it is not surprising that there are few others who still maintain that there are significant correspondences between Austronesian languages and Taiwanese genetic signals at the large scale in ISEA (e.g., Capelli et al. 2001), with similar reservations in other regions (e.g., Heggarty 2007). At the small scale, Cox and Lansing throw down the Sumba gauntlet, even though, a priori, a pattern between language and a genetic marker on one island cannot be extrapolated to be symptomatic of a whole region. On Sumba itself, we note the discordance between linguistic and genetic data sets for the island (based on information in Lansing et al. 2007): the linguistic “homeland” of Austronesian language dispersal on the island shows the lowest rates of occurrence of the Y chromosome haplogroup (O) that is claimed to be diagnostic of Austronesian farmers.

How do we account for the geographical variability in genetic markers and linguistic associations across ISEA? It seems improbable that a “simple” model (following Cox and Lansing), albeit one that is “explicit and testable,” will do; ease of utility is no measure of veracity. At the same time, we assert that the mosaic of social interactions that we are proposing as a conceptual framework for understanding ISEA is no less explanatory or testable than a seemingly unitary hypothesis. To quote Bellwood (2002:27), “No claim is being made that only farmers ever dispersed through already-inhabited areas in prehistoric times, or that only farmers ever spread large language families. . . . No claim is being made that all early farmers were obliged to undergo expansion” (emphasis in original). Campbell (2002) points out that language families associated with agriculture show the same frequency of spreading as those that are not. In short, the farming/language dispersal hypothesis does not provide a testable model for ISEA or elsewhere, because ultimately, the key factors in determining spread of language families are not the presence or absence of agriculture but rather “historical contingency and opportunity” (Bellwood 2002:27).
Archaeology is concerned with elucidating the complexities of human \( (\text{pre}) \text{history} \) through observed traces of material culture. As such, it is ideally situated to shed light on the social and historical complexities that underlie the geographical variability of genetic-linguistic accordance/discordance in ISEA. As has long been realized, spatial correlations are often methodologically problematic and, even when valid, require explanation (Gould 1970). In this case, we must elucidate the \( (\text{pre}) \text{histories} \) of social exchange, interaction, and practice within ISEA that account for the observed genetic, linguistic, and archaeological phenomena.

Of greatest significance is that the farming/language dispersal hypothesis is devoid of archaeological and paleoecological evidence to indicate the spread of farming across ISEA from Taiwan. Many Malayo-Polynesian speakers were agricultural; this conclusion is apparent from historical linguistic evidence and accords with archaeological evidence from Taiwan. Malayo-Polynesian speakers contributed to the range of plant exploitation practices within ISEA, as did the people living there and those from mainland Asia and Melanesia. The chicken, dog, and pig were initially domesticated in Asia and then brought into ISEA, but the archaeozoological evidence does not indicate that they were all brought at a single time or along a single route, namely, via Taiwan.

None of the commentators present evidence to bolster an argument for the spread of farming from Taiwan. The lack of archaeobotanical evidence for rice is claimed by Bellwood to result from a lack of microfossil (phytolith and starch analyses) applications in ISEA contexts. This is a sleight of hand (see Paz 2005). Rice is frequently detected from macrobotanical remains at archaeological sites in mainland East Asia and yet is seldom found, except as inclusions in pottery, at purportedly early “Austronesian” or “Neolithic” sites in ISEA. Although the absence of evidence is not evidence of absence, it certainly cannot be used in support of something, namely, farming.

Most commentators agree with, and Mahdi and Paz elaborate on, our notion of pre-Malayo-Polynesian cultivation in ISEA, which is implied from the dispersal of vegetatively propagated plants. Our argument for this is not founded solely on the controversial evidence of banana from Uganda (Lejui, Robertshaw, and Taylor 2006), as Bellwood claims (see papers in Denham, De Langhe, and Vrydaghs 2009). Spriggs concludes that these forms of horticulture had “no great implications for the societies involved.” He considers the combination of plants and domestic animals carried by Malayo-Polynesian-speaking, “Neolithic” farmer-voyagers to be the source of truly revolutionary change. There are two problems with Spriggs’s argument: conceptual and evidential. Conceptually, his interpretation carries echoes of a “people without history” (Wolf 1982), whereby not much happened before the arrival of Malayo-Polynesian speakers; real \( (\text{pre}) \text{history} \) seemingly begins with the “Neolithic.” Such views exhibit a strong Eurocentric inheritance (raised by Torrence), and, further, Paz problematizes the application of the concept “Neolithic” in the ISEA context.

Evidently, there is no multidisciplinary evidence of revolutionary socioeconomic or cultural changes across ISEA at the supposed time of Malayo-Polynesian language dispersal, whether fast train, slow boat, or pulse paused. If the plants and domestic animals carried by these early farmer-voyagers were such important drivers of change, why is archaeological and paleoecological evidence of these revolutionary transformations so elusive? More dramatic evidence of agricultural expansion, as well as more ubiquitous cultural remains, occur millennia later (as Paz notes). Even if “early” rice and domesticated animal remains are found at the occasional site in ISEA, such fragmentary evidence is consistent with introduction via multidirectional exchange networks and adoption within, as well as transformation of, preexisting practices and social forms. As Mahdi eloquently states, greater consideration is needed of the “reciprocal role of indigenous farming.”

Preceramic maritime interactions within ISEA, as well as with and within neighboring Melanesia, are clear (Bulbeck 2008; Torrence and Swadling 2008; White 2004). An increasing body of evidence from archaeology and historical linguistics indicates that several elements of the putatively Malayo-Polynesian cultural package either were already in ISEA before Taiwanese influences or were introduced from elsewhere; these traits include voyaging technology, some domestic animals, at least one pottery style, numerous crop plants, non-cereal-based agriculture, and shell material culture (see Mahdi’s and Paz’s comments). Taiwanese influences were probably strongest in the northern Philippines, just as Melanesian influences were strongest in eastern Indonesia; these patterns are products of distance-decay effects across socially constructed space. Although distinctively regional material cultures persisted, a seeming material-culture “package” consisting of originally indigenous and exotic traits formed in ISEA through a partial homogenizing process of social interaction, exchange, adoption, and transformation. Items were assimilated into Malayo-Polynesian languages within ISEA, and Malayo-Polynesian speakers took these words and things to, as well as exchanged them with, places outside ISEA.

We have not questioned a Taiwanese origin for red-slipped pottery, but as Torrence has noted, it need not have dispersed solely with Malayo-Polynesian people or languages. To allay any ambivalence on this matter (noted by Oppenheimer), the spread of red-slipped pottery should not automatically be equated with or used as a proxy for the spread of farming, a language family, or people in ISEA. There are no presumptive correspondences: farming ≠ red-slipped pottery ≠ language ≠ people. Each element has its own historicogeographic expression; sometimes these elements co-occur, and sometimes they do not.

Torrence takes us to task for using the recent colonial experience of New Guinea as an analogue of processes on islands in ISEA during the Holocene. The analogy was designed to be a heuristic illustrative of “some of the social processes”
involved and should not be read literally. Her criticism is founded in terms of our use of a landlocked example, whereby we fail to capture the appropriate maritime qualities needed to understand ISEA during the Holocene. We accept these criticisms.

To sum up, we are not proposing an alternative hypothesis, simple or otherwise, to “model” human interaction over the Holocene period in a pancontinental region; we are seeking to recast the whole multidisciplinary narrative. None of the comments cause us to question our primary conclusions. Various incarnations of the farming/language dispersal hypothesis fail to provide an historical narrative to account for the distribution of genes, languages, and material culture across ISEA over the past 5,000 years. “Austronesian dispersal,” whether fast, slow, or pulse paused, was not a single expansionary process from Taiwan through ISEA and eventually onward to Polynesia. We propose an alternative interpretative framework that focuses on the social dynamics through which Taiwanese, mainland Southeast Asia, and Melanesian influences, as well as those from within ISEA, were transformed through time and across social space.

—Tim Denham and Mark Donohue

References Cited


Bellwood, Peter, Geoffrey Chambers, Malcolm Ross, and Hsiao-chun Hung. Forthcoming. Are “cultures” inherited? multidisciplinary perspectives on the origins and migrations of Austronesian speaking peoples prior to 1000 BC. In Investigating archaeological cultures: material culture, variability and transmission. Ben Roberts and Marc van der Linden, eds. Dordrecht: Springer. [PB]
———. 2008. Austronesian cultural origins: out of Taiwan, via the Batanes Islands, and onwards to western Polynesia. In Past human...
Bellwood, Peter, James J. Fox, and Darrell Tryon. 1985. The Austro-
______. 1995. The Austronesian homeland: a linguistic per-
Bellwood, Peter, and Colin Renfrew, eds. 2002. Examining the farm-
ing-language dispersal hypothesis. Cambridge: McDonald Institute for Archaeological Research.
Bellwood, Peter, Janelle Stevenson, Eusebio Dizon, Armand Mijares,
Gay Lacsina, and Emil Robles. 2008. Where are the Neolithic land-
sapes of Ilocos Norte? Hukay (Manila) 13:25–38. [PB]
land Archaeological Association.
______. 1984–1985. The Austronesian homeland: a linguistic per-
______. 1993. Central and Central-Eastern Malayo-Polynesian. Oce-
______. 2005. The linguistic macrohistory of the Philippines: some speculations. In Current issues in Philippine linguistics and anthropo-
Campbell, Lyle. 2002. What drives linguistic diversification and lan-
guage spread? In Examining the farming/language dispersal hy-
pothesis. Peter Bellwood and Colin Renfrew, eds. Pp. 49–63. Cam-
bridge: McDonald Institute for Archaeological Research.
Capelli, Cristian, James F. Wilson, Martin Richards, Michael P. H. Stumpf, Fiona Gattaix, Stephen Oppenheimer, Peter Underhill, Vincenzo L. Pascali, Tsang-Ming Ko, and David B. Goldstein. 2001. A predominantly indigenous paternal heritage for the Austrone-
Chow, Rachel A., Jose L. Caeiro, Shu-Joo Chen, Ralph L. Garcia-
Cox, Murray P. 2005. Indonesian mitochondrial DNA and its op-
position to Pleistocene era origin of Proto-Polynesians in Island Southeast Asia. Human Biology 77(2):179–188. [PB]
Dagan, Tal, and William Martin. 2007. Ancestral genome sizes specify the minimum rate of lateral gene transfer during prokaryote evo-
Dam, Rien A. C., Jennie Fluin, Papay Suparan, and Sander van der Kaars. 2001. Palaeoenvironmental developments in the Lake Ton-
dano area (N. Sulawesi, Indonesia) since 33,000 yr BP. Palaeo-
De Langhe, Edmond, and Pierre de Maret. 1999. Tracking the banana: its significance in early agriculture. In The prehistory of food: ap-
Denham, Tim, Edmond De Langhe, and Luc Vrydaghs, eds. 2009. History of banana domestication. Special issue, Ethnobotany Re-
search and Applications 7:164–380.
Denham, Tim, Simon G. Haberle, Carol Lentfer, Richard Fullagar,
Judith Field, Michael Therin, Nick Porch, and Barbara Winsbor-
Diamond, Jared, and Peter Bellwood. 2003. Farmers and their lan-
Dobney, Keith, Thomas Cucchi, and Gregor Larson. 2008. The pigs of Island Southeast Asia and the Pacific: new evidence for taxo-


Donohue and Denham


Hung, Hsiao-chun. 2008. Migration and cultural interaction in southern coastal China, Taiwan and the northern Philippines, 3000 BC to AD 1. PhD thesis, Australian National University, Canberra.[PB]


Malapa, Roger, Gemma Arnau, Jean-Louis Noyer, and Vincent Lebot. ——. 1999. Y es, there were bananas in Cameroon more than 2000 years ago. InfoMusa 13(1):40–42.


——. 2004. Yes, there were bananas in Cameroon more than 2000 years ago. InfoMusa 13(1):40–42.


O’Connor, Sue, and Peter Veth. 2005. Early Holocene shell fish hooks from Lene Hara Cave, East Timor establish complex fishing technology was in use in Island South East Asia five thousand years before Austronesian settlement. Antiquity 79:249–256.


———. 2006. Archaeology and culture in Southeast Asia: unravelling the Nusantao. Quezon City: University of Philippines Press. [SIO, VP]


———. Forthcoming. “I was so much older then, I’m younger than that now”: why the dates keep changing for the spread of Austronesian languages. In A journey through Austronesian and Papuan linguistic and cultural space: papers in honour of Andrew Pawley. John Bowden, Nikolaus Himmelmann, and Malcolm Ross, eds. Canberra: Pacific Linguistics. [MS]


