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New Caledonian Culture History: A Review of the Archaeological Sequence

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ABSTRACT

An outline is presented of a culture historical sequence for New Caledonia, by critically reviewing and integrating all currently available information from a wide variety of sources. The often noted possibility of an early aceramic cultural horizon associated with "tumuli" or mounds is explored in some detail, even though solutions to the problems cannot be reached on the known data.

The evidence relating to the Lapita assemblages is examined and a sequence, based on ceramic change and radiocarbon dates spanning some 1400 years, is proposed for that cultural horizon. The Lapita assemblages are shown to be but one of two early, and securely dated, ceramic styles present in New Caledonia, in contrast to their role as the sole foundation culture in some other island groups in Eastern Melanesia and Polynesia. Some assemblages, in approximately the same age range of 1600 B.C. to A.D. 200, are dominated by a second ceramic style of paddle impressed pottery. The term Podtanean is adopted for them.

After A.D. 200, these two early ceramic styles give way to another, which persists well into the period of European contact, and is often referred to in the literature as the Melanesian cultural complex or Mangaasi style. Because these designations seem inappropriate, as prejudging issues of cultural continuity, replacement and outside contacts, we refer to it instead as the Oundjo ceramic style. Its definition is largely based on information recovered by Gifford and Shutler from a number of sites, which because of the way they were excavated, analysed and correlated now require reassessment. Such a revision is undertaken, the materials being separated into those which are fully prehistoric and those associated with imports of the historic period. North-South differences between the pottery assemblages of the historic period are identified. A revised culture historical sequence for New Caledonia is then proposed.

Keywords: NEW CALEDONIA, CULTURE HISTORY, REVIEW, ARCHAEOLOGICAL SEQUENCE, TUMULI, LAPITA, PODTANEAN, OUNDJO, CERAMIC STYLE.

INTRODUCTION

In teaching University courses on Oceanic prehistory, it has proved difficult to present a coherent summary adequately outlining the New Caledonian sequence. The reasons for this are several. First, the materials relating to New Caledonian prehistory, which have appeared in a great range of sources, are seldom integrated within a single account. Second, only some of the results of investigations in New Caledonia have been published in widely available sources. The rest of the information appears in manuscript, in reports to or for governmental organisations, in microfiche, or in articles and monographs which are not easily accessible. Third, the main sources are in both French and English, posing problems of translation and full communication of results across the language barrier. Fourth, the major published work on the sites of the late period by Gifford and Shutler (1956) has serious deficiencies in its presentation of the data. Finally, the various reports use different frames of reference and terminologies.

A description of the main sources on which we have drawn in making this summary illustrates some of the points above. Following an early excavation at

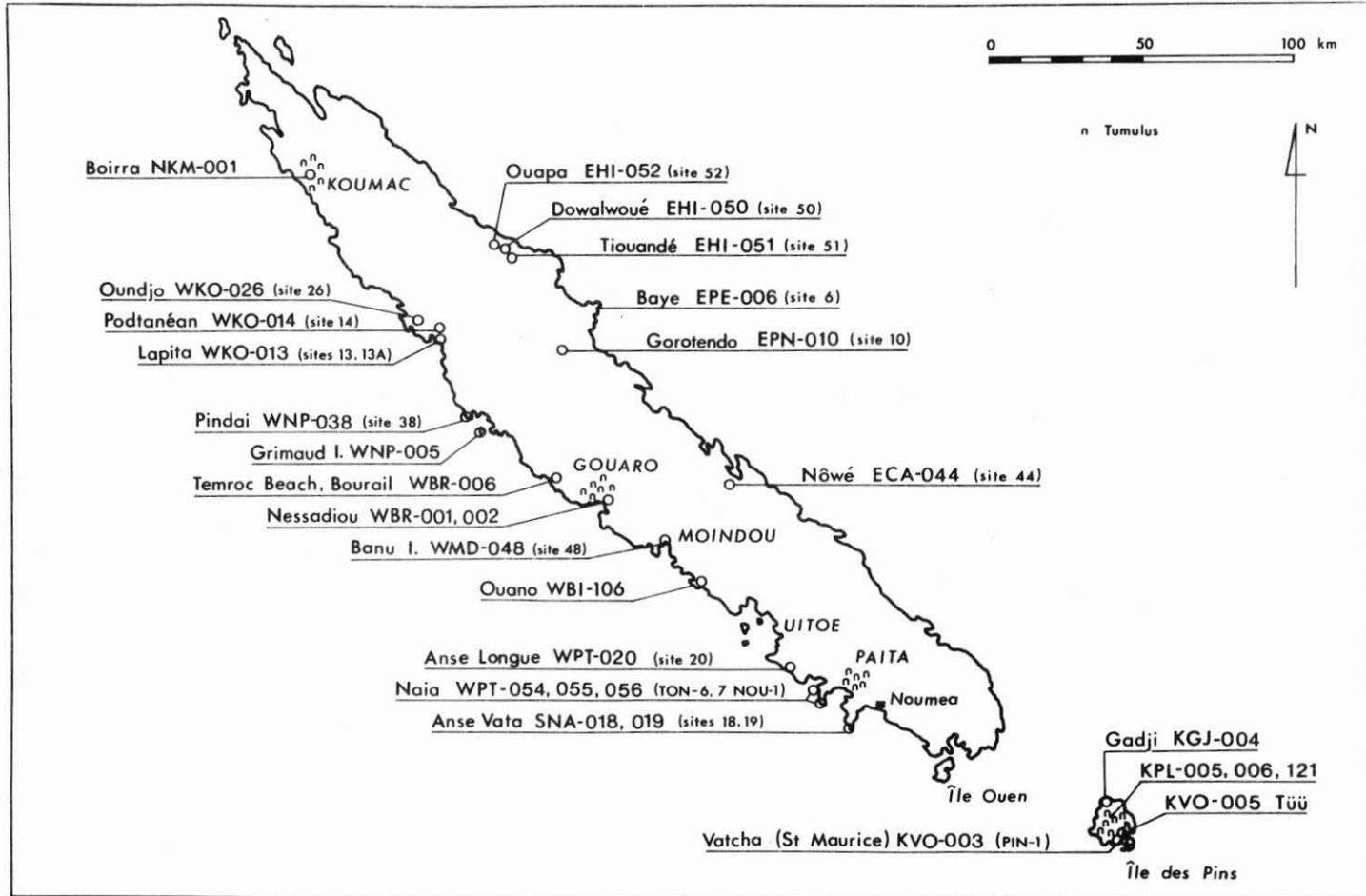


Figure 1: Map of the principal archaeological sites in New Caledonia.

Bourail by Glaumont (1889), the initial report of a Lapita site on Foué Peninsula by Piroutet in 1917, and reports on a range of cultural materials, some from sites, by Sarasin (1916-1922, 1917, 1929), there was little activity until 1948, when Lenormand found a distinctive pottery and other items on a beach at Saint-François-près-Vao on the Île des Pins. Knowledge of this find allowed Avias (1950), in an article summarising the prehistoric and historic pottery styles of New Caledonia, to establish the close similarity of the Vao pottery with that found earlier by Meyer at Watom, an island off the northeast end of New Britain, and samples from that site later lodged at the Musée de l'Homme by Father O'Reilly. Independent confirmation of the close relationship between the two sets of potsherds was provided at about the same time by O'Reilly. After Gifford and Shutler's excavation at "site 13" on the Foué Peninsula in 1952 (Fig. 1), recognition of this stylistic relationship was extended to the pottery from that locality, including that previously reported by Piroutet (Gifford and Shutler 1956:75). Subsequently, the name of that locality, Lapita, was adopted when referring to the pottery in this style and to the cultural assemblages associated with it (Golson 1971:67).

It was the reconnaissance survey of some 53 sites by Gifford and Shutler (1956) in 1952 and excavations at 11 of them that provided the first, substantial, archaeologically-recovered data on New Caledonian prehistory. Moreover, for the first time in this part of Oceania, the archaeological results were combined with a suite of radiocarbon dates which allowed independent assessments of age for the various deposits and a cultural sequence for the island group. Unfortunately, however, Gifford and Shutler had excavated their sites by uniform series of six inch levels which they tended to regard as roughly contemporary, and they analysed and published their data within that framework. This has many undesirable properties, making it necessary to exercise great care in the use of their information. They also presented the results of their pottery analysis, except for records on certain decorated categories, by weight in ounces rather than in the more usual form of number of pieces. To assist in re-analysis and revision, we have used both a microfilm of a large part of the catalogue of their material in the Lowie Museum of the University of California, Berkeley, and information on decorated sherds from "site 13", kindly recorded for Green by Peter White and students, while White was teaching a class in Pacific prehistory at that University.

Golson went to New Caledonia in 1959-1960 to excavate the reported Lapita site on the Île des Pins (Fig. 1). Stimulated by Chevalier's (1963) exploration of some curious tumuli or mounds with "concrete" cores at Paita on the mainland, he also decided to investigate the tumuli on the Île des Pins reported by Avias (1949). Golson (n.d.) wrote a mimeographed report on his work in English, subsequently translated and published in French (1963). Later a radiocarbon date appeared for the excavated Lapita site, referred to by Smart as PIN-1 (Smart n.d., Golson 1971:75). However, no fuller details of these investigations have since become available.

To follow up Golson's work, Smart (n.d.) went to New Caledonia in 1966-67 to undertake research for his Ph.D from the Australian National University. He investigated three sites, TON-6, TON-7 and NOU-1 at Naia Bay on the southwest coast of the main island (Fig. 1). "Shortly before he was to leave, fire destroyed his records and collections, after which he returned to his most important localities, the adjoining TON-6 and TON-7 sites on the western arc of Naia Bay" (Vanderwal n.d.) to make small new excavation tests and collections. As Smart subsequently abandoned his Ph.D, we have only an unpublished summary report (Smart n.d.) and Vanderwal's manuscript (n.d.) reworking Smart's ceramic information on which to draw for analysis.

In 1969-1970, Frimigacci carried out a programme of test excavations on the Île des Pins, before conducting a major excavation at the Vatcha site at Saint-François-près-Vao, apparently the same site as that known to Golson and Smart as St. Maurice or PIN-1. His preliminary report (Frimigacci 1970) was followed by a detailed analysis of the pottery in the site (Frimigacci 1974). In the interim he excavated a tumulus at Gouaro (Fig. 1) while looking at the whole question of tumuli. This, together with further test excavations along the length of the beach at Vatcha and a useful summary of New Caledonian prehistory, is available in Frimigacci's Ph.D thesis, presented to the University of Paris in 1975 and now published in microfiche (Frimigacci 1977a). Further test excavations and section drawings of various New Caledonian sites containing paddle impressed pottery are in an unpublished paper given in the Oceanic section of the 1976 Nice conference (Frimigacci 1976), a shorter revised version of which has now appeared (Frimigacci 1981).

More recent work on the main island includes a preliminary report on the Lapita site of Boirra near Koumac from April to September 1978 (Frimigacci 1978). In the same year Frimigacci and Maitre (1978) briefly reported on a tumulus disturbed by quarrying in the Tülü region on the Île des Pins. This tumulus was investigated more fully in 1979, the same year in which salvage excavations were conducted on the Lapita site of Nessadiou near Bourail on the west coast of the main island (Frimigacci 1979). Since then Frimigacci (1980) has published on the environmental location, use of space, and some additional dates for Lapita sites in New Caledonia. Also, Frimigacci and Maitre (1981) have been responsible for the production of an archaeological map and accompanying explanatory text summarising New Caledonian prehistory in the Atlas of New Caledonia. Finally, the numbering system for archaeological sites in New Caledonia has been standardised (Frimigacci and Maitre 1980).

In the central part of this paper we will attempt to integrate the above information into a prehistoric sequence for New Caledonia. This will entail revising various portions of that sequence and discussing some of the many problems encountered in making these revisions. There are four sets of data to be discussed. First, we will consider the question of tumuli as cultural features and review the controversial issue of their early dating. Next, we will examine the various layers and levels from excavated Lapita sites and try to place them in a sequential order for the period from 1600 B.C. to A.D. 200. Then, we will look at a set of sites with deposits containing assemblages dominated by paddle-impressed pottery which completely overlap in time with Lapita assemblages. Finally, we will re-analyse the contents of the ten later sites excavated by Gifford and Shutler as a means of establishing new chronological relations between them. When integrated with the TON-6 site excavated by Smart, these provide a more meaningful sequence for the last 1700 years of New Caledonian prehistory.

AN EARLY ACERAMIC CULTURAL HORIZON?

Archaeological assemblages, as early as or earlier than the well known sites of the Lapita cultural complex dating from 1600 to 600 B.C., are at present poorly documented in Eastern Melanesia. In contrast, deposits earlier than any Lapita material are to be expected in, and are in fact known from, New Britain and New Ireland at the western end of the Lapita site distribution (White *et al.* 1978, Downie and White 1978, White 1979, Specht *et al.* 1981). As a result, the prevailing opinion for Eastern Melanesia has been that of Shutler and Marck (1975:95), who claimed enough work had been done in Vanuatu, New Caledonia, Fiji, and Polynesia "to

reasonably suggest the temporal priority of the Lapita over other horticultural traditions". Green (1979:47) has reviewed this claim, and shown that, while it appears likely for Polynesia and probable for Fiji, it has yet to be fully demonstrated for the area from the central Solomons to New Caledonia.

One possibility of material contemporary with or earlier than Lapita from New Caledonia has been cited by numerous authors in the past few years (Brookfield with Hart 1971:78, Pawley and Green 1973:12, Shutler and Marck 1975:102) but without any full discussion of the detailed evidence. Brookfield and Hart (1971:78) wrote "there seem to have been earlier—perhaps much earlier—inhabitants of New Caledonia who built tumuli of concrete and coral lime", citing Chevalier (1963) and Golson (pers. comm.) to this effect. More recently, Shutler, on the basis of the early radiocarbon dates on materials associated with these tumuli and evidence for burials in one of them has put forward "the hypothesis that by 10,000 years ago, a non-Austronesian, aceramic, pre-Neolithic, tumuli-building people were in Island Melanesia, on New Caledonia and Île des Pins, and that eventually evidence for similar early occupation of islands between New Caledonia and New Guinea will be found" (Shutler 1978:222). The New Caledonian evidence on which Shutler bases this hypothesis needs fuller and more probing examination than Shutler was able to give it in the context of his general article.

DISTRIBUTION

The sites in question are "tumuli" and "tas de fer" from the main island (Grand Terre) of New Caledonia and from the Île des Pins 70 km to the south (Fig. 1). There are an estimated 400 tumuli or earthen mounds on the Îles des Pins (Delibrias *et al.* 1966:89) and a further, but much smaller, number of earthen mounds and heaps of iron stone rocks on the main island of New Caledonia. Their distribution is not determined by geological factors. Various sized mounds are found throughout New Caledonia, in both coastal and inland situations, and, while some are undoubtedly natural in origin, others have evidently been constructed with local materials—ferruginous gravel or coral on the Île des Pins and silica at Paita and Koumac on the main island, for example.

Golson's group mapped more than 120 mounds on the Île des Pins, noted different types and excavated three examples, tumuli 5, 6 and 121 (Golson 1963:19). Chevalier (1963) investigated a tumulus on the Île des Pins and two tumuli in the Paita district of the main island, recorded several others (1963:39-40), and established, by probing, the presence of "concrete" blocks in the interior of many mounds on the Île des Pins plateau (Golson 1963:21). Frimigacci (1977a:37) excavated a natural mound at Gouaro on the main island and one with burials at Tüü (Frimigacci 1979) on the Île des Pins. A preliminary investigation of the latter had been conducted by Frimigacci and Maitre (1978), following a report on it by Dubois (1976).

NATURAL OR CULTURAL ORIGIN?

Some of the earthen mounds of New Caledonia are certainly natural. As Frimigacci and Maitre (1978) point out, many lateritic plateaux have heaps of iron ore up to 1.5 m high, and Frimigacci (1977a:37) has described the excavation of what was apparently a naturally formed low mound on a colluvial plain at Gouaro, containing a limestone crust, which is very common in the area. This mound did not contain a "concrete" cylinder as described by Chevalier (1963) or Golson (1963). Golson (1963:21) describes a similar low mound (tumulus 6, KPL-006) on the Île des Pins that also did not have a central cylinder.

The presence of a cylinder is important as one indication of a cultural origin for a mound. Thus, cylinders are a normal internal feature on the Île des Pins tumuli

(Golson 1963:22), and are also present at Paita (Chevalier 1963). Tumulus 121 (KPL-121) contained a flat bed of "concrete" 2 m in diameter and 30 cm thick, lying a metre below its surface. This had a central posthole not evident on the surface. Tumulus 5 (KPL-005) had a central cylinder underneath two "concrete" bowls, the upper one smaller than and slightly offset with respect to the larger and lower one. Lips of both bowls appear on the mound's surface. Moreover, separate postholes are suggested for each period of bowl construction (Golson 1963:19-21). None of the tumuli investigated by Golson or Chevalier have yielded any pottery, stone tools, bone, charcoal or marine shells, other than a concentration of the land snails *Placostylus souvillei* (Morelet) and *Placostylus senilis* (Gassies) in and around the "concrete" cylinders and beds. None of these shells showed signs of burning or intentional fracture.

With the lack of other artefactual evidence, the argument as to whether a tumulus is natural or cultural has sometimes centred on the composition of the "concrete" of the bed, cylinder or basin within it. Whatever their origin, these features were evidently formed *in situ*, because the external parts of the cylinders contain many fragments of local material from the surrounding area, either bits of silica gravel (Paita) or iron oxide gravel (Île des Pins), included in the substance as it hardened (Delibrias *et al.* 1966:89). The cylinders have therefore formed in place and are not composed of transported limestone blocks as some have suggested. Chevalier (1963:41) points out that the use and fabrication of lime mortar was unknown to the present inhabitants of New Caledonia until the missionaries arrived.

Frimigacci (1977a:32) suggests a natural explanation for the formation of beds of limestone "concrete" in the mounds, pointing to the existence of widespread calciferous crusts along the Southwest coast of New Caledonia, which are essentially similar to look at. This may well be the most reasonable explanation for the "cement" bed in the Gouaro mound, but does not explain the offset postholes in the two basins in tumulus 5, or the formation of cylinders 2 m high in most of the Île des Pins tumuli, or the cylinders at Paita.

There are other indications that the "concrete" is not of natural origin. Chevalier sent samples of the "concrete" to Paris (Laboratoire du Service des Mines) and to the DSIR Building Research Station, England, for analysis. The DSIR reported that the samples were of calcite cementing haematite ironstone and suggested that the constituents are a lime mortar or concrete with ironstone and coral as aggregate. It could not be established with certainty if the lime was burned and then run to a "putty" before mixing or if the coral was ground to a mud. The general appearance on balance suggested that the lime had been burned (Rafter *et al.* 1972:649). On the basis of the ^{13}C value of the coral aggregate, Rafter *et al.* (1972) tentatively concluded that the mortar in the concrete, if it was coral, was initially burned. On the basis of their ^{13}C value, the land snail shells were evidently not burned before use as aggregate.

FUNCTION OF THE MOUNDS

Many theories about the mounds' formation and use have been propounded over the years, ranging from their being the focus of a stellar/solar cult, to natural formation, to construction by now extinct megapods (Avias 1949, Frimigacci 1977a:27, pers. comm.). One theory held that the tumuli are burial mounds, and it was in this light that Golson noted (1963:18) that no burials were found in the three excavated tumuli 121, 5 or 6.

A local informant told Golson that skeletons had been found in the surface of a mound being demolished in his village, but volunteered the opinion that they seemed

to have been introduced at a later date (Golson 1963:21-22). After examining a tumulus at Tüü (KVO-005), near St Joseph's Bay on the Île des Pins, Dubois (1976:237) concluded that the tumuli there had been re-used as gravemounds in pre-European times, with grave goods accompanying the bodies.

However, Frimigacci and Maitre have also looked at the Tüü tumulus, and disagree with Dubois' conclusion that the burials are intrusive; they thought it more likely that the mound was built up gradually with each interment (Frimigacci and Maitre 1978), on a gently sloping dome of placed chunks of coral. Frimigacci conducted additional excavations to investigate this hypothesis. He concluded that in this case the tumulus was a collective grave, built gradually for the purpose with the burials of layer I differing from those in layers II and III (Frimigacci 1979:21-24). Pottery was also found for the first time in a mound in the upper part of layer I. He goes on to say that nearly all the coastal tumuli contain human bones and in this respect differ from those in the interior. They also differ in the composition of their cores, those on the coast being of an irregular shape consisting of coral lumps and marine shells, whereas those of the interior have a cylindrical column made from an aggregate of lime of coral origin and calcite mixed with ironstone gravel (Frimigacci 1979:25). While both have *Placostylus* land snail shells associated with their cores, for Frimigacci the link between the two types of mound is still to be determined.

In summary it appears that the range of sites lumped under the tumulus or mound category is very broad indeed and may represent neither a single functional type nor a single time period. Some, in fact, are probably natural in origin, others burial mounds, and yet others of unknown function and uncertain origin.

DATING FROM PLACOSTYLUS SHELL

As mentioned above, *Placostylus* land snail shells are the only objects consistently recovered from the mounds. Only two of the species which have been found are identified—*Placostylus souvillei* (Morelet), the chief species eaten in southern New Caledonia today, and *Placostylus senilis* (Gassies), now extinct. *Placostylus* shells (presumably various modern forms) are found in or very close to the "concrete" in many mounds, including the "concrete" limestone beds of some of the natural mounds. They were especially common in Frimigacci's excavated mound at Gouaro (Frimigacci 1977a:38)—they are common in the area, and he suggests they may have become encrusted during natural deposition (1977a:35). Frimigacci (1977a:32) also points out that the numbers of shells vary with locality, there being some on the Île des Pins and at Paita, many in the Gouaro mound and none at Koumac. The *Placostylus* snail shells may well have been incorporated in natural formations, but they are also present in the "concrete" of the cylinders for which no natural explanation has yet been given. In fact for the tumulus at Tüü, Frimigacci (1979:21) says they could not by themselves have reached the middle of a mound 30 m in diameter and 2 m high.

Some *Placostylus* shells were apparently used as aggregate in the "concrete" of the cylinders, but none of the shells in the mounds show signs of human use. Presumably, however, some in addition to *P. souvillei* were eaten. More than 35 *Placostylus* species are found in New Caledonia, and yet only six have been identified in archaeological sites. Four of these were found in the later deposits of sites excavated by Gifford and Shutler (1956) on the main island. The other two are restricted to sites on the Île des Pins. Both *P. senilis* and *P. souvillei* have been identified from the tumuli of the Île des Pins. Both are in tumulus 121, and *P. souvillei* alone is in tumulus 5. Moreover, at the Lapita site of Vatcha on the coast of

TABLE 1
RADIOCARBON DATES FOR NEW CALEDONIA

Gif 298	<i>Tumulus of Paita, Date I</i> <i>Placostylus</i> shells tied to mortar on the surface of the central cylinder in the tumulus.	12,900 ± 450 BP
Gif 300	<i>Tumulus of Paita, Date III</i> Mortar from interior of cylinder.	9,600 ± 400 BP
NZ3347	<i>Tumulus 5</i> Land snail shells adhering to and partly incorporated in the concrete of the lower basin.	8,180 ± 75 BP
NZ3348	<i>Tumulus 5</i> Coral aggregate around shells above.	7,710 ± 70 BP
NZ3589	<i>Tumulus 5</i> Land snail shells, layer 8 near lower concrete basin.	7,590 ± 120 BP
NZ3587	<i>Tumulus 5</i> Land snail shells from concrete block.	7,540 ± 160 BP
NZ3588	<i>Tumulus 5</i> Land snail shells from layer 5 near concrete cylinder.	7,090 ± 110 BP
Gif 299	<i>Tumulus of Paita, Date II</i> Mortar from surface of cylinder, tied to <i>Placostylus</i> shells.	7,070 ± 350 BP
NZ3585	<i>Tumulus 5</i> Old concrete.	5,090 ± 130 BP.
NZ3584	<i>Tumulus 5</i> New concrete.	4,120 ± 90 BP
GAK	<i>Vatcha, Île des Pins</i> <i>Placostylus</i> shells from hearths in Horizon IV. Probably nearer 1600BC, see Frimigacci 1977a:185.	4,010 ± 130 BP
NZ3593	<i>Tumulus 121</i> Concrete	3,380 ± 80 BP
NZ3590	<i>Tumulus 121</i> Concrete	3,370 ± 80 BP
ANU 96	<i>TON-7, Naia</i> (Vanderwal n.d.) Dates large oven cut through postholes of small round house. Oven contains paddle impressed sherds.	3,165 ± 120 BP
NZ3591	<i>Tumulus 121</i> Land snail <i>Placostylus souvillei</i> (Morelet)	3,150 ± 80 BP
NZ3592	<i>Tumulus 121</i> Land snail <i>Placostylus senilis</i> (Gassies)	3,070 ± 80 BP
Gif 1981	<i>Site 13, Lapita, Location A</i> (non-cultural) whole pelecypod shells in the crusted marine top of the terrace under a layer of yellow pumice, possible highest sea level.	3,040 ± 100 BP
UW471	<i>Nessadiou</i> Layer III	2,875 ± 115 BP
ANU 262	<i>Île des Pins, PIN-1</i> (Smart n.d.) Dates middle of sequence of PIN-1, therefore presumably dates Frimigacci's Horizon II at Vatcha.	2,855 ± 170 BP
ANU 259	<i>NOU-1, Naia</i> (Smart n.d.) Small oven, carved impressed pottery.	2,855 ± 95 BP
M 341	<i>Site 13, Lapita, first location</i> Charcoal 24-30 inches, square C1-2, D1-2.	2,800 ± 350 BP
M 336	Charcoal 30-36 inches, square C1-2, D1-2.	2,435 ± 350 BP
	pooled mean . . .	2,617 ± 251 BP
UW364	<i>Boirra</i> Layer III	2,515 ± 130 BP
Gif 1983	<i>Site 13, Lapita, location A</i> Base of cultural layer containing Lapita and traditional Melanesian sherds—midden pelecypods above layer of yellow pumice.	2,250 ± 100 BP

TABLE 1 Continued

ANU 97	<i>TON-7 Naia</i> (Vanderwal n.d.) Dates small oven among postholes of rectangular plan palisades, layer II +	2,065 ± 110 BP
M 340	<i>Site 50, Dowalwouē</i> Charcoal, 78-84 inches	1,880 ± 350 BP
UW358	<i>Boirra</i> Base. Site E.	1,870 ± 70 BP
UW472	<i>Nessadiou</i> Layer II	1,780 ± 100 BP
ANU 98	<i>TON-6, Naia</i> (Vanderwal n.d.) Charcoal, bottom of layer I.	1,745 ± 117 BP
UW361	<i>Boirra</i> Next to top, Site E	1,740 ± 85 BP
M 333	<i>Site 14, Podtanéan</i> Charcoal, 42-48 inches	1,700 ± 300 BP
ANU 99	<i>TON-6, Naia</i> (Vanderwal n.d.) Charcoal from two small ovens, layer Va, associated with a round house.	1,635 ± 110 BP
ANU 286	<i>TON-6, Naia</i> (Vanderwal n.d.) Charcoal layer Vb. Confirms ANU 99 rather than the ANU unnumbered result of 1090 BP for layer Va.	1,400 ± 80 BP
M 332	<i>Site 20, Anse Longue</i> Charcoal from 36-42 inches	1,335 ± 300 BP
ANU 230	<i>TON-7, Naia</i> Charcoal from small oven, bottom of plough zone. Discarded by Smart, Vanderwal (Vanderwal n.d.)	1,245 ± 70 BP
	<i>TON-6, Naia</i> (Smart n.d.) Charcoal from small oven, layer Va; result evidently discarded in favour of ANU 99.	1,090 BP
ANU 284	<i>TON-6, Naia</i> Dates layer VII (Vanderwal n.d.)	930 ± 80 BP
M 334	<i>Site 26, Oundjo</i> Charcoal from 30-36 inches	905 ± 300 BP
M 335	<i>Site 26, Oundjo</i> Charcoal from 24-30 inches	785 ± 300 BP
M 337	<i>Site 6, Baye</i> Charcoal 24-30 inches	615 ± 300 BP
ANU 285	<i>TON-6, Naia</i> (Vanderwal n.d.) Dates layer VIII	440 ± 120 BP
M 338	<i>Site 51, Tiouandé</i> (Gifford and Shutler 1956 p. 89)	385 ± 300 BP

Note: Dates in this table are given according to the old half-life of 5568. The majority of dates where mentioned in the text as corrected and expressed in calendrical form have been re-calibrated to include the new half-life of 5730 and a secular correction. They are given as a mean adjusted to an age in calendrical years based on the New Zealand version of the MASCA table (Michael and Ralph 1972) and should be taken as no more than rough estimates of true age to within 400 years.

the Île des Pins only the fossil form (*P. senilis*) occurs in the lower layer of horizon IV, while in the three horizons above it gradually gives way to the modern form *P. souvillei*. This suggests that *P. senilis* went extinct during the early part of the Lapita horizon. If so, an age at least as old as Vatcha, horizon IV, is suggested for tumulus 121.

RADIOCARBON DATING

The *Placostylus* shells assume added importance because, apart from the "mortar" itself, they provide one of the few possibilities for absolute dating of the tumuli.

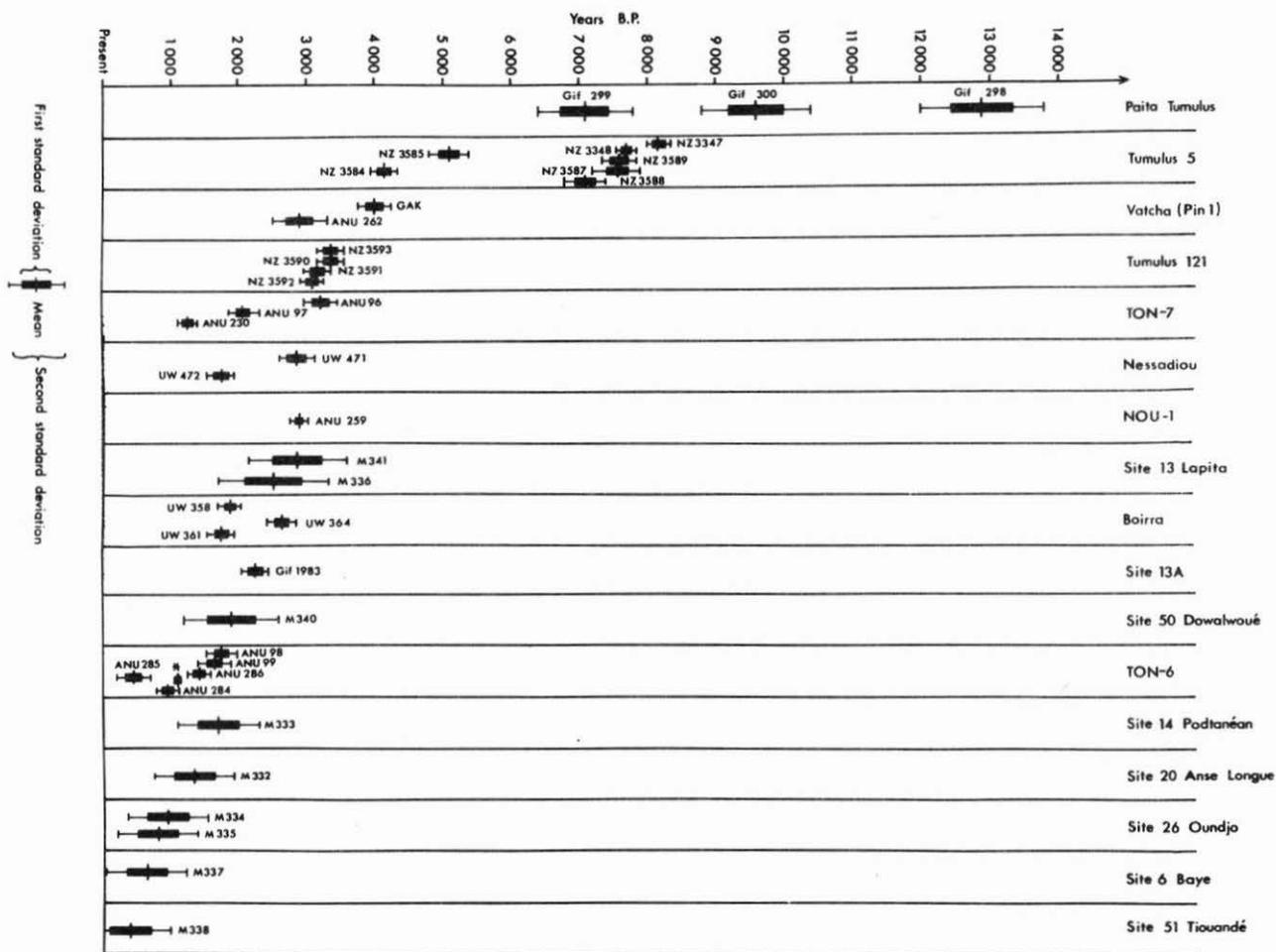


Figure 2: Chronological distribution of radiocarbon dates from New Caledonian archaeological sites.

Rafter *et al.* (1972) commented that if the lime in the "mortar" had been burned and the lime had recarbonated, it could be used to date the structure. Their opinion was that it had been burned, and the resultant dates are not completely inconsistent with the dates from the *Placostylus* shells, given the known difficulties of carbon dating land snail shells.

Placostylus shells are known to have the potential to indicate ages greater than their true age—for example, live collected land snails of the species *P. fibratus* (Martyn) gave an age of 640 ± 40 B.P., through taking up about 8 percent of a theoretically possible 12 percent of dead carbon as part of the carbonate which forms the shells (Rafter *et al.* 1972:650).

Given this potential for inaccuracy, what are the problems with the tumulus dates? The first is the extreme age of $12,900 \pm 450$ B.P. for one numbered Gif 298. This sample was *Placostylus* shells tied to the mortar on the surface of the central cylinder of one of the Paita tumuli. Delibrias, who did the dating, has expressed every confidence in the reliability of the sample (which was 99 percent pure aragonite), and thus of the date (Shutler 1978:222). Yet the result is some 5,800 years older than Gif 299 for mortar from the surface of the cylinder, tied to the *Placostylus* shells, and some 3,300 years older than the Gif 300 result on mortar from the interior of the cylinder (Table 1). Also, the three dates are statistically significantly different from each other. Thus, while the *Placostylus* shell gives older dates than the mortar, as expected, one is not able to nominate an exact age for the construction of the tumulus on the basis of the radiocarbon dates.

The next problem concerns the dates for tumulus 5. Here land snail shells adhere to and are partly incorporated in the concrete of the lower basin. They are dated to 8180 ± 75 B.P. (NZ 3347) while the coral aggregate adhering to the shells is dated to 7710 ± 70 (NZ 3348), an apparent difference of 470 years (Table 1). Again the *Placostylus* shells are older than coral aggregate adhering to them. There remains, however, the problem of a difference between three further dates on the snail shells from later contexts with means ranging from *circa* 7590 to 7090 B.P., one date on mortar tied to some of these shells of 7070 B.P. and two additional dates on the concrete with means ranging from *circa* 5090 to 4120 B.P. (Table 1). The differences, which are significant, are not easily explained, nor is it possible to provide a well supported series of ages for events at the site.

The problems with tumulus 121 are less severe. Here *P. souvillei* and *P. senilis* date to *circa* 3070 and 3150 B.P., while the means on the concrete are 3370 and 3380 B.P. The means for the shells in this case are apparently somewhat younger than those for the concrete (Table 1). However, if the dates are taken to two standard deviations, the age ranges for the land snails (2910-3310 B.P.) and the concrete (3210-3540 B.P.) overlap, indicating that they are not of significantly different age statistically. Thus the dates for this site provide a reasonably uniform set. Moreover, the age range for this tumulus is within that for other archaeological sites, such as Vatcha and TON-7, and is in line with the argument above based on the probable time of extinction of *P. senilis*.

Taking an overall view of radiocarbon dating for sites in New Caledonia (Fig. 2), it is clear that all tumuli dates fall at the early end of the accepted sequence, while some overlap with dates on pottery bearing sites that are considered reasonably correct radiocarbon estimates of true age. This applies to all dates on a range of materials from tumulus 121 and fits well with an independent assessment of age based on the approximate extinction of *P. senilis* at Vatcha; it also applies to the younger (4120 B.P.) of the two dates for concrete in the later cylinder at tumulus 5. On this basis, the 5090 B.P. date for the concrete in the lower and earlier cylinder at

tumulus 5 might also be seen as reasonably acceptable. In fact, the four *Placostylus* dates from tumulus 5, though indicating an age as much as 3000 years older, also maintain the same age differential between the upper and lower cylinders.

Real difficulties ensue, however, with the remaining dates. For tumulus 5, the *Placostylus* shell results and one mortar date indicate an age in the 7100 to 8200 B.P. range, and for the one tumulus at Paita anything from 7000 to 13,000 B.P. seems possible with no apparent way of explaining the inconsistencies. If, as seems likely, contamination is playing some kind of role, about all one may say is that it would have to be massive for these sites not to be very early in the New Caledonian sequence on the basis of available radiocarbon results.

SUMMARY

On the basis of their distribution, morphology and composition, it is obvious that a range of features have been included in the tumulus category. Some are quite probably natural features, but others in the eyes of their excavators and on the evidence they contained are most plausibly explained as of cultural origin. It is also likely that not all the tumuli in New Caledonia are of the same age or cultural affiliation. However, a number of them, particularly those investigated by Chevalier and Golson, appear to possess sufficient similarity to be looked on as representative of an early cultural horizon and to be given greater consideration as such than they have had previously in the archaeological literature of Oceania.

Returning to Shutler's hypothesis, his suggestion of a 10,000 year antiquity is based on radiocarbon evidence that needs to be treated with considerable caution. At least on present evidence, it is in direct conflict with other equally possible but much younger age estimates for the same events. However much confidence the laboratory may have in the 13,000 year old shell sample because it was 99 percent pure aragonite, something not completely understood at present seems to be occurring with *Placostylus* shell dates to make them unreliable on more than one occasion. However, dismissing all the radiocarbon dates for the tumuli does not seem to be an appropriate alternative either. What the dating evidence suggests is that perhaps more than 6000 years ago and certainly 3000-5000 years ago tumuli were being formed in New Caledonia. Moreover, it seems necessary to continue attributing at least some of these tumuli with their cylinders and other features to human activities, as they provide a range of evidence not easily explained by any set of natural events.

If it is accepted that many of the tumuli are cultural features, and date to the beginning of the New Caledonian sequence, then it may be reasonable to see them as representative of an aceramic cultural complex. Certainly such complexes are known from other areas of Melanesia, such as Guadalcanal and Southern Vanuatu, which on the present evidence seem to have been occupied over the last 3000 or more years by Austronesian speakers who did not use pottery. An aceramic period also preceded the ceramic phases in New Ireland (Downie and White 1978) and New Britain (Specht *et al.* 1981). These instances are sufficient to indicate that the proposal is not overly speculative. Also, assigning some of the tumuli of New Caledonia to a pre-Lapita aceramic helps to explain the absence of pottery in these sites, in an area where pottery is a major component of all sites for the last 3,500 years.

What is less certain is that these sites represent a non-Austronesian, pre-Neolithic people. Granted, the diversity of languages in New Caledonia place it in the initial phase of the break-up of the Oceanic branch of Austronesian languages. As Pawley and Green (1973:48) pointed out, "a Proto-New Caledonian associated with the

later ceramic tradition, which appears at 1200 B.C. and after is probably too recent for the degree of linguistic diversity found there". The possible break-up of the Oceanic subgroup by 3000 B.C. (Pawley and Green 1973:52) could be construed as consistent with some of the evidence from New Caledonia. Dates of 4000 to 5000 years ago would not strain the archaeological data reviewed above or mean that the tumulus builders were necessarily non-Austronesians. However, few at present would wish to accept the presence of Austronesian speakers in island Melanesia at time depths much greater than 5000 years. It is only if some much earlier age estimates for tumuli are adopted that they might be taken to imply initial occupation by a group of non-Austronesian speakers.

Transport between 6000 and 7500 years ago of obsidian from Talasea in New Britain and probably chert and chalcedony from other distant sources to Balof Cave in New Ireland (White *et al.* 1978) suggests that suitable water craft, which could have been used in the early settlement of New Caledonia, were available and in use in Western Melanesia at this time. More important is the documentation of early human settlement from the lower levels of Balof cave "for at least 2000 years, and probably longer, before the earliest radiocarbon dates associated with pottery in Melanesia, along with evidence of wide-ranging resource exploitation, supporting a gradualist model of island Melanesia settlement rather than an abrupt settlement by pottery-making horticulturalists" (White *et al.* 1978:878). On this basis early aceramic settlers of New Caledonia need not be seen as "pre-Neolithic" either. In fact, the impoverished and highly endemic flora and severely restricted fauna of New Caledonia make it unlikely that hunters and gatherers could have survived there, except perhaps along the sea shore. A more likely explanation, for example, of the occurrence of tumuli in the centre of the Île des Pins, in a now laterite landscape covered in fern with only a few pockets of bush, is that these initial tumulus-building settlers, in clearing for swidden gardens the once heavy bush indicated by the land snails, quickly deforested this highly sensitive mineralized zone. It never recovered and since then has been a little utilised, fern-covered and fire-maintained disclimax area, with the consequence that few later pottery bearing sites are found there.

We could develop this line of argument further, but enough has been said to indicate that the "pre-Neolithic" as well as the non-Austronesian part of Shutler's hypothesis should be treated with caution. Settlement by Oceanic speaking Austronesians with outrigger canoes and horticulture, but without ceramics, up to 5000 or 6000 years ago is an equally plausible alternative.

THE LAPITA CULTURAL HORIZON

Although the study of Lapita sites from throughout Island Melanesia and Western Polynesia continues to advance (Golson 1971, Garanger 1974, Green 1979), the Lapita assemblages from New Caledonia have been rather poorly incorporated within that literature. For example, there is no detailed and well argued case for a sequence of excavated Lapita sites from New Caledonia, although a general case could be made from the work of Frimigacci (1974, 1977a, 1980). In this section such a case will be made in the course of reviewing the Lapita sites of New Caledonia in some detail.

DISTRIBUTION OF LAPITA SITES

Sites with Lapita sherds are widely distributed in New Caledonia (Fig. 1) from Koumac in the north of the main island to the Île des Pins. All main island sites with such pottery, except EHI-050 (Dowalwoué), are on the southwest coast, where the

lagoon is much better for coastal navigation, providing an easy means of contact between them (Frimigacci 1978:5, 1980:7). To date seven sites are usually identified as having significant Lapita assemblages; the five on the main island are NKM-001 (Boirra), WKO-013 (Lapita), WBR-001 (Nessadiou), WPT-055 (TON-7, Naia), SNA-019 (Anse Vata), and the two on the Île des Pins are: KVO-003 (Vatcha, or PIN-1) and KGJ-004 (Gadji) (Frimigacci 1978:5, Frimigacci and Maitre 1981: Planche 16). However, other Lapita sites, or sites with Lapita sherds, have been reported. Gifford and Shutler (1956:75) list sherds from WKO-014 (Podtanëan), SNA-018 (Anse Vata, contiguous to SNA-019), and EHI-050 (Dowalwouë), and Frimigacci (1977a:184) also reports finding Lapita sherds in the Naia, Uitoe and N'Gué dunes. Vanderwal (n.d.) cites Smart as also reporting Lapita sherds at TON-7 at Naia, but he found none in his reanalysis of the pottery (but see below).

Frimigacci (1981:113-115 and Fig. 1) marks WBI-106 (Ouano), northwest of Uitoe, as another now destroyed Lapita site on his most recent map, along with two sites on the island of Maré in the Loyalty group. He (Frimigacci 1977a:182-183) also reports what is evidently yet another Lapita site on the Foué peninsula—this time, however, the site is inland on a hill, running down to a now inundated region of mangrove swamp, with about 1.5 m of colluvial talus at its edge. The thickest cultural deposits occur in this talus, on top of natural serpentine and underneath 30 cm of colluvium. The deposits on the hill are more sparse. This site, about 1.5 km from sites 13 and 13A, in the direction of the Koné wharf, is the first indication in New Caledonia of a Lapita settlement other than on a beach.

Frimigacci (1978:4-5, 1980:5-7) has singled out a number of locational factors common to Lapita sites, besides their occurrence along the lagoon-sheltered southwest coast. First, each seems to lie well apart from the others, and all are plainly turned toward the ocean, so that in looking seaward from each there is a major passage in the barrier reef. Three are set into the mouth of a river, close to a marshy zone where mangrove is the dominant vegetation, and the lack of fringing reef in front of the site allows canoes to land even at low tide. Other sites are rather similarly located. He (Frimigacci 1980:5) states it is impossible to know if the occupants of these sites practised horticulture, but notes the people chose for their location a fertile region where horticulture was possible (Frimigacci 1978:5).

THE EXCAVATED SITES

In addition to the surface records of sites with Lapita pottery, five have been excavated and various levels or layers in them radiocarbon dated.

The first Lapita site to be partially excavated was "site 13" (WKO-013) found along a south facing beach on the Foué Peninsula (Fig. 1) in a locality named Lapita. It has usually been referred to as a single site, although Gifford and Shutler (1956:7) in fact excavated at two localities 400 m apart, which they designated as site 13 and site 13, location A, both in their published report and in their catalogue. Green (1979) has argued that site 13 and 13A in fact represent two separate Lapita sites of different age and composition, the materials from which should not be lumped together. We will develop that case further here, drawing on original catalogue data as well as the published evidence.

Site 13: At one locality of the site Gifford and Shutler did only minimal excavation. Although it was the better stratified of the two localities investigated, it had a considerably lower density of pottery. The size of the occupation area at this location cannot be determined from the available information. Only two test pits, each 1.7 m² and some 2.5 m apart, were excavated, but only one of these proved to have some depth and material of cultural significance. In this test rectangle, C1-2, D1-2, the concentration of potsherds, shell, bone, and charcoal was between 18 and

36 inches in depth. While the distribution of the various constituents appears to vary a little in depth, all reveal the same pattern. Among the samples taken from the wall and used to reveal midden composition, between 96 and 99 percent of the first 21 inches was residue, and most of the rest was stone (Gifford and Shutler 1956: Table 5). In contrast, most of the coral, pumice, charcoal, molluscs, fishbone and potsherds recovered from the midden samples occur between 21 and 39 inches. By weight, 135 oz of pottery was recovered, 60 percent of it plain, and 40 percent decorated, but none of it was ribbed paddle impressed (relief) (Gifford and Shutler 1956:7). This amounts to 650 sherds according to the Lowie Museum catalogue, of which 80 percent are plain and 20 percent decorated (Table 2). Most (81 percent) of this pottery occurred between 18 and 30 inches in depth. The shellfish remains exhibit a similar pattern, with the bulk, 70 percent of the bivalves and 68 percent of the univalves, occurring between 18 and 30 inches, and much of the rest occurring just above or below those levels (Gifford and Shutler 1956: Table 24). This makes more understandable the statement that the top 24 inches of deposit in this rectangle consisted of black adobe merging into brown adobe and "beach debris" below, with the latter being more correctly interpreted in our view as midden, at least between 18 and 36 inches in depth.

TABLE 2
DISTRIBUTION OF POTSDHERDS FROM SITE 13 BY LOCATION, DEPTH, AND NUMBER

RECTANGLE LEVEL	A1-2, B1-2		C1-2, D1-2		TOTALS	
	PLAIN	DECORATED	PLAIN	DECORATED	PLAIN	DECORATED
0-6	20	1	1	—	21	1
6-12	13	—	4	—	17	—
12-18			22	4	22	4
18-24			163	39	163	39
24-30			261	69	261	69
30-36			31	5	31	5
36-42			6	7	6	7
42-48			3	1	3	1
Totals					524 (80%)	126 (20%)
					Total of 650 sherds.	

The radiocarbon dates of 2800 ± 350 and 2435 ± 350 B.P. (Table 1), reported by Gifford and Shutler (1956:89) also come from this test pit at site 13, the first from the 24-30 inch level and the other from the 30-36 inch level (catalogue data Lowie Museum specimen numbers 15631 and 16226). The statement by Shutler (1971:24) that "the part of site 13 where the excavations were conducted is an old yam field" does not in fact apply to site 13 but to site 13A (Gifford and Shutler 1956:7). Thus his proposal that the furrows in the yam field, which may on occasion have reversed the stratigraphy in the site and would therefore serve as a logical explanation for the reverse order of the mean age of these two dates, does not suffice. Rather the two dates are to be seen as coming from the same occupation deposit below the adobe. As such they are simply two independent but not statistically different age estimates for that layer, and can be pooled by the Case II method of Ward and Wilson (1978) to yield a result of 2617 ± 251 B.P.

More recently Chevalier found a number of large potsherds at site 13, which could be joined together. These form the substantial portion of a shallow undecorated bowl with a flat rim and rounded base (Frimigacci 1977a:182 and Plate 4).

Site 13A: Gifford and Shutler did more extensive excavations at location A, 400 m east of site 13, where along 400 m of an exposed beach front both midden and sherds were visible in section and falling down the talus slope. Although they collected from the beach front, and apparently did a small excavation there (Lowie Museum catalogue), the main excavations were inland of the road. Here one excavation of a 1.7 m² rectangle seemed to be unproductive, while others in an A-B row of aligned rectangles, which began some 16-18 m back from the seafront and extended inland, proved more productive. In this series of rectangles they opened up approximately 11.9 m² of deposit in seven excavated rectangles, four on the seaward end of the series and three on the inland end. The exposure of pottery and midden along some 400 m of beachfront and the demonstration by excavation that it extended inland at least 30 m gives a rough idea of the size of this site, some of which was disturbed by being part of a yam field.

Of the far more abundant pottery at site 13A only 33 percent by weight (in contrast to 40 percent at site 13) carried Lapita decoration, another 3 percent being of a paddle impressed type called ribbed relief by Gifford and Shutler (1956:7, 73). Again by resorting to the Lowie Museum catalogue, we have been able to put together a table based on numbers of sherds from the beachfront excavation, the seaward rectangles just inland of the road (all dug to 30 inches depth) and the three rectangles further inland, dug to 36 and 42 inches respectively (Table 3). There is some difference in the slightly higher percentage of decorated to plain sherds in the more inland rectangles, but probably not enough to be significant. The overall figures based on sherd numbers of 69 percent plain and 31 percent decorated seem a reasonable assessment. The corresponding figures of 68.9 percent plain, 28.8 percent "incised" or Lapita decorated, and 2.3 percent "relief" or ribbed paddle impressed pottery are not too different from those provided by weight.

What is consistent throughout all the excavations at 13A is the preponderance of the pottery in the upper 12 inches of the deposit (Table 3). This fits well the only description of the stratigraphy at 13A as consisting of dark midden deposit about 15 inches deep, below which were beach deposits yielding artefacts to a depth of 42 inches (Gifford and Shutler 1956:7). In sum, unlike site 13, the principal excavated artefacts and midden material at site 13A were largely in the upper 18 inches. For example, 88 percent of the plain pottery sherds by number and 83 percent of the decorated sherds derive from that zone. It seems that the same applies to the midden remains, although the exact percentages cannot be derived from Gifford and Shutler's (1956) Tables 1, 13, and 15. The results from 13 and 13A are combined by six inch levels, so that concentrations appear not only in the upper 18 inches but again at 18-30 inches. Still, it is clear that most of the fish bone (Gifford and Shutler 1956: Table 13) came from the upper 6 inches of site 13A.

A more recent cutting in the beachfront at location A of site 13 to examine the stratigraphy (Frimigacci 1977a: Fig. 105) showed it to consist of an upper 70 cm (28 inches) of archaeological deposits mixed with grey pumice and containing the same kinds of pottery as Gifford and Shutler found, including a number of pieces of ribbed paddle impressed sherds. The occupation layer, which is disturbed, has pottery throughout its 70 cm of depth. This equates well with Gifford and Shutler's results of finding pottery to a depth of 30 inches (76 cm), in their beach front excavation, although the majority of their pottery came from the upper 12 inches (Table 3), as elsewhere in the site.

The importance of the recent stratigraphic section is that it has been dated (Table 1). Midden pelecypod shells from the base of the cultural materials between 60 and 70 cm are dated to 2250 ± 100 B.P., while non-cultural whole pelecypod shells in

the crusted marine top of the terrace under a layer of yellow pumice, perhaps rafted there by the action of higher seas, yielded an age estimate of 3040 ± 100 B.P. These two radiocarbon determinations for the first time provide means of assessing the age of site 13A and thus the principal materials excavated by Gifford and Shutler at this locality, independently of the previous age estimates, which in fact apply to site 13 only.

Vatcha: The Lapita site KVO-003 on the beach of Saint-François-près-Vao on the Île des Pins has been variously referred to as St Maurice (Golson 1963), PIN-1 (Smart n.d.) and Vatcha (Frimigacci 1970, 1974, 1976, 1977a) (Fig.1). It appears to provide evidence of a stratigraphically intact occupation, earlier than at any other Lapita site in New Caledonia.

The initial Lapita occupation in horizon IV at Vatcha is situated on old and indurated shelly marine sand, which had been exposed by a former retreat of the sea to a level near the present one. In a 35 m² main area, Frimigacci exposed an apparently undisturbed living floor with a midden dump, hearths, and other features covering some 20 m². Two test squares, one 20 m inland and another 90 m to the west along the beach from this main area, revealed the same horizon, with traces of human occupation. The latter contained a similar hearth, sherds, turtle bone, stone flakes and a shell armband (Frimigacci 1977a:159).

A dune (horizon III), which subsequently covered the site, had its formation interrupted by sea action, which planed its surface and deposited a lens of yellow pumice. Further Lapita occupation occurred on this surface (horizon II), associated with a posthole and some other features, such as a huge oven in test pit L. On the evidence of nine widely distributed 10 m² test pits, this occupation covers an area larger than 30 × 90 m. It corresponds to the occupation horizon described by Golson (Golson 1963, Smart n.d.) who excavated a series of four test pits totalling 26 m² along the beach frontage over a distance of 126 m and found them uniformly rich in material. Another 6 m² test pit, 29 m from the beach, had less material, while one 69 m inland produced almost nothing.

In one place, at the base of the uppermost deposit (horizon I), Frimigacci discovered what appeared to be part of an intact Lapita occupation (horizon Ib) in association with yellow pumice. Other than this and horizon IV, the layers have obviously been badly disturbed by various agencies through time. Thus the living floor in horizon IV shows no sign of wave action and only 0.6 percent of the sherds were rolled; in contrast sherds from other layers are present in the dune sand of horizon III, and horizon IV sherds are found in horizon II, a layer in which 23 percent of the sherds are rolled or eroded (Frimigacci 1974:38). Golson (1963:15) reported that the upper levels of the site had been turned over and their contents mixed by past agricultural activities. This fits with Frimigacci's finding that some 43 percent of the sherds in horizon Ia are rolled or eroded (Frimigacci 1974:38).

As well as the usual decorated Lapita sherds, some paddle impressed pottery is found in all layers, with an increasing addition of what Frimigacci (1979:26) calls "Melanesian tradition" pottery from horizon II upwards. Initially, a complex description and classification was adopted for this pottery (Frimigacci 1974:38-70, and especially Table 11). This is simplified elsewhere (Frimigacci 1977b:21-45, Frimigacci and Maitre 1981:II.B.1) into "Lapita geometrique" (where the motifs are made either by continuous incised lines, or what appear to be continuous lines though they are in fact made with deeply impressed dentate stamped tools leaving teeth marks seen only by a close inspection of the base of the lines) and "Lapita pointille" or the more typical toothed or dentate stamped Lapita.

There are two radiocarbon dates (Table 1) for Vatcha. That of 2855 ± 170 B.P. was obtained by Golson from "PIN-1" and dates a layer and assemblage equivalent to Frimigacci's horizon II. That of 4010 ± 130 B.P. dates several burnt *P. senilis* shells from hearths in horizon IV. This would be a very old age for a Lapita site, and as a single date from *Placostylus* shells must be treated with caution. Frimigacci (1977a:185) acknowledges this, and there and later (1981:115) suggests that an age estimate of around 1600 B.C. might be more realistic.

Boirra: The Lapita site NKM-001 of Boirra, near Koumac, is located on an embayment on the west coast of the northern part of New Caledonia (Fig. 1). The site begins some 30 m back from the beach, and continues inland more than 100 m. Here isolated dunes, with stratified archaeological deposits on and around them, are found for several hundred metres behind a beach sheltered by Pandop Point to the north (Frimigacci 1981: Fig. 2). The dunes have developed on an old and level Holocene beach, composed of shelly beach sand with yellow pumice on its surface. The terrace is now 1.8 m above present mean sea level (Frimigacci 1976: Fig. 8).

Several stratigraphic cuts and one test pit were made in the dunes in 1976 to allow drawing of a 90 m stratigraphic section from the beach edge back into the site (Frimigacci 1976: Fig. 8). Other test squares some 90 m back from the beach, including one in a small mound designated excavation E and another in a larger mound which was subsequently excavated more fully, were also undertaken at that time. These investigations showed archaeological deposits lying horizontally on the raised beach surface, with in one case a fairly thin horizontal occupation lens incorporated in the beginnings of the subsequent dune formation (Frimigacci 1977a: Fig. 89). In the main section, the upper pottery bearing deposits have a generally similar archaeological content, but undulate over the sterile lenses of dune sand which separate them from the earlier occupation layer. We are not certain whether these deposits constitute an intact later occupation as Frimigacci believes, or are simply reworked deposits from the underlying occupation.

In 1978, 40 m² was excavated in the large mound tested previously (Frimigacci 1978: Fig. 4). These main excavations, now designated A (Frimigacci 1981:115), revealed that the mound had been formed on a natural hummock. Three cultural layers covered it, with the upper two exhibiting distinct living floors surrounded by coral blocks of an "encircling wall" enclosing paving, a "swept and trampled area", postholes and midden, sherds and tools in heaps, apparently undisturbed. No living floor was found in association with layer III, which extended out under the "encircling wall" of the two layers above. The lower two lowest layers, IV and V, were encountered only at the sides of the mound and are not easily explained at present. The stone technology remains the same throughout all the layers. In contrast, there is a progression from mostly ribbed paddle impressed and Lapita decorated sherds in the bottom layers (V, IV and III) to a predominance of "undecorated Mangaasi" pottery, which however still has a few ribbed paddle impressed and dentate and geometric Lapita sherds associated with it in the top layer.

The Mangaasi pottery apparently first appears in the bottom of layer II (Frimigacci 1978:28). In our view, its association with a few Lapita and paddle impressed sherds in the upper layers may well be due to disturbances of the underlying layers during the later occupations, so that some sherds from layer III or below have migrated upwards. The alternative interpretation, that these ceramic traditions overlapped at the late end of the site's sequence, seems less likely.

In the preliminary report on Boirra, the study of the ceramic and lithic material had not yet been started, and no radiocarbon dates had been processed (Frimigacci

1978:27). A little additional information of both kinds is now available. The 1976 test excavation in area E contained 23 percent paddle impressed pottery against 76.9 percent Lapita, of which only 8.7 percent is decorated; in contrast the main excavation area of 1978, now referred to as A, contained only 8 percent paddle impressed sherds and 92 percent Lapita, of which 34 percent were decorated (Frimigacci 1978:115). Radiocarbon dates for the first occupation of the mound at Excavation E are 1870 ± 70 B.P. and for the next to last occupation 1740 ± 85 B.P. (Frimigacci 1980:8). A radiocarbon date for layer III at excavation A yielded a result of 2515 ± 130 B.P. (Frimigacci 1980:115, 1981:8). From these pottery and radiocarbon results, Frimigacci concludes that the importance of paddle impressing increases in the more recent Lapita layers.

In the matter of dating, it should also be pointed out that rafted yellow pumice is found on top of the sterile deposits underneath layer III and built up against the late "encircling wall". It also occurs in little lenses in layers II and III but not in layer I. In general, the cultural deposits at Boirra follow the initial deposition of the yellow pumice.

Nessadiou: The Lapita site WBR-001 of Nessadiou, adjacent to Bourail Bay and a major reef gap, was the scene of archaeological salvage operations following commercial sand quarrying which damaged much of the locality before excavations began. Except for a few test squares on the margins which revealed the entire stratigraphic sequence, all that remained intact in the large central area were the features of the bottom cultural layer cut into the underlying white dune sand. However, the extent of the area exposed by these commercial operations did indicate something of the organization of the earliest features of a Lapita site.

At Nessadiou three cultural layers overlay a dune formation (Frimigacci 1978:9). The uppermost layer, I, is a deposit containing sherds assigned to the recent or "Mangaasi related" pottery assemblages. A culturally sterile organogenic dune sand separates this from layer II, a bluish soil associated with living floors characterised by Lapita and paddle impressed pottery. At the base of the sequence, layer III not only possesses many more artefacts, including Lapita and paddle impressed sherds but is also the layer from which the intact structural features in the underlying dune sand derive. A radiocarbon date for layer III places it at 2875 ± 115 B.P., and one for layer II places it at 1780 ± 100 B.P. (Frimigacci 1981:115).

In a mechanically exposed area of approximately 20×35 m, postmolds reflecting the construction of successive houses were distributed over the northwest portion in a zone 12×20 m in size. Two rubbish filled pits and a patch of diffused charcoal with split oven stones and food remains, that could be the base of an earth oven destroyed by the sand mining operators, were encountered in a 7×15 m zone on the southeast side. Frimigacci (1978:10, 1980:9) interprets some postholes in three of the four apparent clusters as perhaps indicating three oval structures without centrepoles. From the trash filled pits, identification of the fish otoliths has shown that all of the fish species were very small and of a type caught today with nets and spears in the tidal river waters immediately adjacent to the site. The pits also contained cowrie and arca shell net sinkers. A large amount of shell midden, especially oyster, and the absence of fishhooks and pelagic or even lagoon fish indicate that the occupants focussed their efforts on the abundant and easily accessible marine resources of the inshore and nearby mangrove zones (Frimigacci 1981:9; Frimigacci and Maitre 1981).

SEQUENCE OF SITES

Horizon IV at Vatcha, for which Frimigacci suggested an age of 1600 B.C., has for some time been seen as the earliest known Lapita occupation in New Caledonia.

This is consistent with its stratigraphic position below horizon II dated to around 1100 B.C. on the basis of a calibrated age for the associated radiocarbon date. The *Placostylus* shell date of 4060 years ago for horizon IV certainly supports its antiquity, but is probably too early by some 400 to 500 years. The antiquity of the deposit is also supported by Green's (1978:12 and Fig. 6) analysis of the decorative motifs on sherds from nine Lapita sites and from five sites on Tonga combined as a tenth entity. In this analysis it was necessary to treat all the sherds from site 13 and 13A as one entity and those from Vatcha as another. However, because most of the decorated sherds from site 13 are from 13A and most decorated sherds from Vatcha from horizon IV, it is largely those two sherd collections which were compared. The results indicate that Vatcha groups most closely with the earliest known Lapita sites from the Reef/Santa Cruz area, dated to *circa* 1100 B.C., and sites 13/13A cluster with the later sites.

Another indication of age is geological. The yellow pumice at site 13A is dated to later than the 8th to 9th centuries B.C. if the shell result is calibrated to the new half life value and the ocean reservoir effect is subtracted (Gillespie and Swadling 1979) before adding a secular correction. This pumice appears at the top of horizon III at Vatcha and just under horizon II dated to *circa* 1100 B.C. on a corrected calendrical age. Horizon IV then is earlier than both the dated cultural horizon at the site and the pumice dated from site 13A, and an estimate of somewhere between 1400 and 1600 B.C. may be likely. It fits well with the known ceramic, stratigraphic and geological evidence.

The next two Lapita sites in age would be horizon II at Vatcha at *circa* 1100 B.C. and site 13 at Fouē at around 900 B.C., on the basis of corrected secular ages for their radiocarbon dates. Site 13A, however, would be of later age again, on the basis of its radiocarbon date. As the date is on shell, the correction for the new half life, ocean reservoir effect and secular calibration all have to be applied. A date of *circa* A.D. 150 would appear to be indicated. We are able to find some support for this chronological order of sites in the percentage of ribbed paddle impressed pottery associated with the more typical Lapita decorated wares. In horizon IV at Vatcha they contribute only 0.7 percent of total pottery, in horizon II they constitute 2.3 percent, and in horizons 1b and 1a 5.3 percent and 5.7 percent (Frimigacci 1974: Table 2 and Table 11). There were none in the small sample of sherds from site 13, which may be a case of sampling error, but in site 13A about 2.3 percent of sherds are again ribbed paddle impressed.

Further support for the sequence of Lapita sites suggested above is indicated by certain decorative trends noted by different authors. In analysing the pottery from Vatcha, Smart restricted himself to the contents of three layers from three squares. He did not present any detailed information about the sherds but generalised:

The most prominent feature is the toothed-stamp impressed pottery which occurs in all layers but in a decreasing proportion towards the top. It occurs on a range of vessel forms including some with acute shoulders and tall, flared necks. The ledge rim is predominant. The same vessel and rim forms occur with an incised decoration with a variety of 'hatched' motifs, some of which occur in stamp impressed technique as well. The incised decoration increases in frequency towards the top. Associated with these two sorts of pottery are a very few carved-paddle impressed sherds from restricted vessels with a slight shoulder and everted rims. The paddle impressed pottery occurs only in the upper two layers. (Smart n.d.:5).

These layers correspond fairly well with the upper three layers of Frimigacci (1974). From Table 4 we can see that, among decorated sherds at Vatcha, the percentage of those with dentate stamped designs plus those with continuous stamped impressions placed in the geometrique class declines from horizon IV to

horizon Ia. By the same token, geometrique class sherds with only incised decoration increase from horizon IV to horizon Ia. However it must be noted that the category including all geometrique sherds carrying some incised decoration shows no change. Nevertheless, a pattern similar to that noted by Smart at Vatcha can be seen to occur also in that part of the site excavated by Frimigacci.

TABLE 4
DISTRIBUTION OF DECORATED SHERDS IN THE LAPITA SITE OF VATCHA, 'ÎLE DES PINS' BY NUMBER AND PERCENTAGE

Layer	Total of decorated sherds	All dentate stamped sherds	All incised sherds	Paddle impressed sherds	Incised only
Ia	19	9 (47%)	7 (37%)	4 (21%)	6 (32%)
Ib	26	14 (54%)	11 (42%)	4 (15%)	8 (31%)
II	88	66 (75%)	31 (35%)	5 (6%)	17 (19%)
IV	144	117 (81%)	52 (36%)	3 (2%)	24 (17%)

Note: "All dentate stamped sherds" includes Frimigacci's categories F, FE, G, GE, GEF. "All incised sherds" includes categories E, FE, GE, GEF. These two categories overlap, which explains why all categories together total more than 100 percent. "Incised only" is Frimigacci's category E, "paddle impressed sherds" is his category D.

¹ From Frimigacci 1974: table 11

TABLE 5
NUMBER AND PERCENTAGE OF PRINCIPAL DECORATIVE TECHNIQUES AT SITES 13 AND 13A¹

Site	Total decorated sherds	Dentate ("Roulette") decorated sherds	Incised decorated sherds	Other decorations
13A	2070	1022 (49%)	696 (34%)	353 (17%)
13	126	95 (72%)	27 (20%)	10 (8%)

Note: "Dentate decorated sherds" includes all sherds with any "roulette" decoration, "Incised decorated sherds" includes all "incised" sherds. "Other decoration" includes "gashed", "gouged", "relief", "stippled", "punctate", "circle relief" in site 13A, and "gashed" and "stippled" in site 13. These categories again overlap, as several sorts of decoration can be present on one sherd.

¹ From Lowie Museum catalogue, entries 19506—21106

Sites 13 and 13A can also be seen to conform to the general pattern of decreasing dentate decoration and increasing decoration by incision or by other means through time (see Table 5). As stated above, we believe site 13A to be later than site 13.

Although the small numbers of sherds, particularly at Vatcha and site 13, means that these conclusions should be treated with reserve, an overall pattern is indicated: typical Lapita dentate decoration decreases through time and is gradually replaced by geometric incising and other techniques, including ribbed paddle impressing.

Table 6 shows that this happened at a similar rate and time on both the Île des Pins and the Foué peninsula, as ordering the sites and layers by the percentages of dentate, incised and other decoration provides an overall sequence consistent with all the data presented above. Horizon IV at Vatcha is earliest, horizon II and site 13 are similar to each other, and site 13A is later, containing pottery suggesting that it is roughly contemporary with horizon Ia/horizon Ib at Vatcha.

TABLE 6
TRENDS IN PRINCIPAL DECORATIVE TECHNIQUES FOR LAPITA SITES
FROM NEW CALEDONIA

Site/Layer	Total of decorated sherds	All dentate decorated sherds	Incised sherds	Other decorated sherds
Site 13A	2070	1022 (49%)	696 (34%)	353 (17%)
Vatcha Ia	19	9 (47%)	6 (32%)	4 (21%)
Vatcha Ib	26	14 (54%)	8 (31%)	4 (15%)
Site 13	126	95 (72%)	27 (20%)	10 (8%)
Vatcha II	88	66 (75%)	17 (19%)	5 (6%)
Vatcha IV	144	117 (81%)	24 (17%)	3 (2%)

Note: "Incised sherds" includes the "Incised decorated sherds" category in Table 5 for sites 13 and 13A, but includes only the "Incised only" category from Table 4 for Vatcha, rather than the "All incised sherds" category.

At Boirra, Frimigacci also noted a change in pottery decoration. In layer III of excavation A, which a calibrated radiocarbon date places at about 650 B.C., the decorated Lapita sherds comprise some 34 percent of the total and the paddle impressed sherds only 8 percent. When the two dated occupations of excavation E, with ages calibrated to *circa* A.D. 100 and 220 (i.e. similar in age to 13A), are examined, only 8.7 percent of the pottery is Lapita decorated, and paddle impressed pottery now comprises 23 percent of the total. Trends like those outlined above are again in evidence. The Boirra site, like site 13A, is on a marine cut terrace with yellow pumice on top of it.

The late radiocarbon date for layer II at Nessadiou which calibrates at *circa* A.D. 180 attests, together with those for excavation E at Boirra and site 13A, that Lapita assemblages associated with increasing amounts of paddle impressed pottery prevail in New Caledonia until the second to third centuries A.D. In contrast, the layer III date for Nessadiou, which calibrates to around 1140 B.C., indicates that this deposit is somewhat older than that of site 13, although not as old as layer IV at Vatcha.

An important outcome of this review of Lapita sites in New Caledonia is to show that the information is now sufficient to entertain the possibility of developing a local New Caledonian sequence for them, as has been done in other island groups where Lapita sites have been found. The data from a set of five excavated sites indicate, largely on the basis of stratigraphy, radiocarbon dates, and ceramic change that a tentative sequence can be drawn up which spans the period from about 1600 B.C. to A.D. 200 or perhaps slightly later. However, what is now required is that a temporal analysis based on a closer comparison of various ceramic attributes, including decoration, be undertaken. This along with additional radiocarbon dates would further refine such a sequence.

PADDLE IMPRESSED POTTERY

Two ceramic styles, Lapita and Oundjo, each based on several decorative techniques, form temporal ceramic horizons in New Caledonia, one at the early end of the sequence and the other at the late end (see following section). In contrast, another ceramic decorative technique, which Gifford and Shutler (1956:73) called "ribbed relief" but which we call "ribbed paddle impressed", occurs throughout the ceramic sequence from the earliest occupation layers of the Lapita horizon to the historic deposits of numerous sites at the late end of the sequence.

In New Caledonia Lapita sites, the paddle impressed technique as a decorative device begins as a very minor element in early Lapita site assemblages, but by the

end of that sequence it has become a more important, though never a dominant, part of them. Elsewhere than in New Caledonia, the paddle and anvil technique is often claimed as a manufacturing method for Lapita pottery, usually on the basis of anvil impressions on the inside of pots. It is not, however, seen as part of the Lapita decorative style, indicating that paddles deliberately carved to produce decoration were not used and that, in most cases, any kind of paddle marking on the outer surfaces of Lapita pots was subsequently obliterated by wiping. Lapita site assemblages in New Caledonia, therefore, are unique in having carved paddle impressed pottery firmly associated with them, although Hunt (1980) has argued this may also be so in the Lapita sites of Viti Levu in Fiji. This situation has led Frimigacci (1981:117) to the following hypotheses: either the Lapita potters brought this manufacturing technique with them to New Caledonia or they borrowed it from other peoples in the territory. In fact, he (Frimigacci 1978:28) earlier speculated that the origin of carved paddle impressed pottery in New Caledonia does not derive from a "ceramic tradition", but is due solely to a construction technique. This technique later became the mark of certain groups, by which means a real "tradition" arose and later spread to Fiji. Certainly, whatever its origins, he views it as evolving into one of the three ceramic traditions of New Caledonia (Frimigacci 1977b, 1981; see also Frimigacci and Maitre 1981).

Given the concept of pottery horizon and tradition (Willey 1945), carved paddle impressing would constitute a technological tradition of a restricted type, based on a particular method of decoration which exhibits continuity throughout the ceramic portion of the New Caledonian sequence. When viewed from the perspective of entire assemblages containing distinctive styles of pottery dated to particular points in that sequence, however, it seems evident that for a time it may well also be seen as a separate cultural entity. Elements of it were soon "borrowed" in a small way by makers of a Lapita style pottery, and later survived as a minor technique among makers of Oundjo style pottery. During this early period it would seem that a separate style name is required for these contemporary, but entirely different, assemblages dominated by carved paddle impressed pottery and lacking most or all of these elements of the distinctive Lapita style. This ceramic category we propose to call Podtanéan after the name of site 14, where it occurs on sherds in the lower levels as the main decorative element (see below). It should be noted that, as in the geometric type of the Lapita style, a small amount of incising is present, involving certain motifs which are a part of the Podtanéan style assemblage. Thus one cannot separate the ceramic assemblages of New Caledonia simply because they have any single method of producing decoration; incising and paddle impressing are decorative techniques found in all three major styles, but their frequency and the kinds of motifs and style of decoration, as well as the pot forms on which they appear, differ in each case. In the Podtanéan style assemblages, carved paddle impressing dominates to the extent of 70 percent or more of the type of decoration employed, but is associated with various kinds of incising, applique, and other types of tool impressing as well.

SITES WITH PODTANÉAN POTTERY

TON-7: Now numbered WPT-055, the TON-7 site on the central part of Naia Bay consisted largely of just two major layers, forming a shallow deposit over a wide area of beach flat (Smart n.d.). Smart originally excavated 144 m² of this site, but our information comes only from one 5 m × 1 m baulk tested later. The upper layer, III, had been severely disturbed by ploughing over the entire site. Although Smart (n.d.) thought the pottery in it was slightly different from that in the layer beneath, the analysis by Vanderwal (n.d.) of the test sample shows it to contain a

TABLE 7
FREQUENCY OF OCCURRENCE BY LAYERS OF DECORATED SHERDS ACCORDING TO
DESIGN CATEGORIES FOR SITES TON-6 AND TON-7 (After Vanderwal n.d. Table 4)

LAYERS ¹ :	SITE TON-7				SITE TON-6									
	I	II+	II	III	I	II	III	IV	V	VI	VII	VIII	IX	X
DECORATIVE CATEGORY²														
Incised —B	—	—	—	—	—	3	—	—	1	—	—	—	—	—
Incised —A	—	—	—	—	—	—	1	1	—	5	—	1	—	1
Incised —E	—	—	—	—	1	—	—	—	—	—	—	—	1	1
Trailed incised —H	—	—	1*	—	—	—	—	—	—	—	1	—	1	1
Cross hatched incised —C	—	—	—	—	—	—	—	—	—	—	—	1	10	6
Nubbins —L	—	—	2*	—	—	—	—	—	—	—	1	—	52	86
Incised —D	—	—	1	1	1	1	—	—	1	5	—	—	2	—
Incised —G	2	1	1	—	—	—	1	—	—	2	—	—	1	—
Incised —J	—	18	17	—	—	—	1	2	3	3	8	3	21	10
Incised —F	—	21	21	—	—	—	—	—	—	—	—	—	—	—
Incised —I	3	39	70	—	—	—	—	1*	—	—	—	—	—	—
Comb incised —K	—	11	29	1	—	—	—	—	—	—	—	—	—	—
Applique —M	—	3	1	—	—	—	—	—	—	—	—	—	—	—
Impressed —N	—	29	55	1	—	—	—	—	—	—	—	—	—	—
Impressed —O	1	7	6	1	—	—	—	—	—	—	—	—	—	—
Carved paddle impressed —P	87	512	520	23	—	—	—	—	—	—	—	—	—	—

¹ Smart's (n.d.) numbering system. Vanderwal uses 1, 2, 3, 4 from the bottom in his table for TON-7.

² See Figure 3 for illustrations of each design category.

* Indicates sherds thought to be out of context.

WPT-054 (TON-6) only



Figure 3: Sherds illustrating the main decorative categories used by Smart (n.d.) in the analysis of pottery from sites TON-6 (WPT-054) and TON-7 (WPT-055).

very few sherds (27), most of them ribbed paddle impressed (Table 7). We have therefore discounted this layer from further discussion.

The main layer, II, at TON-7, provided a much better sample of pottery, thought to be from an undisturbed context. The 5 m × 1 m test square produced 724 decorated sherds, of which 520 (72 percent) were ribbed paddle impressed. Other techniques of decoration present in this layer were various types of incising, applique and expressing (nubbins) (Table 7 and Fig. 3).

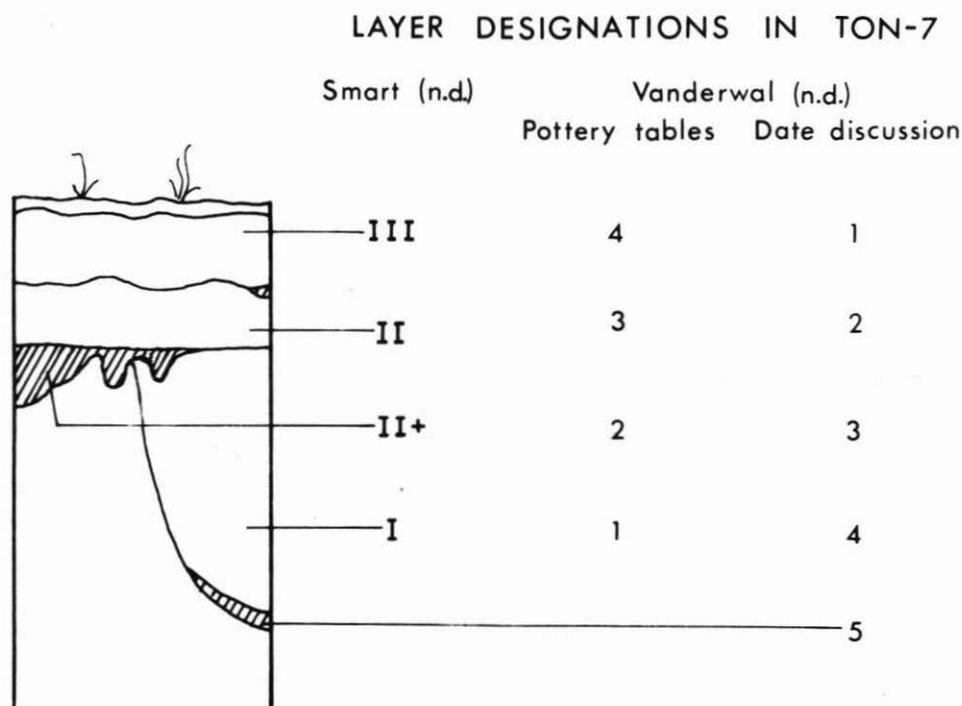


Figure 4: Different systems used in numbering layers in TON-7 (WPT-055).

In some areas of the site, including the tested area, a further layer (II+) was present, sealed by layer II (Fig. 4). This layer contained structural disturbances consisting of small ovens, as well as postholes which formed palisaded rectangular enclosures. Although there were no smaller structures evident within these enclosures, ovens were present in all of them. Similar palisaded village units were observed ethnographically on the Île des Pins, particularly at Gadji (Smart n.d.). Of 641 decorated sherds recovered from this layer in the tested area, 512 (80 percent) were ribbed paddle impressed, the other sherds being decorated by various incising

techniques (Table 7 and Fig. 3). In the tested area there were two large ovens dug beneath and sealed by layer II+, with a distinct break between layer II+ and the oven fill which was designated layer I. One of the ovens disturbed the postholes of a typical New Caledonian small round house suggesting it was earlier still. The ovens contained 93 potsherds, of which 87 (94 percent) were ribbed paddle impressed, the others being impressed or incised.

Three radiocarbon dates have been obtained for TON-7. The first (3165 ± 120 B.P.) was charcoal taken from the unnumbered fill lining the bottom of one of the large ovens discussed above. The oven was refilled immediately after use and later sealed by layer II+. As Smart (n.d.:7) points out, there is reason to expect the fill of the oven to have been in place shortly after the oven was last used, so the date for the charcoal lining is a reasonable age estimate for the ribbed paddle impressed and incised sherds in the oven fill, which he has labelled layer I (Vanderwal in his pottery tables calls this layer 1, but refers to it as layer 4 in his discussion of the dates, see Fig. 4).

The second radiocarbon age estimate (2065 ± 110 B.P.) dates the structural disturbances of layer II+ (Fig. 4). The third radiocarbon date for TON-7 (1245 ± 70) is on charcoal from a small oven in the top of layer II, on the interface between it and the plough zone. This result was discarded by both Vanderwal and Smart (Smart n.d.:2, Vanderwal n.d.:12) as representing an intrusion from the plough zone, the oven now being contiguous with it, the surface from which it once originated having been destroyed. We feel that given the types of pottery within layer II, and especially the large proportion of ribbed paddle impressed sherds, 1245 B.P. is an unrealistic age estimate for the top of layer II (though perhaps not for some part of the ploughed horizon), and accordingly we also discard it.

Vanderwal (n.d.) cites Smart as reporting in a seminar paper that the dated oven pit also contained Lapita stamp impressed and applique sherds. However, Smart (n.d.) makes no mention of this, although the published report on the date for this oven (Polach *et al.* 1968:195) says it contained "stamped impressed (Lapita style)" pottery as one of the associated pottery types. Golson (1971:76, 1972:555) indicates that these comments are incomplete and partly in error. However, he (Golson 1971:76) goes on to say that "in the top of the oven fill, sherds of Lapita, paddle impressed, and applied and incised types were found together, sealed in by a level layer II+ dated 115 B.C. ± 110 ". This, however, is not supported by Vanderwal's analysis of Smart's coded data from the test square, and thus the matter remains ambiguous. One source of the confusion may be the tool impressed sherds coded under Smart's decorative category 0 (Fig. 3). One of these is clearly shell impressed, but the other one illustrated could well be a typical dentate stamped Lapita sherd. Thus some dentate Lapita sherds could be among the 15 specimens listed in Table 7 under category 0.

NOU-1: The site of NOU-1 is renumbered as WPT-056. It was originally the eastern part of TON-7, but Smart could salvage only a single layer from an extensive sand quarry which subsequently swallowed TON-7 as well. Smart (n.d.:5-6) described the pottery from the site as almost exclusively ribbed paddle impressed sherds, representing vessels with a slight shoulder and everted rim. There were also "a few sherds from shallow hand modelled bowls with direct rims" (Smart n.d.:5) and one small "dish" with a mat-impression on the base.

A single date of 2855 ± 95 B.P. was obtained from charcoal in a small oven in the remnant layer. This date would place the pottery in this layer chronologically somewhere between the pottery in the oven fill (layer 1) at TON-7 and that

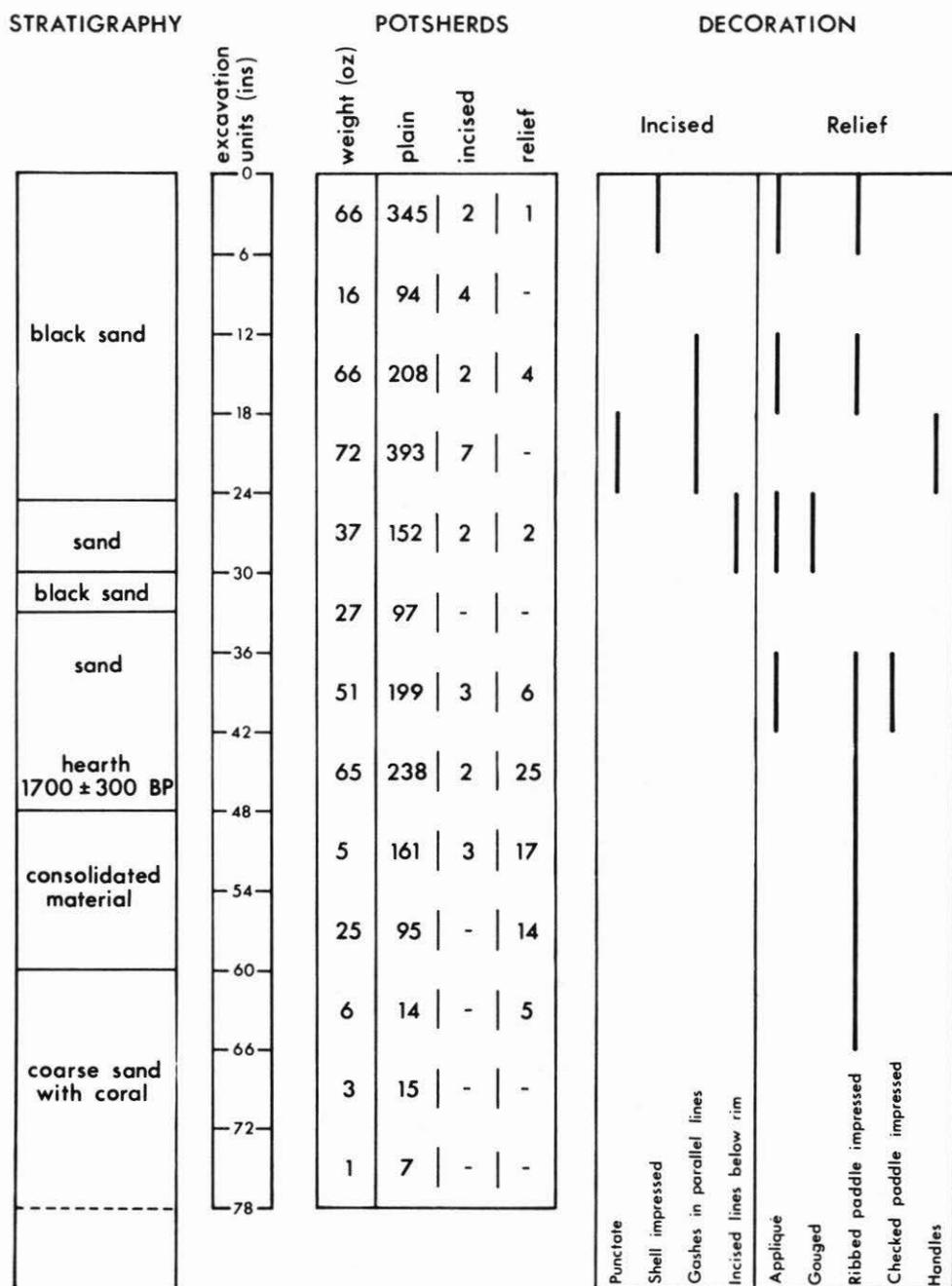


Figure 5: Correlations between stratigraphy, pottery distribution, and decoration at Podtanéan site 14 (WKO-014).

with the postholes and ovens of layer II + . This is further supported by a dominance of ribbed paddle decoration in NOU-1 similar to that in layers I/II + at TON-7.

Site 14, Podtanēan: This site, excavated by Gifford and Shutler (1956:8), is also on the Fouē peninsula, south of the Konē wharf, and approximately 1.6 km from sites 13 and 13A which are on the other shore of the peninsula. It covers about 1.2 ha from the beach up the hillside, but of this area only two 6 × 6 foot squares were dug as four 6 × 3 foot rectangles, some 15 feet apart in a series of six inch levels to a depth of 78 inches. This is one of the few sites excavated by Gifford and Shutler where it seems possible to relate the stratigraphic record described for section C2-D2 (Gifford and Shutler 1956:8) to their analyses of the pottery by six inch levels (Fig. 5). We think it reasonable to suppose that this stratigraphy applies to all the levels in the four rectangles, given such a small sample from a limited area.

Podtanēan (site 14) is also the only non-Lapita site excavated by Gifford and Shutler which contains no material from the historic period. Referring to Figure 5, two main occupations of the site are discernible, one related to the concentrations of potsherds between 12 and 30 inches and the other to the concentration between 36 and 54 inches. In general, the concentration in the upper levels equates with layers of black sand, and the lower levels equate with layers of consolidated sand. The few decorated sherds present in the black sand layer (0-30 inches) belong mainly to the later Oundjo pottery horizon (see below), with only two ribbed sherds present (one at 0-6 inches, one at 12-18 inches). Most of the sherds in the upper levels are plain. All the decorated sherds—incised, ribbed paddle and other relief—make up only 1.9 percent of total potsherds recovered from these upper levels, with the incised sherds forming the dominant (71 percent) technique among the decorated sherds.

In the lower levels (36-78 inches), however, the ribbed paddle impressed technique is dominant, forming 89 percent of decorated sherds. Furthermore, decorated pottery forms 9.3 percent of the total sherds from these levels. Unfortunately we have no detailed information about the eight incised sherds found between 36 and 54 inches, but we do know that none of them carry the late Oundjo style incised decorations listed for the upper levels in Figure 5. In our opinion it is, therefore, more probable that these sherds carry incised decoration of the type found in sites TON-7, 13 and 13A, rather than of the later types found at Oundjo, site 26. There is an age estimate for the largest concentration of sherds in the lower levels. A radiocarbon date of 1700 ± 300 B.P. was obtained from charcoal in an undisturbed hearth at 42-48 inches in rectangle C2-3, D2-3. This estimate would indicate a probable age similar to that of layer II at TON-7.

Other sites: Frimigacci (1981:113 and Fig. 1) indicates there are now 29 sites in New Caledonia and the Loyalty Group with paddle impressed pottery (Frimigacci and Maitre 1981 earlier give the number for New Caledonia as 18). However, of the 29 sites on the map of his Figure 1, only 27 are in fact indicated as having such sherds, the other two being Lapita sites so far without them. Eight of the remaining 27 sites on the map are also indicated as having Lapita pottery in them, including TON-7 and two sites in the Loyalty Islands. This means that in New Caledonia itself there are some 18-20 non-Lapita sites known to yield varying amounts of paddle impressed pottery. A number of these are not sites with Podtanēan style assemblages, but later Oundjo style site assemblages in which paddle impressed sherds occur in small numbers. However, other sites are definitely Podtanēan in the sense it is used here. For example, in the bottom 12 inches of Dowalwouē (EHI-050) paddle impressed pottery occurs as the sole decorative technique between 30 and 42 inches. This we think is more reasonably assigned to the Podtanēan than to any later period. The bottom levels of Tiouandē (EHI-051), radiocarbon dated to

approximately the first few centuries A.D., are roughly contemporary with the lower levels of site 14, but contain only undecorated pottery, making it impossible to assign them to any pottery style.

Another non-Lapita site, perhaps connected with this time period and type of pottery, is the one at Moindou reported by Avias (1950:128-130). Here, associated with the upper 3 m of the soil deposit on the alluvial plain, pottery of the Oundjo style was found, below which were a number of sterile layers to a depth of 6 m. Then a layer was encountered between 6 and 6.5 m depth associated with charcoal and pottery of a different style. Although no paddle impressed sherds were reported, rim sherds with a garland type of applique just below the lip are described as being a unique type not found in later sites. An almost identical type of decoration is reported by Smart under his category M (Fig. 3). It is very uncommon, occurring on only four sherds in layers II and II+ of the TON-7 site. Other early pottery also buried at a similar depth of 6 m in the plain of Niza, Bourail, was first reported by Glaumont (1889:215).

Taken together, this information appears sufficient to suggest that early in New Caledonian prehistory, in addition to Lapita, there are some distinctive assemblages of pottery requiring recognition as a separate decorative style. They may even turn out to belong to a full cultural complex that differs significantly from the better known one of Lapita.

THE PODTANĒAN CERAMIC SEQUENCE

On the evidence available, sites with layers assignable to the PodtanĒan ceramic style occur in the following sequence. It begins with layer I material from TON-7, assignable to about 1600 B.C. on calendrically corrected age. This is followed by the assemblage from NOU-1 dating to about 1100 B.C. on an age corrected basis, followed by that from layer II+ from TON-7 dating to about 150 B.C. The last of these is almost as late as the latest known Lapita ceramic assemblages. Materials contemporary with them and dating to the first few centuries A.D. are layers II from TON-7 and the lower levels from the PodtanĒan site itself (site 14), which can be roughly dated to A.D. 300.

The presence of the ribbed paddle impressed sherds in horizon IV at Vatcha also demonstrates that this decorative technique has existed in New Caledonia from the earliest part of the ceramic sequence. This is consistent with the 1600 B.C. date of layer I at TON-7 and Frimigacci's estimate of that age for horizon IV at Vatcha. The steady increase in the percentage of ribbed paddle decorated sherds at Vatcha as shown in Table 4 and the similarity of the percentage of ribbed paddle impressed sherds in Vatcha horizon II and site 13A could be used to support Frimigacci's view of the tradition. His perspective takes into account the similar pot shapes, colours, temper, and slipping in dentate stamp and ribbed impressed sherds. From that he deduces as one possibility that the ribbed paddle impressed pottery arose solely from a construction technique, which later became distinctive to certain groups and formed a "tradition".

However, the greatest percentage of ribbed paddle impressed decoration in any of these Lapita sites is at Vatcha horizon Ia, where 25 percent of the decorated sherds are paddle impressed, and Excavation E at Boirra, where 23 percent are. The other figures are far lower, down to 5 percent at Vatcha horizon IV. In contrast, at TON-7 layer I, which is chronologically equivalent to Vatcha horizon IV, ribbed paddle impressed sherds comprise 94 percent of all decorated sherds. At NOU-1, of similar age to Vatcha II, nearly all the sherds are ribbed paddle impressed, and no dentate decoration was found. The radiocarbon age estimates for layer II+ at TON-7 are

only a few centuries removed from those for site 13A, but ribbed paddle impressing is the decorative technique on 80 percent of the decorated sherds at TON-7 layer II+, and in contrast ribbed paddle impressed sherds make up only 8 percent of decorated sherds at site 13A. Furthermore, few or no dentate sherds occur in the analysed sample from TON-7.

Although not itself a Lapita site, TON-7 shares another pottery decorative element with Lapita sites containing many dentate decorated sherds. Smart (n.d.:6) says that one recognisable element in TON-7 was pottery "with incised 'hatched' and 'chevron' motifs rather similar to that recovered from PIN-1 [Vatcha] but here occurring with everted rims some of which are of the thickened variety". This presumably forms one of categories 'F' or 'I' (Fig. 3) in Table 7, i.e. those incised decorative categories missing from the later site TON-6. Smart (n.d.:5) also tells us that at PIN-1 some of the incised "hatched" motifs occur in the dentate stamped technique as well.

In summary, ribbed paddle impressed sherds are found in small numbers in dentate Lapita sites, and some elements of Lapita style incising are common to both complexes, as are some pot shapes, temper and colours. However, few or no dentate sherds are found at TON-7 or NOU-1, where the overwhelming majority of sherds are ribbed paddle impressed. It therefore seems to us that ceramic assemblages dominated by ribbed paddle impressing and by dentate stamping form two, distinctly separate, contemporary, pottery complexes which nevertheless share aspects of their decorative styles, doubtless because they were contemporary and in contact with each other.

That ribbed paddle impressing forms a distinct tradition is further shown by the decline of dentate stamping through time, while ribbed paddle impressing continued, albeit in small numbers, right up to the historic period. Thus there seems to be a period after the decline of the Lapita horizon at some time after A.D. 200 when ribbed paddle impressing may be virtually the only form of pottery decoration found in New Caledonian sites. This period is poorly represented in the excavated record, the two best examples being layer II at TON-7 and the lower levels at Podtanéan site 14.

At the end of this period, at some time after A.D. 300, the Oundjo style of decoration appeared and became widespread. But ribbed paddle impressing continued, as a fairly minor technique, and ribbed paddle impressed sherds are found in small numbers in sites, 19, 26, 44, 6, and 51 excavated by Gifford and Shutler. The alternative, that these sherds are all out of place, seems less likely.

Checked paddle impressing (Gifford and Shutler 1956:73 "cross-relief" or "checkerboard"), which is a dominant paddle impressing technique in the Navatu phase of Fiji, is represented around A.D. 300 in New Caledonia by only one sherd, at 36-42 inches in site 14. There are only six other excavated sherds of this type from Gifford and Shutler's New Caledonian excavations, at various levels in sites 26, 44 and 6, and a few more specimens are known from surface collections. It seems to have no obvious temporal placement and is a very minor form in the carved paddle impressed technique of New Caledonia in contrast to Fiji. The number of samples is too restricted to confirm Frimigacci's impression (1977a:204, 1977b:47) that checked paddle impressing was added to or replaced ribbed paddle impressing during the recent period.

OUNDJO STYLE HORIZON

Gifford and Shutler (1956) excavated eleven sites on the main island of New Caledonia in 1952. Ten of those sites are reanalysed in this section. Their other site,

now sites 13 and 13A, has been discussed already in the section on the Lapita tradition. Also, the lower levels of site 14 have been treated above and need not be considered again. In addition one site, TON-6, excavated by Smart is included in this section.

TABLE 8
OCCURRENCE OF HISTORIC ITEMS AND OF INCISED DESIGNS BY SITE AND SIX INCH LEVELS FOR TEN SITES EXCAVATED BY GIFFORD AND SHUTLER

Site numbers	52	50	51	26	14	6	44	48	20	19
HISTORIC										
Clay pipes	0-12		0-12	0-18		0-6	0-12	0-6		
Blue beads				0-12			0-6			
Green beads				6-12			0-12			
Pig		0-6		0-30			0-12		0-6	
Deer		0-12		0-6					0-12	0-6
									30-36	
									48-54	
Cattle		0-12		0-6			0-18			0-6
Goat	0-6	0-6	0-6				6-12			
Rat (Norway)		0-6		6-12			0-6	24-30 (burrowed)		0-6
Cat				0-6						
HISTORIC PERIOD										
Wavy lines on rim	0-12	0-12	0-6	0-24						
Multiple fine lines	0-12		0-12	0-12	18-24					
Straight line below rim	6-12	0-6	0-12	6-12	18-24					
Two parallel lines below rim	6-12	0-6	0-18	12-24						
		12-24								
Gouges and gashes on rim	0-16	6-12		0-12		6-12				
Multiple continuous line		0-6	0-12	0-6	12-24					
Finger nubbins				0-6			0-6			
Shell impressed				0-12						
Fine wavy lines			0-6	0-12						
Leaf or tree							0-6		0-6	0-6
Multiple chevrons							0-6		0-6	0-6
Gouged relief		6-12	0-12							
PREHISTORIC PERIOD										
Straight line below rim		12-14	12-18							
Wavy lines on rim				30-36						
Gouged relief			24-30							
Shell impressed					0-6					
Leaf or tree								12-18		6-12

Golson (1972:569-573), in his discussion of Gifford and Shutler's New Caledonian work, indicated some useful distinctions on the main island of New Caledonia between a northern group of sites and a more southerly group. He also commented on resemblances in decorative elements and features on the pottery of both regions to pottery from Fiji and Vanuatu. These similarities have led Frimigacci to speak of "tessons de poterie mēlanēsienne" and "les poteries à faciēs mēlanēsians" (1970), "poteries de couleur atypique" (1974), "les temoins de la tradition mēlanēsienne" or "ensembles culturels mēlanēsians" (1977a), "poterie de tradition mēlanēsienne" (1976) and finally "la poterie MANGAASI" (ou des "Ensembles Culturels Mēlanēsians") (1978:19, 28). In the more recent publications the last two, Mangaasi and Melanesian Cultural Assemblage or Complex, have come to be the favoured terms (Frimigacci 1980, 1981; Frimigacci and Maitre 1981). While these terms describe the broader relationships of this cultural complex, it seems to us that some more New Caledonian oriented framework and terminology is needed in the first instance.

REVISION OF GIFFORD AND SHUTLER SITE CORRELATIONS

To re-analyse the material of Gifford and Shutler it is necessary to re-align the six inch levels from various sites by which data are presented in their report, using means additional to "depth below surface". The following methods present themselves. First, Gifford and Shutler (1956:75-6 and Table 17) provide information on European artefacts (clay pipes, blue and green trade beads) and introduced animals (deer, cattle, goat, cat, norway rat and pig), which indicate a late or European contact period for the levels in which they occur (Table 8). Such material is found in all the sites but 14, and a line can be drawn for each site above which all levels are assigned to an "historic period". This procedure provides a satisfactory solution for correlating the upper levels of sites 52, 50, 51, 26, 6, 44, 48, 20, and 19, with the exception of a few items noted below.

The re-aligned levels can be further analysed according to the listing by Gifford and Shutler (1956:74-75) of the incised designs found at more than one site. This results in the isolation of 12 incised decorative designs that are in large part confined to the same levels (Table 8) as the historic artefacts and introduced animals, and therefore constitute a late and largely "historic" set of pottery designs within the more general incised category. Among these 12 designs are five which also occur in earlier levels (Table 8) and are further discussed below.

Because the top levels of site 14 yielded no historic items and contained only one of the late design motifs, shell impressing, in its uppermost level, they are probably earlier than the historic period as defined above. For this reason, the upper levels comprising the main occupation associated with the black sand layers at site 14 are assigned to a fully prehistoric period of the Oundjo horizon, and the radiocarbon dated levels of the lower consolidated sand layers are assigned to the earlier Podtanēan style assemblages. Having fixed the equivalence of the upper levels of each of the other sites, judicious arrangement, admittedly of a somewhat subjective nature, allows a fairly satisfactory set of correlations for the prehistoric period to be developed, based on the radiocarbon dates, the depth and composition of the deposits, and the associated pottery. They result in a revised set of temporal equivalences as portrayed in Figure 6.

OUNDJO STYLE POTTERY

The later pottery from New Caledonia is often referred to as "incised", after the principal technique used in decoration in this period. However, "incised" is for several reasons an unsatisfactory term to characterise this pottery. Firstly, most

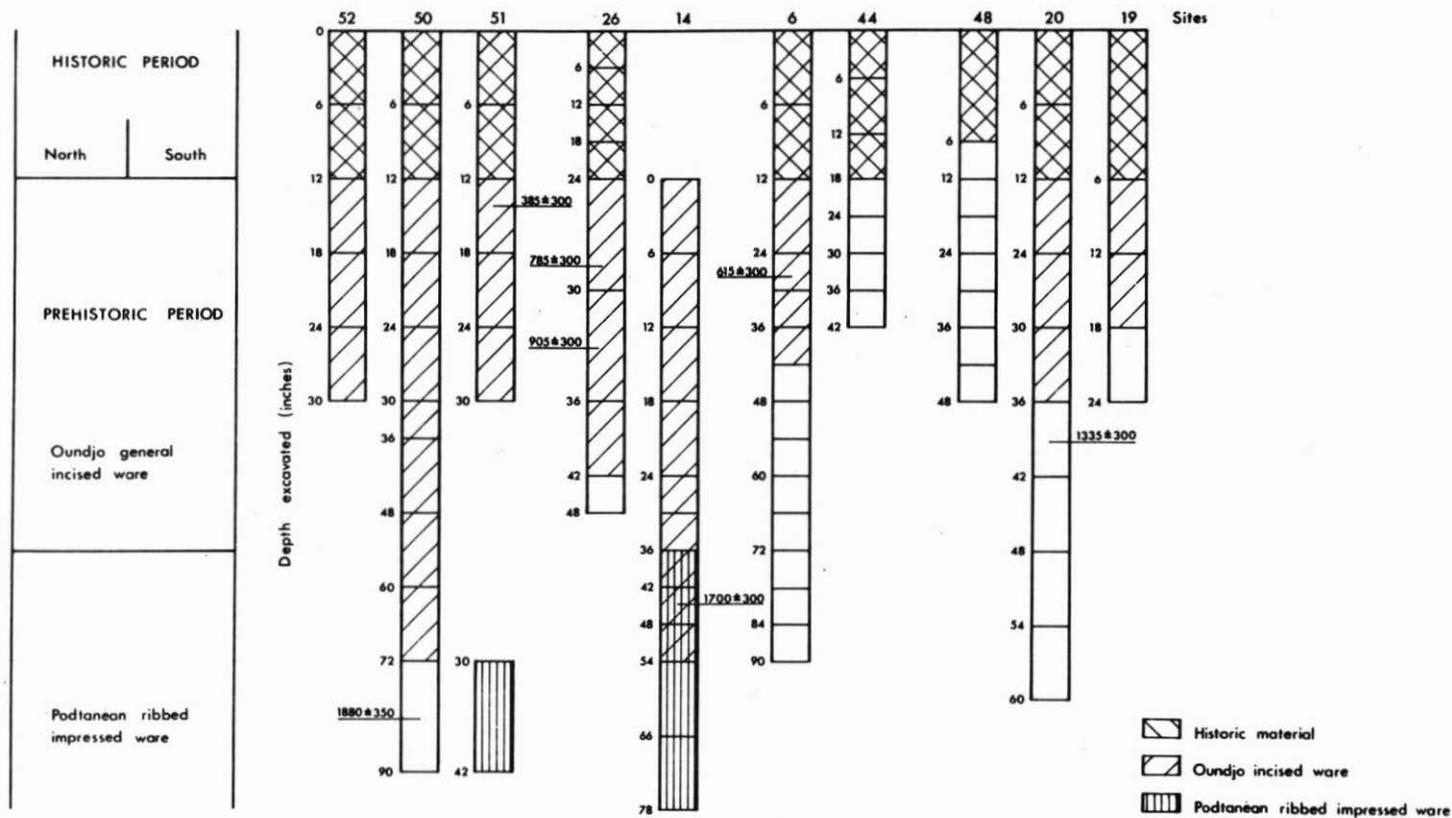


Figure 6: Revised correlations between the unit levels of the ten sites excavated by Gifford and Shutler (1956).

(usually more than 90 percent by weight) of the pottery is plain, with decoration restricted to the upper bodies and rims of a few simple pot types—a spherical pot with a restricted mouth and an open bowl. Next, it has already been shown that incising as a decorative technique occurs throughout the ceramic sequence in New Caledonia, the changes in incising and in other decorative categories consisting of differences in the design and motifs which are involved in the different periods (Frimigacci 1977a:204). There is, for example, Lapita incising of Frimigacci's Geometrique category in which motifs are shared with those formed by dentate stamping, a situation also found in the Lapita ceramics of other island groups. Moreover, it appears that in New Caledonia some, but not all of the incised designs associated with the Lapita assemblages, are also encountered in incised designs on the pottery associated with assemblages of the Podtanĕan style (see above). It also appears that in the Podtanĕan assemblages there are three incised categories, D, G and J, represented in Smart's analysis of TON-7, which continue into the later ceramic levels of TON-6 in small numbers (Table 7). What the analysis also demonstrates, however, is that a large range of new incised decorative techniques, A, B, C, E, and H, appear in these later levels, and the other earlier incised decorative categories, F, I and K disappear. This suggests that in New Caledonia there is a late decorative style, just as there are earlier ones distinguished by the terms Lapita and Podtanĕan. It is also worth noting that in these earlier decorative styles, although one decorative technique, dentate stamping, is predominant in Lapita and another, ribbed paddle impressed, in the Podtanĕan, other decorative techniques are also present as part of the style. In the same way, in the later ceramic style of New Caledonia, although the incised technique is most prominent, other decorative techniques may be expected to be associated with it.

The object here then is to use the published material of Gifford and Shutler (1956) to define for New Caledonia a more recent ceramic style in which incised decoration predominates. We have selected the name of site 26, Oundjo, to refer to this ceramic style, as both the historic and prehistoric elements of that style are fairly well represented in this site.

Golson (1972:570), noting the large size and geographical and linguistic diversity which characterised New Caledonia, commented that some of the complexity in the pottery may be regional and not chronological. He went on to elaborate this point with respect to the distribution of suspension holes, handles, stick nubbins and various incised motifs. The point is also illustrated in Table 9, where the ten sites excavated by Gifford and Shutler are organised on a north to south axis. In the table, the presence of suspension holes in the northern sites and handles and expressed nubbins in the more southerly ones is evident. It is also apparent that

TABLE 9
NORTH-SOUTH DISTRIBUTION OF FOUR CERAMIC ELEMENTS BY NUMBER AND RIM FORMS BY PERCENTAGE FOR TEN SITES EXCAVATED BY GIFFORD AND SHUTLER

Site numbers	NORTH					SOUTH				
	52	50	51	26	14	6	44	48	20	19
<i>Attributes by number</i>										
Handles	—	—	—	1	1	6	10	2	21	19
Suspension holes	13	3	23	124	—	13	1	—	—	—
Expressed or stick nubbins	—	—	2	—	—	8	16	16	83	—
Gouged relief	—	2	3	—	1	—	—	—	—	—
<i>Rims by percentage</i>										
Incurved	4	4	2	1	10	3	0	22	10	14
Outcurved	48	47	45	49	46	34	27	8	20	30
Straight	48	49	53	50	44	63	73	70	70	56

outcurved and straight rims occur (by percentage) in almost equal proportions in the northern sites, while in the southern sites straight rims occur in a higher proportion. Following up this line of argument in respect to the incised decorative categories defined by Gifford and Shutler (1956:74-75), it becomes evident from Table 10 that there is a set of incised designs which are widely shared in both northern and southern sites, and there are other sets of less common designs which are either largely northern or largely southern in their distribution.

TABLE 10
NORTH-SOUTH DISTRIBUTION OF PRINCIPAL INCISED DESIGN CATEGORIES
FOUND AT MORE THAN ONE SITE BASED ON TEN SITES EXCAVATED
BY GIFFORD AND SHUTLER

Site numbers	NORTH					SOUTH				
	52	50	51	26	14	6	44	48	20	19
<i>General Incised</i>										
Multiple intersecting lines (138)	X	X	X	X	—	X	X	—	X	X
Gashes in parallel lines (136)	X	X	—	X	X	X	X	—	X	—
Punctate (91)	X	X	X	X	X	X	X	—	X	X
Miscellaneous gashes (74)	X	X	X	X	—	X	X	—	X	X
3 or more parallel lines (21)	X	X	X	X	—	X	X	X	X	X
Various incised lines below rim (10)	X	X	X	X	X	X	X	—	—	—
<i>Northern Incised</i>										
Wavy lines on rim (42)	X	X	X	X	—	—	—	—	—	—
Multiple fine lines (16)	X	—	X	X	—	—	—	—	—	—
Straight line below rim (16)	X	X	X	X	—	X	—	—	—	—
2 parallel lines below rim (14)	X	X	X	X	—	—	—	—	—	—
Gashes and gouges on rim (12)	X	X	—	X	—	X	—	—	—	—
Multiple continuous lines (8)	—	X	X	X	—	—	—	—	—	—
<i>Southern Incised</i>										
Leaf or tree design (11)	—	—	—	—	—	—	X	—	X	X
Multiple chevrons (5)	—	—	—	—	—	—	X	—	X	X

() number enclosed in bracket indicates total frequency of occurrence

X = present — = absent

In this analysis, one curious result is that site 14 belonging to the northern group has none of the designs found in the other northern sites (Table 10). However, when one recalls that site 14 also lacks any historic material in its upper levels, an explanation immediately presents itself. This is that the northern designs which occur in sites 50, 51, 52 and 26 are in fact all very late in time, a conclusion consistent with the analysis set out in Table 8. The six northern designs are there included among the 12 listed for the historic period. Only two of them occur in the immediately prehistoric period as well. In short, the northern designs do not appear in site 14, as might be expected from its location, largely because its upper levels are from a chronologically earlier period, although sampling error too may be part of the explanation.

The two exclusively southern motifs in Table 10 occur late in the sequence also, as Table 8 indicates for the three sites, 44, 20 and 19, from that region. They are

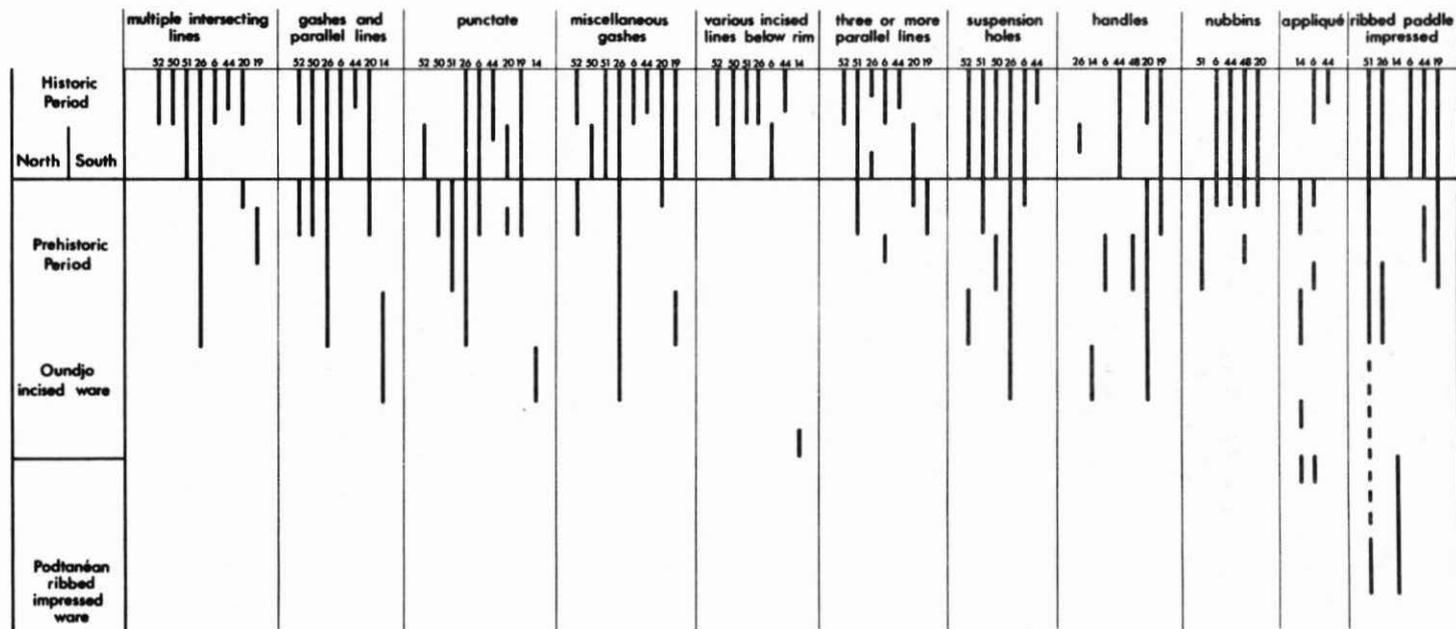


Figure 7: Distribution in time of widespread designs and other ceramic features on the basis of the revised correlations between ten sites set out in Figure 6.

missing from site 48, probably through sampling error because of the small amount of decorated pottery from that site. They do not occur in site 6 either. Still, this site occupies something of a middle ground in Tables 8 and 10, and on geographic position it would seem more likely that site 6 should be associated with the northern group. This, at least, is the case on the evidence of two of the late northern designs that occur there (Table 10). However, in several other respects site 6 remains transitional between the northern and southern groups.

Those design elements, which in Table 10 are shown to be widespread throughout New Caledonia on the evidence of the ten sites excavated by Gifford and Shutler, can also be shown to be of both historic and prehistoric age. This is demonstrated in Figure 7, where the ten sites are organised by level in the same way as in Figure 6, and the presence by depth of each of the six widespread incised designs is then plotted. Also plotted in the same fashion are the distribution in time by site of suspension holes, handles, stick nubbins, applique designs, and ribbed paddle impressed decoration. For all but the category of "various incised lines below the rim", evidence is available from three or more sites that the designs in question go back in New Caledonian prehistory at least some 700 years and in some cases perhaps as much as 1300 years. At the other end of the time scale, all six widespread designs are equally well represented in sites of the historic period. The weakest case is the category of "various incised lines below the rim", which on the evidence of site 14 alone is also of prehistoric age. A problem here is that this design may not form a very tightly defined category. Still, these six design categories and the other categories from Figure 7 discussed next serve to define a unified Oundjo ceramic style at the recent end of the New Caledonian sequence.

Both applique and ribbed paddle impressed are decorative categories represented in TON-7 and in the earlier Podtanēan style assemblage from site 14. As the evidence of Figure 7 indicates, they continue as a minor decorative component throughout the prehistoric and into the historic period of the Oundjo horizon as well. Stick nubbins on the other hand, while of prehistoric age, begin rather later in the Oundjo horizon, an estimate on the basis of the radiocarbon dates and Figure 7 being something of the order of 400 to 900 years ago at most. This is supported by the results from TON-6 (see below). Stick nubbins are not exclusively southern in their initial distribution in the prehistoric period, but except for site 6 a largely southern survival seems to hold true for examples of the historic period. Handles, both circular and oval, are present throughout the layers at both TON-7 and TON-6, which is consistent with their presence throughout the prehistoric as well as historic periods in the southern group of sites excavated by Gifford and Shutler. In contrast, except for the one oval handle with groove (Gifford and Shutler 1956:72) from site 26, the northern group of sites use suspension holes in the historic period, which is consistent with known ethnographic practice in the region. From Figure 7 it can be seen that the use of suspension holes in the north began well back in the prehistoric part of the Oundjo horizon. In this instance site 6, with its suspension holes, again aligns itself with the northern group during the late prehistoric period and on into the historic period. One could, in fact, argue that the former use of handles in site 6 was displaced during the prehistoric period by the use of suspension holes, the trait diffusing as far south as site 44 by the end of the historic period.

The results of this review indicate that a more precise definition of the Oundjo ceramic style and horizon is possible. Moreover, it can be seen that these ceramics formed a widespread basic horizon with a common set of design elements, decorative categories and pottery features in the prehistoric period, which continued into the historic period. Other elements, however, make the historic period divisible

into northern and southern groupings. The different trends in the north and south begin to appear in the prehistoric period, as is shown by such traits as a preference for suspension holes over handles in the northern group of sites. Toward the late end of the prehistoric sequence other design elements characteristic of the northern group of sites in the historic period begin to appear. This is demonstrated by such categories as (Table 8) "straight line below the rim", "wavy lines on the rim", which first occur in the prehistoric levels. The same applies to the initial occurrence of the leaf or tree design in the southern group of sites.

DATING THE OUNDJO HORIZON

Our definition of an "historic period" may appear more precise than it should be. It probably covers the 18th, 19th and early 20th centuries, and may even have begun in the 17th century A.D. Two difficulties occur here. First, most of the historic items used to date these levels are likely to belong to the 19th century, the deer, for example, having been introduced in 1867 (Gifford and Shutler 1956:28). Next, all the levels comparable to the ones from which the historic materials come at these sites are unlikely to be so late. Some are probably also from a slightly earlier period in the late 18th or even 17th centuries A.D. Also some of the animal remains are clearly out of place. The rat in site 48 at 24-30 inches, for example, is discounted by Gifford and Shutler (1956:6) as a result of its burrowing habits, while the deer bones in site 20 at the 30-36 inch level and again at 48-54 inches are dismissed by the statement "that part of our excavation may have been in a modern garbage pit or other disturbed soil". Such arguments, however, may not apply to the pig. At site 26 we have placed the upper 24 inches with its deer and pig and various late northern design elements in the historic period. The pig, however, continues down to the 30 inch level from which there is also a radiocarbon age estimate of 785 ± 300 years. It is more likely that the pig is a very late prehistoric introduction by the Polynesians, as the widespread and borrowed Polynesian term for it, *puaka*, indicates (Hollyman 1959:382-383).

Dating the beginning of the Oundjo horizon in the prehistoric period is more difficult. This is because there are few securely dated levels with a quantity of decorated pottery in the Oundjo style before about 900 years ago in the Gifford and Shutler sites. For example, the date for site 20 at 1335 ± 300 years is from a level with all plain pottery. Also, as noted in an earlier section, the 1700 ± 300 age for the levels of site 14, where incised materials overlap with pottery that is mostly ribbed paddle impressed, has no design information to suggest the incised materials are in the Oundjo style. Indeed we have argued it is more likely they are not. Therefore, it is necessary to turn to Smart's excavations where in two sites, TON-6 and TON-7, there is a well dated sequence and decorative information suggesting a marked change in the ceramic style (Table 7).

TON-6: The site of TON-6 was an exposed narrow strip of beach in the western end of Naia Bay, excavated by Smart in 1966-67. It contained ten layers. Very few sherds came from the lower layers I-VIII, but they tended to be larger than those in the upper layers. According to Smart (n.d.:7), only two vessel forms were present, a simple restricted vessel, probably spherical, and a high sided open bowl. Table 7 shows that the decoration is mostly incised, and surprisingly there are no paddle impressed sherds at all, despite the proximity of the site to TON-7, where ribbed paddle impressing is so dominant. Some incised decorative categories, D, G, and J (Fig. 3), are present in both TON-6 and TON-7, suggesting some sort of continuity between the two. The incised categories, B, A, and E, are confined to TON-6, while "Trailed incised", "Cross hatched incised", and "nubbins" (H, C and L, see Fig. 3) occur mostly late in the sequence at TON-6. One sherd with trailed incised and

two with nubbins also occur in layer II at TON-7. This occurrence of nubbins in TON-7 requires explanation, as elsewhere the nubbins occur only in the second millennium A.D. as noted above. Such an explanation will be attempted below.

Smart (n.d.:8) noticed some changes through time in the TON-6 pottery: incised "frond" motifs were present throughout but gradually became more complex. The pottery in the lower layers was thick and carried simple "frond" motifs, and the middle part of the sequence was marked by the "croix enveloppe" motif and other isolated motifs. The first sherd with nubbins, in layer VII, is associated with a proliferation of simple incised decoration and bevelled rims; these types continued to the top, where trade goods were present, as was the case in most of the sites excavated by Gifford and Shutler. Sherds in the late part of the sequence were also smoother, harder and blacker.

Five radiocarbon age estimates are available for TON-6 (Table 1). When corrected into secular age estimates they yield the following results: the initial cultural deposits in layer I are dated to around A.D. 200, two small ovens in layer Va are dated to *circa* A.D. 330 and layer Vb above it dates to *circa* A.D. 580; layer VII, where one sherd with nubbins is present, is dated to around A.D. 1040, and layer VIII is around A.D. 1520.

The first traces of stick nubbin decoration occur around 900 years ago at TON-6, but nubbins do not become a major decorative element until layers IX and X, i.e. later than A.D. 1520, where they amount to 68 percent of decorated sherds (Table 7). This is consistent with the pattern noticeable in the sites excavated by Gifford and Shutler (Fig. 6 and Gifford and Shutler 1956:73). Nubbins are present as a minor element in sites 48 (1 sherd) and 51 (1 sherd) at around 900 years ago, but appear suddenly in sites 6 (8 sherds), 44 (16 sherds), 48 (15 sherds), and 20 (83 sherds) at a time just before the historic period, some 300 to 400 years ago. The two sherds with nubbins at TON-7 can thus be seen to be many centuries earlier than those in other New Caledonian sites, in a layer which starts about 150 B.C. We think these two sherds and the trailed incised sherd in TON-7 (Table 7) may be seen as intrusions, just as the carbon date of 1245 B.P. is probably an intrusion from the plough zone.

This sequence for TON-6 and the change in decoration between it and TON-7, marked both by continuity in certain incised decorative categories and the loss of some and introduction of other incised categories, would seem to provide the best available age estimate for the beginning of the Oundjo horizon. Nevertheless, with such small samples of sherds from these levels and the change dated at one site only, caution should be exercised. However, an estimate in the fourth century A.D. would not be out of line with other evidence. Certainly, one can be reasonably sure that the Oundjo style horizon existed in New Caledonia by the end of the first millennium A.D. Still, as Frimigacci (1977a:277) commented "a close study of the New Caledonian incised and applique relief pottery is equally necessary to a better understanding of the cultural currents and reciprocal influences of the various peoples of Melanesia" (translation ours). This review of the Oundjo ceramic style we hope goes some distance in that direction.

ADDITIONAL CONSIDERATIONS

Having defined and dated the Oundjo ceramic style on the basis of information provided by Gifford and Shutler and by Smart, it is possible to return to some of the differences between earlier pottery assemblages from the Lapita horizon and those which Frimigacci assigned to this later "Melanesian" or "Mangaasi" period. The main thrust of Frimigacci's research has been directed at the early end of the sequence, but he describes pottery from the late end of the sequence very similar to

that described by Gifford and Shutler. For example, Frimigacci (1977a:191) notes plain pottery, incised "tree" motifs, and nubbin decoration from the Île Ouen (Frimigacci 1971:191) and suspension holes and nubbins at Grimaud Islet (WNP-005, Fig. 1) in a layer above ribbed paddle impressed pottery (Frimigacci 1976:7). He also indicates that plain pottery supercedes ribbed paddle impressed at Pindai, site 38 (Fig. 1) (Frimigacci 1976:9). His comment on this later pottery is that it has coarser temper than that in either Lapita or ribbed paddle impressed sherds, utilised coarser clay, and was fired for longer periods (Frimigacci 1970:35). In a subsequent article Frimigacci (1976:22) says that this pottery, coarse tempered and decorated mostly by chevron motifs, arrived in New Caledonia about 1000 years ago; the incised motifs diversified and, at around the contact period, shouldered and flat lipped forms disappeared, whereas nubbins and applique relief (wreathed) decorated forms appeared and went through anthropomorphic and zoomorphic variations to the present day. As well, he (Frimigacci 1974:68) noted that there were several new rim forms and that the colour was dissimilar to that of Lapita and ribbed paddle impressed sherds at Vatcha. In the most recent summary, Frimigacci and Maitre (1981) say their Melanesian Cultural Complex includes two large groups of ceramics that are imperfectly defined in New Caledonia. One, directly linked to the classic Mangaasi of the New Hebrides (Vanuatu), includes wares decorated with applied reliefs and geometric incising; the other reflects local innovations upon this and includes relief decorations such as nubbins, gouges, and more complex incised decorations. Thus, besides drawing attention to general parallels with the incised and applique decorated pottery in New Guinea, New Britain, the Solomons, Bougainville, Fiji and Vanuatu, Frimigacci (1977a:276) states that the decorative motifs of the late prehistoric pottery in Fiji, the Mangaasi tradition in Vanuatu, and the recent pottery in Northern New Caledonia are directly comparable. Similar comments were earlier made by Golson (1972:573).

CONCLUSION

Bellwood (1978:262) commented in reviewing the New Caledonian sequence that it was "very poorly understood at present" and, following a brief presentation of the ambiguous evidence from the concrete-cored mounds, had to be satisfied with a simple sketching in of the later ceramic developments. He also noted that New Caledonia was racially and linguistically a complex place, with much less homogeneity than characterised Fiji, for example. He therefore felt that "it was clear that New Caledonia should have more to tell than Fiji", even if on the ceramic evidence available to him the two sequences seemed to present almost identical pictures. We believe that this review has brought together sufficient information to reinforce the notion of a more complex picture which Bellwood anticipated.

At the beginning of the sequence the enigmatic tumuli, or concrete-cored mounds, provide a number of issues, the answers to which remain uncertain. However, there are several lines of evidence to suggest that these structures are man-made, and that they belong to the early end of the New Caledonian sequence rather than to any later point in it. Of Bellwood's (1978:250) two choices, that either some Lapita connection with them may be found, or that they may have been built by some unknown pre-Lapita inhabitants, the second seems more likely to us on the present evidence. However, we would not go as far as Shutler and assert that they represent an aceramic, pre-Neolithic, non-Austronesian population dating back some 10,000 years. It seems just as likely to us that they may represent an aceramic, Neolithic, early Austronesian population, seemingly dated between 3000 and 5000 years ago and perhaps as much as 6000 years ago. Still at present these tumuli present a problem which only further archaeology and more data will resolve.

The review of the Lapita materials from New Caledonia exposes both their widespread distribution along the west coast of the main island down to the Île des Pins and their distribution through time, allowing the construction of a sequence for the various sites and layers. This sequence is based not simply on radiocarbon dates but on stratigraphy, together with the changing ceramic content in the sites themselves.

The presence in ceramic assemblages of the Lapita style of designs, not only in dentate stamping but also in incising, is well known from the Reef/Santa Cruz and Vanuatu Lapita sites, as well as those from Fiji and the Lau Islands. In New Caledonia, incising as a decorative technique seems to increase toward the late end of the Lapita sequence and dentate stamping to decline. Somewhat similar trends seem to be indicated for Vanuatu by the late Erueti Lapita site there.

In contrast to incising, no occurrence of carved paddle impressed pottery in the Lapita sites of the Lau group, Vanuatu and the Reef/Santa Cruz area, or in sites further west, is known to us. Good evidence for an association of carved paddle impressed pottery with Lapita is so far confined to the sites of New Caledonia, where its use appears in the earliest levels and increases through time. Although it is possible that similar ribbed paddle impressing may be shown to occur in the Lapita levels of Fiji as well, as proposed by Hunt (1980), this Fijian case is by no means as good and may also be explained by intrusion from cultural or natural mixing of the deposits involved.

A common viewpoint that the Lapita cultural complex is either the earliest or the sole early ceramic style in New Caledonia, however, is not supported. What this review of the New Caledonia material has demonstrated, which was not previously as well appreciated as it might have been, is that the presence of ribbed paddle impressing in Lapita ceramic assemblages may be attributable to the existence in New Caledonia of an equally early and separate ceramic style which we have called Podtanéan. This style, while characterised by a dominance of ribbed paddle impressing on the decorated potsherds of its ceramic assemblages, also shares some elements of vessel shape and incised motifs with the Lapita complex, as might be expected if the two were in regular contact from the beginning as is suggested by our review. More interesting perhaps is that it is the Podtanéan which continues on after the Lapita and becomes the ceramic component on which the case for continuity throughout the New Caledonian sequence can best be made. It is also the paddle impressed decoration which increases in importance through time in Lapita assemblages, making it possible to suggest that the Lapita was influenced by the Podtanéan rather than the other way round.

The contrasting view is that the Podtanéan developed out of the Lapita of which it was originally a small part (Frimigacci 1978:28). If in time our view of the Podtanéan as a separate and equally early ceramic complex proves correct, it will have important implications for the culture history both of New Caledonia and of this part of the Pacific. Certainly, with the tumuli and the Podtanéan, one would hesitate to assert any longer that there are *no other cultural assemblages* in this part of Oceania which are as early as or earlier than the Lapita. Nor would one wish to assert that the settling or founding populations of New Caledonia are solely to be identified with the Lapita cultural complex. The possibilities are at least three in number, and the prospects now seem much better for realising the more complex culture history anticipated for New Caledonia.

The demonstration that the later incised ceramics of the New Caledonian sequence form a distinctive style and horizon, albeit one in which some elements from the earlier Podtanéan continue, is essential to advancing our understanding

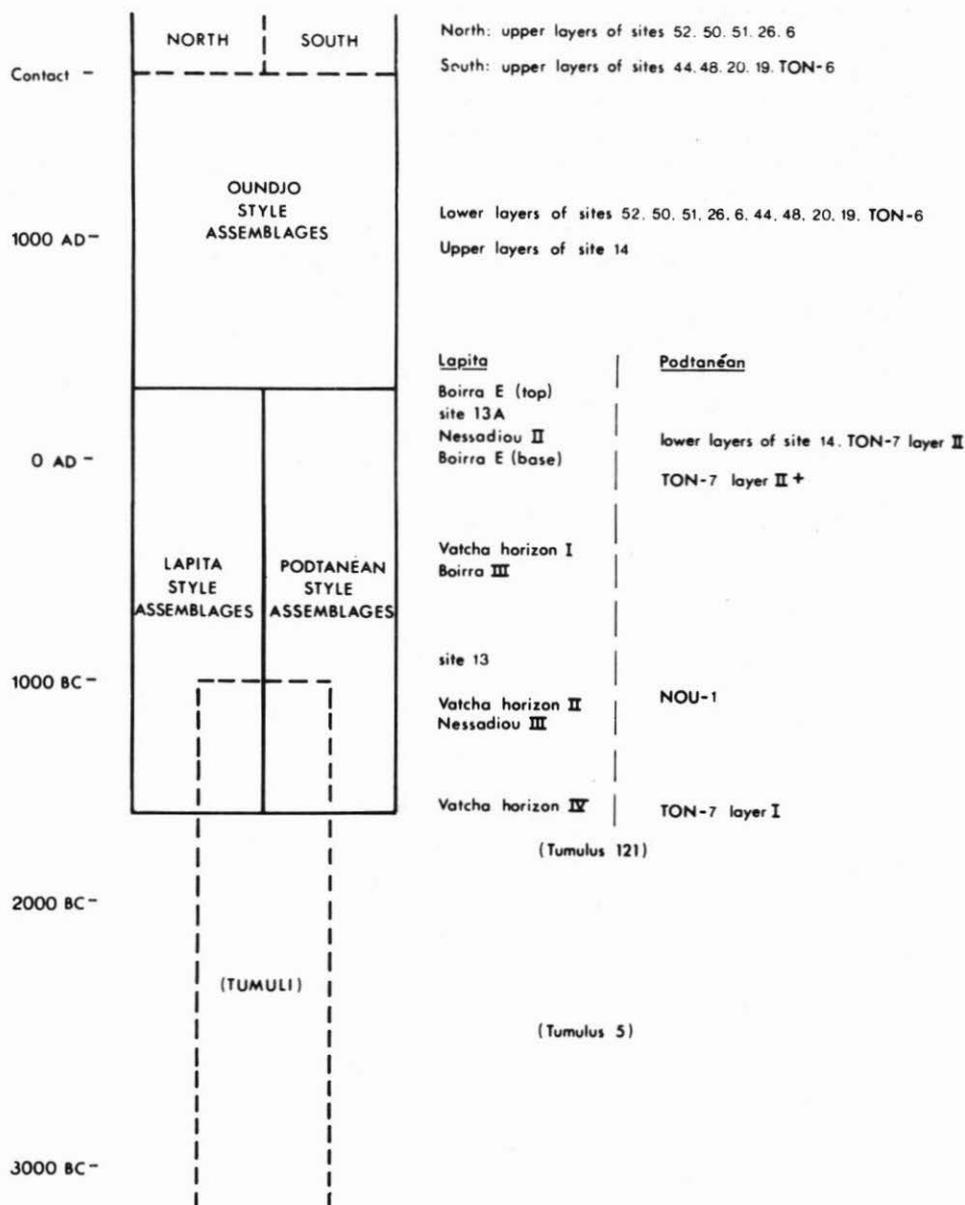


Figure 8: A diagram of the New Caledonian sequence indicating the temporal placement of the principal excavated sites and layers used in its construction.

beyond the interpretation of Gifford and Shutler. This ceramic style we have called Oundjo. The Oundjo style initially seems to be uniform throughout New Caledonia, and decoration in the style is fairly restrained for much of the prehistoric period. It is only at the late end of the prehistoric period and on into the historic portion of the sequence that the decoration grows more complex and elaborate. Moreover, it is possible, on both designs and other elements, to separate the very late or "historic" ceramic assemblages from sites throughout New Caledonia into northern and southern groupings along lines initially suggested by Golson.

A consequence of the revision of the Oundjo materials is the dating as late prehistoric to historic of a number of the elements that Golson (1972:571-573) and others have used to draw parallels with Fiji and Vanuatu. This applies to both the motifs unique to particular sites and those shared between a number of them. Only a type of comb incising found in TON-7 (Table 7) and the Moindou type "guirlandes" (wreaths) applied just below the rim of large globular pots, also found in that site, are clearly of much earlier age in New Caledonia (Golson 1972:568). The late dating of most of the other parallels is consistent with a similarly late (Ra phase) dating in Fiji. This is, however, quite a few centuries after the disappearance of the comparable Late Mangaasi pottery from Vanuatu, so that their apparent appearance in New Caledonia has not yet proved contemporary with their disappearance from Vanuatu. In the earlier Oundjo style assemblages from New Caledonia it is difficult to establish other than very general similarities with either the Mangaasi ceramics of Vanuatu or the contemporary Vunda phase pottery from Fiji. Still there are some possible parallels in the earlier Podtanean decorated sherds with Fiji, on the one hand, and Vanuatu on the other, that should be further explored in the future.

The overall New Caledonian sequence may be charted schematically as in Figure 8. With the current exception of what is apparently a culturally unrelated complex of tumuli at the beginning of the sequence, a case may be argued for ceramic continuity with some change in style of decoration throughout the sequence. This applies whichever of the possibilities is accepted for the relationship between the Lapita and Podtanean materials. Some of these ceramic changes may be related to events and influences from outside New Caledonia itself, but in the main most could have been internally generated. A similar case can be made for continuity in other aspects of the cultural sequence, in addition to the pottery.

Smart's Naia Bay excavations and those by Frimigacci at Nessadiou provide us with virtually the only archaeological information available on house structures in New Caledonia, from which it is possible to infer a remarkable pattern of continuity. The round house was typical of New Caledonia at European contact, and the first archaeological occurrence of this form is at TON-7 in Naia Bay, where the postholes of a small round house were disturbed by and thus earlier than one of the two large ovens of layer I, dated to around 1600 B.C. on a calendrically corrected age. The probable oval houses of the 12th century B.C. at Nessadiou follow next in the sequence. Another such round house, although somewhat larger than that at TON-7, was found halfway through the sequence at TON-6, dated to around A.D. 330 on a corrected basis. This implies that houses have retained the same shape for over 3500 years. In layer II+ at TON-7, dated to around 150 B.C., Smart found palisaded rectangular enclosures containing ovens, similar to palisaded village units observed ethnographically at Gadji on the Îles des Pins, some 2000 years later. The normal Oceanic style hearths and ovens are found in various sizes in most of the sites, from Vatcha layer IV and TON-7 layer I through to site 6 of Baye.

Remarkably few non-pottery portable artefacts have been recovered archaeologically in New Caledonia, but they also show a great deal of continuity. Trochus and conus shell armlets and evidence for their manufacture have been found in Vatcha horizon II (at around 1100 B.C.), TON-7 layer II+ (at about 150 B.C.), sites 13 and 13A, 14, TON-6, 6 and 26; that is, from 1000 B.C. to the present. Flakes and cores in chert, quartz, basalt, serpentine, nephrite, phtanite, and chalcedony have been found in Vatcha horizon II, Boirra, sites 13 and 13A, and sites 52, 50, 51, 26, 14, 44, 20 and 19. The few adzes found have lenticular sections in Vatcha II, oval sections at Naia Bay and in sites 13 and 13A, while both oval and lenticular section adzes were in the ethnographic collection made by Gifford and Shutler.

Gifford and Shutler found worked bivalves, bivalve shell net sinkers, and cowrie octopus lure caps in both their Lapita sites 13 and 13A and in many of their Oundjo sites (Gifford and Shutler 1956: Table 43). They also found that worked univalves are present only in the Oundjo sites and noted (1956:84) that a number of unique artefact types occurred in "site 13". Three worked discs of pottery with bevelled edges came from 0-24 inches in site 13A (dated to around A.D. 150), and Frimigacci (1977a:159) reports a similar disc from layer II of test pit 68 at Vatcha (dated to around 1100 B.C.). Of special interest are the two obsidian flakes found in the New Caledonian Lapita sites: One, source unknown, came from the 0-6 inch level in rectangle A13-14, B13-14 at site 13A (dated to around A.D. 150); the other was found by Golson *et al.* at Vatcha (dated to after around 1100 B.C.) and came originally from the Talasea source, 3500 km away (Ambrose 1976:366).

The unique types notwithstanding, the overall pattern is fairly clear. The basic house and artefact forms in New Caledonia have changed very little in the last three and a half thousand years, despite changes in the styles of pottery decoration.

As with any review of the kind undertaken in this paper, a host of problems and prospects present themselves. Some seem more pressing and interesting than others. Among those we would single out for investigation are the following: 1) the excavation in the north and south of New Caledonia of a series of deeply stratified Oundjo sites capable of better documenting and dating that part of the ceramic sequence; 2) excavations of a kind that would greatly enlarge the corpus of structural and portable artefact evidence other than pottery for the Oundjo horizon; 3) excavation and dating of a number of stratified sites with Podtanëan pottery, along the lines begun by Smart, to replace and expand on the material he collected; 4) further studies and restudies of the Lapita material to elucidate further the changing ceramic content of that complex in New Caledonia, together with the area excavation of one or more levels in a Lapita site to recover structural and portable artefact evidence and define activity areas within Lapita sites; and 5) in all of the above, the collection of good economic data on subsistence. (The material collected on this by Gifford and Shutler is largely unusable, and for the earlier sites such information is largely unavailable.) We suspect the tumuli and various problems associated with them will continue to attract attention without further need on our part for comment. Still, their examination alone would provide too narrow a focus, for as Bellwood observed New Caledonia has a complex prehistory, and we have just begun to scratch its surface.

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