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## The Prehistory of the Austronesian-Speaking Peoples: A View from Language

Robert Blust<sup>1,2</sup>

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*Prior to the European colonial expansions of the past several centuries the Austronesian (AN) language family had the greatest geographical extent of any on earth, including in its territory areas that had never previously been settled. Although predominantly distributed in a tropical or subtropical environment, AN-speaking peoples exhibit a wide range of physical types, material cultures, and types of social and political organization. This paper addresses ways in which linguistic comparison can contribute toward answering such questions as the following: Where was the AN homeland? What was the nature of early AN material culture, social and political organization? What can we infer about early AN pathology? How did early AN speakers view the spirit world? It concludes with a discussion of culture loss, many examples of which can be inferred both from the Pacific and from insular Southeast Asia.*

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**KEY WORDS:** Austronesian; Pacific; Southeast Asia; linguistics; culture-history.

### INTRODUCTION

The existence of a language family which extends over much of tropical Asia and the Pacific was recognized as a byproduct of the European colonial expansions of the Age of Exploration. By 1600 Dutch navigators re-supplying in Madagascar en route to what is today Indonesia commented explicitly on the striking similarity of Malagasy with Malay, the lingua franca which served them in all of the major ports of island Southeast Asia (Houtman, 1603). A century later Hadrian Reland (1708), drawing on de-

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fective and partially mislabeled vocabularies collected by the Dutch voyager Jacob Le Maire in western Polynesia in 1615, indicated that Malay-like languages also extend eastward into the Pacific. Finally, during the second voyage of James Cook (1772–1775) vocabularies were collected from various parts of Polynesia and Melanesia, and it was determined that this still unnamed language family reaches from the western edge of the Indian Ocean to the eastern Pacific (Forster, 1778).

In 1838 Wilhelm von Humboldt proposed a name for this far-flung collection of languages: “Malayo-Polynesian,” from the name of the best-known language in island Southeast Asia and the best-known group of languages in the Pacific. In 1906 the Austrian linguist and ethnologist Wilhelm Schmidt suggested “Austronesian” (“southern islands”) as a substitute which avoids the unwanted implication that the Austronesian (AN) languages of Melanesia are not to be considered legitimate members of the same family as Malay and the Polynesian languages. As will be seen below, both terms are used today, but with different designations.

Although important pioneering work in comparative Austronesian linguistics was carried out by such Dutch scholars as H. N. van der Tuuk and Hendrik Kern in the nineteenth century, the first systematic reconstruction of Proto-Austronesian phonology and vocabulary was that of the German medical doctor and linguist Otto Dempwolff (1934–1938; Blust, 1988). The major contributions to lexical reconstruction since that time are Milke (1961, 1968), Grace (1969), Blust (1970, 1973, 1980b, 1983/1984, 1986, 1989), Zorc (1971), Pawley (1976), Tsuchida (1976), Mills (1981), and Geraghty (1990).

Apart from some Dutch work in Indonesia, little archaeology of any significance was done anywhere over this enormous region until the second half of the twentieth century (see references in Bellwood 1979, 1985). As a result, linguistic comparison offered a window on the past in the Austronesian world long before archaeological research was sufficiently advanced to provide an alternative perspective. Over a century ago the “Wörter und Sachen” (words and things) technique, sometimes called “linguistic palaeontology”, was applied to Austronesian lexical data by Kern (1889); a more recent treatment is that of Blust (1976). The past two decades have seen an increasing awareness by archaeologists of the role that linguistic inferences can play as a supplementary tool and sometimes even as a set of guiding hypotheses for the prehistorian concerned with questions of cultural continuity and change (cf., e.g., the papers in the special issue of *World Archaeology* for June 1976, and more recently the special session on “language, anthropology and archaeology” at the World Archaeological Congress 3, held in New Delhi December 4–11, 1994, where some 57 papers were presented on this narrowly focused topic).

In the time that has passed since making my initial commitment to write the present article in 1989 two other summaries of AN culture history have appeared (Pawley and Ross, 1993; Zorc, 1994). The former, while presenting a thorough review of the published literature and an excellent discussion of the relationship of method to results, enters into very few substantive details. The latter, while reveling in detail, includes a great deal of material that can hardly be called culture-historical, either for purposes of identifying a distinctive physical environment or for elucidating the manner in which the human community coped with it (e.g., terms for “cold” and “warm” weather, “fog”, “dust”, “thunder” and “lightning”, “sink/drown”, “earth”, “smoke”, “touch lightly on the shoulder”, “think/consider”, etc.). I hope here to steer a middle course between these contributions, keeping general issues of method and purpose in mind, but also noting enough detail to pique the interest of the areal archaeologist.

## METHOD

Because I am writing for nonlinguists, I will confine myself to a discussion of results, generally without entering into the supporting arguments or underlying methods which have given rise to them. Nonetheless, a few brief remarks on method probably are essential.

Historical linguistics depends for its results on two fundamental and by now well-tested claims about the nature of language: (1) The relationship between sound and meaning is largely arbitrary, and (2) sound change is largely regular. The first of these claims was first clearly enunciated by Saussure (1959), and the second by various of the Neogrammarians during the last three decades of the nineteenth century. Both have been challenged in various ways, but both remain as pillars of linguistic method.

Like everything in Nature, language changes. In time words come to differ in shape and perhaps also in meaning. Since sound change is regular, the differences in the sound shape of words are systematic, and permit the original forms to be reconstituted with a rather high degree of confidence. The procedures followed in such reconstitution of prehistoric forms are collectively known as the Comparative Method. Where we have documentary checks, as in comparing the modern Romance languages with their immediate common ancestor, Latin, we are encouraged that even in the absence of documentary support our results will not ordinarily go far wrong.

The application of the Comparative Method to related (cognate) words by a process of triangulation results in a reconstruction of the sound system and vocabulary of an earlier language, called a proto-language. To illustrate with three simple examples, Malay *laŋit*, Samoan *laŋi*, Hawaiian

*lani* “sky”, Malay *taŋis*, Samoan *taŋi*, Hawaiian *kani* “weep”; and Malay *mata*, Samoan *mata*, Hawaiian *maka* “eye” show recurrent correspondences of sound in words of related meaning, and so are assumed to derive from (reflect) a common ancestral form in each case, conventionally preceded by an asterisk to show that it is based on inference, not on observation. For our purposes here (leaving out information that can be supplied only by the aboriginal languages of Taiwan), these forms can be reconstructed as \**laŋit* “sky”, \**taŋis* “weep” and \**mata* “eye”.

The reconstructed vocabulary of a language provides information about the codified experience of its speakers. Since experience includes both the world of sensory perception and the world of cognitive construction, reconstructed vocabulary may be used to draw inferences both about the physical environment and the culture of those who used it. A part of the corpus of inferences which can be drawn from the study of reconstructed vocabulary is independently testable through other lines of evidence (archaeology, palynology, physical anthropology, genetics, etc.).

Proto-languages can themselves give rise to other proto-languages which may in turn give rise to extant, or historically attested languages. Thus, Proto-Indo-European, probably spoken around 6000 B.P., gave rise to a number of daughter languages from which the modern branches of this language family descend. One of these prehistoric descendants was Proto-Germanic, spoken about 3000 B.P. Proto-Germanic in turn divided into three known prehistoric daughter languages, Proto-North Germanic, ancestral to the Scandinavian languages, Proto-West Germanic, ancestral to English-Frisian and Dutch-German, and spoken perhaps 2200–2300 B.P., and Proto-East Germanic, ancestral to the historically attested but now extinct Gothic.

Since proto-languages may themselves give rise to other proto-languages, it is essential that we understand not just that the languages which we compare are related, but more precisely the degree of relationship between them. This is the problem of linguistic subgrouping, and it may be compared roughly to a family tree in personal genealogy, or to a cladogram in biological taxonomy. Subgroups are defined by exclusively shared innovations, that is, changes which are most simply and plausibly explained as the result of single events in a prehistoric language which continued to diversify and transmit the results of these changes to its descendants. Shared similarities which are retained from the common ancestor of the entire group have no value as markers of exclusively shared history (Greenberg, 1957; Ruhlen, 1987).

With these general remarks as a guideline we can now turn our attention to the AN language family.

## THE AUSTRONESIAN HOMELAND

Language families have a geographical distribution. Where this distribution is compact, as with the North Caucasian or Chukchi-Kamchatkan languages, the question of a homeland or primary center of dispersal is of minor interest. In widely distributed language families such as Indo-European or Austronesian, however, the homeland question is of primary importance for understanding directions of migration and of cultural change.

The homeland of a family of languages is inferred to be the area of highest diversity in number of primary branches (hence earliest splits), not individual languages (hence latest splits). It is critically important not to identify diversity with number of sample units (in this case languages), but rather with number of primary classificatory divisions (in this case subgroups). Sapir (1968) called the area of greatest diversity the “linguistic center of gravity” of a language family; this notion was formalized by Dyen (1956), who referred to the guiding principle of historical inferences based on language distributions as the “principle of least moves”. Much the same type of conceptual framework was developed independently in botany by Vavilov (1931).

Serious work in subgrouping the AN languages did not begin until Dempwolff (1937) drew attention to evidence for a large eastern subgroup now widely accepted and commonly known as “Oceanic”. The most comprehensive subgrouping of AN languages is that of Dyen (1965), who based his conclusions on the then relatively new and untested technique of lexicostatistics. Dyen concluded that the lexicostatistical evidence supports an inference that the AN homeland was in the area of New Guinea and the Bismarck Archipelago. This conclusion was adopted by Murdock (1964), who constructed a speculative culture history that today cannot be taken seriously by linguists, archaeologists, or physical anthropologists.

The problem with Dyen’s results is fundamentally a problem with lexicostatistics itself: Linguistic subgroups can be firmly established only when based on innovations that are exclusively shared by a subset of languages. What lexicostatistics provides is a simple distance measure which is indifferent to *how* quantitative differences arose, and hence to the critical distinction between innovations and retentions. As a result lower than average retention rates are interpreted as indicating greater separation time even when contradicted by evidence of exclusively shared innovations, a common occurrence among the Oceanic AN languages of Melanesia (cf. Grace, 1985). It is worth noting that much the same debate can be found in evolutionary biology in recent years between proponents of cladistics (corresponding to subgrouping by exclusively shared innovations) and numerical taxonomists (those who use simple distance measures such as lexicostatistics).

My views on AN subgrouping have been published elsewhere (Blust, 1977, 1978, 1993a, 1995), and will not be defended here. The single most important point to note is that the 14 remaining aboriginal languages of Taiwan probably fall into at least six primary branches of the entire AN language family, and that all of the estimated 900 to 1,200 non-Formosan AN languages belong to a single enormous subgroup, now generally known as “Malayo-Polynesian” (MP). Within the MP subgroup the fundamental split separates Western MP (WMP; Philippines, western Indonesia, mainland Southeast Asia, Madagascar, and Palau and the Marianas of western Micronesia) from Central-Eastern MP (CEMP; eastern Indonesia, Melanesia, Micronesia except as qualified above, Polynesia). By far the most important CEMP subgroup is Oceanic, comprising over 450 languages in coastal New Guinea and the insular Pacific.

In accordance with the “principle of least moves” it follows that the most likely homeland of the AN languages was on Taiwan, although it was not necessarily confined to that island. From Taiwan population expansion into the northern Philippines had begun by perhaps 5500 B.P. (Bellwood, 1985, p. 224). From the southern Philippines the linguistic evidence strongly suggests a split into two major population segments, a western one ancestral to Western MP, and an eastern one ancestral to Central-Eastern MP. CEMP in turn evidently split into two streams, Central MP (CMP) moving southward into the central Moluccas and then westward through the Lesser Sunda Islands, and Eastern MP (EMP) moving eastward around the north coast of New Guinea and then splitting into South Halmahera–West New Guinea (SHWNG) and Oceanic (COC), the latter moving on into the insular Pacific, where it is associated archaeologically with the Lapita culture complex in the Bismarck Archipelago by at least 3600 B.P.

Blust (1986/87) provided estimates of the time depth of various AN proto-languages. These estimates were based on the relatively secure starting point of the Central Pacific subgroup: Fijian, Rotuman, and the Polynesian languages are descended from an immediate common ancestor which must be associated with the initial Lapita settlement of Fiji and Samoan just before 3000 B.P. Given this apparently necessary association between an archaeological culture and a proto-language, it is necessary to assume increasingly greater separation times as one moves upward through the AN family tree. As a reasonable first approximation of the time needed to account for the degree of divergence between the AN languages of western Melanesia and those of areas further east, a date of 4000 B.P. was proposed for Proto-Oceanic. To date the earliest archaeological attestation for the Lapita culture complex in western Melanesia is some four centuries later (Kirch, 1988b, 1986), but it is by no means certain (1) that the earliest Lapita sites have already been uncovered, or (2) that the Lapita culture

complex was coterminous with Proto-Oceanic society rather than a cultural development in one of its immediate descendants.

The AN language family has a history of about six millennia. During this considerable time period there were population movements into new areas which differed in climate, topography, flora and fauna and what might be called “human ecology” (i.e., interactions with peoples of different linguistic and cultural origins). Any discussion of AN culture history thus faces the problem of focus: Should we attempt to describe all that can be inferred from the available evidence about the earliest period in the AN expansions, or should we instead select a few salient features of culture and trace their history through the millennia of migration and cultural change? Since the purpose of this article is to provide a broad overview of AN culture history as revealed by the Comparative Method of linguistics, I have emphasized the former course, but tried to give some idea of changes over time where these appear particularly significant. In general I refer only to linguistic reconstructions at the Proto-Austronesian and Proto-Malayo-Polynesian levels, and where there is no need to be more specific use the term “Early Austronesian” (EAN) as a convenient cover term for Proto-Austronesian and Proto-Malayo-Polynesian—hence approximately the first millennium of the AN expansion.

The application of the Comparative Method to the reconstruction of many features of Proto-Oceanic culture history is covered thoroughly in Pawley and Green (1984), and will not be repeated here. It should perhaps be emphasized, then, that the primary focus of my discussion will be on a phase of AN culture history which is somewhat antecedent to that reflected in the archaeological record of the Lapita culture of the Pacific islands. Where I depart from this focus and refer to linguistic evidence for POC culture I indicate so explicitly.

In this paper I label linguistic reconstructions as PAN (Proto-Austronesian), PMP (Proto-Malayo-Polynesian), PWMP (Proto-Western Malayo-Polynesian), or Proto-Oceanic (POC). A reconstruction by itself is a hypothesis, and hence an abstraction. To facilitate appreciation of the observations upon which these hypotheses are based, I indicate in parentheses after each reconstructed form the distribution of its reflexes in terms of major geographical regions: T = Taiwan, P = Philippines, WIN = western Indonesia, EIN = eastern Indonesia, OC = Oceania.

## THE EXTERNAL RELATIONSHIPS OF AUSTRONESIAN

Given the size and geographical extent of AN, it is perhaps not surprising that widely divergent views have been expressed about its possible

connection to other language families, ranging from proposed connections in the Americas, to wider connections in the Pacific and Asia, to the Middle East and even Europe. Only a few of these proposals of external linguistic relationships need be mentioned here.

Schmidt (1906) presented evidence for an Austric superfamily consisting of two primary branches: Austroasiatic (AA = Munda plus Mon-Khmer) in mainland Southeast Asia, and Austronesian in island Southeast Asia and the Pacific. Although the morphological evidence for Austric was particularly tantalizing, there were problems which prevented most linguists from accepting the claim that it pointed to remote genetic relationship.

Benedict (1942, 1967) has argued that the Tai-Kadai and Hmong-Mien (Miao-Yao) languages of mainland Southeast Asia form a superfamily with AN which he calls "Austro-Tai". Although much of the evidence which Benedict has cited in support of this relationship fails to pass the test of demonstrably recurrent sound correspondences (Blust, 1996; Dahl, 1976, pp. 109–116; Reid, 1984/1985) the Austro-Tai hypothesis has been accepted by some scholars (Bellwood, 1991; Reid, 1984/1985; Ruhlen, 1987). More recently Benedict (1990) has expanded this proposed superfamily to include Japanese, again on the basis of evidence which many are sure to question.

Most recently Sagart (1993) has argued that Chinese and AN have a common origin within the past six millennia (since his comparative procedure implies that both derive from PAN). In a more recent publication Sagart (1994) has expanded this proposed genetic unit to include Tibeto-Burman and AA in a revised Austric superfamily which incorporates the AA, AN, and Sino-Tibetan language families as primary branches.

Needless to say, all of these proposals are controversial. Nonetheless, Reid (1994a) has recently reexamined the Austric hypothesis in the light of new evidence on the morphology of AA languages. This material considerably strengthens the arguments originally advanced by Schmidt (1906).

Blust (1996) takes up the archaeological implications of the Austric hypothesis in its narrow sense, as originally defined by Schmidt. Within AA the first split produced the ancestral communities of the Munda of eastern India on the one hand, and of the Mon-Khmer of mainland Southeast Asia, on the other. In accordance with the "principle of least moves," the AA homeland is most plausibly located between the Munda and the main body of Mon-Khmer languages. Diffloth (personal communication) suggests the middle Salween basin; given the distributional evidence, a homeland somewhere in upper Burma could not be far from the historical reality. As already seen, the distribution of primary AN subgroups favors a homeland on Taiwan. We are thus faced with serious problem of reconciling linguistic observations with geography, since these two areas are about 1,300 miles apart.

Since AN languages have never been documented in southern China, linguistic evidence cannot lead us further back than a probable homeland in Taiwan. From this point the argument proceeds by relatively small steps, each leading further back in time and closer to the Burma-Yunnan frontier. These are summarized below.

*Step 1.* Taiwan probably was settled from the adjacent mainland of China. Since attested migrations rarely if ever result in the removal of an entire population, it is likely that speakers of PAN or its immediate antecedent were found on both sides of Taiwan Strait and on the intervening Pescadores (P'eng-hu) Islands by the late seventh millennium B.P.

*Step 2.* Pre-PAN speakers probably reached the coast of southern China (modern Fujian Province) from the north, although they may have spread further along the mainland coast to the south of Taiwan after settling the islands. The archaeological culture most likely to have been antecedent to the AN settlement of Taiwan is that of Hemudu, at the southern side of Hangzhou Bay just south of the Yangzi estuary.

*Step 3.* The archaeological culture of Hemudu almost certainly derived from the rice-growing cultures of the Middle Yangzi, which were cultivating rice (or harvesting wild rice under conditions closely approximating cultivation) by 7800–8500 B.P. in the region of Lake Dong-Ting. The Middle Yangzi cultures are within 750 lineal miles of upper Burma, and hence bridge nearly half of the geographical gap between the likely homeland of Proto-Austroasiatic and that of Proto-Austronesian.

*Step 4.* At this point even the archaeological support runs out. What we have, however, is a distribution of early rice-growing cultures adapted to life in pile dwellings in flood-prone environments, and an associated chronology which suggests a direction of movement: from the Middle Yangzi around 7800–8500 B.P. to Hemudu at the mouth of the Yangzi around 7000 B.P. to Taiwan around 6000 B.P. Until further relevant archaeological work is done, the rest of the argument must be based on the distribution of primary Austric subgroups and the dictates of geography. In western Yunnan near the border with Burma the Salween, Mekong and Yangzi rivers run roughly parallel for some 200 miles, separated by very narrow watersheds. From this region a semisedentary pre-Neolithic culture which relied heavily on the exploitation of wild rice could have expanded west into the Brahmaputra Valley, emerging very near the historical territory of the Munda-speaking people of eastern India. If others followed the Salween and Mekong, they would have emerged in the AA heartland of mainland Southeast Asia, while that branch which moved into the Yangzi basin would have been constrained by the course of the river to turn eastward, emerging just south of modern Shanghai.

This is an appealing scenario for explaining the distribution of “Austro-” languages, but is it anything more than speculation? I believe that it is. Speculations are by definition untestable expatiations in the realm of possibility, while hypotheses are controlled by (1) compatibility with the primary observations, (2) simplicity, and (3) competitive superiority.

Step 1 is favored because it is in competition with essentially four alternatives, none of which is well supported: (1) that PAN emerged from a pre-Neolithic population on Taiwan itself, with no migration from without, (2) that AN speakers arrived in Taiwan from the Northeast, (3) that AN speakers arrived from the East, (4) that AN speakers arrived from the South.

Hypothesis (1) is effectively ruled out because the Neolithic transition in Taiwan is abrupt, and shows clear parallels with similar developments at about the same time in the Pescadores Islands and on the Fujian coast (Chang, 1986; Tsang, 1992). In addition, the distribution of hunter-gatherers in the Philippines, the Malay Peninsula, and the Andaman Islands, as well as traditions of former contact with small black people among the Formosan aborigines (Li, 1993), strongly favors a hypothesis that the pre-Neolithic population of Taiwan was physically Negrito.

Hypothesis (2) receives no support either from linguistics or from archaeology. Although the tiny southern Ryukyu Islands may well have been settled by AN speakers prior to the arrival of the Japanese, the probability is far greater that they were settled from Taiwan or the mainland of China, rather than that they were a staging area for the settlement of Taiwan.

Hypothesis (3) points to the wide open Pacific, and leads us nowhere either linguistically or archaeologically.

Hypothesis (4) offers a more serious alternative. However, the languages of the Philippines are much less diverse than those of Taiwan, implying that the area has been settled for a shorter time. Even if this situation has resulted in part from a leveling of once greater linguistic differences the radiocarbon chronology for Neolithic sites in the Philippines begins at least half a millennium after that in Taiwan (Bellwood, 1985, 1991).

We are left then with a movement from the Fujian coast to Taiwan. This is archaeologically supported by a similar material culture on both sides of the Taiwan Strait and on the intervening Pescadores Islands in the period 5000–6500 B.P. (Chang, 1986, 1989; Tsang, 1992). The absence of AN languages in southern China is hardly surprising. Han Chinese civilization first took form in the Yellow River Valley, and has been gradually expanding southward throughout the dynastic period. It was not until the Han Dynasty (206 B.C.–220 A.D.) that Han Chinese culture began to subdue the “Hundred Yueh”, as the once numerous non-Han peoples south

of the Yangzi are known in the Chinese annals. Given the continued expansion of Han Chinese and the ongoing sinicization of the earlier population in southern China during the past two millennia, there can hardly be any doubt that many languages disappeared as their speakers became "Chinese". Indeed, the same process is proceeding apace at the present time in Taiwan.

For Step 2, a movement from the north is favored for at least two reasons. First, as will be seen, several terms for both rice and millet must be reconstructed for PAN. Since rice was initially domesticated in the Yangzi Valley in the period 7800–8500 B.P. (Yan, 1990), and millet was initially domesticated in the Yellow River Valley at roughly the same time, PAN speakers would have had greater opportunities to acquire both if they had reached Fujian from the north rather than from the south. Second, as noted by Meacham (1984/1985) the archaeology of coastal Guangdong does not present close parallels with that of Taiwan. Moreover, as noted by Bellwood (1991) the basal waterlogged layers of the spectacular Neolithic site at Hemudu, radiocarbon dated to 6900–7200 B.P., contain abundant evidence of rice, of domesticated dogs, pigs, chickens, cattle, and water buffalo; of pottery, matting, rope, loom weaving, boat building; and of the construction of pile dwellings which made sophisticated use of mortice and tenon joints in carpentry. All in all the material culture inferable from the archaeological record at Hemudu has close parallels with that inferable from the linguistic record for PAN on Taiwan about a millennium later.

The remaining steps are more controversial. However, the radiocarbon chronology for the domestication of rice and for a cultural adaptation to marshy lakelands which were periodically inundated, leading to the construction of pile dwellings, supports a likely derivation of coastal sites such as Hemudu from the "Middle Yangzi" cultures of roughly a millennium earlier.

From this point we must simply extrapolate from later developments: If AA and AN languages have a common origin and the Neolithic settlement of Taiwan ultimately began with the domestication of rice in the middle Yangzi we can, so to speak, play the film backward. Doing so would take us further up the Yangzi, to the region where the three rivers (Salween, Mekong, Yangzi) run parallel, whence at about 9000 B.P. the split-up of Austric began.

This hypothesis, which seeks to explain the distribution of AA and AN languages, has an added advantage: If Tai-Kadai is included within an expanded Austric family, the distribution of primary Tai-Kadai subgroups also follows naturally from a movement down the Yangzi to the coast. The Gelao languages in western Guizhou Province do not appear to form a

group, but rather include several primary branches of the Tai-Kadai family (Graham Thurgood, personal communication). The Gelao-speaking area is very near the headwaters of the Wu river, a major southern tributary of the middle Yangzi. If Tai-Kadai is genetically related to AN, then, we have a fairly straightforward explanation for the language distributions: The Middle Yangzi rice farmers circa 8000 B.P. divided into two streams, one (Proto-Tai-Kadai or some ancestral form of it) moving south up the Wu Valley into western Guizhou, and the other (ancestral to AN) moving east to the coast in the region of Hangzhou Bay (and thereafter south to Fujian, Taiwan and beyond).

## THE NATURAL ENVIRONMENT

The natural environment can be subdivided into a physical component which includes the landforms, climate, weather system, etc., and a biotic component which encompasses flora and fauna.

### The Physical Environment

If PAN was spoken on Taiwan around 6000 B.P. the combined resources of palaeoclimatology, archaeology, and comparative linguistics should be able to provide a good general overview of the nature of the physical environment. Today Taiwan lies at the intersection of the tropics and the temperate zones (the Tropic of Cancer separates roughly the southern third of the island, which is subtropical, from the northern two-thirds, which are warm temperate). The island lies slightly north of the range of the monsoons, but is directly in the path of the typhoons that sweep out of the western Pacific during the summer months. This fact is reflected in PAN \*baRiuS “typhoon” (T, P, WIN), a word which occurs in a number of Formosan and Philippine languages in the meaning “typhoon”, and in languages further to the south with other, seemingly attenuated meanings (e.g., Kelabit, in the highlands of northeast Sarawak, where *bariw* refers to any strong wind).

The highest peaks in the Central Mountains reach elevations of over 4000 meters, and are snow-covered in the winter. Most of the Formosan aboriginal languages reflect \*SuReNa “snow, ice, frost”, and it appears likely that this word was present in PAN. As AN speakers moved southward into the tropics reflexes of \*SuReNa naturally disappeared, and it was not necessary to coin new words for “snow” and “ice” until the settlement of

Hawaii and New Zealand brought their distant descendants into contact with water in its solid state again some 5,000 years later.

It does not appear possible to reconstruct a separate morpheme meaning “river” in PAN or PMP. Instead, by at least PMP times rivers were called by the same name as “fresh water” (PMP \*wahiR), perhaps with the optional disambiguating qualifier \*aluR “flowing”. In this connection PAN \*iluR presents an interesting challenge to semantic reconstruction. Like \*aluR, \*saluR, and some forms in individual attested languages (e.g., Bikol *sulóg* “flow of water; current”), PAN \*iluR contains a monosyllabic root \*-luR “flow”. In Taiwan the word has been recorded only in Kavalan *iRuR* “small stream, creek” (as opposed to *sanuR* “river”). In various Philippine languages a reflex occurs meaning “river” or “creek”, as in Ilokano *ilog* “creek (of salt water); river” or Tagalog *ilog* “river”. In others it means “to flow”, while in Bikol the reflex of \*iluR refers to the main channel of a river: *mag-ilog* “travel via the main channel or deepest part of a river”, *ka-ilog-an* “main channel or deepest part of a river”. Since Mukah Melanau of coastal Sarawak has *iluh* “channel between the roots of trees in a mangrove swamp”, one is given the impression that PAN \*iluR referred not to rivers as such, but more particularly to the central channel in which water continues to flow even during the dry season.

One of the most striking features of the rivers of Taiwan, both on the eastern (windward) and western (leeward) sides of the Central Mountains is the distinction between the riverbed and the river itself. The former typically is a shallow, boulder-strewn, water-scoured pathway which may be several hundred meters wide, while the latter for most of the year is a thin ribbon of water no more than 10 meters wide flowing somewhere near the middle of the much wider seasonal channel. This very common feature of the waterways of Taiwan is a direct result of the seasonal typhoons with their torrential but short-lived rains, and the steepness and height of the Central Mountains. What PAN \*iluR may have referred to are these perennial flows within the larger seasonal typhoon-fed river systems. Outside Taiwan, where the local topography and rainfall pattern differs in various ways, the term came to apply to the deepest channel of any river, even if the river itself showed little or no seasonal variation in width compared to the dramatic changes seen in the flash-floods of the Taiwan typhoon season.

Although PAN \*Nabek evidently meant “breakers, surf” (T, WIN, EIN, OC), little else can be reconstructed on the PAN level relating to the marine environment. As noted elsewhere, this situation may reflect little more than the fact that few of the surviving aboriginal languages of Taiwan are in contact with the sea. For PMP we can infer considerably more, including: \*bena “lower course of a river, tidal bore” (WIN, EIN), \*binaŋa/minaŋa “estuary,

mouth of a river" (P, WIN, EIN), \*daRat "littoral sea" (WIN, OC), \*namaw "sheltered water; harbor, lagoon" (P, WIN, EIN, OC), \*sawaq "channel, passage" (WIN, OC), and \*tasik "sea, saltwater" (P, WIN, EIN, OC).

These terms, which distinguish a number of types of topographic features, suggest the importance of a coastal environment to speakers of PMP. A single PAN term, \*bukij "mountain; forested inland mountain areas", can be posited in reference to inland environments, and the only directional terms are \*daya "upriver, toward the interior" and \*lahud "downriver, toward the sea". These forms suggest that PAN speakers also preferred a coastal environment. When and why their descendants moved inland to the forested mountains of Taiwan remains unclear, but an abundance of wild game probably would have provided a major incentive.

Outside Taiwan much the same pattern appears to have been widespread: Initially a settling population favored the coastal zone until it was eventually drawn inland by economic advantages or forced inland by pressure from other groups. This appears to have been the case in northern Borneo (Blust, 1974, p. 210ff), and is a well-known characteristic of Lapita sites in the Pacific (Green, 1979, p. 32).

As they moved eastward into the Pacific, AN speakers left monsoon Asia and entered a zone of different winds and seasonal patterns. This is reflected linguistically in the semantic evolution of such terms as PMP \*habaRat "west monsoon" and \*timuR "east monsoon", which have reflexes as far east as Polynesia, but with meanings such as Samoan *afā* "storm, gale, hurricane", *timu* "rainy". An exemplary treatment of the problem of semantic change in this domain of the Proto-Oceanic vocabulary is given by Ross (1994).

### The Biotic Environment

An AN-speaking population arriving in Taiwan toward the end of the seventh millennium B.P. would have found a natural environment rich in plant and animal life. A representative sample of the flora which they are most likely to have encountered is found in Verheijen (1984), Blust (1984/1985), Li (1994), and Wolff (1994). These are discussed in passing elsewhere, and will not be further mentioned here.

Among the indigenous fauna were the Formosan black bear (*Ursus thibetanus formosanus*), the clouded leopard (*Neofelis nebulosa brachyurus*, Swinhoe), the Formosan leopard cat (*Felis bengalensis chinensis*), the muntjac or barking deer (*Muntiacus reevesi micrurus*, Sclater), the Formosan serow, or wild goat (*Capricornis cruspus swinhoei*, Gray), the Chinese civet cat (*Viverricula indica pallida*, Gray), the Formosan hare (*Lepus*

*sinensis formosus*, Thomas), various tree squirrels, several flying squirrels of the genus *Petaurista*, the Formosan pangolin (*Manis pentadactyla pentadactyla*, Linnaeus), the Chinese river otter (*Lutra lutra chinensis*, Gray), and the Formosan rock monkey (*Macaca cyclopis*).

Several of these animals have cognate names in Taiwan, but are known by other terms elsewhere (if they are known at all). Taiwan-only cognate sets include names assignable to \*Cumay “bear”, \*lukeNaw “clouded leopard”, \*Sidi “serow, wild goat”, \*lutuk “hare”, and \*Sanaq “river otter”. Other indigenous fauna in Taiwan are called by names that have cognates in MP languages: PAN luCuŋ “monkey” (with cognates in the southern Philippines and in Malay), PAN \*buhet “squirrel” (with cognates in the northern and central Philippines and in Java), PAN \*qaRem “scaly anteater, pangolin” (with cognates over much of Borneo, but nowhere else). Given the linguistic and archaeological evidence for a homeland in Taiwan it is likely that PAN speakers were in contact with the entire suite of indigenous Formosan fauna, losing the names for some of these when they moved southward into new faunal zones, but retaining others. In some cases these retentions are very puzzling. Perhaps the best illustration of such a case is \*qaRem “pangolin”, reflected in Taiwan and in Borneo (where it applies to another species of the same genus, *Manis javanicus*), but with no evidence that the animal was ever found in any part of the Philippines except Palawan and the adjacent Kalamian and Cuyo Islands, which, like Borneo, rest on the now submerged Sunda Shelf.

Two other faunal terms are particularly noteworthy: PAN \*qiSu “shark” (T, P, WIN, EIN), and PAN \*buqaya “crocodile” (T, P, WIN, EIN, OC). The first of these terms is reflected only in the meaning “shark”. The second is reflected uniformly as “crocodile” in all MP languages. A single reflex of \*buqaya is known in Taiwan, Puyuma *buaya* “shark”. It is clear that the referent of PMP \*buqaya was the saltwater, or estuary crocodile, *Crocodilus porosus*, and that PAN \*qiSu was generic for sharks. The presence of a reflex of \*buqaya in southern Taiwan thus suggests that the crocodile, which is no longer found on the island, extended further north within the past several millennia. When it disappeared from the waters of Taiwan, its name was transferred to the only other large predator which posed a threat to humans in saltwater and estuarine environments, namely the shark. The semantic change in Puyuma *buaya* can thus be seen as motivated by a functional equivalence in relation to the human community.

Without question the most important biotic transition that AN speakers faced in expanding through island Southeast Asia into the Pacific was the change from a placental mammalian fauna to a marsupial mammalian fauna experienced in crossing the Wallace Line. It is now well known that the division between the Asian and Australian faunal zones cannot be drawn as

sharply as Wallace originally claimed, since the two intergrade in some areas such as Sulawesi (which has two native marsupials, and a number of native placental mammals). However, the likely migration routes of AN speakers took them south from the Philippines, with a split into a western stream (ancestral to Western MP languages), and an eastern stream (ancestral to Central-Eastern MP languages). In moving out of the southern Philippines into the northern Moluccas speakers of PCEMP would have been thrust rather abruptly into an entirely different fauna zone. As noted in Blust (1982), the fact that cognate terms for such marsupials as the cuscus (PCEMP \*kandoRa) and bandicoot (PCEMP \*mansar) are found both in eastern Indonesia and in the western Pacific cannot easily be explained unless we assume that the Central MP, South Halmahera–West New Guinea, and OC languages were a single linguistic community at the time of terminological innovation.

## MATERIAL CULTURE

Since material culture is the mainstay of archaeological research, I will subdivide this category into smaller units and try wherever possible to focus on prehistoric inferences from language which are in principle archaeologically testable.

### Economy

As recently as 30 years ago it was still possible for a distinguished ethnologist to write of EAN speakers as hunter-gatherers who had acquired nearly all features of sedentary life from contact with “peoples of a different language and superior culture” on the Asian mainland (Murdock, 1964). In retrospect this statement must appear rather startling both to linguists and to archaeologists. Although the archaeological record for Southeast Asia and the Pacific was considerably poorer than it is now, massive linguistic counterevidence to Murdock’s claim had long been available, but was simply ignored (Blust, 1976).

The following general statements can be made about the economy of EAN society: (1) grain crops were cultivated, (2) root crops were cultivated, (3) sugarcane was cultivated, (4) various tree crops were cultivated, (5) the dog, the pig, the chicken and perhaps the water buffalo were domesticated, (6) hunting and fishing were both important.

*Grain Crops*

The linguistic evidence for cultivation of grain crops by PAN times is abundant. The most direct evidence comes from PAN terms for rice in its various states (unharvested, harvested but uncooked, cooked): \*pajay “rice-plant, rice in the field” (T, P, WIN, EIN), \*beRas “harvested rice/husked rice” (T, P, WIN, EIN), \*Semay “cooked rice” (T, P, WIN). In addition there are several PAN terms for millet, including \*baCaR “millet sp.” (T, P, WIN, EIN), \*beCeŋ “millet sp., probably foxtail millet” (T, P, WIN, EIN), \*zawa “millet sp.” (T, P, WIN).

What places the linguistic evidence for PAN cultivation of grain crops beyond question is the array of terms which provide indirect support for the same conclusions. Even if the primary terms were borrowed (a hypothesis which, on phonological grounds, is very improbable), there is no plausible borrowing hypothesis which could also explain the widespread cognates relating to seed rice, driving animals from the fields, harvesting, threshing and winnowing the grain, storing it and the like. The major terms providing indirect evidence for cultivation of grain crops are PMP \*ampaw “empty husk of grain” (P, EIN), PAN \*bineSiq “seed rice” (T, P, WIN, EIN), PAN \*buRaw “chase away, drive off, esp. birds or animals from the fields” (T, P, WIN, EIN), PAN \*eRik/iRik “thresh grains by trampling” (T, WIN), PAN \*lepaw “granary” (T, WIN, EIN), PAN \*lesuŋ “mortar” (T, P, WIN), PAN \*paspas “thresh grains by beating” (T, P), PAN \*qani “to harvest, usually rice” (T, P, WIN), PMP \*qapa “empty husk of rice, etc.” (P, WIN, EIN), PAN \*qaSelu “pestle” (T, P, WIN, EIN), PAN \*qeCa “rice husk” (T, P, WIN), PAN \*tapeS “winnow” (T, P, WIN), and PAN zaRami “rice straw, rice stalks left standing after the harvest” (T, P, WIN).

To date there is little archaeological evidence for rice cultivation in Taiwan earlier than about 4500 B.P. (Bellwood, 1985, p. 213ff). However, the linguistic evidence leaves no alternative to the conclusion that rice was cultivated from the beginnings of the AN settlement of the island at least a millennium and a half earlier. Moreover, as Bellwood (1985) pointed out, the abundant rice remains in the Yangzi basin and coastal southern China long before 4500 B.P. makes it extremely unlikely that Neolithic settlers reached Taiwan with a sedentary life style, pottery, and domesticated animals, but no grain crops.

It should perhaps be stressed that widespread cognate sets which relate to irrigated rice agriculture are unknown, although such sets are available for geographically restricted areas, such as northern Luzon (Reid, 1994b). The linguistic evidence thus suggests that EAN speakers cultivated swidden rice, and that wetfield cultivation developed in various scattered areas in the Philippines and Indonesia several millennia after the AN dispersal from

Taiwan. At the same time it must be acknowledged that rice in its natural state is a wetland crop, and that the original transition from gathering to cultivating must have taken place under wetland conditions. Swidden agriculture can therefore be seen as a millennia-long transitional stage between the incipient stages of rice cultivation under natural wetland conditions, and the most advanced stages of cultivation in which the optimal natural environment was recreated through artificially constructed pondfields. Finally, it is likely that the ancestral Malagasy already practiced wetfield rice cultivation in southeast Borneo before their migration to east Africa sometime between the seventh and tenth centuries (Adelaar, 1989).

### *Root Crops*

The claim that PAN speakers cultivated root crops is perhaps less likely to excite controversy than the similar claim about grain crops. What must be emphasized from the linguistic evidence, however, is that there is no basis for claiming an evolution from root crops to grain crops: Both were present from the earliest period for which linguistic reconstructions are possible.

The principle root crops which can be inferred by use of the Comparative Method are PAN \*biRaq “wild taro: *Alocasia* spp.” (T, P, WIN, EIN, OC), PMP \*laqia “ginger” (P, WIN, EIN, OC), PMP \*qubi “yam” (P, WIN, EIN, OC), PMP \*tales “taro: *Colocasia esculenta*” (WIN, EIN, OC).

Of these, only \*biRaq can safely be attributed to PAN, and it is a plant that normally is not eaten except in times of scarcity. Despite the lack of known linguistic support, however, it is very likely that *Colocasia esculenta* was among the tubers cultivated by PAN speakers, as it has been widely used by all Formosan aboriginal groups within the ethnographic present. Yams appear to have been of very marginal importance in Taiwan, although they are almost universally important among AN speakers elsewhere.

The distribution of the sweet potato (*Ipomoea batatas*) in the Pacific has been the subject of ethnobotanical discussions for well over half a century (Dixon, 1932; Yen, 1974). Yen (1971) suggested multiple introductions, the earliest probably as a result of prehistoric Polynesian contact with the coast of northern South America, with much later introductions into island Southeast Asia by the sixteenth-century Portuguese and Spanish. Its history in Polynesia probably does not date back as much as a millennium. The sweet potato is widely cultivated by the Formosan aborigines, but words

for it (usually some form of *bunga*) suggest an introduction via the northern Philippines.

### *Sugarcane*

Although most botanists over the past three decades have held the view that sugarcane was first domesticated in New Guinea (Warner, 1962), it is clear from the linguistic evidence that sugarcane was present in Taiwan by 6000 B.P. (Blust, 1976, 1984/1985). Recently Daniels and Daniels (1993) have suggested that *Saccharum officinarum*, the only species of sugarcane found in the Pacific, may derive from the Chinese sugarcane, *Saccharum sinense*, which was introduced to island Southeast Asia around 4500 B.P. and to the western Pacific about a millennium later by speakers of AN languages. It is worth stressing that the linguistic evidence has never been in doubt, and is only now leading plant geneticists to question what was long considered to be received knowledge.

Reflexes of PAN \*CebuS “sugarcane” are found in all major regions in which AN languages are spoken (T, P, WIN, EIN, OC). The distinctive Formosan reflexes of the initial and final consonants make borrowing a very improbable explanation for the attested distribution. Additional support for the antiquity of this cultigen in the AN-speaking world is provided by PMP \*ququs “chewing on sugarcane” (P, WIN, OC).

### *Tree Crops*

Many EAN tree terms can be reconstructed (Blust, 1984/1985, p. 62), and a large portion of these undoubtedly had an economic value as sources of timber, food, medicine, dyestuffs, etc. The most important trees used as sources of food probably were PMP \*kuluR “breadfruit” (P, WIN, OC), PMP \*niuR “coconut” (P, WIN, EIN, OC), PMP \*punti “banana” (P, WIN, EIN, OC), and PMP \*Rambia “sago” (WIN, EIN, OC).

Of these plants only the banana grows at all well in Taiwan. Basay and Trobiawan, two extinct languages formerly spoken in the far north of Taiwan, both had *puti* “banana” (Tsuchida et al., 1991). However, these languages and the neighboring Kavalan contain a number of Spanish and Philippine loanwords traceable to the Spanish colonization of northern Taiwan (1626–1642), and it is possible that *puti* is a Philippine loan. For this reason the economic importance of the banana to speakers of PAN remains somewhat unclear, although its importance to speakers of PMP is undeniable.

The coconut grows in the far south of Taiwan, but can hardly be said to flourish today. It is possible that conditions were warmer and more favorable in the past, but it seems unlikely that the coconut was of central importance in PAN society. In PMP society, probably located along the coasts of northern Luzon, the matter was different, for here the coconut does flourish, and undoubtedly did during the early period of AN settlement. Much of the “tropical” character of attested AN societies, including heavy reliance in various areas on such plants as the breadfruit, coconut, and sago palm, must have begun to take shape after their departure from Taiwan.

Like the coconut, the breadfruit grows in the southern part of Taiwan, but is quite rare. Further to the south the breadfruit is a common tree of the tropical forests, but its economic value is small, and it achieves real dietary importance only in the central and eastern Pacific (Micronesia, Polynesia). Based on phonological irregularities in some languages, Wolff (1994, p. 522) claimed that names for the breadfruit spread from the Pacific into island Southeast Asia. This view is questionable since the plant itself is native to the forests of insular Southeast Asia, where wild varieties of *A. altalis* are common. Merrill (1954, p. 188) noted that in Polynesia the breadfruit occurs only as a planted tree, and only seedless forms are normally encountered, suggesting that both the importance of the breadfruit, and its propagative dependence on human intervention increased as AN speakers moved eastward into the Pacific. Increasing dependence on and cultivation of a plant that is essentially wild in Southeast Asia would not be surprising in the more remote parts of the Pacific, where far fewer natural food resources were available on the land and much had to be imported from ancestral homelands further to the west. Sago poses interesting problems in an overview of AN culture history (Dutton, 1994). In some areas it has virtually no economic importance, while in others it is the mainstay of the diet. In general sago is important where the centrality of rice has been lost. This is true in the swampy Melanau coastal region of Sarawak on the island of Borneo, and over much of the Moluccas in eastern Indonesia. Sago is important in many parts of Melanesia, but not in Micronesia or Polynesia. The linguistic evidence shows that the plant was known and terminologically distinguished by PMP times, but tells us nothing about its economic importance. The impression that emerges from the distributional evidence is that sago was rather marginal in the earliest phases of the AN expansion (which, as Bellwood, 1991, 1994, has suggested, almost certainly was powered by rice agriculture). Like other plants that were of marginal economic value at the outset of the AN diaspora (e.g., breadfruit, pandanus), sago acquired greater importance to populations that moved into particular types of environments, even becoming the staple in some areas.

PMP \*abated/abateR “sago grub” (P, EIN, OC) shows that the grub of the sago beetle was terminologically distinguished from other kinds of larvae. In many of the dictionary entries it is described as edible, and Collins and Novotny (1991) provided additional evidence from the Moluccas that the sago grub was an important source of protein in some areas. It is thus likely that it was eaten in PMP times. Space does not allow a discussion of all plants that were economically important to EAN speakers, but we should perhaps note in passing that the areca palm *Areca catechu*, PMP \*buaq (P, WIN, EIN, OC), must have been important even in PAN times. Formosan and extra-Formosan languages do not share cognate names for this plant, but it is highly valued for its nut, which is chewed with lime in a leaf wrapper throughout island Southeast Asia and the western Pacific. Only in the central and eastern Pacific is the use of the areca nut completely eclipsed by the *Piper methysticum*, or kava plant.

As noted by Crowley (1994), the attested distribution of kava, widespread in the Pacific area, probably results from a complex history of diffusion from a center of origin somewhere in northern Vanuatu.

### *Domesticated Animals*

Domesticated animals that can be attributed to EAN society include: PAN \*asu/wasu “dog” (T, P, WIN, EIN), PAN \*beRek “pig” (T, P, WIN, OC), PMP \*manuk “chicken” (P, WIN, EIN, OC), and PAN \*qaNuan “carabao, water buffalo” (T, P, WIN).

As might be expected, the dog, which probably was domesticated by Pleistocene hunter-gatherers in most parts of the world, was already an important asset in PAN times. Its role will be discussed below under Hunting and Fishing.

Blust (1976) proposed a lexical distinction between PAN \*beRek “domesticated pig” and PAN \*babuy “wild pig”, noting that reflexes of both are widespread in island Southeast Asia, but that only reflexes of \*beRek (POC \*mpoRok) survive east of the Wallace Line, where pigs were introduced by human means. The linguistic and distributional facts are thus consistent: If pigs were introduced into Wallacea and the insular Pacific by AN speakers, they would have been called \*beRek, not \*babuy (which did not yet exist in this area). In time reflexes of \*beRek were generalized to all pigs, domestic and feral. As further support for this inference, words for “pig” in a number of Papuan languages closely resemble AN forms (Blust, 1976, p. 26).

Although occasional claims have been made for much earlier evidence of the pig in New Guinea, none of these have held up well. It still appears

likely, then, that the pig was introduced into the western Pacific by speakers of Proto-Oceanic (for further discussion cf. Lynch, 1991).

PMP \*manuk does not provide strong linguistic evidence for EAN domestication of the fowl, since it referred more generally to birds. However, PMP \*lalun̄ “cock, rooster” (P, WIN, EIN) appears to be specific to fowls, and supports the claim that fowls were among the domesticated animals that accompanied the AN expansion into eastern Indonesia.

More problematic is PAN \*qaNuan̄. While the form clearly can be reconstructed, its meaning remains unclear. In Taiwan the word refers variously to carabao, deer, and cattle. In the Philippines it generally refers to carabao, but on the island of Mindoro designates instead the *tamarau* (*Bubalus mindorensis* Heude), a unique wild buffalo. All over the island of Sulawesi, which Darlington (1980) characterized as a “subtraction-transition area”, reflexes of \*qaNuan̄ refer to the *Anoa depressicornis*, an endemic antelope or dwarf buffalo. Neither of the latter referents can be original, since both are geographically highly restrictive. Similarly, it appears unlikely that PMP \*qanuan̄ referred to *Cervus equinus*, the largest type of deer, which evidently was called \*uRsa. This leaves “carabao” as the most likely meaning. However, within the ethnographic present the carabao is closely associated with wet rice agriculture, and there is no good evidence for this form of tillage until well after the break-up of PAN. Moreover, in western Indonesia and the lowland Philippines words resembling Malay, *kerbau* are common for the carabao, and appear to be loans from a Mon-Khmer source on mainland Southeast Asia, thus implying an introduction from mainland Southeast Asia within the past 2000-3000. years. Bellwood (1991) has noted that the carabao was domesticated by the rice farmers of Hemudu on the southern shores of Hangzhou Bay by 7000 B.P. Whether it was carried to Taiwan during the AN settlement of the island from southern China, or whether PAN \*qaNuan̄ initially referred to a wild bovid and only later came to be applied to the carabao remains unclear. PAN \*babuy-an “pig pen” (F, P) and PMP \*bala/bara/baRa “pen, enclosure for domesticated animals” suggest that animals were penned in, although they do not provide information about the locations of such enclosures (under the house, etc.).

### *Hunting and Fishing*

In addition to the collection and cultivation of plant food, EAN speakers relied heavily on hunting and fishing as a source of dietary protein. This is reflected linguistically in a fairly rich vocabulary connected with the capture of game animals or with fishing. First, there is a general term for

hunting: PAN \*qaNup (T, P, WIN). In a number of the languages of the Philippines and western Indonesia the inherited word for “dog” can be affixed with maŋ- “active verb” to form a verb \*maŋ-asu meaning “hunt using dogs”.

There can be little question that the dog was valued as a companion of the hunt in PAN society. Moreover, there is a clear correlation between the historical stability of these terms and the importance of their referents. In Taiwan, the Philippines, and parts of western Indonesia (e.g., Borneo) where large indigenous quadrupeds (especially various deer, and perhaps wild pigs) were natural quarry, reflexes of PAN \*qaNup “to hunt” and \*asu “dog” are fairly stable. In Eastern Indonesia, where the indigenous marsupial fauna are largely confined to the cuscus and bandicoot, small mammals that are more easily caught in traps than tracked with dogs and hunted with bow and arrow, reflexes of \*qaNup disappear. In the Pacific, where the indigenous mammalian fauna become even more impoverished, reflexes of both \*qaNup and \*asu disappear, and terms for “dog” become extremely variable. As Rehg (1992) has argued convincingly, in most Pacific islands the dog simply has no economically useful function, and moreover becomes a competitor for food in times of scarcity. The result is that dogs themselves are eaten, or are abandoned to their own resources, often dying out for want of food. Under these circumstances it is not surprising that terms for “dog” are so variable in Oceanic languages: The dog has often disappeared on Pacific islands, and been reintroduced, perhaps generations later, bringing with it a new name. By contrast, in island Southeast Asia the dog is essential to the success of the hunt, and is thereby given a stable place in human society which does not guarantee, but at least favors, stability in the name by which it is called.

Probably the most important animals hunted by EAN speakers were various deer native to Taiwan and the Philippines, and wild pigs. Unlike some societies in northeast Asia (Ainu, aboriginal Korea) it does not appear that PAN speakers hunted the bear for economic reasons, or practiced a bear cult. The principal weapon used in the hunt almost certainly was the bow, PAN \*busuR (T, P, WIN, EIN, OC). Notably, in a number of the societies of western Indonesia, where Indian cultural influence began to be felt perhaps two millennia ago, reflexes of \*busuR now refer to a bow-like instrument used in the carding of cotton fibers rather than to a weapon of the hunt.

In addition to the bow, which almost certainly was used in the hunting of deer and wild pigs, a variety of traps were used to catch smaller mammals, such as rats, squirrels, and the like. Reconstructed terms relevant to this semantic domain include: PAN \*bekas “spring a trap” (T, P, WIN), \*PMP \*biŋkas “spring a trap” (P, WIN, EIN), PMP \*bitik “noose trap;

spring up suddenly" (P, WIN, EIN, OC), PAN \*qaCeb "deadfall trap" (T, P, WIN), PAN \*taqan/taqen "set a trap" (T, P, WIN, OC). Although it does not appear to be as widely distributed, we might also add PWMP \*bala(n)tik "spring-set spear or arrow trap" (P, WIN).

The first two terms are doublets which show that spring-set traps were used by PAN speakers in Taiwan, and continued to be used by AN speakers at least until they reached eastern Indonesia. The similar implications of PMP \*bitik and \*taqan/taqen suggest that spring-set traps were still important to EAN speakers in at least the western Pacific, where some (mostly marsupial) native fauna could be caught in this manner. As the AN migrations eastward carried populations into increasingly impoverished faunal environments, the use of spring-set traps appears to have been abandoned, with (perhaps expanded) fishing strategies coming to subsume the whole of what had earlier been a combined hunting-fishing lifestyle.

By contrast, the deadfall trap does not appear to have had as great a value as spring-set traps. Linguistically this is reflected in the smaller number of lexical items that can be associated with it (only one), and ethnographically in its distribution, which apparently is restricted to Taiwan, the Philippines and western Indonesia.

In addition to terrestrial hunting there may have been some hunting of marine mammals. No evidence is available for hunting of whales or dolphins, and seals appear to have been rare or absent in the marine environment of EAN speakers. However, PMP \*duyɔŋ "dugong" (P, WIN, OC) is a term that is widely reflected in island Southeast Asia and the western Pacific (particularly the neighborhood of New Guinea). There are no specific linguistic indications that the animal was hunted, but given its value as a source of protein this is likely to have been the case. If Kavalan *babuy na raziŋ* (lit. "pig of the sea"), a large unidentified sea mammal, refers to the dugong [cp. Malay *duyɔŋ* "dugong", and the alternative name *babi duyɔŋ* (lit. "pig dugong")], the antiquity of AN contact with this marine mammal can be extended to PAN times.

Among specialized types of hunting we might also mention PMP \*pu-lut "birdlime" (P, WIN, EIN, OC), often made from the sticky sap of the breadfruit tree. Within the ethnographic present, birdlime has been used in many AN-speaking societies for the capture of birds, and the distributional evidence suggests that this continues a practice which was found in their common ancestor.

The reconstructed vocabulary of fishing and fish names in EAN society is quite large, and the obvious inference to be reached is that fishing was of great importance. From a fairly early time it appears likely that fishing strategies were broadly divided into those appropriate for women and children, and those appropriate for men. The former included the collection

of mollusks, crustaceans, echinoderms, and the like from coastal shallows or lagoons, while the latter were focused on fishing from boats, or on shore fishing with large nets that required cooperative effort. Among terms for marine invertebrates that probably had some economic value are: PMP \*buliq “cowrie” (T, EIN, OC), PAN \*kuRita “octopus” (T, P, WIN, EIN, OC), PMP \*nus “squid, cuttlefish” (WIN, OC), PMP \*qaliliŋ “cateye shell” (WIN, EIN, OC), PMP \*qali-maŋaw/qali-maŋu “mangrove crab” (P, WIN, EIN, OC), PMP \*qayuyu “coconut crab” (WIN, OC), PMP \*qudaŋ “shrimp, lobster” (P, WIN, EIN, OC), PMP \*sisi/sisiq “snail, barnacle” (P, WIN, EIN, OC), PMP \*tambuRiq “conch” (P, WIN, EIN, OC), PMP \*tiRem “oyster” (P, WIN, OC).

The cowrie was valued for its shell, which is widely attested ethnographically as a net sinker, and which should be present in archaeological fishing contexts. One other shell was of great importance: the large shell of the conch, which served as a trumpet in many AN-speaking societies, and was sounded at specific occasions, as the launching of a canoe on a major voyage, or in other ceremonial contexts.

Widespread cognates for “oyster” in MP languages suggests that this shellfish was important. No widespread cognate set for “pearl” is known, the word sometimes being borrowed from other language families (e.g., Malay *mutiara* “pearl”, from Sanskrit). It thus appears that the oyster was valued solely for its meat. Both oysters and mangrove crabs are associated with coastal mangrove swamps, and it must therefore be concluded that the territory occupied by speakers of PMP included mangrove swamps. On the other hand many types of snails, barnacles, shrimps, and lobsters are associated with rocky coastlines, which must also have been part of the environment of PMP speakers.

In addition to the above terms we can add PAN \*bubuR “jellyfish” (T, WIN, EIN), PMP \*kima “giant clam, *Tridacna* sp.” (P, WIN, EIN, OC), PAN \*kuRita “octopus” (T, P, WIN, EIN, OC), PAN \*qumaŋ “hermit crab” (T, P, WIN, EIN, OC), and PMP \*saŋasaŋa “starfish” (WIN, OC).

It is not clear to me whether the jellyfish, octopus, hermit crab, or starfish had any economic importance. Due to the danger of entrapment it is likely that the giant *Tridacna* clam was gathered only by male divers; its shell was valued in the manufacture of adze blades.

No widespread cognate sets are known for sea urchins or sea cucumbers. Although some sea urchins have had an economic value in the Pacific region in attested AN societies, it is not clear whether this was true of EAN society, or whether it is a later adaptation to an increasingly marine-oriented environment. Similarly, although the Chinese market for sea cucumbers was the driving force behind the annual “tripang” voyages of such

Indonesian peoples as the Buginese and Makasarese, there is no evidence that these holothurians had any economic value within native AN cultures.

One final category of economically important foods that were gathered rather than hunted from the sea is that of seaweeds. Some attested AN-speaking societies terminologically distinguish large numbers of seaweeds, thus indicating their importance in the native diet. This is true of societies as far apart as the Kavalan of eastern Taiwan, and the Hawaiians. Nonetheless, only three terms can be attributed to PMP, and these are variants of a single form: PMP \*lamut/limut/lumut (P, WIN, EIN, OC).

Unlike the the coastal gathering strategies of women and children, which could be done by wading or swimming in shallow water, most fishing activities by men probably required the use of boats. The principal reconstructions relevant to the fishing activities of men are PMP \*apuŋ apuŋ “fish-net float” (WIN, OC), PMP \*bitik “fishing pole” (P, WIN, EIN, OC), PAN \*bubu “basket trap for fish” (T, P, WIN, EIN, OC), PMP \*hapen “fishing line” (P, WIN, EIN, OC), PAN \*kawil “fish hook” (T, P, WIN, EIN, OC), PMP \*kebuR “fish drive” (P, WIN, OC), PMP \*lawaq “dip net?” (WIN, OC), PAN \*paen “bait” (T, P, WIN), PMP \*puket “dragnet” (P, WIN, EIN, OC), PMP \*saruk “type of fish net” (WIN, OC), PMP \*tuba “derris root fish poison” (P, WIN, EIN, OC).

Closer to shore fish could be obtained by drives in which the water was beaten with sticks or coconut fronds to steer the fish into nets or traps. This probably was a communal activity practiced by men, women, and children, and reflexes of PMP \*kebuR “fish drive; turbid, of disturbed water” (P, WIN, OC), suggest its nature. Some form of scoop net probably was used by women to net small fish or crustaceans near the shore. This may have been PMP \*lawaq “dip net?” (WIN, OC), although the precise referent of this term remains somewhat unclear. In deeper water dragnets were used to ensnare larger fish. A relatively stable term reflected from the Philippines to the Southeast Solomons documents the importance of this method of net fishing over a period of several millennia. In the Southeast Solomons *hulo* (from \*puket) refers both to a dragnet used in fishing and to a barrier net used in hunting pigs (Ivens, 1972, p. 389); it is unclear whether PMP \*puket referred to hunting nets as well as to fishing nets. In addition to net fishing it is clear from archaeological contexts that fishing with hook and line was also practiced. Terms for “fishing line” and “fish-hook” are widely distributed, and show that these were taken by AN settlers moving out of Southeast Asia into the Pacific rather than being independently invented in the two areas. PMP \*bitik may have meant “fishing pole”, although its basic meaning was “jerk up suddenly”, in which sense it also applied to other tools, e.g., noose traps.

Of perhaps greater cultural historical interest (since it is less of a “given”) is the evidence for the conical basket trap for fish. Although many local variations are ethnographically attested, the basic form of this trap is everywhere the same: It usually is made of bamboo, with a funnel-shaped mouth of converging bamboo splints which allow entrance but obstruct egress from the central holding chamber. Such traps are almost universal in AN-speaking societies (and, in fact, were traditionally found in other parts of the world, including west Africa and western Europe). On distributional grounds alone we could infer with some confidence that such traps were used in EAN society, although the prospects of archaeological retrieval are virtually nil. The fact that reflexes of PAN \*bubu are found from eastern Taiwan to Fiji strengthens this inference considerably.

One other widely distributed term connected with fishing is PMP \*tuba “derris root”. The root of the *Derris elliptica* was pounded and mixed with water to stupefy fish and so enable them to be more easily caught. Since the effectiveness of this method of fishing depends heavily on maintaining a concentrated dose of the active ingredient in a restricted area it clearly was more effective in freshwater lakes or streams than in the sea, and so presumably was used primarily as a means of capturing freshwater fish. In the Pacific the bark or seed of the *Barringtonia asiatica* (PMP \*butun) was used in a similar way.

No widespread cognate set for “harpoon” has been uncovered to date, although PWMP \*balabeg “harpoon” (P, WIN) includes forms reaching from the northern Philippines to the Malay Peninsula. Based on the available linguistic evidence, then, we cannot infer the use of harpoons in fishing by speakers of PAN or PMP.

Finally, on distributional grounds alone it appears likely that torch fishing was practiced at night, as this method of fishing is virtually universal among AN-speaking peoples from Taiwan to Polynesia.

### Food Preparation

Under this heading I will include all inferrable methods used for preparing food to eat, or preserving it for storage.

Daily cooking was done indoors over the hearth. There are two terms that appear to have carried the latter meaning: PAN \*qabu-an (T, P, WIN) and PMP \*dapuR (P, WIN, OC). The first of these is derived from \*qabu “ash” and meant literally “place of ashes”, presumably from the accumulation of cooking ashes which were removed only periodically. It is not clear what distinction might have been signaled by the contrast of the two terms in PMP.

A cooking pot, PMP \*kuden (P, WIN, EIN, OC), was placed on the hearth, supported by a trivet, or arrangement of three stones, PMP \*dalikan (P, WIN, EIN). The most important reconstructed terms for cooking and related activities are the following: PAN \*Capa “to smoke” (T, P, WIN, EIN), \*CuNuh “roast over a fire; burn” (T, P, WIN, EIN, OC), PAN \*nasuk/Nasu “to boil” (T, WIN, EIN, OC), PAN \*TaNek “to cook” (T, P, WIN), PMP \*zakan “to cook” (WIN, OC).

Reflexes of PAN \*Capa in many languages refer to the smoking of fish or meat to preserve it for later use, and there can be little doubt that this was its PAN meaning as well. A clear difference in type of cooking is seen in \*CuNuh, often reflected with the meaning “to roast food over an open fire or in hot embers”, and in \*nasuk/Nasu, reflexes of which typically refer to boiling. Further semantic distinctions for \*taNek and \*zakan are yet to be made.

Among other terms relating to cooking which are of some interest are PMP \*tuduk “skewer for roasting meat, fish, etc.” (P, EIN), PMP \*buRbuR “rice porridge, rice gruel” (P, WIN, EIN), and PAN \*qataq/qetaq “eat food raw” (T, P, WIN, EIN, OC). The first of these terms provides further evidence for cooking directly over a fire or embers, while the second suggests one of the ways in which rice was eaten other than as the center of a meal with plant foods and animal protein. The last term includes fish among its referents in several languages, but may have applied to a wide range of foods that were normally eaten cooked.

Terms which may have some relevance to inferences about food preparation, but which often have a wider reference include PMP \*bekbek “pound, pulverize” (P, WIN, EIN, OC), and PMP \*zuRuq “soup, broth, gravy” (P, WIN, EIN, OC).

Reflexes of the first of these terms in languages of the Philippines and western Indonesia often refer to the result or process of pulverizing grains, particularly rice. In OC languages, where grains were not possible referents, the cognate terms very commonly refer to the crumbling of organic materials in decay. If the meanings in island Southeast Asia are conservative, they suggest that rice powder was produced by pounding, although its uses remain obscure.

Reflexes of the second term encompass such referents as the juice of fruits, honey, gravy, the sap of trees and the like, but also refer to soup in some languages.

One cooking term which merits special mention is PMP \*qumun “earth oven” (WIN, EIN, OC), POC \*qumun “earth oven” : \*qumun-i “cook in an earth oven”. Chowning (1991, p. 55) objected that this term “is a misnomer in many parts of Melanesia, including Lakalai, Kove and Sengseng, where the whole process is completely above ground”. However,

the three cases which she cited to illustrate her point are from geographically contiguous or near-contiguous societies in central and southwest New Britain, and she acknowledged that “the evidence at Lapita sites indicates at least some excavation.” In Kei, spoken in the central Moluccas of eastern Indonesia Geurtjens (1921, p. 135) gave *umun* “een kuil, waarin steenen gloeiend gestookt zijn, met bladeren overdekt, waarop spijzen, daarover weer bladeren, gloeiende steenen en eindelijk alles toegedekt met zand, om de spijzen gaar te laten stoven” [“a pit in which glowing hot stones are placed and covered with (a layer of) leaves on which food is placed and covered with more leaves, this being covered with more glowing hot stones and finally the whole covered over with sand so as to let the food stew”]. Similarly, in Palau, a reflex of \*qumun designates an excavated earth oven or the action of cooking in such a structure: *mengúm* “bake food in a hole in the ground”, *ch-l-um* “was baked in a hole in the ground” (McManus, 1977, p. 186). The simplest explanation of this linguistic and cultural distribution is that the earth oven was used by speakers of PMP, and has been lost over most of island Southeast Asia, but generally preserved in the Pacific (and occasionally modified in form, as in the cases cited by Chowning).

Lichtenberk (1994) and Ross (1995) have provided useful surveys of the reconstructed vocabulary relating to food plants and food production in POC, but generally restricted their discussion to Oceanic languages and entered into more detail than is considered necessary for sketching the wider picture here.

### Tools and Implements

The category of tools and implements is a broad one, and can be subdivided into several smaller units.

Since it is clear that PAN speakers cultivated both root and grain crops, they must have had implements which enabled them to work the fields, plant, keep animals away from the crops, harvest, thresh, winnow, store, etc. To date only a small amount of linguistic material is available bearing on these matters. Several widely divergent Formosan languages reflect \**tak* “hoe” (Pazeh, Kavalan), and this term may date from the initial AN settlement of Taiwan. However, it is difficult to control for borrowing between the aboriginal languages of Taiwan, since these have developed out of populations which have been on the island for some six millennia, and which were not always necessarily in their present locations. Outside Taiwan there is no widespread cognate set for “hoe”, but PMP \**sual* “digging stick” (P, WIN, OC) is found in both island Southeast Asia and the Pacific.

Among wood-working tools PMP \*kiRam “axe/adze” (WIN, OC) is perhaps the most secure reconstruction. In at least two widely divergent languages (Palauan, Ponapean) a reflex of \*kiRam refers specifically to the *Tridacna* shell adze, but it is not clear that this was an essential feature of the PMP referent. To date linguistic reconstructions for such tools as planes, files, drills, and saws are not available for any early proto-language, although the tools themselves have a fairly wide distribution. The only other tool used in connection with wood that has been inferred from linguistic comparison is PAN \*palu “hammer; to hammer” (T, P, WIN, EIN, OC). What remains unclear is the range of objects with which \*palu could co-occur. The construction of both houses and canoes appears to have relied heavily on mortise and tenon joints, which require only wood and binding material. Reflexes of \*palu are clearly distinguished from reflexes of \*qaSelu “pestle”, and the verbs denoting pounding of foodstuffs and hammering are not at all the same in most AN languages. What then did EAN speakers hammer?

The most likely objects of \*palu were wooden pegs used as dowels in the joining of planks, PMP \*papan (P, WIN, EIN, OC). Although there is evidence for EAN knowledge of iron several millennia before an archaeologically defined “Iron Age”, there is no evidence of iron nails or other iron tools.

### Metals

Blust (1976) presented linguistic evidence for a knowledge of iron which appears to considerably antedate archaeological evidence for iron-working in Southeast Asia. This statement has come under attack in several quarters (e.g., Crowley 1994, p. 87; Meacham 1984/1985, p. 92). It is understandable how such criticisms might be made by an archaeologist, since the material of his own discipline provides no basis for inferring an early knowledge of iron among AN-speaking peoples. It is less easy to understand such criticisms from a linguist unless they are accompanied by an alternative explanation of the linguistic observations upon which the original inference was based. The critical reconstructed forms relating to a knowledge of iron in Blust (1976) are PWMP \*bari “iron” (P, WIN), PAN \*malat “sword” (T, WIN), PWMP \*salsal “blacksmithing” (P, WIN), PWMP \*landasan “anvil” (P, WIN), and PWMP \*karat “rust” (P, WIN). The evidence supporting each of these reconstructions was cautiously weighed to assess the merits of chance, borrowing, and common inheritance as explanations of the observed distributions, and it was concluded that there is evidence that iron was terminologically distinguished from other metals by

at least 3500 B.P. (Blust, 1976, p. 30), and perhaps as early as 6000 B.P. In addition, it was pointed out that \*salsal and \*landasan support an additional inference that metals were *worked* by at least 3500 B.P. Crowley (1994, p. 87) conflated these two statements and averred that “others have reconstructed Proto Austronesians as literate metallurgists, arousing the skepticism of archaeologists.”

Knowledge of metals and knowledge of metallurgy obviously are not the same thing. Iron ores make up about 5% of the earth’s crust, occurring most commonly in the form of haematite crystals, or as bog-iron (limonite), although meteoric iron is also found in smaller amounts. There is no *a priori* reason why iron in any of these forms could not have been known and named by people whose tools were made of stone and shell. Particularly in crystalline form, iron may very well have been regarded as having supernatural properties. In many parts of the world quartz crystals form part of the ritual paraphernalia of the shaman (being regarded as instruments of prescience, hence facilitating the foretelling of events, the diagnosis of disease, etc.), and it is certainly possible that haematite crystals or iron ore in other forms also had ritual significance.

The comparative linguist must rely on primary sources, and these often give only the most schematic information about the meaning of a word. PWMP \*bari was based on the comparison of Palawan Batak (Philippines) *bari* “iron, metal” with Iban *bari* “steel”, the latter form presumably showing a more recently developed meaning from earlier “iron”. In addition possible but uncertain cognates were cited from several Formosan aboriginal languages.

The gloss for Iban *bari* in Blust (1976) came from Scott (1956), but the more recent Iban dictionary of Richards (1981) gives *bari* only as a modifier of *besi* “iron”: *besi bari* “steel”, noting a possible connection with Malay *bahari*, a form that Wilkinson (1959) listed only in the collocation *keris bahari* “kris with a long narrow straight blade”. This new information somewhat weakens the original comparison, but at the same time additional supporting information has come to light. First, although he himself adopted a different interpretation than mine, Mahdi (1994, p. 175) drew attention to a form cited by Ray (1913) which I had missed in my earlier discussion: Tabun (interior of northern Sarawak) *bari* “iron”. Second, more Formosan material has been found which points to \*baliS “iron”, a form which could not be borrowed from any of the languages of the Philippines or Indonesia because these languages lack the final consonant (PAN \*-S disappeared almost everywhere outside Taiwan). It is possible that the similarity of such forms as Kavalan *balis* “iron” to Palawan Batak *bari* “iron” is due to chance, since the medial consonant correspondence has not been confirmed as recurrent. Nonetheless, even if this comparison is dismissed

the evidence for \*karat provides an independent basis for an inference that iron was *known* (though not necessarily worked) by the period 3500-4000 B.P. Marschall (1968, p. 248ff, passim) provides an overview of the forms in which iron ore is found in surface sites in Indonesia, thus giving some idea of the ease with which it would have been located by EAN speakers there. A second metal which merits a brief discussion is lead or tin. For Puyuma, in southeastern Taiwan, Cauquelin (1991, p. 212) cites *timra* “bullet; lead (metal)”, while Tsuchida (1980, p. 243, 269) gave *timRa* “bullet; lead”. In Tagalog and Bikol of the central Philippines the word appears as *tiŋá?*, and *timá?/tiŋá?* “lead (metal)”, respectively, in Kelabit of central Borneo as *semera?* “lead (metal)”, in Malay as *timah* “tin (also a generic term covering: zinc or spelter)”, in Old Javanese as *timah* “tin, lead”, in Sangir of northern Sulawesi as *timbeha* “tin, lead”, and so on in a number of other languages of western and eastern Indonesia. Together these forms appear a priori to support PAN \*timeRaŋ “lead; tin”.

Cauquelin (1991) and Tsuchida (1980) described two different dialects of Puyuma; in the first of these the reflex of \*timeRaŋ is regular, but in the second we would expect \*\*timRaH. A similar phonological irregularity appears in Amis *timra* “bullet; bomb” (expected \*\*timla?), thus suggesting that this word has been borrowed into some of the languages of southern Taiwan. The problem with this hypothesis is that the nearest known language with a cognate term is Tagalog, and the form of the word makes Tagalog a very unlikely source for the word in southern Taiwan. Alternatively we might speculate that a related word was once found in Ilokano (where it would be expected to appear as *timra*), diffused into southern Taiwan, and then disappeared in the lending language. There is, however, simply no known evidence for this word anywhere in northern Luzon.

Most of the reflexes in eastern Indonesia appear to be loans from a Sulawesi source (probably Buginese *tumerra*), as signaled by the distinctively irregular first-syllable vowel. Even if we were to dismiss the Formosan and eastern Indonesian material as products of borrowing, however, we would be forced to conclude that a distinct term meaning “lead, tin” was found in PWMP by at least 3500–4000 B.P. Again, it should be noted carefully that the linguistic evidence says nothing about the uses to which this metal was put—all that can safely be inferred from the identification of a widespread cognate set is that the material was terminologically distinguished from other materials, and so was known to speakers of the language in which this terminological distinction was made.

Finally, there is fairly straightforward evidence for PMP \*bulawan “gold”. In addition there is a cognate in Kavalan of northeastern Taiwan. However, Kavalan contains a small number of clear loanwords from Spanish which must have been acquired during the brief Spanish colonization

of northern Taiwan (1626–1642), and it appears that some loans were also acquired from Tagalog or other Philippine languages at this time through contact with Filipinos who were imported as colonial vassals. Even if we dismiss the Kavalan evidence as a likely product of borrowing, there is abundant support for PMP \*bulawan “gold”. Mahdi (1994) wished to dismiss this evidence by substituting a complicated and unnecessary hypothesis of widespread parallel semantic change from \*bulawan “copper, brass” to “gold”, but I find his argument far less well supported than the hypothesis that \*bulawan simply meant “gold”.

### Settlement and Housing

Blust (1987) presented an analysis of the EAN terminology for “house” and related concepts, with the following major conclusions: (1) PMP \*banua represented the concept of an inhabited territory (as opposed to wilderness). This included the village and its population, together with everything that contributed to the life-support system of the community (farms and gardens, fruit groves, sources of water and the graves of the ancestors). There was no separate term for “village”. (2) PAN \*Rumaq “house” referred exclusively to family dwellings. (3) PMP \*balay was a public building as opposed to a family dwelling, probably used for community meetings (in any case there is no indication that access to it was limited by sex). (4) PMP \*lepaw appears to have meant “granary”, although some reflexes occur in the meanings “house”, “hut”, “back verandah” and the like. (5) PMP \*kamaliR shows a wide range of semantic reflexes (“granary”, “fieldhut”, and other meanings in the Philippines; “palace”, “workshop of a blacksmith”, and “bedroom” in Sulawesi, “house” in the Lesser Sundas, and “men’s house” throughout the Admiralty Islands and Vanuatu in Melanesia). We can safely rule out “house” and “granary” as plausible glosses, since these meanings were represented by \*Rumaq and \*lepaw. This leaves “men’s house” as the most likely original sense.

Green (1994), citing work by Waterson, objected that “public building” is a poor gloss for PMP \*balay, since public buildings traditionally “are absent in many Southeast Asian societies.” It is difficult to understand how such statements enter the literature. Simple perusal of Lebar (1972, 1975) shows that some type of public building (bachelors’ house, ritual house/ancestral spirit house/ ceremonial house, community hall, guest house) traditionally was widespread in island Southeast Asia, being absent primarily in those parts of Borneo where the longhouse was innovated (Blust 1994), in Sulawesi, and in interior Mindanao, where concern for military defense reached an almost obsessive degree. Cases cited explicitly by Lebar in-

cluded most Sumatran groups, Balinese, Donggo, Savu, Manggarai, Endeh, Sika, Solorese, eastern Tetum, Atoni, the Southwestern Islands of the Lesser Sundas as a whole, Yamdena, Aru, Ambonese, western Toraja, Mori, Ngaju Dayak, Ma'anyan, Land Dayak (headhouses), Maranao, Amis, Puyuma, Paiwan, Bunun, and Tsou. In Blust (1976, 1987) the expression "public building" was selected as a neutral choice for a building of uncertain function which clearly differed from the private family dwelling called \*Rumaq. Green preferred the gloss "unwalled building", which is a plausible physical description of the structure, but says nothing about its *function*. In his interpretation a PMP village could presumably have had any number of \*balay, while in mine it would most likely have had just one.

As noted in Blust (1976), a number of features of the EAN house can be inferred from cognate linguistic material, although archaeological support for some of these is not likely ever to be forthcoming. The major terms for parts of the house are: PMP \*ataŋ "crossbeam" (P, WIN, EIN), PMP \*bubuŋ, \*bubuŋ-an "ridgepole, ridge of the roof" (P, WIN, EIN, OC), PMP \*haRezan "notched log ladder" (P, WIN, EIN), PMP \*kasaw "rafter" (P, WIN, EIN, OC), PMP \*papan "plank" (P, WIN, OC), PMP \*paRa "storage rack for firewood, etc. above the hearth" (P, WIN, OC), PAN \*qatep "roof thatch" (F, P, WIN, EIN, OC), PAN \*SadiRi "housepost" (F, P, WIN, EIN, OC).

Two of these terms are of critical importance to AN culture history: PAN \*SadiRi and PMP \*haRezan provide mutually corroboratory testimony that the EAN house was raised on posts and entered by ascending a (probably notched log) ladder. This point was made in Blust (1976, p. 36) when the archaeological exploration of the western Pacific was still in a very rudimentary stage, but has now been confirmed archaeologically for the earliest known Lapita site in Melanesia by Kirch (1988a, 1988b).

The other terms cited here have little direct relevance to archaeology, but can be used to fill out details in the picture of the EAN house. As noted in Blust (1976) there is strong linguistic evidence supporting the claim that by at least PMP times (if not earlier) the house was raised on posts and was entered by a (probably notched log) ladder. Since it had a ridgepole we can infer that the floorplan was rectangular rather than round. Moreover, the reconstruction for "ridgepole" shows that the roof sloped. There is abundant evidence for roofing with thatch shingles. In less tropical areas such as Taiwan or the northern Philippines this is usually done with bundles of sword grass (*Imperata cylindrica*); in more tropical areas such as Indonesia or Melanesia the preferred roofing material is the frond of the sago palm. To the extent that climatic conditions and hence the distribution of flora have remained similar in island Southeast Asia over the past six millennia, it appears likely that the EAN house was roofed with

sword grass or similar material, and that palm thatch only became dominant as a roofing material when AN-speaking groups moved into more tropical regions.

To these we can add the less widely attested term PWMP \*kulub “bamboo ridgepole cover” (P, WIN), which provides a bit more information about the form of the roof by perhaps 4000–4500 B.P.

There are two practices associated with the house which have archaeological implications and are likely to be of some antiquity. Neither can be inferred from linguistic comparison, but an inference that they were found in EAN society can be justified by distributional evidence. The first of these concerns the jaws of pigs. In many parts of island Southeast Asia and the Pacific, pig jaws are hung from the rafters of the house. In some cases these may be the jaws of pigs killed in the hunt, while in others they are the jaws of pigs killed for a feast. In the latter case they are hung in the house of the feast-giver, who normally would be a chief or other person of wealth and status. An example of the former type was given by Hose and McDougall (1912, vol. 2, p. 65) for the Kenyah of central Borneo among whom “The lower jaws of all wild pigs that are killed are cleaned and hung up together in the house, for it is believed that if these are lost or in any way destroyed the dogs would cease to hunt.” An example of the latter type appears among the Sa’a of Malaita in the Southeast Solomon Islands, where according to Ivens (1972, p. 30), in the chiefly lodge “The jaws of pigs killed at feasts are put on the rafters.”

The second practice concerns the burial of a sacrificial victim under the first or main pillar of a new house. This practice was traditional among the Melanau of Sarawak (Hang Tuah Merawin, personal communication), and is reported by Ivens (1972, p. 375) for the Sa’a, who required it only for the first pillar of a chief’s house.

The first of these practices is, to my knowledge, fairly distinctive, and likely to date from at least PMP times. The second is echoed in other parts of the world (Frazer, 1960, p. 222), and so may have developed independently in some AN societies after their separation from a common ancestor.

### Sailing and Navigation

Pawley and Pawley (1994) provided a valuable overview of the linguistic evidence for EAN canoe-building and navigation. As in the earlier sketch of Blust (1976) reconstructed vocabulary was presented to show that PMP speakers had a fully developed outrigger canoe complex which included several types of boats, sails and sailing techniques, paddles, rudders,

canoe bailers, cross seats inside the hull, rollers for beaching canoes, and of course the outrigger itself. In addition they added a great deal of new information regarding such matters as hull construction, planking, the keel, carved projecting end-pieces, platforms, cabins and the like. All in all we are given a rather detailed picture of the material vehicles which carried AN speakers halfway around the world from island Southeast Asia to Madagascar in the west, and across the Pacific to Hawaii and Easter Island in the east.

Perhaps the single most significant unanswered question about EAN sailing and navigation is when the outrigger canoe complex, and with it long-range navigational capabilities, developed. As Pawley and Pawley (1994) noted in their conclusion, hardly any of the reconstructed terminology relating to sailing and navigation in general, and *none* of the reconstructed terminology relating specifically to the outrigger canoe complex, can be assigned to PAN. This situation is a direct result of two factors: the higher-order subgrouping of AN and the circumstances in which the aboriginal peoples of Taiwan have found themselves after centuries of Chinese immigration to the island.

If one accepts the Malayo-Polynesian hypothesis, no lexical reconstruction can be assigned to PAN without Formosan cognates. Since most of the aboriginal peoples of Taiwan are now confined to the economically less desirable lands in the mountainous interior, terminologies relating to the sea are particularly difficult to reconstruct for PAN. Virtually all of the evidence that we have comes from five languages: (1) Kavalan, still spoken by perhaps 300–500 people along Taiwan's narrow east coast; (2) Amis, spoken by about 100,000 people over a wider north-south zone on both sides of the Kavalan; (3) Puyuma, spoken by 5,000–6,000 people in a small enclave near Taidong; (4) Paiwan, spoken by some 30,000 people along the southeast coast of Taiwan to the south of the Puyuma; and (5) Siraya, once spoken on the southwest plain, but now extinct. Kavalan has reflexes of \**layaR* "sail", and \**paluja* "to paddle", Paiwan has *la-laya* "flag, banner" (presumably reflecting \**layaR*), and some of the Tsouic languages in the mountains of south-central Taiwan reflect \**qabaŋ* "boat". All that can safely be inferred about PAN sailing and navigation from this evidence is that boats were both paddled and sailed. We do not know whether these boats had outriggers, or anything about their sailing capabilities. For AN speakers to have reached Taiwan during the late seventh millennium B.P. it would have been necessary to cross the Taiwan Strait, a body of water somewhat over 100 miles in width. This could conceivably have been accomplished with sailing rafts (Doran, 1971, 1981), as bamboo suitable for the construction of such watercraft is abundantly available in southern China.

There is one historical reference which suggests that the outrigger canoe was used in eastern Taiwan during the eighteenth century. Chinese records from the Ching dynasty indicate that during the sixty-first year of the emperor Kang-xi (1722 in the Western calendar) an expedition which was sent to explore Taiwan under the leadership of general Ju Wen-bing was shipwrecked on the northeast coast of the island. As a result of this accident the general and his men came into contact with Kavalan aborigines, who killed some of the crew. Peace was restored through the mediation of a local Chinese trader who was experienced in dealing with the natives, and the crew spent some time in the area observing local customs. Among other things they reported that the Kavalan ate raw fish and crabs with salt, and that they used boats made from a hollowed log hull with wooden pieces on the sides "like wings". This would appear to be a fairly straightforward description of a single-hulled double outrigger canoe, and might be taken to resolve the issue whether the outrigger canoe complex developed in Taiwan, or only after AN speakers had departed for the Philippines.

The problem in interpreting this report has to do with contact. From 1626 to 1642 the Spanish colonized a small part of northern Taiwan, and left several conspicuous loanwords in Basay and Kavalan, the principal languages with which they came into contact. Since the Spanish headquarters in the Far East had been established at Manila in 1572 (the year the Manila Galleon moved from Cebu), it is only to be expected that the Spanish brought some Filipinos to Taiwan with them. Ferrell (1969, pp. 53, 247) reported that the outrigger canoe of the Kavalan (which is no longer in use) was called *ban̄ka*. This word is phonologically irregular for Kavalan, and indicates borrowing. The source almost certainly was Tagalog *ban̄ka* "boat". We are left, then, with the same uncertain choice between two alternatives with which we began: (1) The outrigger canoe complex may have developed on Taiwan or even earlier along the coast of southern China, and been subsequently lost in these areas, or (2) AN speakers may have reached Taiwan with sailing rafts or simple dugout canoes and only developed the more elaborate outrigger canoe complex after moving southward into the Philippines.

### Warfare

No general term for "war" has been reconstructed for any early AN proto-language. A number of terms which can be associated with warfare provide the principal linguistic testimony for this semantic domain. These include: PAN \*busuR "bow" (T, P, WIN, EIN, OC), PAN \*panaq "shoot

an arrow" (T, P, WIN, EIN, OC), and PAN \*buNuq "throw at, hit with a projectile" (T, P, WIN, EIN, OC).

By themselves these three terms provide little information about EAN warfare, since there is every reason to believe that the bow served primarily as an instrument of the hunt, and \*buNuq could have referred to projectiles aimed at game. However, it is clear that AN speakers took the bow with them into the Pacific beyond the Solomons chain, where the only native mammals were the rat and the bat (Darlington, 1980, p. 324). Under these circumstances the bow must have lost much of its importance as an instrument of the hunt and acquired an increasing importance as an instrument of warfare.

PAN \*busuR "enemy" (T, P, EIN), a homophone of \*busuR "bow", PAN \*kayaw "headhunting; hunt heads" (T, P, WIN), and PAN \*taban "war trophy" (T, P, WIN), applies only to human adversaries, and so provides a more specific type of information about warfare. The inference that PAN speakers practiced headhunting is well supported by reflexes of \*kayaw, and less directly by reflexes of \*taban (meaning "head trophy" in such Formosan languages as Kavalan and Amis, but referring to war booty, elopement, and similar concepts outside Taiwan). As in other parts of the world, headhunting was inextricably tied up with religious ideas, in particular notions of human and agricultural fertility resulting from the capture and ritual incorporation of souls or spiritual force from outside the community.

PMP \*tamiŋ "shield" (P, EIN) suggests that shields were used in warfare as protection against flying missiles or the blows of clubs. PMP \*suja "bamboo trail or pitfall spikes" (P, WIN, OC) is a revealing comparison for a feature of warfare that is unlikely ever to be retrieved from the archaeological record. Within the ethnographic present obliquely sliced spikes of bamboo, sometimes contaminated with excrement, have been planted in trails or camouflaged pitfalls as mantraps both in mainland and in island Southeast Asia (most recently in the Vietnam War). Reflexes of \*suja in Borneo, Sumatra, the Malay Peninsula, and parts of the Pacific as far east as the southeast Solomons attest to the early and continued use of this device among AN speakers as they moved further eastward into new environments. Although cognate linguistic forms have not yet been identified in Taiwan, trail and pitfall spikes of sharpened bamboo contaminated with human excrement were traditionally used as protection against the surreptitious approach of enemies by at least the Thao (Shih A-sung, personal communication), and it is very likely that the practice dates from PAN times.

PMP \*qambat "lie in wait, ambush, waylay" (P, WIN, EIN) indicates one manner in which attacks were carried out. The fact that there is no reconstructed vocabulary for largescale fighting in the form of pitched bat-

tles may indicate that these were rare, most encounters tending more to the hit-and-run tactics of guerrilla warfare. As in most prestate societies, it seems likely that the aim in warfare was less the total vanquishment of the enemy and territorial conquest than the personal redress of a perceived wrong and the collection of booty.

Several other terms are of potential interest in relation to warfare, but are difficult to interpret. In Mindanao reflexes of PMP \*baRani “brave, bold, fearless; dare to do something” refer to war leaders who have proved their prowess in battle by the taking of human life (Cole, 1968). This meaning may continue a usage that was present in PMP, or it may be one that was innovated within the special history of the Manobo peoples of Mindanao; reflexes collected so far in other areas have the more general meaning “brave, bold” and the like. Likewise, \*hamuk “run amuck” is a term that refers to a violently antisocial psychological state which may or may not have had connections with warfare.

Finally, Blust (1972) proposed that PMP \*qaRta meant “outsiders, alien people”, a meaning that it retains in such languages as Manggarai and Ngadha in the Lesser Sunda Islands. Adelaar (1994, p. 16) and Reid (1994c, p. 448) both challenged this reconstruction, the former preferring to gloss \*qaRta as “human being” and the latter as “Negrito”. There are numerous problems with the hypothesis that \*qaRta meant “human being”, not the least of which is the existence of another form (PMP \*tau) which is consistently reflected in the meaning “human being”. Reid’s suggested gloss probably is closer to the truth in that Negritos would have been the prototypical outsiders to PMP agriculturalists moving southward into the Philippines (Garvan, 1964; Reid, 1987).

The fact that reflexes of PMP \*qaRta mean “slave” in a number of widely separated daughter languages implies that most slaves were individuals from outside the community who had been incorporated as war captives. In this sense the translation “slave” is misleading, as the AN conceptual category had none of the economic implications associated with slavery in the Western World, and probably little of the cruelty. A slave was rather an outsider by birth who remained an outsider after capture and “incorporation” because s/he lacked the kinship affiliations which defined one’s place within society.

### Clothing

There are a number of uncertainties in drawing inferences about the manner in which EAN speakers clothed themselves. Nonetheless we can be fairly sure of some things.

First, clothing probably was made primarily of woven cloth rather than of animal skins or bark cloth. Zorc (1994, p. 557) maintained that in EAN (his “Hesperonesian-Formosan”) society “people dressed in either the skin of *animal*, *hide*, *leather* (\*qaNiC, \*kaLiC) or a *skirt*, *sarong* (\*tápiS).” But the first two reconstructions are reflected only with the meaning “animal hide”, and neither linguistic nor ethnographic evidence is presented for a connection with clothing.

There is unimpeachable linguistic evidence for a knowledge of true loom weaving by 6000 B.P. or earlier. This is provided by the doublet forms PAN \*tenun, \*tinequn “weave” (T, P, WIN, EIN), and by PAN \*baRija, PMP \*balija “batten of the loom” (with an equivalent distribution). Judging from the construction of attested forms, the word for “loom” itself probably was a morphological derivative of \*tenun. In addition PAN \*qatip and \*qatip-an (T, P, WIN) evidently referred to a part of the loom, probably the breast beam, while \*qaNi (T, WIN) may have meant “weaving spindle”.

It is clear from the ethnological evidence that weaving took place on a back loom, the (female) weaver sitting on a mat with legs extended forward or tucked under and the plane of the textile extending horizontally from her lap to a transverse horizontal head beam secured between two uprights. Tension on the warp threads was provided by the weaver’s sitting posture (forward to lessen, backward to increase). In the humid conditions characteristic of most of the AN world, no early textiles have survived, and we can therefore say little about the types of materials and their designs. Fibers probably were obtained primarily from hemp or banana plants (in particular the *Musa textilis*), and it is possible that some of the geometric and schematically anthropomorphic designs found on contemporaneous ceramics were also employed in weaving [cf. Chen (1988, p. 172ff) for sample Atayal, Pazeh, and Paiwan textile patterns; Rubinstein (1989) for the Philippines; and Kahlenberg (1977) for Indonesia].

Limitations of the available linguistic evidence make it much more difficult to justify inferences about specific articles of apparel. However, one widespread term stands out: PAN \*tapis (T, P, WIN, EIN). For Formosan languages Tsuchida (1976, p. 130) cited Saaroa *tapisi* “short skirt-like garment worn by men around the waist”, and Bunun *tapis* “piece of cloth worn by men, hung down, to cover the private parts”. In the Philippines and various parts of Indonesia reflexes of what can be taken to be the same form refer to a woman’s skirt. Given this difference of referent, it is not yet possible to be exact about the referent of PAN \*tapis, except to note that it almost certainly referred to a skirt-like article of apparel which was made of woven cloth [cf. Hicks (1976, p. 103) for a photograph of a Tetum weaver at work on a *tais*, said to be “the formal dress worn for rituals and other occasions”.)

Even if PAN \*tapis did not designate a loin-cloth, it appears likely that some form of woven loin-cloth was worn by men. In PWMP this was called \*bahaR (P, WIN), but no earlier etymon has yet been reconstructed. Distributional evidence from Taiwan and the Philippines suggests that various types of jackets and trousers may also have been made for use on special occasions.

There is no known linguistic evidence for early use of buttons or similar types of fastening devices, but PAN \*bakes “belt” (T, P, WIN, EIN) points to some kind of cincture. Both positive ethnographic evidence and negative linguistic evidence lead us to conclude that belts were woven waistbands tied like sashes rather than punctured rawhide straps with buckles.

In addition to these terms we must take note of PAN \*Sabit (T, P, WIN) and \*SebaN (T, P, WIN, EIN), both of which referred to a long cloth wrapped around the body by women and used primarily for carrying young children (older children, the injured, etc., could be carried pick-a-back: PAN \*baba).

Although some type of rain cape probably was worn in inclement weather, and a hat or turban-like cloth probably was worn on the head while working in the fields (PMP \*tudun “head cover”, with monosyllabic root \*-duŋ “shelter, protect”), no evidence has ever been presented for footgear of any kind. Early AN speakers evidently went barefoot, as did many of their descendants well into historical times.

There has been an unfortunate tendency in the past to impose implicit Western notions of “progress” on interpretations of the history of such aspects of traditional culture as food production and technology. Earlier schemata in which the domestication of root crops had to precede that of grain crops, and in which bark cloth production had to precede loom weaving, now appear untenable in the light of evidence from both comparative linguistics and archaeology. The mere fact that speakers of PAN already had loom weaving does not imply that it had “supplanted” bark cloth technology. On the contrary, although the linguistic evidence found to date is very sketchy, there are excellent archaeological and ethnological reasons to believe that bark cloth has been a part of AN-speaking societies throughout the six millennia that they have had loom weaving (Bellwood, 1985; Ling, 1960; Tolstoy, 1994). The real challenge in advancing our understanding of this aspect of AN culture history is to find support for hypotheses about the different utilitarian and social functions of woven textiles and bark cloth within the same societies as they evolved through some 300 generations.

It is a pity that Oliver (1989, 1, p. 89), in his massive survey of the literature on Oceanic ethnology, fell back on equivalent types of simplistic formulations in discussing the history of loom weaving and bark cloth: “It

is also significant that the clay spindle whorls, which were common in mainland Asian sites, were less common in island Southeast Asian sites, and altogether absent in Oceania—thereby confirming ethnographic distinctions in textile making: weaving on the Asian mainland, weaving and bark cloth making in island Southeast Asia, and bark cloth making in Oceania (except in western Micronesia where some weaving was also practiced).” In fact, both weaving and bark cloth making are found in all three areas, although admittedly with different emphases. The back loom, very similar in form and function to that found among Austronesian-speaking peoples in Taiwan, the Philippines and Indonesia, is ethnographically attested in the Carolines (Fischer, 1970, Appendices), in the Banks Islands, and in the Santa Cruz archipelago [Rivers, 1968, 1, endplates, 2, p. 379]. Oliver’s implicit position that weaving was either acquired in island Southeast Asia after AN speakers moved into the Pacific, or was lost by speakers of POC and then reinvented in Micronesia and Melanesia, has little appeal in comparison with the simpler view that weaving persisted until after the dispersal of POC, but then disappeared rather quickly in most areas, much like pottery over large parts of the same region.

Fabrics were sewn together, as attested by PAN \*taqiS “to sew” (T, P), PAN \*zaRum “needle” (T, P, WIN, EIN, OC). A second term for “to sew” appeared later and overlapped with PMP \*taqih (from PAN \*taqiS): PMP \*zaqit “to sew” (P, WIN, EIN, OC). It is possible that these terms had different referents, since some modern Oceanic languages distinguish, e.g., the sewing of clothing from the sewing of thatch shingles for roofing. Ethnographically, needles appeared to be made mainly of bone, the wing-bone of the flying fox being especially common.

In addition to loom weaving and the manufacture of bark cloth, it is also clear that the plaiting of mats, baskets, and the like formed an important part of womens’ work: PMP \*añam/añem (P, WIN, OC) “to plait”, PMP \*batuR (WIN, OC) “to plait”, PAN \*SapaR (T, P, WIN) “unroll a mat”. Although many attested societies have a fairly rich terminology for various types of plaited mats, trays, and baskets, the reconstructed vocabulary in this semantic domain is rather limited.

One remaining uncertainty concerns the use of deerskins in EAN society. If PAN was spoken on Taiwan, there can be no question that deer were hunted, at least for their meat. Ferrell (1969) noted that during the seventeenth century there was a vigorous trade in deerskins between various aboriginal groups in southern Taiwan and the Dutch. Whether the value placed on deerskins was stimulated by economic factors that resulted from Dutch-aboriginal contact or reflected more traditional usages is unclear.

### Personal Adornment

Personal adornment covers a range of physical referents, some of which are likely to leave an archaeological trace, while others are not. In the former category we can include the doublet set PAN \*quNuq (T, P) and \*SiNuq “beads, necklace”, and in the latter PAN \*beCik “tattoo” (T, P, WIN, EIN). This is not to say that all types of beads are commonly preserved in archaeological sites, or that the practice of tattooing may never be retrieved archaeologically. Beads of wood or other perishable material may have a short lifespan in tropical soils, while conditions of anaerobic sealing or extreme dessication may preserve human skin for millennia, as in the striking examples of tattooed bodies recently unearthed in Pazyryk kurgans of central Asia (Polosmak, 1994).

Although there is archaeological evidence for earrings, fingerrings, bracelets, armlets and the like, no good linguistic comparisons for these referents have yet been identified at the PAN or PMP levels. Jade artefacts are rather common in early sites in Taiwan and the Pescadores Islands (e.g., Tsang, 1992, Plate 26), but are rare or nonexistent outside outside Taiwan (except in New Zealand, where the abundance of nephrite made it a common material for ceremonial objects). It is likely that this was a material which was valued by speakers of PAN, but which was largely lost after the southward movement into the Philippines and only later reacquired (in another mineral form) in a few places such as New Zealand. Prominent among shells which served for ornamental purposes was the trochus, PMP \*lalak (WIN, OC), often used in Melanesia for armbands, and reportedly traded by the Sama-Bajaw “Sea Gypsies” of the southern Philippines (Pallezen, 1985, p. 323).

Given the clear linguistic and archaeological evidence for shell beads used in necklaces by speakers of PAN circa 6000 B.P., it is almost certain that earrings also were used. Whether the earlobes were distended by heavy earrings as is done in various parts of the AN world within the ethnographic present probably cannot be determined.

Comparative linguistic data do not permit any inferences about body deformation. However, Sagart (1994, p. 299) has noted that the practice of tooth evulsion, in particular the removal of the upper lateral incisors, is traditional among many Formosan aborigines, and archaeological testimony of a similar practice in what must have been an ancestral population appears in Chang (1957) and Pietrusewsky (1992). So far as I have been able to determine, although filing of the canines and some other forms of dental mutilation are found in western Indonesia, evulsion of the upper lateral incisors is not found in any AN-speaking population outside Taiwan. If this practice was found in PAN society, which appears likely from the continuity

of archaeological and ethnographic evidence, it evidently was lost when AN speakers moved southward into the Philippines.

There can be no question that tattooing was practiced in EAN society. More refined questions, such as whether both men and women tattooed and what the social or other significance of tattooing was, are more difficult to answer. Among the Atayal of northern Taiwan (Lebar 1975, p. 147), the Dusun of Sabah (Roth, 1896, vol. 2, p. 159), and the people of the Mentawai archipelago west of Sumatra (Nooy-Palm, 1972, pp. 43–44), a special tattoo was reserved for the successful headhunter. Rather than assume independent development in three historically related cultures, it appears best to attribute this agreement to a feature of PAN society. While tattooing may have been associated with headhunting, it is unlikely that this was its sole function. In many attested societies reflexes of PAN \*beCik or its doublet \*batik refer to decoration or designs in general, including the mottled pattern on snake skin and “batik” prints on textiles.

### Music

In Blust (1976) nothing could be said about the musical capabilities of EAN peoples. This situation has now changed.

The only secure linguistic reconstruction relating to a musical instrument on the earliest levels is PAN \*tulani, PMP \*tulali “flute” (F, P, WIN, OC). This word almost certainly referred to a bamboo nose flute, as it still does in several descendant communities.

Although a linguistic reconstruction is yet to be achieved, the Jew’s harp (or mouth harp) is also a basic traditional musical instrument among many Formosan aborigines and elsewhere in island Southeast Asia. It is most commonly employed in courtship, and it appears likely that this practice was present already in PAN times.

The drum, consisting of a hollow wooden resonating chamber and a taut skin cover at one or both ends is one of the most widely distributed traditional musical instruments in other parts of the world, and we might therefore expect to find evidence for it among EAN peoples. There is, however, little linguistic or ethnographic support for such an inference. Rather, the slit-gong or log drum appears to have been used as the functional equivalent of skin-headed drums in other parts of the world (e.g., for sending signals at a distance). To date linguistic reconstructions for the slit-gong (a hollow log closed at both ends with a longitudinal slit in the center, piggy-bank fashion) are available only for Proto-Oceanic: \*dali, \*koŋ koŋ, both evidently meaning “slit gong”, although the latter appears to have been onomatopoeic, and may have referred to the sound. However, the

slit-gong is attested in Taiwan (Chen, 1988, pp. 79–80) and the writer personally observed a specimen in the court of the Sultan of Yogyakarta in central Java during the early 1980s. It thus appears likely on distributional grounds that the slit-gong has an older history among AN-speaking peoples, probably dating from at least PMP times.

Needless to say, the bronze kettledrums of the Dong-son tradition, which are widespread in Indonesia, have been introduced from mainland Southeast Asia over the past 2,500 years (Bellwood, 1985, p. 272ff). In the same category we should perhaps mention the gamelan, a xylophone-like arrangement of gongs which is called by a reflex of \*kulintarṅ in several languages of the Philippines and western Indonesia and probably did not exist prior to the advent of bronze casting, although it could conceivably have developed from a nonmetallic (e.g., bamboo) prototype.

No evidence of any kind is known for native stringed instruments, all of which appear to be products of borrowing from India or the Middle East within the past two millennia.

## SOCIAL ORGANIZATION

The principal issues in discussing EAN social organization concern (1) type of descent, (2) type of marriage, and (3) presence or absence of hereditary statuses.

As early as 1919 Kroeber claimed that Philippine kinship systems derive from an original bilateral type which lacked descent groups. Thirty years later Murdock (1949) reached much the same conclusion for “Malayo-Polynesian” (= AN) as a whole. During this 30-year interval, however, the Dutch ethnologist J. P. B. de Josselin de Jong (1977) and his student F. A. W. van Wouden (1968), working with a range of societies in Indonesia which they attempted to place within a single “ethnological field of study”, concluded that the original structural type within the “Indonesian field of study” had descent groups, and practiced preferential matrilineal cross-cousin marriage. As so often happens in dealing with a comparative problem which requires reference to hundreds of related languages or cultures, both sides in this unstated controversy had reasonable explanations of the phenomena which they considered, but they did not adopt sufficiently broad views of the problem to see where difficulties arose for their interpretations.

Blust (1980a) addressed the basis for historical inferences about EAN descent and marriage through an examination of relevant linguistic reconstructions. The first conclusion reached was that PMP society probably had descent groups (viz., corporate kin categories defined through reference to

an apical ancestor). This conclusion follows from an important cross-cultural study by Murdock (1968), in which it was shown that the presence of a relative sex parameter in the sibling terminology of ethnographically attested societies is strongly associated with the presence of descent groups (particularly matrilineal descent). By applying a uniformitarian hypothesis to attested and reconstructed languages, it must be concluded that the same statistical association which Murdock found in his sample of attested societies also held for PMP. Since terms for cross siblings are attributed to PMP it follows that descent groups probably should be attributed to the speakers of this language.

The second conclusion that emerged from this study was that PMP society probably had preferential matrilineal cross-cousin marriage, and hence a system of marital alliance of the sort that Lévi-Strauss (1969) has called “generalized exchange”. There were several lines of evidence which pointed in this direction, but one of these stands out as especially important: the history of sibling terms.

This point was taken up at greater length in Blust (1993b), where particular attention was paid to a series of parallel changes called “the cross sibling substitution drifts”. In these changes the original terms for cross siblings (but not for parallel siblings) have been replaced independently in many languages from the northern Philippines to Madagascar to the Pacific with terms that appear to have had other primary significations: “male/female” or “child” + “male/female”. Converging lines of evidence involving (1) the syntactic behavior of the morphologically complex cross sibling terms in possessive constructions, and (2) the use of structurally similar expressions in both WMP and CMP languages to refer to wife-giving and wife-taking groups in systems of asymmetric exchange strongly favor an inference that PMP society distinguished wife-giving from wife-taking groups, and that the terms for these groups replaced the original terms for cross siblings in many daughter languages, i.e., Z (m.s.) was replaced by “male group” and B (w.s.) was replaced by “female group”. The apparent reversals of gender association here make sense when it is recalled that “wife-givers” = superior/male, and “wife-takers” = inferior/female in ethnographically attested schemes of dualistic cosmological classification, and that the wife-givers are the sister’s side, the wife-takers the brother’s side in asymmetric exchange.

Marshall (1984) concluded that POC lacked a relative sex parameter in its sibling terminology, but failed to observe basic methodological controls in reaching his conclusion, and was consequently the target of the same criticism from each of the four linguists who independently commented on his paper.

Based on the use of graph theory to determine most likely change paths, Hage and Harary (1995) took issue with Marshall's (1984) conclusions regarding POC sibling terminology, and reached a view of marriage and descent for speakers of POC which was very similar to that proposed by Blust (1980a, 1993b) for PMP.

Fox (1984/1985, 1994) questioned the usefulness of any type of classification of AN-speaking societies which is built around descent, but offered no explanation for the linguistic observations which support the inferences (1) of PMP descent groups and (2) of PMP asymmetric exchange. Chowning (1991, p. 72) challenged Fox's proposals to purge AN ethnology of such general anthropological concepts as "consanguinity", "affinity", and "descent".

The other area of social organization which has stimulated some debate in the literature is that of achieved versus inherited status, particularly in relation to leadership. Pawley (1982) identified two linguistic comparisons which appear to justify an inference that inherited status of the type common to attested Polynesian societies continues a type that was present in POC society, but which was lost over much of Melanesia. The linguistic evidence cited by Pawley was challenged by Lichtenberk (1986). However, Pawley was likely to be right whether the details of the linguistic evidence which he cited are accepted or not. Friedman (1981) and Hayden (1983) reached very similar conclusions based on rather different lines of evidence, and Kirch (1988a) cautiously assessed the internal evidence of distribution inequalities in prestige goods from Lapita excavations, suggesting that this material does indeed imply differential social statuses that may in some cases have been fairly marked (although, admittedly, without evidence of generational continuity it is difficult to determine whether statuses were ascribed or achieved).

On a higher level in the AN family, the question of hereditary leadership becomes even more challenging. A number of the societies of western Indonesia traditionally recognized three social strata which were defined by birth (or, in the case of the lowest, exclusion from kinship networks). In central Borneo this was the case for such peoples as the Kelabit (Harrisson 1959), Kenyah (Hose and McDougall, 1912), and Kayan (Rousseau, 1979). Lebar (1972, pp. 174, 191) reported that a similar type of stratification appears to have been more common in the past among such groups as the Melanau of Sarawak and the Maanyan of southeast Kalimantan. Further afield, a system of three rigid social classes has been reported for Nias, in the Barrier Islands west of Sumatra (Schröder, 1917), and a similar tripartite division of society into nobles, commoners, and slaves on the basis of hereditary rank is known among such groups as the Malagasy of Madagascar (of southeast Bornean derivation), the Banggai, Mongondow, west-

ern Toraja, and Mori of Sulawesi, the Atoni of Timor, and the Kei islanders of the central Moluccas (Lebar, 1972). Distributional evidence alone suggests that a social stratification into nobles, commoners, and slaves (the latter recruited from war captives) is an old feature of MP societies, although cognate linguistic forms which would enable us to infer a PMP terminology associated with social stratification are yet to be found.

## DISEASE AND DEATH

Blust (1976) identified four EAN terms for pathological conditions of the body. Three of these refer to skin diseases: PAN \*buqeni "ringworm, *Tinea imbricata*" (T, P, WIN, EIN, OC), PAN \*kurap "scaly skin disease" (T, WIN), PMP \*panaw "fungus infection which produces white patches on the skin, *Tinea flava* or *Leucoderma*" (P, WIN, OC). The more extensive comparative material now available largely confirms this tendency for the disease terminology to carry a heavy emphasis on cutaneous infections: PWMP \*bugis "a scaly skin disease, ichthyosis" (P, WIN), PMP \*buteliR "wart; cyst; nonpurulent skin eruption" (P, WIN, EIN, OC), PWMP \*kudis "scurfy skin disease, scabies" (P, WIN), PAN \*kuris "scurfy skin disease, scabies" (T, P, WIN).

Only two other general categories of bodily afflictions are reflected at all clearly by widespread cognate material. The first of these involves terms that relate to bodily swellings: PWMP \*bagaq "disease that causes swelling of body parts (edema?)" (P, WIN), PMP \*belbel "hydropoesia, bodily swelling caused by water retention" (P, OC), PWMP \*busun "be afflicted with a swollen abdomen as a result of violating customary law" (P, WIN). The second is PAN \*bulaR "cataract of the eye" (T, P, WIN, OC).

It is perhaps worth noting that each of the first two categories is associated with spirit attacks in the ethnographic literature (Blust, 1981). It is not clear to me whether this is also true for ocular cataracts.

Several terms relating to the burial of the dead and associated rituals which were not available in Blust (1976) can now be added to this discussion. These include PMP \*balun "bind, bundle; wrap in cloth; death shroud" (WIN, EIN), PMP \*baliw-an "don mourning apparel; mourn for a deceased spouse" (P, EIN), and PMP \*baluq "mourn the dead" (P, WIN, EIN, OC).

Although reflexes of PMP \*balun often occur with the more general meaning of "wrap in cloth", they refer specifically to a funeral shroud in Rejang of south Sumatra, Tae' of central Sulawesi, Wolio of southern Sulawesi, and Tëtum of Timor, and this is likely to have been a component of the earlier meaning. The evidence for \*baliw-an is slender, but is supported indirectly by other forms of \*baliw. As observed in Blust (1981),

PMP \*baliw probably referred to a dual division of society through which a number of ritual and ceremonial functions were expressed, as in the mourning of a deceased spouse (one from the “other” moiety).

Although we can reconstruct PAN \*lebeŋ “bury; burial” (T, P, WIN), very little linguistic evidence has been collected which bears on burial practices. The one notable exception to this statement is discussed in Blust (1986/87), where it was argued that PMP \*liaŋ “cave” became “grave” in a number of the languages of northern Sarawak as a result of the earlier practice of cave burial by the AN-speaking settlers of the area. We can thus infer a semantic development: (1) \*liaŋ = cave, (2) \*liaŋ = cave = burial place, (3) \*liaŋ = burial place. Much the same type of semantic shift records changes in the history of technology in an English word such as “pen” (from Latin *penna* “feather”), where three stages are discernible: (1) /pen/ = feather quill, (2) /pen/ = feather quill = writing implement, and (3) /pen/ = writing implement.

### THE SPIRIT WORLD

The most important reconstructed terms that appear to relate directly to ideas about the world of spirits are: PAN \*qaNiCu “ghost, spirit of the dead; owl” (T, P, WIN, EIN, OC), PMP \*ñawa “breath, breath soul” (P, WIN, EIN, OC), and PMP \*sumaŋed “life-force, soul” (WIN, EIN).

The first of these terms is very widespread, and almost always refers to the spirits of the dead. The third has a more restricted distribution in island Southeast Asia, and evidently was applied not only to humans, but also to the vital principal of rice (\*sumaŋed ni pajay “spirit of the rice”) which it was necessary to protect when harvesting. In practice this belief was connected with the use of harvesting blades small enough to be concealed in the palm of the hand so as not to startle the rice spirit and cause it to flee when the grain head was severed. As noted by Wilkinson (1959, sub /tuai/) among Malays the finger-blade was used only in harvesting seed rice, not rice intended for consumption, since it was only the former that needed to retain its “soul” and remain capable of growth until the next planting.

PMP \*ñawa has a variety of semantic reflexes, including “breath”, “soul”, and various body parts, most notably the fontanelle and the heart. It evidently referred to a concept of the life-force somewhat different from that encoded in \*sumaŋed. Wilkinson described Malay /ñawa/ as the “breath-soul” and it is likely that a very similar sense attached to PMP \*ñawa “breath, as a physical expression of the life-force”.

In addition to the above terms Blust (1983/1984) posited PMP \*qatuan “deity”, based on Malay /tuan/ “master, lord”, Uma (central Sulawesi) -/tua/ “lord”, Emira (western Melanesia) /otuana/ “spirits”, and various reflexes of Proto-Polynesian \*ʔatua “deity, god”. The reconstructed gloss for this term has been challenged by Chowning (1991, p. 61) on the grounds that “one of the differences between Melanesian and Polynesian religions is the scarcity, and often the complete absence, in Melanesian systems, of any beings powerful enough to be given that label.” Chowning may well have been right that \*qatuan did not refer to a supernatural being or class of supernatural beings powerful enough to merit the label “deity”. However, the reasons for her position can hardly be accepted, since the proposed gloss is attributed to a language ancestral to all non-Formosan AN languages, which probably was spoken somewhere in the northern Philippines around 5000 B.P. The absence or near-absence of deistic concepts in ethnographically attested Melanesian societies can only be critical to determining the meaning of this term if these societies preserve the original sense of the term and all other AN-speaking societies have changed it. But this clearly is an empirical question, one not to be decided on the basis of preference for languages or cultures with which one may have greater personal familiarity. Moreover, it is worth noting that this issue may turn out to be inseparably implicated in theories of EAN social organization, since societies tend to create a supernatural domain which mirrors the power structure of the social organization: Egalitarian societies lack all-powerful deities, while the deities of hierarchical societies which concentrate power in the hands of a hereditary nobility commonly are far more powerful and demanding.

The last set of linguistic comparisons concerning the EAN spirit world is difficult to cite in a brief compass. Blust (1983) presented evidence for a family of affixes which most commonly appeared as \*qali- and \*kali-. These morphemes were generally fossilized on disyllabic word bases which belonged to a limited subset of semantic domains, including the following: (1) creepy-crawly things (various ants, bumblebee, butterfly, dragonfly, firefly, leech, luminous millipede, mangrove crab, etc.), (2) mystifying natural phenomena (rainbow, echo, whirlpool, whirlwind, etc.), (3) muddled psychological states (confused, dizzy, forget(ful), talk/walk in one’s sleep), (4) certain body parts (clavicle, scapula, pupil of eye, hairwhorl), (5) certain skin conditions (dandruff, rash), (6) certain birds (owl, woodpecker, swallow), (7) certain plants, and some that cannot easily be clustered (restless, gargle/rinse the mouth, sparks, death struggle, topsy-turvy). Each of these semantic categories carried a distinctive morphological marking in widely scattered languages which marks it as belonging to a single larger category (the “\*qali/kali- forms”). A consideration of the ethnographic literature

suggests that \*qali/kali words designated referents that had a dangerous connection with the spirit world, one which was morphologically marked to increase their perceptual salience so that children learning the language were simultaneously enculturated into the taboos associated with them.

### CULTURE LOSS REVISITED

One of the most intriguing consequences of the use of cognate vocabulary to reconstruct AN culture history is that a simple model of unilinear progress in economy and material culture becomes completely untenable. Rather, as Rivers (1912) argued over 80 years ago, there is strong evidence that features of culture which may appear indispensable in some environments can disappear through adaptation to new environments. Based on the linguistic evidence, there can be no question that AN speakers in Taiwan around 6000 B.P. (1) cultivated rice and millet, (2) lived in substantial timber houses raised on piles, (3) had domesticated pigs, dogs, and perhaps water buffalos and chickens, (4) practiced true weaving on a simple back loom, (5) used the bow and arrow, and (6) were familiar with some metals, including at least tin. By the time the descendants of this community reached the northern Philippines around 5500 B.P., the linguistic evidence shows clearly that they possessed in addition the outrigger canoe, pottery (archaeologically present in Taiwan at 6300 B.P., but not recoverable from the available linguistic evidence), and a number of important root and tree crops including the yam, taro, banana, sago, breadfruit, coconut, and sugarcane, the last of which they had brought with them from Taiwan. By the time the descendants of *this* cultural community reached Fiji and western Polynesia around 3500 B.P. they (1) had lost all knowledge of grain crops, (2) lived in reasonably well-constructed houses which, however, apparently were not raised on piles, (3) had lost the water buffalo, and perhaps the dog, (4) had lost all knowledge of true weaving, coming to rely entirely on bark cloth for clothing, and (5) had lost all knowledge of metals. Although pottery survived in Fiji and western Polynesia in the period shortly after 3500 B.P., it subsequently disappeared throughout Polynesia. Similarly, although the bow was known in much of Polynesia, it had lost whatever value it once had as an instrument of the hunt, apparently never functioned in war, and was confined almost exclusively to sport.

Such a developmental picture, suggesting as it does an ongoing impoverishment of material culture, is jarring to many Westerners, for whom the idea of "progress" is unassailably basic and universal, and for whom the definition of progress is uncompromisingly technological. But the alternative to this conclusion—that the features of material culture in ques-

tion were developed *after* the separation of the AN-speaking peoples of island Southeast Asia from those of Fiji and Polynesia—is impossible to maintain without ignoring or doing serious violence to the evidence of comparative linguistics. Moreover, archaeological and distributional evidence supports the general thesis that culture loss was not unusual in AN culture history. To cite only one archaeologically salient example, pottery is found in the earliest culture-bearing levels in Tonga around 3200 B.P., shows stylistic deterioration after about 2400 B.P., and disappears around the time of Christ. Nearly two millennia later it was reacquired from Fiji, where it had survived throughout the more than 3,000 years since the common ancestor of Fijian and the Polynesian languages split and began to diverge. Perhaps most remarkable of all, the very long-distance sailing technology which had enabled AN-speaking peoples to settle the remote islands of the Pacific in the first place was lost independently in such widely separated areas as Easter Island, and on all of the high islands of Micronesia.

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