A Formal Analysis of the Lapita Ceramic Assemblage from Site 13A

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Introduction

Lapita pottery was first discovered in 1909-10 by Father Otto Meyer on Watom Island in the Bismarck Archipelago, but it was not until 1956 that Gifford and Shutler first recognized Lapita as the product of a distinctive culture (Kirch 1996:6-7). Through their excavation of dentate-stamped pottery in early cultural levels in New Caledonia, Gifford and Shutler made the correlation between the pottery from their site of Lapita and other sites in Melanesia and Western Polynesia. They saw both stylistic and technological similarities in pottery finds from Watom, from Tonga (McKern 1929), and from the Sigatoka sand dunes in Fiji, thus establishing Lapita as an early and widespread culture in Melanesia and Western Polynesia (Kirch 1988a). Radiocarbon dating established this early period as being 1000 to 500 B.C. Until fairly recently it was thought that to be included in the Lapita cultural complex the pottery had to be dentate-stamped. Now, undecorated ceramics of similar technology and form are included when found with other items of Lapita material culture in the temporal and geographic range of Lapita-type occupations in the Pacific (Green 1979).

S. M. Mead pioneered the formal analysis of Lapita decoration in his study of pottery fragments recovered by Mr. and Mrs. L. Birks from two sites near Sigatoka, Fiji. Mead developed a systematic analysis of the content and organization of Yanuca decoration to provide a basis for comparing the Yanuca assemblage with other Lapita sites (Mead et al. 1975). Mead assumed that the decoration found on Lapita vessels was not applied haphazardly, but arranged in a systematic manner. He broke the decorative systems down into three parts: sets of techniques through which design elements can be given visual form, an inventory of design elements and units, and a set of design processes which may be expressed in the form of rules. (All three are susceptible to comparison for the purpose of inferring cultural relationships). He first considered pattern placement on the vessel, then identified the types of design fields into which it is consistently organized. He then identified the elements and motifs and a few process rules that described the organization of these units within zones on the sherds (Sharp 1988). Mead was not attempting to reflect a Lapita "concept" of decoration, or the order of application of designs. What he did was to develop a system that described the sherds at Yanuca (i.e., an "etic" system). This formal approach was expanded by the addition of motifs from assemblages on Viti Levu (Shaw in Donovan 1973), and from the Reef/Santa Cruz Islands (Donovan 1973). Sharp (1988) points out that Mead's analysis dealt mostly with motifs and zones, and their relationships of design. What Mead failed to do, although he thought it might be useful, was to analyze motif structure. Since then, there have been studies which have dealt with motif inventories rather than the structure of patterning described by process rules. Sharp (1988) mentions that the formal analysis done by Mead has not been applied at the motif level, and if variability in Lapita decoration lies in the design motifs, an assessment of this variability in terms of both content and structure is essential.

Because Gifford and Shutler saved everything recovered from their 1956 excavations on New Caledonia, I was able to re-examine and formally analyze the Lapita ceramic assemblage from site 13A. I concentrated on vessel morphology and decoration. Ever since Mead's analysis of the dentate-stamped assemblage from Viti Levu, Fiji, studies of Lapita ceramic decoration have looked to this as their model. Sharp (1988) points out that much of this work centers on the content-design motifs and motif inventories, rather than the structure of the decorations themselves. Because of this, identification, grouping, and comparison of design motifs rely on subjective analysis. Also, the potential of Mead's formal analysis remains unrealized. I intended to follow Sharp's method of extending Mead's study of zone patterning at the motif level in order to arrive at a basis for comparison of both content and structure in Lapita decorative systems. From this I hoped to develop a systematic, detailed analysis of the content and structure of design motif as well as vessel morphology. This would provide a basis for assessing similarities and differences in Lapita dentate-stamped assemblages across time and space. Such a comparison could provide crucial information for evaluating models of Lapita colonization, development, and interaction. Intra- and inter-regional networks, and their changes through time should be reflected in similarities within and among island groups in the content and structure of dentate-stamped decoration (Sharp 1988). Through all of this we may be able to reconstruct the life ways of these Lapita peoples and gain insights into how they changed, migrated, and eventually colonized much of the rest of the South Pacific.

Because of the limitations of the sample I was unable to use vessel morphology as a basis for comparison. Other elements, although also somewhat limited in representation did enable me to confirm Gifford's major thesis, namely that the sherds found at site 13A on New Caledonia are consistent with what we consider to be Lapita pottery.

Site 13A

Sites 13 and 13A are located on the beach on the Coral Sea side of the Foué Peninsula, 4-5 miles (c. 7 kilometers) from the town of Koné in New Caledonia. The sites are located on the northwest side of the island. They were given the name Lapita by E. W. Gifford in commemoration of the village which occupied the area when it was excavated in 1952. The two sites run along a strip of beach that extends approximately a quarter of a mile and is situated between the talus slope and shoreline. The width varies from 200-500 feet along the site. Gifford divided the sites as to their location on either the east or west side of a fence that ran from the talus slope to the shoreline. Site 13A, which was the richer of the two, included all of the quarter mile of exposed midden along the beach to the east of the fence. Gifford and Shutler dug 55 6-inch blocks, comprising 495 cubic feet of deposit. They excavated collection units at 6-inch (15.2 cm) arbitrary levels. They do note, however, that dark midden material was about 15" deep, below which was beach debris which contained artifacts to a depth of 42". Site 13A yielded a total of 1,335 ounces of excavated sherds (Gifford and Shutler 1956).

The Sample

My sample consisted entirely of ceramic sherds collected by Gifford and Shutler from site 13A. They were all diagnostic sherds, i.e., all of them either had decoration, or if plain were parts of rims, lips, bases, or handles. Their sizes ranged from 1/8 inch rims to 3 inch by 3 inch body sherds. These sherds were collected from four of thirteen grids; all levels were examined

from each grid; i.e., all and only diagnostic sherds within a grid were included. I examined grids A14-B14, A1-B1, C1-D1, and C4-D4. This sample consisted of 327 catalog numbers which totaled 544 sherds.

Methods

I chose the grids situated at the extreme cardinal points of the site, hoping that they would offer the most comprehensive coverage given the time constraints for the investigation. The protocol was designed to allow for comparison with the work of prior researchers, including Mead (1975), Donovan (1973), and Kirch (1988b). It was done in cooperation with fellow students Elizabeth Manning, Tim Plowman, and Jody Johnson, who were working on similar ceramic assemblages from New Caledonia.

My analysis was carried out using a protocol which categorized the sherds according to technology and usage while placing them in space and time (the protocol was a variant of that given in Appendix B). In order to analyze the sherds I classified them according to the following categories: grid unit, level, surface condition, residue, sherd form, vessel form, primary method of decoration, secondary form of decoration, temper type, basic rim form, rim thickening, rim thickening position, lip form, rim diameter, lip thickness, maximum rim thickness, surface treatment, decoration position, design zone, zone marker, and motif. For each sherd all this information was recorded on data sheets. In addition I sketched all sherds which contained some form of design. (Although I agreed with most of Gifford and Shutler's classification, I found it necessary to reclassify all sherds which he called "incised" as dentate stamped; perhaps this was only a question of semantics.)

Results

Levels

The most important observation about distribution by level is the high concentration of sherds at the upper levels of the site (Table 1). There is a one-to-one ratio of frequency of occurrence and level. Of the seven levels where sherds were found, 89% were found in the top three levels. The levels were divided at 6-inch intervals (0-6", 6-12", etc.). Table 1 shows the distribution by level of all sherds. Table 2 shows the distribution of primary decoration method at all levels. Table 3 shows primary motif by level. The distribution of all sherds at the first three levels is 46%, 28%, and 15% respectively. The distribution at lower levels drops off sharply after level 3; levels 4-7 comprise only 11% of the total sample.

The major conclusions concerning level are (1) that there is a much higher concentration of sherds at the upper levels of the site; (2) that there is no significant change in technology among the levels (i.e., in decoration, temper, size, etc.); and, (3) that there are no gaps between levels. What is the implication of higher sherd concentrations at the upper levels? Obviously, there was greater usage of the site at those levels, which could mean increased population over time through internal growth or immigration of new people. Or it could simply mean increased use by a constant population due to new uses of the site. The fact that there are no gaps in sherd occurrence between levels suggests that the site was continuously occupied. That there was no apparent change in technology appears to rule out the likelihood of an intrusive population,

Table 1
Sherd Temper by Level, Site 13A

Temper Type	0-6"	6-12"	12-18"	18-24"	24-30"	30-36"	36-42"	Total
Calcareous Sand	167	113	55	27	6	4	1	373
Black/Dark Minerals	30	12	5	5	2	2	2	58
Translucent/Light Minerals (quartz)	45	23	16	4	3		3	94
Shell Fragments								
Olivine Sand	1		1		1			3
Lithic Fragments	7	4	3					14
Mica								
Grog	1	1						2
Total	**251**	**153**	**80**	**36**	**12**	**6**	**6**	**544**

Table 2
Primary Ceramic Decoration Method, Site 13A

Decoration Type	0-6"	6-12"	12-18"	18-24"	24-30"	30-36"	Total
Incised	11	10	1	2	0	1	25
Dentate-stamped	174	108	60	30	9	4	385
Parallel Paddle Impressed	22	4	5	1	1		33
Shellrocker Impressed	13	8	4	1			26
Notched	7	6	3	1	1		18
Endtool Impressed	1	1					2
Combed	1						1
Shell Impressed		1					1
Total	**229**	**138**	**73**	**35**	**11**	**5**	**491**

unless it would have been a group from a similar culture, which is possible. There are then these additional possibilities: that population simply increased by natural growth; or that, for whatever reason, a constant population used the site with increasing frequency over time. To conclude definitively what is implied by these observations will require additional comparisons with other analysis done on related subjects as well as on other sites.

Methods of Decoration

Of all the categories analyzed, method of decoration was most significant for this site (Table 2). It had the largest number of samples and richest distribution (aside from temper, which represented the total sample). The great majority (491 of 544) of sherds carry some form of decoration. Each sherd bears only one method of decoration; there were none with secondary methods of decoration. Eight decoration methods are found in the sample: (1) incised, (2) dentate-stamped, (3) parallel-paddle impressed, (4) shell-rocker impressed, (5) notching, (6) end-tool impressed, (7) combed, and (8) shell impressed. They largely occur on the body of the

Table 3
Primary Decorative Motif by Level, Site 13A

Motif Number	0-6"	6-12"	12-18"	18-24"	24-30"	30-36"	Motif Total	Sherd Total
001.1	2		1				3	3
001.4	1						1	4
002.1	1			1			2	2
002.2	1						1	1
002.7	1		1				2	5
008.1	1						1	1
008.3		1					1	1
008.4	1	1		1	1		4	4
008.5			3				3	3
008.6	1						1	10
010.1		1	1				2	2
010.3			1				1	3
019.1	3				1		4	4
024.1	2						2	2
024.3	1	1					2	2
024.4		1					1	1
024.5	2						2	7
028.1	2	1	1				4	4
028.2	5	5			2		12	12
028.3		1					1	17
036.1		1					1	1
036.2		1		1			2	3
045.1	1	1					2	2
076.1		1					1	1
077.1	2	3			1		6	6
077.4	2	1		2			5	11
082.1	1						1	1
097.1		1					1	1
099.1	3	3	1	1		1	9	9
Total	**33**	**24**	**9**	**6**	**5**	**1**		**78**

vessel, and rarely on the base, rim, lip, and even on the inside of the lip. Of all the decoration types dentate-stamped is by far the most frequent at every level, followed by parallel-paddle impressed, shell-rocker impressed, and incised, which occur at much lower frequencies. It is interesting to note that decoration occurs in significant numbers at all levels, although much less

frequently at the lower ones: 46% at level 1, 28% at level 2, 15% at level 3, 8% at level 4, 2% at level 5, and 1% at level 6.

The most significant conclusions concerning methods of decoration are the consistency of methods through all levels and the predominance of dentate stamped pottery. This corresponds to the findings of Mead et al. (1975) and Donovan (1973). In the Lapita tradition the consistency of techniques at all levels suggests a continuous growth rate and a "functional balance rather than intrusion" (Donovan 1973). In addition, the decoration methods and design elements found in this sample comprise a subset of those described by both Mead and Donovan. Also, there were no new findings in these categories which are outside the set they described. For these reasons it seems logical to conclude that the decoration methods found at this site correspond closely to those at other Lapita sites.

Motifs

There were indications of motifs on all sherds with design elements (Table 3). However, due to the small size of the sherds it was difficult to determine the nature of the motifs, or to correlate them with any of the motifs described by Mead et al. (1975) and Donovan (1973). As a result the sample of motifs eligible for analysis is very small (78 of 491 sherds with design elements). As mentioned above, the distribution by level of motifs corresponds closely to the total distribution of the sherds, viz., they are concentrated at the upper levels: levels 1 through 3 = 85%. More than half of sherds with motifs display a single motif (49 of 78); the rest have at least one secondary motif. The distribution of primary motifs by level appears to be uniform, ranging from 1 to 12 at any particular level. As opposed to the occurrence of motifs in general, the distribution of particular motifs by level seems almost random. Although the sample is small, a few motifs do appear more often than others (motif numbers 028.3 = 17, 028.2 = 12, 008.6 = 10, 099.1 = 9). Thereafter, the numbers become inconsequential.

Given the small sample size it would be difficult to make even tentative conclusions concerning motif. The best that can be said is that all of the motifs found and their distribution pattern correspond to and comprise a subset of those described by Donovan (1973) for the Lapita sites of the Reef/Santa Cruz Islands.

Temper

Three temper types predominate at all levels (Table 1). They are calcareous sand, dark minerals, and light minerals (quartz). Of these, calcareous sand, most likely of local provenance, occurs most frequently (68%), followed by light minerals (17%), and by dark minerals (11%). The remaining types account for a mere 4% of the total. The relative proportions for all types remain more or less constant at all levels.

Temper is consistent through all levels and is probably all of local origin. This suggests that from earliest times the pottery was manufactured locally and that it is unlikely that there were important intrusive influences on it. The extremely few examples of non-calcareous tempers may suggest experimentation, or that a few pots were imported to the site from elsewhere.

Vessel Form/Sherd Form

The great majority of sherd forms in this sample were body sherds, with a small representation of rims, lips, handles, and bases. I also found a few examples of carinated sherds. Most of the sherds were very small, ranging from 1/8 inch to 3/8 inch, with the bulk clustering about 1 inch in diameter. There were no intact vessels.

To indicate vessel form one needs sherds of rims, carinations, or the like. Body sherds by themselves are usually inadequate to indicate vessel form. Unfortunately, most of the sherds examined were body sherds, and those which could be called diagnostic for this purpose were very sparse and small in size. There is even doubt that all of these were, in fact, appropriate for diagnostic purposes. The sample is therefore small (76 pieces). The bulk of the sample, consistent with other protocol categories, occurred at the upper levels.

In general, keeping in mind the above limitations, the ware appeared to be very fine: thin walled, light weight, fine tempers. They seem to carry the lines of smaller bowls and somewhat larger carinated vessels. There may also be a few sherds from collared bowls, flat bottom dishes, open-mouthed jars, constricted jars, and perhaps some larger bowls. But these all occur in low frequencies; to say more would be overly speculative.

Since the number of sherd forms considered diagnostic for the purpose of determining vessel form was so small, as was the size of individual sherds, any conclusions about vessel form must, once again, be tentative. Therefore it is not really possible to make correlations between vessel form and other categories such as motif and design elements. Similarly, it is not possible to correlate vessel form and use. For these reasons it is difficult to use vessel form as a precise correlate to forms found at other Lapita sites, although there are suggestions (carinations, rim forms) that they are in fact related, and nothing to indicate that they are not.

Surface Condition/Residue/Surface Treatment

The surface condition of the sherds was almost uniformly neither waterworn nor eroded, nor were any concretions present. Similarly, there was no trace of residue on any of the sherds. There were no burn marks inside or out, nor any trace of usage inside or out.

Almost all sherds showed some sign of surface treatment. These included use of slip, burnishing, paddle impressing, wiping, and indeterminate methods. No resin, or other glazing method was found. Of these methods, wiping and use of slip were overwhelmingly the most common. The others were only infrequently observed. I only noted methods which left visible signs of treatment. The original manufacture may have included the other techniques, but it would take special methods to make such a determination.

The surface condition strongly suggests that the site had never been disturbed nor uncovered after the period of occupation. Lack of any residue strongly indicates that the pottery was not used for cooking, and that the site may not have been domestic, but could have been used for special purposes (i.e., ceremonial, storage, meeting?). The only real link to other Lapita sites is the use of slip, which seems to be common throughout Lapita assemblages.

Rims and Lips

Aside from helping to determine vessel form (however speculatively), data on rims and lips was extremely sparse. Information in this category includes basic rim form, rim thickening, rim thickening position, lip form, rim diameter, lip thickness, and maximum rim thickness.

Rim forms: the sample contained a mixture of vertical, inverted, and everted forms, all of which had been attached to small vessels.

Rim thickening: for the most part there was no thickening; the rims, interior and exterior, were parallel.

Lip form: the great majority was flat, with the occasional beveled lip, and an occasional grooved one.

Rim diameter: the sherds were too small to make a realistic inference.

Lip thickness ranged from 5-10 mm, most of them in the 5-7 mm range, with an occasional larger one. There were too few to make significant judgments.

Maximum rim thickness was consistent with lip thickness.

Decoration Position/Design Zone/Zone Marker

Decoration position is exterior on all but two sherds: one on which the decoration wraps around the lip, and one which has decoration on the base. On all examples the decoration position extends from just below the rim down to some indeterminate point in the body of the vessel. Only rarely in this sample does it exceed these limits. Design Zone Markers are overwhelmingly types GZ and RZ and combinations of these (Mead et al. 1975). Design Zones are restricted to types A1 and A2, i.e., those which fall between the above zone markers. The important issues are that decoration position is almost exclusively exterior and that design zones and zone markers are a subset of those found by Mead et al. (1975). It appears, therefore, that all these elements precisely correspond to those found on other Lapita sites.

Conclusions

Although the name "Lapita" derives from a village located near site 13, the question arises whether the material culture subsumed under that name is, in fact, a unified cultural complex. To that end I investigated the ceramics of site 13A. The inferences that I drew from my sample led me to the conclusion that ceramic evidence from this site does indeed corroborate the results of Mead et al. (1975), Donovan (1973), Green (1979), and others that we are dealing with a single cultural complex.

This is certainly one of the older sites as confirmed by radiocarbon dating (Gifford and Shutler 1956), probably dating to around 1000 B.C. Another interesting aspect of site 13A is that the pottery appears virtually unchanged throughout all levels, and that through the most recent levels there was no deterioration of technology. In addition, the ware seems to have been manufactured locally through all levels with no apparent disruptions in the form of trade, immigration, or other intrusions. Also consistent with its age is the fineness of the pottery

compared to the coarser, heavier quality of more recent sites. The predominance of dentate stamping also confirms the site as an early one.

Evidence that this site is part of a larger Lapita cultural complex can be seen in the correspondences to sites on other islands of the various facets of ceramic structure: methods of decoration, design elements, motifs, temper, decoration position, design zones, and zone markers. Areas where strong positive evidence is lacking, but no counter information can be adduced include: vessel form, sherd form, surface condition, residue, and surface treatment (apart from the use of slip), rims, and lips.

This investigation only dealt with ceramics from a particular site. It is evident that to definitively establish that this site is part of a larger, unified cultural complex will require confirmation from other sites on New Caledonia and other islands, as well as results drawn from data collected from other aspects of material culture including lithics, faunal materials, sediment and shell analysis, and the study of ceramic technology and manufacture. Hopefully, this study of ceramics can be a useful link in this pursuit.