

WERE LAPITA POTTERS ANCESTRAL TO POLYNESIA?
MERVYN MCLEAN

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Occasional papers in
**Pacific
Ethnomusicology**

ARCHIVE OF MAORI AND PACIFIC MUSIC

THE UNIVERSITY OF AUCKLAND

WERE LAPITA POTTERS
ANCESTRAL TO
POLYNESIANS?

A VIEW FROM
ETHNOMUSICOLOGY

Mervyn McLean

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PACIFIC ETHNOMUSICOLOGY

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The problem of Polynesian origins has been a perennial of both popular speculation and academic enquiry for well over a hundred years. Since the 1970s it has approached resolution after the discovery by archaeologists of a remarkable culture of Lapita colonists who are generally accepted to have been the first to penetrate beyond the Solomon Islands into the area now known as Remote Oceania, where they are believed to have been the ancestors of present-day Polynesians.

The present paper was prompted by a major discovery on the island of Efate in Vanuatu. In 2004, archaeologists excavated a site at Teouma near Port Vila, where they uncovered a large number of headless skeletons in association with intact Lapita pots, offering opportunity for DNA analysis of the skeletal remains (Bedford et al. 2006). Official results of the DNA analysis are still awaited but preliminary findings released to the media have indicated absence of a nine-base-pair deletion which is characteristic of 94 per cent of present-day Polynesians, suggesting that these particular potters may have been ancestors not of Polynesians but of Melanesians like those still living in Vanuatu. What then of Lapita sites elsewhere? Could the Lapita settlers of these regions also have been Melanesians? And, if so, where did the Polynesians come from? The present paper offers a body of musical evidence as a contribution towards finding possible answers.

EVIDENCE FROM MUSIC

Sources of information on this topic are primarily from three earlier publications (McLean 1979, 1994, 1999). Also drawn upon as required are extensive data files of music structure traits in New Guinea and Island Melanesia, compiled from sources listed in McLean 1995, and from listening to and analysis of available audio recordings from these areas.

MUSIC AREAS

The first of the above studies successfully distinguished music areas in Oceania using a statistical clustering method to identify co-occurring traits on a matrix of about 40 geographical areas and 40 selected musical traits including both musical instruments and structural elements of vocal music. Western and Eastern Polynesia emerged as strongly differentiated musically, confirming results reached on a variety of ethnographic grounds, including some musical ones, by Edwin Burrows (1938).

Specifically, with exceptions in some areas, these differences included the following (McLean 1999:453):

Western Instruments

Large canoe-shaped slit gongs
Nose flutes with both ends closed
Struck tubes
Rolled mats
Sounding boards

Eastern Instruments

Small bamboo-derived slit gongs
Nose flutes with one end closed

Western Structure

Litany

Isometre
Polyplane and drone polyphony

Eastern Structure

Engmelodik and quavering
cadences
Heterometre
Unison

Also of relevance to the present topic are pan-Polynesian traits characteristic both of the initial migrants into Eastern Polynesia and those left behind in the home area of Western Polynesia. In the musical instruments category or in lieu of them are body percussion, handclapping, jew's harps, shell trumpets, leaf oboes, and sticks. Structural elements include spoken recitation (*parlando*), one-note melody (*recto tono*), responsorial and strophic forms, and spoken, shouted, and trailing cadences.

The differences between the two areas of Western and Eastern Polynesia, and uniformities within each could only have happened as a result of isolation and separate development of the two after the initial settlement of Eastern Polynesia from Western Polynesia about 2,000 years ago. Longevity of music traits and corresponding usefulness for analysis is proven by still extant shared music systems in the Marginal Polynesian cultures of Hawai'i, the Marquesas Islands, Mangareva, and NZ Maori that have been separated for at least a thousand years. The uniformities of music in these areas, differing as they do from the kinds of music in central Eastern Polynesia, are a perfect illustration of the "stone in the pond" model of diffusion, with ripples spreading from the centre of origin to far-flung communities on the edge of the pond, which retain traits once characteristic of the centre. The package of marginal Polynesian musical traits is evidence of the kind of music practised by the original settlers of Eastern Polynesia 2,000 years ago. Also of relevance to the present paper is a cluster of traits identified as Core Melanesian which can be shown to have influenced the music styles of Western Polynesia subsequent to the departure of the Eastern Polynesian settlers.

Finally, when the instrumental and structural associations in the 1979 paper were amalgamated, patterns of combined associations emerged, with some unexpected results. New Caledonia, for example, is almost universally regarded as part of Melanesia. The clustering study, however, showed its strongest musical links – especially for music structure – to be with Fiji and, through Fiji, ultimately with

Western Polynesia. Thus, for music, New Caledonia and Fiji belong with Polynesia rather than with Melanesia.

Chained associations involving several areas also emerged, including the following:

Futuna — Uvea — Tonga — Samoa — Society Is. — Marquesas Is.

The direction of influence is not indicated, but it will be noticed that in the centre of this distribution is Samoa which almost certainly ranks as the area of origin for the entire chain. In one direction the chain extends through Tonga as far as Futuna, and in the other Samoa becomes the probable homeland and fabled “Hawaiki” for all of Eastern Polynesia.

The above chain also serves to illustrate an important distinction between borrowing relationships and longer-term ones resulting from migrations. The leap from Samoa to the Society Islands is self-evidently an example of migration, and Futuna is also far enough away from Tonga and Samoa to reflect settlement history. As might be expected, however, there is extensive evidence of long-term and protracted borrowing relationships between all islands and island groups that are adjacent to each other. Tonga and Samoa provide a prime example, with numerous song and dance forms known to have been borrowed each from the other (q.v. McLean 1999 Ch.28).

McLean 1994 is a monograph entitled *Diffusion of Musical Instruments and Their Relation to Language Migrations in New Guinea*. On the basis of the earlier study, it was expected when work on the monograph began that most of the associations to be found would be of the borrowing kind. It was a surprise to discover that not all of the relationships could be explained in this way and there was extraordinarily close fit with language migrations worked out by linguists (reported by Wurm *et al.* 1975).

Musical instruments in 518 tribal areas of New Guinea, were plotted and compared, and six distributional areas of associated instruments

were identified as follows:

- Distribution A: Hourglass drums.
- Distribution B: Jew's harps, mouth bows, zithers, rattles, panpipes, tubular flutes, and wooden trumpets.
- Distribution C: Bullroarers, ocarinas, bamboo trumpets, bamboo megaphones, and sacred flutes.
- Distribution D: Shell trumpets, leaf oboes, stamping tubes, and struck tubes.
- Distribution E: Slit gongs.
- Distribution F: Instruments of local distribution: Rubbing blocks, water drums, gourd trumpets, piston flutes, and struck and rubbed limepots.
- Distribution G: Rare instruments: Concussion sticks, nose flutes, and leaf whizzers.

Few of these have much to do with Polynesia. Distribution F is wholly unique to New Guinea. Distribution G has reached New Guinea from adjacent areas of Micronesia, where nose flutes take a different form from those of Polynesia. Distribution C is a coast-to-coast area centred on the Highlands of Papua New Guinea, and adjacent to Australia whence bullroarers would have come, as shown also by the presence in the area of Australian loan words (Wurm *et al.* 1975:921), and by recent discovery of genetic markers shared with Australia (Friedlaender *et al.* 2007:65).

The remaining music areas, however, extend beyond New Guinea, throwing light, as will be seen, on otherwise insoluble problems of distribution:

- Distribution A, consisting entirely of hourglass-shaped drums, is almost universal in New Guinea except for areas of absence most prominently in interior regions of southern Gulf province

in Papua New Guinea and in southern Papua. These drums are hand-held instruments used for dance accompaniment, and have no resemblance to Polynesian instruments, which take a different cylindrical form and are not carried. From New Guinea, however, they have diffused throughout Eastern Micronesia, where they provide material proof of linguistic subgrouping into Nuclear Micronesian, and offer some clue as to where the linguistic uniformities came from.

- Distribution B contains a full range of instruments for every purpose and is unquestionably Papuan rather than Austronesian in origin, with Austronesian speakers gaining it only late in the distributional sequence.
- The full Distribution D complex of shell trumpets, leaf oboes, stamping tubes, and struck tubes has a coastal distribution in sporadic pockets on both northern and southern coasts of New Guinea. The component instruments, however, do not always belong together. Shell trumpets occur world-wide in coastal regions, and in Oceania have no areas of conspicuous absence except far from the sea in the interiors of the largest landmasses. The leaf oboe occurs not only in Papua New Guinea but extensively in Island Melanesia and throughout both Polynesia and central and western Micronesia. In the Indonesian-administered area of Western New Guinea it is rare. In the same area, Marind is the sole reported example of struck tubes. Stamping tubes are not reported in Western New Guinea at all, and they are absent as well in most of the Highlands of Papua New Guinea. By and large the instruments of Distribution D are characteristic less of New Guinea than of Island Melanesia and Western Polynesia. Struck tubes, for example, are instruments of Western but not Eastern Polynesia, and stamping tubes are reported in Eastern Polynesia only for the Society Islands and Hawai'i, where they may have been independently invented. When work on the present paper began, it was tempting to attribute the origins of the Polynesians

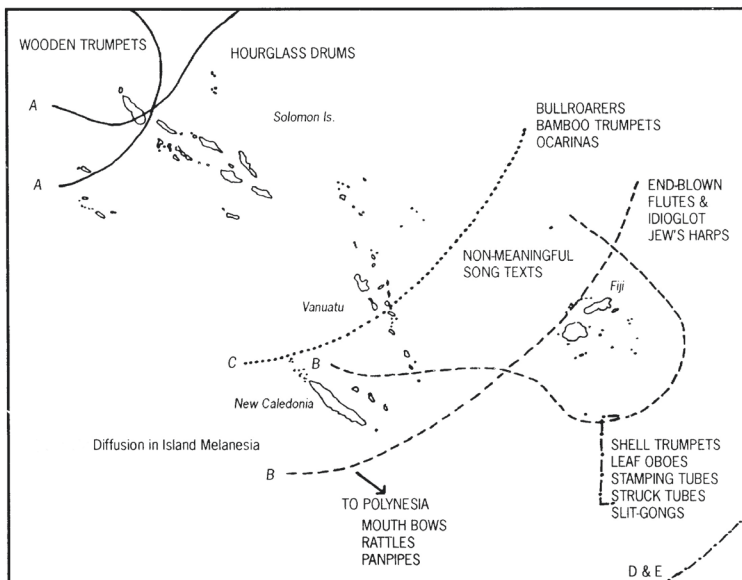
to the Distribution D people, who at first sight appear to qualify on account of a proposed migration of Eastern Oceanic speakers into the south coast of Papua New Guinea around 4000 BP (Wurm et al. 1975:955, 956) and the presence there of the Distribution D complex. But this prospect soon evaporated. The areas concerned all have music systems exhibiting core Melanesian traits, and stamping tubes are almost everywhere associated with polyphony, which is another Melanesian trait, absent in Eastern Polynesia except as a missionary introduction (McLean 1999:33ff) and evidently introduced into Western Polynesia only as a late borrowing from Melanesians. On balance, therefore, Distribution D has to be regarded as Melanesian.

- Distribution E is made up exclusively of wooden slit gongs. Characteristically, the instruments are large and hollowed out in the shape of a canoe. They occupy a broad northern coastal belt extending from the Lapita homeland of the Bismarck Archipelago westwards to the Indonesian side of the Sepik border of Papua New Guinea through the Madang and Sepik regions, where the instruments are found predominantly among maritime and riverine speakers of Austronesian languages. In the opposite direction from the Bismarcks, distribution extends southwards through Island Melanesia to Western Polynesia and Fiji. In Micronesia, slit gongs are mostly absent and they are conspicuously absent as well in most of mainland New Guinea except for the north coast.

DIFFUSION IN ISLAND MELANESIA

An important finding from the New Guinea study concerns instruments typical of New Guinea which diffused in successive waves southwards into Island Melanesia following the path of slit gongs. Some, along with elements of music structure belonging to the core Melanesian complex, reached as far as Western Polynesia but are not present in Eastern Polynesia, showing that they were acquired by Western Polynesians from Melanesians subsequent to the departure of Eastern Polynesian settlers around 2000 BP, and accounting for most of the musical differences now distinguishing Western Polynesia. Distinct boundaries mark the limits of each successive wave of diffusion.

The Distribution D and E instruments have penetrated furthest with some Distribution B instruments hard on their heels. Of the latter, mouth bows and rattles have gone furthest unless independently



Diffusion beyond New Guinea

invented in Eastern Polynesia. Panpipes managed to reach only as far as Samoa and Tonga where they are now long obsolete. Of the remaining Distribution B instruments, end-blown flutes and the typical New Guinea idioglot jew's harp have reached only as far as New Caledonia and Rotuma. Non-meaningful song texts which are associated with both Distribution B instruments and borrowing in New Guinea remain associated in Island Melanesia. None of the Distribution C instruments (bullroarers, bamboo trumpets and ocarinas) has gone further than central Vanuatu (McLean 1994:98).

The hourglass drum (Distribution A) does not extend beyond Buka and Bougainville in northern Island Melanesia, where it is present with wooden trumpets (Distribution B). As already indicated, this typically New Guinea form of drum has also diffused throughout Eastern Micronesia where one would expect it to have been introduced from the Bismarck Archipelago. Except for drums (Distribution A) and some elements of Distribution D (shell trumpets and leaf oboes), Micronesian instruments are essentially complementary to those of New Guinea. Bullroarers (Distribution C) have penetrated only the southern fringes of Micronesia, where they co-occur with leaf oboes (Distribution D) and leaf whizzers (Distribution F).

Jew's harps in Micronesia are in complementary distribution to drums, occurring in the west but not in the east. They are different in shape from the idioglot jew's harps of New Guinea and it is questionable whether the two belong together. The most likely explanation for the Micronesian distribution is that Micronesian jew's harps entered the area from the Philippines, independently of New Guinea jew's harps.

The remaining Micronesian instruments are sticks and nose flutes, both of which are rare in New Guinea (Distribution F). It has already been suggested that these instruments entered New Guinea from Micronesia. Nose flutes co-occur in Micronesia with jew's harps. Again it seems likely that they reached the area from

the Philippines. Sticks are shared with Polynesia but are universal in Micronesia, qualifying on this account as Micronesia's most characteristic instrument (McLean 1994:loc.cit.).

VOCAL MUSIC AREAS

Of particular use for present purposes are contrasting packages of traits referred to above as Marginal Eastern Polynesian and Core Melanesian. A feature of Marginal Polynesia is vocal styles of small melodic range, with few notes (Engmelodik), in contrast with Core Melanesia which is characterised by music of large melodic range and a five-note scale without semitones (anhemitonic pentatonic). Also prevalent in Island Melanesia is singing in parts (polyphony), shared with Western Polynesia, but contrasting with lack of polyphony (unison) in Marginal Eastern Polynesia. Within Melanesia, Vanuatu stands alone in this respect with absence of polyphony there except in Malekula. It is possible that the lack of polyphony in Vanuatu results from a greater degree of Papuan ancestry there than in other areas, which has also been suggested genetically (Hill et al. 1985:572-3). Fiji and New Caledonia possess polyphony but not wide range or anhemitonic pentatonic scales. In this and other respects, as earlier indicated, they are closer to Polynesia than to other areas of Melanesia.

The Core Melanesian traits of wide range and anhemitonic pentatonic scales, are characteristic throughout the Bismarck Archipelago, and the Solomon Islands, and extend also, though to lesser degree, into Vanuatu but not further south.

Three forms of Engmelodik can be distinguished, with separate areas of distribution. Those of Marginal Eastern Polynesia have 2-4 notes within the interval range of a perfect 4th, with or without semitones. A second type occurs in the Core Melanesian areas, in this case as subsets of the anhemitonic pentatonic scale (anhemitonic ditonic, tritonic and tetratonic). Again there are 2-4 notes but there are no semitones, and ranges can extend to an octave or more, qualifying as Engmelodik when

they are within a fourth or fifth. Finally, among available music notations from New Caledonia, the Loyalty Islands, Fiji, and Rotuma, a handful of anhemitonic scales like those of the Bismarck Archipelago are found. Most of the scales, however, are of 3 to 5-notes with semitones and a melodic range most commonly of a perfect 5th, identical, as a rule with the first few notes of the European major or minor scale which, to judge from notations published by Wilkes (1845(3)189-90, 245-6), were already exerting influence in Fiji by the early nineteenth century.

The pattern thus seen in Island Melanesia is a north to south progression of Core Melanesian traits from dominance in the Bismarcks and Solomons, some attenuation in Vanuatu, and disappearance in the southern regions of Fiji, New Caledonia/Loyalties and Rotuma, where a form of Engmelodik different from either Core Melanesia or Marginal Polynesia is found.

In Micronesia there is convincing evidence of a Polynesian connection in work reported by the pioneer American ethnomusicologist, George Herzog in a study of wax cylinder recordings made during a German South Sea Expedition of 1908–10.

Herzog transcribed into musical notation and analysed recordings from Palau, Satawal, Tobi, Pur, Sorol, Mogemog, Faraulip, Ifaluk, Elato, and Yap in the Central and Western Carolines, and from Puluwat and Truk in the Eastern Carolines (Herzog 1932, 1936). Two styles emerged from the analysis: a Central/Western style, and a contrasting Eastern one as follows:

	Central/Western	Eastern
Melody and scales	Limited tonal material including 2-note melodies, and recited or parlando styles	Built on extended tetrachords Song-like legato More tuneful No wholly recited songs

	Central/Western	Eastern
Rhythm	Often follows text Dotted rhythms Few durational values Often without strong metre Frequent paired rhythms	Flowing regular rhythm Portamento slurs Triple metres preferred
Tempo	Change of tempo unusual	
Form	Repetition of short motifs Introductions	Binary forms usual Codas
Polyphony	Bordun Parallel seconds and thirds	Little or no polyphony
Manner of performance	Uncertain intonation Gliding notes Transitional notes Grace notes Terminal glissando	Tendency to constant intonation Shouted endings

Obvious to anyone familiar with Oceanic music, as to Herzog himself, is a clear-cut affinity with Polynesia for the Central/Western Micronesian style, and more in common with Melanesia for the Eastern one. The Central/Western area could readily have been occupied from the geographically adjacent Bismarck Archipelago, and the Eastern Micronesian area either from the Bismarcks or from further afield within Island Melanesia.

In almost every respect except one, the traits noted for the Central/Western Carolines are either found in Marginal Eastern Polynesia, or are present in both Marginal and Western Polynesia. But the entries

in the above table for polyphony seem at first to be the wrong way round. Polyphony, as already noted, is prevalent throughout Island Melanesia except in most of Vanuatu, and drone-based polyphony is one of the core features of Western Polynesia, where, like other traits not present in Marginal Polynesia, it is assumed to have been gained from Melanesians after the departure of East Polynesians. Parallel seconds are especially anomalous if regarded as Polynesian, as they most frequently occur as a result of simultaneous performance of adjacent degrees of the anhemitonic pentatonic scale which again is Melanesian and appears in Western Polynesia only as a likely result of borrowing from Melanesia.

A possible explanation for polyphony, if not parallel seconds, in Herzog's samples could be influence either from Tuvalu or from one or both of the Polynesian Outliers, Kapingamarangi and Nukuoro. The latter two cannot be ruled out because not enough is known of their music. Tuvalu, however, does not have parallel seconds, and the following accounts for the presence of both anomalies without involving either Tuvalu or the Outliers.

In the Solomon Islands there are elaborate polyphonic panpipe ensembles as well as multi-part vocal music. Polyphony could have diffused to other areas from there: southwards into Western Polynesia; westwards into the south coast of Papua New Guinea as early as 4000 BP if the language migration proposed for this area by Wurm *et al.* is correct; and northwards into western and central Micronesia, as a late development from the Admiralty Islands, where two-part dissonant polyphony is famously present (Messner 1981), and intermittent drones are not unknown. Panpipes and stamping tubes would not have been part of the movement into the Carolines because of lack of bamboo in the predominantly atoll environment. The entire package of traits would have been spread and maintained as a result of the well known *sawei* tribute system of the Yap empire and similar systems of exchange that continued to operate until modern times.

Finally, lack of polyphony in the eastern Carolines could be a remnant of pre-Polynesian practice before the introduction of polyphony from the Admiralties. In every respect, therefore, Herzog's results are consistent with an early group of Eastern Oceanic speakers who spent some time in Micronesia before migrating into Remote Oceania, with Marginal Polynesian traits first to arrive into the Carolines, and polyphony later after the departure of Polynesian ancestors.

ISSUES ARISING FROM OTHER DISCIPLINES

Before attempting an answer to the question posed in the title of this paper, it is necessary to briefly review salient work carried out in archaeology, linguistics, physical anthropology and genetics.

THE LAPITA HYPOTHESIS

If not quite a household word, Lapita is well-known as the name given to a distinctive form of dentate-stamped pottery, the bearers of which are believed to have been ancestral to present-day Polynesians. Originating in New Britain, the Lapita potters were seafarers who occupied numerous sites throughout Island Melanesia and Western Polynesia over a period of about 3500–2800 BP. Having reached as far as Fiji, the Lapita colonists moved on to Tonga, Samoa, and adjacent areas, where they are believed to have remained in relative isolation for a period, known as “the pause”, of perhaps a thousand or more years, during which voyages beyond the immediate area ceased, and the characteristic features of Polynesian language and culture are thought to have emerged. After this, during the first centuries AD, voyaging over longer distances resumed, Polynesian Outliers in Melanesia were settled, and a final push occurred into Eastern Polynesia as a result of which the whole of this area was ultimately occupied.

For purposes of the present paper, there is no need to review Lapita literature in detail. Two crucial developments must, however, be mentioned:

First is adoption of the terms Near Oceania and Remote Oceania which have replaced the older ethnographic divisions of Melanesia, Micronesia, and Polynesia, and have become standard among most scholars working on the subject of Lapita. Near Oceania includes New Guinea, the Bismarck Archipelago and the Solomon Islands as far south as San Cristobal, with Remote Oceania embracing Polynesia, Micronesia, and all remaining areas of Island Melanesia. Except for

the Mariana Islands, Yap, and Palau in Western Micronesia, the whole of remote Oceania is thought to have been empty of people until the advent of the Lapita potters.

Also of importance are competing “models” of Lapita origin, the most influential of which are Entangled Bank (Terrell 1988), Express or Fast Train (Diamond 1988), Slow Boat (Kayser et al. 2000), and Triple I (Green 1991, 2000). The Fast Train model brings together theories of an origin in Taiwan, followed by transit through the Philippines or Indonesia, then a swift expansion of Lapita colonists into Remote Oceania from the Bismarck Archipelago through Island Melanesia. Terrell’s Entangled Bank, which has had little support, proposes an origin exclusively within Melanesia. The Slow Boat emerged as a result of genetic research on Y chromosomes which identified components of male DNA requiring a more protracted transit than previously thought. Finally, the Triple I model amalgamates elements of the others in a process of intrusion, innovation, and integration.

LINGUISTICS

During the past several decades, linguists have worked closely with archaeologists to provide underpinning for the dating of Lapita sites, the probable origin of Lapita peoples, and for working out the nature of Lapita society from reconstruction of vocabulary in the proto languages spoken at each successive stage of language development as shown in the following sequence:

- Proto Austronesian
- Proto Malayo Polynesian
- Proto Oceanic
- Proto Eastern Oceanic
- Proto Central Pacific
- Proto Polynesian

Within Oceanic, a minimum of three subgroups, Admiralties, Western

Oceanic, and Eastern Oceanic (Remote Oceanic), is currently assumed. Of these, Eastern Oceanic is the language presumed to have been spoken by Lapita settlers; Western Oceanic is a complex of loosely related dialects that developed after initial Lapita colonists had left the area (Bowden 1993); and Admiralties is of special importance because of indications that it shared a period of development with St Matthias (ANU 2004), and the presence in these places of important Lapita sites of Manus and Mussau (of which more later).

The languages of Micronesia fall into three groups. On the southern fringe there are two Polynesian Outliers: Nukuoro and Kapingamarangi which, in common with other Outliers, have languages that are Samoic in origin and were settled by back-migration out of Western Polynesia. In Western Micronesia, the Mariana Islands, Yap, and Palau have language affinities with Malayo Polynesian languages of the Philippines and Indonesia, and are thought to have been settled directly from these places. All of the other languages of both Western and Eastern Micronesia form a single large language family called Nuclear Micronesian. It is part of the Central Pacific subgroup which also embraces the whole of Polynesia together with a portion of Island Melanesia from Vanuatu southwards, including New Caledonia, the Loyalty Islands and Fiji. As will be seen next, this mixture of Melanesian and Polynesian peoples within the same linguistic subgroup poses a problem for the Lapita hypothesis.

PHYSICAL ANTHROPOLOGY

According to the standard view from archaeology, there is “*continuity* – genetically, culturally and linguistically” between the Lapita pottery makers and Polynesians (Kirch (1997:69). This raises the serious difficulty that if Lapita potters were the ancestors of Polynesians as affirmed, and these ancestors were Melanesian like the present-day occupants of Fiji and the other putatively ancestral areas, then there is a problem of phenotype.

Even without the most recent research, the matter of phenotype was long ago comprehensively evaluated by the physical anthropologist William Howells in his book *The Pacific Islanders*, published in 1973 at a time when Lapita studies had already begun. In this book, Howells compared Melanesians and Polynesians, using a variety of evidence available at this time, ranging through outer differences such as colour, size and shape, to inner ones including serum proteins, enzymes, and even ear wax. Having done so and reviewed the linguistic and archaeological evidence, Howells was so convinced of the essential differences between the two groups as to suggest that Polynesians could not have reached the limits of Western Polynesia through Melanesia but must have done so through Micronesia. A Micronesian path for Polynesians has gone into limbo as a result of the currently accepted Lapita hypothesis, but not so Howells's findings from physical anthropology, which have received strong support from recent research in this subject.

Having reviewed craniometric, dental, and other evidence from all of the areas relevant to Lapita, the physical anthropologist Michael Pietrusewsky reports as follows:

Samples from Melanesian Remote Oceania, including Fiji, Vanuatu, Loyalty, and New Caledonia, connect with those from Melanesian Near Oceania and are separate and distinct from Polynesia. Although Micronesian cranial series sometimes cluster with Melanesians, they, along with Polynesians, Indonesians, Southeast Asian and East Asian populations, group together to the exclusion of Australia and Melanesian populations of both Near and Remote Oceania. Melanesia thus appears to retain a cohesiveness that implies it is a useful concept for understanding the biological history of Pacific populations (Pietrusewsky 1996:351).

This is a clear indication that Melanesians cannot be the immediate ancestors of Polynesians. It will be noticed that the Melanesian peoples cited as biologically distinct from Polynesians are all of

those within Island Melanesia who are en route between Near and Remote Oceania and include the Melanesian members of the Eastern Oceanic linguistic subgroup which puts them in the same linguistic category as Polynesians. It will be noticed also that while dissociating Polynesians from Melanesians, Pietruszewsky's analysis of the physical anthropology agrees with the musical evidence by proving their closest affinities to be with Micronesians. Again, as will be seen in the next section, the same has emerged from genetic evidence.

GENETICS

So far there have been two approaches to the problem of determining the genetic origin of Lapita potters. The first and obvious one is DNA analysis of human remains found in Lapita sites, and the other is indirect evidence of past population movements from analysis of DNA samples from living populations.

Encouraged by positive finds of the nine-base-pair deletion in prehistoric non-Lapita remains in Eastern Polynesia, Hagelberg and Clegg (1993) attempted analysis of remains found in Lapita sites from Watom Island, in the Bismarck Archipelago, as well as Fiji, Tonga, and Samoa from sites dated 2700–1600 BP. No trace was found of the deletion, leading to a conclusion that the Central Pacific was not settled by putative Polynesian ancestors but more likely from neighbouring Melanesia. This conclusion has been challenged on evidently valid grounds that the samples concerned were too late in date to be representative of early Lapita, and too fragmented and possibly contaminated to be reliable (Merriwether 1999:250; Pietruszewsky in Terrell *et al.* 2001). Pending results from the Teouma remains and similar ones that could yet be found, indirect genetic evidence of the second kind must suffice.

Most genetics literature of the indirect kind is occupied with testing one or more of the three main theories of Polynesian origins known respectively as Fast Train, Slow Boat, and Entangled Bank.

Two main complexes of genetic “markers” have proved useful for the above work. The first is the nine-base-pair deletion and a related marker known as the Polynesian Motif, both found in mitochondrial DNA which is specific to females and therefore useful for determining descent through mothers. The other, more recent, approach is through Y chromosome markers which are specific to males and therefore of complementary use for tracking family relationships through fathers.

An extremely useful paper which incorporates earlier findings from mitochondrial DNA is Merriwether *et al.* (1999). This includes a table, with sources, of results from a range of studies, showing percentages of the nine-base-pair and Polynesian Motif throughout Polynesia, Micronesia, and some of Melanesia. As might be expected, Polynesia scores highest with rankings of 100 per cent in some areas, but the next highest rankings are in Eastern Micronesia and the central Carolines; even Vanuatu has a respectable rating of 39.3 per cent according to one survey, though only 12 per cent according to another; and a surprise to many will be an amalgamated result of 24.4 per cent in the Madang area on the north coast of Papua New Guinea, which has no obvious affinities with Polynesia. At the bottom of the table, the very low score of 7.5 per cent for Tolai in the Lapita homeland area of New Britain may also raise eyebrows. The Madang result makes sense in terms of later Slow Boat findings (reported below) but, if Lapita potters were ancestral to Polynesians the result for Tolai should have been much higher.

A number of early papers focussing on the Polynesian Motif or nine-base-pair deletion were supportive of the Fast Train hypothesis of Lapita origin – also known as “Express Train” and “Out of Taiwan” – and mostly also demonstrated Polynesian affinities with Indonesia and/or the Philippines, as well as uniformly on this account rejecting Terrell’s “Entangled Bank” or exclusive to Melanesia model. Papers supporting the Fast Train model include Melton *et al.* 1995, Redd *et al.* 1995, Sykes *et al.* 1995, and Trejaut *et al.* 2005.

The next phase of research began with identification of Y chromosome male-specific markers, giving rise to the Slow Boat hypothesis of origin proposed by Kayser et al. (2000). Whereas mitochondrial DNA had tended to minimise links with Melanesia, the Y chromosome data turned up a large number of Melanesian markers in Polynesian DNA, all much further back in the chain of descent than had been expected, implying a slow rather than fast movement of Polynesian ancestors out of Taiwan with substantial Melanesian admixture on the way. This pattern of maternally transmitted mtDNA of Asian origin and paternally transmitted Y chromosome DNA of Melanesian origin has been interpreted by Hage and Marck (2003) as evidence of matrilineal and matrilocal descent in pre-Polynesian populations.

Finally, a very few genetics papers have dealt specifically with Micronesia. Besides the Merriwether paper already referred to, the other studies include Lum and Cann 1998, O'Shaughnessy *et al.* 1990, and Lum and Cann 2000. Because of the ubiquitous presence of the Polynesian Motif throughout both Polynesia and Micronesia as well as Indonesia and even Madagascar, coupled with its absence in non-Austronesian-speaking populations, Lum and Cann (2000:160) offer the suggestion that it could perhaps better be called the "Austronesian Motif". But this is far from all. In the several papers, taking account of a variety of genetic markers, relationships are also demonstrated with the north coast of New Guinea, and a complex picture emerges of lineages, some shared, and some unique to particular areas. Lum and Cann refrain from drawing firm conclusions beyond suggesting that Western Micronesia was independently settled from SE Asia, and " Central-Eastern Micronesians and Polynesians most likely shared a common origin in Island Southeast Asia, and a common route into the Pacific along the north coast of New Guinea" (Lum and Cann 2000:166). O'Shaughnessy et al. seemingly depart from the standard settlement scenario as follows:

Our study has not revealed any markers that differentiate between "mongoloid" components of Micronesians and "mongoloid"

components of Polynesians: at the relatively low resolving power of these analyses they are indistinguishable. The globin gene data are not inconsistent with a Polynesia colonisation scenario that includes routes through both Melanesia and Micronesia, perhaps meeting in the melting pot of Fiji-Samoa-Tonga from which the final later migrations to the far reaches of the eastern Pacific took place (O'Shaughnessy *et al.* 1990:153).

As the sample used for this study includes Guam and Palau in Western Micronesia which, as Lum and Cann affirm, are believed to have been settled direct from SE Asia, the authors have probably assumed that the "Mongoloid" component both in Polynesia and the rest of Micronesia came from there. This cannot be ruled out, but it runs into linguistic difficulties and, as will be seen later, there is an alternative possibility.

In summary, evidence from both physical anthropology and genetics is supportive of a Micronesian rather than Melanesian route for Polynesian ancestors, with Taiwan, the Philippines and Indonesia, and the north coast of New Guinea all involved with population movements ancestral to both Polynesians and Melanesians. A scenario integrating these findings with those from music will follow. But first it is necessary to consider evidence bearing on the issue from canoe technology.

CANOE TYPES AND THEIR DISTRIBUTION

Haddon and Hornell's classic accounts of the *Canoes of Oceania* (1975), written as a series of three volumes in the 1930s (Hornell 1936, Haddon 1937, Haddon and Hornell 1938), provide a wealth of detail concerning the distribution of canoe types in the Pacific and their developmental history. Outmoded theories of origin which were current in the 1920s and are given credence by the authors can readily be dissociated from the data itself, which remains invaluable. For present purposes, it is large sailing canoes used for voyaging that are of most relevance. They can be distinguished as either outrigger or double, and in most of Oceania by triangular sails that are typically either sprit or lateen. Sprit sail vessels have a distinctive bow and stern, and sail uni-directionally. Lateen-rigged vessels by contrast have a bow at each end, and are enabled to sail either end forward by swinging the sail from one end of the vessel to the other.

MICRONESIA

When Europeans first visited the Mariana Islands in the sixteenth century, they encountered canoes of advanced design, later to become known as the "flying *proa*". These were single outrigger lateen-rigged vessels described by Hornell (1936:303), along with the Fijian *thamakau*, which itself was derived from Micronesia, as "one of the two finest types of sailing outrigger canoe ever designed." As knowledge of Micronesia increased, and islands such as those of the Carolines, Marshalls, and Gilberts (Kiribati) also became known to Europeans, canoes of lateen type similar to the flying *proa* were found to be typical throughout the region for inter-island communication, and Micronesians became as famous for their navigational skills as for their canoes. Haddon and Hornell characterise the type of sail on all of these canoes as "the true Oceanic lateen", developed in Micronesia from "the primitive lateen" which in turn originated in Indonesia as "the proto lateen" (Haddon and Hornell 1938:48). Double canoes

were absent in Micronesia except for Truk in the Caroline Islands where there is an early nineteenth century report of a paddling double canoe, and a possibility that double canoes were also in former use there, and were of a kind similar to the sailing canoes of Hawai'i (Hornell 1936:340, 408, 440).

MELANESIA

Melanesia is an area of greater diversity than Micronesia. Double canoes were in use for *lakatoi* and Mailu trading expeditions in the south coast Gulf area of Papua New Guinea. The best known of these are the large sailing canoes (*orau*) of the Mailu people, described by Haddon (1937:238) as "the only permanent, built-up, double sailing canoe in New Guinea, or indeed in Melanesia, with the exception of New Caledonia and Fiji". The sails were of lateen type, but were rectangular or square, as also were sails referred to by Haddon and Hornell (1938:52) from areas further west:

The square sails of the trading canoes of western New Britain have been introduced from Siassi Islands which have cultural affinities with the neighbouring coast of New Guinea. The square sails of the western Melanesian islands—the Admiralties and other islands to the west—may be due to the same series of cultural spreads that brought the square sail to New Guinea.

Some of the complexity of canoe distribution in Melanesia is the result of influence from Micronesia,

the most notable being the Santa Cruz Islands where outrigger canoes of large size are found equipped with lee platforms as in the Caroline 'flying proa' and with outrigger fittings closely related to those of certain eastern Caroline canoes (Hornell 1936:440).

Details of Santa Cruz canoe construction are given by Haddon, who identifies the sail type as crab-claw lateen (Haddon (1937:50).

The Fijian *thamakau* was a large outrigger sailing canoe used for inter-island communication. It combined “distinctly Micronesian” structural features with an originally Melanesian design of primitive dugout with Melanesian-type stantion attachment. The sail was a typical Oceanic lateen; the mast was stepped amidships as in Micronesia; the rigging was similarly Micronesian; and the form of the ribs suggested Micronesian influence rather than Melanesian (Hornell 1936:335-6).

Another hybrid with Micronesian affinities was the Fijian *ndrua* (*drua* in modern orthography), which displaced the *thamakau*. Unlike the *thamakau*, it was a double canoe, albeit with the windward hull shorter than the leeward, combining this with the Micronesian-derived lateen capability of sailing either end forward, and capable also of transporting large numbers of people and huge amounts of cargo. As will be seen, the influence of this form of canoe was to extend into Polynesia, and it also had impact upon nearby New Caledonia, where there were two forms of double canoe described as follows:

One of these is unequal-hulled and has certainly been introduced by Tongan settlers or castaways using the Fijian design of the *ndrua*. The other, more clumsy and equal hulled, represents an earlier and more primitive type, borrowed possibly from the proto-Polynesians (Hornell 1936:344).

In terms of Melanesia as a whole, double canoes are absent with the exceptions noted above, and outrigger canoes are distinguished from those of Polynesia by a different form of outrigger attachment. Multiboom and stantion attachment of the outrigger are general in Melanesia except in the Solomons where outriggers are “all but absent”, in contrast with Polynesia where direct attachment of the boom to the float and few or two only booms are also to be found, with the Melanesian type of attachment most strongly in evidence in islands of Western Polynesia closest to Fiji (Hornell 1936:337).

WESTERN POLYNESIA

Of particular importance, both in their own right and as a result of long-standing associations with Fiji, are the two island groups of Tonga and Samoa.

Tonga had four types of voyaging sailing canoes, two indigenous and two of Fijian origin and design which displaced the indigenous forms in the latter part of the eighteenth century. An indigenous canoe of outrigger type (*vaka*) was supplanted by the more seaworthy *vaka* or *hamatafua* modelled on the Fijian *thanakau*, and a double canoe (*tongiaki*) similarly fell out of use after the introduction of the more versatile *kalia*, copied from the Fijian *drua* (Hornell 1936:253ff).

A similar sequence of events took place in Samoa where an indigenous outrigger canoe, called *amatasi*, fell out of use and became forgotten (Hornell 1936:238), while an indigenous form of sea-going double canoe, the *va'atele*, was displaced by a new form (*'alia*), on the pattern as in Tonga of the Fijian *drua*. Though clumsy compared with its successor, the *va'a tele* served until post-European times for the long-distance transport of heavy and bulky cargo and possibly also as a war canoe. It had two equal-sized hulls, like those of the Tongan *tongiaki*, with a large deck extending over them (Hornell 1936:223).

EASTERN POLYNESIA

As in Tonga and Samoa, both single outrigger and double sailing canoes are historically attested for Eastern Polynesia, but most famous of them all are the great voyaging canoes that first transported Polynesian ancestors into the area from Western Polynesia and made possible their settlement of the entire region. The vessels concerned were equal hull double canoes rigged with simple triangular sprit sails closely related to those seen in the Marquesas Islands by Cook in the eighteenth century, and subsequently underwent further development in Hawai'i, the Society Islands and elsewhere within the area (Haddon and Hornell 1938:55). Details for Hawai'i, the

Marquesas Islands, Mangareva, Easter Island, the Austral Islands, Cook Islands, and New Zealand are included in the first 200 pages of the Haddon and Hornell volumes (Hornell 1936).

PADDLING, ROWING, AND SCULLING

Significant areal differences exist between methods of canoe propulsion in sailing canoes when the vessels were becalmed or not under sail. Paddling is the method universally used for small fishing and other canoes without sails, but does not always extend to larger seagoing sailing canoes. In available descriptions from Micronesia (Hornell 1936:354, 372, 382-3; Burrows and Spiro 1957:84) and in Eastern Polynesia generally (Hornell 1936:8), sailing was supplemented by paddling. The same was true of the Samoan sailing outrigger (*amatasi*) as attested by Erskine (1853:60), who describes the canoes he saw as “capable of holding 14 paddlers,” and by Wilkes (1845:2:143), who refers to paddlers sitting two abreast and paddling at a pace which Wilkes calls “very swift.” (cited by Hornell 1936:240). With some notable exceptions, paddling was also usual in Melanesia. A form of rowing is reported for the Admiralty Islands (Best 1976:369) and the Mailu of New Guinea (Haddon 1937:237), and an extensive region centred on Fiji and embracing Rotuma (Hornell 1936:282), New Caledonia (Haddon 1937:8), as well as areas of Western Polynesia including Tonga (Best 1976:356) and Samoa (Best 1976:340) after adoption of canoes of Fijian design, where manual propulsion was carried out not by paddling or rowing but by sculling.

A number of early travel and missionary accounts give clear descriptions of the sculling method used in these places at the time of European contact. In the Fijian *thanakau* predecessor to the *drua*, sculls (*sua*) with handles 11 to 12 feet in length were thrust vertically downwards through spaces between the outrigger supports. In the *thnakau* of Mbau, “four scullers were the usual complement, two at each end of the platform,” standing upright and facing forward

(Hornell 1936:318). A description of the sculling method by Thomson (1908:295) demonstrates the high degree of co-ordination that would have been required of the scullers:

The sculler describes short semicircular sweeps with the blade, throwing his weight against the handle in front of him as he stands upon the deck. When two are sculling they swing in time but in different directions, and there is no exercise that displays the grace of the human body in action to better advantage.

The positioning of scullers in the Fijian *drua* form of canoe was necessarily distinct from that of the *thanakau* because of its different structure and either-end sailing capability, with sculling positions matched symmetrically fore and aft. A photograph of a moderately large Fijian *drua* reproduced by Best (1976:341) shows two scullers, one at the bow and the other at the stern, sculling simply over the side of the canoe. Typically, however, the sculls were operated through holes cut fore and aft in the deck midway between the two hulls (Hornell 1936:325), and the larger, heavier sea-going vessels required a number of scullers operating in unison. The missionary Thomas Williams, who obtained his information in the 1840s, refers to a *drua* with twelve deck holes, six forward and six aft, through which the sculls were worked (Williams 1982:74). The same author (Williams 1982:88) provides further information as follows:

In a calm, the canoe is propelled by vertical sculling. Four, six, or eight sculls, according to the size of the canoe, are used. The men who work them throw their weight on the upright oar from side to side, moving together and raising their feet alternately, so as to give at a distance, the appearance of walking on water.

Less detail is available for the other areas, but it is clear that in Tonga and Samoa which copied the Fijian *drua* form of double canoe, the sculling method was the same.

SLIT GONGS

In his description of Fijian sculling, Williams (1982:88-9) further notes:

Canoe sailing is not silent work. The sail is hoisted and the canoe put about with merry shouts: a brisk interchange of jest and raillery is kept up while sailing over shoal reefs, and the heavier task of sculling is lightened by mutual encouragement to exertion, and loud thanks to the scullers as each set is relieved at intervals of five or ten minutes...

If there should be drums on board, their clatter is added to the general noise. The announcement to the helmsman of each approaching wave, with the order to *lavi*,—keep her away—and the accompanying “one, two, and another to come,” by which the measured advance of the waves is counted with passing comments on their good or ill demeanour, keep all alive and all in good humour.

Williams’s reference to “drums” is to so-called “wooden drums” or slit gongs, called *lali* in Fiji, where they take the same canoe-shaped form as in most other areas of Melanesia, and are used in a variety of contexts, but in former times pre-eminently as a signalling instrument. Thirteen named varieties of beat are listed in the entry for *lali* in Capell’s Fijian dictionary (Capell 1968:111), cited mostly from Deane (1921), who provides music notations of ten of them, all but one played using two sticks, one in each hand, by a single player. The exception is the “*Lali ni tambua*”, played on two instruments, and taking the form of the “ordinary Fijian *lali* beat with an accompaniment” (Deane 1921:200). This use of two instruments rather than a single one appears to have had its origin from use in the Fijian double canoe, and is shown by distributional evidence to have spread from Fiji to other areas which adopted the Fijian canoe type, with subsequent retention of use in pairs in contexts not involving canoes. In Fiji, large *lali* are commonly reported as paired, and pairing of instruments is on record also from

Tokelau, Rotuma, Uvea, and Samoa, (Fischer 1983:35), to which may be added Tonga, in all cases coincident with the introduction of the Fijian slit gong, *lali* and adoption of the Fijian form of canoe.

Burrows (1937:245) is specific that in Uvea “Two *lali* were formerly part of the equipment of a double canoe.”

Moyle (1988:28), who conducted fieldwork in Samoa in the 1960s, reports that many Samoans recalled seeing *lali* drums in ‘*alia* canoes they had observed as children:

The *lali* were beaten variously to entertain the crew and passengers, and to unite the paddlers when the wind dropped.

Significantly also, there is a survival of earlier practice in present-day canoe races held annually in both Western and American Samoa where

a man sits in the bow facing the stern and beats on an empty tin can to coordinate and regulate the rowers’ strokes, as well as to communicate instructions from the captain (Moyle 1988:29).

Finally, Moyle (1987:65-7), who also carried out fieldwork in Tonga, reports similarly large paired *lali* of unequal size as present there. As elsewhere, they were played one drummer per instrument, each drummer with two drum sticks, again originating from former use in canoes.

... there is evidence that a small *lali* was once part of the equipment carried on board the Tongan double canoe (*kalia*). Tongans from several parts of Vava’u described this use of the drum, which was beaten to announce the boat’s arrival when carrying royalty; the drum was named *laliolo*.

An eye-witness observation of paired slit gongs on Fijian double canoes is provided by Erskine (1853:171). In a canoe about to sail,

two fellows were beating away, each with two short knobbed sticks, on a 'lali' or wooden drum, the same as those of Tonga.

A Fijian precursor to the Tongan usage described by Moyle, in this case involving paired slit gongs, is documented by Hocart (1952:105) who reproduces a *Native Gazette* account of 1910 referring to a rhythm used solely in canoes on which a high chief travelled, beaten on "two drums", of which one was smaller than the other. One of Deane's notations (Deane 1921:201) confirms this use with a *lali* beat "played upon a high chief's canoe when approaching a village," in this case on a single *lali*.

In summary, although Haddon and Hornell make no reference to the *lali* as a canoe accessory, there is no doubt that paired slit gongs were used on the Fijian *drua* and spread from Fiji to areas such as Tonga and Samoa where this form of canoe was adopted. In all cases where a description is available, the slit gongs were of unequal size with one consequently of higher pitch than the other. It is tempting to suppose that the rationale for this was imitation not only of canoe shape, but also of the unequal size of the two hulls of the canoe in which the slit gongs were carried. Some of the signalling uses to which the *lali* were put, such as signalling arrivals and departures are also documented. But why two slit gongs if one could suffice? The answer must surely lie with another common feature of the canoes, namely the use of sculling as a means of manual propulsion, and the need to co-ordinate the movements of the scullers. One of the slit gongs could have regulated the scullers at the bow end of the vessel, and the other, with its distinctively higher or lower pitch, their counterparts stationed at the stern.

CONCLUSIONS FROM CANOE EVIDENCE

From the above evidence, Micronesia emerges as a primary influence upon voyaging canoes of Fiji and, indirectly, upon Tongan, Samoan, New Caledonian and other canoe types adopted from Fiji. The *thamakau*

outrigger of Fiji was a combination of an originally Melanesian form of canoe, with primitive lateen sail and other Micronesian features grafted upon it, and its successor the *drua* was similarly Micronesian but more advanced, becoming in effect a double canoe as a result of enlarging the float. The *drua* and its Polynesian clones is known to have been a late eighteenth century introduction, probably as result of contact from the Marshall or Gilbert Islands (Hornell 1936:344). Its outrigger predecessor can be assumed also to have been a relatively late development, raising the question of where the earliest equal-hulled double canoes of Tonga and Samoa came from, if not from Fiji, which had no known form of double canoe other than the *drua*. Haddon and Hornell have no doubt that the whole of Melanesia can be ruled out, citing an “insuperable objection” to a Melanesian path for proto-Polynesians in

the fact that there is no trace, in the presence of double canoes or of outriggers with direct attachment of their sojourn in any of the Melanesian islands where they would have halted for lengthy periods in the course of such a migration (Hornell 1936:341).

With Melanesia out of the running the only alternative, as Haddon and Hornell also conclude, is migration from Micronesia, bringing the sprit sail to Polynesia (Haddon and Hornell 1938:55) before the invention and spread of the “flying proa” in Micronesia. Although Micronesia is currently as empty of double canoes as Island Melanesia, an exception is noted for the double canoe believed to have been formerly present in Truk, the design of which is said to have been similar to that of Hawai’i (Hornell 1936:440).

Of particular relevance for the present paper would be to find antecedents of Eastern Polynesian double sailing canoes, which must have been similarly equal-hulled and sprit-rigged, with auxiliary use of paddles rather than oars or sculls, but no exact match has been found in the descriptions of early observers. As has been seen, paddling is attested for the indigenous *amatasi* form of Samoan sailing outrigger

canoe. But no accounts have been found either of paddling or sculling for either the Tongan *tongiaki* double canoe or its Samoan equivalent the *va'atele*. Both are on record as carrying smaller fishing canoes with them on long voyages (Hornell 1936:265-6), so perhaps this sufficed upon arriving at a destination.

PATHS TO POLYNESIA

WHERE DID THE MIGRATIONS START?

The discovery by geneticists of the nine-base-pair deletion and Polynesian Motif has confirmed a long-standing consensus from archaeologists and linguists pointing to Taiwan as an area of origin for Austronesian speakers, with Indonesia and the Philippines both likely candidates for the next stage of dispersal. The estimated genetic date for the Taiwan predecessor of the nine-base pair deletion is between 16,000 and 10,000 BP, with appearance in Wallacea dated 1,400 years later at 8,600 BP (Friedlaender 2007:75). Although much older than linguistic and archaeological estimates to the point of appearing “unreasonable” to Friedlaender *et al.*, these estimates may be more accurate than they seem, allowing plenty of time for changes of phenotype further down the track.

WHERE DID MELANESIANS COME FROM?

Next after the sojourn in SE Asia came population movement from there to the New Guinea mainland, initially, from linguistic evidence, to the Bird’s Head region of present-day Western New Guinea by speakers of Malayo Polynesian. There the new arrivals would have found themselves surrounded by already resident Papuan-speaking occupants of the area, and would have begun to integrate with them. A question now arises as to what happened next. Did these immigrants simply stay *in situ*, as assumed by Wurm *et al.* (1975) or, as recently proposed by Pawley (2007:22), did they migrate eastwards along the north coast of New Guinea towards the Bismarck Archipelago where, after some centuries in transit, they became originators of the Oceanic linguistic subgroup and the immediate ancestors of the Lapita potters? Pawley can offer no linguistic evidence of their passage beyond “tantalising traces in the form of loanwords to Papuan languages.” Geneticists are more forthcoming with several reports of

the nine-base-pair in the mtDNA of north coast residents, with male Y-chromosome markers also originating in the same way. An example is from Herzberg *et al.* (1989), which found 14% of the nine-base-pair deletion in 28 individuals from Madang in the north coast of Papua New Guinea, consistent with the idea that Austronesians underwent a period of intermingling and exchange of genes with Papuans during transit along the north coast. Some caution, however, is in order. Most of the reports are limited in their sampling from Papua New Guinea; none seen to date includes samples from Western New Guinea; and Madang is well within range of known linguistic and cultural “backwash” from the Bismarck Archipelago which most probably took place in post-Lapita times. Further sampling, however, particularly closer to the Bird’s Head is likely to provide more conclusive evidence. Fortunately, there is no need to wait this long for confirmation. Pawley identifies the area of origin of these speakers to be among dialects on the south side of the Bird’s Head, and probably located around Genderawasih Bay at the neck of the Bird’s Head (Pawley 2007:21). By good fortune the Serui-laut people of Genderawasih Bay are among groups for which some musical evidence is available. The presence in their music system of wide range and anhemitonic scales which define the Core Melanesian complex of musical traits, proves a connection beyond doubt. These traits could not have reached the Bird’s Head from the Bismarck Archipelago without leaving a trail beyond the Papua New Guinea slit gong belt, so must have gone the other way. Here, then, is an answer to the question of Melanesian origin. Having taken a long time over their journey from the Bird’s Head, mixing with Papuans en route, they would have lost their SE Asian phenotype, while retaining their language. By about 5000 BP there were now two resulting groups of peoples on the move in the Bismarck Archipelago and northern Island Melanesia: the so-called bush people or Papuans who spoke non-Austronesian languages, and settled in the area perhaps 20,000 or more years ago, and the newly arrived Melanesians, who spoke Austronesian languages, and exploited coastal environments. By now Papuans were living in parts

of the northern Solomon Islands and perhaps had reached as far as Vanuatu, but the Melanesians soon followed.

THE ROUTE THROUGH ISLAND MELANESIA

Another event of major significance now occurred with the arrival around 4500 BP of yet another “intrusive” group to New Britain, this time direct from Indonesia or the Philippines, bringing a fresh infusion of SE Asian phenotype and Polynesian Motif. There is no reason to suppose they were large in numbers, but they brought traits new to the area, including advanced pottery, and a music system of small melodic range and few notes (Engmelodik).

Like the Bird’s Head people before them, they began to integrate with the already existing population – in this case the Melanesians – losing their phenotype in the process, but possibly doing so more rapidly this time because the languages spoken by the two groups would have been similar. Eventually, over the course of the next thousand or so years, the new arrivals were to become completely assimilated into the Melanesian population, with attendant loss of their small range music system and replacement with the Melanesian one of large range and anhemitonic scales. Meanwhile, around 3500 BP, before the process of integration was complete, and small range scales were still part of the music system, the Lapita potters emerged and began their celebrated migrations through Island Melanesia, leaving colonies in their wake, and eventually reaching as far south as Fiji, where they became ancestral to present-day Fijians. The long series of journeys required the crossing of two significant water gaps, one of 450 km at the outset and the other of 850 km closest to Fiji, which are believed not to have been traversed until Lapita times (Kirch 2000:95-6). Because of the water gaps, a view sometimes expressed is that the form of transport used by the Lapita people must have been double canoes similar to those used much later by Polynesians. As has been seen, however, this is not supported by Haddon and Hornell’s distributional data, and recent reconstructions by linguists of canoe

terms is also contrary to the idea. Although careful to point out that absence of a reconstruction does not necessarily indicate absence of the referent sought, Pawley and Pawley (1998:209) conclude that a term for double canoe can be attributed to Proto Polynesian but not to Proto Oceanic. On the other hand there is not the least doubt about the provenience of sailing outrigger canoes with decks and indirect attachment of the float dating back at least to Proto Oceanic (Pawley and Pawley 1998:193, 209), vindicating Haddon and Hornell's findings. The combined evidence would appear to indicate that the ocean-going double canoe was an innovation not at the Oceanic subgroup level but some time later, with Proto Polynesian as the only so far affirmed subgroup. An assessment by Irwin (2008:15) of the Lapita canoe form using some of the same sources as those examined in the present paper

suggests that a likely Lapita type was a single-outrigger canoe with a hull made from dugout log, and its freeboard raised with lashed-on strakes. The sail was a simple two-spar rig of a kind usually described as an "oceanic spritsail", and the canoe may have changed direction relative to the wind by some mode of tacking rather than shunting.

Besides providing distributional evidence of canoe type, the trail of the Lapita potters through Island Melanesia is revealing also of the kind of music they probably practised. Foremost for consideration is the extremely widespread presence of canoe-shaped slit gongs beginning with the slit gong belt of northern coastal Papua New Guinea and spreading down the entire Island Melanesian chain as far as Fiji. It would seem reasonable to suppose that it was the Lapita potters who made slit gongs in the shape of their canoes and spread them to these places. Some doubt is cast on the idea, however, by gaps in the distributional data. The sole such gaps or probable gaps are in southern Vanuatu, the Loyalty Islands and New Caledonia, consistent with the known history of Lapita settlement in these areas, but not necessarily of possession of slit gongs by the first settlers.

In present-day New Caledonia, wooden slit gongs are in widespread use as an accompaniment to dance. They are small, portable instruments, only 40-50 cm long, with no resemblance to the large canoe-shaped slit gongs typical elsewhere in Melanesia. One possibility is that the smaller type of slit gong was brought by Polynesians who migrated to New Caledonia in the eighteenth century. Most current instruments, however, both resemble and are named after the Cook Islands *pate*, which was brought first to Samoa by Rarotongan teachers of the London Missionary Society for use as a church bell, and put to the same use in New Caledonia by Samoan teachers of the LMS in the early 1840s (Ammann 1997:20-4, 50).

Whether the large canoe shaped form of wooden slit gong was ever present in New Caledonia is an open question. Speiser (1934:129) states categorically that slit drums are not to be found. Sarasin (1929:229-32) at first describes slit drums as absent except as church bells, then seems to contradict this by referring to the accompaniment of dance by the beating of wood on pieces of hollow trees. But the statement is ambiguous, as also is one by the nineteenth century writer Glaumont (1888-9:98), the earliest source so far found, who makes similar reference to a sort of tamtam or hollowed out tree like those of the New Hebrides on which the player beats with a stick. Either statement could refer to a slit gong, but equally to an actual hollow tree, as implied by Glaumont's likening of the instrument to those of the New Hebrides, which he goes on to describe as larger, and more beautiful with faces sculptured upon them. The reference here is evidently to standing slit gongs of central Vanuatu, which are ethnographically well known, and indeed resemble hollow trees. Use of a hollow tree as an idiophone would be unusual and seems unlikely, in which case the possibility exists that large slit gongs were once present but have fallen out of use in favour of the more portable and convenient *pate* introduced by the LMS. If on the other hand the instrument was genuinely not present then the disparity between New Caledonia and other areas of Melanesia including Fiji lies with

the known differing settlement history of the two areas.

Lapita settlement of Fiji is believed to have taken place from either the Santa Cruz or northern Vanuatu islands at about 3100 BP. New Caledonia was meanwhile settled by a different group which moved through the main Vanuatu archipelago to reach La Grande Terre through the Loyalty Islands at about the same time (Kirch 2000:95). The difference in starting point between northern and southern Vanuatu could have been crucial in terms of slit gong diffusion. The island of Efate (where the Teouma Lapita site is coincidentally located) marks the southerly limit of large slit gongs in Vanuatu (Crowe 1995:24 cited by Ammann 1997:23). North of Efate is the area from which Fiji was colonised; and in the south are the islands from which the New Caledonia settlers would have departed.

There are two possibilities for slit gongs. Either they were brought by the initial Lapita settlers and lost for unknown reasons in southern Vanuatu, or they were brought not by the first settlers but by their immediate successors, who followed their ancestors southwards along paths familiar to them.

Besides possible slit gongs, Lapita potters also had stamping tubes and drone-based polyphony; and their music system was evidently of small range and few notes, shared by Fiji with both Rotuma and New Caledonia.

In the home Lapita area of the Bismarck Archipelago, polyphony co-occurs with the Core Melanesian traits of wide range and anhemitonic scales, so at first sight it is a surprise to find it associated in Fiji with the opposite type of structure of small range and few notes, especially as polyphony has a more restricted distribution in the Bismarcks than the Core Melanesian traits and probably therefore developed later in the region. Polyphony is nevertheless compatible with both small and large range styles and, as has been seen, the small range styles of the Lapita potters would have persisted in the area for a long time despite

the presence of the competing system among the already resident Melanesians. The sequence therefore would have been for the Lapita potters to have adopted polyphony before ultimate loss of the small range styles took place.

Polyphony is present in only about a quarter of the areas in the Bismarck Archipelago for which musical information is available. Specifically, it is reported for Manus (Admiralty Islands); Kove, Bola, Nakanai, Cape Beechey, Uvol, all in New Britain; and on offshore islands of Vitu, Ablingi, Mussau, Baluan and Bipi. All are in the homeland of the Lapita people; offshore islands were favoured Lapita locations; and Manus, Kove, Mussau and Baluan are known Lapita sites (Specht 2007:Table 2). The observed association is remarkable for three reasons: first it demonstrates survival of music traits in the area of Lapita origin for more than 3,000 years; second it proves Lapita potters to have been unequivocally Melanesian; and third it is indicative of association with Micronesia. Of special significance is the primary Lapita site of Mussau, together with Manus and Bipi, all with dissonant polyphony as reported in both Fiji and the Caroline Islands of Micronesia. As all of the sites concerned are strung along the northern seaboard of New Britain within easy sailing distance of the Caroline Islands, and the Lapita people living on this coast ultimately reached as far as Fiji, it is inconceivable that they would not also have visited Micronesia.

THE BRANCH LINE THROUGH MICRONESIA

In view of Herzog's discovery of Polynesian music traits in Micronesia, combined with evidence from both physical anthropology and genetics affirming closer connection between these two areas than others, Howells's suggestion of Polynesian settlement through Micronesia is again in contention.

Two main arguments have been advanced against the idea of a Micronesian path for Polynesians, one relating to radiocarbon dates and the other to prehistoric sea levels:

Radiocarbon dates

Although most radiocarbon dates for Micronesia are indicative of post-2000 BP occupation (Kirch 2000:74), computer simulations reported by Irwin indicate that the high islands of the Carolines and Marshall Islands were available for contact from the Solomons in Lapita times (Irwin 1992:125-6), and a few radiocarbon dates earlier than those given by Kirch have been reported (Athens 1987, Streck 1987, Fitzpatrick and Nelson 2003, Clark *et al.* 2006). None so far is from the immediately relevant area of the central Carolines, but absence of sites does not prove absence of occupation; earlier dates for the Carolines may yet be found; and a date for Bikini in the Marshall Islands of no less than 3450 ± 60 BP (Streck 1987) is without current explanation.

Sea levels

From about 4000 BP (or earlier), and continuing through Lapita times, sea levels were 1- 1.5 m. higher than at present, accounting for former coastal sites in the Bismarcks and elsewhere which are now some distance inland, and having implications also for Micronesia, where conditions for occupation of atolls did not become favourable until sea levels reached their present configuration around AD 1 (Kirch 2000:106, 174). By 3200 BP sea levels began to decline, but atolls did not reach their modern state until after AD 500, when “declining high-tide level fell below mid-Holocene low-tide level.” (Dickinson 2003). The correspondingly late occupation dates for the Micronesian atolls pose an obvious problem for putative movements of pre-Polynesians out of Micronesia. Compared, however, with modern atoll elevations of up to three metres, not all of the land would have been awash during the period at issue, and barren as these places might have been, some could have served as transit points, if not of a hospitable nature for voyaging further afield.

If the radiocarbon date for Bikini Atoll is accepted then, despite higher sea levels in the Holocene period, occupation of Micronesian atolls must have been possible earlier than currently supposed, if only as

staging posts for further voyaging. As Bikini is located on the far north-east extremity of Micronesia, it also follows that the voyaging distance involved was not beyond the capability of the type of canoe then in use. If Haddon and Hornell's report of early double canoes in Truk is correct, it may be that this was the canoe type used, and could represent an early venture by people who could have been the pre-Polynesians.

Howells proposed that from 2500 BC or after there was a parent colony of Polynesian-like people on one of the high islands of the Carolines. Around 1500 BC some of them, speaking Proto Eastern Oceanic, filtered south through the Gilberts (Kiribati) to Fiji and Tonga, later acquiring pigs, chickens and dogs from their Melanesian neighbours (Howells 1973:255, 260).

Howells' dates fit absolutely with the musical evidence, and are consistent with the mix of Marginal Eastern and Western Polynesian music traits found by Herzog in the very area proposed by Howells as the Polynesian homeland.

For best fit with linguistic evidence, pre-Polynesians in Micronesia need to have been speakers of Eastern Oceanic, the linguistic subgroup common to both Nuclear Micronesian and Proto Polynesian. The sole candidates for such speakers belong to the second of the two intrusive groups in the Bismarck Archipelago who, together with the earlier Bird's Head Melanesians, became progenitors of the Lapita potters. At some time before assimilation with Melanesians had gone too far, some members of the intrusive group would have migrated to the Caroline Islands, taking with them the Marginal Eastern musical traits reported by Herzog, and developing in their new area unencumbered by influence from anyone else except possibly from the phylogenetically similar but linguistically different people of the Mariana Islands, Yap, and Palau. Some time during the next thousand years a further significant event now occurred in the form of visits from Lapita or pre-Lapita people, most probably from the Lapita

areas of the Admiralty Islands or Mussau, bringing polyphony and the other musical traits reported by Herzog. Between the two events, and possibly triggered by the latter one, movement of pre-Polynesians now took place out of Micronesia, taking with it Marginal Polynesian music traits but not polyphony. In the mix of music left behind, large range and anhemitonic pentatonic scales were not introduced along with polyphony either because the incomers had not yet adopted them or because these traits, unlike polyphony, would have been incompatible with the existing music system of small range, and could not co-exist with it (see McLean 1986 for an explanation of this process).

Howells's dates for Micronesia can be accepted, but a more likely point of arrival for the pre-Polynesians would be not Fiji, but Samoa, possibly through Tuvalu. If, as is known to have happened, Samoans were able eventually to reach as far north as Kapingamarangi and Nukuoro, albeit by way of Tuvalu or other transit points, then at an earlier time, pre-Polynesians could have reached Samoa from the opposite direction by making use of the return voyaging strategy documented by Irwin (1992), sailing upwind initially, and downwind to return home if land was not found.

In Samoa, the new arrivals would have had an entire archipelago to themselves until the arrival of Lapita potters some hundreds of years later, allowing ample time for Polynesian language and culture to develop. Coming as they did from a predominantly atoll environment in Micronesia they would have been without pottery until gaining it later from Fijians, accounting for lack of archaeological sites attesting their presence. As seafarers, however, their abilities would have at least equalled those of the Lapita people, culminating with development of double canoes capable of venturing as far as Eastern Polynesia. First, using possibly less sophisticated craft then at their disposal, they would have explored every corner of their own archipelago. Next they would have extended their seagoing to embrace Tonga and Fiji, very likely colonising Tonga at about the same time as Lapita potters,

but reaching Fiji only to find it fully occupied by Melanesians. The historically attested trade relationship within the Fiji-Tonga-Samoa triangle could have been an early development. But exploration did not end there. Settlement of the Polynesian Outliers along the entire Island Melanesian chain, as far north as their own former home territory of Micronesia, was to follow, as well as the ultimate final push into Eastern Polynesia, shown by the musical evidence as likely to have taken place from Samoa.

CHRONOLOGY

Dates relevant to the present paper tend to be on a continuum with linguistic dates sometimes older than the radiocarbon ones for the same events (Pawley 1996:403-4), and genetic dates by and large older still. On the understanding therefore that the dates are tentative and subject to review, the following is offered by way of summary and further comment:

6000 BP. Austronesian speakers of Malayo Polynesian reach the Bird's Head of present-day Western New Guinea from SE Asia.

5000 BP. Proto Oceanic speakers reach the Bismarck Archipelago from the Bird's Head having become Melanesian on the way as a result of interaction with Papuans during their journey along the north coast of New Guinea. They bring the Core Melanesian traits of wide range and anhemitonic scales but not polyphony. The Serui-laut people in the home area near the Bird's Head have retained the same traits until the present day.

4500 BP. Ancestors of the Lapita potters enter New Britain as an intrusive culture direct from Indonesia or the Philippines and begin to interact with the already resident Melanesians. Some of them move to the Caroline Islands in Micronesia where they become ancestral to Polynesians. They have shell trumpets and leaf oboes but not slit gongs, stamping tubes, or polyphony. They also have Marginal Polynesian-type structural traits of small range and few notes which they ultimately take to Samoa and Eastern Polynesia.

4000 BP. Melanesian speakers of Proto Eastern Oceanic get as far as the Solomon Islands and some of them migrate from there to the south coast of Papua New Guinea. They have Distribution D instruments and polyphony but not slit gongs. Another group join the pre-Polynesians in Micronesia, most likely from the Admiralty Islands or Mussau, bringing polyphony and possibly triggering movement of

the pre-Polynesians out of the area to find new territories.

3500-2000 BP. After 500 years of interaction, Lapita potters by now have merged sufficiently with already resident Melanesians to become Melanesian in phenotype, but have retained their music system of small range and few notes. Lapita people or their descendants develop slit gongs in the shape of their canoes, and the former begin their migrations through Island Melanesia, taking scales of small range and few notes to Fiji and New Caledonia. At about the same time, pre-Polynesians emigrate from Micronesia, taking similar styles of small range to Samoa. They remain relatively isolated there from Melanesians, gaining neither slit gongs, polyphony nor any other Melanesian traits until after the colonisation of Eastern Polynesia. Quite possibly some of these traits were not adopted until Samoans came more extensively into contact with Melanesians as a result of Samoan settlement of the Polynesian Outliers, which now begins.

2000 BP- Colonisation begins of Eastern Polynesia from Samoa, and the two areas of Western and Eastern Polynesia subsequently develop in isolation. In Eastern Polynesia, vocal styles of small range and few notes brought by the first settlers are retained in Marginal Eastern Polynesia until modern times. In Western Polynesia rolled mats as a percussion device come into use and diffuse throughout the area, and Western Polynesians interact increasingly both among themselves and with Melanesians. Tongans, for example, who are closest geographically to Fiji, most probably gain stamping tubes and polyphony as well as the slit gong from the Fijians. Samoans do not adopt the slit gong until later, gaining separate forms of it, including the *lali* from Fiji and the *nafa* from Tonga, retaining the names of each from the donor areas. Micronesians gain hour-glass drums either from the Bismarck Archipelago or from Buka/Bougainville in the Solomon Islands, and descendants of the Lapita potters have meanwhile become fully integrated with Melanesians in the Bismarcks and have adopted the Core Melanesian complex of wide range and anhemitonic scales with accompanying loss of their own former music system.

CONCLUSIONS

An essential starting point for the present study is the discovery of marked differentiation between music areas of Western Polynesia and Marginal Eastern Polynesia which emerged after the settlement of Eastern Polynesia around 2000 BP, allowing distinctions to be made between Polynesian music systems before and after this date. In Marginal Polynesia Engmelodik styles taken to the area by the first settlers are still to be found. By contrast in Western Polynesia, post-2000 BP developments were a result both of innovation and of borrowing relationships, and are relevant to the current enquiry principally for purposes of elimination. Interactions among Polynesians, Melanesians and Micronesians have been continuous in varying degrees from pre-Lapita through to modern times, posing a problem of disentangling the more recent distributional events from the older ones. The extensive three-way contact between Fijians, Tongans and Samoans in the period immediately prior to European contact, coupled with influence from Micronesia during the same period, is especially worthy of note. Thus, although the Lapita people or their descendants can be identified as possessors of slit gongs, it was not until the latter part of the eighteenth century AD that slit gongs came to be used in Fijian and Western Polynesian double canoes, where they were coincident with sculling. Associations can also be demonstrated between other elements of music within the area (*see* McLean 1999) that have contributed to the present mix and overlay relationships that can be counted as ancestral. Sufficient clues remain however, for a satisfactory sequence of events to be proposed which accounts for all of the known facts.

In brief, combined evidence from music, physical anthropology, genetics, and canoe types and distribution points overwhelmingly to Micronesia rather than Melanesia as a path for Polynesians, and a dual hypothesis of Polynesian origins can accordingly be proposed:

The Lapita people were Melanesians who settled all of the currently Melanesian areas of both Near and Remote Oceania. After arriving

in Fiji, they may indeed have been among Polynesian ancestors, but were not primarily or exclusively so. Instead, Polynesians developed independently within Western Polynesia, most likely in Samoa, after migrating there from Micronesia, and only later began to intersect with descendants of the Lapita potters.

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