
EDITOR'S FORUM

LAPITA FISHING STRATEGIES: A REVIEW OF THE ARCHAEOLOGICAL AND LINGUISTIC EVIDENCE

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Introduction

The traditional economies of Oceanic societies place a heavy reliance on marine resources. This is a fact well documented throughout the islands of Melanesia, Micronesia, and Polynesia. The fishing methods described ethnographically in these regions cover a wide array of techniques but, despite a number of locally unique behavioral and technological innovations, the fishing practices that provide the mainstay of Oceanic marine exploitation are marked by a high degree of conformity.

It has been argued that Polynesian and much of the Melanesian and eastern Micronesian fishing technology is derived from the Lapita Cultural Complex, whose bearers first colonized much of Oceania. For this reason the study of Lapita fishing is deemed by some archaeologists to be crucial to the understanding of later developments in Pacific fishing practices: "The Lapita Cultural Complex is . . . ancestral to the Polynesian cultures, and probably also to many of the cultures of Melanesia and Eastern Micronesia. In short, to understand the development of Polynesian fishing technology and behaviour, a knowledge of Lapita fishing strategies is crucial as these comprise the ancestral baseline" (Kirch and Dye 1979:55).

To date archaeological studies of Lapita fishing techniques have been carried out by Green (1979, 1986) and by Kirch and Dye (1979). These studies have drawn on the analysis of fishbone from Lapita middens, and also on the use of ethnographic analogy. The results of these studies point to a predominant inshore fishing adaptation of Lapita societies. The majority of the fishbone recovered is derived from fish species that inhabit the inshore coral-reef zones. Furthermore, although a number of bait hooks have now been recovered from the Massau Lapita sites (Kirch 1987), lure hooks are less common and seem to occur within late Lapita and Lapita-related contexts (Green 1986:132; Kirch and Yen 1982:243-244). These factors have led to the widely held view that Lapita fishing strategies were generally adapted to a reef-lagoon ecosystem (Green 1979; Kirch and Dye 1979).

However, despite the high degree of conformity between sites with regard to their fishbone components and the scarcity of artifactual evidence for offshore marine exploitation, it is incorrect to assume that the Lapita fishing strategies were adapted solely to reef-lagoon conditions. There is an observed selection among Lapita communities for dwelling sites close to reef-lagoon areas and the fishing evidence reflects this bias. This does not mean that Lapita people were not exploiting the full range of marine zones using the appropriate technology.

In this article linguistic evidence will be used to augment the archaeological and ethnographic material to build up a more complete picture of the full range of Lapita fishing adaptations. It will be shown that speakers of early Oceanic languages (and this would include most of the Lapita people) had words for the full range of fishing methods found among Oceanic fishing peoples up until recent times.

Given the wide spatial and temporal spread of Lapita culture, it is inappropriate to attempt to assign to the Lapita Cultural Complex one specific language. It is highly probable, however, that most, if not all, of the populations bearing Lapita culture spoke Austronesian languages, in particular languages belonging to the Oceanic subgroup of Austronesian (Pawley and Green 1973; Shutler and Marack 1975). Proto-Oceanic (POC) is an interstage of Austronesian that probably broke up no later than 2,000 B.C. (Pawley and Green 1973, 1984) from which the contemporary languages of Melanesia east of longitude 136°E, Polynesia, and much of Micronesia are derived.

It is assumed here that because cultures showing features distinctive of Lapita are dated between 1,600 B.C. (Kirch and Hunt 1988) and the first centuries A.D., lexical items reconstructed to the level of POC would cast some light on Lapita culture. The languages of Fiji and Polynesia constitute a subgroup of Oceanic languages known as Proto-

Central Pacific (PCP). Since the Fiji-West Polynesia region was first settled by Lapita peoples, PCP reconstructions may also be of value. Although this same argument would also hold for Proto-Polynesian (PPN), that proto-language may have developed some time after the main Lapita colonization so PPN reconstructions are not noted here.

The subgrouping adopted here to allow POC reconstruction follows Ross (1986). Ross proposes a Western Oceanic group of Oceanic languages consisting of three high-order clusters (North New Guinea, Papuan Tip, and Meso-Melanesian) that are distinct from the Oceanic languages to the east of Santa Ysabel in the Solomons. This group of eastern languages does not constitute a subgroup of any of the Western Oceanic language clusters, but appears to be descended from early departures from POC (Ross 1986:449). In addition, Ross points out that there are four language groups in the eastern region that cannot be definitely grouped with the other eastern Oceanic languages. In this article the only member of this grouping that has been used to provide cognates of fish and fishing terms is that of the South East Solomons, which Ross suggests is most immediately related to the Western Oceanic languages at the level of POC.

For the purposes of this article a POC item is reconstructed if regular cognates are found in Oceanic languages to the east of Santa Ysabel (including the languages of the South East Solomons) and in a language or languages of one of the Western clusters. A consensus has yet to be reached concerning the exact relationship between the eastern group and the languages of the South East Solomons. The term Proto-Remote *Oceanic* (PRO) would seem to be an appropriate representation of a lexical item reconstructed from both these language groups, but this proto-language may in fact be synonymous with POC. I take a conservative approach here, listing an item as PRO when (1) cognates from both the South East Solomons and the eastern language group imply a proto-form but (2) no reflexes from the Western Oceanic languages can be found that allow the reconstruction to be carried back to POC.

The full range of previously reconstructed POC fishing terms as well as several terms previously unrecorded will be examined. A comparison will then be made between what is known archaeologically and what conclusions can be drawn from the linguistic evidence concerning Lapita fishing.

Traditional Fishing Practices in Oceania

In Oceania, fishing and other types of marine exploitation play a dominant role in the subsistence economy. This is particularly true in the cen-

tral and eastern Pacific. The major food plants and domestic animals were introduced to most areas of Oceania by man and indigenous species of flora and fauna decrease as one moves east into Polynesia. This is less true of the marine ecology and, with the exception of New Zealand, most Oceanic fish species are represented throughout most of the islands of Oceania.

Dozens of named fishing methods have been recorded ethnographically in Oceania but most of these fit into a small number of general categories representing basic technological and behavioral strategies. A representative sample of the recorded techniques from both atolls and high islands is presented below.

In the Palau islands Masse (1986) has defined six general fishing categories. These are spearing, netting, poisoning, line fishing, basket trapping, and pond trapping. In Niuatoputapu Kirch and Dye (1979) observed at least thirty-seven named fishing techniques that fell into the categories of netting, angling, spearing, trapping, diving, and poisoning. In Hawai'i Kirch (1982) identified eight fishing categories: poisoning, spearing, trapping, shallow line-fishing, deep line-fishing, netting, and trolling.

These fishing methods all fall within the general categories of netting, hook and line fishing, trolling, trapping, spearing, and poisoning.

Netting

The term "netting" covers a wide range of techniques from dip netting, a one-person operation, to set or drag netting, which can require the cooperation of ten or more people. In Niuatoputapu Kirch and Dye note that seine netting is one of the most productive fishing strategies and that more fish are taken with nets than with any other fishing method (1979:61, 67). They also make the important point that netting is an extremely complex fishing strategy: Although it relies on a fairly simple technology it requires a complexity of behavioral strategies (Kirch and Dye 1979:67).

Spearing

Spears are used either as primary equipment while diving or wading in the shallows or as secondary equipment to assist in the landing of fish taken from canoes or trapped in stone weirs or pond traps.

Ethnographic studies in both Palau and Niuatoputapu indicate that

night spearing with torches can yield very large catches. In Niuatoputapu this is the most productive form of fishing after seine netting (Masse 1986: 88; Kirch and Dye 1979:57).

Hook and Line Fishing

This type of fishing is usually conducted either from the reef-edge or from a canoe. Masse distinguishes between long-line fishing used to catch fish from the outer faces of the reef with hand-held lines and shallow water short-line fishing usually carried out inside the lagoon or just off the reef-edge from canoes. Rod fishing from the reef-edge using short lines would also be included in this category.

A wide variety of fishhook types are manufactured in Oceania and there have been a number of studies of ethnographic and archaeological fishhook assemblages (Anell 1955; Davidson 1967; Kashko 1976; Sinoto 1968; and others). Johannes (1981) argues that this variety of shapes is functionally determined, relating to both species and habitat; material of manufacture would also play a determinant role in hook form.

Trapping

Trapping is a category that covers a wide range of specialized fishing methods including the use of basket traps, ponds, and weirs.

Basket traps vary in size according to the type of fish being sought. In Palau they are usually constructed of bamboo and are rectangular in shape. There are at least fifteen different varieties recorded from Palau, each designed for specific fish species. These traps are baited, sunk to the required depth, and sometimes camouflaged with rock or lumps of coral.

Weirs are generally constructed of stone or coral, but can also be made of wood in the form of a fence. They form an enclosure somewhere between the low and the high tide marks with the open end facing the shore. The fish enter the enclosure during high tide and are trapped as the sea retreats. The fish can then be collected with nets or with spears.

Ponds are usually constructed of coral or stone blocks between the high and the low tide marks. They are complete enclosures that are submerged at high tide but at low tide protrude slightly above the water line. Used to trap fish, they can also be used to keep fish alive before a feast (Titcomb 1952). Basket traps, ponds, and weirs can all be baited with a ground or floating bait.

Trolling

Trolling is a specialized method designed to catch pelagic fish species. A lure is used to which a hook is attached. This is then pulled across the water and in this way resembles the movements of a surface-swimming fish. The larger pelagic fish are attracted by the movement and take the lure.

Lures are generally made of some shiny material such as pearlshell, turtle shell or polished bone. Stone could be used in those places where other materials are not available. Trolling is done from canoes outside the reef zone.

Poisoning

Poisoning of fish is carried out using poisons derived from plants such as the *Barringtonia asiatica* tree or the vine *Derris eliptica*. The poison is either put into containers and sunk into crevices and pools in the reef or it is mixed with sand and sprinkled into the target area. According to Masse poisoning is a labor intensive activity in Palau and for this reason is only done before a major feast when large quantities of fish are required (1986:92). In some areas of Oceania, the Southern Cooks for example, poisoning is conducted on a much smaller scale, often by a single individual.

Oceanic Marine Environment

The marine environment in most parts of Oceania falls into a number of quite distinct fishing zones. These are the reef-flat, the reef-edge, the lagoon, and the open-sea. These correspond quite closely to the four biotype zones identified by Kirch in Hawai'i: the inshore, benthic, pelagic, and neritic zones (1982:45).

Open-sea Zone

The open-sea zone includes Kirch's pelagic and benthic zones. The pelagic zone is the surface layer where the pelagic fish such as bonito and tuna swim and the benthic zone is the lower layer where the bottom-feeding fish are found. These latter species include the labrids, the scarids, and the groupers.

In Niuatoputapu, open-sea fishing is said to be more productive than fishing from the reef but the cost in terms of the capital investment in

ocean-going craft, among other things, makes the open sea a less important source of marine food. Furthermore, in Niuatoputapu (and probably throughout most of Oceania) the open sea is considered dangerous and in some cases is feared (Kirch and Dye 1979:60).

In general the open sea is highly productive but usually a less important source of everyday subsistence. The supply of fish from this source is less reliable due to limitations of access and variable success rates.

Reef-edge

The reef-edge is the seaward face of the fringing reef and is one of the most important micro-environmental marine zones. Not only does this area contain the widest range of species but it can be fished using a number of different techniques.

Lagoon

The lagoon is traditionally an important source of seafood and in some cases is said to provide the bulk of sea products. In many islands, however, a majority of the fish caught in the lagoon are actually taken from around the coral heads of the reef-flat and the reef-edge; the waters of the lagoons themselves do not provide a large quantity of fish.

Reef-flat

The reef-flat is a coralline ledge that lies between the littoral zone and the lagoon, on the lagoon side of the fringing reef. On uplifted coral reef islands (Makatea islands) the reef-flat extends from the shore to the reef-edge and is usually covered by no more than a meter or two of water at high tide. The reef-flat consists of a series of coral heads, surge channels, and pools that can be fished at high tide with seine nets over the channels and at low tide with spears, dip nets, and poisons.

The reef-flat is easily accessible and can be fished using a wide variety of techniques. The quantity and variety of fish found there is also high. These factors make this one of the most economically important fishing zones in much of Oceania.

Table I lists sixteen of the most commonly caught families of fish in Oceania and the environment from which they are taken. The selection of fish is based on surveys from a number of different areas and includes both ethnographic and archaeological information. The areas surveyed include the Society Islands (Leach, Intoh, and Smith 1984), Palau

TABLE 1. **Marine Habitat of Commonly Caught Fish**

Fish Families	Open-sea	Reef-edge	Lagoon ^a	Reef-flat
Acanthuridae		X	X	X
Balistidae		X		X
Belonidae	X	X		
Carangidae	X	X		
Carcharhinidae	X	X		
Chaetodontidae		X		X
Diodontidae		X		X
Epinephelidae		X		
Holocentridae		X		X
Katsuwonidae	X			
Labridae	X	X		X
Lethrinidae	X			X
Lutjanidae	X			X
Mugilidae	X	X		
Mullidae		X	X	
Scaridae		X		X

Sources: Habitat and fishing methods relating to these fish have been taken from the following: Munroe (1967), Green (1986), Kirch and Dye (1979), Bagnis et al. (1972), and Masse (1986).

^aMost reef fish inhabit the lagoon but they are usually caught around the reef-flat and reef-edge.

(Masse 1986), New Zealand (R. Nichol pers. comm. 1984) and Rarotonga (Baquie 1977). These areas were chosen because they represent a variety of marine environments, The Society Islands and Rarotonga represent high islands with large areas of lagoon. Niuatoputapu is an eroded high island with a small lagoon and large expanses of reef-flat. Palau is an archipelago ranging from uplifted limestone islands to atolls. New Zealand represents the southernmost and coldest extreme in which Oceanic people fished. A high degree of similarity was found in the types of fish sought, although there were regional specializations based on particular marine conditions.

Table 2 lists the most commonly used methods of catching the fish listed in Table 1.

The data in Tables 1 to 3 indicate clearly that the most commonly caught fish species in Oceania are those found in inshore waters, particularly around the reef-edge and the reef-flat. It is also in these zones that the widest range of fishing techniques can be used. Large-scale offshore trolling expeditions aimed at bonito and other pelagic fish have been noted for a number of regions of Oceania but the importance of

TABLE 2. **Commonly Caught Fish and Their Usual Methods of Capture**

Fish Families	Net	Hook	Lure	Trap	Poison	Spear
Acanthuridae	X	X		X	X	X
Balistidae		X			X	
Belonidae		X				
Carangidae		X	X	X		
Carcharhinidae		X				
Chaetodontidae	X	X			X	
Diodontidae	X					X
Epinephelidae	X	X			X	X
Holocentridae	X	X		X		
Katsuwonidae			X			
Labridae	X	X		X	X	X
Lethrinidae	X	X		X	X	X
Lutjanidae	X	X		X	X	X
Mugilidae	X	X		X	X	X
Mullidae	X			X	X	X
Scaridae	X			X	X	X

Sources: See Table 1.

TABLE 3. **Usual Fishing Methods Employed in the Major Fishing Zones**

Zones	Net	Hook	Lure	Trap	Poison	Spear
Open-sea		X	X			
Reef-edge	X	X			X	X
Lagoon	X	X		X		
Reef-flat	X	X		X	X	X

these strategies in terms of subsistence may have been overstressed. Masse suggests that in Palau, for example, the social values of trolling in terms of prestige and access to wealth may have been more important than the subsistence value (1986: 108).

In general, Oceanic fishing strategies seem to be highly specialized, with a wide range of techniques aimed at particular species and for use in specific conditions. From this full range, communities choose those techniques most appropriate to their local environment and seasonal setting. Consequently, although most groups practice all the general methods of fish capture outlined above, the most economically important strategy in any island is dependent on the local marine environment and on meteorological conditions. In the highly developed reef-lagoon ecosystems those species taken with nets, poisons, traps, and

spears are predominantly caught, while in the higher islands, such as those of East Polynesia, hooks and lures are more commonly used to catch the offshore species. This is reflected in the wide variety of hook shapes represented in archaeological collections from East Polynesia.

Lapita Fishing

Although early reports on the Lapita Cultural Complex tend to be dominated by descriptions of pottery, some more recent papers have been concerned with other aspects of Lapita culture. Several of these papers have taken up the issue of Lapita fishing strategies.

In a summary of the evidence for Lapita fishing Green (1979:36) argued for a predominance of reef and shallow-water lagoon exploitation. This was based on the fishbone finds in a Lapita site on the Main Reef Islands, Site SE-RF-2 (Green 1976:257) and on Tongatapu (Poulsen 1967). Since then a detailed report on fishbones from three sites on Niuatoputapu has been completed by Kirch and Dye (1979) and the SE-RF-2 material has been reanalyzed using an improved reference collection and methodology (Green 1986). Both of these studies confirm a predominance of fish taken from the inshore zones, particularly the reef-edge and the reef-flat, and only a very small number of pelagic and benthic fish species. These latter usually require a trolling or hook and line method of capture. A summary of the identified fish families represented in Lapita middens appears in Table 4.

The archaeological evidence in the form of artifacts associated with fishing also points to reef and shallow-water exploitation. So far few one-piece hooks have been recovered from Lapita sites and lures only appear toward the end of the Lapita sequence. This is significant in view of the large number of hooks recovered from later sites in East Polynesia.

Together with the ethnographic studies of Oceanic fishing, the evidence suggests that Lapita fishing was based on the use of techniques for inshore exploitation including netting, spearing, trapping, and poisoning (Kirch and Dye 1979; Green 1979, 1986). Furthermore, Kirch and Dye have argued that the Lapita practice of inshore fishing was an adaptation to a tropical South West Pacific reef-lagoon environment. Such an adaptation occurs in response to the relative danger of venturing outside the reef zone and to the greater economic return of certain types of inshore fishing in these environments (Kirch and Dye 1979:60, 67, 72-73). There is some question, however, whether we are observing

TABLE 4. Fish Identified in Lapita Middens and Their Usual Methods of Capture

Fish Family	Net	Hook	Lure	Trap	Poison	Spear
Acanthuridae	X	X		X		X
Balistidae	X	X				X
Belonidae	X	X	X			X
Carangidae	X	X		X		X
Diodontidae	X					X
Holocentridae	X	X				X
Labridae	X	X		X		X
Lethrinidae	X	X				X
Lutjanidae	X	X				X
Mullidae	X	X		X		X
Ostraciidae	X					
Pempheridae						X
Scaridae	X	X		X		X
Scombridae	X	X	X			
Scorpaenidae		X				X
Serranidae	X	X			X	X
Sparidae	X			X	X	X
Sphyraenidae		X	X			

Sources: See Table 1.

the full range of Lapita fishing adaptations, given the limited environmental areas where sites have been located. There is certainly a preference for reef-lagoon habitation settings among Lapita communities and therefore the archaeological evidence pointing to the most efficient means of exploiting such settings is no surprise. Yet the evidence may reflect a bias based on the specific environment in which the majority of excavated Lapita sites are located. In order to investigate the full range of Lapita fishing strategies the linguistic evidence will be reviewed. This material should be free of any environmentally influenced bias.

Linguistic Evidence for Lapita Fishing

The reconstruction of early Oceanic fishing terms provides fairly direct evidence of the type of techniques used by Lapita fishermen. At least sixteen such terms have been reconstructed to date (see Table 5). Five of the six main fishing categories practiced in Oceania today are represented at the level of POC. This includes five terms for netting, three referring to hook and line fishing, two terms referring to fish trapping

TABLE 5. **Fishing Terms Reconstructed to POC or PCP**

Language	Reconstruction	Gloss	Source
POC	*kau	fishhook	Grace 1969
POC	*kima	fishhook	Grace 1969
POC	*kupenga	fishing net	Grace 1969
POC	*pani	bait or lure	Blust 1978
POC	*bintu (l, r)	kind of fish or crab trap	Blust 1980
POC	*tupa	fish poison	Grace 1969
POC	*ndeke	pocket of seine net	Biggs 1965
POC	*alap	to draw in nets	Grace 1969
POC	*uto	net float	Grace 1969
POC	*pupu	basket trap	Lincoln 1978
POC	*mpaya	fishing lure	Pawley and Green 1984
POC	*tail	to catch fish	Blust 1976
POC	*puko	fishing net; seine	Blust 1976
POC	*matau	fishhook	
PPN	*matau	fishhook	
GIL	*matau	fishhook	
PCP	*yapo	to fish; fishing line	Hockett 1976
PCP	*qapa	net gauge	Hockett 1976

and one term each for the techniques of poisoning and lure fishing. No term for spearing has been recorded but as one of the simplest fishing techniques and also one of the most productive it is also likely to have been practiced. The reconstructions for hook, lure, and bait suggest that angling techniques were important to early Oceanic speakers.

A large number of fish names have also been reconstructed to POC, PRO, or PCP. While these terms do not necessarily indicate that these particular fish were caught by Lapita people they do give some indication of the extent of early Oceanic marine knowledge. Fifty-three fish names have been reconstructed in Tables 6 and 7; interestingly, a large number of these fish have been found in Lapita middens.

Of the fifty-three fish names listed in Tables 6 and 7, twenty-one terms refer to clearly identifiable families at the level of POC or PRO. These fish cover the full range of marine habitats (Table 8). Four are usually found in the open-sea zone, six are found either in the open-sea or reef-edge zones, and ten are found only around the coral of the reef-edge and reef-flat. Of these twenty-one families at least eight are usually caught using hooks, two with lures, and the remainder with varied techniques including netting, spearing, and poisoning. Eleven of these families (52 percent) have been found in Lapita middens.

TABLE 6. **Lexicon of Previously Unrecorded Reconstructions of Fish Names**

	Language	Reconstruction or Cognate	Gloss
1.	POC	*qalu	<i>Sphyræna</i> sp., or other long-bodied fish; barracuda
	Titan	a l	thick-bodied barracuda
	Nauna	Kil	thick-bodied barracuda
	Penchal	kil	thick-bodied barracuda
	'Are 'are	raru	pike fish
	Nggela	alu	barracuda
	Sa'a	salu	barracuda
	Lou	k l	thick-bodied barracuda
	Seimat	al-	thick-bodied barracuda
	Wuvulu	al-	thick-bodied barracuda
2.	POC	*qawa	<i>Chanos chanos</i> , milkfish or salmon herring
	PPN	*'awa	milkfish-salmon herring
	Fijian	yawa	milkfish
	Gilbertese	bane-awa	milkfish
		awa-tai	milkfish
	Lau	hakwa	milkfish
	To'aba'ita	thakwa	milkfish
3.	POC	*paRi	ray (generic term)
	PPN	*fai	ray (generic term)
	Arosi	hari	fish, ray
	Lau	fali	ray
	Fijian	vai	ray
	To'aba'ita	fali	stingray
	Mota	vari	stingray
	Vangunu	tape bari	stringray
4.	POC	*qume	<i>Naso</i> sp., unicorn fish
	Lau	'ume	black flattish fish size of mullet
	To'aba'ita	uume, ume	<i>Naso</i> sp.
	Langalanga	ume	<i>Naso</i> sp.
	Arosi	ume	<i>Naso</i> sp.
	Bauro East	a'ume	<i>Naso</i> sp.
	Mota	ume	<i>Naso</i> sp.
	Yapese ^a	quum	type of fish, unicorn fish
5.	POC	*sumu	Balistidae
	PPN	*sumu	Balistidae
	Fijian	sumusumu	<i>Tetrodon</i> ^b
		cumu	Balistidae, triggerfish
	Lau	humu	triggerfish
	Mota	sumu	fish sp.

TABLE 6. **Continued**

	Language	Reconstruction or Cognate	Gloss
14.	PRO	*tipitipi	Chaetodontidae sp.
	PPN	*tifitifi	butterfly fish
	Fijian	tivitivi	butterfly fish
	Mota	tivitivi	butterfly fish
15.	PRO	*mpanda	<i>Acanthocybium solandri</i>
	PPN	*paala	<i>A. solandri</i>
	Gilbertese	baara	<i>A. solandri</i>
16.	PCP	*saputu	Lutjanidae or Lethrinidae sp.
	PPN	*sa(a)putu	Lutjanidae sp.
	Fijian	sabutu	Lethrinidae sp.
17.	PCP	*kapa	Mugilidae sp.
	PPN	*kafa	diamond-scaled mullet
	Fijian	kava	mullet sp.
18.	PCP	*mpalangi	Acanthuridae sp.
	PPN	*palangi	Acanthuridae sp.
	Fijian	balangi	<i>Acanthurus teuthis</i>

^aIt remains uncertain whether Yapese is in fact an Oceanic language.

^b*Tetrodon* and Balistidae are closely related.

Conclusions

From a summary of fish species represented in Lapita middens and the scarcity of offshore-fishing gear recovered from Lapita sites, it has previously been argued that trolling and hook and line fishing were a minor component of Lapita fishing strategies. It has also been suggested that the fishing strategies represented archaeologically reflect a Lapita adaptation to tropical South West Pacific reef-lagoon ecosystems. The linguistic evidence, however, suggests that the speakers of early Oceanic languages were aware of and had names for a variety of fish found in all the marine zones and possessed the technology to catch them. On linguistic grounds it would be difficult to argue that there was any substantial difference between the practices of early Oceanic fishermen and those of recent Oceania.

The discrepancy between the linguistic and archaeological evidence relates to the range of environments in which Lapita sites have been located. Lapita communities selected reef-lagoon localities, quite possi-

TABLE 7. Lexicon of Previously Recorded Reconstructions of Fish Names

	Language	Reconstruction	Gloss	Source
1.	POC	*qabuqabu	fish species	Blust 1980
2.	POC	*bakuku	presumably sea bream	Blust 1980
3.	POC	*kuRaw	edible marine fish	Blust 1980
4.	POC	*palata	fish species	Blust 1980
5.	POC	*paya	kind of small fish (sardine or anchovy?)	Blust 1980
6.	POC	*puyu	a fish resembling the climbing perch	Blust 1980
7.	POC	*buna	fish species	Blust 1980
8.	POC	*katambak	fish species	Blust 1980
9.	POC	*ki(k)kik	marine fish species	Blust 1980
10.	POC	*kiteng	marine fish species with venomous dorsal spines	Blust 1980
11.	POC	*Ringaw	fish species	Blust 1980
12.	POC	*sepet	fish species	Blust 1980
13.	POC	*tamban	fish species, sardine species	Blust 1980
14.	POC	*qatu	bonito	Pawley 1972
15.	POC	*kawakawa	grouper	Grace 1969
16.	POC	*kananse	mullet	Grace 1969
17.	POC	*pakiwak	shark	Grace 1969
18.	POC	*kulapu	kind of fish	Blust 1976
19.	POC	*la(m)pa	fish species	Blust 1973
20.	POC	*punsu	kind of fish	Blust 1976
21.	POC	*lawa	kind of fish	Blust 1976
22.	POC	*mamin	kind of fish--wrasse	Blust 1976
23.	POC	*(n)tangari	fish species	Blust 1972
24.	POC	*nsansa	kind of fish	Milke 1961
25.	POC	*kalia	reef fish, grouper, double-headed parrot fish	Blust 1976
26.	POC	*konga	kind of fish	Blust 1976
27.	POC	*sin(nsa)	kind of fish	Blust 1976
28.	POC	*tio	kind of barbelled fish	Blust 1976
29.	PCP	*ntonu	fish species	Hockett 1976
30.	PCP	*poqo	a small fish	Hockett 1976
31.	PCP	*qulapi	parrot fish	Hockett 1976
32.	PCP	*ngka(n)si	fish species, shellfish species	Hockett 1976
33.	PCP	*ngkio	fish species	Hockett 1976
34.	PCP	*lai	fish species	Hockett 1976
35.	PCP	*maqo(maqo)	kind of fish	Hockett 1976

TABLE 8. Fish Families Identified to POC, PRO, or PCP

Fish Family	Marine Zone(s)	Capture Method(s)	Lapita Middens
Acanthuridae	reef-edge	net/hook	present
Albulidae	open-sea/reef-edge	hook	absent
Balistidae	reef-edge/reef-flat	hook/poison	present
Belonidae	reef-edge	hook/lure	present
Carangidae	open-sea/reef-edge	hook	present
Carcharhinidae	open-sea/reef-edge	hook	absent
Chaetodontidae	reef-edge	net/hook	absent
Channidae	reef-edge	hook/net	absent
Dyastidae	open-sea	hook	absent
Engraulidae	lagoon/open-sea	net	absent
Epinephelidae	open-sea/reef-edge	net/hook	absent
Katsuwonidae	open-sea	lure	absent
Labridae	reef-edge	hook	present
Mugilidae	reef-edge/reef-flat	net/hook	absent
Mullidae	open-sea/reef-edge	trap/spear	present
Nemipteridae	reef-edge/reef-flat	hook	present
Feristidae	open-sea	hook	absent
Scombridae	open-sea	hook/lure	present
Scorpaenidae	reef-edge/reef-flat	hook	present
Sparidae	reef-edge	net/poison	present
Sphyraenidae	open-sea/reef-edge	lure	present

bly because of the ease of marine exploitation, but they were not technologically restricted to the exploitation of these areas.

Green (1986) has already pointed out that the archaeological evidence on Anutan fishing suggests a heavy reliance on angling. This is an adaptation in response to an offshore submarine plateau that provided excellent fishing using long-line bait hooks. The dates for these sites suggest they were contemporaneous with Lapita culture (Green 1986; Yen and Gordon 1973:92). The Anutan case is a clear example of an Oceanic community of a similar antiquity to Lapita culture that selected offshore fishing techniques as a response to local conditions, and it is highly probable that Lapita peoples also practiced such a strategy. It is assumed that when Lapita sites are excavated in non-reef-lagoon environments the full range of fishing adaptations will become known.

NOTES

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Language sources used in the text are:

Proto-		Mota	Codrington 1896
Polynesian	Hooper n.d.	Nauna	Blust 1980
'Are'are	Blust 1980	Nggela	Fox 1955
Arosi	Fox 1970	Palauan	*
Bauro (East)	Barnett 1978	Penchal	Blust 1980
Bauro (West)	Barnett 1978	Ponapese	*
Cebuano	Blust 1980	Roviana	Waterhouse 1949
Chamorro	*	Sa'a	Ivens 1918
Fijian	Capell 1973	Savosavo	Blust 1980
Gilbertese	Sabatier 1971	Seimat	Blust 1980
Ilokano	Blust 1980	Titan	Blust 1980
Kahua	†	To'aba'ita	Akimichi n.d.
Langalanga	Blust 1980	Ulawa	Barnett 1978
Lau	Barnett 1978	Wuvulu	
Lou	Blust 1980	Vangunu	Lichtenberk pers. comm.
Malay	Blust 1980	Yapese	
Marshallese	*		

*Although a complete range of Micronesian dictionaries is available, all Micronesian cognates listed in the text have been taken from the Micronesian Finderlist with Semantic Codes (Computer printout, 29 June 1981) produced by the Linguistics Department of the University of Hawaii.

†Barnett 1978 lists these lexical items as being from Santa Ana. In this text "Kahua" is used for the language of Santa Ana Island following the convention of Tryon and Hackman (1983:37).

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