STONE TOOLS IN SECONDARY REFUSE: LITHICS FROM A LATE PRECLASSIC CHULTUN AT CUELLO, BELIZE

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IA. Introduction: The Cuello Chultun and Its Contents

The archaeological site of Cuello, in northern Belize, preserves a sequence of building levels and pottery the analysis of which has led to a redefinition of the Maya Preclassic period, and especially of the Early Preclassic (Hammond 1977, 1980). Excavation at the site focused on Platform 34, a large, flat construction topped by a small Late Preclassic pyramid. Approximately 14 m southeast of the main area of excavation was found a chultun, Feature 87 -- an underground structure consisting of two chambers connected to the surface by a masonry shaft and surrounded on the surface by a plaster catchment floor (Figure 1). A third chamber, connected to one of the others by a hole through the wall, was also excavated. A separate shaft led to the surface from this chamber, but the shaft was not excavated. The chultun was probably originally used for food storage, and later used as a trash dump (Bullard 1960; Puleston 1971; Hammond 1980). The fill of the three chambers was dated by ceramics to the end of the Late Preclassic, ca. A.D. 100. Besides ceramics, the fill contained both animal and plant remains and an assortment of lithic items. It is the lithic collection from the chultun that is discussed in this paper.

It is thought that the fill of Cuello Feature 87 is what Schiffer (1976:30) has termed secondary refuse. Secondary refuse is trash deposited first near an activity area, then redeposited in another context later, perhaps as a result of general cleaning of the living surfaces. The presence of articulating sherds across chambers of the chultun and across horizontal contexts suggests that the redeposition was either a single event or a series of events very close together in time. The fact that the fill consists of secondary trash raises important issues regarding the analysis and interpretation of the chultun lithics.

The primary purpose of this paper is to describe the lithic collection from the chultun in such a way as to provide information for interested lithic analysts and to make comparison with other collections possible. However, context can be an important element of description, and our understanding of context can influence conclusions drawn from the characteristics of the collection. In the examination of the chultun collection, therefore, each item or class of items is interpreted with a view to suggesting an explanation for its incorporation into the refuse. In general, the following alternative possibilities have been considered: 1) the item class consists of an unwanted byproduct of manufacture or resharpening; 2) the item was exhausted; 3) the item was broken, a) during use, or b) during manufacture; 4) the item was abandoned unfinished. For some lithic items none of these possibilities seems very probable while for others several seem equally probable. Finally, the consequences and implications of the prehistoric selection of these items as refuse will be considered.

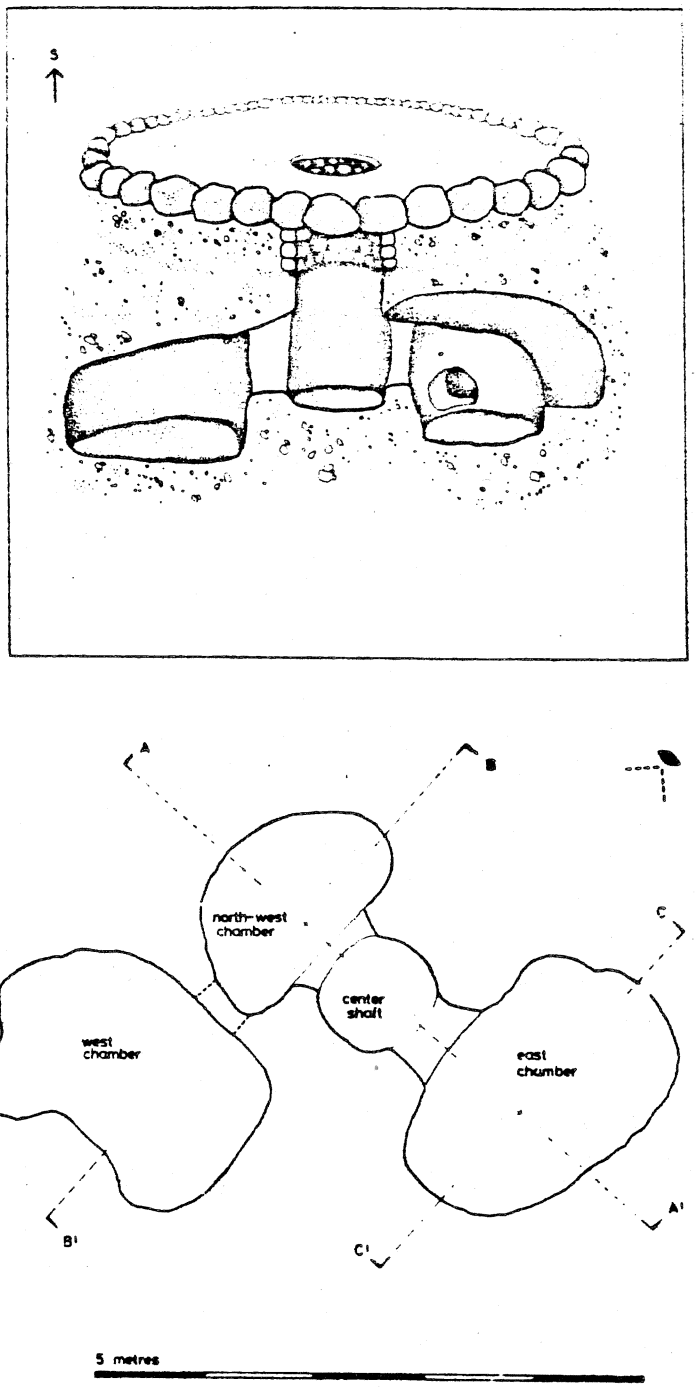


Figure 1. Schematic drawing and plan of the Cuello chultun, Feature 87. (N. Hammond, by permission)

IB. Note on Colors of the Lithic Materials

In Mesoamerica the raw materials used in the manufacture of stone tools, most notably chert, occur in a variety of colors. There is some evidence that there may have been preferential selection of particular colors by Maya flint-knappers for the manufacture of certain kinds of tools, and these preferences may have changed over time (Richard Wilk, personal communication; Rovner 1974). The choice of colors may have been idiosyncratic, constituting an element of pure style among Mesoamerican lithics attributes, and thus affording a measure of "probable degree of communication between two or more cultures" (Jelinek 1976: 20). The physical availability of various chert colors cannot be well-evaluated until material sources are better mapped than they are today and until variation within sources and within nodules is better understood. This lack of information limits any discussion of the political and social dimensions of the differential occurence over time and space of chert colors. However, patterning of color variations may offer clues to or substantiations of regional and intrasite sociopolitical change, and this possibility is currently being explored in the Maya area (Rovner 1981). It is of course possible that the prehistoric basis for selection was not color but grain size or some other material characteristic affecting workability. In any case, the phenomenon of differential distribution of raw material colors is part of the archaeological record and is described in this paper.

A Munsell color chart was used in the descriptions of tools (Tables 1 and 2) in order to standardize the color designations. Color names given to items other than formal tools fall within the range shown for those colors in the tool descriptions, but no attempt has been made to distinguish between varieties of colors for smaller items in the chultun lithic assemblage.

One material whose origin is at least partially known is a subcategory of brown chert: a fine-grained material which occurs in abundance at the prehistoric manufacturing center of Colha, 27 km southeast of Cuello (Hester 1979). Tools of this particular brown chert are identified in Section IIA.

II. The Chultun Lithic Assemblage: Description

IIA. Retouched Tools

The Cuello chultun contained 22 whole retouched tools and 13 fragments of tools. Descriptions of tools are summarized in Tables 1 and 2. The tools are initially divided according to whether they are bifacially flaked or unifacially flaked. Names given to individual tools are based upon nomenclature used by earlier authors, especially Willey et al. (1965) and Willey (1972), with the use of Bordes' typology when Mesoamerican descriptions are inadequate (Bordes 1961).

Nineteen (86%) of the whole tools are chert. Five of these (Ib, IX, XI, XIV, IV) are the fine-grained brown chert which may have come

Table 1. Bifacially retouched Tools from the Cuello Chultun

	TOOL TYPE	L	W	T	MATERIAL/MUNSELL COLOR	REFERENCES
Ia	Tranchet-bit adze	10.5	5.4	2.5	Gray chert/5YR 5/1	Shafer 1976
Ib	Tranchet-bit adze	10.7	5.5	2.0	Grayish brown chert/10YR 4/2	
II	Pick	11.9	3.7	2.3	White chert/10YR 8/1	Andresen 1976
III	Dagger	17.1	2.5	2.1	Yellowish-brown chert/10YR 6/4	Willey et al.1965, Figs. 264a,b, 265b,c
IV	Standard Maya biface	10.9	4.4	1.4	?	Stoltman 1978; Willey et al. 1965 e.g. Fig. 270f.
V	Hoelike implement	8.2	4.9	1.6	Brownish gray chert/10YR 6/2	Willey 1972:17, Fig. 158
VI	Gouge/chisel	8.7	2.1	1.1	Grayish brown chert/10YR 5/2	Willey et al. 1965, Fig. 274g,e, Fig. 276, p. 433
VII	Knife/scraper	5.6	4.0	1.5	Brownish-gray chert/10YR 6/2	Willey et al. 1965, Fig. 277f,p p.437. Willey 1972, Fig. 157a
VIII	Transverse concave side scraper	3.5	5.3	1.5	Brownish-gray chert/10YR 6/2	--
IX	Side-notched side scraper	4.4	2.5	1.2	Yellowish-brown chert/10YR 6/4	--
Xa	Bifacial notched scraper-punch	4.7	5.2	1.6	Gray chert/7.5YR 7/0	--
Xb	Bifacial notched punch w/burin blow	5.0	5.5	1.5	Brown chert/10YR 3/3	--
XI	Bifacial notched punch	5.6	5.7	1.7	Yellowish-brown chert/10YR 5/6	--
XXII	Double transverse side scraper	4.8	4.1	1.3	White chert/7.5YR 8/0	--

Table 2. Unifacially Retouched Tools from the Cuello Chultun

	TOOL TYPE	L	W	T	MATERIAL/MUNSELL COLOR	REFERENCES
XIIa	Transverse convex prismatic side scraper, bilaterally notched	4.8	5.0	1.7	Gray chert/10YR 7/2	Willey et al. 1965, Fig. 274h, p. 437
XII	Concave side scraper with cortex	4.1	4.5	1.9	White chalcedony/7.5YR 8/0	--
XIV	Steep side scraper with cortex	4.9	3.2	1.6	Yellowish brown chert/10YR 5/6	--
XV	Triangular denticulate transverse side scraper	3.6	7.8	.7	Yellowish brown chert/10YR 5/6	--
XVI	Awl or drill	3.8	2.7	.4	White chalcedony/7.5YR 8/0	Willey et al. 1965, Fig. 276g, p. 434
XVII	Heavy drill	6.4	3.1	1.8	White chert/7.5YR 8/0	Willey 1972:1780179
XVIII	End scraper	4.3	3.3	1.7	White chalcedony/7.5YR 8/0	--
XIX	Double notched punch with cortex	4.5	4.3	1.1	White chalcedony/7.5YR 8/0	Willey et al. 1965, Fig. 272c, p. 437
XX	End scraper	4.2	4.3	1.0	White chert/7.5YR 8/0	--
XXI	Drill/punch, multiple tool	9.1	2.8	2.2	Grayish-brown chert/10YR 5/2	--

from Colha (Lucas p.c., Sec. IB above). It is unknown whether the raw material was imported from Colha, or whether the finished tools themselves were imported.

Tools Ia and Ib, the tranchet-bit adze, may represent a type unique to northern Belize (Shafer 1976). The two examples in the Cuello chultun are quite typical of this tool type. Both tools show considerable use-wear chipping on the bit. Tool Ia has large coarse flaking and a battered appearance on the exterior face of the bit. Ib has less but similar wear with the addition of one large deep flakescar on the exterior face, plus two long flat flakescars on the interior face. These adzes may be inthe chultun refuse because they were considered too worn for further use. However, Ia has a deep flake scar across half the bit end, which may represent an unsuccessful attempt at resharpening or at creating the initial edge (see Shafter 1976 for a description of the technique). It may be significant that Tool Ib has retouch around approximately 2/3 of the nonbit edge on its internal face, while Ia has much rougher retouch, with frequent step fractures, around about half of the nonbit edge on the internal face. The outline of the remaining edge of Ia is very irregular, suggesting that retouch for the purpose of straightening and thinning the edge was never done on this portion of the tool. It is likely that this is a failed, unfinished tool, perhaps briefly used as a steep scraper after being rejected as an adze during the process of its manufacture. Ib probably has an exhausted bit. The Maya worker may have thought resharpening would spoil the shape of the tool by shortening it too much, since the removal of the sharpening flake would reduce total tool length by as much as 2.5 cm. Or perhaps he did not know how to resharpen it. The fact that there are what appear to be resharpening flakes in the chultun is evidence in favor of the first explanation (see Section IIc below).

Tool II, a "pick" form, is known elsewhere in northern Belize though probably not restricted to that area. John Andresen (p.c.) comments that the Cuello chultun example is smaller than the other Belizean "picks" he has seen. The material is a rather coarse white chert, and the tool was made on a large flake, roughly chipped. Tool II may be in the chultun assemblage because it was retouched for sharpening as much as possible and after the latest edge had dulled it was thrown away. Steep retouch and step fractures are conspicuous both on the rounded end and laterally.

Tool III, a "dagger" form with a very narrow blade, is made on a large, long flake. The material is a tan-striped chert. It is unifacially retouched except on the handle or stem, and on the tip, where there is bifacial retouch. It is triangular in section. The stem portion of the tool in fact looks exactly like the stems of the plano-convex daggers from Barton Ramie and many other sites. Willey's description of the Barton Ramie examples, that they are "in cross section... thickest at blade base, tapering to both point and stem end" also fits the Cuello Tool III well (Willey et al. 1965:412). However, the blade portion of the tool is narrower than those illustrated by Willey. For example, 4.4 cm is given as the minimum width at blade base of the Barton Ramie collection, but Cuello Tool III measures only 3.5 cm at

blade base. The unprovenienced example illustrated by Coe (1957) also has a narrow blade. Herein may be the explanation for the presence of this item in the chultun. Jelinek (p.c.) has suggested that Tool III is simply a worn-out specimen of the familiar planoconvex dagger. The lateral edges appear dulled, and there are many small flakescars with step fractures that probably are the result of use.

Tool IV is what has most often been called a chopper or celt, although it is on the small end of the size range for these tools. Nothing can be said about the raw material because Tool IV is thoroughly burned. The chultun contents do not show evidence of having been burned en masse after deposition in the underground chambers. The ceramics are generally not burned, although there is some scorching probably caused by cooking-fire accidents (Kosakowski p.c.). Tool IV was probably in the chultun because it was burned, although it is also possible that it was worn out, deposited on a trash heap which subsequently burned, then redeposited in the chultun. The material has become very brittle. This was the only tool found to have broken during shipment from Belize to the U.S.

Tool V has been called a "hoe" because of its resemblance in outline to an item illustrated by Willey (1972). However, there is obvious dulling through use only of a small area on one lateral edge near the rounded end, as might be expected on a knife or scraper. The outline of Tool V is flattened at this point rendering the tool asymmetrical and providing an explanation for its classification as trash.

Tool VI most closely resembles the illustrated gouge from Barton Ramie, yet the lateral edges are very worn, with crushing-type edge damage and tiny step-fractured flakescars bilaterally and on one edge bifacially. In this case the steep angles formed by the edges were probably considered unsuitable for further retouch.

Tool VII may be a biface of some unknown form retouched, after breaking or wearing out, to make an ad hoc (Shafer 1980) scraper or knife. The shape is vaguely triangular, with a straight edge that could be a steeply retouched break and flat broad flakescars on one face that seem to bear no relationship to the current shape of the tool. There is considerable crushing, mostly unifacial and with step fractures, along two edges.

Tool VIII is technologically similar to VII in that it appears to be a scraper or knife formed from a broken biface. Bilateral notches were struck off opposite faces. Use-wear crushing and scarring are considerable along one edge, and, given the nature of the chultun contents, it can be suggested that the concavity of the edge is likely due to extensive use and perhaps resharpening, and not part of the original tool design.

Tools IX, Xa and Xb are multipurpose ad hoc tools. All have some combination of notches, each created by one blow and showing tiny use-wear flakescars, with small dull points, one showing signs of wear.

Tool XXII is a thick alternate scraper made on a flake, and is a bifacial tool in that one edge is retouched on one face and the other edge on the opposite face. One edge angle is much steeper than the other and has cruder retouch.

These last four bifacials and all the unifacial tools are probably ad hoc in nature, that is, chunks, flakes or discards (byproducts of the manufacturing process) picked up and quickly struck into shape for a particular task or set of tasks, and casually discarded. For example, Tool XXI is a sharpening flake from a heavy chopper, one which would have been considerably larger than any found in the chultun. The flake has been drastically but simply retouched with two or three blows to make a working edge composed of two notches on either side of a squared-off point. One notch shows use-wear scars. The apparent working area of XXI resembles the working areas of IX, Xa and Xb rather closely, though the overall morphology of XXI is very different from the other three.

Yet another notched and pointed tool is Tool XI. One notch shows use-wear and there is an additional area of small steep step-fracture flakescars lateral to the point. XI is probably, like VII and VIII, a biface broken during manufacture or during use; the latter is suggested by the presence of the lateral step fractures mentioned, located where one might expect to see them on a large bifacial knife or chopper.

Tool XII is a neatly made notched planoconvex scraper. The bilateral notches have each been finished by the removal of one large, flat flake. These notches are located in such a way as to suggest that they were used to haft the tool. One edge of the tool is composed of cortex and shows irregular steep flakescars of use. The edge opposite to this is carefully retouched along its entire length and shows use-wear. Laterally, one edge adjacent to the notch is worn to an almost 90° angle. This wear consists of crushing and step fractures, and renders the tool asymmetrical.

Tool XIII has a squared point similar to that on Xa and Xb, XXI, and XI, but without the accompanying notch. This tool is very rough in outline, perhaps partly due to the nature of the material, which is coarse-grained. Retouch/use-wear scars are large and steep, and there is some battering use-wear as well.

Tool XIV is a scraper made on a thick flake. There is some battering use-wear on the proximal end, exterior face, but the evidence of use-wear on the single crudely retouched edge is equivocal. There are two tiny burin scars on the exterior face.

Tool XV was also made on a flake, which retains the bulb and platform. The distal end has been retouched to form what could be a series of four notches rather than denticulation. Two of these "notches" have a good deal of wear flake scarring. The other two are not damaged.

Tools XVI and XVII are both labelled drills, but they are very different from each other. XVI is a delicate implement made with minimal

retouch on a miniature Levallois-type flake. XVII is relatively heavy and thick, is extensively unifacially retouched to a point, and retains a steep median ridge on the opposite face. XVI shows only a little equivocally identifiable use scarring lateral to the drill point, while XVII has much crushing and tiny step-fracture wear along the retouched edges. In addition, there is yet another notch-like area on XVII, with possible wear scarring within it. This is distal and lateral to the pointed end.

Tool XVIII, made of the same material as XVI, is an amorphously shaped scraper with very steep retouch and use-wear flake scars along the edge with a laterally located notch with one or two tiny flake scars within it.

XIX is a notched tool, the working area of which resembles those of IX, XI, Xa, Xb, XV, and XXI. Two notches were each made with a single blow, on either side of a squarish point. Again there is use-wear flaking within the notches, and in addition a promontory adjacent to one notch is also worn.

XX is a minimally retouched, minimally use-wear scarred scraper of the same material as XVII. The shape is amorphous and XX is probably a casually used chunk of waste material.

IIB. Tool Fragments

With one, or possibly two, exceptions, the tool fragments in the chultun did not appear to bear any relation to the types represented by the whole tools. The first exception is a handle or stem of gray-brown chert from a tool apparently very similar to Tool III, but a bit larger. The break occurred very near the bottom of the "dagger" blade, but it appears that this blade was as worn down as that of Tool III. The other exception is a wedge-shaped fragment of bifacially retouched fine-grained brown chert that could well have come from a tranchet bit adze like Tool Ib.

Six of the tool fragments are badly burned. These are all bifaces, probably of chert. One is a nearly whole tool with heat-induced fractures on its periphery obscuring the original shape.

There are five other items. One is the tip of what may have been a heavy chisel or gouge with a slanted bit, bifacially retouched and made of a fine-grained light gray chert. It shows flakescar wear bilaterally and probable polish along one edge.

The remaining four fragments are bifacially flaked, and appear to be three midsections and one end piece. One midsection is of a fine caramel colored chert, one of a brownish heavily patinated chert, and the third a fine-grained brown chert. The last shows use-wear scars on the remaining edges, and may have been burned or heated. The end piece is a thick (2.1 cm) piece of pinkish gray chert with a steep butt and showing a varied assortment of retouch techniques. This may have been a tool broken during manufacture and retouched for ad hoc use.

IIC. Flakes and Amorphous Pieces

That flakes and amorphous pieces without deliberate retouch are refuse is self-evident and requires little further comment. However, the presence of tiny flake scars on about 15% of all flakes and amorphous pieces, probably the result of *ad hoc* use, demonstrates that these items pass through an intermediate step in the economic system before their ultimate deposition as trash.

There are 107 flakes in the chultun, ranging in size from less than 1 cm in length and 1 cm in width, to 23 cm in length and 9.6 cm in width. It was felt that varying use of screens in collecting the chultun lithics made calculation of mean dimensions of flakes not useful in this case. Table 3 shows the kinds of materials from which the flakes are made, and the number and percentage of flakes in each material category which retain some cortex on the exterior face. As is the case for tools, the most common material for flakes is chert. In addition to the three chert colors seen in tools, there occur among flakes and amorphous pieces several other chert colors, mostly reddish or pink, but also purple-striped and yellow. In the accompanying Tables these are lumped together under "various colors."

It is interesting that although the absolute number of chalcedony flakes is much smaller than the number of chert flakes, the percentage of flakes retaining at least 10% cortex is about the same for both materials. Table 4 shows that the percentage of flakes of various color chert retaining at least 10% cortex is almost twice as high as that for any other category. Further, as Table 4 shows, the only appreciable difference in sizes of partially cortical flakes is that those of various-color cherts are larger than those of other materials. These percentages suggest that more minimally processed or unprocessed nodules of these colored cherts were being brought into Cuello than minimally or unprocessed nodules of any other material. However, it is also possible that the local chert nodules have brightly colored layers just beneath the cortex, so that a red partially cortical flake might come from the same nodule as a white secondary flake. Heating of nodules (especially small ones) before reduction may also produce such color variations. A X^2 test did not confirm the significance of the higher percentages of various-color flakes with cortex ($P > .05$). However, it is possible that this result is due to the small sample size. The question of differential occurences of cortex among chert colors remains one to be addressed by study of the whole Cuello assemblage.

Forty-nine (46%) of the flakes were biface thinning flakes, with slightly more of brown chert than of any other material. Two brown chert flakes and three gray chert flakes were sharpening flakes struck from use-worn tool edges. Two of the gray chert sharpening flakes are tranchet bit adze sharpening flakes, demonstrating that this technique was in fact known in Cuello in Preclassic times (Sec. IIA above; Shafer 1976).

There are 181 amorphous pieces in the chultun collection. Amorphous pieces are unretouched lithic items that do not show flake

Table 3. Flakes from the Chultun

MATERIAL	#	% OF ALL FLAKES	# W/CORTEX	% W/CORTEX
Chalcedony	22	20%	5	23%
Miscellaneous materials	3	3%		
Chert	82	77%	17	20%
		% OF ALL CHERT FLAKES		
Brown	28	34%	5	18%
White	21	26%	4	18%
Gray	20	24%	3	15%
Various colors	13	26%	5	38%
TOTALS	107	100%		

Table 4. Sizes of Partially Cortical Flakes

MATERIAL	# OF CORTICAL FLAKES	LENGTHS/WIDTHS OF CORTICAL FLAKES
Chalcedony	5	6.1 X 4.1 7.1 X 4.7 5.6 X 3.6 2.1 X 3.5 2.4 X 1.4
Brown chert	5	3.2 X 2.6 4.1 X 4.2 1.7 X 3.2 1.5 X 2.0 3.3 X 2.0
White chert	4	2.0 X 2.8 4.6 X 2.6 4.5 X 3.2 5.7 X 3.4
Gray chert	3	3.7 X 4.0 1.1 X 1.4 2.7 X 2.9
Various-colored cherts	5	7.8 X 4.0 8.1 X 5.6 4.1 X 6.5 5.4 X 3.3 3.4 X 2.6

characteristics. Table 5 summarizes the distribution of materials and the occurrence of cortex among these items. Chert is again the dominant material, although not to the degree seen in the other lithic categories. However, there are probably many pieces of chert among the burned items for which material identification is not possible. There are more pieces of white chert than of any other material category (except the burned items). The large percentage of burned items among amorphous pieces is readily explained by the fact that these pieces are actually heat-shattered remnants of flakes and perhaps of tools -- they are amorphous because they have burned. Amorphous pieces vary widely in size, the largest being 8.3 cm long by 4.2 cm wide, the smallest about 1 X 1 cm. Percentages of each material type retaining cortex are quite similar to the percentages seen for flakes.

IIC. Cores, Core Tools and Hammerstones

Twenty-three items in the Cuello chultun are classified as cores, core tools or hammerstones. Three of these are chalcedony, maximum diameters of which were 14.1, 11.3, and 7.4 cm. Eleven are white chert, the largest being 11.9 maximum diameter. The smallest is a flattish core remnant of 5.7 X 3.3 X 2.0. Five cores are gray chert, measuring 9.6 X 4.9 X 3.9 cm, 5.3 X 3.4 X 2.4 cm, 3.7 X 4.9 X 3.9 cm, 8.0 X 5.1 X 3.3 cm, and 4.5 X 4.4 X 1.9 cm. There is one grayish brown chert core, 6.3 cm maximum diameter. A limestone fragment, 8.0 cm in maximum diameter, is questionably a core. Its surface is very rough except on one face, where it is ground smooth. There is a cobble hammerstone 6.9 cm in maximum diameter which has one flake removed, probably as a result of use. The upper periphery of the flake scar is very battered and there is some battering on the opposite end of the cobble as well. There is discoloration over the slightly flattened opposite faces in exactly the areas which would be covered by the hand of a person using the tool as a hammer.

Battering-type use-wear is seen on two of the chalcedony cores and two of those of white chert. One white chert core has been further retouched with burin blows to make a point that shows use-wear. One gray chert pyramidal core (3.7 cm maximum thickness) has use-wear flaking around the edges of the flat face.

There is a white chalcedony nodule split in half which has two cleanly squared edges with adjoining faces ground smooth; this measures 3.0 X 4.1 X 2.3 cm.

It is notable that there is only one small core of brown chert, in contrast to the frequent occurrence of this material type in the other item categories. On the other hand, white chert, which does not predominate in any other category, occurs more often than any other material among the cores.

Table 5. Amorphous Pieces from the Chultun

MATERIAL	#	% OF ALL PIECES	# W/CORTEX	% W/CORTEX
Chalcedony	24	13%	7	29%
Miscellaneous materials	26	14%	?	?
Chert	78	43%	17	22%
		% OF ALL CHERT PIECES		
Brown	17	22%	3	18%
White	26	33%	5	19%
Gray	14	18%	4	28%
Colors	21	27%	5	24%
Burned material	53	30%	?	?

III. Discussion and Some Interpretations

IIIA. The Nature of the Assemblage: Implications

It is assumed that the Cuello chultun contents are secondary refuse, and this characterization has several implications for the interpretation of the chultun lithics. The assumption is that none of the items are *in situ* from the point of view of systemic context. The tools are not now located in or near any areas of tool manufacture or use. Consequently we cannot use the distribution of time categories in the chultun to talk about workshops, and a discussion of complete reduction sequences (as in Collins 1975) is not appropriate to the chultun collection. Additionally, it cannot be determined, based on context, whether the tool types represented in the chultun functioned in the performance of household tasks or of ceremonial or other extra-household tasks. Thus a primary typological division of tools into "utilitarian" and "ceremonial," as done first by Kidder at Uaxactun (1947) and subsequently by many others studying Maya lithic collections (e.g. Coe 1959), cannot be justified. The rudimentary typology employed in this paper is based upon the location of retouch, bifacial versus unifacial.

The chultun lithic assemblage is a sample skewed toward worn out, broken, and otherwise useless items. This skewing is a characteristic of lithic collections in most archaeological contexts (Frison 1968; Jelinek 1976) with the exception of collections composed of a) tools left inadvertantly or unavoidably in the locale of use (an arrowhead imbedded in an animal which escapes his hunters) and b) tools lost outside of primary activity areas before their usefulness is exhausted (an axe dropped on the way to the woods). If it is assumed that the chultun contents are all trash, the chultun lithic collection is seen as an extreme case of the skewing phenomenon, and axiomatically the stone tools occur here because they are of no further use. The chultun collection probably does not contain any "lost" items. It is likely that all the lithics in this assemblage are in it as a result of deliberate selection. Suggestions can be made concerning what we would expect to see in a lithic assemblage composed entirely of selected refuse.

Without making any assumptions about the representativeness of the chultun collection, it is possible to note variations in the occurrence of material types, size and characteristics of byproducts, techniques of manufacture, and to draw some behavioral inferences from these observations. First, if stone tools were being made in the Cuello community, byproducts of manufacture would form a high percentage of the assemblage. If certain materials were preferred over others for toolmaking, we might see a preponderance of those materials among the manufacturing byproducts. In addition, if manufacturing of tools was being done in the vicinity, we would expect manufacturing failures in the collection in the form of half-finished broken tools and tools abandoned before being finished because of technical errors or flaws in the material.

The tools that are seen in the refuse are worn down, broken, or for some other reason no longer useful, and as a result these tools are

probably morphologically different from tools of the same types that occur in other contexts. For some types, what is seen in the chultun may be the minimum size considered functional by the prehistoric tool-user, perhaps after multiple resharpenings as well as wearing down from use. Other types in the chultun are no longer usable by virtue of defects other than size, such as loss of edge angle suitable for use or sharpening retouch.

IIIB. The Cuello Tool Industry

It can be said, based on the chultun contents, that stone tools, and specifically bifaces, were being made or renewed in the Late Preclassic Cuello settlement since manufacturing debris forms a large portion of the assemblage. There is a suggestion from this evidence that unprocessed nodules were not being brought into the settlement. Large decortication flakes are absent, and relatively few pieces of debris retain cortex. There are more cores of white chert than of any other material, and because the chultun contents are selected refuse we cannot conclude that proportionately more white chert cores were being reduced, although this is one possible explanation. We can conclude that it is likely that more were being thrown away within the Cuello settlement. Given the fact that in the chultun there are relatively few tools (particularly bifacial tools) made from white chert, it seems reasonable to suggest that the occurrence of a high proportion of cores of this material in the chultun demonstrates that it was both more accessible and less valued than other kinds of chert. The preponderance of brown chert among tools coupled with the lack of cores of this material suggests that brown chert was being brought into Cuello in the form of tool blanks. The high percentage of brown chert flakes provides some evidence against the alternative explanation that the material arrived at Cuello only in the form of finished tools.

Additionally, the frequent occurrence of white chert and chalcedony among unifacially (and thus less elaborately) worked tools, along with the greater frequency of these materials among cores and the relative dearth of brown chert cores, suggests that while complex and time-consuming bifacial work was done with material pre-shaped into blanks (perhaps at a quarry site), simpler tool-making was done by preference in more readily available materials struck directly from minimally preprocessed nodules.

More evidence for the manufacture of bifacial tools at Late Preclassic Cuello is provided by the occurrence in the chultun of unfinished tools, Ia being the most conspicuous example. As has been noted this tranchet bit adze was apparently an important item of equipment for the Maya of northern Belize. The chultun contents suggest that the Cuello knapper knew how to sharpen these tools as well as how to make them, albeit with something less than perfect control of technique.

IIIC. Tool Disposal

More tools of chert were thrown away than tools of any other material. This could be because more chert tools were being used at

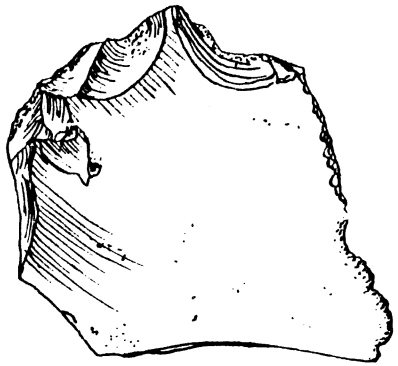
Cuello than tools of other materials, but it could also be because 1) chert tools wore out faster than implements of other materials, 2) chert was more readily available and did not have to be conserved, 3) worn out tools of other materials were disposed of away from the settlement or in contexts other than domestic refuse (e.g. used in fill or placed in burials).

Whether the tools represent minimum useful sizes for their types, as suggested in particular for Tools Ib, II, III, and IV, or limits of shape as suggested for Tools IV, VIII, and XII, can only be demonstrated by extensive comparison of tool dimensions -- including edge angles -- with those of tools from other contexts. This is a potentially useful exercise because the establishment of ranges of size and morphology is essential to adequate definition of tool types. Worn tools must not be placed inadvertently in separate formal typological groups. It is noteworthy that at Colha Operation 2006, a lithic workshop, Shafer (1979) identified as "used" a number of bifacial celts with dimensions similar to those of Tool IV, while his "complete but unused" celts are much larger (Shafer 1979:59).

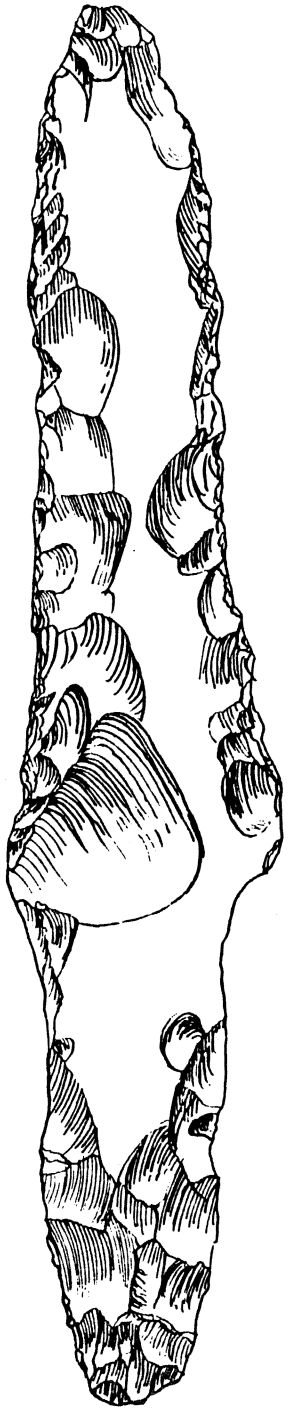
It is possible that there is a tool type seen in the Cuello chultun which is recognizable only when the tool is in an exhausted state; that is, the notched and pointed tools described as Tools IX, Xa, Xb, XXI, XI, XIX and perhaps XV. As noted, these are ad hoc tools and thus may only have a morphology which links them typologically in the archaeological record after use. Stoltman (1978) documents the occurrence at Becan of "notched flakes" and notes that this artifact type was unreported in the Maya archaeological literature. These notched items form about 28% of all retouched flakes in the Becan collection, and Stoltman suggests that they are "well-suited for myriad tasks involving the processing and shaping of wooden artifacts, which certainly must have bulked large in the tool inventory of the ancient Maya" (1978:14). In the Cuello chultun, the seven items identified as notched-and-pointed tools constitute 32% of the collection. Again, we cannot conclude that 30% of all tool-using activity at Cuello involved these tools. It is perhaps more likely that the notched and pointed tools were thrown away at a high rate, because they were easy to make out of any handy bit of waste and/or because they were quickly exhausted. Comparison with frequency of occurrence in other contexts may provide further evidence regarding this proposed tool type.

A possibility to be explored is whether a lithic refuse typology could be developed which would provide evidence as to the character of a deposit. At Cuello, for example, we may test a hypothesis that Standard Maya bifaces (celts) of particular dimensions are found only in domestic refuse, whereas a bimodal size distribution of these tools, as in Operation 2006 at Colha (Shafer 1979 and above), suggests a mixed workshop-residential context. Co-occurrence of the small bifacial celts with notched-and-pointed tools may also be characteristic of domestic trash in the Late Preclassic. The significance of varying frequencies of types and sizes for the interpretation of context can only be determined by analysis of lithics from many well-understood archaeological contexts.

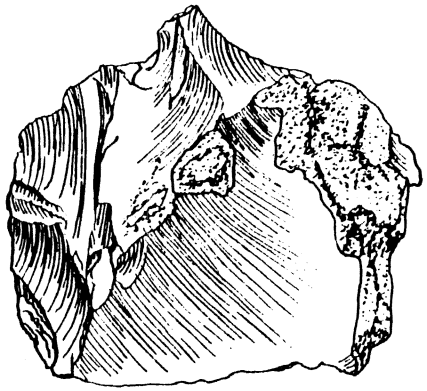
a



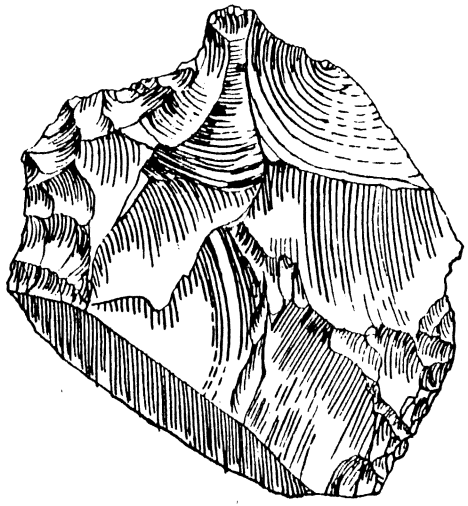
c



b



d



e

3 CM

Fig. 2: Chultun tools;

a) Tranchet-bit adze, Tool Ib (p. 6)
b) Planoconvex dagger, Tool III (p. 6)
c) Tool XIX (p. 9)
d) Tool Xa (p. 7)
e) Tool XI (p. 8)

IV. Summary and Conclusion

The Late Preclassic Cuello Chultun, Feature 87, is assumed to contain selected secondary refuse, and the lithic component of the contents is comprised of waste materials which document the production, resharpening and disposal of several kinds of stone tools within the Cuello settlement. These include some chopping or cutting tools and, more commonly, small scraping tools often made on broken bifaces and perhaps used for domestic woodworking tasks. It can be assumed that the latter were used within the settlement. The former may have been used at Cuello, or may have been used elsewhere and brought back to the settlement (and disposed of there) because of a desire to conserve the handles in which they were hafted. It is possible that there was differential use of raw materials for the manufacture of various kinds of tools and there is some suggestion that different kinds of raw materials were brought into the settlement in different forms (as nodules or as blanks). Additionally, some raw materials may have been conserved less carefully than others.

Comparison of the contents of Feature 87 with other contexts across time and space within the Cuello settlement may provide the basis for further discussion of possible local and regional socioeconomic significance of observed variations in these lithic assemblages.

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