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INTRODUCTION

The purpose of this study is to discuss the problem of the chipped stone industries, which accompany the various ceramic cultures of the Greater Antilles. This theme has not yet been dealt with in full by the relevant literature; in fact, the information given so far has done little more than confirm the existence of stone flakes, occurring alongside ceramics of Neo-Indian cultures on the territory of Hispaniola and Cuba. In his classic study of the culture of the Taino peoples, S. Loven (1935) pointed out for the first time, that whereas in the Lesser Antilles ceramics connected with the Arawaks are found without any concomitant chipped stone implements, the latter appear fairly frequently in Hispaniola and Cuba.

Until recently it was thought that the oldest ceramics occurred in Puerto Rico, in approx. 200 A. D., as a result of the expansion of Saladero culture from the South American continent. Subsequently, circa 700 A. D., a second wave of Neo-Indian cultures spread, constituting the beginnings in Hispaniola and Cuba of various local groups attributed to so-called Ostiones culture (or to the ostionoid series). Later still local meillacoid groups developed on this basis (8th-9th century A. D.). Finally these were influenced by new elements from the continent, spreading throughout the Caribbean and attributed to so-called Boca Chica culture (or to the chicoid series). Such an interpretation of the course of events, based mainly on studies of ceramics, is suggested by American scholars, particularly by the author of the most extensive works on the subject—I. Rouse (1948, 1964).

The latest investigations conducted in Cuba and Hispaniola confirm the possibility of an earlier introduction of ceramics, which did not necessarily arise from the expansion of Saladero culture. The findings of M. Veloz Maggiolo (cf. Veloz Maggiolo, Ortega, Plinio Pina 1974) in El Caimito in the Dominican Republic, and the discovery by R. Dacal Moure of sites such as Aguas Verdes—Canimar in Cuba, all indicate that the first ceramics, which appeared in the Greater Antilles as early as the 1st century A. D., do not have direct links with Saladero culture. Perhaps, then, they were the result of a separate wave of influence, originating from the continent and

expanding via the Caribbean, as has already been suggested (Kozłowski 1975, p. 106-107).

As we shall demonstrate, certain of the main series of ceramics found in the Greater Antilles differ among themselves quite considerably, both in stone technology and in the typology of the chipped tools. In order to substantiate this statement we shall examine in turn the industries connected with the following ceramic series:

a) the first ceramics in Cuba and Hispaniola, i.e. assemblages of the El Caimito—Canimar type;

b) ceramics connected with the meillacoid series, considered the oldest group, especially so-called Mayari culture in Cuba;

c) other groups of the meillacoid series, for example Sub-Taino culture in Cuba.

Unfortunately we do not possess sufficient data for the characterization for stone implements concomitant with the chicoid series, particularly with Taino culture in Cuba. Therefore we shall restrict ourselves to certain general remarks concerning the relationship between inventories of the Cuban Taino and Sub-Taino types.

In considering the problem of flint industries among Neo-Indian collection from the Greater Antilles it must be remembered, that their development took place in a period when on all three islands, i.e. Cuba, Hispaniola and Puerto Rico, the Neo-Indian peoples were neighbours to Meso-Indian tribes, characterized by their extremely varied forms of flint industry. This produce conditions favourable to mutual contacts and exchange (cf. Kozłowski 1975, p. 86; Veloz Maggiolo, Ortega 1971; Veloz Maggiolo 1976).

1. ASSEMBLAGES OF THE EL CAIMITO—CANIMAR TYPE

The isolation of flint inventories, occurring with the oldest ceramics of Cuba and Hispaniola, is based on datings obtained for the following sites:

a) El Caimito in the Dominican Republic. C 14 dates: 180 B. C., 15 B. C., 120 A. D. and 180 A. D. (all these dates were obtained from shells; Veloz Maggiolo 1976);

b) Canimar I. C 14 dating 840 A. D. (Gd—765), too late. Subsequently a thermoluminescent dating was performed—2000 B. P. (Kozłowski 1975, p. 108). This confirms observations based on palaeogeographical data (regression of the sea, dated at the first millennium B. C.).

c) Aguas Verdes. Palaeomalacological dating: earlier than the 1st century B. C. (Kozłowski 1975, p. 108).

The features of pottery from the El Caimito site—above all the specific linear incised decoration—reveal fundamental differences from ceramics of Saladero culture (Veloz Maggiolo, Ortega, Plinio Pina 1974). Unfortunately, examples from the Cuban sites only allow us to assert very generally, that

they, too, are characterized by linear incised decoration, that they were well baked and originate predominantly from wide bowl-like vessels. A detailed description of the ceramics is being prepared by the discoverer of both Cuban sites, R. Dacal Moure.

When establishing the chronology of inventories belonging to the Canimar type, it is important to bear in mind that the Playita site probably represents a stratigraphic sequence consisting of an assemblage of Sub-Taino culture, following an assemblage of the Canimar type (Kozłowski 1975, p. 106).

Our description of the chipped stone industry, connected with the oldest phase of ceramics in the Greater Antilles, may be summed up by the statement that this is a microflint industry, rather of the bladelet kind. The most general conclusions regarding this production thus point to its total independence from all the preceramic and ceramic cultures of the Antilles. At the same time this fact enables us to easily identify the assemblages in question, even in cases when the ceramics have not been satisfactorily counted and are uncharacteristic. This was realized by M. Veloz Maggiolo, in his short description of the stone industry from the El Caimito site, where he correctly stressed the presence here of "de navajas relativamente pequeñas acompanadas de una industria de microlascas impresionante en silex y en rocas calcareas" (1974, p. 3). Despite its brevity, this formula makes it possible to relate the El Caimito site to the Cuban sites mentioned in the introduction.

Let us now attempt a characterization of both Cuban assemblages. The techniques employed in order to obtain the blanks are illustrated by the table I.

From the data set out above the following conclusions emerge:

1. The technique for obtaining blanks was basically of the blade variety. The blade index (calculated without taking into account flake fragments and splintered flakes, nor, of course, waste material) comes to:

Canimar I.	19.70
Aguas Verdes	21.90

These values also correspond to the breakdown of the cores, which are encountered in a larger series exclusively at Canimar I, while in Aguas Verdes they are represented only by a few fragments. In the case of Canimar I the breakdown was as follows:

initial blade-flake cores (fig. 1: 5).	1
cores for bladelets (fig. 1: 6, 7).	2
small single-platform blade cores	2
small double-platform blade cores	2
single-platform blade-flake cores (fig. 1: 10, 11)	2
multi-platform blade-flake cores	1
used cores	1
discoidal cores (fig. 1: 8, 9)	5

Table I

Implements	Canimar I		Aguas Verdes	
	Quantity	%	Quantity	%
Primary flakes	40	10.52	16	6.01
Partially cortical flakes (with cortex on one side)	7	1.84	10	3.75
Partially cortical flakes (with cortex on the distal end; fig. 3: 1, 2)	—	—	1	0.37
Ordinary flakes without cortex, struck from a common direction (fig. 1: 1)	132	34.70	12	4.51
Flakes from 90° cores or from core preparation (fig. 1: 2)	33	8.68	2	0.74
Triangular flakes (resembling Levalloisian points; fig. 3: 3-5)	20	5.26	4	1.50
Flakes from the trimming of core edges (fig. 1: 3, 3: 7-9)	2	0.52	4	1.50
Flakes from residual or discoidal cores (fig. 1: 4)	5	1.31	—	—
Blades from single — platform cores	48	12.63	42	15.78
Blades from double-platform cores (fig. 3: 17)	11	2.89	—	—
Splintered flakes (fig. 3: 10)	23	6.05	65	24.43
Fragments of flakes	59	15.50	80	30.07
Waste	not counted		80	11.20
Total	380		266	

From this table it is apparent that blade cores and blade-flake cores predominate, while only discoidal cores served as a special source of flakes. Probably the majority of the triangular flakes, as well as flakes with centripetal scars on the dorsal side, originate from these.

2. The degree of core preparation prior to exploitation was comparatively small. This is shown by the relatively low index of prepared striking platforms, and by the small amount of flakes from core edge rejuvenation. In view of the incidence of 90° cores (including triple-platform) and of discoidal cores, it is not possible to discriminate precisely between flakes produced during exploitation and those originating from the preparation of single-platform cores. The breakdown of flake butts from the Canimar I site was as follows:

	Quantity	%
unprepared butts	175	54.10
"wedge" butts	46	14.20
dihedral butts	9	2.70
butts formed by a single blow (unfaceted)	60	18.50
prepared butts (faceted)	33	10.20
Total	323	

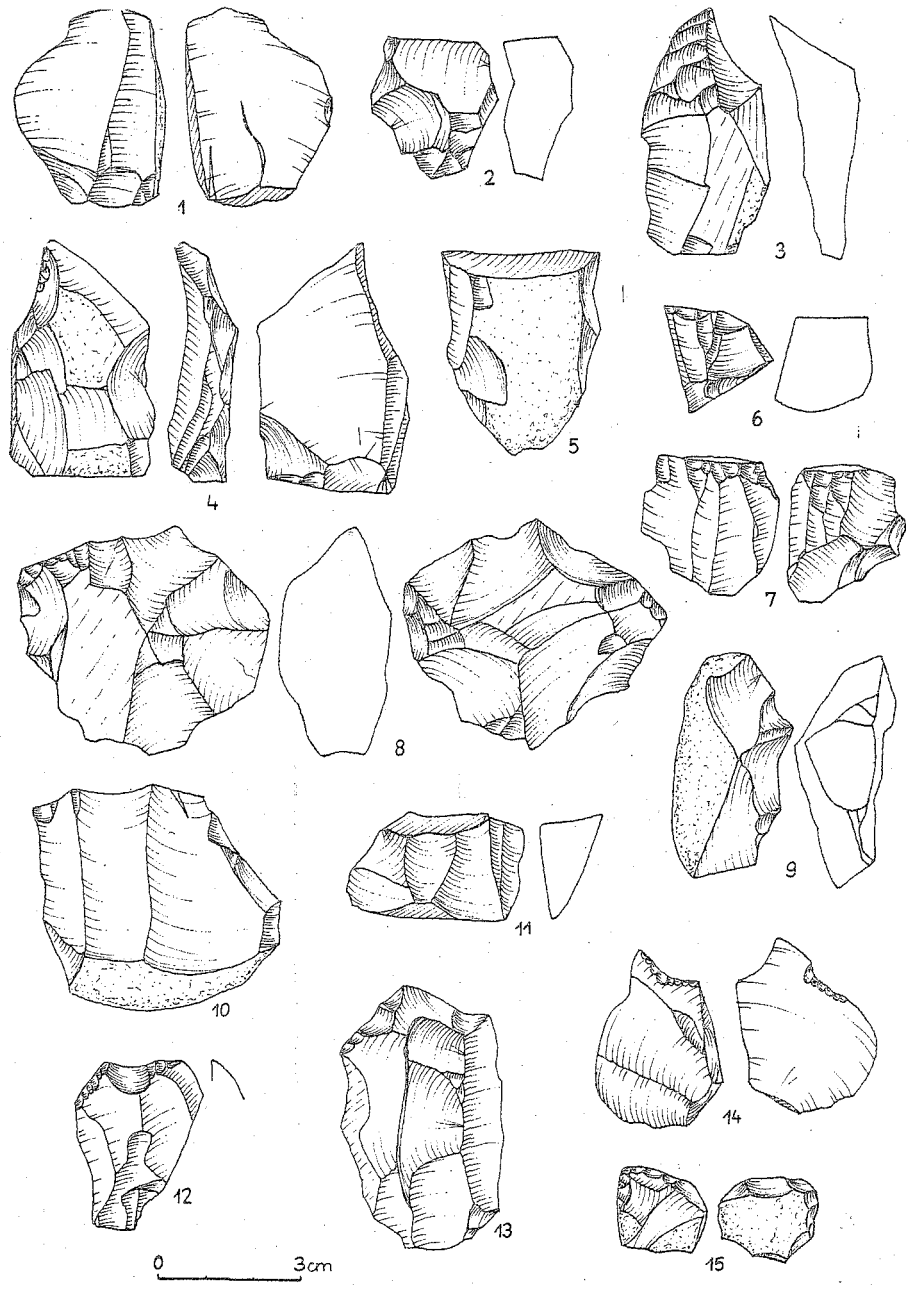

Fig. 1. Artifacts from Canimar I, Cuba. Collection of Montané Museum, University of Habana

1-4—flakes, *6-11*—cores, *12, 13*—end-scrapers, *14*—perforator, *15*—splintered piece

3. The rather low proportion of primary flakes, compared with the considerable quantities of flakes and blades from the advanced stages of core exploitation, indicates that pebbles were brought to the camps already partially decorticated. Since most of the raw material came from secondary (alluvial) deposits, it should be assumed that the pebbles underwent initial processing at the place where they were found, in order to test their potential qualities.

4. The morphometric breakdown of the blade material is similar on both sites. Most numerous are blades measuring 3-4 cm long (up to 50%), followed by blades under 3 cm long (up to 36%). Larger blades (over 4 cm, but never exceeding 6-7 cm) account for only 14%. As for width, blades measuring from 0.5 to 1.0 cm are most frequent.

5. Significant differences between the two sites occur only in the relative quantities of single and double platform cores (the latter are encountered only in Canimar I), and in the higher proportion of splintered pieces in Aguas Verdes (cf. table I). This is caused by the frequent use made of the splintering technique on the Aguas Verdes site, as is indicated by the breakdown of tools (cf. table II).

Now we shall consider the statistical and typological composition of the "tool kits" from both these sites.

Table II

Retouched tools	Canimar I	Aguas Verdes
End-scrapers (fig. 1: 12, 13)	2	7
Burins	1	2
Retouched blades	—	1
Backed pieces (fig. 2: 1-4)	4	7
Points of the Canimar type (fig. 2: 5-7)	3	—
Retouched bladelets (of the Aguas Verdes type)	1	1
Perforators (fig. 2: 8, 9)	4	4
Side-scrapers	4	1
Retouched flakes	7	6
Splintered pieces (fig. 1: 15, 3: 19)	4	55
Fragments of splintered pieces	3	36
Total	33	120

As the information presented above reveals, perforators and backed pieces are the most frequently encountered implements on both sites, while the most important difference between them consists in the presence of numerous splintered flakes in Aguas Verdes. In the light of research into the stone industries of the Old World we may, however, conclude, that this distinction is only of secondary significance. For the incidence of splintered

pieces may depend to a high degree on the nature of the local raw material, or on the quantity in which it is found. In regions with low resources of larger concretions, the increase in the number of splintered pieces is often the expression of an attempt to adapt to local conditions.

Excluding the problem of splintered pieces, the remaining part of both Cuban inventories has closest analogies with the microflint industries of some cultures belonging to the formative period both on the territory of the USA and on the northern coast of South America. In the latter case the

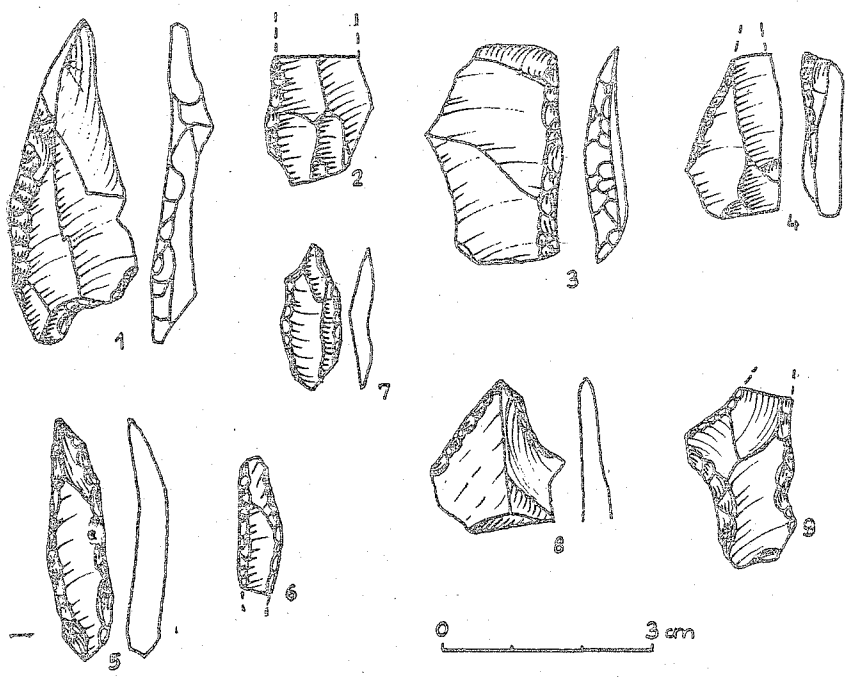

Fig. 2. Artifacts from Canimar I, Cuba. Collection of Montané Museum, University of Habana
1-4—backed implements, *5-7*—Canimar microlithic points, *8*, *9*—perforators

analogies concern Momil culture (Reichel-Dolmatoff 1957), dated at the 1st millennium B. C. This culture is characterized by bladelets used for making double points, by backed bladelets, straight or arched, and perforators. Together with these, splintered pieces are also founds (Reichel-Dolmatoff 1957, fig. 2: 3-9).

Within the United States microflint industry is known from Jacketown (Ford, P. Philips, Haag 1955) and from Poverty Point (Ford, Webb 1957). On both these sites microlithic implements are only part of larger stone inventories, which also include coarse flakes, choppers, side-scrapers and leaf-points. The microlithic industry itself is based on bladelets obtained mainly from single-platform cores, analogous to our specimens from Canimar I

(cf. Ford, Webb 1956, fig. 26 a-e). The most abundant group of tools are the so-called Jacketown perforators (Ford, Webb 1956, fig. 26 p-t, y), analogous to our perforators. Besides these there are "double ended perforators" (Ford, Webb 1956, fig. 26 w, x), which are the equivalents of the double points defined by us as of the "Canimar type". Also numerous at Poverty Point are the tools described by J. Ford and C. Webb as "needles", which, judging by the illustriations (fig. 26 u, v) are backed pieces ("steeply chipped about the entire periphery"—as Ford and Webb emphasize, 1956, p. 81). Apart from these, side-scrapers and end-scrapers are also mentioned (the latter occur only in small numbers). The proportions of the various groups of tools in Poverty Point are quite different, for here perforators predominate (approx. 79%). It should, however, be stressed that the assemblages from the USA are dated at the close of the 2nd millennium B. C., and are thus almost 1000 years older that the presumed age of the Greater Antilles inventories.

The special features of assemblages of the El Caimito—Canimar type clearly demonstrate their uniqueness compared with the flint industries of all preceramic and ceramic cultures, hitherto considered characteristic of the Caribbean region. At the same time, their links with the formative cultures on both sides of the Caribbean are extremely revealing. This may partly explain the enigmatic similarities between the formative cultures of South America and the south-eastern area of North America, a fact to which many have drawn attention (cf. Bullen, Stoltman 1972). The sites from Hispaniola and Cuba do not, however, solve the problem, because of their late chronology in relation to that established for the initial phase of the formative cultures on the mainland; the sites may nevertheless point to a trans-caribbean route of direct contacts, of which they are a later, isolated manifestation.

The question of contacts between Florida and the Greater Antilles has been investigated again recently by R. P. Bullen (1974). He arrived at the conclusion that such contacts did not in fact exist, with the possible exception of very late relations (13th-14th century A. D.) between Cuba (or rather, Eastern Cuba) and the islands off the coast of Florida (Florida Keys). The analysis carried out by Bullen does not, however, take into account the above mentioned early ceramic cultures. The existence of earlier contacts between the Greater Antilles and the mainland finds yet another interesting and convincing argument in the discovery in Florida of dug-out boats, dated at circa 1000 B. C. (Bullen, Brooks 1967).

2. ASSEMBLAGES WITH CERAMICS OF THE MAYARI TYPE

According to the generally accepted division of Cuban prehistory into periods, as formulated by E. Tabio and E. Rey (1966, p. 10), Mayari culture features as the oldest ceramic culture on the island. Such a prominent position

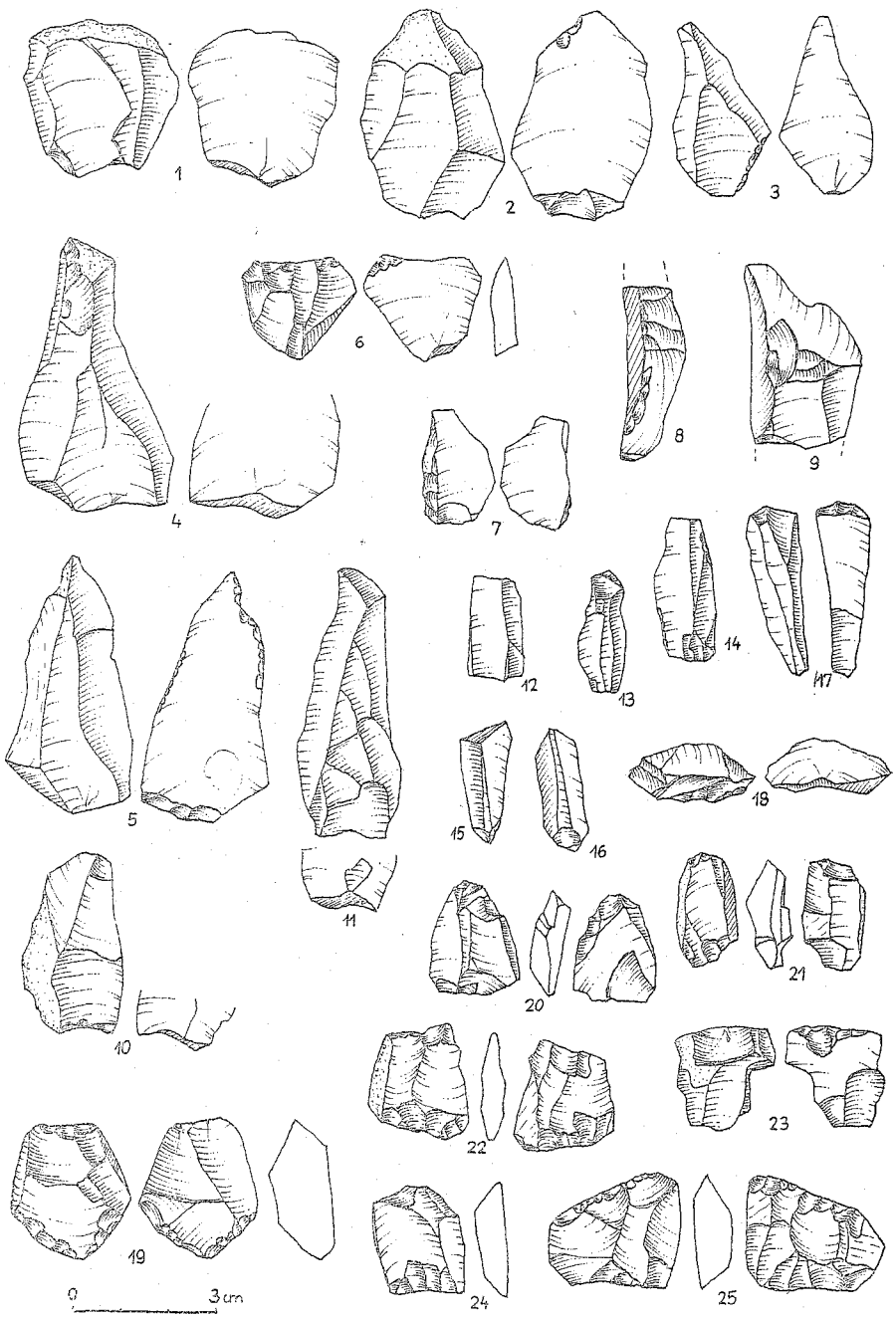

Fig. 3. Artifacts from Aguas Verdes, Cuba. Collection of Montané Museum, University of Habana
1-10, 18—flakes, *11-17*—blades and bladelets, *19-25*—splintered pieces

was ascribed to "Mayari culture" not so much because of the C 14 dating, which really was early (for Mejias—930 A. D., for Arroyo del Palo—980 and 1190 A. D.), but rather as a result of certain economic links with preceramic peoples, and also of the presence here of stone and shell products, reminiscent of preceramic assemblages attributed to the "Cayo Redondo Aspect" (cf. Tabio, Guarch 1966, p. 78). It must, however, be remembered that the oldest sites of "Sub-Taino" culture in Cuba are dated as early as the 9th century A. D. (cf. the date for the upper stratum at Damajayabo—830 A. D.). Thus there are serious doubts as to the definition of "Mayari culture" as the oldest ceramic culture, a claim which is further refuted by its own most likely genealogy. Namely, the ornamental style—straight line incised—has closest analogies with the Meillac style in Hispaniola, and indeed seems to be nothing more than a simplification of the Meillac type of decoration, also dated in Hispaniola at the 9th-10th century A. D. (cf. Rouse 1964, p. 509).

One of the arguments cited in support of the possible links between Mayari culture and the old substratum in Cuba was the discovery in the Arroyo del Palo overhang of highly specific flint implements—namely, long slender blades. These specimens have been quoted many times as distinctive forms of Mayari culture, not only by the explorers of the site (Tabio, Guarch 1966, table XV; also Tabio, Rey 1966, table III), but also by other scholars (e.g. Bullen 1974, fig. 4). Nevertheless, these accounts do not allow for the fact that most of the finds did not originate from the culture layers of the overhang. As the discoverers themselves admit (Tabio, Guarch 1966, p. 59), in the majority of the squares investigated "not a single flint knife occurred". Only in two cases a flake originating from a blade-core and the fragment of a blade were found (Tabio, Guarch 1966, table XV 5, 6) in the culture layer itself. In fact, there are more loose finds of blades from this site in the Collection of the Archeological Institute in Havana, than are mentioned by Tabio and Guarch. In their account the number of four is suggested, while in the collection there are 11 specimens (nos 3187, 3787, 3696 and 3778). A further two published blades could not be identified among the material stored here. Thus altogether there should be 13 pieces. All, as the description states, certainly originate from the region of the site, but were supplied by amateurs and farmers (fig. 4: 1-7).

Of particular interest are the dimensions of these specimens (over 12 cm—4 examples, 8-12 cm—9 examples), also their slender form (width generally 2-3 cm, with only 2 examples wider than 3 cm), and finally, certain of their technological features. All the blades were struck from single-platform cores, which had undergone preparation. This preparation was accomplished laterally, as is proved by the interesting example (no. 3696) of a blade made by removing the lateral edge of the core, and showing sings of an attempt at trimming the prepared lateral edge on the opposite surface (fig. 5: 1). On another blade a similar attempt at trimming a prepared lateral edge, or of

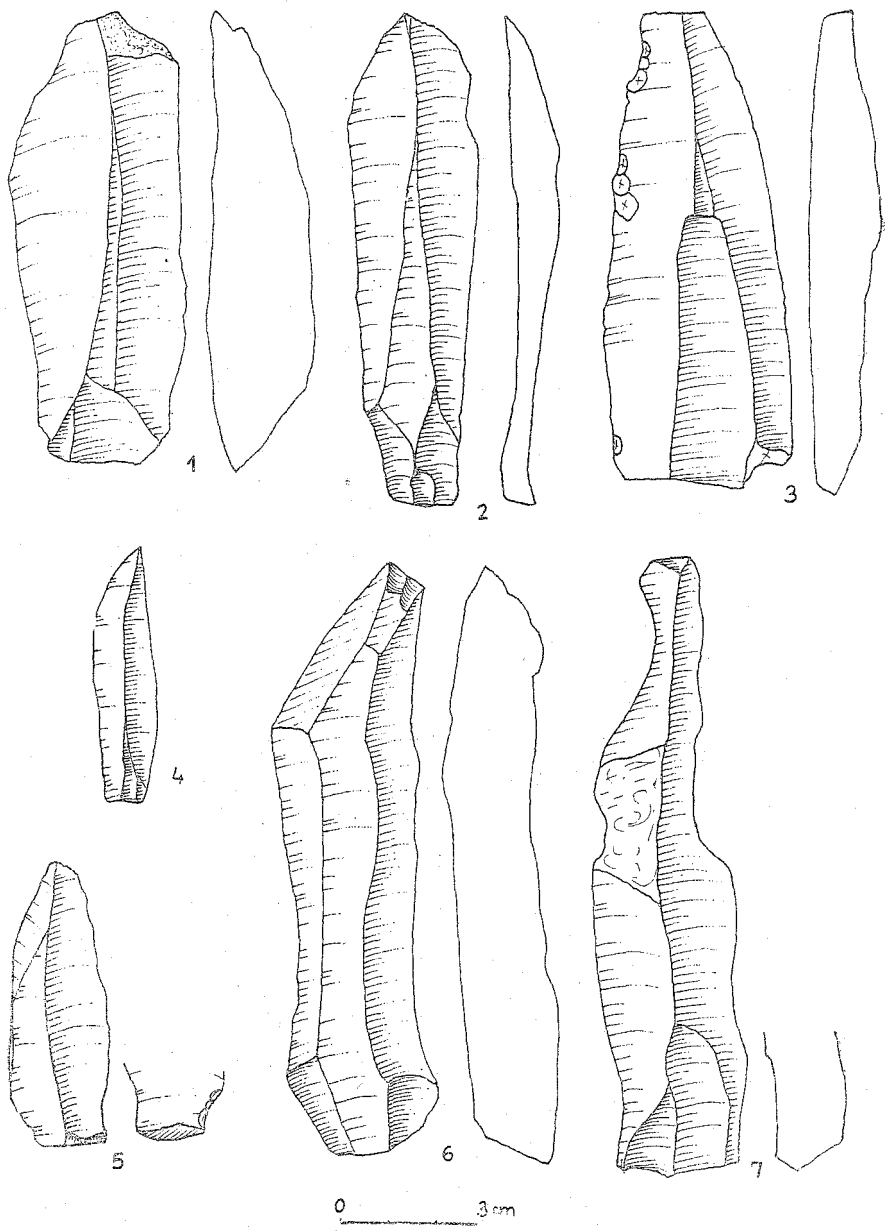

Fig. 4. Artifacts from Arroyo del Palo, Cuba. Collection of Institute of Archaeology, Academy of Sciences, La Habana

1-7—blades

some other operation for shaping the side of the core, is visible (fig. 5: 3). Only a few specimens reveal traces of retouching: eg. one broad blade with an incomplete retouch on both sides (no. 3187—fig. 5: 2), a specimen with a kind of notch on the base (no. 3787—fig. 5: 4) and the blade formed by removing the lateral edge of the core, with something resembling an end-scraper on the proximal end (no. 3696).

The features of the above mentioned blades remain in direct contradiction to the rest of the material. As is apparent from the study by E. Tabio and J. Guarch (1966, p. 58), the excavations yielded a total of 1362 flakes and 30 cores. Unfortunately, we are not able to offer here a full description of these products; we can only put forward the general conclusion, that they have nothing in common with the blade technique represented by the series of blades under discussion. They reveal absolutely no traces of the preparation or exploitation of blade cores.

Under these circumstances we should assume that the series in question does not constitute an integral part of the materials concomitant with ceramics of the Mayari type. There are three possible interpretations of their origin:

a) that they are an import to Mayari culture from the preceramic milieu of Seboruco-Mordán (= Barrera) culture;

b) that they represent a mechanical addition to the group of Mayari type ceramics, originating from the neighbouring site of Seboruco-Mordan culture;

c) that they form part of the group of Damajayabo-Couri culture, whose presence beneath the overhang is confirmed by finds of shell products and smoothed stone objects. It is also possible that these products come from devastated graves, previously discovered under the overhang in Arroyo del Palo (Tabio, Guarch 1966, tables XIV, XVII, XVIII).

It is a known fact that numerous assemblages of Damajayabo-Couri culture contained imports of blade tools from Seboruco-Mordán culture (Kozłowski 1975, p. 81); this phenomenon was accurately observed by M. Veloz Maggiolo (1974, 1976) and defined as the process of the "hybridization" of these sites.

The first interpretation seems improbable, since features of the size and technique of the blades from Arroyo del Palo correspond to the middle phase of Seboruco-Mordán culture, which can be generally dated at the 2nd millennium B. C., definitely not later that the 1st millennium. The highest levels in the stratigraphic sequence of the Levisa I site (Kozłowski 1975a) were already devoid of such blades, despite the fact that a small fragment of Mayari type ceramics was found in the highest layer. In fact, this stratum yielded hardly any blades at all, and certainly none of the long slender variety.

The other two hypotheses seem much more likely. They suggest that the blades and blade implements in Arroyo del Palo were merely a mechanical addition to the ceramic assemblage. It should thus be presumed that Mayari culture possessed flake stone industries similar to those of Sub-Taino culture,

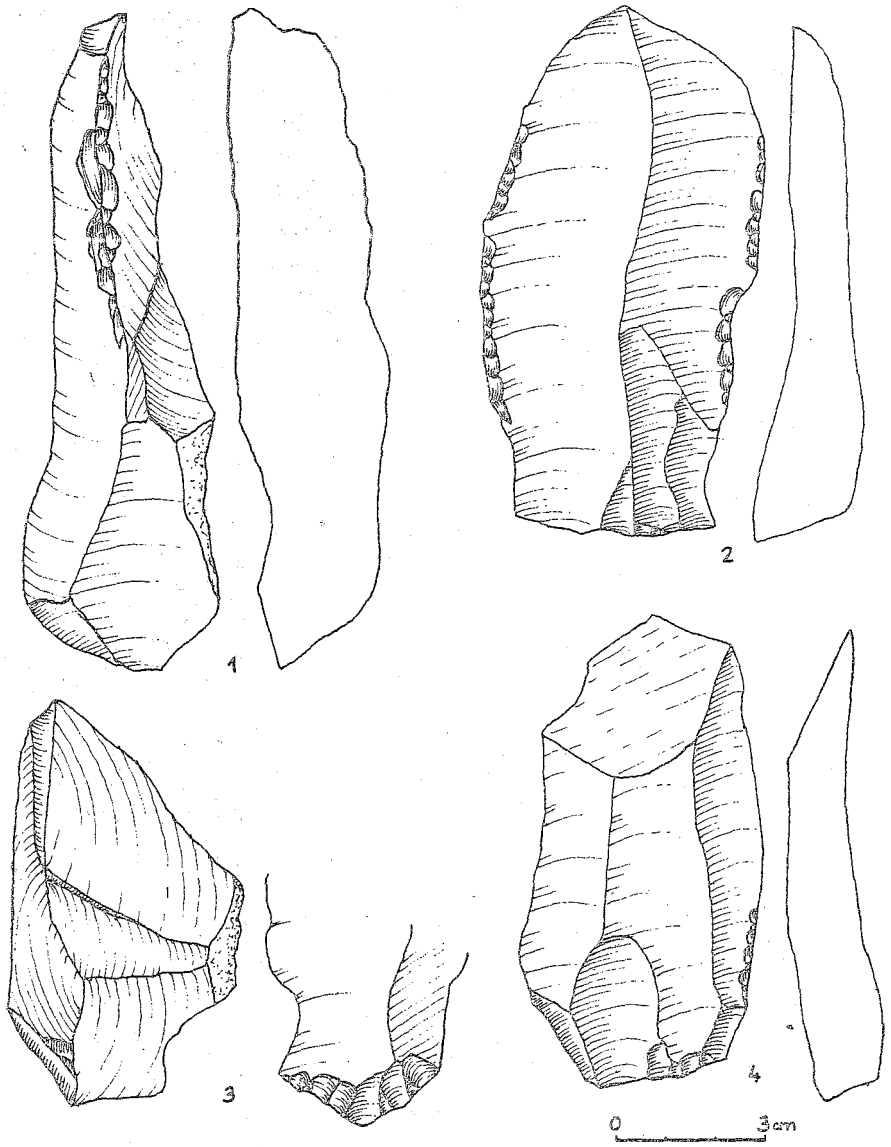

Fig. 5. Artifacts from Arroyo del Palo, Cuba. Collection of Institute of Archaeology, Academy of Sciences, La Habana

1—trimming blade, *2*—retouched blade, *3*—piece with high retouch on proximal part, *4*—notched blade

discussed below. Moreover, there is every reason to doubt the idea that Mayari culture represents the oldest stage in the development of ceramic producing societies in Cuba. This role rather belongs, as we have already shown, to inventories of the El Caimito-Canimar type, while the earliest

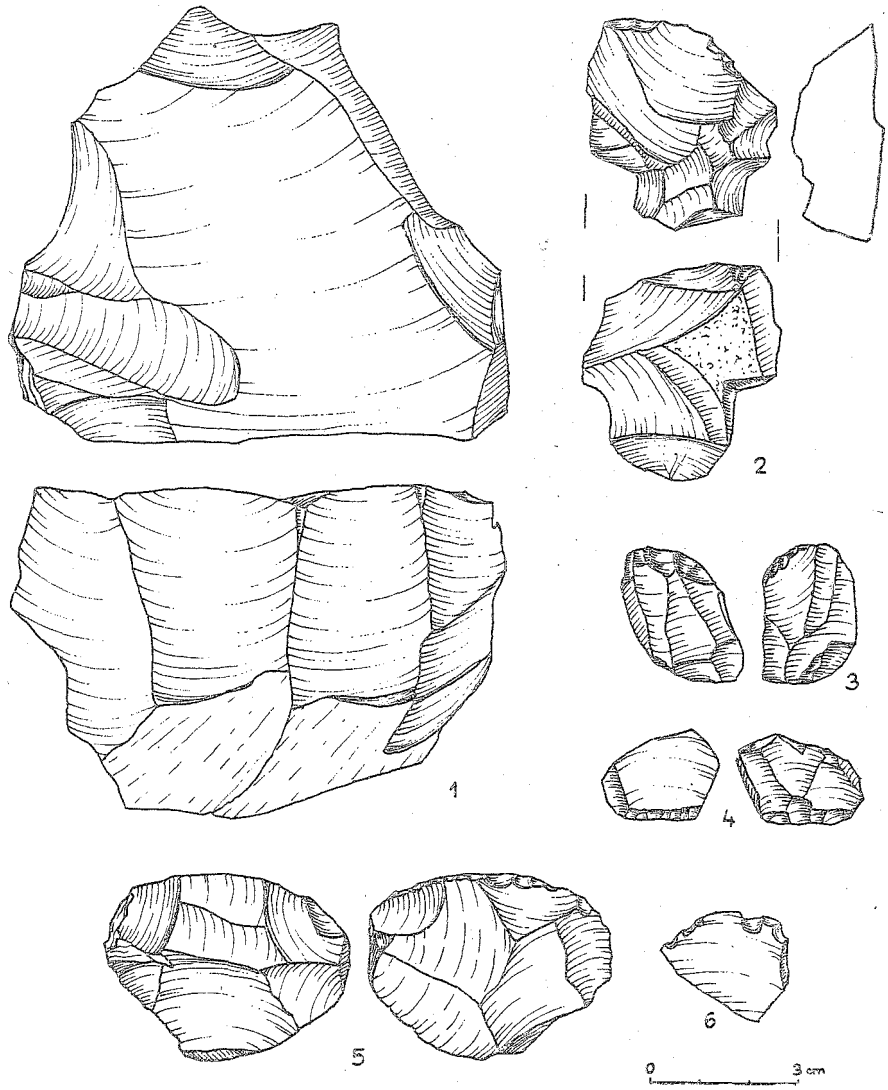

Fig. 6. Artifacts from Damajayabo, Cuba. Collection of University in Santiago de Cuba
1, 2—cores, *3, 4*—splintered pieces, *5*—side-scraper, *6*—denticulate implement

phase of influence by the meillacoid series should still be associated with Sub-Taino culture. This hypothesis, based on C 14 datings, appears very probable, especially if we reject the idea of the presence in Mayari culture of local preceramic traditions of stone industries.

Analysis of the situation relating to sites of Mayari culture also involves the still controversial issue of the incidence of blade technique on sites of the Meillac type in Hispaniola. As the work of I. Rouse reveals (1941, fig. 6:

4, 5), blade knives (in reality these are unretouched blades) occurred only in Moyeaux and Diale I (Republic of Haiti) in individual cases (one for each of these sites). All the available data, as well as the context provided by other stone implements, tend to suggest that they were a mechanical addition (probably connected with the local settlement of Damajayabo-Couri culture). The local production of flint blades has not been established on any of the sites with Meillac type ceramics.

3. ASSEMBLAGES WITH CERAMICS OF THE SUB-TAINO TYPE

Although many sites of the Sub-Taino type have been unearthed, there are only a few in which the absence of earlier additions may be guaranteed, and which contain flint material carefully collected during excavations. Of the Cuban sites, we have selected three:

1. The well known two-level site of Damajayabo near Santiago de Cuba, of which the upper level, connected with Sub-Taino culture, has been dated at circa 830 A. D. (Martinez Arango 1968). According to the published material, this level has yielded 68 flint implements, part of which (17 pieces), however, are ordinary unworked fragments;

2. the Los Mates site, situated in the region of Holguin and thoroughly investigated by F. Martinez Arango; dated at the 15th century A. D. This site has yielded a collection of 142 flint products, made available to us by the discoverer (in the holdings of the Anthropological Museum of the University in Santiago de Cuba);

3. The El Morillo site near Matanzas, carbon-dated at circa 1360 A. D. For this site we examined material from the Montané Museum of Havana University, thanks to the kind permission of Professor M. Rivero de la Calle and of R. Dacal Moure.

These materials, covering essentially the whole range of Sub-Taino culture in Cuba, reveal a considerable amount of common features, which does not, however, exclude certain local elements, particularly in the case of El Morillo.

Basically, the technique of stone-working here was of the flake variety, but also included some tools made from unworked pieces of flint.

The predominant core type is the discoidal flake core (fig. 6: 2; 8: 4) usually quite irregular, but almost always bifacial. As a rule the edges of the cores have not been levelled, which gives them a denticulated surface. Such cores are present on all three sites.

Apart from the discoidal type, there are low single-platform cores, used for striking off regular rectangular or triangular flakes, which because of the levelling of their edges sometimes resemble blades, but which from the point of view of size are not blades (fig. 6: 1; 8: 3).

The third category consists of multi-platform (mostly triple-platform)

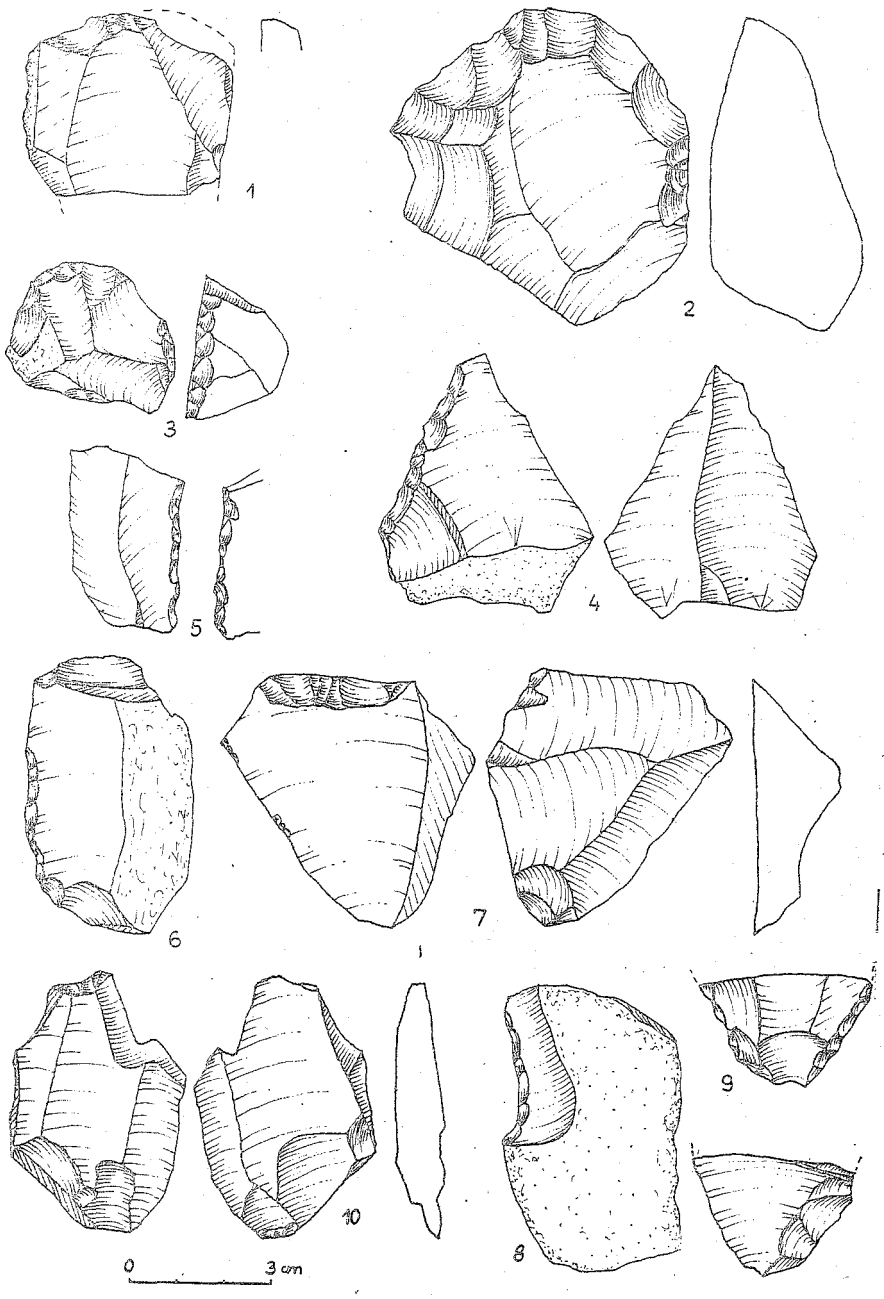

Fig. 7. Artifacts from Los Mates, Cuba. Collection of University in Santiago de Cuba
1-3—end-scrapers, *4-7*—side-scrapers, *8*—notched implement, *9*—flake with thinned base, *10*—splintered piece

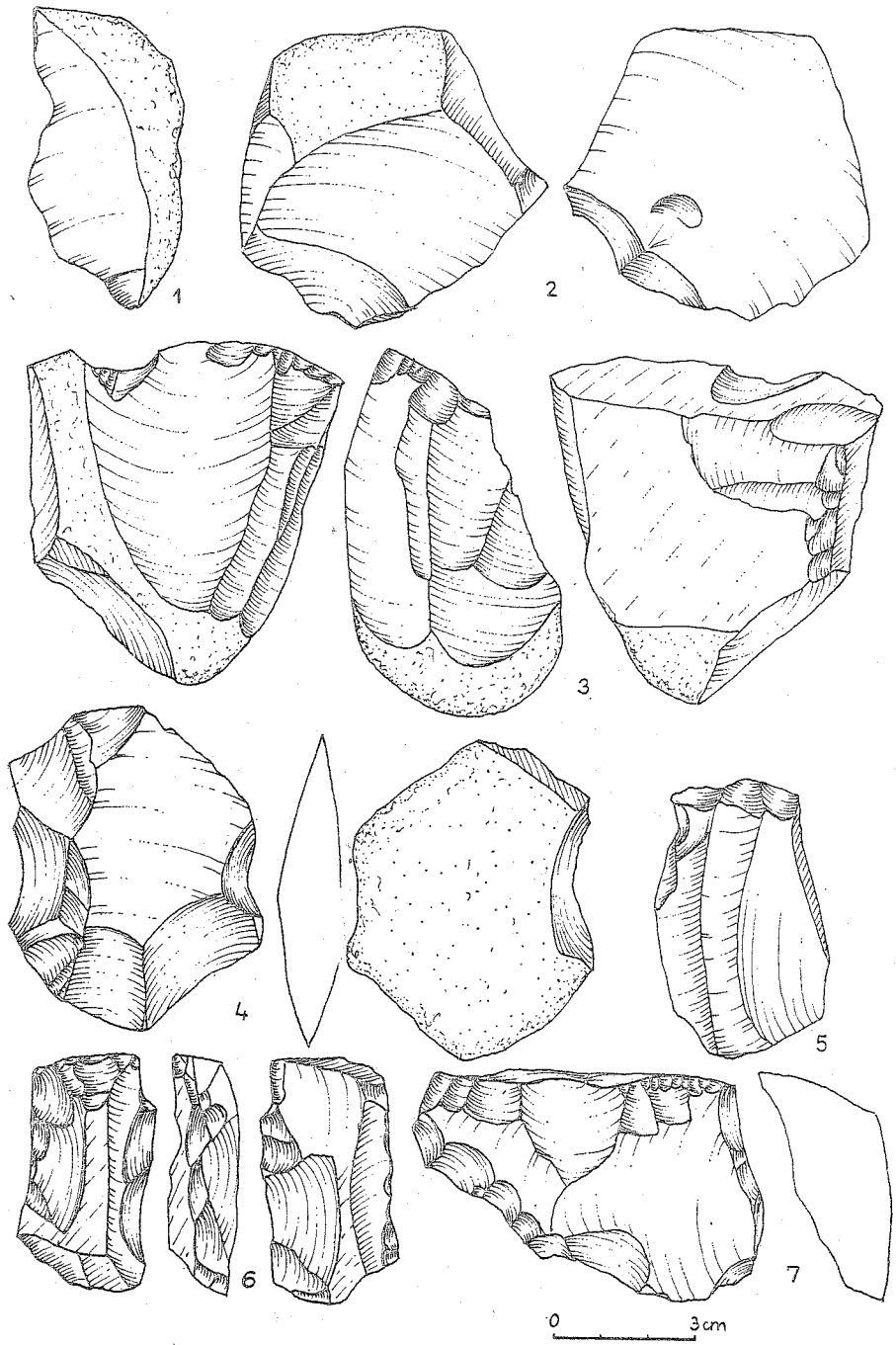

Fig. 8. Artifacts from El Morillo, Cuba. Collection of Montané Museum, University of Habana
1-2—flakes, *3, 4*—cores, *5*—end-scraper, *6, 7*—side-scrapers

flake cores, sometimes cylindrical in shape, with consecutive striking faces. More rarely multi-platform cores of polyhedral-globular shape are encountered.

Besides normal core exploitation, with an organized system of striking platforms and striking faces, other methods have also been observed: namely,

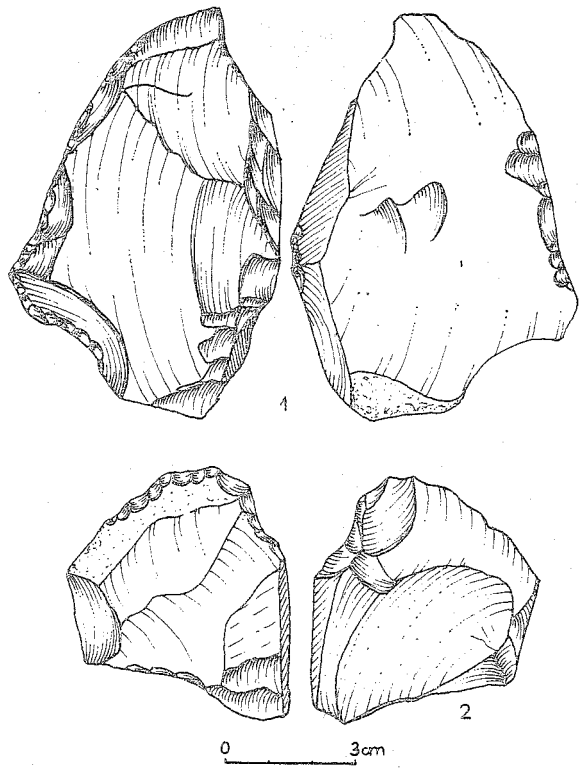

Fig. 9. Artifacts from El Morillo, Cuba. Collection of Montané Museum, University of Habana
1, 2—side-scrapers

the splintered and amorphous techniques. The latter generally consisted in the transversal fracturing of slabs of chert (more rarely of quartz or calcite), without any apparent intention of influencing the shape of the flake. This is characteristic only of sites from Oriente province.

Through the application of the above types of core different kinds of flakes, set out in table III, were obtained.

As these details clearly show, the type of core entirely corresponds to the blank obtained. The technique of core exploitation is likewise connected with the method of butt preparation, see table IV.

In this case the occurrence of faceted butts is due above all to a change in the orientation of multi-platform cores, when a former striking face serves

Table III

Flakes	Los Mates		Damajayabo (upper level)		El Morillo	
	Quantity	%	Quantity	%	Quantity	%
Primary flakes	13	13.1	6	13.3	4	16.0
Partially cortical flakes (fig. 8: 1)	—		8	17.7	3	12.0
Flakes from discoidal cores (fig. 8: 2)	14	14.1	4	8.9	3	12.0
Flakes from 90° cores	3	3.0	4	8.9	—	
Ordinary flakes, rectangular or triangular	22	22.2	2	4.4	4	16.0
Flakes from the rejuvenation of striking platforms	1	1.0	—		—	
Splintered flakes	3	3.0	2	4.4	1	4.0
Fragments of flakes	9	9.1	12	26.6	9	36.0
Amorphous flakes from chert slabs	12	12.1	2	4.4	—	
Flakes from hammerstones	22	22.2	5	11.1	1	4.0
Total	99		45		25	

as the basis for a new one, whereas the presence of butts formed with a single blow results from the deliberate preparation of striking platforms on the cores.

The dimensions of the blanks also reflect the systems of core exploitation described here. Only a few flakes approach the size of blades (i.e. they slightly exceed the proportion of 1:2), while most of them fall within the range of 1:2-1:1. There is, moreover, quite a considerable number of flakes, whose width is greater than the length. This is illustrated by the following table and morphometric diagrams (fig. 10, 11).

Table IV

Site	Primary butts	Unfaceted butts formed with single blow	Faceted butts	"Wedge" butts	Total
Los Mates	15	12	5	7	39
Damajayabo (upper level)	9	8	5	3	25

In the case of all assemblages, the application of hammering is evident. This is further confirmed by numerous finds of hammerstones, mainly of the edge type, on all the sites in question; in addition to these, Los Mates contained numerous flakes from hammerstones.

The implements are also clearly of the flake variety. Unfortunately, the series described here are not particularly numerous, thus the relative proportions of finds in the various groups may serve only as a general guide.

Table V

Site	Proportions						Total
	1 : 2		1 : 2—1 : 1		> 1 : 1		
	Quantity	%	Quantity	%	Quantity	%	
Los Mates	5	5.7	43	49.4	39	44.8	87
Damajayabo (upper level)	1	4.1	14	58.3	9	37.5	24

The tools are quite heavy, though not particularly large, and were made by applying extremely varied retouches. The main groups of implements are presented in table VI.

Table VI

Retouched tools	Los Mates	Damajayabo (upper level)	El Morillo
End-scrapers on flakes			
blade type (fig. 7: 1)	1	—	—
high (fig. 7: 3, 8: 5)	1	—	—
discoidal (fig. 7: 2)	1	—	1
Side scrapers			
lateral (fig. 7: 4-6)	6	—	1
bifacial (fig. 8: 6; 9: 1)	9	—	4
transversal (fig. 6: 5)	2	1	1
Side scrapers of the El Morillo type (fig. 7: 7)	1	—	4
Flakes retouched on the ventral side (fig. 7: 9)	1	—	—
Notched implements (fig. 7: 8)	1	—	1
Denticulated implements (fig. 6: 6)	4	1	4
Fragments of implements with a steep retouch	2	—	1
Splintered pieces (fig. 6: 3, 4; 7: 10)	15	2	2
Total	14	4	19

The few end-scrapers are clearly of the flake kind. One specimen from Los Mates has more regular lateral edges, as it was made on a rectangular flake from a single-platform core.

The side-scrapers have unifacial retouches, generally steep and denticulated, as in the case of elongated side-scrapers; otherwise they have inverse retouches, as in the case of transversal side-scrapers. A separate group is formed by specimens with a bifacial retouch. However, this is never a flat, covering retouch, but rather splintered. Some convex side-scrapers are very sym-

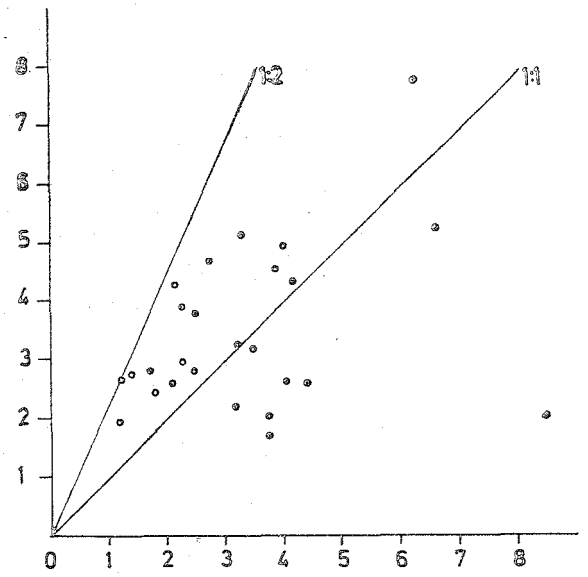

Fig. 10. Damajayabo, Cuba. Length/Width Scattergram for debitage. Black points—primary flakes

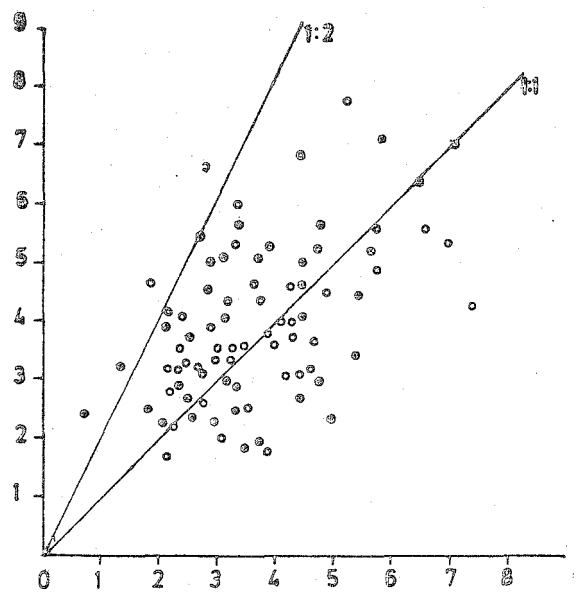

Fig. 11. Los Mates, Cuba. Length/Width Scattergram for debitage. Black points—primary flakes

metrical, while others (especially straight-lateral) have incomplete, rather irregular retouches.

A unique group of implements consists of side-scrapers of the El Morillo type. We have used this term to denote specimens of the flake variety, which possess a steep, relatively high retouch on one or two parallel edges and a convex retouch (as on "hand-adzes") on one of the other edges. Their exact function remains a puzzle; possibly they were tools for chopping, or used as adzes. A satisfactory explanation of this problem could be reached only through traceological research.

Denticulated and notched implements do not form typologically homogeneous groups. Their retouches are unevenly distributed over various parts of the flakes.

Similar "tool kits" occur on other sites containing ceramics of the Sub-Taino type. This is particularly true of the sites from the Banes area (Rouse 1944). Nevertheless, there are some sites which diverge in certain ways from this model. Divergences are found above all in two inventories from the collections of the Montané Anthropological Museum in Havana—Laguna de Potosi (Camaguey province, excavated by M. Rivero de la Calle in 1966), and Imias (Oriente province, collection no. 810). The first site—besides tools similar to those already discussed (denticulated implements, a flake with a flat inverse retouch at the distal end—fig. 12: 5, a kind of small side-scraper of the El Morillo type—fig. 12: 6), and besides showing a similar technique for obtaining flake blanks (multi-platform flake cores—fig. 12: 2, 3)—also yielded some new elements: a typical chopper from white quartzite (fig. 12: 1), a kind of perforator and a blade with a flat alternate retouch on both edges (fig. 12: 4). The size of this last example (a slender flake) exceeds the dimensions of blanks known from assemblages of the Sub-Taino type. Perhaps, then, it is a foreign addition, or an object found by the people of Sub-Taino culture and subsequently reutilized. This last possibility would appear to be most likely.

The chipped stone industry from the Imias site is even more original. Materials worked here were exclusively flat pebbles of quartzite or sedimentary rocks (slate, mudstone). From such pebbles a kind of end-scraper was produced (fig. 13: 2), or sometimes "half handadzes", by means of the deep surface treatment of one side (fig. 13: 1). But the most frequent products were pebbles with two lateral notches formed uni- or bifacially by retouching the notch, or by making one with a single blow (fig. 13: 4, 5). These objects resemble weights used on fishing nets, produced in the Antilles by smoothing down lateral notches. The Imias collection contained only one flake tool, resembling side-scrapers of the El Morillo type, made from white quartz (fig. 13: 6). And finally, mention should be made of pebbles showing sings of initial striking (fig. 13: 3).

The stone implements listed above were discovered in Imias alongside typical Sub-Taino ceramics, decorated with linear motifs, strokes and reliefs.

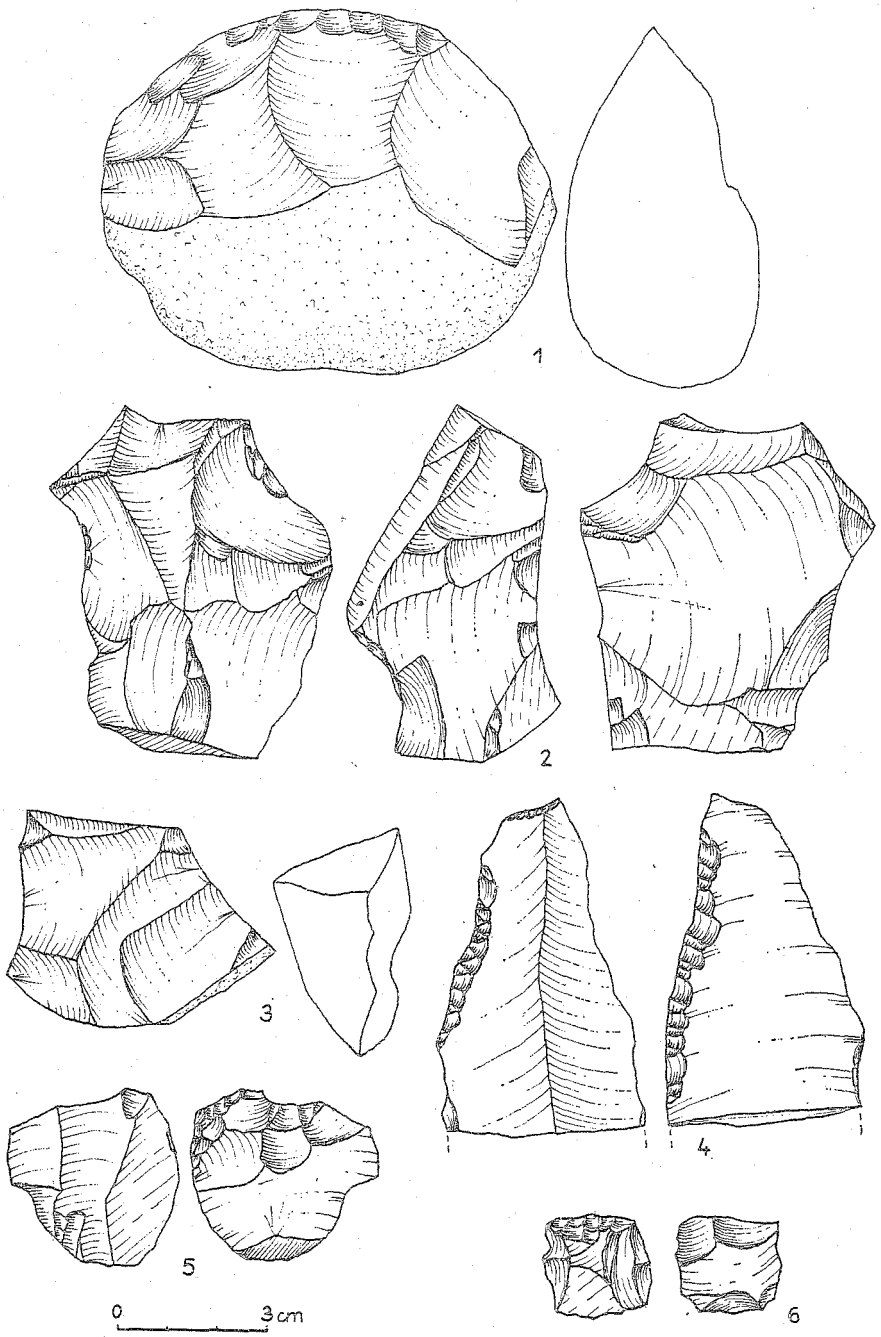

Fig. 12. Laguna de Potosi, Cuba. Collection of Montané Museum, University of Habana
1—chopper, *2*, *3*—cores, *4*—retouched blade, *5*—flake with deep retouch on distal end, *6*—El Morillo scraper

This would seem to suggest that the stone industries accompanying them could be of different kinds. In fact, however, most of these sites are characterized by flake industries with "tool kits" of the type discussed earlier.

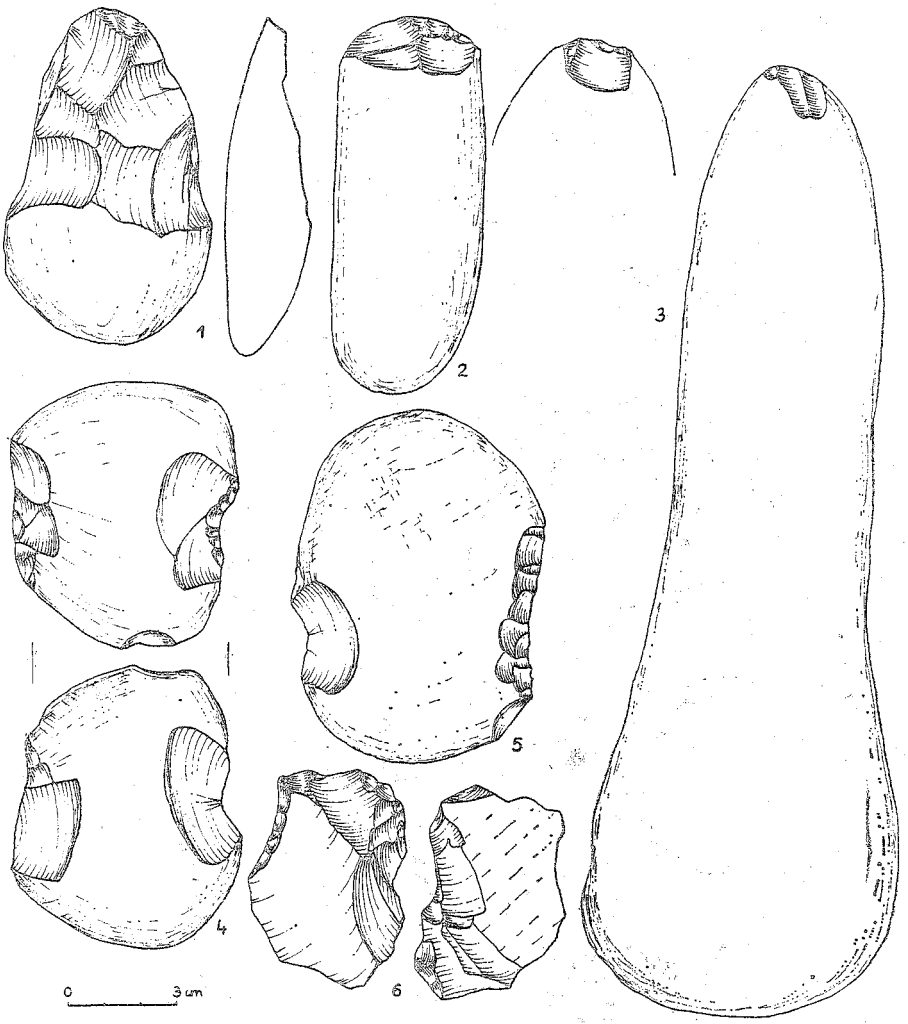

Fig. 13. Artifacts from Imias, Cuba. Collection of Montané Museum, University of Habana
1—„Hand-adze", *2*—„end-scraper", *3*—flat pebble with inicial working, *4*, *5*—„notched" pebbles, *6*—El Morillo scraper

When examining the problem of the origin of those flake industries, which belong to Sub-Taino culture in Cuba, we must take account of the fact that Sub-Taino ceramics undoubtedly arose from the development of ostionoid traditions, in particular of Meillac culture. We may thus agree with the opinion

of most scholars (Rouse 1964; Tabio, Rey 1966), that the appearance of Sub-Taino type ceramics was connected with the migration of the Neo-Indian population from Hispaniola to Cuba. This fact should lead to the conclusion, that the technology of stone industries accompanying Sub-Taino ceramics was introduced as a result of this same migration. Unfortunately, previous investigations rather suggest, that the peoples of Meillac culture did not use chipped stone implements. The excavations of I. Rouse (1941), carried out in the Republic of Haiti, suggest that apart from what were probably mechanical additions of blade implements from Seboruco-Mordán culture, the sites of Meillac culture were devoid of chipped stone implements. On the other hand, Rouse lists a number of polished implements (petaloid axes, a stone chisel, hammer-grinders, rubbing stones), among which only a "stone net sinker" is of special interest, since it is related to the notched pebbles from Imias. I should also be mentioned here, that the relatively early (belonging to the ostionoid complex) Igneri culture in Puerto Rico is supposed to have such pebble products—chipped stone axes and some flakes—among its characteristic features "pieces of flint" according to I. Rouse (1952).

In the light of the above information, we may put forward several tentative hypotheses concerning the origin of the stone industry of Sub-Taino culture:

1. The industry was imported to Cuba in the form of a "kit" of implements based on pebbles, and of implements produced by smoothing and "pecking" techniques. Only in Cuba itself did the adoption take place of flake techniques, together with a "tool kit" comprising end-scrapers, side-scrapers, notched and denticulated tools. This hypothesis points in a similar direction to the earlier suppositions of S. Loven (1935).

2. Flake techniques and implements are fully developed in Cuba in the 1st millennium A. D., both in Guayabo Blanco culture (in the sense given this term by J. K. Kozłowski, 1975), and in Carnero culture (cf. also Kozłowski 1975, p. 58). Since all the basic groups of implements known from Sub-Taino culture also appear in both the above mentioned cultures, the possibility exists that they were borrowed by the Neo-Indian population from the local Meso-Indian tribes. It is worth noting, that the peoples of Guayabo Blanco culture lived mainly in the western part of the island (where Neo-Indian settlement is rather exceptional), whereas Carnero culture settlements were concentrated, among other places, in the southern part of Camaguey province, that is in the immediate vicinity of the region settled by the peoples producing Sub-Taino ceramics.

A verification of these theories would of course require a more extensive study of the whole range of material from the entire Greater Antilles.

Finally, there remains the problem of the last wave of Neo-Indian settlement, which occurred in the Greater Antilles in the form of the so-called chicoid series. This wave is associated with so-called Carrier culture in the case of Hispaniola, and with Taino culture in the case of Cuba. The latest

excavations of sites on the eastern promontory of Cuba (e.g. Laguna de Limones) indicate that the differences between Sub-Taino and Taino culture are not in fact very large (Guarch 1972, p. 29). Only by means of a statistical analysis of the larger series is it possible to establish any closer relationship between sites with Taino type ceramics and those with Carrier type ceramics. Unfortunately, we did not have the opportunity to study the stone inventories accompanying ceramics of the Taino type from the sites on the eastern promontory of Cuba. Nevertheless, data cited by J. Guarch (1973) provide adequate proof that the flint industry here was of the flake kind. He mentions the occurrence of side-scrapers and other retouched flake implements, unfortunately without giving drawings or other typological comparisons. This problem requires separate study.

CONCLUSIONS

In the light of our discussion, the chipped stone industries accompanying ceramic assemblages in the Greater Antilles may be attributed to two distinct traditions:

1. Microlithic blade industries connected with the earliest ceramics around the turn of the 1st millenium B. C. and the 1st millenium A. D. They probably derive from formative microlithic industries on the mainland.

2. Flake industries concomitant with ceramics of the ostionoid series, represented on Cuba by the industries of Mayari and Sub-Taino culture. There is no evidence for the existence of separate industries characteristic of Mayari culture, and the same is probably true of Taino culture. The flake industries discussed in this study possibly derive from a local substratum of Meso-Indian cultures, whose development in Cuba (until the discovery of the island by Columbus) was parallel to that of Neo-Indian cultures.

Translated by Ewa Lee

BIBLIOGRAPHY

BULLEN, R. P.
1974 *Were there Pre-Columbian cultural contacts between Florida and the West Indies: the archaeological evidence*, "Florida Anthropologist", vol. 27, no. 4

BULLEN, R. P., H. K. BROOKS
1967 *Two ancient Florida dugout canoes*, "Quarterly Journal of the Florida Academy of Sciences", vol. 30, no. 2

BULLEN, R. P., J. B. STOLTMAN
1972 *Fiber tempered pottery in Southeastern U. S. and northern Columbia: its origin context and significance*, Florida Anthropological Society

FORD, J. A., Ph. PHILIPS, W. A. HAAG
1955 *The Jacketown site in the West Central Missisipi Valley*, "Anthropological Papers of American Museum of Natural History", vol. 45, no. 1
FORD, J. A., C. H. WEBB
1957 *Poverty Point: a Late Archaic site in Luisiana*, "American Museum of Natural History—Anthropological Papers", vol. 46, no. 1
GUARCH, J.
1972 *La ceramica taina de Cuba*, "Serie Arqueologica", vol. 2, La Habana
1973 *Tercera parte del estudio sobre el grupo cultural Taino en Cuba*, "Serie Arqueologica", vol. 3, La Habana
KOZŁOWSKI, J. K.
1975 *Preceramic cultures in the Caribbean*, "Prace Archeologiczne", vol. 20
1975a *Levisa I (prow. Oriente)—pierwsze wielowarstwowe stanowisko paleoindiańskie na Kubie*, "Sprawozdania Archeologiczne", vol. 27
LOVEN, S.
1935 *Origins of the Tainan Culture, West Indies*, Göteborg
MARTINEZ ARANGO, F.
1968 *Superposicion cultural en Damajayabo*, La Habana
REICHEL DOLMATOFF, G.
1957 *Momil—a formative sequence from the Sinu valley*, "American Antiquity", vol. 22, no. 3
ROUSE, I.
1941 *Culture of the Fort Liberté Region*, "Yale University Publication in Anthropology", vol. 24
1944 *Archaeology of the Maniabon Hills, Cuba*, "Yale University Publications in Anthropology", vol. 26
1948 *The West Indies: an introduction the Ciboneys. Handbook of South American Indians*, vol. 4, Washington
1952 *Puerto Rican prehistory*, "Scientific Survey of Puerto Rico and the Virgin Islands", vol. 18
1964 *Prehistory of West Indies*, "Science", vol. 144, no. 3617
TABIO, E., J. GUARCH
1966 *Excavaciones en Arroyo del Palo*, La Habana
TABIO, E., E. REY
1966 *Prehistoria de Cuba*, La Habana
VELOZ MAGGIOLO, M.
1974 *Esquema para una revision de nomenclaturas arqueologicas del poblamiento preceramico en las Antillas*, Santo Domingo
1976 *Medioambiente y adaptacion humana en la prehistoria de Santo Domingo*, "Historia y Sociedad", vol. 24
VELOZ MAGGIOLO, M., E. ORTEGA
1971 *El preceramico de Santo Domingo. Nuevos lugares y su posible relación con otros puntos de Arca Antillana*, Santo Domingo
VELOZ MAGGIOLO, M., E. ORTEGA, P. PLINIO PINA
1974 *El Caimito: un antiguo complejo ceramista de las Antillas Mayores*, Santo Domingo