

THE PETROGLYPHS OF MAISABEL:
A STUDY IN METHODOLOGY

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This paper is about rock art despite its difficulties. Indeed, the problems which afflict the study of *arte rupestre* are so legion that many professional archaeologists mistakenly eschew its study. This is particularly unfortunate since both early (Fewkes 1907:150; Mallory 1972[1893]: 136) and recent (Sued Badillo 1972:8) authorities have remarked about the singular elaboration and quality of Puerto Rican petroglyphs. In the following report on the petroglyphs associated with the Elenan-Ostionoid component of the large Saladoid-Ostionoid Maisabel site on the north-central coast of Puerto Rico, near Vega Baja (Fig. 1), I hope to show that this assessment is in error. As I refer to these unique engravings, I will borrow the term "lithograph" from Cruxent (1955). However, I will utilize it as a cover term for both of the kinds of rock art most commonly found in the Caribbean: petroglyphs (the engraved form) and pictographs (the painted). These particular petroglyphs are unusual because they are cut horizontally into the bedding plane of the beach rock, in the tidal splash zone in front of the site (Figs. 2-3), rather than the normal pattern of being engraved on river boulders, plaza margins or cave walls.

One problem in analyzing this art form is context, or rather the lack of it. Because they frequently appear alone, or in dubious association with other datable artifacts such as pottery, lithographs present a problem of dating (Porras 1973:2-3; E. Rodriguez 1985:45). To this fundamental difficulty may be added the great formal, stylistic and executional variety of the rock art itself. To quote an early, and influential, student of petroglyphs in the Greater Antilles, "(t)he forms which these pictographs take are almost numberless" (Fewkes 1907:154). This variation is further compounded by the notorious difficulty in deciphering the "meaningful" or "intentional" meandering lines of a lithograph. This field hurdle begins with merely distinguishing these lines from the natural fissures in the stone. Thus rock art all too often constitutes the prototypical instance of a prehistoric "Rorschach Test," where the most fevered imagination can "fill in the lines" with everything from Mexican glyphs to the tracings of ancient astronauts.

During the course of documenting the Maisabel petroglyphs, I will try to partially resolve these problems on three levels:

- (1) data recovery, through a novel technique of polyethylene-tracing;
- (2) stylistic syntax, via an equally new methodology of "generative-grammatical" componential analysis; and
- (3) semantics (iconography), through ethnohistorical and ethnographic analogy.

My treatment of the last level of analysis will hypothesize certain ideological, economic and political functions for these petroglyphs. In other words, I hope to outline how *arte rupestre* can be a resource in its own right, not an impediment, or worse, an irrelevant "epiphenomenon" of some other aspect of culture.

METHODOLOGICAL DIFFICULTIES OF LITHOGRAPHIC DATA RECOVERY

To begin at the beginning, at the level of perception, one problem continues to be a lack of established methodology (Sujo Volsky 1975:59). How does one record both kinds of lithographs? Back before the advent of small, portable cameras the difficulty began with the untrained human eye. Mallory (1972[1893]:762-763, Plate LIV), in his early classic on Amerindian "picture writing," illustrates the barely recognizable renditions of the same designs by differently skilled drawers of the Algonkian Dighton Rock petroglyphs in Massachusetts from 1680 to 1830.

Closer to home, Delgado (1976:105, Illus. 27-29) has pointed to the mistaken variations present in the literature of boulder petroglyphs in Venezuela. I documented a similar process of perceptual distortion by conducting an experiment with my fieldschool students from the Centro de Estudios Avanzados de Puerto Rico y el Caribe (CEAPRC), San Juan. I used one particular petroglyph from the Maisabel site, a plumed, goggle-eyed, Indian head (Figs. 4-6). I had twelve students do independent free-hand drawings of this petroglyph, cautioning them not to compare notes. I expected that their natural range of graphic skill and perceptual acuity would reflect the range of early travelers who sketched so many lithographs for us. As one might expect, the twelve resultant versions presented extremes of variation such that it was scarcely possible to discern that they all referred to the same engraving!

This "artistic" difficulty is particularly galling since the earliest work on lithographs in the Greater Antilles was done by Pinart (1979 [1890]), yet he was such an appallingly bad artist that his illustrations, to quote Fewkes (1907:149, n."a"), "...are too imperfect to aid the student in identifications of the pictographs (sic) [petroglyphs]."

One might expect the advent of the camera to have solved these technical problems, but, alas, this is not the case. We may have aesthetically compelling photographs of lithographs, such as those in Porras' (1973) survey of the petroglyphs of the Alto Napo River in Ecuador, but they are of less than optimal use if the investigator, as in that case, does not provide a scale for size or a north arrow for orientation. The same lack of scale hampers drawings based on the petroglyphs, as in Delgado (1976) on Venezuelan lithographs, or in rubbings ("surface printings"), of Puerto Rican petroglyphs presented by Frassetto (1960:Figs. 5-6). Even worse, the literature is replete with illustrations of lithographs offered without either scale or labels, whether as to media or provenience (Delgado 1976:Illus. 4, 136-236).

This paper will introduce a new field methodology for compensating for this differential lack of drafting skills, that of polyethylene-tracing.

This method is presented as an accompaniment to, not replacement of, such traditional recording methods as sketching, photography and rubbings.

ANALYTIC PROBLEMS IN LITHOGRAPHIC SYNTAX DECIPHERMENT

The technical difficulties of lithographs do not end with their recording, however. There is still a dearth of intersubjectively recognized schemata for analyzing the lithographs once they have been recorded. Whether this applies to simple stylistic analysis and typology, or to the more ticklish problem of iconography, it is still true that a powerful analytic system for teasing meaning from this art form is only in its infancy. Recently, however, a promising new approach based on the pioneering efforts of Shepard (1971) in ceramic analysis has been applied, via analogy, to lithographs by Sujo Volsky (1975). This is essentially a componential analysis whereby the student "decomposes" the image into its component parts and reconstructs the common pictorial forms out of those parts using the simple rules of bilateral and rotational symmetry (Sujo Volsky 1975:99-103, 106). In this approach, the designs are considered within their total context by specifying different levels of analysis, from the general environment of the lithographs, through the interrelationships of the various figures, to the identity of the images themselves. Or, the analyst may proceed from the opposite direction, from the basic constituent elements of the component parts of the figures, and their interrelationships, to the component parts themselves and their mutual relations (Sujo Volsky 1975:96).

The approach I will suggest here is actually an independent invention similar to Sujo Volsky's approach, and it uses some of the same antecedent methods, such as Shepard's symmetry rules. However, my method diverges from hers by being more generative and grammatical. The genealogy of my approach actually dates back to Rouse's (1939) pioneering modal analysis of pottery and Lathrap's (1970) subsequent modifications of it to present processual "routing diagrams" of artisan-viewed creation. That technique has been further modified by Lathrap's students (Raymond et al. 1975) into a generative "design grammar" approach. This new methodology envisions both primitive constituent elements of the designs ("design elements") themselves, as well as the ordered and recursive rule sets that can be applied to them. These rules will then yield recognizable compounds of elements, or "motifs." This analysis was first applied to a Late Prehistoric pottery style in the Peruvian jungle, the 9th century A.D. Cumancaya Tradition (Raymond et al. 1975), and then extended by myself to the modern, related, ethnographic decorative art of the Shipibo-Conibo Indians within that same region (Roe 1980).

The advantage of this system is that it allows the analyst to "talk with the dead," to construct similar "statements," or combinations of motifs ("design layouts"), to those the long-deceased artists produced. It also allows the analyst to anticipate novel solutions before they are discovered in the archaeological record (Roe 1973:119). This method also allows the systematic comparison of different corpi of art and the operational specification of their stylistic and grammatical differences. "How similar is similar" can now be answered statistically or by an algorithm!

This same generative, design grammar approach has recently been applied to Saladoid, pre-Taino and Taino ceramic art by this author (Roe 1983b) and is now being extended to lithographs. As such, it parallels another interesting approach, which is also componential, and comes out of French structuralism. This has been applied by Henri Petitjean Roget (1976) to Lesser Antillean archaeological and ethnographic art. The possibilities of an "emic archaeology," which all of these cognate approaches offer, are stimulating and offer great promise. Some of these, as in computer simulation and replication of ethnic design structure, are already realized (Roe 1982b, 1983a).

THE SEMANTICS OF LITHOGRAPHS: PROBLEMS OF ETHNOGRAPHIC ANALOGY

Another difficulty facing the analyst of rock art is the notorious problem of accurately deciphering the semantics, or iconographic meaning, of these cryptic images. Again to quote Fewkes (1903:467), "(w)e know so little of the conventional symbolism of the aborigines of the Antilles that it is difficult to hazard an explanation of the meaning of individual pictographs, but we may very properly suggest an interpretation of their general significance."

Part of the problem, at least in the Antilles, was the early disappearance of the Indians and the imperfect, and garbled, ethnographic accounts, such as those of Father Pané (Arrom 1974), that we possess of their ideology (Roe 1982a:191). Of course, we are also in doubt as to the relationship of these images to that ideology. About all we know is that lithographs were only one form of "spiritual house," or "zemi," of the multitudinous spirits that inhabited their cosmology. Other vehicles for these same spirits could take the form of wood sculpture, cotton figures, or carved stone images.

In the lowlands of South America, where these images and the peoples who produced them had their origin (Fewkes 1903:463-464, 1907:151-152), the matter is only slightly clearer. The literature is replete with instances where early ethnographers ascribe total ignorance of the origin and function of lithographs to present-day Indian occupants of their range. This implies greater antiquity for these works than the ethnographic present. The range of native explanations for these artifacts, in the face of that ignorance, is manifold. Brown (1873:254-257) records the Indians of Guiana as believing that they were made by "Makunaima, their great spirit" (more likely, a Culture Hero). Similar veneration, and ignorance of manufacture, is recorded by von Humboldt (1850, I:196-201), referring to Schomburgk's voyages on the Essequibo. Sometimes fear, rather than veneration, greets these powerful works of the spirits, as Im Thurn (1883:368-369) notes for the Indians of Guiana. His recording of Indians rubbing pepper into their eyes upon seeing such graven images is understandable given lowland South Amerindian analogy of pepper with "culturally-cauterizing" fire holding these "raw" spirits at bay (Roe 1982a; 1985).

Recent sources, like Porras (1973:3), record the same ambiguity on the part of modern Indians to these ancient works. He cites both Quichua (Quijos) and Achuar (Jíbaros) attitudes to the Alto Napo petroglyphs ranging from the work of the devil, or the savage (i.e., alien) "Aucas," to

the homes of their own dead ancestors! Nevertheless, analysts tend to concur on the obvious "religious" connotations of such works and the sites in which they are most commonly found: caves and rapids or pools in white-water rivers. Brown (1873:257), for example, cites both the great care with which the river boulder petroglyphs were cut on the Corentyn, Berbice and Cassikytyn (Kassikaytiu) Rivers of Guyana, as well as the phallic imagery present on some of them, to argue for a religious purpose behind their creation. In the same manner, Pinart (1979[1890]) speaks of the caves within which many Puerto Rican petroglyphs are cut, and pictographs painted, as rendezvous points for ancient Indian ceremonies and sacrifices. Fewkes is more explicit in citing modern Puerto Rican folk wisdom among the "Jibaros," or *mestizo* peasants of the interior of the island. Presumably because they may have some Taino heritage, their belief that the caves and their associated artifacts are sacred is relevant here. These enigmatic symbols are still associated with the Indians (as troglodytes) and their works are still (as of the early 20th century) ascribed with magical properties and actions (Fewkes 1907:156-157). There is some chronicler evidence to back up these surviving folk beliefs:

The Indian belief that caves were the dwelling places of spirits is mentioned by several writers of the sixteenth century. These spirits were supposed to leave the caverns and wander over the earth at night. The superstition is still current in several West Indian islands. The Antilleans, like the Pueblo Indians of our Southwest, believed that the first man and woman emerged from a cave in the earth or were born of the earth Goddess. The dead were supposed to return to the caves consequently (specially as ancestor worship played a most important role in their worship) they performed many of their ceremonies in caves and subterranean caverns (Fewkes 1903:453, n.1).

Indeed, in lowland South Amerindian cosmology, I have argued (Roe 1982a:138-139) that caves represent entryways into the subterranean or subaqueous Underworld. Just as those other liminal, or "connecting" overlapping realms, the mountains, they function as "shamanistic ladders" for access to the Upper and Lower Worlds that symmetrically flank the earth on which men dwell. In the case of the Waiwai of our recent expedition to the Upper Essequibo, these Caribs regard the large boulders that dot the surging waters of the Essequibo as the fragmented remains of their World Mountain. To judge from other regional Carib associations, this World Mountain, or "Rock," is a mythic transformation of a petrified World Tree trunk holding up the three superimposed levels of their multi-tiered cosmos. It functioned both as armature and conduit to the world of the Bird Sky Spirits, the *kakenau kworokjam*. Thus any carvings engraved into these rocks would be sacred by association as well as representing the "mythically empirical" corroboration of the sacred accounts. "See," an informant could affirm, "the tales about the falling of the World Rock are true, don't you see its fragments, those huge boulders, there in the river to this day?"

Unfortunately, the use of these modern ethnographic accounts to explain the fabrication of archaeological petroglyphs entails a methodological problem. That problem is the appropriateness of the use of direct histori-

cal analogy between data derived from the ethnographic present (whether it be reports from the 16th or the 20th centuries) and the archaeological past. Boas (1955) long ago pointed out the mutability of symbolism, particularly of geometric designs, as one goes from one ethnic group to the next. On the archaeological level, Grieder (1975) also cautioned against such symbolic "disjunction" between different diachronic phases of even related prehistoric cultures.

However, if carried to extreme (Dubelaar 1986a:82-83) such a skeptical view, a kind of "interpretational nominalism," would demolish iconography as an approach to ancient art. Thus I will not choose that path but rather will attempt some limited decoding of the Maisabel petroglyphs, based on a general meta-cosmological model I have developed for lowland South Amerindian societies (1982a), as well as specific observations derived from my own recent ethnographic research among the Waiwai Indians of Guyana (1985). The latter are particularly important since they occupy the culture-geographic region from which the ancestors of the Maisabel Indians came in the first centuries B.C. Closer to home, I will also employ ethnohistoric studies conducted for coastal Taino settlements in Puerto Rico. The Taino were, after all, the direct descendants of the Elenan occupation of sites like Maisabel.

The last of the difficulties lithographs present is the seemingly limited kind of cultural data they can yield. Principally, this has been aesthetic information. Present-day artists have treated them as sources of inspiration reflecting a cultural identity they share or wish to share (Collazo 1983). As aesthetically compelling as these lithographs are, their cultural value is not limited to that important function.

The accurate recording of lithographs and the detailed spatial plotting of their distribution can also help in an understanding of their role in culture history and process, both over space and time. Botero y Oostra (1977:34-35), for example, have found that in Colombia petroglyphs and pictographs do not have the same pattern of distribution or history. Each medium occupies a different ecological zone, ranges across disparate geographical regions and has contrasting stylistic properties.

While the style of pictographs and petroglyphs does seem to co-vary in the Greater Antilles, with certain differences being an obvious product of their contrasting media, the primary, meticulous documenting of the spatial and stylistic variability of lithographs, such as Dubelaar has recently pioneered for the Guianas and the Lesser Antilles (1986a, 1986b), is still in its infancy in Puerto Rico. Despite the early efforts of Pinart (Alegria 1979), Fewkes and Mason (Dávila 1985), and the later work of Frassetto (1960), there is still no program of systematic island lithograph mapping, documentation and archiving. Although much work has been done, it is of highly variable quality, frequently unpublished or buried in contract reports. We are no closer today to a refined chronology of this form of rock art, much less a detailed mapping of style provinces, than we were in the 1960s.

This paper attempts to redress some of these deficiencies by presenting accurate scale drawings, photographically reduced from 1:1 polyethylene

tracings (Figs. 4, 7-13) and carbon paper rubbings (Fig. 6), together with scaled oblique and vertical photographs (with the contrastive filling-in done in non-destructive bread flour rather than the commonly employed chalk, Figs. 15-16), of some 32 new petroglyphs from the multi-component Maisabel site. I offer information on their execution, interrelationships, generative grammatical and modal analysis, iconography, cultural affiliations and dating.

I will also address a recent call by E. Rodriguez (1985:37) to extend the analysis of lithographs to new social domains, that is, beyond the aesthetic and religious. Whether this effort is called "social archaeology," or, as I prefer to designate it, "cultural archaeology," it signals an additional interest in rock art as a channel of communication between contrasting, and possibly competitive, ethnic societies. In this light rock art becomes relevant on both the subsistence and political levels.

Thus, despite the problems lithographs present to students of culture history and process, they also offer a broad spectrum of important cultural information about Amerindian societies. These societies, after all, uniquely combined the aesthetic and the technologic, the social and the metaphysical aspects of the human enterprise (Roe 1980, 1982a). With the proper recording techniques and methods of analysis, they can yield surprisingly detailed information about extinct cultural systems.

As Huckerby (1914:238) long ago pointed out, while most of the other artifacts and ecofacts the archaeologist deals with have emerged from the travails of preservational bias (their travel through time) as distorted or incomplete fragments of what were originally cultural wholes, petroglyphs often resist that distortion. While Indians never made potsherds (they made pots), "the petroglyphs have remained in the same position as they were when first chiseled by the prehistoric artist" (1914:238), and with their physical properties more intact than other aspects of material culture. Thus, while they present many problems, lithographs do offer, and often better than any other category of material desiderata, the cultural wholes that the archaeologists profess to reconstruct. One has only to decipher their cryptic messages.

THE SETTING OF THE MAISABEL PETROGLYPHS

The story of the Maisabel site (Ayes 1985b; Siegel 1986), first discovered in 1979 by a local resident based on his awareness of the petroglyphs near the shore, begins in early Cedrosian Saladoid times. The Maisabel site fits the pattern of other very large, but spatially isolated, sites along the northern coast of Puerto Rico (Roe 1984:156; Roe et al. 1985:56) (Fig. 1). One finds such sites on the windward side of the island, where the prevailing northeasterlies lash the coast, but where there are offshore, buffering ramparts that interfere with the easterly wavetrains (Kaye 1959:54, 60). In the process of diffracting the waves, such formations create shallow lunate embayments (Fig. 2). The latter provide calm anchorages for dugout canoes. Together with the offshore land forms, the embayments allow the formation of *thalassia* beds. The embayments and the reef-like characteristics of the sea-fronting formations create niches rich in fish and molluscan fauna. At Maisabel, those sea-

fronting formations are unusually broad and comprise lithified dune (eolinitic) and chemically identical calcite-cemented sandstone beachrock of Holocene age (Kaye 1959:50-51, 68-69). It is into the latter soft stone that the Maisabel petroglyphs were carved.

Many favorable circumstances other than the sheltered embayment, such as close proximity to the mouth of the Río Cibuco to the east, freshwater springs and low-lying swamps to the south, and the brackish environment of a large mangrove forest with accompanying molluscan and crustacean faunas to the southeast, all created the necessary conditions for an early, pioneering occupation. The result was a large Saladoid site (Fig. 2) with a concentrically-arranged, semi-circular pattern of mounds and flat plaza-like inter-mound areas. At least one such region had a specialized "cemetery" function (Siegel and Bernstein 1988). This occupation dates back to 100 B.C. by C-14 dating. Although other large contemporaneous sites lie far to the east, research in Dorado (to the immediate east) has confirmed the absence of a large Saladoid site in close proximity to Maisabel (Ortiz Montañez 1986:24). Rouse (1988:Fig. 5) depicts a distribution map with equivalently wide spacing to the west. Large sites with wide spaces between them hint at agonistic inter-societal relations. That is, a multi-ethnic competitive and pioneering setting must have existed. Indications of warfare in the early Saladoid osteological collections, both at Maisabel (Budinoff 1988) and Hacienda Grande (ex-Castillo [now CIIPR] collection includes a male skull with a similar stingray spine lodged in its base), confirm that pattern.

By 600-1200 A.D there was a widespread "bidirectional" (Ortiz Montañez 1986:25) settlement expansion by the Cuevan, Monserratean and then Elenan successor cultures (the last being of the "Ostionoid" series). While some sites penetrate into the piedmont zone of the interior, others moved toward the current coastline and a maritime orientation. This bi-polar movement corresponds to Rainey's (1940) hoary Crab/Shell Culture dichotomy. That dichotomy is now assuming the dimensions of a gradual, in situ, continuum of changing adaptation, à la Goodwin (1980) and Rouse (1986). This new settlement pattern represented a "settling-in" to the unique insular environment that Puerto Rico offered and thus created a subsistence base for a subsequent massive demographic expansion. Elenan sites are much more numerous than their Saladoid predecessors, but individually much smaller. Their close proximity, one to another, argues for a more pacific milieu.

At the Maisabel site, these regional changes are manifested in a way that also argues for a continuity of culture. This was reflected in a similar concept of the site from the Saladoid to the Elenan occupations (Siegel and Bernstein 1988). The cemetery area continued its ancient function, the resting place of biologically related populations through nine centuries. Residence continued on the high ground, but now in the inter-mound "saddle" areas. Yet, there is also a dramatic expansion of settlement to the current shoreline during Elenan times. Apparently, strings of huts and their associated residential compounds occupied the low dunes in front of the lunate embayment. They nestled behind the protective T-shaped Puerto Nuevo peninsula (Fig. 2).

The 1985-1987 CEAPRC fieldschools, of which I am the Director, have documented a continuous, but not dense, Elenan midden eroding out of the current sand dunes. It extends some 500 m along the shore, and for 15 m offshore as the second only submarine prehistoric survey in Puerto Rican archaeology, initiated by two scuba-equipped CEAPRC students in our 1987 fieldschool, indicated. The densest parts of that shallow midden (beginning at 10 cm below current surface level) are concentrated at the bend in the embayment near the eastern base of the peninsula, in direct association with the petroglyphs (Fig. 3).

Furthermore, we know that the Holocene beachrock into which these petroglyphs were carved is in a continuous process of formation extending into the present (Kaye 1959:70-79). The curious step-like courses of this eolianitic beachrock curve inside of the sandy beach in a manner suggestive of dramatic erosion of the beach bluff. This is a phenomenon also attested to by the exposed roots and toppling trunks of the dune-retaining coconut palms and pines that form the present vegetation of the dune.

Different areas of this beachrock therefore lithify at different times. We found modern bottle glass actually encrusted into the rock at one point! Moreover, we also recovered at an older segment of the beachrock, in an area far removed from the petroglyphs (Fig. 3), both a petaloid celt and an edge-grinder of basalt encrusted into the beachrock. The latter is an Elenan holdover from Archaic and Hacienda Grande Saladoid times (Walker 1985:186, Figs. 9-10). This material was discovered at the easternmost extension of the exposed beachrock near whole Elenan vessels eroding, via wave action, into the sea out of the sandstone. They were still in situ, as they had been when the sand in which they were interred turned to stone!

THE PETROGLYPHS

Further to the west, on an older patch of beachrock, are the three groups of unique "beach petroglyphs." They look upward, being engraved into the horizontal beachrock steps (Fig. 15), rather than being carved into vertical or oblique river boulder or cave locations, as we are accustomed to seeing.

Indeed, these nearly unprecedented beach petroglyphs add a new fourth type to Fewkes' (1907:149) hoary three-type classification: river, cave and (ball park) boundary stone petroglyphs. We can now add "beach petroglyphs" to that list. These Maisabel specimens, however, are not completely unique since another beach petroglyph has been reported from part of the contemporary Ostionan Ensenada (R-1) site at Rincón on the northwestern coast (Alemán et al. 1986:18, Fig. 6). As a further point of similarity to some of the Maisabel beach petroglyphs, the Ensenada glyph is also reputed to be a fish. However, it is currently invisible, being covered by the tide and sand sediments. This is the same sort of overburden we had to laboriously clear from the Maisabel examples.

The twice-daily inundation of the Maisabel petroglyphs under high tide argues for the mean sea level having been somewhat lower when they were carved than it is today. Indeed, a geomorphological study of the beach area by Questell (1987) suggests that the sea level was 50 cm lower in

Elenan times. This prior level produced a local history of subsequent eustatic regression and beach erosion which is consistent with the present beach degradation and the redeposition of Elenan pottery fragments through wave action.

The beachrock itself is very soft sandstone and was apparently carved by harder diorite or greenstone implements using the "peck and groove" technique. They reveal broad U-shaped incisions (Fig. 16). In its softness the beachrock is equivalent to the yielding calcite deposits in the Karst topography of the Puerto Rican caves. Indeed, the famous Cueva del Indio site near Arecibo to the west (Pinart 1979[1890]:75, where it is designated Cueva del Islote), and in which there are stylistically cognate petroglyphs of a similar age, is formed by wave solution within the same kind of tectonically uplifted, lithified dunes that compose the Puerto Nuevo peninsula protecting the Maisabel beach petroglyphs.

Long ago Fewkes (1907:150) noted that the nature of the raw rock materials upon which Puerto Rican petroglyphs were incised determined their quality. The hard diorite/quartzite river boulders paradoxically (because of the greater effort needed to work them) have the finest, most controlled carvings. In contrast, the softer calcite cave petroglyphs evidence sloppier execution. These new, but sometimes sloppy, beachrock petroglyphs are therefore comparable to the cave petroglyphs. Typically the beach glyphs are meandering and very deep (1.2 cm deep, 2.5 cm wide). Perhaps their depth reveals the same periodic "renewing" or "re-engraving" that Frassetto (1960:385-386) noted for some boulder and cave types.

With the exception of the isolated petroglyph of Group C (this "group" being composed of only one carving, the anomalous plumed Indian head C-1, Figs. 4-6), all of these petroglyphs seem to be contemporary. They apparently date to Elenan times, based jointly on their association with the linear Elenan beach occupation, and on stylistic grounds.

This accords with a general pattern around the island, where petroglyphs (pictographs may be earlier) seem to start with the Elenan Ostionoid and Ostionan Ostionoid styles. This may be because they represent a shift from the small, semiprecious and exquisitely-worked lapidary art (Chanlatte 1981, 1983) of the "personal presentation" material culture of the tribal Saladoid societies, to the monumental and distantly-visible "public art" of the incipient chiefdoms of pre-Taíno times. It is thus not a coincidence that ball parks come in at this time (probably just by differentiating from dance plazas), and are also associated with petroglyphs as boundary markers at sites such as Tibes (Questell 1983) and El Bronce (Robinson et al. 1983, Frontispiece, 51-52, Plates 9-10, [Plate 9 redrawn here as Fig. 14a from my own polyethylene-tracing from the original stone slab]; Robinson 1985:I2, Fig. 3, Fig. 9 [F955]).

Both ball parks and their associated petroglyphs are manifestations of distantly-visible, "display" art. They are crude monuments to the conspicuous consumption of manpower and, indirectly, the display of political power. As such, ball parks and boundary glyphs contrast with the cultural refinement of the small and exquisitely-worked artifacts of earlier island societies. The latter are usually "sartorial" objects intended to be

examined and commented upon from up close, and, as such, are always essentially personal.

THE METHODOLOGY OF DATA RECOVERY

I have discussed the difficulties of using freehand sketches to record petroglyphs. A more reliable method of drawing is to do tracings of slide projections, or opaque-projector tracings of photoprints or negatives. In all cases these are helpful and may reveal details not captured in rubbings or tracings (Dubelaar 1986a:5-6). Yet, they share the difficulties of photographs in that the oblique nature of many shots will yield distorted, foreshortened, asymmetrical tracings of the lithographs. These views may alter or obscure important details.

Many investigators therefore have experimented with alternative 1:1 copying techniques. The simplest method is the rubbing, often done as we did them for all the glyphs, with crumpled-up carbon paper (Fig. 6). This is better than using charcoal sticks because the paper does not break up over irregular surfaces. Nevertheless, rubbings work much better on the flatter, smoother, more regular surfaces and incisions of river boulder petroglyphs than they do on the deep and irregular contours of cave or beachrock petroglyphs. Furthermore, there is often a fuzzing-out of the incisions in a rubbing, and that obscures detail. Nevertheless, our rubbings did yield additional data and are hence to be recommended in even this, their most difficult application. They are but one of a battery of necessary recording techniques.

The related practice of "overprinting," using rollers and printer's ink, as Williams (1978:Fig. 1) has done for Guyana petroglyphs, yields better results than rubbings, but requires more materials and implements and works best on the better quality river boulder carvings. Frassetto (1960:382) has developed a surface printing technique that also works on the deeper and more irregular cave petroglyphs, but it is more cumbersome and involves more steps than either of the other methods.

Goodland (Bullen 1973b:65; Dubelaar 1986a:135) innovated a latex-molding "peel" technique for recording Guyana petroglyphs. It holds great promise and will be employed next field season on Maisabel petroglyph C-1. However, both latex and acrylic modeling paste, which have similar properties, are heavy, time-consuming and expensive.

Fortunately, another technique has evolved which is perhaps the simplest, most portable and least expensive of the accurate 1:1 methods for recording lithographs. Unlike other methods, save drawing and photographs, it will work for both petroglyphs and pictographs, regardless of their parent material and execution. Moreover, it will yield a more unambiguous line than the relief techniques.

One lays a clear sheet of acetate or polyethylene over the lithograph, and draws directly over the lines, tracing them with a fine-pointed permanent marker like "Sharpie." Sanoja and Vargas first employed this technique to trace the pictographs of Cueva El Elefante in Venezuela (1970:39), while I independently reinvented it for tracing river boulder

petroglyphs in Adjuntas, Puerto Rico, in 1980. One can purchase cheap, heavy gauge clear polyethylene in fabric stores that sell table coverings for restaurants. Or, in the field, one can improvise flat sheets by cutting up clear, heavy duty plastic artifact bags. If necessary, one can tape the bags together to cover irregular and three-dimensional features like cave stalagmite petroglyphs. The next step is to photographically reduce (to avoid scaling errors) these tracings, together with a scale, and then produce final inked-in renderings on tracing velum or mylar with rapidographs and permanent drafting ink. These are the methods I used to draw all the figures for this report.

For the Maisabel petroglyphs, a long, continuous 40 m roll of plastic was laid over the groups of petroglyphs to preserve their accurate spatial interrelationships. Thus, for study purposes, when redrawing a petroglyph, I can also draw associated petroglyphs on either side at a reduced scale in order to show the spatial context of the featured petroglyph. By comparing black-and-white photographs, color slides, and rubbings, with the acetate tracings one can even present alternative renderings for all petroglyphs (for there is always some doubt as to details). Furthermore, these drawings were made after repeated viewings of all the glyphs, under different light conditions and inundational circumstances (in one case the latter phenomenon helped by depositing fine sand in an incision that had escaped all previous notice, thus highlighting it naturally).

Or, more speculatively, as I have done based on comparative evidence in Fig. 14b--a reconstruction of my polyethylene tracing of Fig. 14a--one might even venture a guess as to what the artist of an eroded petroglyph (this one from El Bronce, chronologically and stylistically relatable to the Maisabel petroglyphs) may have originally intended. There is as much place for alternate and reconstructed drawings in a report on petroglyphs as there is for one arbitrary version.

STYLISTICS OF THE MAISABEL PETROGLYPHS

However, merely recording petroglyphs, no matter how carefully it is done, is pointless without a methodology for analyzing their elements and motifs. It is this aspect that will yield the initial space/time matrix within which cultural questions can be addressed. I have used here a new method for "decomposing" the images into their parts and then "recomposing" them to form motifs and design layouts suitable for iconographic analysis.

It is based on the fourth generation modal analytic framework developed for incised designs on ceramics by other investigators and myself for the Cumancaya Tradition of the Peruvian montaña (Raymond et al. 1975). First, one isolates the major dimensions of formal variability for a given corpus. This is done experimentally, unless one can actually observe fabrication stages in an ethnographic setting which define the dimensions processually. The latter option is obviously impossible in most archaeological settings. I have collapsed both regional petroglyphs and pictographs into one corpus for this provisional exercise. When a fuller treatment is eventually attempted, separate modal analyses for both media should be done to isolate executional media influences (Roe 1982b:Fig. 3) on the lithographs.

In Figures 17-32 I have defined these dimensions (by no means exhaustively) for just the anthropomorphic representations. They are: Head Forms, Eye and Pupil Forms, Mouths, Noses, Diadems, Hairline, Cheek Patterns, Ears, Earplugs, Upper Lip Lines, Face Appendages, Torsos, Torso Patterns, Torso Appendages, Torso Finials, Arms, Hands, Legs, Feet, and Genitalia. A precocious analog of this approach was independently developed by de Hostos (1923:Figs. 17-22) when he isolated eye, nose, ear and mouth types from sculpture (not lithographs), but without the present grammatical framework. A componential analysis of all the images in the corpus then yields a number of modes, or culturally-recognized choices of images, within each dimension. For example, there are 14 varieties of heads within the "Head" dimension (Fig. 21). In all cases, I have also indicated a "null" category as the last of the modes within each of these dimensions. The null option applies to the depictions in which such modes are not used, the choice to not use something one is aware of being just as much a choice as to select it (Lemonnier 1986:161).

One of the objects of this exercise is to be able to differentiate between contrasting images. If two depictions are stylistically divergent, just how different are they? One can answer what used to be a frustratingly subjective question with a quantitative answer. Rephrased, one can obtain a "similarity quotient" simply by comparing shared dimensions and modes and then applying a statistical test, such as Chi-Square, to see just how different or similar they really are. Figure 33 shows three different lithographs (Figs. 9 [A-11], 13 [B-4] and 14 [C-2]) and how they compare in a flow chart of modal selections within the dimensions of a human depiction in Antillean petroglyphs. A systematic comparison of regional images using this system can make possible the identification of stylistic provinces as a first step to deciphering culture process and history.

This method accomplishes another goal beyond simply defining stylistic provinces. These images are not put together haphazardly, but instead respond to cultural rules that manipulate the elements already identified. Figure 34 begins the assaying of such rules. For example, we see the same mechanism of "perceptual ambiguity" in these petroglyphs that exists in pre-Taino pottery lugs. This is a playful double entente whereby one can examine a face on a modeled lug, and then turn the lug upside-down to view another face sharing the same eyes or mouth as the first one, but inverted above it (Fig. 34, VIIIa). We see this in A-14 (Fig. 9) where a small head with limbs perches atop the beginning of another, larger face with two eyes and a (probable) pendant mouth. The outlines of that larger face simultaneously function as the lower extremities of the smaller figure above it.

Another form of perceptual ambiguity is called "kenning," following Rowe's (1967) decoding of symbolic ambiguity in Chavin iconography. This is a highly evolved and indirect form of reference (Roe 1975) whereby, for example, bodies become tongues by emerging out of mouths, or, as here (A-1, Fig. 7), the waist of an incomplete "wrapped figure" becomes a face. Or, the body of a sea turtle becomes a face (A-23, Fig. 11) and its flippers "rays." The image becomes both a "sub-medially rayed face," and a "sea turtle with marks on its carapace" (Fig. 34, VIIIb) simultaneously!

An understanding of these rules allows the student to anticipate new combinations not already recorded, as well as decipher known depictions. The first step is to synthesize patterns out of the analysis. That is, a set of "design compounds," or motifs (Fig. 35), are identified that represent common manipulations of the dimensions and modes. For instance, using the "perceptual ambiguity" rule one can generate "alter ego" motifs consisting of a main figure with a smaller, subsidiary figure perched on its head. In Puerto Rico the common example of this alter ego motif takes the form of "solar" perching figures functioning as "crowns" on wrapped figures (Bullen 1973a:Fig. 5, Upper Icacos). In the Dominican Republic simpler examples, much like A-14, are found in the Cuevas del Borbon (Pagán Perdomo 1978:54). Presumably, these motifs gained currency because they carried profound meaning. We know that in related areas of South America, like Colombia, the alter ego motif refers to powerful shamanistic familiars, or titular spirits, and linked notions of spiritual transformation (Reichel-Dolmatoff 1972:Fig. 75; Roe 1982a:296). Below, I will decode the semantics of one Maisabel motif, the "swaddled infant=ancestor" figure.

Lastly, beyond the morphological level, one identifies any coherent aesthetic statement, or design layout, employed in rock art. This is a sequential, or symmetrical, arrangement of motifs. In an art form where every depiction was done for its own sake, sometimes partially erasing an earlier image beneath it, it is rare to find design layouts. Obviously, this makes any such instance, no matter how abbreviated, very important. Figure 35d, for example, based on Fewkes (1907:151) for pairing of the "swaddled type" petroglyphs in Utuado, perhaps indicates the "Magical Twins." This figure also shows "internal pairing" in a very interesting large Río Espíritu Santo wrapped figure's face, Cara del Indio site, in Humacao (Rodríguez López 1981:Foto 17).

REGIONAL STYLISTIC AFFINITIES OF THE MAISABEL LITHOGRAPHS

Once the motifs have been synthesized, the next step is to examine the regional stylistic affinities of the motifs. I will emphasize Puerto Rico and the Dominican Republic, leaving Lesser Antillean and northern South American (Guianas, Venezuela, Colombia) examples for more indirect reference. The goggled visage represented by the left-hand engraving of A-4, Fig. 7 (the right-hand "T" is probably a partially completed eyebrow-nose motif) is also found in regional caves, such as the Cueva de las Archillas, Barrio Torrecillas, Morovis, where it is called a "mask" (Ayes 1985a:5-6, Petroglifo 1). Similar oculares have been recorded for Adjuntas (Collazo 1983:3-4), at the famous *piedra pintada* on the old road from Aibonito to Cayey (Pinart 1979[1890]:Pl. 10, Fig. 1), and further to the east, at the Cara del Indio site along the Río Espíritu Santo (Rodríguez López 1981: Foto 8, Dibujo 3).

The interesting Maisabel "bat" head portrayed in A-6 (Fig. 8) also appears in one of the larger petroglyphs our fieldschool traced at the famous Cueva del Indio to the east, near Arecibo. It appears as well in Jayuya in the interior (Collazo 1983:5), and the Río Espíritu Santo, Cara del Indio site (Rodríguez López 1981:Foto 8, Dibujo 3). Walker (1983: Fig. 18) has recorded another possible bat figure along the Rio Blanco, eastern

Puerto Rico. Clearly the bat was an important local figure, maybe because its canines represented a miniature analog of the feline's.

Simpler faces, like A-7 (Fig. 8), and one from Cueva del Islote (Pinart 1979[1890]:Pl. 1), or a "cognate" face recorded by Fewkes (1907, Plate LX, Pt. 1i), are too common to be of much use.

The obvious "Sun" portrayed in A-11 (Fig. 9) shows how the "sub-medially rayed face" and the "solar crowned" motifs intergrade, as they do in numerous analogous pictographs from caves in nearby Morovis (Martínez Torres 1981:Figs. 2-4, 18, 74, 169). This was obviously an important image (ethnographically the Sun is almost a supreme deity in lowland belief systems, Roe 1982a:250), as it is pictured frequently, from Cueva del Islote=Indio (Pinart 1979[1890]:75, Pl. 2, Figs. 1-2) to Utuado (Fewkes 1907:151, Plate LX, Pt. 1d,e) to neighboring La Cueva del Negro, in the Ciales cordillera, where the image is associated with "sub-Taino" ceramics (Ayes 1986b:5[6]), to Salto Arriba, Utuado (Frassetto 1960:Figs. 5, 8), Jayuya (Collazo 1983:4), and at Cara del Indio (Rodríguez López 1981:Dibujo 2, Foto 16). The South American parallels stretch, as might be predicted, from Venezuela (Sujo Volsky 1975, Fig. 123, at Quebrada de Tusmare), to Colombia (Botero and Oostra 1977:30, Lám. CVX, Río Caqueta).

Immediately to the east, in Dorado, there are many "simple faces" like A-13 (Fig. 9), but they appear in *mogote* (limestone outlier) caves and appear to date to Taino times (Ortíz Montañez 1986, Apéndice III, Tabla B). Such simple faces abound in the mountainous interior, such as in various caves in Morovis (Martínez Torres 1981:Figs. 11-14, 63-66), and in Ciales (Ayes 1986a:12-13, 1986b:3; Pinart 1979[1890]:Pl. 9, Fig. 80). They appear everywhere, from the interior of the center of the island around Caguas (Betancourt 1983:5) to the Río Espíritu Santo Cara del Indio complex (Rodríguez López 1981:Dibujo 2). They even appear in the northeastern coast at the Ensenada site near Rincón (Alemán et al. 1986:18, Fig. 5). In the latter case they are "Elenan" by association, as they are in one of the Ciales caves (Ayes 1986b:3). Elsewhere, they are Taino (Ayes 1986a:12) to judge--if one can--by pottery associations. Bullen (1973a:13, 1974:97) has covered the other Greater and Lesser Antillean distribution of this form.

Other images at Maisabel, a surprising number, are unique to this site. These are the "fishtraps," fish, and some of the "geometric" motifs, such as A-21 (Fig. 11). Singular also is what may be a heretofore unseen frontal view of a three-pointer with anthropomorphic face (Alegria, personal identification, 1987).

On the other hand, certain Maisabel images, like the "wrapped figure," have almost too many parallels (Bullen 1973c:66-67). It appears at every site mentioned above! However, for types that have the "single-X" torso pattern of B-4 (Fig. 13), we find a tighter geographical distribution. This includes an otherwise dissimilar Cueva de las Palomas pictograph from Morovis (Martínez Torres 1981:Fig. 66), and very similar Cueva del Islote=Indio eolinitic petroglyphs near Arecibo (Pinart 1979[1890]: Pls. 1-2, Fig. 6, Pl. 3, Figs. 10-11). Other single-X wrapped figures, like the one Fewkes cites from "eastern Puerto Rico" (1907:157) (and Walker 1983:Fig. 4 shows as coming from the Río Blanco) may be contemporary with

this Maisabel depiction while others, such as the ones Bullen (1973a:Fig. 5) and Frassetto (1960:Fig. 8) picture from Upper Icacos, Utuado, are almost certainly later, that is Taíno. Other Lesser Antillean (Clerc 1973:Fig. 7, Campsterre site, Guadeloupe), Guianan (Dubelaar 1986a:84, Wonotobo Falls, Surinam), and Brazilian (Dubelaar 1986a:Figs. 230, 235, Arquipélago de Tarumá, Cuminá River) single-X torso patterned wrapped figures are all conceptually related, but stylistically distinct. They are probably variants of the more numerous "multiple-X" type.

Considering then, both the morphology and syntax of these lithographic images, and their space-time systematics, the stage is now set for the iconographic decoding of these petroglyphs.

ICONOGRAPHY OF THE MAISABEL IMAGES

What is very striking about this assemblage of petroglyphs is their marked aquatic imagery. Unlike any of the inland river or cave petroglyphs, these Maisabel carvings display a wealth of oceanic fish, crustacean and reptilian imagery in addition to the familiar anthropomorphic (A-1, Fig. 7) and non-representational, or conventionalized, geometric depictions. Perhaps this iconography reflects the Elenan orientation to the sea. A crab appears (A-2, Fig. 7) and is similar to clear depictions (with pincers) from Cueva de las Palomas, Cueva de la Mata de Guineo and Cueva de las Golondrinas, all from neighboring Morovis (Martínez Torres 1981:Figs. 71-73, 128).

A small turtle is depicted in A-3 (Fig. 7), as well as a much larger *Carey de Concha*, the Hawksbill (*Eretmochelys imbricata*) (CICA n.d.). This figure (A-23, Fig. 11) is portrayed oriented to the shore (after all, these large sea turtles come to land to lay their eggs and are then vulnerable to human predation), while right next to it is a conventionalized fish (A-24, Fig. 12). The latter points in the opposite direction, toward the sea, the natural habitat of fish. A virtually identical fish was recorded by this author from the analogous site of Cueva del Indio near Arecibo to the west, while a similar *Carey* was recorded by Walker (1983:Fig. 20) from a river petroglyph in the Río Blanco, eastern coast of Puerto Rico, but not in association with fish.

F. Fernández, a "Recursos Naturales" ichthyologist, has identified the A-23 schematic rendering, and that of the similar A-26 and A-27 (Fig. 12), as probably representing one of the Jacks, the Carangidae (*los jureles* in Puerto Rican Spanish [Erdman 1987:3]). These are strong-swimming, roving fish that enter these reef zones as predators. As Randall (1983:101) points out, "(m)any of the carangids, such as the pompanos, are highly esteemed food fish." In terms of their spiked, projecting dorsal and anal fins, and their scissored caudal fins, outlined in black against a striking silvery body, the Permit, (*Trachinotus falcatus*) (Randall 1983: Fig. 131) or the Harvest Fish, the *palometa* in regional Spanish (*Peprilus paru*) (Erdman 1987:Fig. XLIII), are the best local candidates for these petroglyphic representations.

There are other, less conventionalized, fish depictions among the Maisabel petroglyphs. Some are unidentifiable, like A-12 (Fig. 9), while

others are, like A-9 (Fig. 8) and A-15 (Fig. 10). F. Fernández immediately labeled A-9 as the Queen Triggerfish, or *peje puerco* in local Spanish (Erdman 1987:Fig. XLVI, *Balistes vetula*), one of the tetraodontiformes. It is a common reef fish esteemed for its tasty flesh (Randall 1983:Fig. 290). The Triggerfish and similar forms are also one of the most common fish in the Maisabel faunal assemblage. Lastly, F. Fernández has identified A-15 (Fig. 10), with its bulky body, gaping mouth and projecting mandible, as a grouper, one of the Serranidae. The best local candidate is the Red Hind, or *mero cherna* (*Epinephelus guttatus*) (Randall 1983:57-58; Erdman 1987: Fig. XXII).

It may be significant that all three of the identified fish depictions also have three things in common: (1) they are all identified as being particularly savory food fish; (2) they are all visually striking, being colorfully and/or dynamically marked; and (3) all of them occasionally carry the potentially deadly neurological illness *ciguatera* (a Taíno Arawak term). For a culture that used mind-altering hallucinogens, the symptoms of this tropical affliction, one of which is to alter sense perceptions (cold feels intensely hot; heat, freezing), might have marked it as having a supernatural etiology. My own studies of lowland mythic symbolism (Roe, in press) indicate that the overlapping zone between two contrasting (opposing) conceptual categories, the Venn diagram of "Esteemed Food Fish/Poisonous Inedible Fish," may have been mythically marked. Therefore the fish that occupied that conceptual zone could be graphically represented as being paragons of their kind.

Depictions of fish are considered rare, but have been reported on occasion, in both the Antilles (Alegria, pers. comm., 1987 on a fish pictograph he saw in a cave near the San Vicente central, La Vega, near the coast to the east of Maisabel, since unlocatable; Fewkes 1907, Pl. LXIa, Ponce, Puerto Rico; Robinson et al. 1985, Frontispiece, El Bronce near Ponce; Pagán Perdomo 1978:Pls. 82-86 [pictographs], Cuevas del Borbon, Dominican Republic) and northern South America (Dubelaar 1986a:Fig. 154a, Kuyuwini River, Guyana; Fig. 223-3 [pictograph], Inipi River, French Guiana; Sujo Volsky 1975, Fig. 39, La Candelaria, Venezuela).

OF FISH TRAPS AND POWER

Consonant with the numerous depictions of fish at Maisabel is a geometric motif (A-10, Fig. 9) located right next to a fish. I interpret this, based on the little "+" motifs, as a wicker woven basketry fish trap. If this identification is correct, maybe its redundant proximity to a Maisabel version of the "Sun" (A-11, Fig. 9) alludes to a Guiana myth, the "Sun's Fish Trap" (Lévi-Strauss 1973:221, on the Macusi).

There are several reasons for finding the identity of this and similar Maisabel petroglyphs (B-1 and B-2, Fig. 13) as fish traps or parts of fish weirs instructive. First, we have a unique number of edible aquatic fauna pictured at Maisabel. Second, we know from Fernández Méndez's (cited in Ramos y Ramírez 1987:4) investigations of the ethnohistoric sources that the Taíno had extensive fish weirs. Moreover, they used them to turn river mouths, lake islands and bays (such as the Río Cibuco and both sides of the Puerto Nuevo T-shaped peninsula) into gigantic "naturefact" traps (Fernán-

dez Méndez 1960:10). Third, we also know that ocean frontage was valuable for these Indians, particularly if that frontage included such land features. We also know that these features and their associated traps continued to be a controlled resource, the use of which required petitioning down into colonial times (Fernández Méndez 1960:12). The source of protein through fishing this technology provided was easily convertible into political power. The sources tell us that high-ranking *caciques* who controlled access to such zones held sway over lesser neighboring *caciques* who did not. Fourth, Durant (1981:80) informs us that in similar culture areas like aboriginal Virginia, where the same technology was employed, one way Indian groups expressed agonistic relations with competing groups was to sabotage their enemy's fishing weirs.

Fifth, we know from Ramos y Ramírez's (1987:10) ethnohistorical and archaeological investigations that at least some of the local Puerto Rican fish traps, such as the one on Lake Joyuda near Cabo Rojo on the southwest coast, dated back to the Ostionoid times of the Maisabel petroglyphs. Sixth, from neighboring and culturally-related regions of South America like the Guianas and the Northwest Amazon, we are informed of both archaeological (Williams 1979, but see Dubelaar 1986a:80-81 for a critique of this interpretation) and ethnographic instances of petroglyphs representing fish traps and being associated with deep pools along rivers where they could best have been employed. They were used as territorial markers to claim favored fishing spots by ethnic groups in competition with their neighbors (Goldman 1948:784, 1963, on the Cubeo, Northwest Amazon). Seventh, we also find in neighboring Venezuela that petroglyphs are unusually abundant as a communication device (carrying, among others, messages about territoriality) along the rivers and coasts that would have provided the very migratory and trading avenues along which the mutual exchange of such messages would have been most socially useful (E. Rodríguez 1985:48). Lastly, Canino Salgado (1986:2) informs us via ethnohistorical research in Dorado, that the Río Cibuco just to the east of the Maisabel Playa was the beginning of one such frontier between rival *cacicazgos*.

From all of these elements I conclude that the Maisabel petroglyphs marked, and mythologically validated, the ethnic "joint" ownership of valuable fishing and marine hunting resources as well as the necessary naturefact aids (local landforms). Moreover, these lithographs were designed to communicate that differential access across competitive ethnic boundaries.

One might object that this inference compares apples and oranges: an archaeological complex with ethnohistorical accounts. Yet, the fact that (1) I am referring to the comparatively late Elenan Ostionoid complex, not the much earlier Saladoid tradition where symbolic and economic discontinuities with the ethnographic present of the 15th century are much more evident, (2) there is evidence that the life-ways were similar between the Elenoid culture and some Taíno groups since both utilized the littoral niches and manifested a similar dietary and settlement organization, and (3) the Taíno were the direct cultural descendants of the Elenan populations in this region of Puerto Rico. For all these reasons I argue that direct historical analogy is useful to "explain" the function and appearance of these petroglyphs.

If these alleged socio-economic semiotics of the Maisabel petroglyphs are correct, is there any evidence for the mythic justification of their marking functions? I suggest that there was and it involved the figures with X-shaped torso patterns, either single, like B-4 (Fig. 13), or with multiple X-shaped patterns.

THE "SWADDLED INFANT" AS "WRAPPED ANCESTOR"

The human figures that appear with these subsistence-oriented glyphs, whether as ancestors or important deities like the Sun (A-11, Fig. 9), or anthropomorphized "three-pointer" "zemis" like the one seen in full-face, not profile, view in A-20 (Fig. 11) might have legitimized that ownership in terms of kinship-based joint property concepts. Both Fewkes and Lovén long ago documented the importance of ancestor worship in at least the Taíno end of this Antillean animistic tradition. One could also cite Frassetto's rephrasing of Goldman's studies: "In South America, the Cubeo Indians, primarily a fishing people of the Vaupés-Caquetá region (Northwest Amazon) consider the petroglyphs at local rocky sites to be the creation of sib ancestors and defend their river rights by citing the engravings as territorial validation [I might add, there hierarchy was also implied by river placement, status going up the further down stream one's group occupies space (Goldman 1963:25)--wider rivers downstream being able to support more fish and therefore yield more protein]. These petroglyphs are renewed from time to time" (Goldman 1948:784).

To this observation I also relate Porras' Ecuadorian Achuar identification of these petroglyphs as not only being the work of the ancestors, but their "homes," or "bodies" as well. Hence, I suggest that the traditionally-designated "Swaddled Infant," also present at Maisabel as B-4 (Fig. 13), is nothing of the kind. Rather, it is a dead ancestor wrapped in a hammock. Thus its presence at the site adds that dimension of ancestral supernatural validation to the important subsistence and political resources the Maisabel petroglyphs safeguarded with their profusion of symbolic aquatic protein.

This hypothesis is buttressed by the fact that there is no legitimate local ethnographic basis for the morphological analogy between the wrapped figure present in the Antilles, as in B-4, and the North Amerindian pattern of swaddling infants. The analogy was initiated in the 19th century by Pinart (Alegria 1979:75, n.3), and was carried on through convention by Mallery (1972[1893]:137) and, in the 20th century, by Frassetto (1960:386) and Bullen (1973c:66). The way is open for an alternative designation.

Wrapped figures abound as lithographic motifs in Puerto Rico and the Lesser Antilles. They are all directly relatable to the Guianan "Timehri" type of Im Thurn by the simple substitution of a round or square head for the Guianan semi-circular expanded head (although even that type is sometimes found in the Lesser Antilles--Huckerby 1914, Plates XXVa and XXVIIb for St. Vincent; see Bullen 1974:99, 101 for the contrast with the Puerto Rican petroglyphs). Componentially, they are all, from the Antilles to Colombia and Brazil, associated with ("Solar") rayed (thereby possibly conferring supernatural status) headdresses and X-shaped torso wrapping patterns. I decode the latter motif as twined, or looped, hammock netting.

Such an identification is not fanciful since one of the common methods for interring or exposing the dead among lowland South Amerindians involved wrapping the body in a hammock. Furthermore, one possible explanation for the fetal position of most ceramic-age burials in Puerto Rico, including the majority of those from Maisabel (Budinoff 1988), and for their somewhat haphazard orientation in the ground (lying on the left side, the right side, the back, or seated) is that it was easier to carry and lower a corpse wrapped in his or her hammock into a narrow hole than to excavate large holes for extended burials. These tightly-wrapped bodies would remain in whatever attitude they assumed when they hit the bottom of their narrow burial pit.

Moreover, among the anthropomorphic Maisabel petroglyphs (A-1, Fig. 7; A-16, A-17, and A-19, Fig. 10; A-22, Fig. 11), a comparative componential and generative-grammatical analysis of the whole corpus, and related finds from my own investigations in sites like Cueva del Indio, suggests that many of the fragmentary, eroded, or unfinished specimens may really have been "Wrapped Figures" as well. Glyph A-1, for example, shows a face on the middle of an elongated body of a wrapped figure--a pictorial device found elsewhere in the Lesser Antilles, but with its head missing; A-17 is an "open-ended" wrapped figure remarkably similar to analogous figures, with X-shaped markings, from the Trois Rivières site in Guadeloupe (Clerc 1973:Fig. 6). Even purely geometric designs, like A-19, are really unfinished, or abraded, portions of wrapped figures. What is visible of A-19 corresponds, for example, to the vertically-pitted (Fig. 28t) torso pattern of other complete regional specimens. Moreover, it terminates with the "tri-footed" torso finial pattern (Fig. 29d) of typical wrapped figures. Even more enigmatic icons, like A-16, may also represent "ancestral cocoons." Not only is it similar in the vertically-pitted torso pattern to a pictograph from Cueva de las Palomas, Morovis (Martinez Torres 1981:Fig. 100), but it parallels a great quantity of isomorphic Cueva la Catedral pictographs, but with horizontally-lined torso patterns, in Barrio Bayaney Hatillo, near the Camuy River, south of Arecibo (Diaz 1986:1). Caves were, after all, ideal "storage places" for the wrapped dead of Puerto Rico. For a more complete "wrapped cocoon," in that it has a visage, see Clerc 1973:Fig. 5, again from the Trois Rivières site.

I therefore suggest that these rayed and wrapped ancestral figures validated the kin-group ownership of this sacred, and economically and politically important, spot in a way both supernaturally efficacious and aesthetically compelling. What better way to get this charged message of kin group "ownership" of desired resources across than unique rock art, beachrock petroglyphs, located on a rich frontier.

THE CHRONOLOGY OF THE MAISABEL PETROGLYPHS

Building upon the chronological findings of some of Rouse's early work, in 1960 Frassetto distinguished deeply-engraved and shallowly-engraved petroglyphic styles. She related them to pre-Taino and Taino times respectively. She pointed out certain design motifs, like horizontally-elongated eyes, as being the stigmata of the more elaborate later "Capa" type, as best exemplified from Caguana in Utuado (Frassetto 1960: 387). My

analysis adds other style markers (like upper lip lines and eccentric pupils) to these differences.

Note that the third Maisabel group, Group C, is anomalously represented by a single petroglyph, C-1 (Fig. 4). It is also the most complex face in this corpus. C-1 is also stylistically divergent from the rest, principally in its horizontal, goggled eyes. They are placed on the face asymmetrically, like those Fewkes (1907:159, Plate LXII) figured from St. Vincent. Closer to home, this goggled type is also present in the late (and more elaborate) Upper Icacos petroglyphs (Bullen 1973a:Fig. 5). The two curious "plumes" of C-1 are echoed on a pictograph from la Cueva Lucero in Guanadilla (Diaz, pers. comm. 1987).

Moreover, C-1's incisions are much more finely and shallowly made (5 cm deep; 1.2 cm wide) than those of Groups A and B. Next, it is also spatially isolated from the other two groups, being over 50 m to the west of Group A. Lastly, it is the only one of the 32 petroglyphs to be carved on a tilting upper face of a step in the beachrock. Unlike all the other petroglyphs, it is never submerged by high tides. Also in contrast to the other petroglyphs, which are mostly oriented north-south, C-1 faces precisely due east, inclined on its rock to greet the first rays of the morning sun. For all of these reasons, I argue that this unique glyph is Taino in date and therefore postdates (when the sea level was as high as it is today) the earlier pre-Taino petroglyphs.

If the rest of my argument about the "iconic" function of these rock metonyms are correct, such evidence for Taino continued interest in at least the shore of this site bolsters my other argument for cultural continuity. Such a continuity of economic and socio-political exploitation carries the symbolic associations of the Maisabel playa site up to a point in time where the ethnohistorical sources become relevant.

SUMMARY AND CONCLUSIONS

This report documents a unique set of horizontal beachrock petroglyphs at the site of Maisabel, north coast of Puerto Rico. These glyphs add a new, fourth type, that of the "beachrock petroglyph," to Fewkes' lithographic typology. The iconography of these beachrock glyphs, in their aquatic imagery, documents the subsistence and settlement shift within the multi-component Maisabel site that we have picked up in other artifactual and ecofactual (principally faunal) domains. They punctuate the continuum of the old Crab Culture/Shell Culture dichotomy.

My analysis of the lithographs presents a case study in a new methodology of data retrieval (polyethylene-tracing), as well as an exercise in "emic archaeology" (the generative-grammatical and modal analysis of the petroglyphs in the figures) I and others pioneered originally in ceramic design analysis. It demonstrates that not all of one's informants need be alive.

Lastly, lithographs relate to other areas beyond aesthetic and spiritual domains. Specifically, I have advanced a "social archaeological" explanation of the glyphs as a communicative device to mark the political

and subsistence ownership of important fishing resources and facilities (fish traps and weirs). Moreover, this "marking" occurs in competition with neighboring ethnic units along geo-ecological boundaries (Barth's 1969 famous territorial expression of ethnicity). Yet, the presence of supernaturally validating, solar-attributed, anthropomorphic "ancestral wrapped figures" among these petroglyphs argues for a synthesis of the social and the cosmological. The Maisabel petroglyphs really attest to the need for a "cultural archaeology" of these cryptic, but moving and valuable remains.

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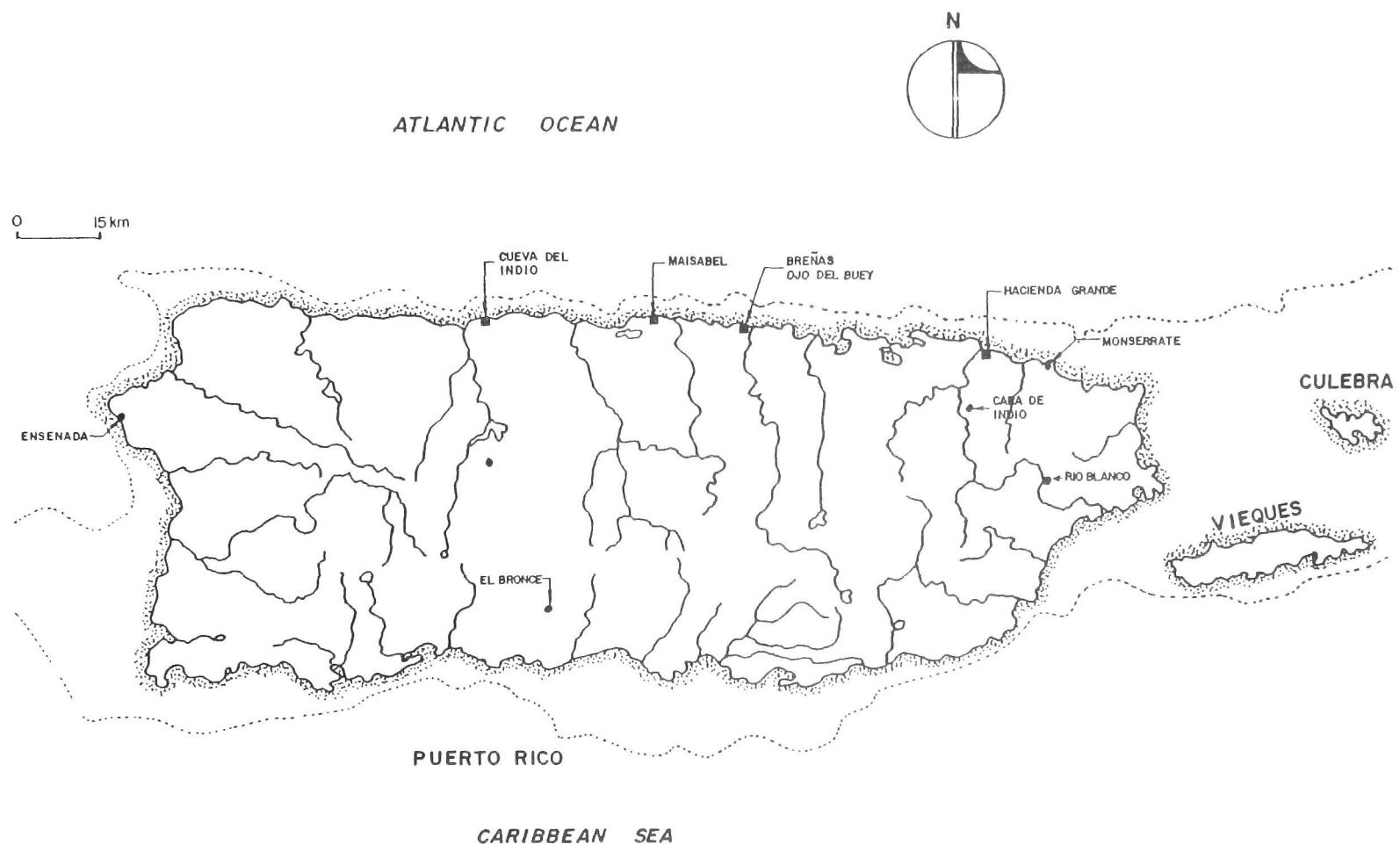


Figure 1. A map of Puerto Rico showing some of the sites with lithographic material similar to Maisabel.

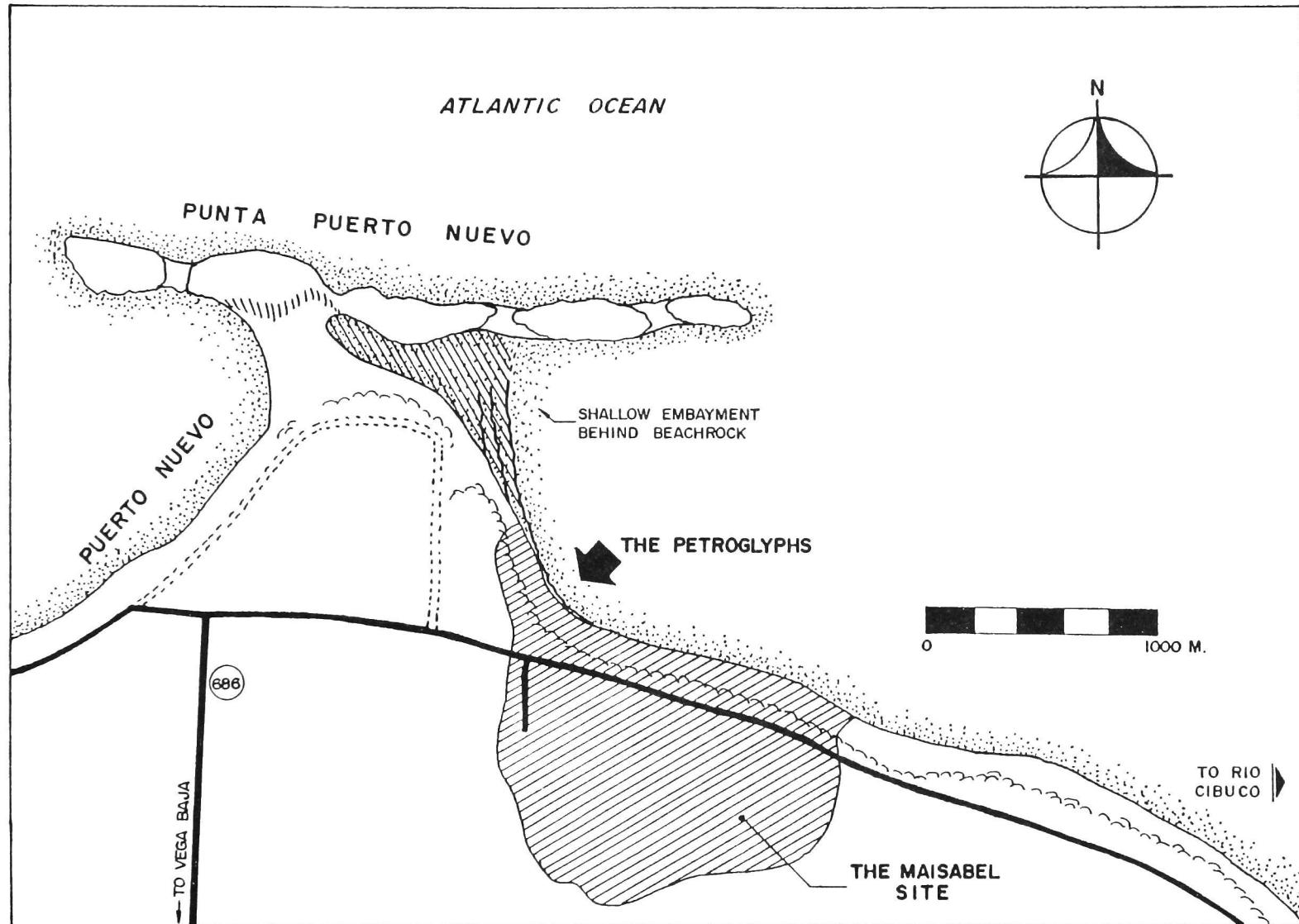


Figure 2. The Maisabel site and the location of the beach petroglyphs based on ground survey and aerial photographs.

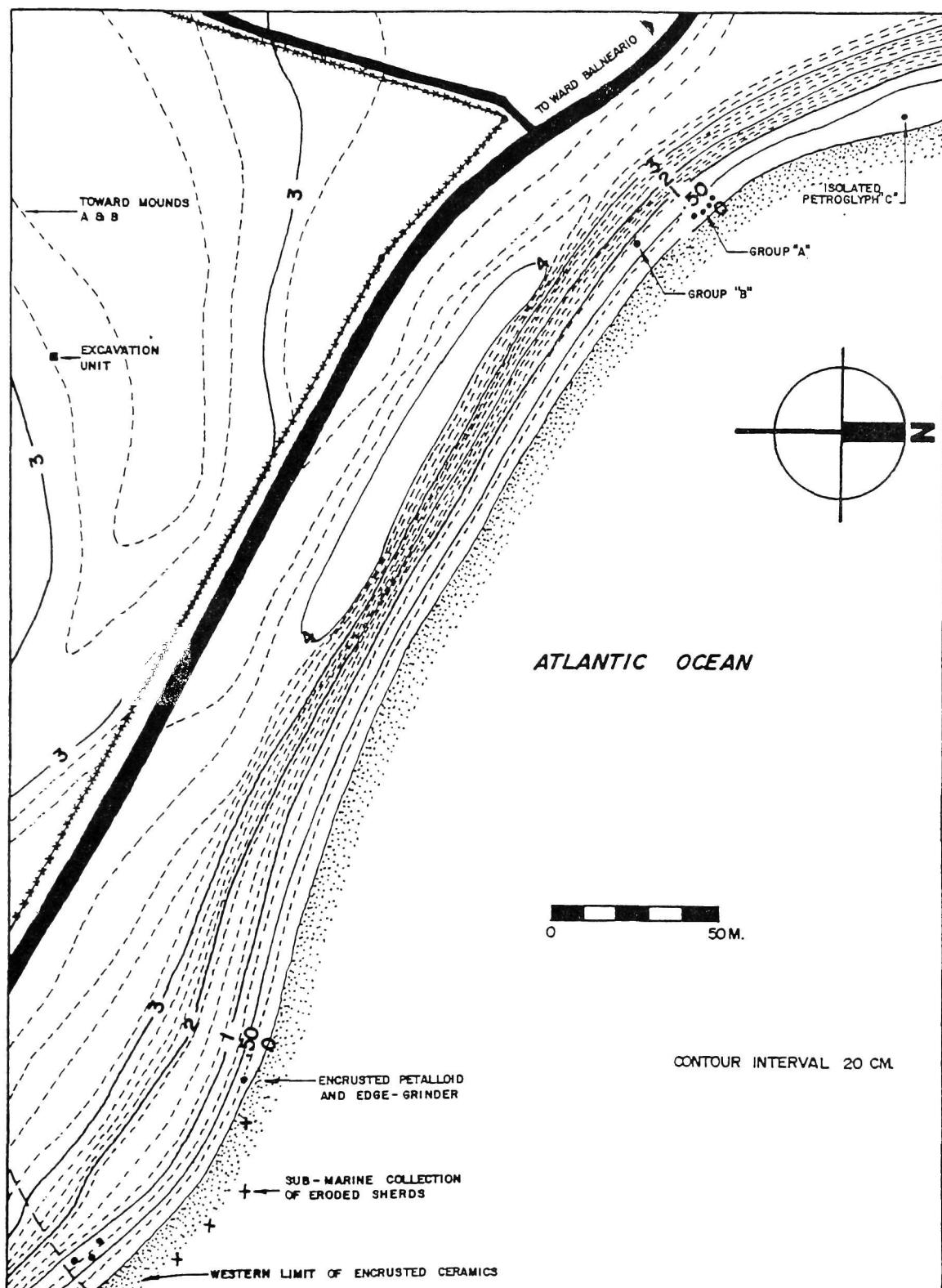


Figure 3. A close-up of the petroglyph and offshore survey locations, transit-sighted, 20 cm contour mapped.



Figure 4. Group "C" Maisabel Petroglyph (C-1), the isolated plumed head.



Figure 5. The C-1 petroglyph (incisions highlighted in beach sand) and its unique, naturally inclined beachrock slab (non-inundatable).



Figure 6. A carbon paper rubbing of C-1 showing greater uniformity of line than groups "A" and "B".

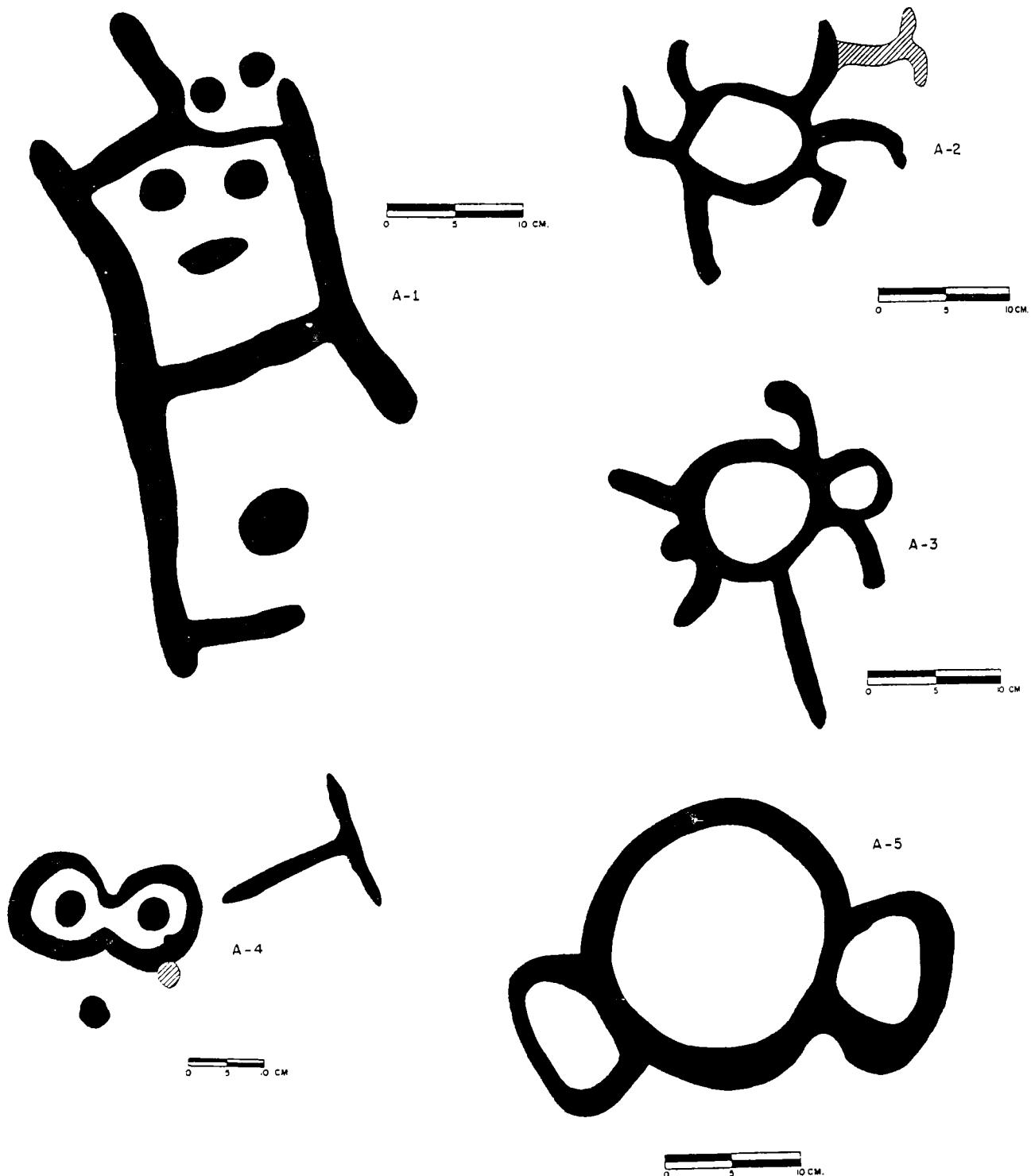


Figure 7. Group "A" Maisabel petroglyphs: A-1, a probable "wrapped figure," middle section; A-2, a possible crab; A-3, a probable turtle; A-4, a "masked," goggle-eyed motif; and A-5, a visage missing eyes and mouth.



Figure 8. Group "A" Maisabel petroglyphs: A-6, a possible bat depiction; A-7, a simple face, originally completely closed in outline; A-8, a composite fish/human visage depiction; and A-9, a probable Queen Trigger-fish portrayal.

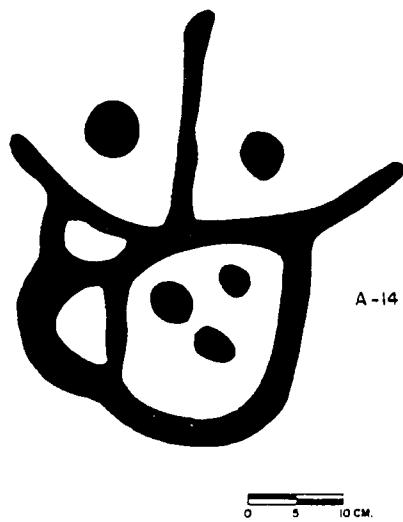
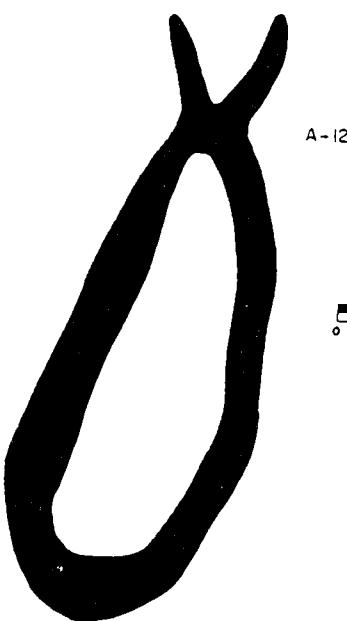
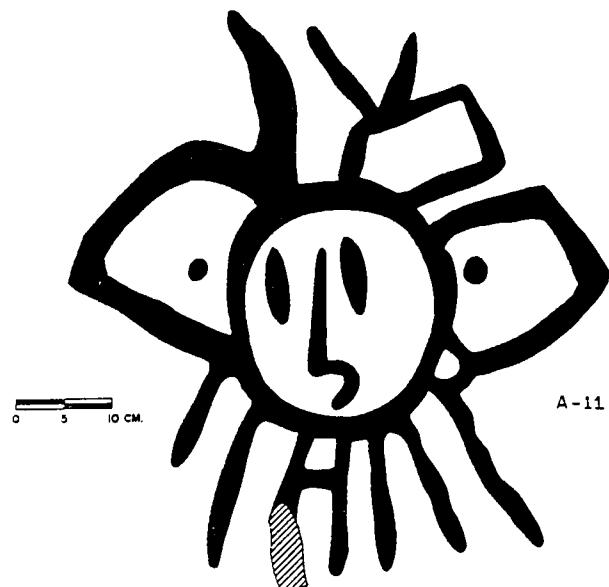
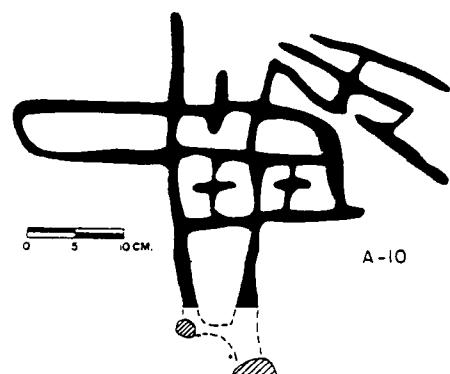


Figure 9. Group "A" Maisabel Petroglyphs: A-10, a possible basketry fish trap; A-11, the sun; A-12, a fish; A-13, a simple face; A-14, a double human visage.

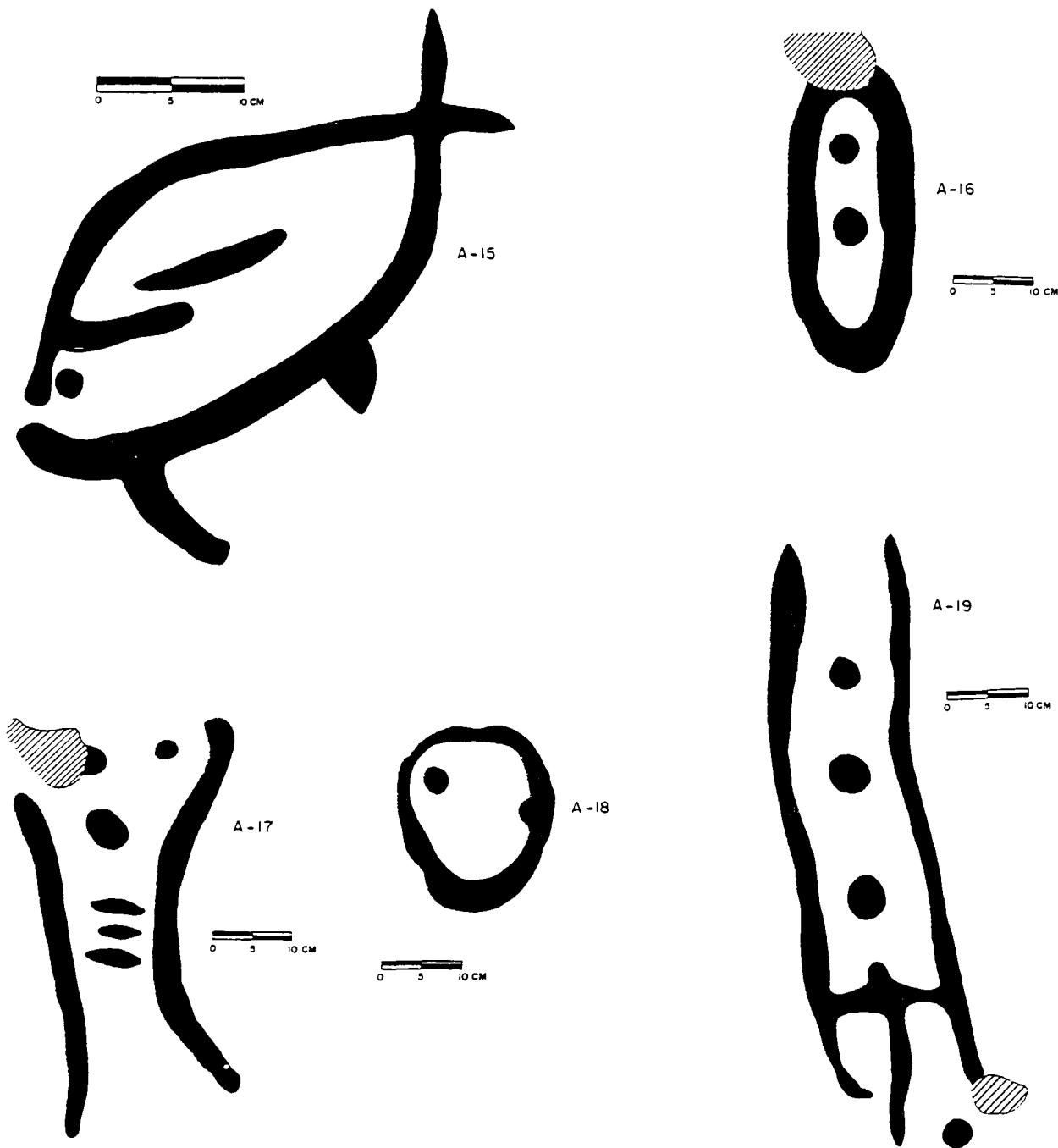


Figure 10. Group "A" Maisabel petroglyphs: A-15, a possible Red Hind; A-16, a possible "ancestral cocoon"; A-17, a "wrapped figure"; A-18, a simple face missing the mouth; and A-19, the middle portion (headless) of a "wrapped" figure.

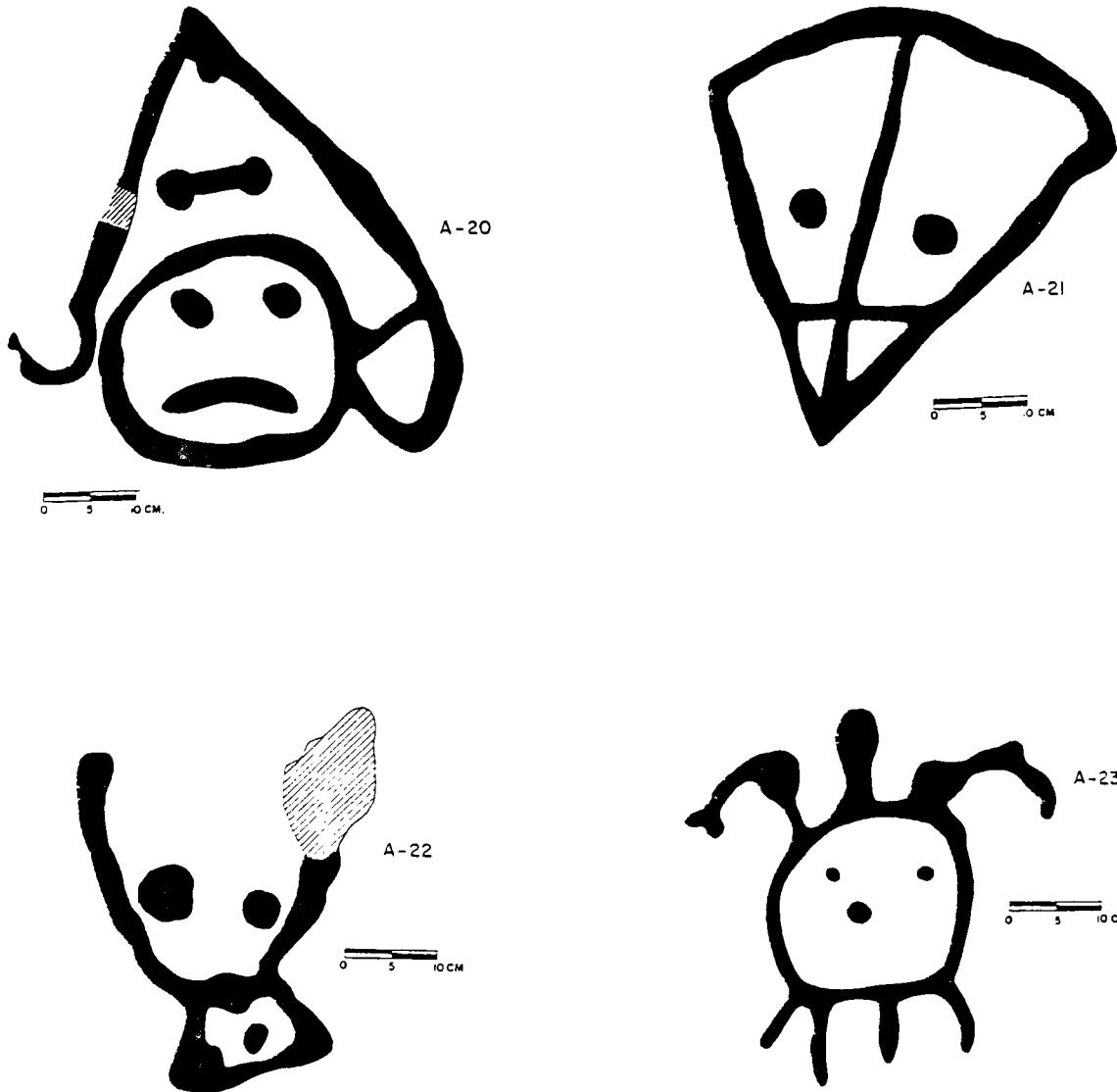


Figure 11. Group "A" Maisabel petroglyphs: A-20, a possible frontal view of a three-pointer; A-21, a "three-pointer" (?); A-22, lower portion of a possible "wrapped figure's" torso; and A-23, a Hawksbill turtle with the carapace kenned as a human visage.

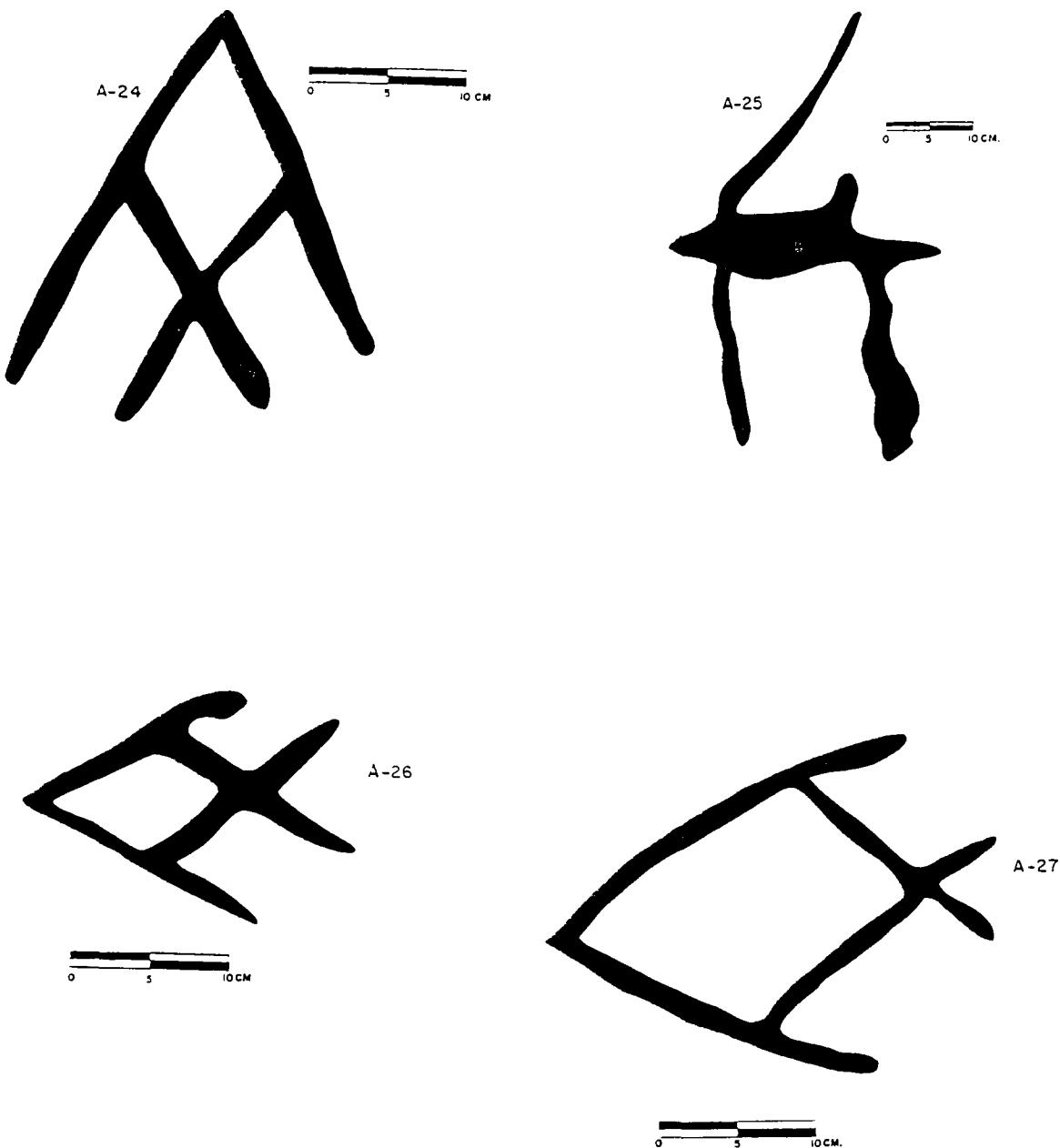


Figure 12. Group "A" Maisabel petroglyphs: A-24, a possible Permit or Harvest fish depiction; A-25, an aquatic mammal (a piniped?); A-26, another possible Permit or Harvest fish depiction; and A-27, another possible Permit or Harvest fish depiction.



Figure 13. Group "B" Maisabel petroglyphs: B-1, a possible fish trap or weir (?); B-2, a geometric (trap?) depiction; B-3, a fish head (the body extends upward, but fragmentarily); and B-4, a "wrapped figure" with X-shaped torso pattern.

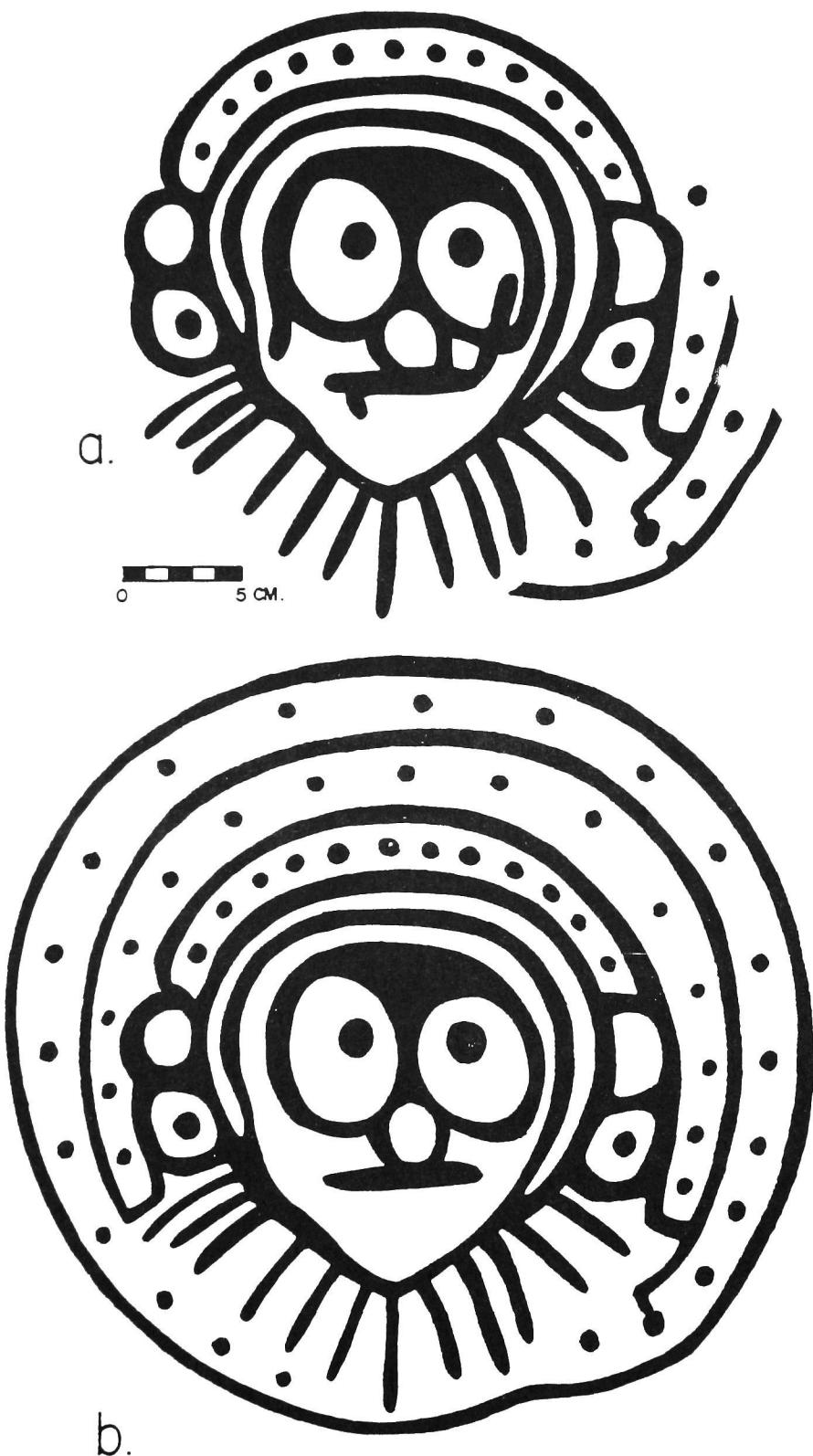


Figure 14. Two versions of an El Bronce petroglyph stylistically related to the Maisabel petroglyphs: a) the original glyph, polyethylene-traced by the author; b) a reconstruction based on probable intent.



Figure 15. A panorama of the Maisabel petroglyphs of Group "A" being inundated by high tide. From left to right, those visible are the sun (A-11), the fish trap (A-10) and the Queen Triggerfish (A-9), a visible representation of the "Sun's Fish Trap" myth of the Guianas.



Figure 16. A close-up of the "sun" rayed-head petroglyph showing the depth and irregularity of the incisions into this soft eolianitic beach rock.

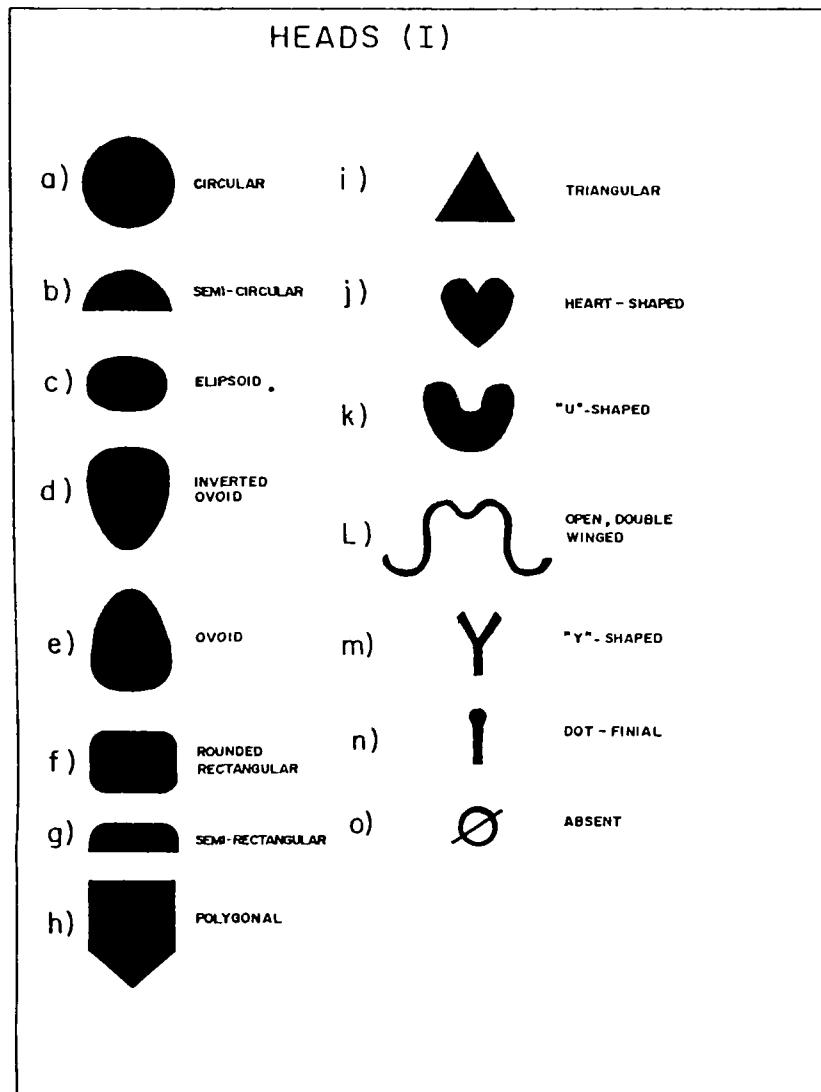


Figure 17. The lithograph "head" dimension (I) and modes (a-o).

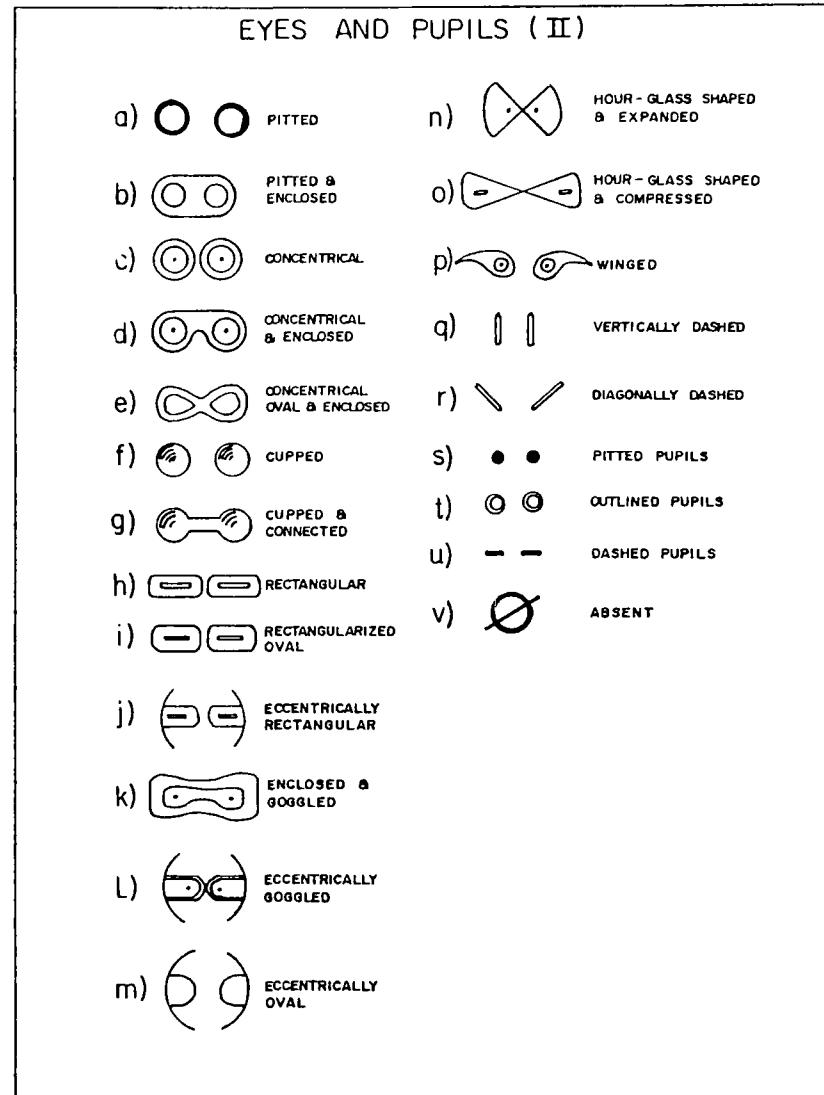


Figure 18. The lithograph "eyes and pupils" dimension (II) and modes (a-v).

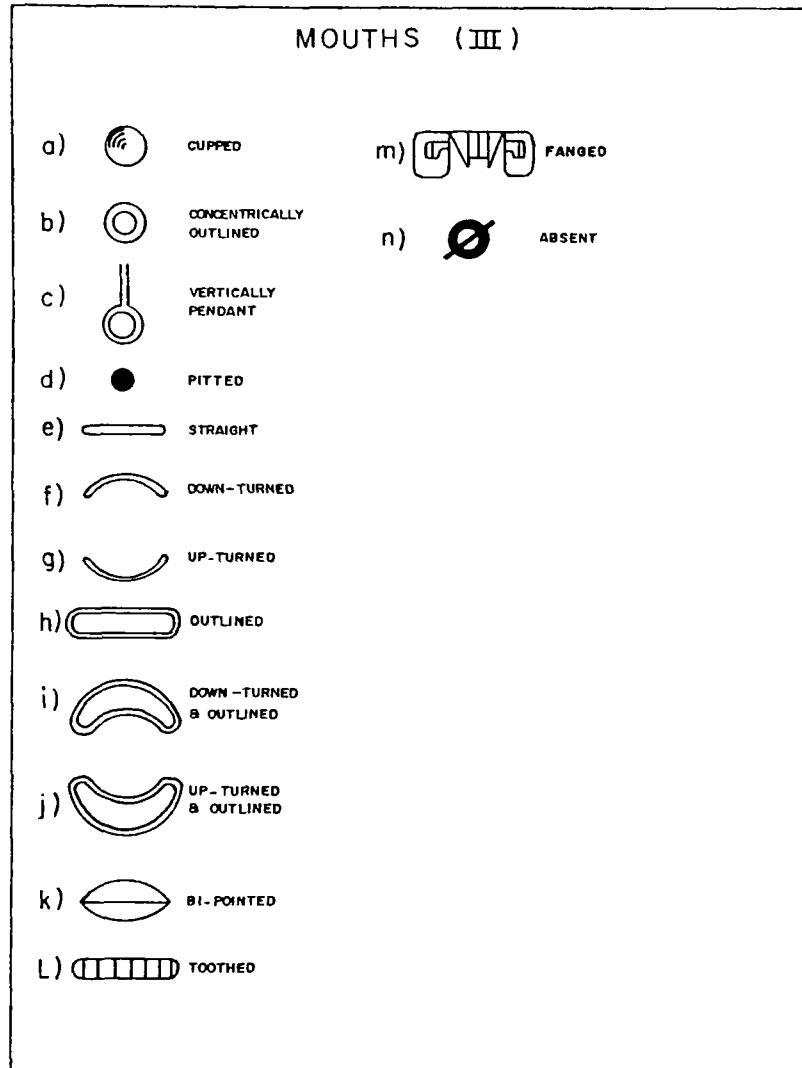


Figure 19. The lithograph "mouths" dimension (III) and modes (a-n).

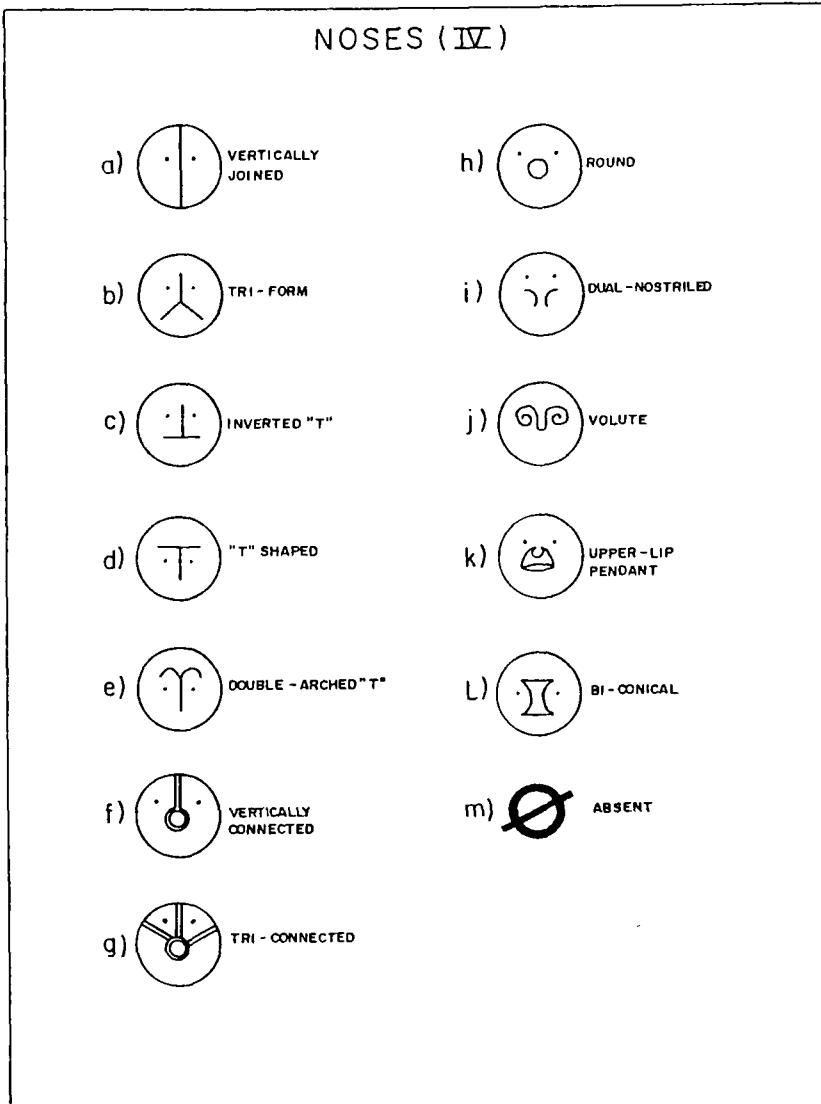


Figure 20. The lithograph "noses" dimension (IV) and modes (a-m).

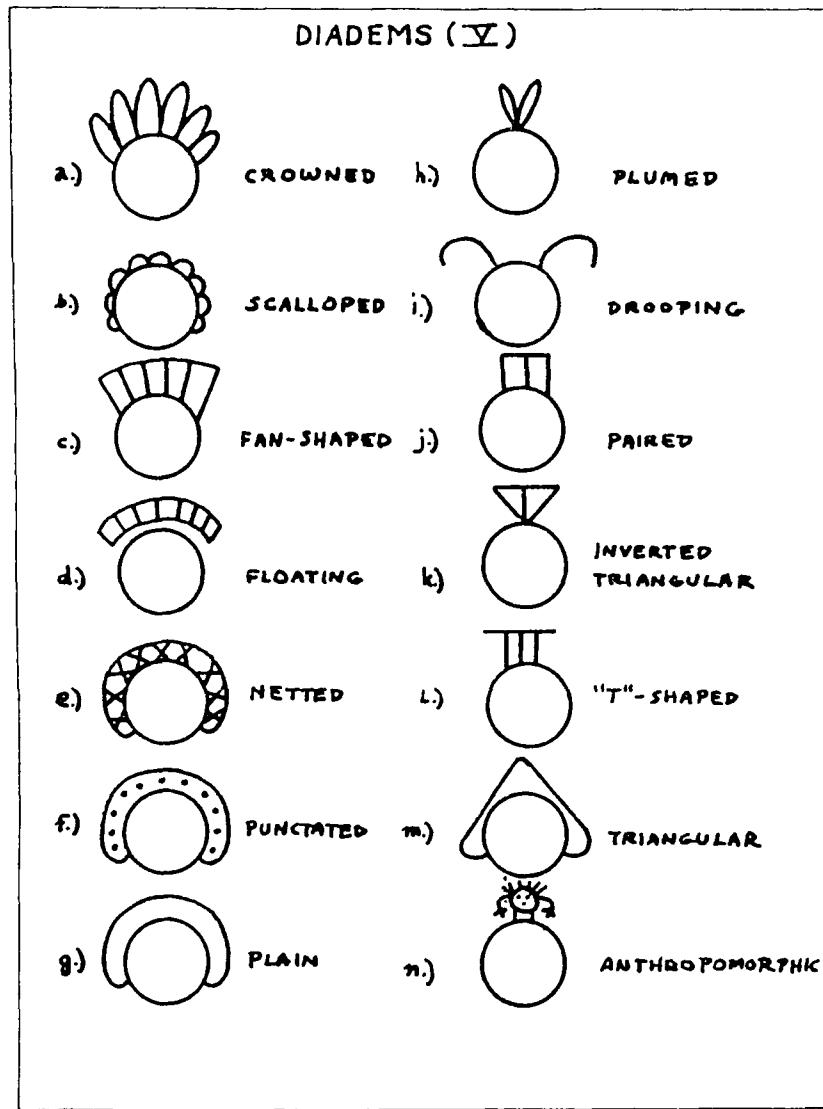


Figure 21. The lithograph "diadems" dimension (V) and modes (a-n).

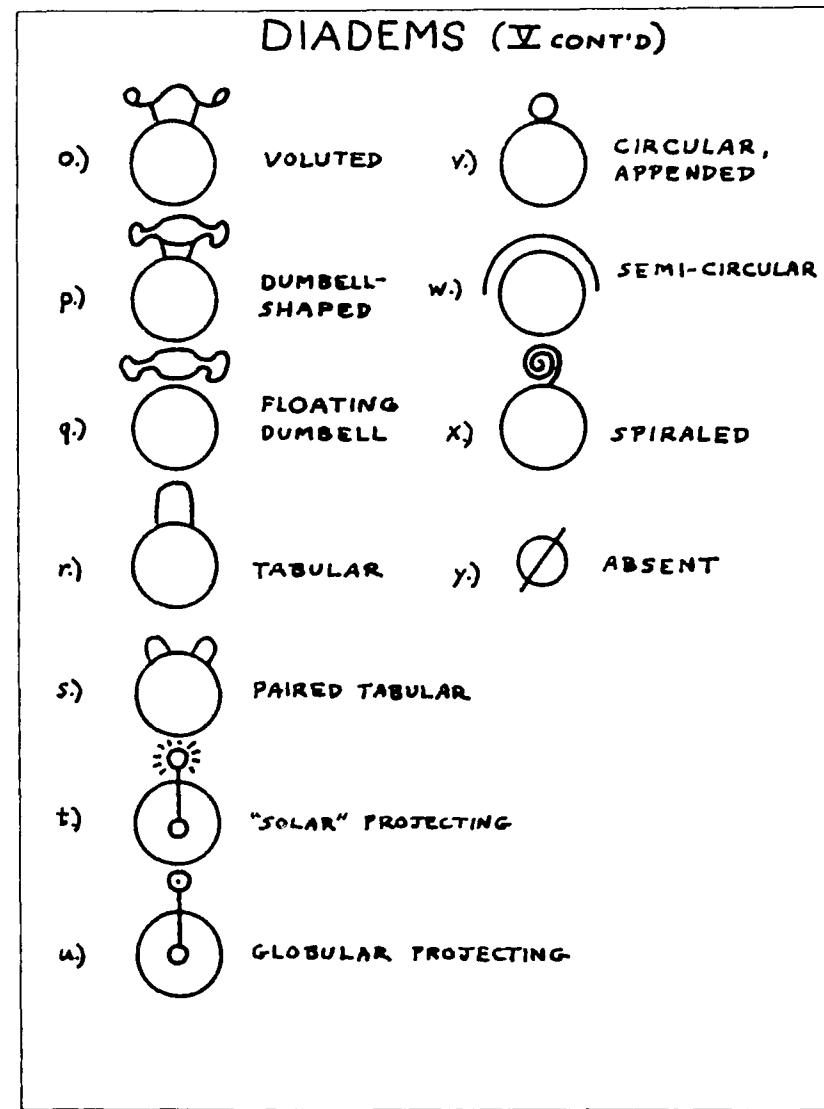


Figure 22. The lithograph "diadems" dimension (V) and modes (o-y).

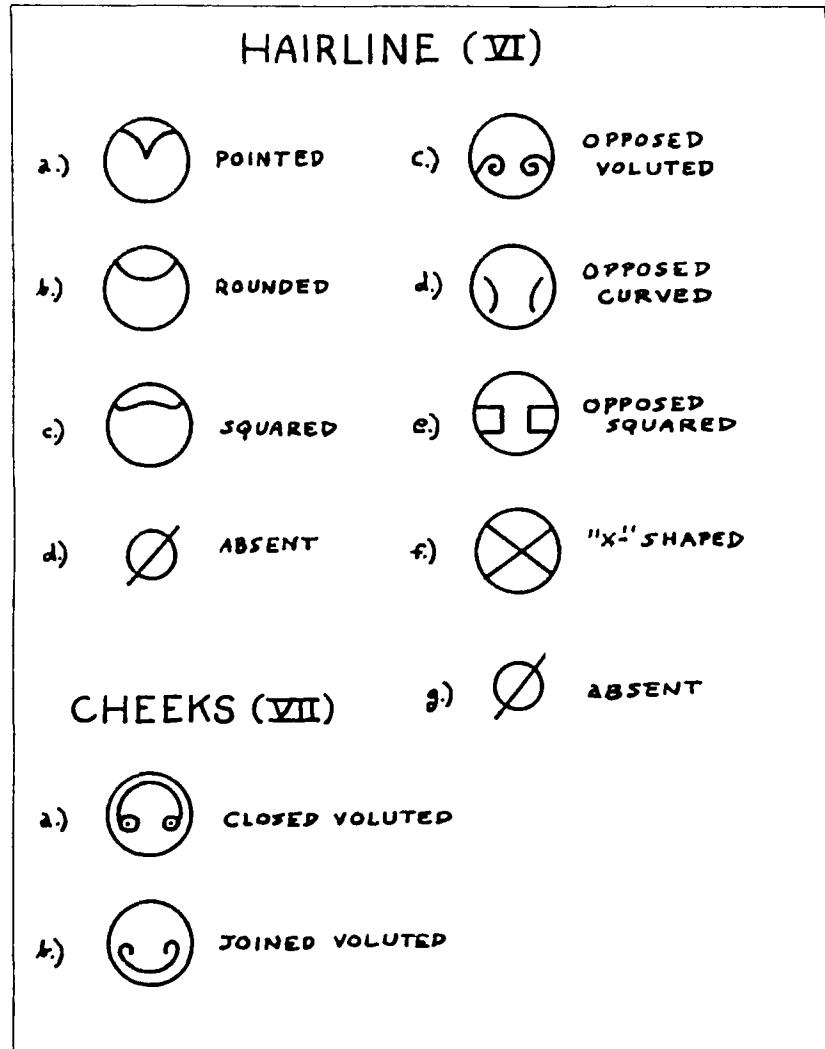


Figure 23. The lithograph "hairline" dimension (VI) and modes (a-d) and "cheeks" dimension (VII) and modes (a-g).

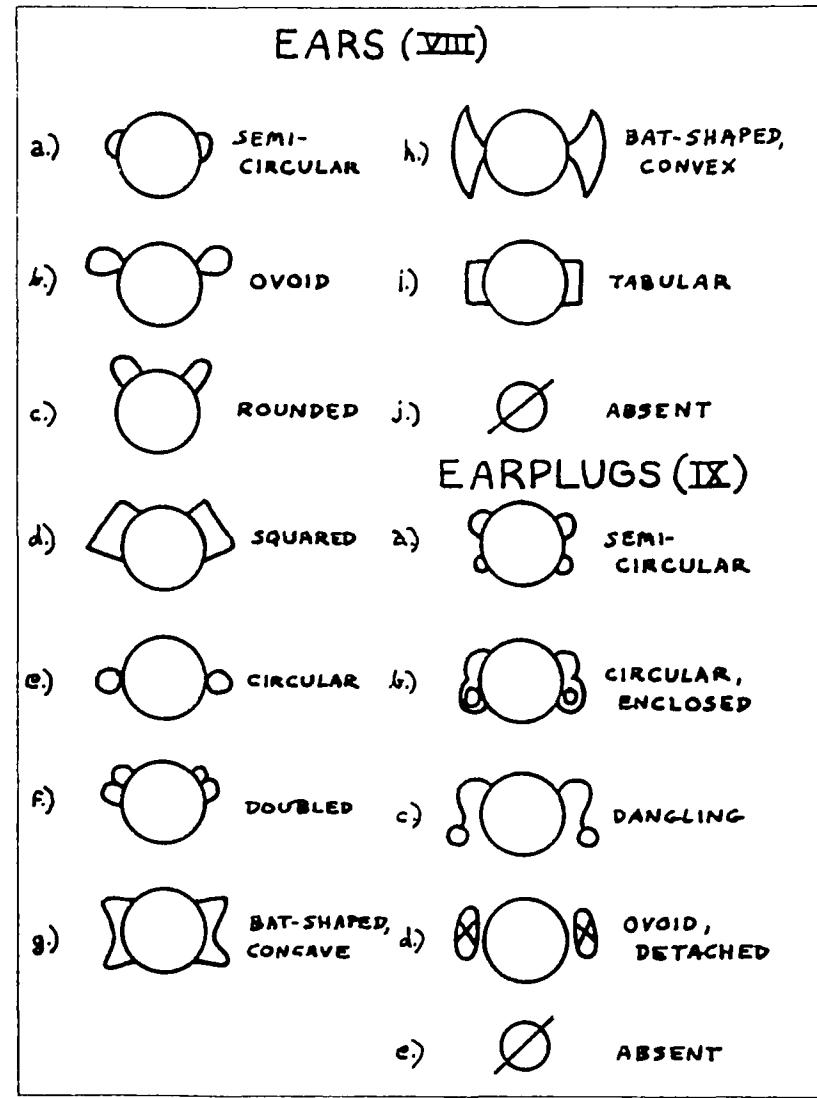


Figure 24. The lithograph "ears" dimension (VIII) and modes (a-j) and "earplugs" dimension (IX) and modes (a-e).

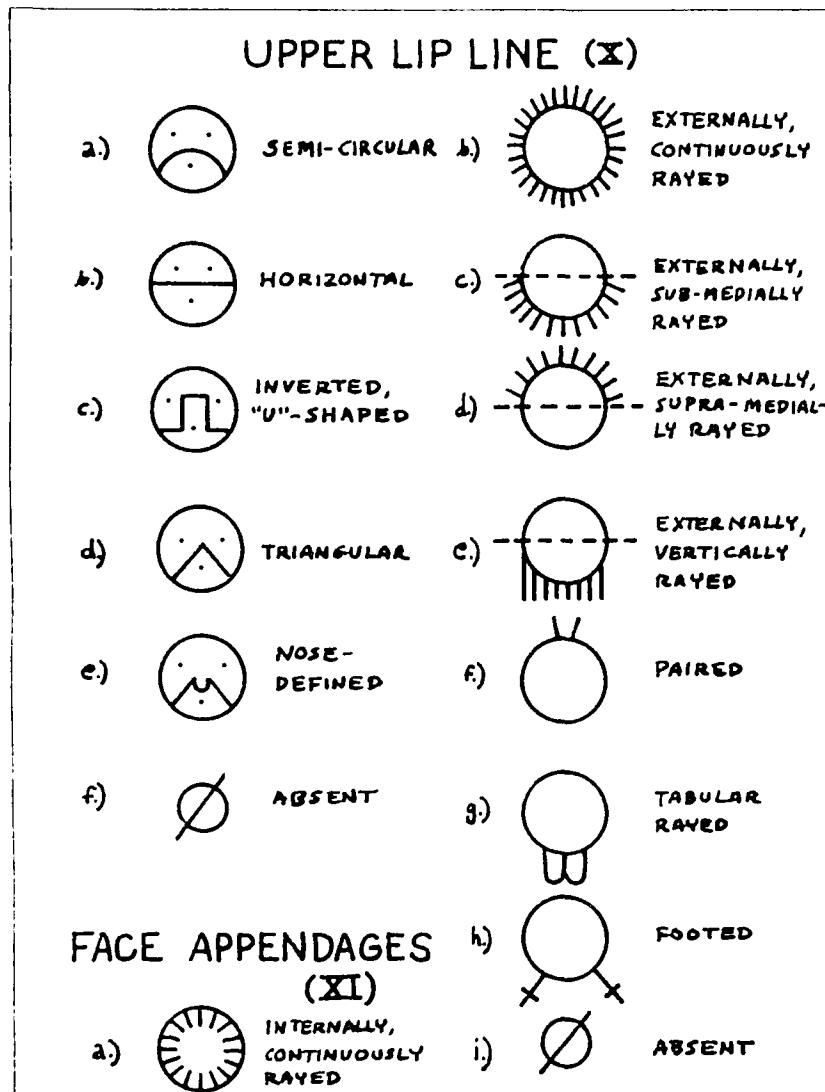


Figure 25. The lithograph "upper lip line" dimension (X) and modes (a-f) and "face appendages" dimension (XI) and modes (a-i).

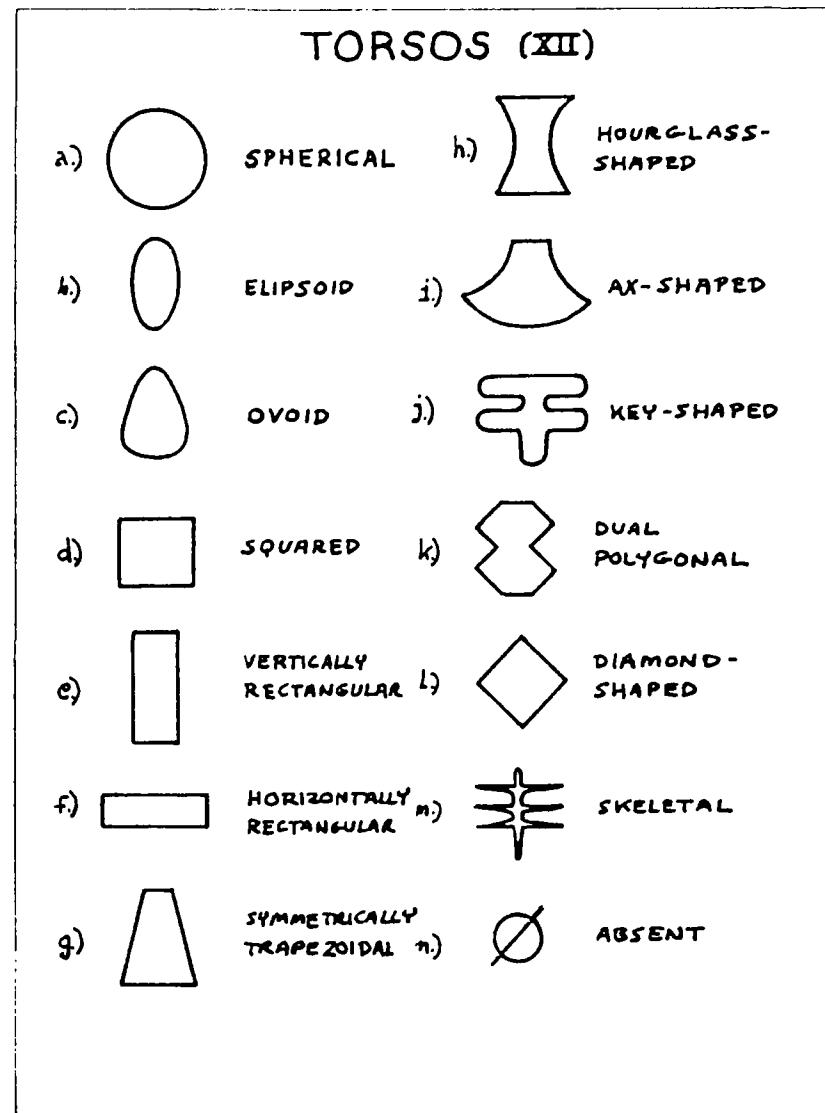


Figure 26. The lithograph "torsos" dimension (XII) and modes (a-n).

TORSO PATTERNS (XIII)

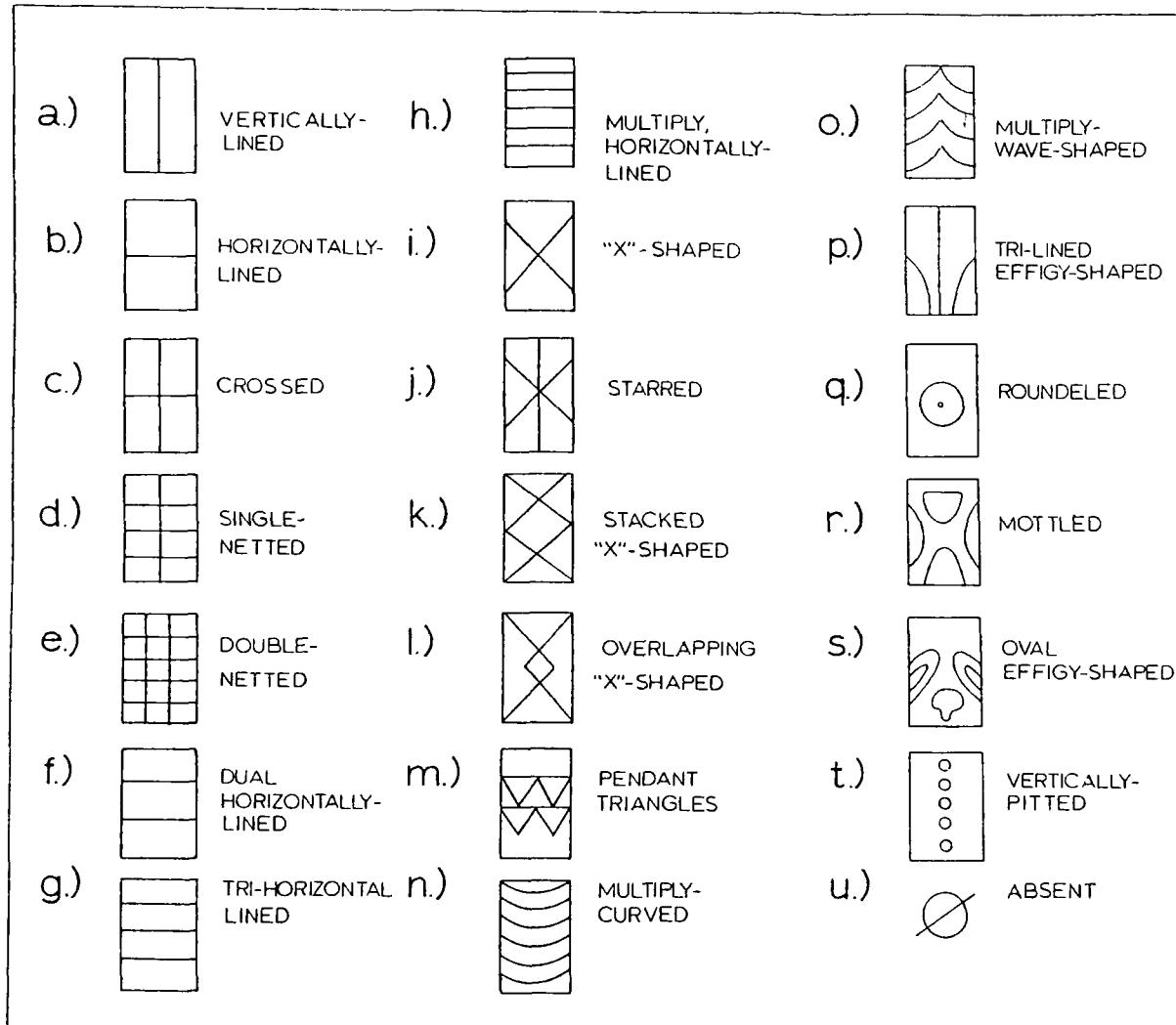


Figure 27. The lithograph "torso patterns" dimension (XIII) and modes (a-u).

TORSO APPENDAGES (XIV)

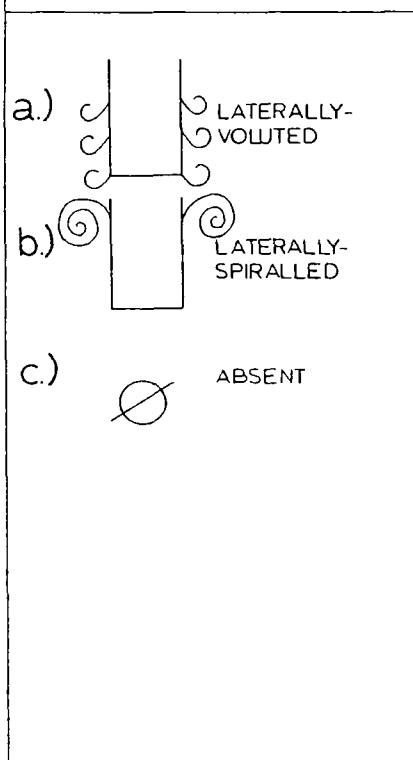


Figure 28. The lithograph "torso appendages" dimension (XIV) and modes (a-c).

TORSO FINIALS(XV)

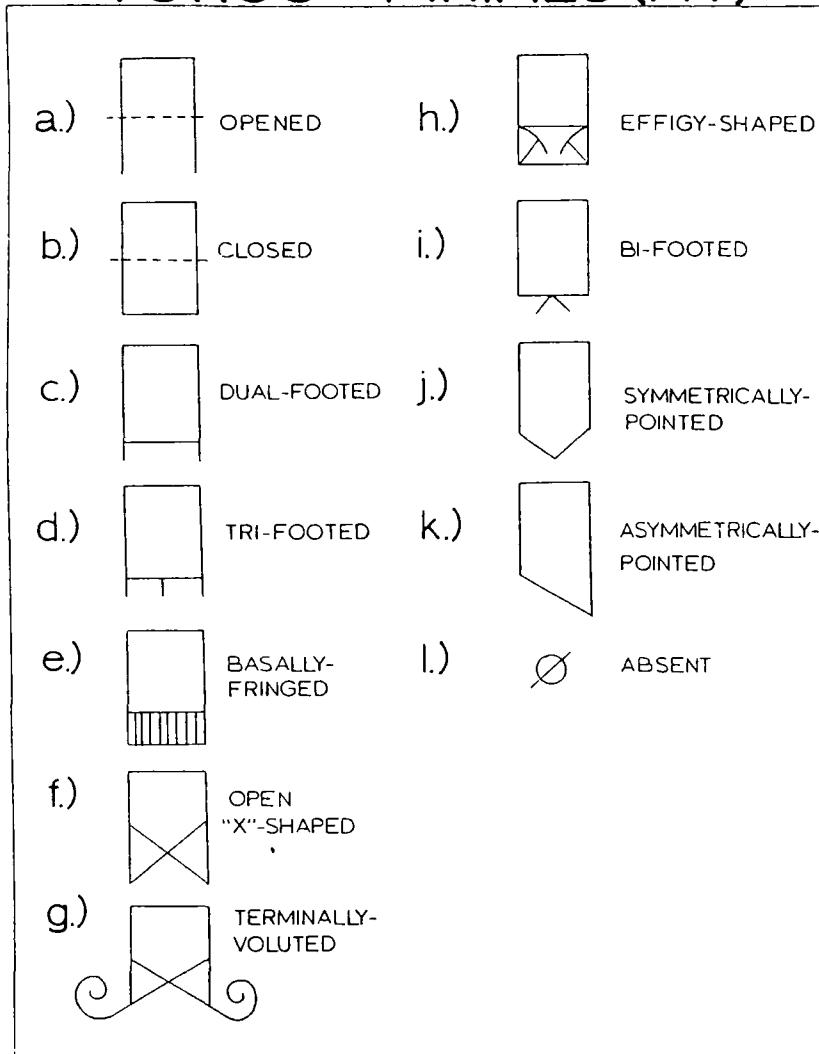
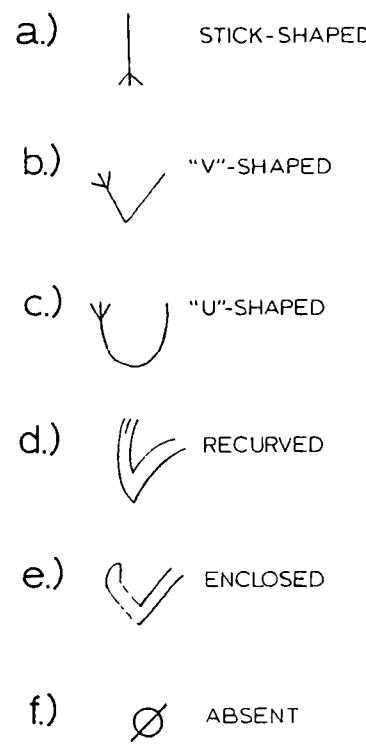


Figure 29. The lithograph "torso finials" dimension (XV) and modes (a-l).

ARMS(XVI)



a.) Y "Y"-SHAPED

HANDS(XVII)

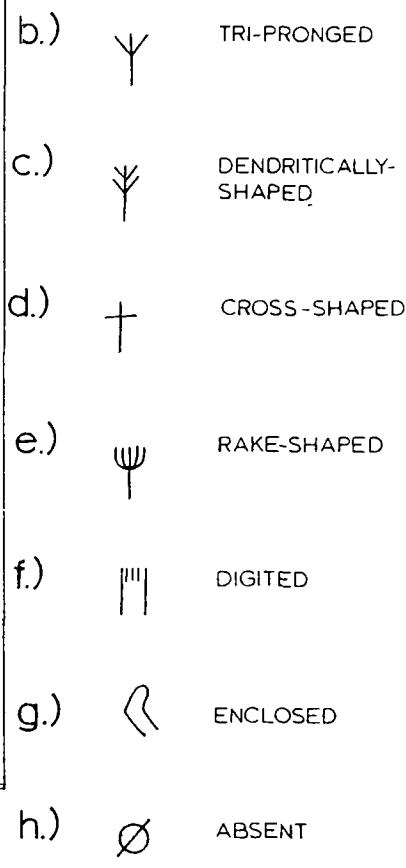


Figure 30. The lithograph "arms" dimension (XVI) and modes (a-f) and "hands" dimension (XVII) and modes (a-h).

GENITALIA (XX)

LEGS(XVIII)		FEET(XIX)		GENITALIA (XX)	
a.)		STICK-SHAPED	b.)		TRI-PRONGED
b.)		"V"-SHAPED	c.)		DENDRITICALLY-SHAPED
c.)		"U"-SHAPED	d.)		CROSS-SHAPED
d.)		RECURVED	e.)		RAKE-SHAPED
e.)		ENCLOSED	f.)		DIGITED
f.)		ABSENT	g.)		HALF-OVAL SHAPED
a.)		"Y"-SHAPED	h.)		ABSENT

Figure 31. The lithograph "legs" dimension (XVIII) and modes (a-f) and "feet" dimension (XIX) and modes (a-h).

Figure 32. The lithograph "genitalia" dimension (XX) and modes (a-c).

DIMENSIONS

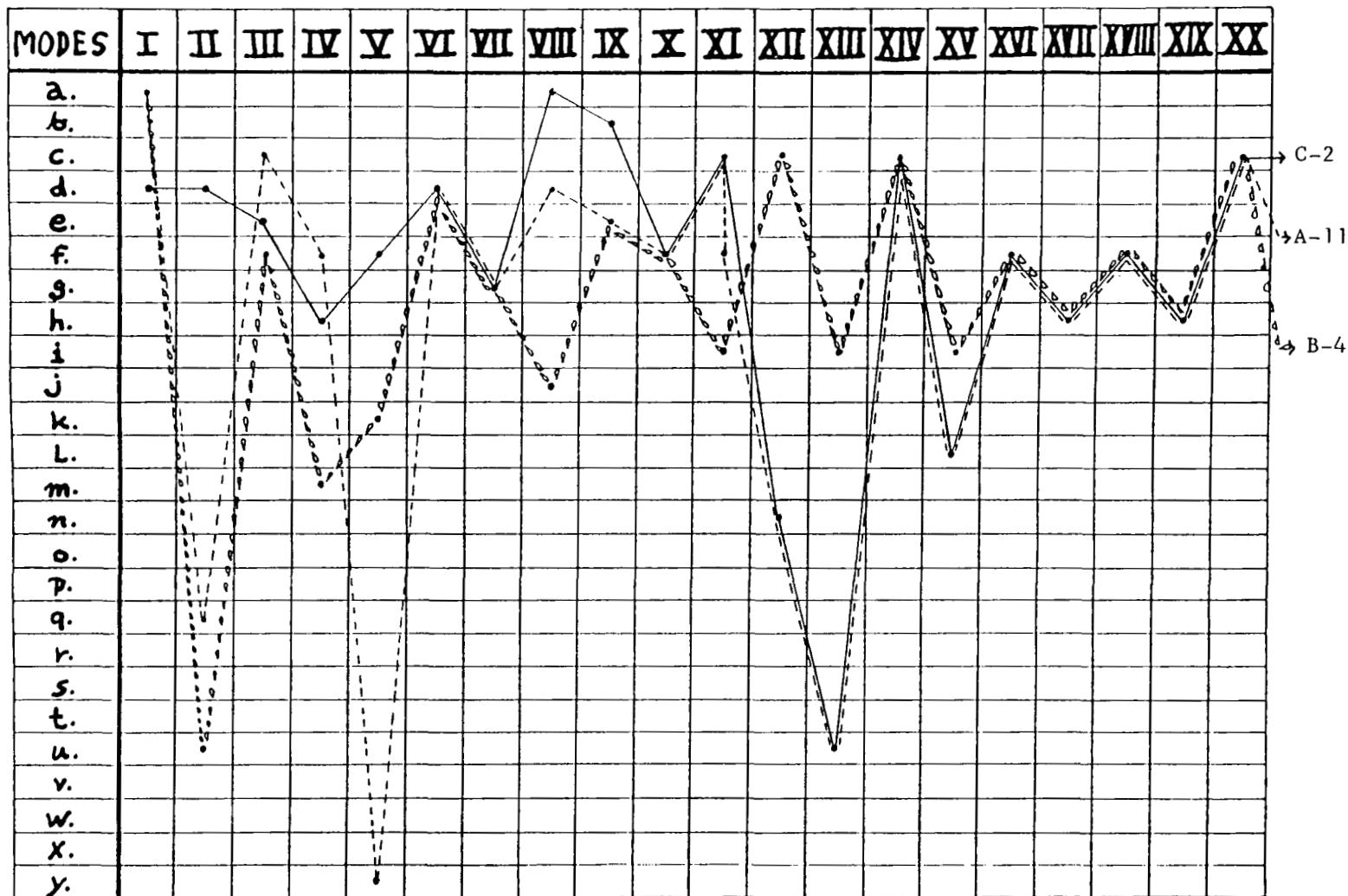


Figure 33. A comparative flow chart of dimensional and modal selections for three figured lithographs (Figs. 9 [A-11], 13 [B-4] and 14 [C-2]).

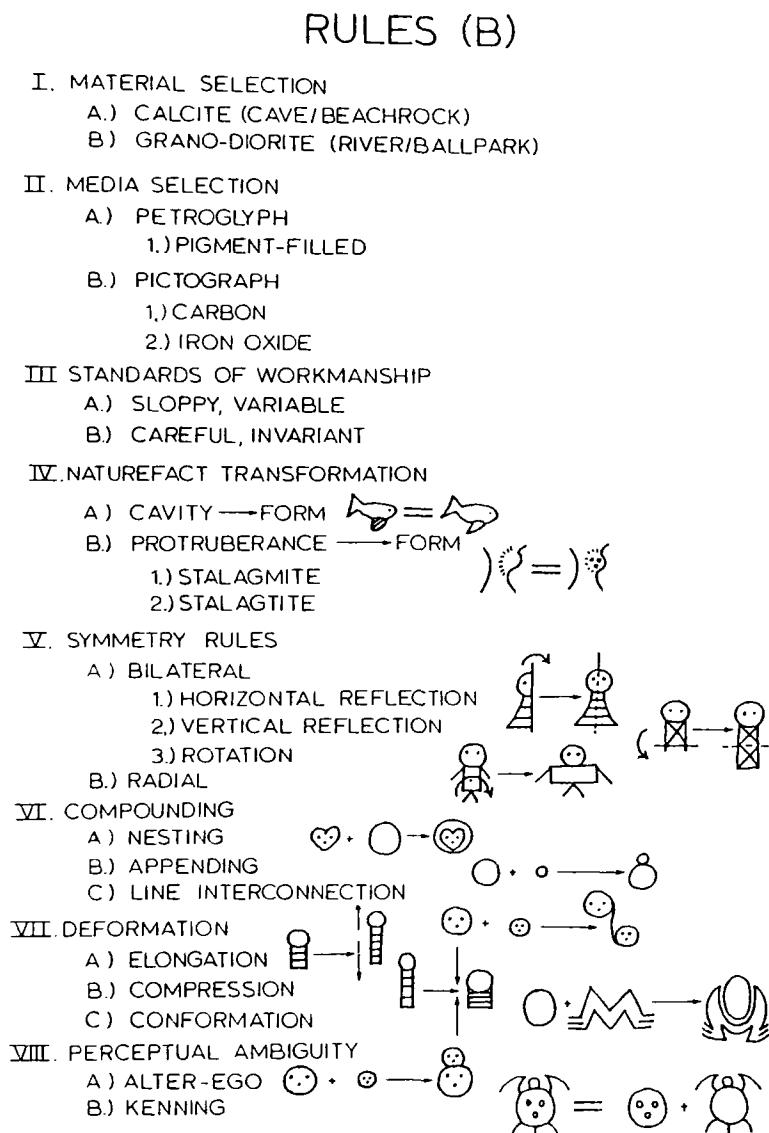


Figure 34. A simplified generative grammar of lithographic art, the rules (B) of design element recombination.

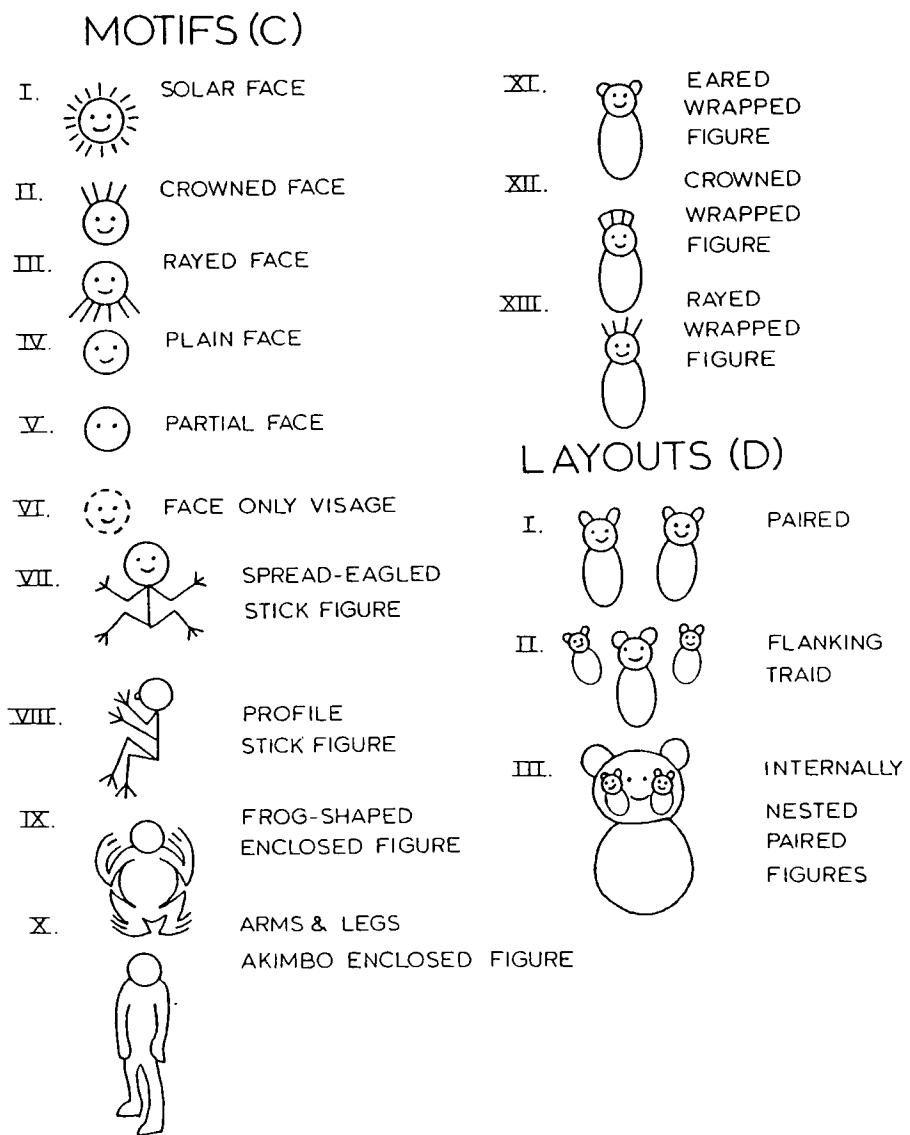


Figure 35. The design compounds, or motifs (C), of lithographic art, and their associated design layouts (D).