Re-Evaluating the Flaked Stone Artifacts from Lapita Sites 13 and 13A

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This report presents an analysis of the lithic artifacts collected from sites 13 and 13A by Gifford and Shutler in 1952. The analysis of lithics from the type site of Lapita may come as a surprise to some because the history of the Lapita site is one of ceramics not lithics. Beginning with Gifford and Shutler, there has been an overwhelming emphasis on ceramics when examining Lapita sites. In much current work, this ceramic-centric view of Lapita material culture is still evident (e.g., Frimigacci 1975; Galipaud 1988). The result today is a rich record of Lapita ceramics (Green 1979), but a poor one of other aspects of Lapita material culture. This is not to say that Lapita ceramics are not important, but that they should not be the only aspect of Lapita to be studied.

Thanks to Gifford's meticulous field and museum methodology, the flaked stone artifacts from sites 13 and 13A were curated in the P. A. Hearst Museum of Anthropology. This report concentrates on the function and technology of the sites 13 and 13A flaked stone artifacts with a consideration of them through space and time. After describing the site and my methodology, I will address the research goals by way of three particular aspects of the Lapita lithic sample: stratigraphic distribution, color of raw material, and flake attributes (both quantitative and qualitative).

Sites 13 and 13A

Sites 13 and 13A run along a strip of beach that extends <0.5 km and is situated between the inland talus slope and the shoreline. Gifford and Shutler 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. In each of these sites, 3 by 6 foot collection units were excavated in 6-inch arbitrary levels. In all there were 55 of these 6-inch "blocks" excavated, yielding 495 cubic feet of deposit (Gifford and Shutler 1956:7).

Gifford and Shutler paid much greater attention to site 13A than to site 13, including more collection units over a greater distance. They give the reason for this unequal attention in their site report when they state that "almost ten times as many (ceramic) sherds were excavated at location A as at the western end (site 13)" (1956:7). Before excavating the designated collection units, Gifford and Shutler also made a surface collection of the two sites. The problem I encountered with this is that in the catalog of New Caledonia artifacts, the artifacts collected during the surface collection are recorded simply as a combined "13 and 13A surface collection" (cat. no. 19548). Recording the two sites under one catalog number makes it impossible to determine the original provenience of the artifacts collected and thus my reasoning for making the surface collection a third and separate category for analysis.

Also important in reassessing the excavations at the Lapita site are the various screen sizes Gifford and Shutler used. While excavating at sites 13 and 13A Gifford and Shutler alter-

nated between a 1/4" (6.4 mm) screen and a 1/2" (12.8 mm) screen. In the end, the 1/2" screen was used more often as indicated by entire days where the 1/4" screen was abandoned (Gifford and Shutler MS [1952]:65). The implications are important because screen size affects the size of the artifacts collected (and thus the size of the artifacts I analyzed). In the case of site 26, it is known that 1/16" (1.6 mm) screens were used, and extremely small artifacts such as lithic shatter were collected and brought back for analysis. What is important to my analysis of the Lapita lithics is that according to their field notes, Gifford and Shutler used the larger screen sizes not simply as a standard sampling strategy but because they were not finding any smaller artifacts during excavation. In certain units such as A1-2, level 1 (0-6"), both 1/4" and 1/2" screens were used simultaneously and the results were able to be compared. Concerning this unit, Gifford and Shutler note in their fieldnotes that they were "using both screens, but [retrieving] nothing from [the] 1/4 [inch] screen" (Gifford and Shutler MS [1952]:64). Obviously the screen size used during excavation affected the artifact sample collected, but in Gifford and Shutler's excavations of New Caledonia the nature of the artifacts being collected did play an important role on the sampling strategy used.

The Sample

I examined a 100% sample of the lithics collected from excavated sites 13, 13A, consisting of 283 individual pieces. The sample consists predominantly of flakes and cores with only a few exceptions labeled as "not determined." There is no shatter in the sample whatsoever (see screen size discussion). Of the flakes and cores in the sample, the majority are flakes. The average length of the flakes is approximately 30 mm and their average weight approximately 7 g. The vast majority of the Lapita lithics are a red-brown chert with only three pieces being of materials other than chert (obsidian, quartzite, and rock crystal). When referring to the total sample from all three localities (13, 13A, and surface collection), I will simply say "Lapita site lithics."

Methods

Consistent with Gifford and Shutler's field collection strategy, I have divided the Lapita site lithics into three basic groups: site 13, site 13A, and the combined surface collection. Of these three groups the majority of lithics collected came from 13A (surface, N = 10; site 13, N = 13; site 13A, N = 260). Due to the sporadic nature of the surface collection and the lesser amount of excavation at site 13, I concentrate on the lithics of site 13A.

Lithic attributes were defined following Crabtree (1972). I separated the specimens into four groups: diagnostic flakes, non-diagnostic flakes, shatter, and cores. Diagnostic flakes were defined minimally as having a bulb of percussion and striking platform. Non-diagnostic flakes had the general morphology of a diagnostic flake but contained less than two of the diagnostic attributes. Cores were defined as specimens having one or more flakes taken from it. Shatter was defined as the amorphous small chips which result in the action of flaking a core. As stated earlier, no shatter was found in the Lapita lithics, but the category was recognized during analysis.

Departing from Gifford and Shutler's methodology, no formal tool groups were assigned during this analysis. In Gifford and Shutler's analysis the lithics were divided into two groups. Group 1 was characterized by specimens which showed "definite, though slight, modification for use" (Gifford and Shutler 1956:67). The second group comprised unclassified flakes and cores of which some showed modification but no retouching (1956:67). Group 1 contained various different formal tool types such as scraper-hammer stones, end and side scrapers, gravers, choppers, and others (1956:67). Group 2 had no such sub-divisions. In the analysis made here, this two group system is abandoned and the sample is treated as one single group. Retouched or other modification was recorded for each specimen.

The protocol used for the analysis of the Lapita lithics was developed in cooperation with David Price who reanalyzed the lithics collected from site 26 (see Price, this volume). Our protocol was influenced by other recent lithic analyses made in the Oceanic region (e.g., McCoy 1982; Cleghorn 1986). Using the same protocols for site 26 and site 13 lithics allows for intra-site comparisons. The purpose of our protocol was to standardize observations regarding the function and technology of the lithics. It concentrates on both quantitative and qualitative aspects of the lithics. The observations that were emphasized here are those of color (Munsell), specimen type following Crabtree (1972), morphology following Cleghorn (1986), metrical attributes, use-wear, and retouch. Information for each artifact was recorded on a data sheet and in the case of the Lapita sites, each lithic was also drawn.

Results

Stratigraphic Distribution

The most apparent spatial pattern to emerge from my data analysis is the high concentration of lithics in the upper levels of the sites. Of the eight levels present in the excavation, 91.8% of the lithics are found above level 3 (12-18"). Tables 1 and 2 show the distribution of diagnostic flakes, non-diagnostic flakes, and cores throughout all excavation levels; distribution by unit is shown in Table 3. The distribution of diagnostic and non-diagnostic flakes is concentrated in level 1 (0-6"). Of the 232 flakes examined, 152 are found within this level alone. The next concentration is in level 2 (6-12") with 40 flakes. The deeper levels contain far fewer lithics with only one diagnostic flake found in level 6 (30-36"), while levels 7 and 8 (30-48") are completely devoid of lithic artifacts in both sites. The only anomaly in this pattern is in level 5 (24-30") of site 13 which has eight diagnostic flakes. This anomaly may set site 13 apart from site 13A, but one must remember that only 12 flakes were collected from site 13. As of now, the pattern created by the 213 lithic flakes of site 13A is of greater importance.

The pattern of level distribution present in the lithic flakes of the Lapita site is also present in the cores. Like the flakes, the cores are also concentrated in the upper levels, but in this case the abundance of level 1 lithics is even more extreme. Of the 50 cores collected, 46 of them are from site 13A, and of those 36 come from level 1. This means that 78% of site 13A cores come from level 1 alone. Some 96% of the cores come from the top two levels and surface (0-12"). There are only two cores found below level 2 and none below level 5.

Table 1
Distribution of Flakes by Level, Sites 13 and 13A

Level (inches)	Site 13		Site 13A		Surface		Total
	Diagnostic	Non-diagnostic	Diagnostic	Non-diagnostic	Diagnostic	Non-diagnostic	
Surface			4	8	5	2	19
0-6	1	1	79	71			152
6-12	1	1	28	10			40
12-18			5	4			9
18-24			2	1			3
24-30	8						8
30-36			1				1
36-42							0
42-48							0
Total	**10**	**2**	**119**	**94**	**5**	**2**	**232**

Table 2
Distribution of Cores by Level, Sites 13 and 13A

Level (inches)	Site 13	Site 13A	Surface	Total
Surface		5	3	8
0-6		36		36
6-12		4		4
12-18				0
18-24		1		1
24-30	1			1
30-36				0
36-42				0
42-48				0
Total	**1**	**46**	**3**	**50**

Munsell Color

Color was used to indicate the range of variation in material, which may then correlate with variation in source. With the Lapita lithics it is immediately noticeable that there is a uniformity to their color. The majority of the sample could be loosely termed as red-brown. The color of the artifacts was determined by use of the *Munsell Soil Color Charts* (1988). By matching the artifacts to carefully controlled color plates, a color description is obtained.

Table 3
Distribution of Lithics by Unit, Sites 13 and 13A

Site/Unit	Diagnostic Flakes	Non-Diagnostic Flakes	Cores	Non-Det.	Total
Site 13					
A1-2/B1-2	1	1			2
C1-2/D1-2	9	1	1		11
Talus Slope					
Total	**10**	**2**	**1**	**0**	**13**
Site 13A					
A1-2/B1-2	13	6	1		20
A2-3/B2-3	14	10	4		28
A3-4/B3-4	24	15	8		47
A4-5/B4-5	18	22	7		47
A11-12/B11-12	14	14	12	2	42
A12-13/B12-13	14	8	4		26
A13-14/B13-14	13	10	4	1	28
C1-2/D1-2	4	1			5
Talus Slope	4	8	5		17
Beach Front					0
Total	**118**	**94**	**45**	**3**	**260**
Sites 13 & 13A					
Surface	5	2	3		10
Grand Total	**132**	**99**	**49**	**3**	**283**

The Lapita site lithics show great uniformity in their color. The three most abundant categories are dark reddish-brown, very dusky-red, and dusky-red. This applies to all three sites even though the distinction is not as great in site 13 and the surface collection. What is noticeable is the lack of variation in the two smaller sample categories. It seems that the abundant categories of site 13A are the only categories in site 13 and the surface collection. As for site 13A, there seems to be substantial variation in the Munsell colors (20 different kinds), but there is a sharp distinction between the three "abundant" categories and the rest. Of the 260 lithics collected from site 13A, 205 (79%) are from the three groups (dark reddish-brown, very dusky-red, and dusky-red). Adding site 13 and the surface collection gives the same percentage.

The Lithic Assemblage

When the sample is viewed as a whole, one immediately notices that the majority consists of flakes. To be precise, 81.9% of the sample are flakes. It is also noticeable that there are no extremely small flakes or shatter (see screen size discussion) which contrasts with site 26. After the qualitative analysis, only three of the 283 artifacts examined were judged to be "not

Table 4
Flake Morphology, Sites 13 and 13A

Attributes	Site 13		Site 13A		Surface		Total
	Diagnostic	Non-diagnostic	Diagnostic	Non-diagnostic	Diagnostic	Non-diagnostic	
Flake morphology							
Not determined		1	1	56		2	60
Irregular	2		15	6			23
Convergent	2	1	18	6	2		29
Divergent	2		57	11	2		72
Parallel	4		30	13	1		48
Sub-parallel							
Termination							
Not determined	0	2	1	62	1	2	68
Feather	1		26	3			30
Hinge	5		34	6	3		48
Snap	3		57	19	1		80
Multiple	1		3	2			6

determined" (see Table 3). The sample seems to consist predominantly of flaked stone artifacts that could be termed as "usable."

The qualitative analysis emphasized five main attributes of the flakes: morphology, termination, amount of cortex, edge-damage, and retouch. Table 4 presents the results of the analysis of flake morphology and termination. The majority of the flakes examined were either divergent in morphology with a snap termination or "not determined." The reason for such a high amount of "not determined" flakes is because if a non-diagnostic flake could not be positively oriented, then it was counted as "not determined" in morphology and termination. The variation between the categories is not too extreme. Parallel and hinge termination flakes are also relatively abundant in the sample (20%) although not as much as the divergent and snap termination flakes mentioned earlier (31.0% and 34.5%, respectively).

Next cortex, edge-damage, and retouch were recorded. The majority of the flakes examined had no cortex (see Tables 5 and 6). Some 159 (68.5%) of the 232 flakes were in the "absent" category. The flakes that did have cortex tended to be evenly varied as to the amount and location of it. Of the flakes with cortex, the majority had it located only on the dorsal side. As for the edge-damage and retouch, more interesting patterns surfaced (see Tables 7 and 8). Some 53% of the sample showed some kind of edge-damage. This high percentage suggests that the flakes were not only "usable," they were used. Of the flakes with edge-damage, 69.9% of them were diagnostic. In contrast to the edge-damage results, only 16 were determined to have retouch. This makes for only 6.8% of the entire sample and 13% of the flakes with edge-damage.

Table 5
Presence of Cortex on Flakes, Sites 13 and 13A

Cortex (%)	Site 13		Site 13A		Surface		Total
	Diagnostic	Non-diagnostic	Diagnostic	Non-diagnostic	Diagnostic	Non-diagnostic	
Not Determined				17			17
0-25			5	8	1		14
25-50			4	7	1	1	13
50-75	2	1	4	4			11
75-100			16	2			18
Absent	8	1	88	58	3	1	159

Table 6
Location of Cortex on Flakes, Sites 13 and 13A

Location of Cortex	Site 13		Site 13A		Surface		Total
	Diagnostic	Non-diagnostic	Diagnostic	Non-diagnostic	Diagnostic	Non-diagnostic	
Not Determined	8	1	90	75	3	1	178
Platform	0	0	4	6	2	0	12
Dorsal	2	0	15	12	0	1	30
Platform & Dorsal	0	1	9	2	0	0	12

Like the edge-damaged flakes, the few flakes which had retouch were predominantly diagnostic (81.2%).

The quantitative analysis concentrated on seven metrical attributes of each artifact: length, axial length, width, thickness, weight, and striking platform width and thickness when applicable (see Tables 9-11). Even though the sample size of site 13A is considerably larger than the other two, the averages of the metric attributes are fairly consistent throughout the entire sample. The only significant variation is in the core sizes between site 13 and the surface collection. The cores on the surface are larger. The average length of the diagnostic flakes from site 13A is 30.53 $\pm$ 10.51 mm (this is about the length of the top half of one's thumb). Their average width is 26.18 $\pm$ 8.67 mm and their weight 6.84 $\pm$ 6.28 g. All in all, the flakes are of a size that one could easily fit in one's hand.

Discussion

Stratigraphic Distribution

Whereas the ceramic artifacts of the Lapita sites are found at all levels (Gifford and Shutler 1956:75), the flaked stone artifacts are found only in certain ones. This raises important

Table 7
Flakes with Edge-Damage, Sites 13 and 13A

Level (inches)	Site 13		Site 13A		Surface		Total
	Diagnostic	Non-diagnostic	Diagnostic	Non-diagnostic	Diagnostic	Non-diagnostic	
surface			2	3	5	1	11
0-6			54	26			80
6-12	1	1	18	3			23
12-18			3	1			4
18-24			1				1
24-30	3						3
30-36			1				1
36-42							
42-48							
Total	**4**	**1**	**79**	**33**	**5**	**1**	**123**

Table 8
Retouched Flakes, Sites 13 and 13A

Level (inches)	Site 13		Site 13A		Surface		Total
	Diagnostic	Non-diagnostic	Diagnostic	Non-diagnostic	Diagnostic	Non-diagnostic	
surface					1		1
0-6			7	3			10
6-12	1		3				4
12-18			1				1
18-24							
24-30							
30-36							
36-42							
42-48							
Total	**1**		**11**	**3**	**1**		**16**

questions concerning the nature of the site. Does the high concentration of lithics in the upper levels of the site indicate a change in the nature of occupation or activities carried out at the site? Was there continuous occupation at the Lapita sites? These are difficult questions to answer and they can not be answered solely with an analysis of flaked stone artifacts. Gifford and Shutler make no reference to the chronological distribution of the flaked stone artifacts collected (1956:66-69). Their report seems to be much more concerned with the sample's comparison to other assemblages of the Pacific (e.g., Tasmania and Australia) rather than trends seen within each site. What they do mention is the change in soil within site 13A (1956:7). Commenting on the natural stratigraphy of the site rather than the 6-inch arbitrary levels, Gifford and Shutler note

Table 9
Flake and Core Measurements, Site 13

Metrical Attributes (mm)	Diagnostic Flakes	Non-Diagnostic Flakes	Cores
Length	32.9 ± 9.92	23.0 ± 12.7	20.2 ± 0
Axial Length	31.2 ± 10.4	23.0 ± 12.7	20.2 ± 0
Width	30.4 ± 7.79	17.7 ± 11.7	11.1 ± 0
Thickness	8.41 ± 3.46	11.8 ± 6.30	10.8 ± 0
Weight (g)	7.66 ± 6.42	8.25 ± 10.3	4.20 ± 0
Striking Platform Width	14.2 ± 6.44		
Striking Platform Thickness	4.51 ± 2.70		

Table 10
Flake and Core Measurements, Site 13A

Metrical Attributes (mm)	Diagnostic Flakes	Non-Diagnostic Flakes	Cores
Length	30.5 ± 10.5	29.1 ± 8.44	42.4 ± 13.6
Axial Length	29.0 ± 9.88	29.3 ± 8.99	44.0 ± 13.0
Width	26.2 ± 0.00	20.6 ± 4.27	31.2 ± 8.45
Thickness	8.34 ± 3.85	9.60 ± 4.18	21.4 ± 8.27
Weight (g)	6.84 ± 7.08	6.84 ± 6.28	37.3 ± 33.9
Striking Platform Width	12.6 ± 6.61	11.7 ± 4.58	
Striking Platform Thickness	5.79 ± 4.14	5.95 ± 3.65	

Table 11
Flake and Core Measurements, Surface Collection

Metrical Attributes (mm)	Diagnostic Flakes	Non-Diagnostic Flakes	Cores
Length	31.7 ± 8.64	27.9 ± 1.56	53.5 ± 12.3
Axial Length	25.2 ± 7.73	27.9 ± 1.56	53.5 ± 12.3
Width	30.3 ± 7.77	23.0 ± 2.90	40.7 ± 12.6
Thickness	11.3 ± 5.73	13.2 ± 4.67	22.9 ± 10.2
Weight (g)	7.96 ± 6.71	6.30 ± 3.82	70.1 ± 61.5
Striking Platform Width	11.2 ± 13.1		
Striking Platform Thickness	6.80 ± 7.50		

that there is a layer of dark midden soil which runs along the site to a depth of about 15". This dark midden corresponds with levels 1 and 2 (0-12") of the arbitrary levels which contain the majority of the flaked stone artifacts. It should also be mentioned that nowhere in site 13A did Gifford and Shutler excavate less than 30" (76.2 cm) deep. So in this case the depth of the units should not have an effect on the large concentration of lithic artifacts in the upper levels. As for the molluskan remains, Gifford and Shutler note that the heaviest concentration of species were found in level 5 (24-30"). Here, Gifford is specifically referring to site 13, unit C1-2/D1-2 and not to site 13A. A radiocarbon date of ca. 2600 B.P. was determined for this unit. When the Lapita site lithic sample is examined as a whole, the molluskan concentration does not coincide with the lithic concentration. Apparently two different processes occurred between site 13 and 13A and the two should be treated separately.

Munsell Color

The color of the lithic material can be interpreted as a uniformity of origin. As stated before, the Lapita lithic sample is entirely chert with the exception of only three pieces. It is known that chert can be found throughout New Caledonia. It was first thought that the Lapita lithic sample could be phtanite which is a micro-crystalline silica groundmass that, like chert, can be found throughout the island. Its color ranges from pale white to gray to black with rod-like structures often tinted yellow-red-violet. The soils developed around phtanite are characteristically red. It was the emphasis on red which led us to believe that the red-brown artifacts of the Lapita site lithic sample were possibly phtanite. Upon close inspection, I feel that the Lapita lithics are indeed chert and not phtanite. According to Routhier (1953), the thin section of phtanite has the appearance of a very fine-grained to fine-grained quartzite. The flaked stone artifacts from the Lapita sites do not have this appearance.

The Lapita lithics probably come from one of the local chert sources. On present evidence, there is no reason to believe it was transported from any great distance. There is too much of it naturally occurring in the vicinity. Even if two different formation processes are occurring between sites 13 and 13A, they both are supplied by the same material from the same source. The inter-site variation between site 13 and 26 deserves more study in the future. It has been mentioned that site 26 has an abundance of lithic artifacts which fall under the dusky-red category. This would suggest that it was supplied as well by the same source as sites 13 and 13A.

The Lithic Assemblage

The lithics from of sites 13 and 13A tell us something about Lapita lithic technology and also perhaps why debitage has not been a major focus in Pacific archaeology. The Lapita lithic flakes have a low percentage of retouch and an even lower percentage of formalized tool types. Perhaps this is what has led many archaeologists to be disappointed with Lapita flaked stone assemblages and to deny them much attention. What is remarkable about the site 13 and 13A flakes is that, in contrast to the low amount of retouch on the flakes, there is a high amount of edge-damage. This means that even if the Lapita people were not retouching their stone tools, they still were using them. Stone tools were obviously important to the Lapita people and much can be learned about them through the study of stone tools.

The large number of flakes in the assemblage with no cortex suggests that the most commonly used flakes were interior ones. This is supported as well by the high percentage of diagnostic flakes. Although the Lapita people were not retouching their flakes to make formal stone tools, they were apparently selecting a certain type of flake. This was a flake that could be held in the hand and with some kind of usable edge for cutting, scraping, or chopping. The tools were probably made simply by direct percussion flaking and then choosing the flakes which seemed most suitable for the job desired. Apparently there was no need for any retouched formal tools requiring more time-consuming preparation.

The Lapita flaked stone artifacts were probably used for similar cutting and scraping functions, much like volcanic glass found in Hawaii (Schousboe et al. 1993; Weisler 1990:20), similar to what Gifford and Shutler termed as group 1 artifact type sub-divisions. As far as this analysis can tell, the function and technology of the flakes from sites 13 and 13A were similar and no differences were found. In this respect, the two sites are linked.

Conclusions

Studying Lapita lithics is no easy task, and this analysis has only begun to address that question. Hopefully, we can begin to think about Lapita lithics and their role in the Lapita archaeological record; Lapita should not automatically mean ceramics. In this analysis we have seen that there are no heavily-utilized tools in the sites 13 and 13A flaked stone sample. There are distinct patterns in the Lapita site lithic sample and they can be seen in some of the various attributes studied here. In stratigraphic distribution, the majority of site 13A lithics are found in the upper levels (0-12") while in site 13 the majority are found in level 5 (24-30"). The entire sample (13 and 13A) shows great uniformity in material type and color, and can probably be traced to a single local chert source. The quantitative and qualitative attributes of the flakes that were analyzed also show a unity between sites 13 and 13A. These attributes provide information concerning the technology and function of the flakes. Simply because the Lapita site flakes were not retouched does not mean they were not used. We can infer that they were used as some kind of hand-held scraper or simple cutting tool. Questions concerning the exact relationship between sites 13, 13A, and other New Caledonian sites excavated by Gifford and Shutler in 1952, are yet to be answered. This can only be done by a consideration of all of the elements of each site, not just the lithics. But the lithics can provide some important clues and should not be excluded. By re-analyzing the lithics from the Lapita site I have provided some data to be compared to other Lapita sites and perhaps our picture of Lapita material culture can become a clearer one.