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SMITHSONIAN CONTRIBUTIONS TO ANTHROPOLOGY

VOLUME 3 [Whole Volume]











Microenvironments in the Ocós area, Guatemala. *a*, View of beach sand and scrub, looking north toward the village of Ocós. *b*, The lagoon-estuary system just north and east of Ocós. *c*, Stilt-rooted red mangrove forest. *d*, The riverine habitat, looking upstream on the Río Naranjo toward Salinas La Blanca. *e*, A tidal stream running through the savannas of the Pampa La Morena. *f*, The Naranjo River, looking downstream from Salinas La Blanca.



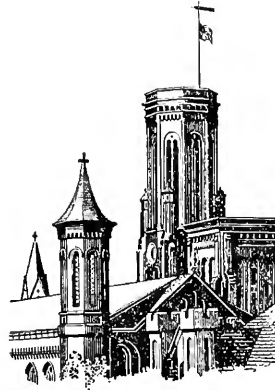
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# Early Cultures and Human Ecology in South Coastal Guatemala

Michael D. Coe and Kent V. Flannery

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## Preface

The program "Interrelationships of New World Cultures" was initiated in 1960 by the Institute of Andean Research and continued for 3 years with the support of the National Science Foundation. The investigations described in this report were carried out as Project C of the program's third year.

We wish to gratefully acknowledge the advice and encouragement of the formulator of the program, Dr. Clifford Evans, of the Smithsonian Institution, and the support of the treasurer of the Institute of Andean Research, Dr. Gordon F. Ekholm, of the American Museum of Natural History.

Our colleagues and friends in Guatemala again provided the same generous aid which they had shown to the senior author during his previous field season of 1958. Our profound thanks go once more to Sr. Don Carlos Samayoa Chinchilla, director of the Instituto de Antropología e Historia, and to Sr. Don Antonio Tejada Fonseca, director of the Museo Nacional de Arqueología y Etnología. Dr. Francis Gall, of the Dirección de Cartografía, furnished us with maps and excellent advice drawn from his extensive knowledge of Guatemalan geography and history.

Our stay in the village of Ocos was made pleasant by the willing cooperation of the mayor, Sr. Don Juan Reyes. We feel deeply grateful to Sr. Don Vicente Cuadros and his family, who are the present occupants of the Salinas La Blanca site; many of the insights which we have had into human ecology in the Ocos area were gained from conversations with our friend Don "Chente."

This report would have been an impossibility without the identifications so kindly furnished us by colleagues in the natural sciences. In particular, we owe debts of gratitude to Dr. Paul C. Mangelsdorf, of the Botanical Museum, Harvard University, for his report on ancient maize specimens; to Dr. Willard D. Hartman, of Yale University, and Dr. Fenner Chace, of the Smithsonian Institution, for aid in identifying crab fragments and modern crabs; to Dr. W. I. Follett, of the California Academy of Sciences, for reporting on fish remains; to Dr. Raymond A. Paynter, Jr., of the Museum of Comparative Zoology, Harvard University, who identified bird bones; to Dr. William J. Clench and Dr. Ruth Turner, also of Harvard, for establishing the species designation of some difficult mollusk specimens; to Dr. Matt Walton and Dr. George H. Myer, of the Department of Geology, Yale University, for their identifications of the raw materials used in stone artifacts and the analysis of pottery thin sections; to Dr. B. Francis Kukachka, of the Wood Identification Laboratory, U.S. Department of Agriculture, Madison, Wis. for his report on charcoal samples; and to Dr. Matsuo Tsukada of the Department of Biology, Yale University, for his analysis of pollen samples from Salinas La Blanca.

The four radiocarbon samples from Salinas La Blanca were analyzed in the Yale Geochronometric Laboratory by Dr. Minze Stuiver.

We have benefited from conversations with archeological colleagues working on problems similar to ours, especially with Dr. Richard S. MacNeish and Fredrick Peterson, then with the Tehuacán Archeological-Botanical Project; Gareth W. Lowe and Dee F. Green, of the New World Archaeological Foundation, and Dr. Stephan F. de Borhegyi and Dr. Lee Parsons, of the Milwaukee Public Museum.

Our thanks go also to Sophie D. Coe, who oversaw the washing of the potsherds and was responsible for the cataloging of all specimens.

All of the pottery drawings in this report are the work of Carl Wester, of the Peabody Museum of Natural History, Yale University. We thank Nancy H. Flannery for the preparation of figures 3, 8, and 42.

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*New Haven, Conn.*

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*Washington, D.C.*

April 1, 1965

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Early Cultures and Human Ecology

in South Coastal Guatemala



FIGURE 1.—Map of southeastern Mesoamerica, showing the location of Salinas La Blanca and other sites mentioned in the text.



# Introduction

The present report is concerned with investigations carried out on the Pacific coast of Guatemala, in a region very close to the Mexican border, during the months of January through March of 1962 (see maps, figs. 1 and 2). This research centered on Salinas La Blanca, a small village site of the Formative period,

situated on the east bank of the Naranjo River, about 1.5 km. north of Ocós (Department of San Marcos). It was our intention to throw further light on the earliest village-farming occupation of this region, as a followup to investigations carried out at the nearby site of La Victoria during 1958 (Coe, 1961).

## PROBLEMS IN THE STUDY OF THE FORMATIVE PERIOD

The outstanding problems in the study of the Formative or Pre-Classic period in Mesoamerica are: (1) the actual sequence of cultures in the various regions of Mesoamerica, and their absolute dating; (2) the rise of civilizations in Mesoamerica, civilizations which are characterized by ceremonial centers, monumental art styles, calendrical sciences, and writing; (3) the interrelationships of New World cultures in this period; and (4) the ultimate origins of settled village-farming life and the arts dependent upon it, such as pottery, figurine-making, loom-weaving, and so forth. In the last 10 years, there has been a great acceleration in our understanding of these problems because there has been more actual excavation in Formative archaeological sites in this time than in the five decades which have passed since stratigraphic work first began in Mesoamerica. What is most significant is that archaeologists have begun to extend their interests to regions away from those in which the most spectacular remains of the Classic and Post-Classic periods are found—to areas which may have been “marginal” in later times but which probably were critical in earlier epochs.

One of these hitherto little-known regions is the dry Central Depression of Chiapas, the valley of the Grijalva River, in which particularly important advances in the field of Formative research have been made by the New World Archaeological Foundation. These have resulted in what is one of the longest and most detailed successions of stratified cultures thus far known for the Formative period. It is often not realized how long and complex the Formative development was, or that most areal “sequences” for the period are not only incomplete but usually rest on alarmingly weak stratigraphic foundations (Coe, 1961, pp. 120–123). For this reason, the Chiapa sequence must serve as a reliable yardstick against which other sequences can be measured.

Few if any attempts to arrange the known Forma-

tive cultures of Mesoamerica into some sort of overall scheme (whether into developmental stages or into chronological periods) have met with general acceptance (Wauchope, 1964, p. 335). The trouble with developmental schemes has been that very few data have been available from which to determine the criteria used to group or rank Formative cultures—for instance, the trait of building temple mounds can hardly be used as a criterion at present, when we have no idea of when and where temple mounds first appeared in Mesoamerica. On the division of the sequence into periods there is somewhat more agreement, particularly among those who have actually been digging in stratified Formative sites in recent years, and especially since the establishment of the Chiapa de Corzo sequence. In this report, we will adhere to the scheme of Early, Middle, and Late Formative defined in Coe (1961, pp. 133–134), although we do not assume that all workers in this field would fully subscribe to it.

Because of the general rarity of radiocarbon dates for the Formative period, there has been a continued dispute over the absolute dating of the cultures within it. Not only are there few dates, but only a tiny handful of these are based upon reliable samples; and by “reliable” we mean charcoal, from twigs or young trees, that is definitely contemporary with the deposit in which it was found. “Mid-den” charcoal found mixed in a sherd dump is suspect; so is charcoal from burned house beams formed from trees that were old when cut. Shell, bone, and antler continue to be dubious as sources for radiocarbon dates. On the other hand, charcoal from stratified hearths or from burned offerings is generally to be relied upon, especially when collected under controlled conditions. Thus, the date of the oldest pottery-using and village-living cultures in Mesoamerica remains in doubt. A rough estimate of 1500 B.C. for the beginning of the Early Formative has been

made (*ibid.*, p. 131), but the true date could well be several centuries earlier or later than this. The upper terminus of the Formative depends closely upon the correct correlation of the Maya and Christian calendars, since the beginning of the Classic is defined as the point at which the Maya began erecting dated stone monuments. In the Thompson correlation, accepted by most students, this would be about A.D. 300, but the rival Spinden correlation would put this back about 260 years. Nevertheless, within this span of time most archeologists concerned with Formative problems are fairly well agreed on the "relative" dating of various cultures, as well as convinced that many more radio-carbon tests must be made.

It was not so many years ago that the Maya civilization was thought to be the oldest in the New World, and the possible source for all other high cultures in this hemisphere. This belief made the search for its origins imperative, and when no such origins could be found in the lowland Maya area, the mystery deepened. Although many Mayanists refused to admit the possibility that the Olmec culture of lowland Veracruz and Tabasco predated the Classic Maya period, the Olmec culture is now generally accepted as of Middle Formative date (ca. 800–400 B. C.) (Drucker, Heizer, and Squier, 1959) and as the probable originator of many of the traits considered typical of the Maya. Several Late Formative cultures of southeastern Mesoamerica, such as Monte Albán I, Tres Zapotes, Izapa, the Miraflores culture of Kaminaljuyú, and Chicanel, brought many of these traits to a high degree of refinement and apparently played a major role in the transmittal of Olmec civilization to the Classic Maya of the Petén lowlands. But from what and how did the Olmec civilization arise? At the present moment, little can be said to answer this most important and disturbing question. When the oldest of all Mesoamerican high cultures seems to have no local roots, it is a great temptation to look elsewhere, even overseas (Ekholm, 1964), but the answers most likely are to be encountered right in Olmec country itself, where excavation in Olmec dwelling sites is sorely needed.

The 1958 excavations at La Victoria reopened a question that has long intrigued New World archeologists: were the Formative peoples of Mesoamerica and the Andean area in contact with each other? If so, what was the nature of the contact, and how much did one area influence the development of the other? Spinden's "Archaic Hypothesis" of 1917 was the first attempt to deal with some very convincing resemblances between Formative manifestations in both areas, although conceived on the basis of extremely fragmentary data. Others who have

carried this idea further are Strong (1943), Willey (1955 a, 1955 b, 1960), Porter (1953), de Borhegyi (1959), Kidder II et al. (1963), and Meggers (1963, 1964). In spite of vigorous objections raised by some Peruvianists (Lanning, 1963), there has accumulated a considerable body of evidence to support the view that there was a two-way movement of some important culture traits between Mesoamerica and northwestern South America during the Formative period, most likely via sea voyages along the Pacific coast, and that Mesoamerica probably played the dominant role in the invention and transmission of many of these traits. For this reason, the discovery at La Victoria of an Early Formative Phase, Ocós, which could be demonstrated to show signs of contact with a specific phase in South America, namely the Formative Chorrera Phase of coastal Ecuador, moved us away from generalities and enabled at least two termini of this maritime contact to be pinned down. Far from being moribund, Spinden's "Archaic Hypothesis" is as lively an issue today as it was half a century ago, although it is now conceived in more complex terms. The issue is important; the two civilized areas of the Pre-Columbian New World were Mesoamerica and the Andes—were these developments independent of each other, or did they arise from a commonly shared Formative base? Was there a New World *oikoumene* comparable to that of the Old World (Willey, 1955 b)?

Regarding the fourth major problem in the study of the Formative period, a virtual revolution has taken place in our understanding of the events leading to the adoption of agriculture in Mesoamerica. Earlier researches of MacNeish in northeastern Mexico had shown that maize cultivation began there at least by 2500 B.C., well back in preceramic times (MacNeish, 1958). The discovery of fossil maize pollen in deposits underneath Mexico City that may be 80,000 years old indicated that the central highlands of Mexico were the natural habitat of wild maize (Mangelsdorf, 1958). In the light of these and other discoveries, MacNeish in 1960 turned his attention to the extremely dry caves and rock shelters of the Tehuacán Valley, in Puebla, Mexico. The successive field seasons in Tehuacán have resulted in the definition of a remarkably long sequence, extending from the initial occupation of the valley, perhaps 11,000 years ago, through the Spanish Conquest.

It is the discoveries, in preceramic context, of the beginnings of plant domestication that are most significant among the findings of the Tehuacán project (MacNeish, 1961, 1962, 1964). The aborigines of Mesoamerica have always been primarily herbivorous rather than carnivorous, and it is apparent from the new Tehuacán data that this pattern goes back to the

“Paleo-Indian” Ajuereado Phase (prior to 7200 B.C.), when about half the diet already consisted of wild plant food. By El Riego times (6800–5200 B.C.), an extremely primitive wild maize with tiny ears may have been among the grasses collected, while squash and chile peppers were actually cultivated. Coxcatlán (5200–3400 B.C.) is the critical phase for the prehistory of Tehuacán and, by extension, of the rest of the New World, for it was within this span of time and in or very close to this area that the American Indian made the first steps in the domestication of maize. During the succeeding Abejas Phase (3400–2500 B.C.), which is also preceramic, remains of cultivated food plants are almost as abundant as those of wild species, and maize had now evolved under domestication to a pop-pod type rather similar to the Bat Cave race.

As a result of the slow increase in food supply with the adoption of a primitive agriculture, the latest phases prior to the Formative in the Tehuacán region show indications of a somewhat more settled life. A small village of pit houses is of Abejas date, although it is doubtful that it was occupied the year round. The Abejas people were fashioning ground stone containers: neckless globular jars and flat-bottomed bowls with outslanting sides. Crude, plain, gravel-tempered pottery appears in the succeeding Purrón Phase (2500–1900 B.C.), and it is significant that the shapes of these earliest known Mesoamerican ceramics exactly conform to those of the Abejas stone vessels.

The general picture given us by the Tehuacán excavations is one of gradual plant domestication taking place in a cultural and environmental context not very different from that of the “Desert Culture” of arid North America (Jennings, 1956). The prerequisite to fully settled village life in Mesoamerica is the possession of an effective maize-beans-squash

agriculture, and it would seem that we have here encountered the first stage in the origins of the Formative. The second stage—the appearance of settled, permanently occupied villages—appears to be better documented in some of the tropical lowland areas of Mesoamerica than in the Tehuacán Valley. The number of Early Formative villages per square kilometer on the lagoon-estuary system of the Guatemalan Pacific coast, to give one example, would seem far to exceed the number of permanent villages per square kilometer in the Tehuacán Valley during the Ajalpan Phase; moreover, the year-round stability of the coastal settlements appears to have been greater (Coe and Flannery, 1964). Until well into the Formative, the pattern in the arid Tehuacán Valley involved the seasonal exploitation of widely scattered natural resource areas as a supplement to agriculture, and it has been reasoned (*ibid.*) that this mitigated against an abundance of permanent villages. In contrast, the coastal farmers specialized in one productive resource area, the lagoon-estuary system, which encouraged the growth of abundant, although localized, permanent villages.

We are not attempting to paint a simple, black-and-white contrast between coast and highlands. Both areas went into the making of Mesoamerica. We note with interest only that while agriculture began in the arid uplands, population growth during the Early Formative was probably higher on the coast. In the Late Formative, sophisticated irrigation systems appear in the Tehuacán Valley (personal communication, Richard B. Woodbury and James A. Neely), indicative of a new and more effective adaptation on the part of the highland peoples. From that point on, population in the highlands grew at a rate that far outstripped the Guatemalan coast until Late Classic times.

## PREVIOUS INVESTIGATIONS IN THE OCÓS AREA

That portion of the Pacific coast plain of Guatemala lying closest to the border of Chiapas, Mexico, was first reconnoitered by Edwin M. Shook in the field season of 1946–47. Shook discovered a large number of archeological sites, principally of the Formative and Late Classic periods, the latter marked by abundant San Juan Plumbate pottery (Shook, 1947, pp. 180–182). One of these, El Sitio, some 18 km. north of Ayutla, is a Formative and Late Classic ceremonial site, and was excavated by Shook. El Jobo, just east of Ayutla, is a sizable mound group principally of Late Formative age, with which an Izapa-style stela was associated. Unfortunately, no reports on either of these two sites have yet appeared.

La Victoria was among the sites encountered by Shook that season. In the winter of 1958, Coe and his wife undertook a 3-months' excavation program at La Victoria, with the intention of finding the earliest Formative occupation of this part of Mesoamerica. The site is located 3 km. north of the fishing village of Ocós, between the Naranjo and Suchiate Rivers, and consists of 10 to 12 very low, flat mounds which represent platforms for ancient houses. Two well-stratified Formative components were found to be abundantly represented; the uppermost deposits consisted of mixed Late Formative and Late Classic (San Juan Plumbate) remains which could only be separated from each other on typologi-

cal grounds. At the time of writing of the 1961 final report on the site, the sequence at La Victoria with estimated dates stood as shown in table 1.

TABLE 1.—CHRONOLOGY OF THE GUATEMALAN COAST IN 1961

Period	Phase	Estimated date
Late Classic	Marcos	A.D. 750–900
Early Classic	(Absent)	—
Late Formative	Crucero	300 B.C.–A.D. 100
Middle Formative	Conchas 2	700–300 B.C.
	Conchas 1	1000–700 B.C.
Early Formative	Ocós	1500–1000 B.C.

The Ocós Phase proved to be of the greatest interest. Formerly, the Las Charcas Phase at Kaminaljuyú, in highland Guatemala, was the most ancient Formative culture known for southeastern Mesoamerica (Shook, 1957, p. 67). However, the closest ties of Las Charcas with the succession at La Victoria proved to be with the demonstrably Middle Formative Subphase of Conchas 2. This placed the very complex Ocós Phase as one of the earliest, if not the most ancient, ceramic-using cultures in southeastern Mesoamerica. Certain specific resemblances seemed to align it closely with the Chiapa I (Cotorra) Phase at Chiapa de Corzo, although the traits shared were few in number, centering mainly on ways of decorating the rims of neckless globular jars (*tecomates*). Ocós ceramics were quite sophisticated, including many plastic decoration techniques, such as rocker stamping of various sorts, textile impressions, and even cord marking, unique thus far for this period in Mesoamerica. A peculiar technique of striping vessels with a thinly applied iridescent paint having an almost metallic luster proved to be a trait shared with early cultures on the coast of Ecuador, but otherwise unknown in Mesoamerica.

The Ocós economy was mixed. Part of it was based upon the products, such as mollusks and fish, to be found in the then flourishing brackish water estuary system. Part was based on plant foods, or so we infer from the grinding tools found; some of these plant foods were almost certainly domestic. Well made clay figurines and the possible presence of a temple mound of Ocós age at a nearby site suggested that while very early, the Ocós people may have had an advanced ceremonial life.

It was then assumed that Conchas 1, with intimate ties to Chiapa II and to early cultures of the Gulf Coast, developed in situ directly out of Ocós, although it was recognized that there were some additions, such as abundant hard white pottery with new forms and decorative techniques. On this assumption, several of the pottery types of the Conchas 1 and 2 Subphases were considered as mere extensions in time of Ocós types and so named. That this assumption was wrong is shown in the present report. At any rate, Conchas marks the most important occupation of La Victoria. It is “typically” Middle Formative, closely allied in pottery and figurine styles to such sites as Zacatenco and El Arbolillo of the Valley of Mexico, La Venta and other Olmec sites on the Gulf Coast, the Mamom Phase in the Petén, and the Las Charcas Phase in the Guatemala highlands. There is no evidence for any significant change in the subsistence base from Ocós times. Away from the village of La Victoria, several sites with large platform mounds indicate that ceremonial construction was carried out.

No Proto-Classic or Early Classic occupation was found at La Victoria, and Shook (1947) in his survey encountered a similar lack of Early Classic sites in the area. La Victoria was settled once more toward the close of the Classic, when considerable amounts of San Juan Plumbate pottery were deposited.

## AIMS OF THE 1962 PROJECT IN THE OCÓS AREA

It became increasingly apparent to Coe after the publication of the 1961 report that more research was needed in the Ocós area, particularly on the Early Formative.

Apart from investigating extra-Mesoamerican cultural relationships, we most wanted to determine the origins of the Ocós culture and of the Early Formative occupation in general. The Ocós Phase had advanced and sophisticated ceramics. Because of the presence of such decorative ceramic features as cord

marking, a derivation from the Early Woodland cultures of the north had been argued (Coe, 1960). However, the earliest pottery of northeastern North America now seems to be considerably later than was once estimated, so that diffusion from there to coastal Guatemala would be an untenable proposition (Bullen, 1961; Griffin, 1964). Briefly, we wanted to find what lay beneath Ocós. Would it be a simple and early ceramic phase like Monagrillo of Panama (Willey and McGimsey, 1954), or would it be pre-



ceramic? If the latter, the mystery of Ocós origins would remain.

As all archeologists know from experience, while it is all very well to pose such questions, it is often difficult to answer them. Kidder once compared archeological digging to deep sea fishing off the New England coast (Kidder, Jennings, and Shook, 1946, p. 1). One must never be confident that the expected will be found, and must be prepared for the unexpected. We discovered an entirely new Early Formative Phase, Cuadros, characterized by many of the same ceramic forms as was Ocós, but much simpler and less varied than the latter. At first, we thought that we might have uncovered the ancestor of Ocós, but once the ceramic analysis had been carried out we realized that we had a later complex, one that was in many respects the progenitor of Conchas 1. So we neither shed any new light on the roots of the Ocós culture, nor did we add anything to the subject of interareal diffusion in the New World.

Actually, our interests and aims changed while in the field. We had fully intended, as part of our project, to undertake a more intensive study of the natural resources, particularly animal, that would have been available to the early inhabitants of the zone, and to make a sizable skeletal collection of the local fauna for purposes of archeological identification. These goals were achieved. At the same time, in our excavations at Salinas La Blanca it was becoming apparent that through some extraordinarily lucky circumstances of preservation, we were fortunate in gaining a view of the ecological adjustment of a Formative village community in the lowland tropics, and an early one at that, a view which was more or less unique to Mesoamerican archeology.

We were able not only to expand the Formative sequence of the Ocós region, but also to delve into matters of more note, namely, to attempt to determine some of the factors which had enabled the Indians living along the Pacific coast of Guatemala to achieve a fully settled life at a very early date. The problem was recast into somewhat different terms. Anthropologists, including archeologists, have generally been concerned with adjustments of past human populations to large-scale changes in the environment, usually brought about by macroclimatological changes, such as the rise in temperatures following on the heels of the last glacial retreat in northern Europe. For example, many attempts have been made to invoke macroclimatological factors to account for the shift from a hunting-gathering way of life to effective village-farming in the Near East, but many biologists and archeologists are becoming increasingly dubious of the validity of such explanations (Reed and Braidwood, 1960, p. 163).

The large-scale environment, usually defined on the basis of differences in the climax type of vegetation is the *biome* (Kendeigh, 1961, pp. 276–279). Biomes include such very general environments as grasslands, tropical forest, mixed oak forest, and desert. It is the biome that has been the focus of attention for most anthropologists concerned with human ecology, and this concern has been mainly with the possibilities and/or limitations of these broad areas for cultural development. For instance, the often deficient soils of the tropical forest biome have led Meggers (1954) to view the tropical forest as an inhibiting environment for cultural growth among the New World peoples living within it.

However, human communities do not react or interact with entire biomes (Forde, 1952, p. 464). The average lowland Maya, for instance, does not behave in relation to a broad and ill-defined “tropical forest”—he behaves in relation to small segments within it, and it is these that impinge on his life. The well-drained ridge of land where his village is located, the deep and darker soils of a certain place where he plants his maize, the stretch of forest where he hunts peccary and spotted cavy, the waterhole or stream in which the tapir wades: it is small microenvironments or *biotopes* such as these that determine the possibilities or limitations of culture change and population expansion.

Like other animal populations, human communities occupy their own “niches,” to which they are biologically (and, in the case of man, culturally) adapted. Human groups, like other organisms, form links in a complex food chain, and human populations certainly fluctuate in response to changes in these food chains. But there are few other animals with such omnivorous habits as *Homo sapiens*, so that human populations can simultaneously occupy the end positions in many different kinds of food chains. The result of this is that the number of ecological niches exploited by any one human community may be extremely varied and complex, to a degree unknown in most other animals. The most varied sets of niches are often used not, as one would expect, by the most culturally advanced peoples, but by the least culturally advanced. Simple hunters and gatherers often live in biomes which are extremely restrictive, and a general lack of sustenance in any one segment of their habitat forces them to move seasonally through a whole series of microenvironments, as certain foods become available in different segments at different times. These most mobile of all people are also the most omnivorous, as seen in the witchetty grub feasts of the Australian aborigines or the grasshopper banquets of the Great Basin Shoshoneans. A strong stomach is an insurance policy in a poor biome.

In contrast, it seems to us, successful settled life was the product of a strong reduction in the number and in the spacing of the microenvironments needed to support a given community (Coe and Flannery, 1964, p. 651). Food production per se means very little if a people still need to move away from the settlements at certain times of the year to exploit

distant wild crops. What were the conditions under which fully settled life was adopted in Mesoamerica? Where were these conditions found? We have tried, in our excavations at Salinas La Blanca, and in our analysis of the ecology of the Ocós region, to throw light on Early Formative period origins by viewing this as a process of microenvironmental reduction.

# The Natural Environment of the Ocos Region

## GENERAL REMARKS

The political department of San Marcos lies in the southwestern corner of the Republic of Guatemala, resting against the Pacific Ocean and the Mexican frontier. It is an area of considerable environmental diversity, with altitude extremes from sea level to the 4,600-meter Tajumulco volcano, and subregional differences in annual rainfall which exceed 3,000 mm. This chapter deals with a small portion of the department, a transect 5 by 15 km. in extent, on both sides of the Naranjo River near the point where it enters the Pacific (figs. 1, 2). This coastal area lies within the region known by the conquering Aztecs as Soconusco (*Xoconochco*).

Local residents distinguish two main subdivisions of the Guatemalan coast. The first is the piedmont or *Boca Costa*, at the base of the mountains. This is more rolling country, with a higher rainfall, where the streams run over pebbly or gravelly beds, and coffee is the main commercial crop. The second is the *Costa* proper, which extends from the piedmont to the sea. It is a low-relief alluvial plain with lower rainfall, where the rivers have sandy or muddy bottoms, and corn or cotton farming replaces coffee. Our Ocos transect belongs to this latter subdivision.

Even within the limited area belonging to the *municipio* of Ocos, environmental variation is notable. Under "optimum" conditions, tropical forest of a mixed deciduous and evergreen type will grow to within 3 km. of the coast; elsewhere, factors of drainage and salinity have produced more specialized biotopes such as mangrove forest and tropical savanna. The vertebrate fauna of the transect has responded with an equally impressive show of diversity, but has been largely ignored with the exception of ornithological studies (e.g., Griscom, 1932). It is hoped that these notes, based on a brief field season whose main purpose was to define the natural resources available to the pre-Columbian Indians of the area, may also direct zoological interest to a region which would indeed reward more intensive investigation.

The climate and geology of Guatemalan Soconusco have been discussed most recently by Coe (1961, pp. 7-14), from whom most of the summary description

given above has been adapted. Ocos is located at the very end of a 50-km. coastal plain, an extremely flat apron of alluvium which extends to the Pacific from the base of the volcanic Sierra Madre de Guatemala. Within the transect under consideration, the maximum altitude recorded is about 5 meters above sea level, 5 km. inland near Platanar. Since the slow-moving rivers of the coastal plain bring fresh volcanic alluvium to the area during each rainy season, soil fertility is high.

The geological dynamics of the transect are complex and poorly understood, but it is generally accepted that the coast is building out with each successive arrival of alluvium (see Shook, 1945, p. 201; Coe, 1961). The extensive estuary system behind the beach undergoes corresponding alterations as the coast moves forward; new estuaries appear and old ones, growing shallower, become completely clogged with sediments caught in mangrove roots and eventually dry up. Coe (1961, p. 111) was able to demonstrate archeologically that a number of now-dry estuaries, traces of which are discernible on aerial photographs, were functioning between 1500 B.C. and the beginning of the Christian Era. It is also apparent, from the same photographs and from accounts of some of the older residents in the area, that local tidewater rivers such as the Suchiate and Naranjo have changed their courses often and in some cases even disappeared during periods of volcanic activity.

From a study of rainfall figures for the Ocos area, three factors emerge: The "twin peak" nature of the rainy season; the intensity of the dry season (4 consecutive months with less than 10 mm. of rain); and the frequently torrential nature of the rain when it comes (822 mm. in June of 1960 at La Blanca). The driest year on record for Ayutla was 1952, with 500 mm. (20 inches). La Blanca's figure of 1,945 mm. (78 inches) in 1960 is unusually high, but not without precedent on the coast; Shook (1945, p. 201) reports a 1942 rainfall for Puerto de San José of 78.3 inches. Because of limited records and the erratic nature of the rainfall itself, it is difficult to pin down a reliable figure for the average

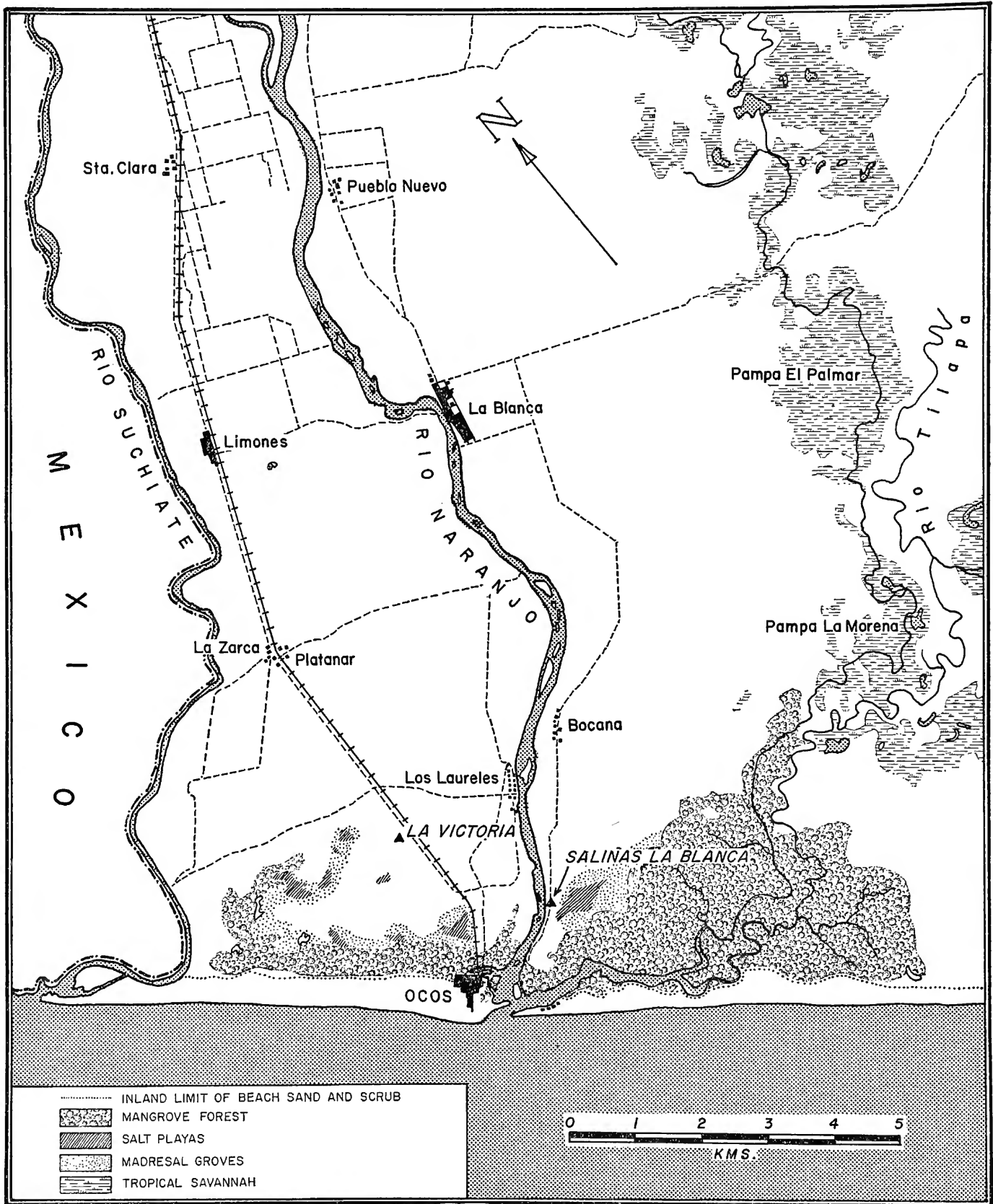


FIGURE 2.—Map of the Ocos area on the Pacific Coast of Guatemala, with Salinas La Blanca and La Victoria located in relationship to some important microenvironments.

annual rainfall of the transect, but a good guess would be between 1,000 and 1,100 mm. (roughly 40–44 inches). This would be enough to produce forest everywhere in the transect were it not for the factors of poor drainage or salinization mentioned above.

Lastly, in areas where the forest *will* grow, its character is determined largely by (1) the severity of the December to March drought and (2) the constancy of local temperatures. All of the Ocos region lies within the frost-free tropics, and mercury readings

stay consistently between 17° C. (62° F.) and 38° C. (100° F.) month after month (Coe, 1961, p. 11). Thus, tropical fruit trees such as the sapodilla (*Achras zapota*) form part of the "upper story" of the forest. Yet the prolonged dry season prevents the taking-hold of a true evergreen forest, and deciduous species like the *ceiba* also flourish. Along watercourses, where humidity is high and morning fogs contribute moisture, high evergreens are more pronounced, and epiphytic plants festoon their upper limbs.

## MICROENVIRONMENTS

The diversity of mammalian forms in the Naranjo River plain is a product of the wide range of micro-environments (or biotopes) offered by this 10-km. strip of coast. A northeast-southwest traverse drawn from the village of Ocos to the Pampa La Morena passes through most of the various microenvironments found in the transect (see fig. 3). The area map (fig. 2) shows more clearly the spatial relationships of each of these environments, which, for purposes of convenience, are here presented under eight headings.

### Beach Sand and Low Beach Scrub

This narrow, infertile strip between the ocean and the estuary is one of the few local vegetation zones of truly arid appearance (frontispiece, *a*). However, some of the mollusks used by the prehistoric occupants of the area must have been gathered offshore here, among them *Agaronia testacea* and *Strombus galeatus*. A beach crab known locally as the *chichimeco* (*Ocybode occidentalis*) occurs out on the gray volcanic sand near the surf, where it is hunted at night or at dawn by the village children; scarcer *nazareno* crabs are hunted during the same period either on the sand or in the beach scrub. Presumably these small crustaceans also figure in the food chain of some of the shore birds.

The black iguana (*Ctenosaura similis*) prowls the dry brush in back of the beach and excavates burrows in the sand under fallen palm trunks or driftwood; armadillos also take advantage of the soft digging in the scrub. An occasional visitor to the beach is the green sea turtle or *parlama* (*Chelonia mydas*), whose flesh and eggs were once widely eaten at Ocos.

### Marine Estuary and Lagoon System

A short distance behind the beach begins a series of tide-controlled brackish water estuaries (frontispiece, *b*) which often extend inland many kilometers, and some of which ultimately connect with streams or rivers coming down from the Sierra Madre. At one time these estuaries were full of crocodiles (*Crocodylus astutus*), now hunted virtually to extinction. *Sciades troschelli*, the marine catfish, is well represented in the lagoon-estuary system, as are red snapper (*Lutjanus colorado*) and several species of snook (*Centropomus* sp.). Nine genera were collected in the Ocos area in one night of fishing by Holloway (Saunders et al., 1950), and eleven were found at Salinas La Blanca.

The pre-Columbian molluscan fauna of these estuaries is better known than its present-day equivalent (Coe, 1961, p. 143); such differences as may occur, however, are probably due to overpicking of the larger species rather than to climatic change. Oysters (*Ostrea columbiensis*), mussels (*Mytella falcata*), and marsh clams (*Polymesoda radiata*) were among the 20-odd forms identified from archeological sites in the area (for complete list, see Coe, *ibid.*). The mud flats flanking the estuary also support an extensive population of fiddler and mud crabs.

### Mangrove Forest

Along the marine estuaries, reaching as far inland as the effects of the tide will permit, are tremendous stands of stilt-rooted red mangrove (*Rhizophora mangle*) (frontispiece, *c*). In its purest form, this is essentially a one-species forest which only slowly gives way to white mangrove and other non-stilt-rooted trees as one moves away from the estuary (see discussion of mangrove succession in Davis, 1940).

Two small crabs, known locally as the *pinto* (*Sesarma sulcatum*) and the *brujo* (*Goniopsis pulchra*), live among



the roots of the red mangrove, where organically rich mud is constantly being collected and held. Huge termite nests are a standard appendage on the ramrod-straight trunks of these tall evergreens, and it is in these forests that the transect's highest populations of collared anteater (*Tamandua tetradactyla*) were in evidence. Arboreal porcupines (*Coendu mexicanus*) are also common in the *manglar*, where they feed on bark, twigs, and cambium of the easily peeled red mangrove.

Farther back from the estuary, in the drier stretches where the forest floor is only seasonally inundated, three larger species of Crustacea occur. Burrows of the mouthless crab (*Cardisoma crassum*; pl. 25, *b*) locally called *cangrejo azul*, with their characteristic high dirt collars, can be found all along the edge of the mangrove stands and in the drier *madresal* groves (see below). Both this crab and the *guëro*, which shares this environment, are widely eaten by the Ocosëños; a third type, the *tío por plátano*, is not eaten because it reportedly exudes a white, milky "poison" which renders the meat unpalatable. This brightly colored but extremely shy crab stays near its burrow and does not venture out as far as the *azul*, whose nocturnal forays in search of terrestrial bromeliad fruit make it a frequent victim of local raccoons.

Most larger animals do not occur in the heart of these mangrove forests because the maze of stilt roots makes foot travel difficult. The great fish and crab resources in the vicinity of the mangroves, however, concentrated most of the area's raccoon (*Procyon lotor*, pl. 2, *b*) population there. These animals are frequently captured and eaten by the people of Ocos, who hunt them with dogs and distinguish two "categories": *mapaches de partida*, which are young animals traveling together in a band, and *anda-solos*, which are older, larger raccoons that have isolated themselves from the colony and forage alone.

### Riverine

Typical of the rivers of Soconusco, the Suchiate and Naranjo originate in the vast network of rocky streams coming down off the piedmont to the north. Reaching the coastal plain, these rivers widen and slow to a speed of only 1 to 4 cm. per second (Saunders et al., 1950) (frontispiece, *d*). At the coast, where the waters of the sea and the estuary join them, the current is even slower, the river bottom is sandy and drifts into bars which appear or disappear with the ocean tides (frontispiece, *f*). These bars are the hunting grounds for countless wading birds (see Griscom, 1932).

The Suchiate and Naranjo support a distinctive faunal assemblage, both in the water and in the moist vegetation along their banks. At one time the river-side must have been lined with high forest, now largely

cut down and replaced by lush, tangled, second-growth *monte*. Corn grows tall along the Naranjo River bottom lands.

In the channels of the river there are catfish, snook, mojarra (*Eugerres* sp.), and a curious fish called the *cuatro ojos* (*Anableps* sp.), as well as fresh water turtles of a number of types. A swimming crab called the *jaiba* (*Callinectes toxotes*) is fished for with hook and line, and small boys wade in the water to collect *cacarico* (*Atya* sp.), a local caridean shrimp which hides in burrows in the side of the bank. At one time there were crocodiles here also, and a species of cayman—probably *Caiman fuscus*, mentioned for the Chiapas coast by Alvarez del Toro (1961, p. 26)—which lived in the fresh-water rivers and inland swamps.

It is in the riverbank *monte* that the green iguana (*Iguana iguana*) abounds. More or less confined to such humid environments, where it lives on leaves, fruit, nectar-bearing flowers and the like, this arboreal reptile is preyed on widely by man and by the jaguarundi (*Felis yagouaroundi*), which follows it right through the thickest brush. The common opossum (*Didelphis marsupialis*) also frequents the riverbank, especially in second-growth areas. Sharing this niche is a smaller relative, the so-called "gray-masked" or "four-eyed" opossum (*Philander opossum*), known locally as the *comadreja* (not to be confused with the weasel which bears this name in Mexico). This species, described as "rare" by some authors, is actually one of the most commonly captured animals in the Ocos area, where it maintains a riverine or estuarine orientation. Handley (in Saunders et al., 1950) suggests that its diet may be richer in fish and other aquatic forms than that of most opossums, and our examinations of stomach contents would tend to support this.

The river otter (*Lutra annectens*) was sighted on several occasions along the banks of the Naranjo, and one specimen was finally collected in March. The tapir (*Tapirella bairdii*), now extremely reduced in numbers if not totally wiped out in Chiapan and Guatemalan Soconusco, would also have used the Naranjo and Suchiate Rivers for its morning bath in prehistoric times, as it is known to do in other coastal areas.

Certain of the fish in the Naranjo are anadromous, the snook being the best example. These fish live in the lagoon and estuary system during the dry season, then migrate upriver when the summer rains take hold.

### Salt Playas and Madresalar

Inland from the present-day estuary are the dried remnants of previous lagoon and estuary systems, many of which functioned recently and are still subject to temporary seasonal inundation. The

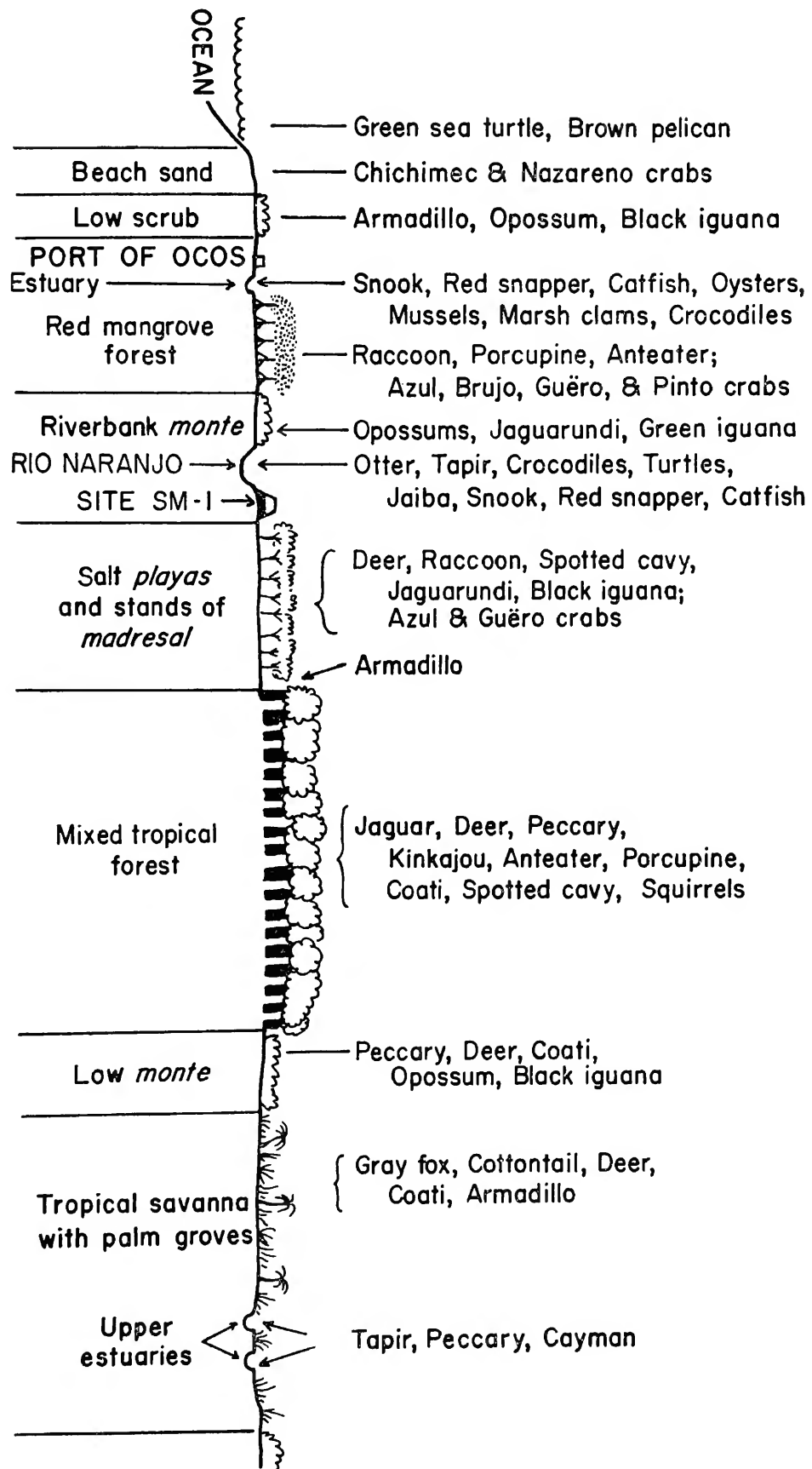


Figure 3.—Northeast-southwest transection of the Ocos area, showing microenvironments. Northeast is to the right. The length of the area represented is about 15 km.

wettest of these salt marshes support populations of *Rhizophora*, while in the drier ones this vegetation gradually gives way to stands of *Avicennia nitida*, a small mangrove known locally as *madresal* ("mother of the salt," so called because of the salt crystals secreted on the leaves). In these stands, or *madresales*, occur hummocks of *piñuela* (*Bromelia pinguin* L.), a terrestrial bromeliad with leaves like a saw-toothed bayonet, the fruit of which periodically attracts large numbers of mouthless crabs. The quantities of deer tracks in the area also led us to suspect that local whitetails (*Odocoileus virginianus*) might browse on *madresal* during the dry season.

The invasion of these prehistoric estuaries by the *madresal* is probably a slow process, for some of the saltier areas are still absolutely barren of vegetation. These small internal drainage basins, the remnants of ancient small lagoons, are referred to by the Ocoseños as *playas*—literally, "beaches"—and it is locally claimed that in the peak of the rainy season they fill with brine shrimp. Both presently and in pre-Columbian times, a number of these basins have been the scene of salting activity, especially Salinas La Blanca.

In the period from November to May, under conditions of low rainfall, the *playas* become baked miniature deserts and the *madresalar* becomes a thick brushland of crackling dry twigs and leaves; it is in the *madresalar* that the black ground-iguana or *giota* (*Ctenosaura similis*) abounds. Less limited in range than the green iguana, the *giota* seeks hot dry areas, lives in cutover second growth, and even reaches the beach sand as mentioned on page 75. It is *this* species, and not *Iguana iguana*, which can be seen "scurrying across the dusty road and paths during the heat of the day" near La Victoria (Coe, 1961, p. 12).

Jaguarundis hunt *giotas* and mice in the dense dry thickets that occur in some parts of the *madresalar*, and we surprised them at this activity several times while on archeological survey east of Salinas La Blanca. These cats also frequent the more tangled underbrush along the Naranjo, where they prey on wading birds, green iguanas, and occasional untended domestic turkeys.

### Mixed Tropical Forest

A few kilometers inland, in areas slightly higher and significantly better drained than the *madresalar*, begins the tropical forest of the Ocoés region. Although deciduous forms like the *ceiba* (*Ceiba pentandra*) and *cedro* (*Cedrella* sp.) occur here, a good percentage of trees (including most of the understory) seem to be evergreen varieties; in February and March, at the

very end of the dry season, not only did many of the trees still have their leaves, but a number were bearing fruit. The term "mixed" seemed to us the least objectionable description of the varied, multispecies character of the Ocoés forests, with no attempt being made here to fit them into one of the readymade "climax vegetation categories" worked out for Mesoamerica by a number of authors. The complex ecology of the Ocoés area will have to be studied by competent botanists before final judgement of its forest types can be made.

The region called "Ojo de Agua," 2½ km. northeast of the Salinas La Blanca site, afforded us with our best look at the local forest. The upper story of trees in this area is roughly 30 feet in height and includes not only tall palms and sapodilla (*Achras zapota*) (the latter of which were bearing fruit in March), but a number of trees known locally as *guanacaste* (*Enterolobium cyclocarpum*), *matapalo* (*Ficus* sp.), *guayacán* (*Guaiacum sanctum* L.), *guamucho* (*Pithecolobium dulce*), and *alcanfura*. Very large buttress-trunked *ceibas* (*Ceiba* sp.) are also common.

Below these grow the *marachán* fan palm (*Sabal mexicana*; this also bears fruit in March), and an understory—often 12 to 15 feet in height—of various evergreens called *hoja de cangrejo*, *migua*, *chapón* (*Stemmadenia donell-smithi*), and *calaguá*, as well as the *manaca* palm (*Scheelea preussi*) (at present, unfortunately, we have only the local names for some of these; others were checked in Miranda, 1952–53). Ferns of various kinds appear below these trees, and the floor of the forest is dense leaf litter. Large arboreal termite nests and impressive swarms of mosquitoes seem to be the major signs of invertebrate life, as no crabs were observed during our traverse of the Ocoés tropical forest.

From the standpoint of mammalian ecology, one of the most important features of this habitat is its tremendous supply of fruit. The sapodillas, which occur nowhere else in the Ocoés transect, support both arboreal forms like the kinkajou (*Potos flavus*; pl. 2, a) and, after the fruit fall begins, terrestrial rodents like the spotted cavy or *tepesquintli* (*Cuniculus paca*). This animal is more typically found in the tropical forest, but experienced "tepesquinteros" in the Ocoés region also claim that when the *piñuela* is bearing fruit, they have been able to shoot numbers of covies by waiting at night in the *madresal* groves where this plant grows abundantly.

Another important tree, the ubiquitous *marachán* palm (*Sabal mexicana*), bears hundreds of fruits the size of a cherry, each of which contains a large, indigestible seed; these telltale seeds, which repeatedly occurred in the stomach contents we examined, traced out for us a real network of animals dependent,

to one extent or another, on the fan palm—coatis, raccoons, gray foxes, and kinkajous among them (see Appendix 1).

Discontinuous in its distribution, but present wherever edaphic factors permit and human occupation is slight, the tropical forest moves inland from Ocosingo, growing wetter and wetter as it approaches the piedmont of the Sierra Madre. Its character changes with each precipitation quantum on the way north until it arrives on the flank of the mountains as a full-fledged rain forest, receiving some 4,000 mm. (160 inches) a year.

Jaguars (*Felis onca*), which presumably are more frequent in these forests than in any of the other local environments, leave tracks as near the sea as Tilapa, and one was glimpsed several times in the Salinas La Blanca area during the excavation of the site.

### Tropical Savanna

Scattered along the small river and estuary systems of the transect area are a number of low, poorly drained patches subject to temporary inundation (frontispiece, *e*). Known locally as *pampas*, these patches are isolates of coarse tropical grass with occasional clusters of palm (especially *marachán*), dry and hot most of the year but turning marshy during times of peak rainfall. These open stretches of grassland provide the only *natural* habitat for many non-forest-adapted species in the transect; cleared cornfields or cattle pasture provide an acceptable (but artificially derived) equivalent.

Large numbers of water birds periodically frequent the *pampas*, and all the rabbit specimens obtained during our stay at Ocosingo came from such an environment. In the thick ground cover of the savanna itself, as well as in the low bush girdling it, cottontail (*Sylvilagus floridanus*) and small rodents are numerous. Understandably, therefore, this is the real heartland of the gray fox (*Urocyon cinereoargenteus*), which pursues all these small mammals relentlessly as well as taking in quantities of fan palm fruit.

The transition from tropical forest to *pampa* is frequent along the coast, often with a buffer zone of scrub *monte* between. This kind of mixed vegetation, "tall, dense stands of fig trees and other timber . . . with palmetto-studded grasslands and brush patches on exposed sites," is given by Leopold (1959, p. 433) as the "ideal habitat" for the coati (*Nasua narica*). The omnivorous coati indeed makes good use of this situation within the Ocosingo transect, where rodents, insects, and fruit of one kind or another seem to be available virtually throughout the year.

The *zanjones*, or upper estuaries, which reach these pampas are often at the very limit of tidal influence

(which is one of the reasons the mangrove forest gives way to savanna). Many are connected with fresh-water streams, coming from farther inland, and their salinity may thus be very low or almost nil. Many of them must have been ideal bathing grounds for peccary and tapir and good habitat for caymans, especially during the heart of the rainy season, when the middle of the *pampa* turns temporarily into fresh-water swamp.

### Cleared Fields and Second Growth

These manmade microenvironments have probably existed in the transect since about 1500 B.C. Gray foxes and cottontails make frequent use of the open pastureland, while the cutover second growth scrub supports opossums, black ground-iguanas, jaguarundis, and deer which are probably as happy there as they were elsewhere in preagricultural times.

Ocosingo make no attempt to clear mangrove forest for planting, and they cut back the *madresalar* only to widen the *playas* for saltpanning. It is the mixed tropical forest and the riverbank *monte* that have suffered the greatest agricultural destruction, particularly in the western half of the transect, where extensive tracts have been cut down and burned bare. Swidden agriculture is not practiced in the Ocosingo area because the fertile volcanic soil will produce three corn crops a year without rotation (see Coe, 1961, p. 13), but considerable primary growth has been irreparably wiped out nonetheless.

Within a relatively short time after the cleared fields fall into disuse, coarse tropical grasses and fan palms begin the process of recolonization; deciduous trees and low evergreen bushes eventually follow. Often the ground cover of these second-growth plots becomes more tangled and dense than was that of the original forest. For example: Coe, returning to Ocosingo after only a 4-year absence, was at first unable to find the La Victoria site which he had worked in 1958 when it was open cattle pasture. An occasional *ceiba*, left because it was simply too huge to cut with handtools, may shade out part of the underbrush in such fields.

Among the animals that have more than likely profited from agricultural land clearing in the Ocosingo area, the pocket gopher or *tuza* (*Orthogeomys grandis*) should be mentioned. Highest populations of *tuza* around Ocosingo occur right in the cornfields, where they compete incessantly with the *milpero* for the young sprouting plants. These animals are regarded as quite a delicacy, and there is evidence that they may have been eaten as early as the Ocosingo Phase (*ibid.*, p. 141). Since the transect produces three corn crops a year, the legacy of the local pocket gopher is an almost never-ending food supply.

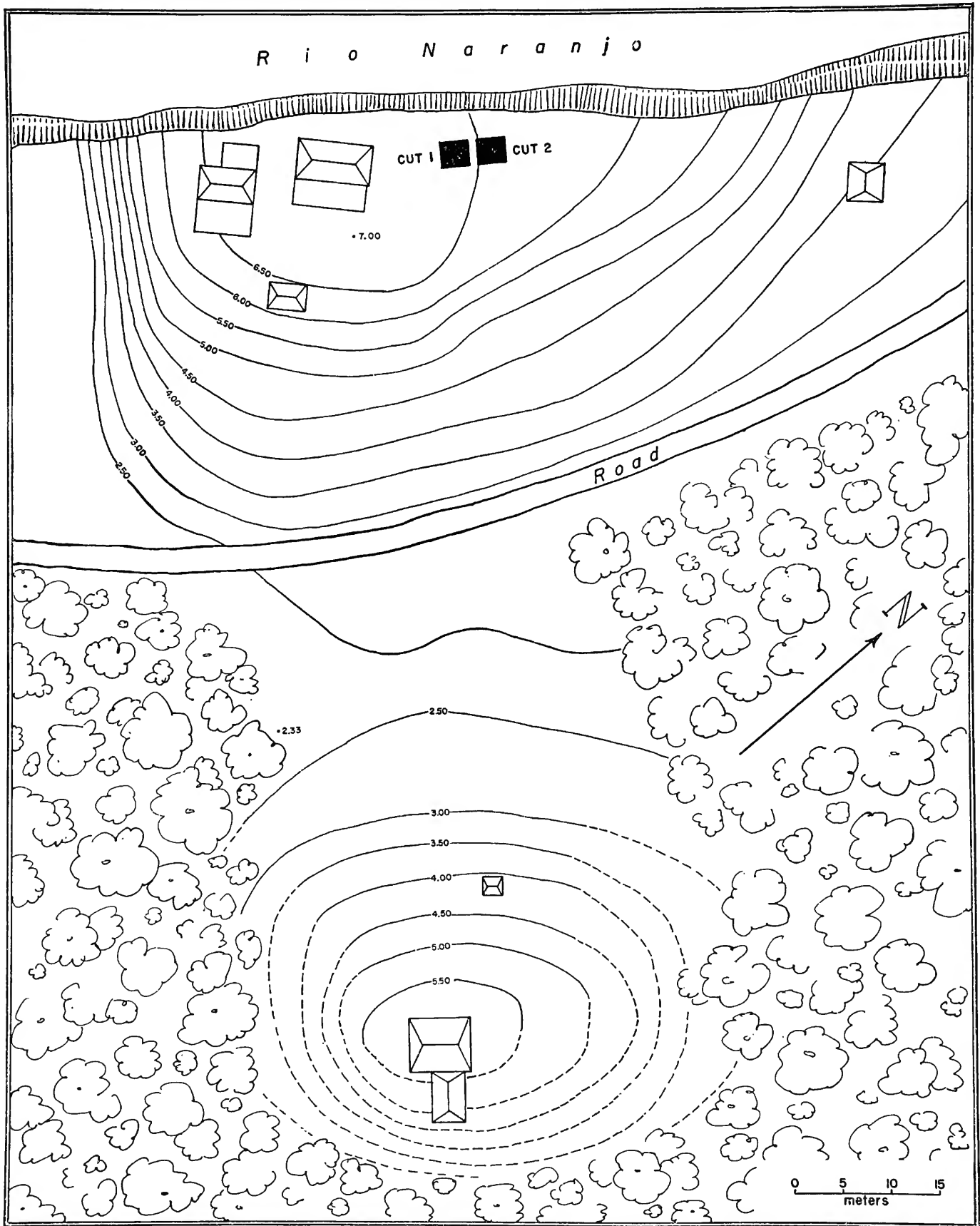


FIGURE 4.—Map of the Salinas La Blanca site, with excavations and modern houses as indicated.

# Excavations at Salinas La Blanca

## LOCATION AND GENERAL FEATURES

The Naranjo is a broad, meandering, braided river subject to tidal action in the lower 10 km. or so of its course toward the sea. During the rainy season, the Naranjo may rise rapidly and inundate the surrounding country. It must have done so often in the past, and has probably carried away many an archeological site in its muddy waters. The site of Salinas La Blanca (SM-1 in our survey) may be one of those soon marked for destruction. It is located on the east bank of the Naranjo, about 1.75 km. north of its mouth, and has at least partially been cut away by the brackish river (fig. 4).

The site consists of two rather low mounds, in appearance not unlike the habitation-midden mounds of La Victoria. The west mound rises rather steeply from the south, reaches a total height of 4.5 m., then slopes away gently toward the north. The present-day inhabitants of the Ocos area wisely choose to place their houses on top of mounds, and this one is no exception. On it lives the extended family of Don Vicente Cuadros, whose calling is divided between farming the milpa land to the north of the site and fishing with hand net and line in the river (pl. 3). This family occupies three thatch-roofed houses on the summit, and a fourth on the lower slope to the north.

Just to the east of the west mound lies the dirt road leading from the Finca Nacional La Blanca south to the embarkation for Tilapa. About 25 m. east of the road begins the slope of the east mound, an approximately oval rise of ground reaching a height of over 3 m. Another family occupies a house on the summit. Between the two mounds of the site the

terrain is very low and flat, and liable to flooding during the wet season.

The banks bordering the river are covered with thickets in which iguanas abound. Probably the immediate vicinity of the mounds once supported a heavier growth than is found there now, but through clearing there remain only fragments of second-growth forest, with an occasional *guanacaste* (*Enterolobium cyclocarpum*) or other tall tree, and a number of fan palms. The *madresal* groves begin about 25 m. to the east of the east mound, and eventually lead into a large salt *playa*, from which our site derives its name, Salinas La Blanca. As described in the preceding chapter, these salt flats represent extinct lagoons and even now are partially covered with water during the summer rains. As will be seen in pages 85-92, the salt *playa* to the east and northeast of Salinas La Blanca was in the past bordered with a fairly extensive human population at various times.

Other archeological sites near Salinas La Blanca include Bocana, located 1 km. to the north in pastureland just east of the road leading south from La Blanca, and below the small modern settlement of that name. Bocana (SM-2) is a site with several large temple mounds, the main occupation of which was during the Marcos (San Juan Plumbate) Phase, and is the site called "La Blanca" in the 1961 report (Coe, 1961, p. 147, fig. 2). The Río Naranjo site (SM-37 in our survey, see pp. 87-89), a small mound of Conchas date, is 400 m. to the south of Salinas La Blanca, and also is cut by the river. La Victoria, incidentally, lies on the other side of the river, 2.4 km. northwest of Salinas La Blanca.

## EXCAVATIONS

We estimated that the highest part of the west mound at Salinas La Blanca, on which we had decided to concentrate exclusively, was about 6 m. above the level of the river at high tide. From experience already gathered at La Victoria, it seemed quite possible that occupation debris would be found all the way down to the water table and even beyond. Accordingly, we elected to confine our excavations to two adjacent test pits which would be as close to

the river edge as possible and as high up toward the summit as the Cuadros family would allow, so as to be reasonably near the ancient epicenter of the mound. Cuts 1 and 2 both were 3.0- by 2.5-m. pits, separated from each other by a 1-m. bank, with the long axis in a magnetic north-south direction, and placed about 3 m. in from the edge of the riverbank (fig. 4; pl. 4). To avert the possibility of the edge of the mound caving into the Naranjo during the



summer floods and destroying the present-day houses, we desisted from running cuts directly into the bank, although these would have been desirable from an archeological point of view.

The work force stayed at five men, two in one cut and three in the other. The opportunities for close supervision of this small crew enabled us to personally oversee many fine details of the excavation and to recover much fragile material that otherwise might have been lost, as well as to keep complete records of what was found. Picks, shovels, trowels, buckets, and pocketknives were the major tools used. To keep the sides of the excavations perfectly vertical and neatly shaved off (a necessity for the making of accurate profiles), we found that a team of two workmen, one to do the "shaving" with a machete and the other to stand above as a supervisor, gave most satisfactory results, the process carried out as each excavation level was completed.

An arbitrary datum was established from the top of a stake hammered into the ground between and just to the west of the two cuts. Since there has been considerable disturbance of the surface of this mound in recent times (especially occasional shallow leveling of the ground for house foundations), the first level in both cuts was taken down to 60 cm. below datum (see profiles in figs. 5 and 6). All subsequent excavation levels were arbitrary 20-cm. units. Since all measurements were taken from one datum point, any given excavation level in one cut is exactly horizontal with the same level number in the other cut. Level 1 in both Cuts 1 and 2 proved to be mixed, with fragments of modern glass and of glazed pottery, as well as a 1951 Guatemalan one-cent piece, along with Pre-Columbian debris.

Down to 1.20 m. below datum, the deposits seemed to be of a featureless buff color, with heavy concentrations of sherds in horizontal layers, a strong indication of midden buildup over a period of time. However, by the time Levels 3 (0.80–1.00 m.) and 4 (1.00–1.20 m.) in Cut 1 were reached, it was evident that we had to deal with several intrusive pits; all of these may have extended down from the surface, but were not visible in the upper part of the profile. Once we had recognized these as such, every effort was made to dig them separately. Pit No. 1 appeared on the east side of Cut 1, and the face of the cut was taken back 50 cm. to completely clear it. Somewhat bottle shaped in outline, and reaching a depth of 1.60 m. from datum, this pit proved to be filled with a soft, grayish-brown earth containing a number of whole or restorable vessels of the Crucero Phase, some charcoal, many Crucero sherds, and two large lumps of burned red clay. Pit No. 2 was located in the northern half of Cut 1, 25–80 cm. from the

north face, and extended down to 1.62 m. The fill of this feature also contained restorable Crucero vessels and Crucero sherds. In the southeast corner of the same cut we encountered Pit No. 3, bag shaped like No. 2, and reaching a depth of 1.15 m. below datum, with more complete or restorable Crucero vessels, sherds, and a loaf-shaped mano. Finally, Pit No. 4, which produced no such vessels, was recognized only after the west profile had been cleared, being located 32–82 cm. from the south wall of the cut and terminating at a depth of 1.10 m. This last pit intruded through a series of gray and pinkish gray clayey layers. Altogether, we recovered a total of 14 restorable Crucero pottery vessels (see figs. 27–34; pls. 19–20) from these pits. It is possible that we failed to see such features in Cut 2, but certainly none were visible in the profiles and no concentrations of vessels or sherds turned up. As for the function of these pits, it is entirely clear from the material in them and from the condition of the vessels that these were pottery dumps.

By the time we had reached Level 5 (1.4–1.6 m.) in both cuts, it was apparent that the depositional history of Salinas La Blanca had been complex. In that level in Cut 1, a portion of a hard, red clay platform began to emerge, jutting out from the west face of the cut. This proved to extend down to Level 7 (1.6–1.8 m.), and seemed to be oriented in a northeast-southwest direction. A series of clay floors of various colors (light and dark gray, as well as pink), placed one on top the other, abutted it on the exposed sides and extended over into Cut 2 to the north. Unfortunately, the platform extended only 30 cm. into Cut 1, but there was a possible post mold on its northeastern corner. At the bottom of this feature appeared about one half of a Pampas Black-and-white bowl (fig. 14, *b*). Another vessel (fig. 14, *a*) belonging to the same ceramic type (and with a characteristic white rim) was found at the base of a second post mold running from the surface of the platform down 1.12 m., and about 1 m. from the first. Thus, both vessels appear to have been put in place at the base of the platform, with the post molds dug down exactly above them. In the clay adhering to these bowls were casts of straw, of small leaves, and probably of maize husks.

This red platform was only the latest stage in a long and complex series of constructional activities. From Level 5 down to Levels 9 (2.00–2.20 m.) and 10 (2.20–2.40 m.) in both cuts, we encountered a number of superimposed floors of variously colored clays, with occasional pits which had been dug down into earlier layers from later strata. Some of these pits are very large, such as the one visible in the east face of Cut 2, which was about 2 m. wide and 1.8

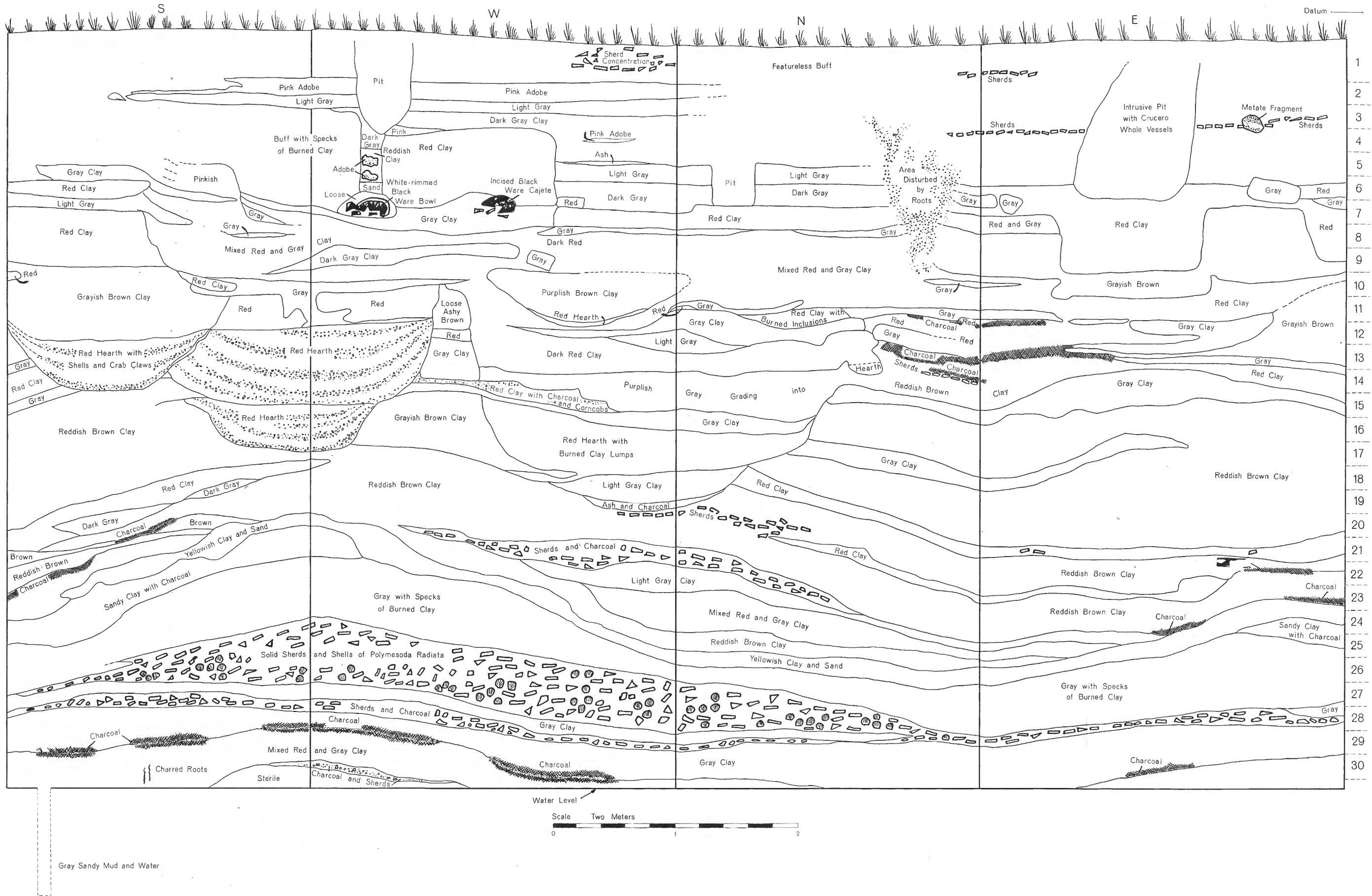


FIGURE 5.—Profile of all four faces of Cut 1, Salinas La Blanca. The vertical numbers refer to excavation units.



m. deep, reaching down to 3.6 m. below datum. Luckily (since the site was being dug in arbitrary units) these pits proved to have completely sterile clay fill. Moreover, the floors and the platform produced relatively few sherds (mainly of the Jocotal Phase), the reason being that the deposits were primarily constructional rather than consisting of midden debris.

In the southwest corner of Cut 2, from 1.4–1.8 m. below datum, a shallow pit filled with burned red clay and numerous shells of *Agaronia testacea* (pl. 26, *d*) can best be interpreted as a cooking hearth. A similar feature appeared on the south wall of the same cut in Level 12 (2.6–2.8 m.), where it had intruded through older strata. Serious disturbances of earlier layers were created by the construction of the same kind of “red hearths” on a large scale in the south and southwest parts of Cut 1, at a depth of 2.6–3.7 m. The fill of all these hearths was extremely hard, completely devoid of artifacts, and characterized by slumping lenses of very small pebbles. Burned *Agaronia* shells and crab claws turned up in fair numbers in the hearth sectioned by the south face of Cut 1, extending from 2.7–3.2 m. below datum.

It has been mentioned that the various hearths and pits belonging to complicated constructional series of clay floors had been cut down into earlier strata. The uppermost of these early layers, left only as a standing column by intrusive pits on either side, appear to be those visible in Level 9 (1.80–2.00 m.), on the north face of Cut 2. These are again, like the later series, clay floors. However, at 2.6 m. in the northeast corner of Cut 1, we uncovered a layer of charcoal on a clay floor. This same floor apparently carried into Cut 2 (in Levels 12–15), where it sloped abruptly down toward the north and east. Post holes associated with this floor were found in the west and south profiles of Cut 2, and we collected a sample of the charcoal associated with it (Y-1150) in the northeast corner of the same cut. Lying some 20–30 cm. below the floor is an earlier one, with approximately the same contours and also covered in part with a layer of charcoal; this feature is penetrated on the south face of Cut 2 by the aforementioned post molds.

A large sterile pit, filled with alternating bands of gray and red clays in the southwest corner of Cut 2, extended from 1.8–4.5 m. below datum; it probably belongs stratigraphically not with these earlier floors but with the overlying series of clay constructions and red hearths, although this would be difficult to prove from the available evidence.

One unexpected discovery during our excavations was in Level 14 of Cut 2, in the uppermost of these two charcoal-covered floors. As one moves away from the north face in this level, the charcoal is seen to be confined only to a small area on that side. In an oval

lens of brown clay measuring about 65 by 90 cm., located in the northeastern quadrant of Cut 2, impressions in the clay of a twilled mat or *petate* were found (pl. 5, *b*), although the original had long since deteriorated. Immediately underlying these impressions were abundant casts of leaves, as well as the cast of a maize cob. To the west of the *petate* remains, in the northwest quadrant of the cut, was a smaller oval area of burned red earth, with curious hard lumps of clay which may have filled casts of long-rotted vegetable remains; some of these resembled small beans, squash seeds, corn kernels, and cucurbit peduncles, although these finds were hardly conclusive.

In Level 14 (3.00–3.20 m.) of Cut 2 began the first of several thick strata consisting almost entirely of sherds. From here, and in Cut 1 from the same level, continuing all the way down to sterile soil, the stratigraphy was comprised by these huge sherd deposits alternating with wide, more or less sterile, bands of clay. These strata fell away to the north and to the east, and, keeping in mind that the western half of the mound has probably been carried away by the river, one can conclude they represent successive layers of midden accumulation from a small settlement, the center of which lay somewhat to the southwest of Cut 1. All these sherd dumps belonged to the Cuadros Phase, and since they were broadly separated by sterile layers, our arbitrary 20-cm. levels rarely if ever cut across two of them. It appeared that all the sherd dumps were deposited within a fairly short time, too brief to have seen ceramic change.

The sherd stratum in Levels 14 (3.00–3.20 m.) to 18 (3.80–4.00 m.) of Cut 2 contained ash and faunal remains, and the sherds themselves, as in other such strata, were often burned, indicating that the slopes of this large house mound were used as cooking areas.

As many as 31 impressions of maize cobs, with many details preserved (pls. 5, *c*, *d*; 24) appeared in the northwest quadrant of Levels 15 (3.2–3.4 m.) and 16 (3.4–3.6 m.) of Cut 1, along with casts of avocado and other large seeds. Cob impressions also came from just above the charcoal layer in Levels 21 and 22 of Cut 2.

At a depth of 4.2 m., in Levels 19 and 20 of Cut 1, we uncovered a living surface with plentiful large sherds, charcoal and ash, and grass impressions; in this material small rodents had made caches. This directly overlay a layer of densely packed sherds, a layer which grows thicker as it dips north into Cut 2, where it slopes down from Level 20 (4.2–4.4 m.) to Level 26 (5.4–5.6 m.). It should be noted that this layer lenses out as it dips down to the east in Cut 2.

Another such sherd layer began in the west side of Cut 1, Level 20 (4.2–4.4 m.), and fell off toward the north in Cut 2, where it descended on the west face

from Level 23 (4.80–5.00 m.) down to Level 28 (5.80–6.00 m.) in the northeast quadrant. At this point it changed into a red clay, devoid of sherds, which produced two cob impressions.

The thickest and most dense sherd stratum was below this latter one, separated from it by various bands of sterile clays. This is found in Levels 24 (5.00–5.20 m.) through 29 (6.00–6.20 m.) in Cut 1, and is there divided into two layers which obviously were deposited in rapid succession. A charcoal sample (Y-1154) was collected from a hearth concentration in the lower layer. The northern extension of the stratum can be seen in Cut 2, Levels 28 through 30, and it would seem that the surface on which it was laid down was more or less level as compared with those above it. The culinary nature of the non-ceramic debris in this stratum is attested by the large quantities of charred shells of the marsh clam, *Polymesoda radiata* (pl. 26, *g*), mixed up with the sherds.

At this stage of our excavations, we were at a very deep level (pl. 4, *b*) and in both cuts there were signs (from the gummy and wet nature of the deposits) that we were approaching water level. Nevertheless, cultural remains kept appearing. On top of an undulating layer of mixed red and gray clay, in Levels 29 and 30 of Cut 1, were lenses of charcoal from one

of which we took radiocarbon sample Y-1166. Below the clay in Level 30 (6.2–6.4 m.) was a small lens of sherds mixed with charcoal, from which we recovered the articulated front and hind legs of a fawn (*Odocoileus virginianus*). The first 20 cm. below this lens was sterile. On the south side of Cut 1, at a depth of 6.3–6.4 m. below datum, charred vertical roots of what could only have been mangrove growing in situ appeared. The extraction of this material was made difficult by the fact that both cuts were then ankle deep in water.

As previously mentioned, sherds were plentiful even in Level 30 of Cut 2. At the bottom of this sherd stratum, and just below Level 30 in the wet mud, we recovered two almost complete bowls (fig. 17, *a*; pl. 14).

The water then covering the deepest levels of our two cuts was quite brackish and coming in at a depth of between 6.4 and 6.5 m. (pl. 4, *c*). Further digging would have been quite out of the question. We were fairly certain that we had reached sterile deposits, but to test this supposition, we took samples with a wide earth auger down to a depth of 7.4 m. below datum in the southeast corner of Cut 1. All that was recovered was gray, sandy mud and water, with no charcoal or other cultural material. Accordingly, we terminated our excavations at this point.

## RECONSTRUCTED DEPOSITIONAL HISTORY

The west mound at Salinas La Blanca has had a complicated depositional history, somewhat difficult to interpret at all times since our excavations were made slightly to the northeast of the probable center of the mound. At any one time, there seem to have been several houses on the mound, perhaps separated by midden areas. The stratification represents the build-up of a multihouse site over a long period of time both by the accretion of discarded trash and by the construction of clay floors and platforms.

Essentially, there are four stages involved in the accumulation of the deposits as we now see them.

*Stage 1* begins with the initial colonization of what seems to have been a slightly raised area in a mangrove forest or, more likely, on the edge of one. The ground level was artificially raised by bringing in loads of clay, alternated with the dumping of quantities of trash. Portions of this artificial "island" were utilized as cooking areas, particularly that portion represented by the deeper layers of our excavations. During the last part of Stage 1, attempts were made to construct better floors of clay, and at one time, at least, some sort of a shelter with postholes was built on the northeastern slope of the mound. All this time, the mound was increasing both in area and in height.

*Stage 2* is marked by the cutting down of wide cooking pits into the old floor and midden strata on Stage 1, these pits eventually filling up with burned red clay and shells. Then, a new series of floors, in red and gray clays, is built up in quick succession, culminating in the raising of a well-made red clay platform which supported a thatch-roofed structure, probably another house. The superimposition of clay floors fronting on the platform finally resulted in the covering up of the platform itself by the latest of these floors. In the terminal part of Stage 2, the uppermost clay floors are now quite horizontal, indicating that the platform mound was much broader and more level than formerly.

In *Stage 3*, there is only slight evidence of clay floor construction, and flat lenses of sherds were probably laid down on earthen floors or outside the houses.

*Stage 4* is the latest, and represents a reoccupation of the site, with a number of pits, both bag shaped and bottle shaped, being cut down from the surface through older layers for use as pottery dumps.

On the basis of the analysis to be presented in the following pages, Stage 1 is assigned to the Cuadros Phase; Stages 2 and 3 to Jocotal; and Stage 4 to Crucero.







# The Formative Ceramic Sequence on the Guatemalan Coast: A Revision and Synthesis

## INTRODUCTION

In the final report on La Victoria, Coe (1961) presented a preliminary outline of the sequence of pottery types for the Formative Phases of the Guatemalan Pacific coast. This outline was based on an analysis of 27,500 sherds from stratified deposits. Some 20 pottery types were described and illustrated during the course of the study, then used to define the Ocós, Conchas, and Crucero Phases.

The 66,220 sherds recovered from Salinas La Blanca did more than permit the definition of the Cuadros and Jocotal Phases. They also enabled us to redefine a number of the La Victoria pottery types and to refine our understanding of the Ocós, Conchas, and Crucero Phases. As a result, we are now able to present a revised and more complete outline of the Formative ceramic sequence on the south Guatemalan coast, which is given later in this chapter.

Our study of the Salinas La Blanca sherds pointed out to us some inadequacies in the La Victoria ceramic analysis, which we have now attempted to correct. These were as follows:

(1) Certain of the pottery types at La Victoria were, in retrospect, mistakenly set up. Chief among these was "Victoria Coarse," which was not a type at all, but rather a "residual category" into which a number of unrelated coarse pottery types from all phases were lumped. In this report we have abolished Victoria Coarse by dividing it into a series of legitimate types, using combined data from La Victoria and Salinas La Blanca. We are still left with a residuum of nondescript coarse sherds, but we have simply counted these as "miscellaneous coarse wares" rather than setting up a type.

(2) Some of the pottery types of the Ocós Phase do not have the long temporal span they were accorded in the La Victoria report, but are restricted to the Ocós Phase. We know this from the fact that they are totally lacking from the succeeding Cuadros Phase. At La Victoria, Conchas Phase villagers had dug a number of pits into older deposits, in the course of which they brought up sherds of the Ocós Phase. These were consequently

redeposited in Conchas levels, making it appear that certain types (notably Ocós Buff and Ocós Brown Burnished) continued into Conchas times as a small percentage of the pottery. The purity of Cuadros Phase deposits at Salinas La Blanca enabled us to see just which types actually lasted into Conchas times and which had simply been redeposited at La Victoria.

(3) Too much "lumping" and not enough "splitting" was done during the course of the La Victoria pottery analysis. It was assumed (wrongly) that there was no cultural break between the Ocós and Conchas Phases, and frequently, similarly slipped sherds from the two phases were regarded as belonging to the same type. We now know that two phases are intercalated between Ocós and Conchas, and in many cases we know which relatively minute differences between similarly slipped sherds are diagnostic of one phase rather than the other. Hence, we have done more "splitting" in this report and, we hope, emphasized more horizon markers.

(4) The La Victoria pottery types were usually named after the phase in which they first made their appearance. This was not necessarily the phase of their greatest popularity. In one extreme case, "Ocós Gray" had its major distribution in the Jocotal and Conchas Phases, and did not really occur in the Ocós Phase at all (a few sherds were intrusive into disturbed Ocós Phase levels at La Victoria). In naming new pottery types at Salinas La Blanca, we used more neutral local geographic terms, which had no implications with regard to phase.

(5) Most Formative pottery of the Ocós region is made from fairly coarse clay with many inclusions visible to the naked eye, particularly quartz crystals, small yellowish plates of biotite, and rust-colored rounded lumps. It was believed during the analysis of La Victoria (Coe, 1961, p. 47) that this kind of clay was tempered with volcanic ash, and the term "crystal ash" was used throughout. This assumption was wrong. Ten thin sections were made from sherds representative of the most important types in the Cuadros, Jocotal, and Crucero Phases. In his analysis of these sections (Appendix 5), George H. Myer, of the Department of Geology, Yale University, reports that none showed any signs that any artificially selected material had been added to the clay; rather, the potters of the Ocós

region had obtained their ceramic material from decayed tuffaceous sediment in which the aforementioned volcanic inclusions were *already present*. That is, the bentonitic clay used in pottery of all periods in the Ocos area was derived from beds of volcanic ash which had been deposited in formerly active lagoons (which had dried up long before the beds were exploited). Unless proof to the contrary is forthcoming, we must add to the list of untempered pottery in the New World the ceramics of the Cuadros, Jocotal, and Crucero Phases, and presumably those of Ocos and Conchas as well.

In spite of the inaccuracies mentioned above, the classification of ceramics from La Victoria is valid in its basic aspects, many of which were reaffirmed by the excavations at Salinas La Blanca. What we will attempt to do in this report is define the new pottery types unearthed at Salinas La Blanca, redefine certain of the La Victoria pottery types in the light of new evidence, and integrate the La Victoria and Salinas La Blanca ceramic data into a single, comprehensive scheme of the whole Formative sequence for the south coastal region.

## THE POTTERY OF SALINAS LA BLANCA: STUDY AND CLASSIFICATION

A total of 66,220 broken pieces of pottery were recovered by excavations in Cuts 1 and 2 at Salinas La Blanca. These were taken to Guatemala City, where they were washed and subjected to a preliminary sorting. It was quite apparent from a cursory inspection that the bulk of the sherds belonged to a single component, named by us Cuadros, with those from the uppermost levels and from the intrusive pits at the top of the site being affiliated with the Crucero Phase. There was also a strong possibility of the presence of a third component between these two.

Some 86 percent of the sherds were plain, unslipped, undecorated, body fragments from jars. In Cut 1, out of a total of 33,571 sherds, 28,666 or 85.4 percent fell into this category. In Cut 2, out of a total of 32,649 sherds, 28,582 or 87.5 percent had a similar aspect. It is probable that all (or nearly all) these nondescript, featureless sherds were from the lower two-thirds of bodies of large *tecomates*, either of the Guamuchal Brushed or Suchiate Brushed type. Being large and very friable, such vessels disintegrated into literally thousands of fragments. However, in practice it would be impossible to tell which type these lower body sherds came from since Guamuchal Brushed and Suchiate Brushed are distinguished by their rim shape and by plastic decoration, which is restricted to the *upper* part of the *tecomate*. There are also two or three other coarse *tecomate* types to which the fragments could conceivably have belonged, depending on rim decoration.

All attempts to find subclasses within this mass of amorphous material proved futile. The task was made even more difficult by the fact that, since these large vessels had been used for cooking, great numbers of these sherds were carbonized beyond recognition. Therefore, we followed the same strategy which has subsequently been proposed by Cowgill (1964, p. 472), and ranked all sherds into two categories: the very common nondescript body sherds, unclassifiable to type (although we could guess at some

possible alternatives), and the remainder of the sherds (some 24 percent). We counted the former in Guatemala City and shipped the latter to the United States for further study. All significant horizon markers appeared in the latter group.

When the time came to draw the frequency graph showing the percentage of each pottery type in each stratigraphic level at Salinas La Blanca (fig. 7), we decided to do it solely on the basis of the sherds shipped to the United States. To include the mass of carbonized, unclassifiable *tecomate* body sherds would have swamped all the well-defined types so badly that none would have appeared on the graph as more than a hair-thin line, completely obscuring its value as a horizon marker.

The procedures of analysis for the pottery shipped to the United States were essentially those advocated by Smith et al. (1960), namely, sorting into tentative and then established varieties and finally into types, although we have avoided some of the complexities of nomenclature involved in this approach. It is not intended here to go into the theoretical history of archeological classification; suffice it to say that the word "type" here implies a ceramic grouping made "on the basis of recurrent association in a specific area within a specific period of time" (Sears, 1960, p. 325). These types have been given binomial designations in the usually accepted way, a geographical name picked from the Ocos area followed by a word or phrase descriptive of the appearance of the pottery. Within each type, we have also counted modes which seemed to us to be distinctive, such as certain gouged designs, rocker stamping, and so forth, in the belief that we would be able to (1) make finer chronological distinctions within the types and (2) indicate wider relationships extending far beyond the known distribution in space of any particular type.

In all pottery descriptions, color designations are in the Munsell system, with color names being those recommended for soil scientists using that system.

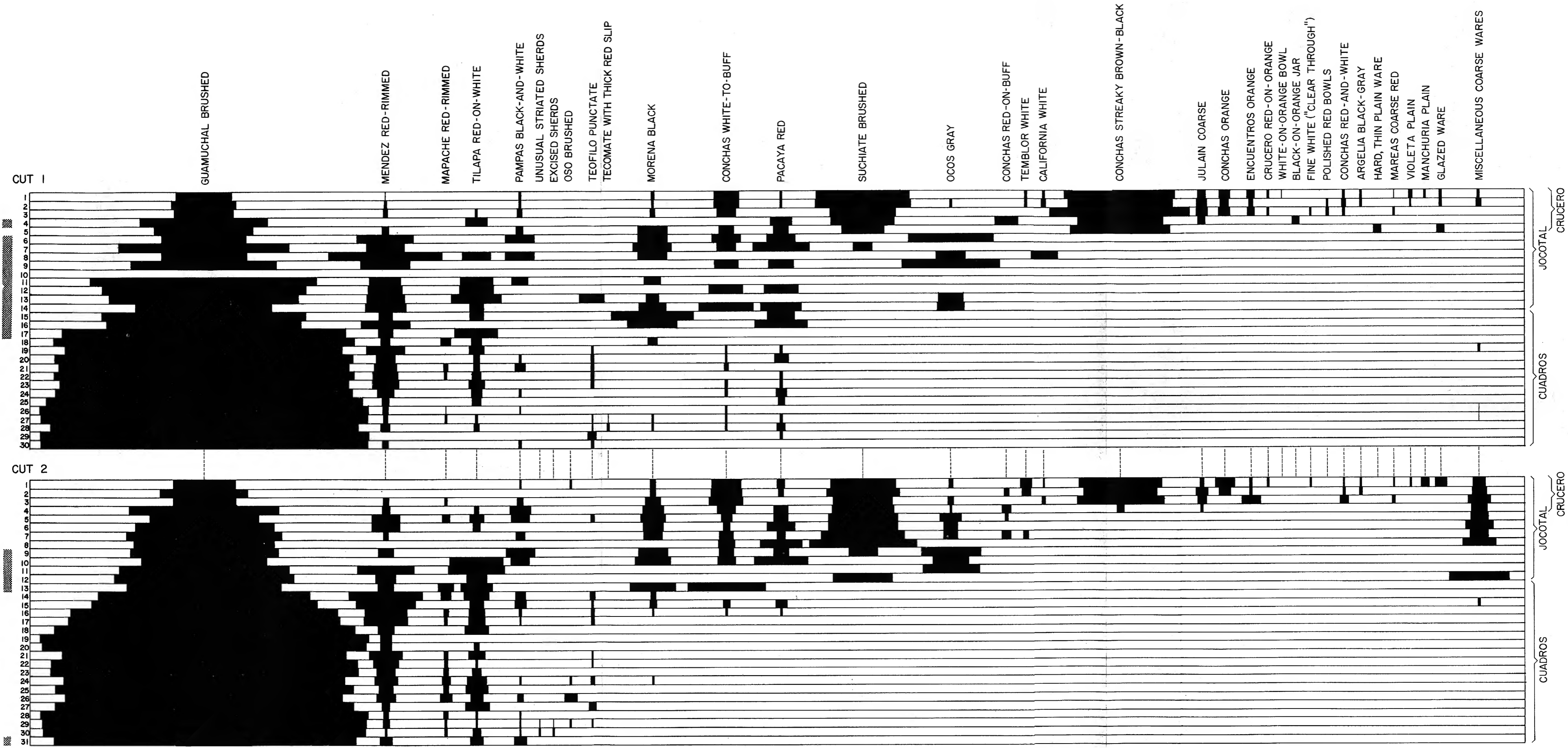


FIGURE 7.—Graph of pottery type percentages by level in Cuts 1 and 2, Salinas La Blanca. The stippled areas to the left indicate levels with less than 40 diagnostic sherds.



## THE STRATIGRAPHIC SUCCESSION AT SALINAS LA BLANCA

## Cuadros Phase

The Cuadros Phase is defined on the basis of those pottery types in the deepest levels of the site, that is, in Stage 1 of the depositional sequence, and in several other sites from which surface collections were made (pp. 85-87). Of the various ceramic types included in this phase, one, Guamuchal Brushed, is overwhelmingly the most abundant, varying in relative frequency from over 96 percent near the bottom of Cuts 1 and 2, to around 50 percent as the phase ends at the beginning of Stage 2. Another marker for Cuadros is Méndez Red-rimmed, which actually reaches greatest popularity in the succeeding Jocotal Phase, especially in depositional Stage 2.

As compared with the Ocós Phase which precedes it, the Cuadros Phase shows far less variety in plastic decoration of its pottery. Most elaborately decorated is Guamuchal Brushed, a monochrome unslipped type characterized by one form: the large, neckless jar, or *tecomate* (a term used by Mexican archeologists), on which the decoration may involve brushing, finger punching from the interior, gouging, punctation, and indented filleting, as well as rarer techniques. Méndez Red-rimmed is also a *tecomate* type, and is basically Guamuchal Brushed with the addition of red slip along the rim band, a decorative mode which also characterizes Mapache Red-rimmed. The only true bichrome shows up on Tilapa Red-on-white, with bold, geometric designs in red on a white background. Monochrome slipped types include Morena Black and Pacaya Red.

Pampas Black-and-white is also slipped, but here the presence of two "colors" is the result of firing variations, the most important result being the production of "white-rimmed black ware."

Decoration on Cuadros pottery, besides those techniques mentioned above, includes plain rocker stamping (rare), incising, cane punching, and pattern burnishing in bands. As far as can be determined, all Cuadros vessels were made by the coiling method, imperfectly smoothed coil junctures being visible on not a few sherds.

The ceramic forms of the Cuadros Phase are extremely few, with *tecomates* being the most popular (probably due to their use as cooking pots); flat bottomed bowls with outslanting sides are next highest in frequency, with necked jars, subglobular jars, and deep bowls also present. Only one small decorative handle was found. Totally absent from the phase are supports of any kind, flanges, spouts, bottles, and composite silhouettes.

## Jocotal Phase

The Jocotal Phase develops directly out of Cuadros, and is marked by a diminution in frequency of Guamuchal Brushed, plus an increase in popularity of Méndez Red-rimmed, Tilapa Red-on-white, and Pampas Black-and-white. Morena Black, Conchas White-to-buff, and Pacaya Red also expand, particularly at the start of Stage 2.<sup>1</sup> Suchiate Brushed is strongly represented in Jocotal deposits, particularly in Stage 3, and increases at the expense of Guamuchal Brushed. Another new type is Ocós Gray.

Jocotal could well have been named a subphase of either the preceding Cuadros Phase or the succeeding Conchas, for it is strongly affiliated with both of these and is, in fact, a transitional phase between the two. Especially noteworthy is a sharp increase in frequency of white-rimmed black sherds. There is a change in emphasis on techniques of decorating *tecomates*, and especially emphasized are exterior finger punching, diagonal incising, and incised arcs, while brushing changes from predominantly horizontal (on convex upper body zones of *tecomates*) to vertical or diagonal. There is a change in *tecomate* form as well, the complex profiles of Cuadros giving way to simple ones with plain rims.

Besides the horizon-marker type of Suchiate Brushed, Jocotal is characterized by the appearance of a very distinctive kind of pottery, namely Conchas White-to-buff, with form and incised decoration directly foreshadowing white flat-bottomed bowls of the Conchas Phase. A specific mode of incising shared by both phases is the double-line-break motif. Jocotal Phase examples, however, lack an exterior slip; Conchas Phase examples are slipped on both sides. As for Suchiate Brushed, a few sherds of this type were present at La Victoria in Conchas 1 deposits, and were included in Conchas Phase illustrations in the report on that site.

In summary, then, Jocotal is a transitional (and probably brief) phase between Cuadros and Conchas, and sees the gradual extinction of some Cuadros types, the alteration of others or their evolution into new types, and the addition of Conchas-like types.

<sup>1</sup> However, sherds become very rare in Stage 2, almost surely because this was a period of clay floor and platform construction, rather than of midden-building; the skewing of the histograms in the levels in which the total number of diagnostic sherds falls below 40 can be seen in figure 7. This means that the sampling of the strata in these levels is so inadequate that a large probable error has resulted.

### Crucero Phase

From our previously gained knowledge of the cultural sequence in the Ocos area, there is definitely a discontinuity at Salinas La Blanca between the Jocotal Phase and the Crucero Phase which overlies it and intrudes into it, as represented in Stage 4. This discontinuity resulted from the abandonment of Salinas La Blanca during the Conchas Phase. We have for Conchas ample evidence of a more-or-less direct evolution out of Jocotal. There is nothing, however, in the "natural" stratigraphy at Salinas La Blanca to suggest such a hiatus—the inference is drawn from the cultural succession at La Victoria, where continuities from Conchas 2 into Crucero are seen.

In its ceramic assemblage, Crucero is utterly unlike any previous phase at Salinas La Blanca. Rather than placing emphasis on the flat-bottomed bowl and the *tecomate* (the latter is in fact absent), the Crucero potters preferred composite silhouette bowls with dimpled bases, bucketlike cylinders, bowls with everted rims, and low-necked, restricted orifice jars.

A totally different set of pottery types replace the older ones. Of these, Conchas Streaky Brown-black is the most important, to be distinguished by its polished, streaky, dark surface which has a slightly waxy feel to the touch. Of lesser frequency are Conchas Orange, with similar characteristics, and an unslipped type, Julain Coarse, which seems to have been an incense-burner type. A large number of other ceramic types also appear, but none has more than a very small relative frequency in the deposits.

The range of decorative techniques is very slight, engraving and excising being the most common, with red pigment often rubbed into the lines or cut-away areas. Engraved motifs include hatched, inter-

locking scrolls, parallel lines, and "scallops." Raised bands and nodes on the exteriors of bowls are frequent, as are horizontal ribs or grooves on the upper part of composite silhouette vessels. Usulután decoration is characteristic of Conchas Orange, with straight (rather than curvilinear) multiple lines. A small amount of bichroming is known, mainly red-on-orange, with one such vessel decorated in crudely painted step-and-fret designs.

Apart from its forms and decorative techniques, Crucero pottery contrasts with the ceramics of the Cuadros and Jocotal Phases, in that most sherds are slipped and polished; sherds of the two earlier phases at the site are overwhelmingly unslipped and in fact roughened through plastic alteration of the surfaces.

Crucero itself was previously defined on the basis of a small number of pottery types sorted out from mixed deposits near the surface of La Victoria (Coe, 1961, p. 33). At Salinas La Blanca, a much richer collection was available from Stage 4, including complete or nearly complete vessels from intrusive pits in Cut 1.

### Other Pottery

On purely culture historical grounds, a few ceramic types at the top of the site should probably not be included with Crucero. These are a handful of glazed sherds, almost certainly of modern date, Violeta Plain (probably belonging with the Cerro del Tiestal complex), and Manchuria Plain (a late *comal* type, probably Late Classic). A word should also be said about Miscellaneous Coarse, which is really a "residual category," but which comprises rim and otherwise distinctive sherds that were easily differentiated from the large category of plain, unclassifiable *tecomate* body sherds.

## THE FORMATIVE POTTERY SEQUENCE VIEWED AS A WHOLE

When the ceramics of the Cuadros, Jocotal, and Crucero Phase levels at Salinas La Blanca had been studied, we returned to the ceramic analysis of the Ocos, Conchas, and Crucero Phases at La Victoria in an effort to see how the entire Formative sequence shaped up when each phase was assigned its proper place. We were immediately struck by the similarity in general ceramic trends between our coastal Guatemalan sequence and the sequences from Chiapa de Corzo and the Valley of Tehuacán. It seemed, therefore, that it would be useful to present our whole Formative sequence as it now stands, especially emphasizing those major trends which are strongly paralleled in other regions of southern Mesoamerica.

We have grouped many of the major pottery types of the Ocos region into a series of "traditions." Each of these traditions involves a set of closely related pottery types which succeed one another through time, preserving certain regional style preferences in spite of continuous innovation. In many cases, the Guatemalan coastal traditions seem to go through series of changes similar to the analogous traditions at Tehuacán and Chiapa de Corzo; in other cases, at critical points in the sequence, there are interesting divergences. For example, during the Late Formative in the Tehuacán sequence, the ceramics fall strongly under the influence of central Oaxaca (MacNeish, 1964, p. 536); and during the Late Formative in the



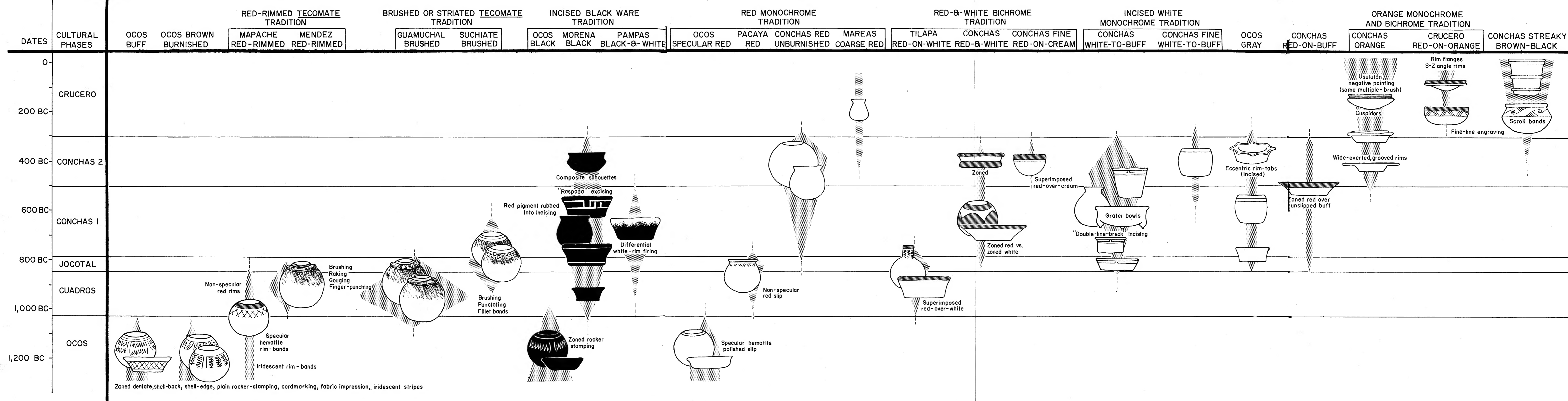


FIGURE 8.—Graph showing the major pottery types and traditions of the Formative period in south coastal Guatemala. Width of the stippled area indicates the relative popularity of a given type during a given cultural phase. Vessel reconstructions *not* to scale; minor types not included.





Chiapa de Corzo sequence, the ceramics fall strongly under the influence of the Mamom-Chicanel (Maya) area (Warren, quoted in Sanders, 1961, p. 52). These trends are not paralleled in south coastal Guatemala, for the strong Late Formative influence there emanates from Izapa and Kaminaljuyú.

More striking are the similarities in traditions, which we feel will be even more apparent when the Chiapa de Corzo and Tehuacán sequences are published in full. Many key pottery types seem to appear, rise to prominence, and disappear with a reasonable degree of synchronization over the entire area from southern Puebla to the Guatemalan coast. At 1300 B.C. we begin with monochrome buffs, browns, blacks, and lavish use of specular hematite. During the course of the Early Formative, red rimmed *tecomates* and striated *tecomates* appear, then red-and-white bichromes and "white-rim-black" differential firing. As the Middle Formative approaches, tra-

ditions of monochrome white ware begin, followed eventually by gray ware. Specular hematite gives way to drabber reds, which characterize the period from 900 to 500 B.C. along with incised white, gray, and black ceramics. With the approach of the Late Formative, the Guatemalan coast goes over into the Izapa-Kaminaljuyú sphere, with orange monochromes, Usulután resist painting, red-on-oranges, and streaky brown-black vessels. This transition is complete by the year A.D. 1.

In the section which follows, we will spell out and describe these traditions in more detail. Pottery types unearthed for the first time at Salinas La Blanca will be defined. Some La Victoria types will be partially redefined. In the case of other previously defined types, the reader will be referred to the appropriate pages in the La Victoria report. We feel that by presenting the Formative in its entirety (as we now know it) we can best facilitate long-range comparisons with other parts of Mesoamerica.

## MAJOR POTTERY TYPES AND TRADITIONS OF THE COASTAL FORMATIVE

We suggest that the reading of this section be accompanied by inspection of the general "battleship graph" for the whole Formative (fig. 8). This chart, dealing only with major types or traditions, has been prepared by combining data from figure 7 (this report) and figures 8, 9, and 10 of the La Victoria report (Coe, 1961).

All types and traditions will be discussed in the order in which they appear in the stratigraphic sequence, from oldest to youngest.

### Types Restricted to the Ocós Phase

#### Ocós Buff

(Coe, 1961, figs. 20, 21)

This type was originally defined in the La Victoria report (Coe, 1961, pp. 53-54). Excavations in Cuadros Phase levels at Salinas La Blanca failed to produce a single sherd of Ocós Buff. We conclude, therefore, that the type was restricted to the Ocós Phase, and that those sherds of Ocós Buff which showed up in later levels at La Victoria had been redeposited.

A number of Early Formative developments in Mesoamerica were characterized by unslipped buff monochromes; such complexes included those in the Tehuacán Valley (MacNeish and Peterson, personal communication). Ocós Buff differs from most of these analogous types in the fact that it was occasionally striped with iridescent paint.

#### Ocós Brown Burnished

(Coe, 1961, fig. 23, j-1)

This type was defined by Coe (1961, p. 54). No sherds

of it were recovered from Cuadros levels at La Victoria, from which we conclude that the type was restricted to the Ocós Phase. Brown Burnished sherds found in post-Ocós levels at La Victoria had evidently been redeposited.

The only vessel shape present in Ocós Brown Burnished was the thin-walled *tecomate* characteristic of the Early Formative, decorated by means of zoned shellback, shell edge, and dentate rocker stamping, zoned cord marking, and zoned fabric impressing. The type is a very distinctive horizon marker for the Ocós Phase.

### Red-rimmed Tecomate Tradition

*Tecomates* with a zoned band of red paint at the rim were widespread in southern Mesoamerica during the Early Formative. Complexes in which they were present included the Ajalpan Phase at Tehuacán (MacNeish, 1962, p. 38), period I at Chiapa de Corzo (Dixon, 1959, pp. 16-17), and the Ocós, Cuadros, and Jocotal Phases on the Guatemalan coast (this report).

Some chronological change can be detected within this tradition. The earliest such *tecomates* were thin walled, and the band of red paint at the neck was specular hematite; this was so in the Ajalpan and Ocós Phases. Later in the Early Formative, *tecomates* were thicker walled and the red paint was *not* specular. This latter type of *tecomate* was often decorated, below the rim band, by brushing, punctating, or rocker stamping (as in Chiapa I, Cuadros and Jocotal, and late Ajalpan).

In order to take into account this chronological

change, we have divided the red-rimmed *tecomate* tradition into two pottery types, Méndez Red-rimmed and Mapache Red-rimmed. In addition, Mapache Red-rimmed has two varieties with chronological significance, a "Specular Hematite" variety and a "Nonspecular" variety.

Mapache Red-rimmed, Specular Hematite variety, was made during the Ocós Phase. Most of the rim sherds shown in the upper half of figure 16 of the La Victoria report (Coe, 1961) belong to this variety. (The La Victoria report calls them "Victoria Coarse," but as explained earlier this was simply a residual category into which a number of unrelated types were "lumped.") *Tecomates* of this variety were globular and probably unsupported (not tripod, as Coe states many of the iridescent striped *tecomates* were). Each had a band of specular hematite at the rim, usually separated from the body of the vessel by an incised line. Some, in addition, had "latticework crisscross line grooving below the painted area on the exterior" (Coe, 1961, p. 50 and fig. 16, third row from top).

At the end of the Ocós Phase, specular hematite rims seem to have gone out of style. Mapache Red-rimmed, Nonspecular variety, came to the fore and lasted throughout the Cuadros Phase. (A few fragments of this type showed up in Jocotal levels at Salinas La Blanca, but they may have been redeposited.) Latticework crisscrossing still appeared on these Nonspecular *tecomates*, and we regard it as one of the links between the Ocós and Cuadros Phases.

Méndez Red-rimmed made its appearance at the start of the Cuadros Phase, lasted through Jocotal times, and seems to have died out by the start of Conchas 1. *Tecomates* of this type had a nonspecular red band at the rim, and their exteriors below the band were decorated by brushing. They reached their highest frequency just at the end of Cuadros and the start of Jocotal (900–850 B.C. ?), somewhat later than the point of peak frequency for Mapache Red-rimmed. They represent the last stage of the red-rimmed *tecomate* tradition.

#### Mapache Red-rimmed

**SPECULAR HEMATITE VARIETY.**—Described in Coe, 1961, p. 50 (under Victoria Coarse) and illustrated, *ibid.*, fig. 16.

**REMARKS:** Restricted to the Ocós Phase, and a good horizon marker for it.

**COMPARATIVE MATERIAL:** Ajalpan Phase, Tehuacán Valley, thin-walled *tecomates* with specular hematite band at rim (MacNeish, 1962, p. 38).

**NONSPECULAR VARIETY.**—(fig. 9; pl. 12, *a-j*).

**PASTE:** Similar to that of Guamuchal Brushed. The color is usually a grayish tan, but occasionally there are wide,

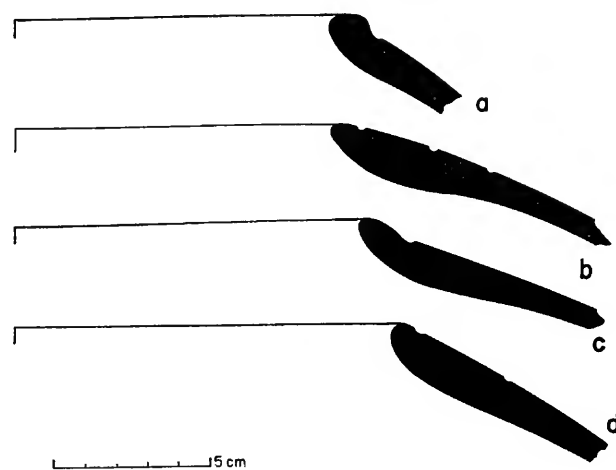


FIGURE 9.—Rim profiles of Mapache Red-rimmed *tecomates*, Cuadros Phase.

dark gray cores; cores are black where the contiguous surface is also black; burned sherds have a black, orange, or reddish brown (2.5 YR 5/4.5) paste.

**SURFACE:** Unslipped, except for the rim band. The exterior has been carefully smoothed but not polished, probably by wiping with a rag leaving a matte texture. The rim band is roughly polished after slipping. Interiors are smoothed or scraped. The color of the exterior is in the same range as Guamuchal Brushed, with black firing clouds common near the rim.

**FORM:** Neckless globular jars (*tecomates*). The rims are usually tapered, with slight interior thickening below the lip, but a few are more rounded. The shape of the base is unknown.

**DIMENSIONS:** Inner rim diameter 18–24 cm., mean 19 cm.; the maximum body diameter is unknown, but is probably similar to Guamuchal Brushed; height unknown; body thickness at point 6–8 cm. below rim is 0.6–0.9 cm., mean 0.7 cm.

**DECORATION:** The rim band was formed by broad, shallow grooves encircling the vessel, usually one placed very near the lip, the other being 2.3–6.0 cm. below the lip; a single row of punctations (either small diagonal strokes or triangular punches) encircles the vessel just below the rim band. After this was done, the entire band was slipped weak red (7.5 R 4/4) with a brush, the slip sometimes being applied over some of punctations, and over into the interior 0.5–2.0 cm. Below the row of punctations, the matte surface of the vessel was usually decorated with linear pattern burnishing, consisting of one or more diagonal lines, some opposed. Two sherds have additional punctate rows, one example of which (pl. 12, *f*) has punctations confined in a zone by rectilinear grooves.

**REMARKS:** Virtually restricted to the Cuadros Phase, and a good horizon marker for it.

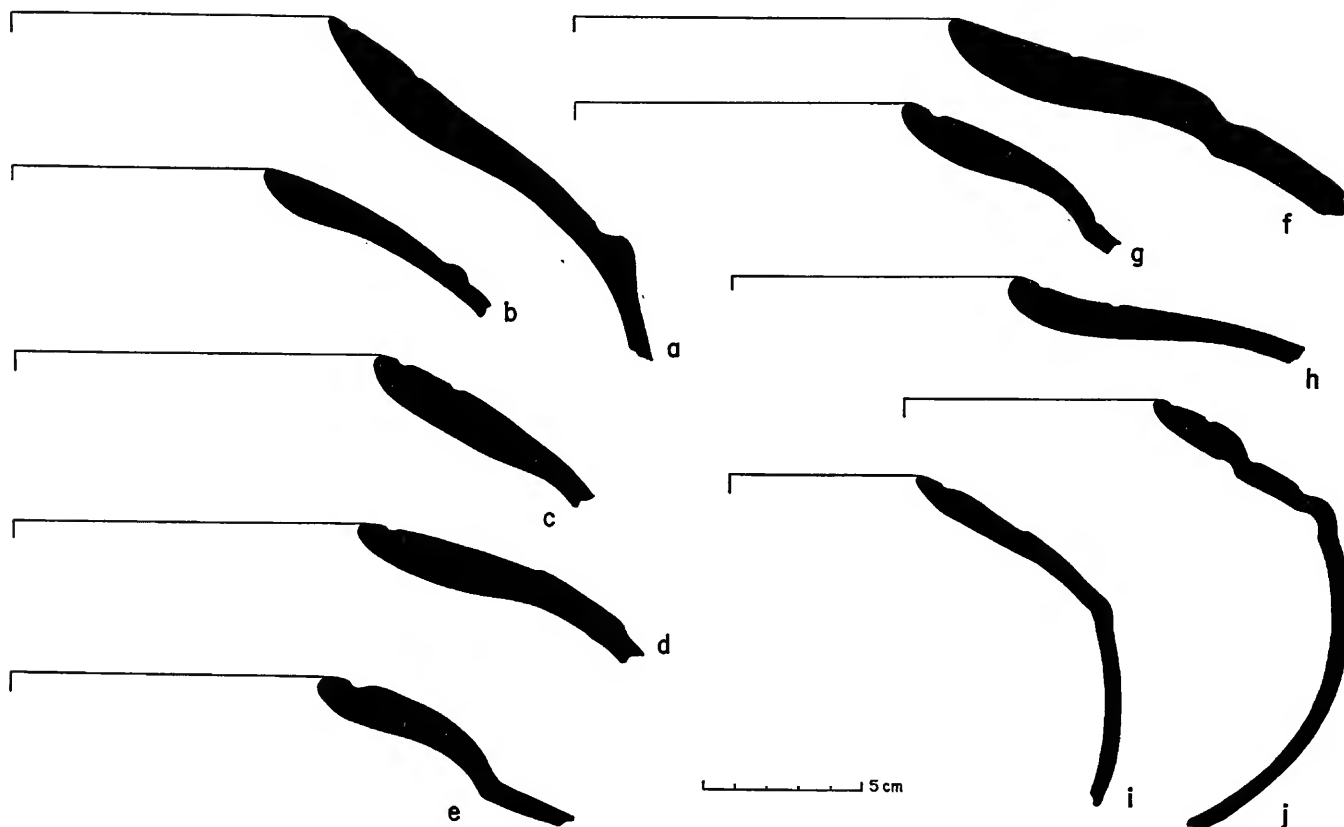


FIGURE 10.—Rim profiles of Méndez Red-rimmed *tecomates*, Cuadros Phase.

Méndez Red-rimmed  
(fig. 10; pls. 10-11)

**PASTE:** Identical to Guamuchal Brushed in all features.

**SURFACE:** Same as Guamuchal Brushed.

**FORM:** Neckless globular jars (*tecomates*). The majority are similar in profile to Guamuchal Brushed, with a convex raised zone encircling the vessel just below the rim band. Rims are usually tapered with a rounded, narrow, lip profile and a slight interior thickening below the lip. The rim band varies in width from 1.0-4.5 cm.; narrower rims are usually associated with close stepped jab decoration (on the convex band). The form of the base is presumably the same as Guamuchal Brushed.

**DIMENSIONS:** Rim diameter 16-22 cm., mean 19 cm.; wall thickness (in brushed zone below convex band) 0.5-0.8 cm., mean 0.6 cm., but nearer rim it may measure to 1.3 cm. The maximum diameters of two partially reconstructible vessels are 30 cm. and 44 cm., although the former is atypically small. Heights are unknown.

**DECORATION:** On all vessels, rim bands are slipped red (7.5 YR 4/4, weak red) and polished; the slipping is usually carried over 1 cm. into the interior; accidental strokes show that a narrow brush was used; on narrower rim bands the slip covers the entire exterior to the edge of the brushed zone—on wider bands it covers the entire

area of the band or only 1-2 cm. down from the lip. Brushing is present on all examples of the type, exactly as in Guamuchal Brushed. Alternative methods of embellishing the convex band after brushing are:

1. *Spaced herringbone gouges* (pl. 10, a), but lower frequency than in Guamuchal Brushed.
2. *Spaced stepped jabs* (pl. 10, b-d, f, i, k)
3. *Close stepped jabs* (pl. 10, g-h)
4. *Horizontal diagonal punctation*, both single and multiple row, with punctations on some becoming very short diagonal lines.
5. *Diagonal incising* (pls. 10, b, k; 11, a, f, i, j), often paralleling spaced stepped jabs and consisting mainly of broad, shallow, indented lines in pairs of parallel diagonals, with two examples of crisscross diagonals.
6. *Curvilinear incising* (pl. 11, b), a form of line indenting emphasizing diagonal lines combined with shallow arcs or sigmoid curves, the latter appearing either singly or in parallel pairs.
7. *Plain rocker stamping* (pl. 10, e), present on only two sherds. *Horizontal punctation, single row* (pl. 10, l) is confined to sherds lacking the convex zone, as in Guamuchal Brushed. *Indented filleting* (pl. 10, b, f), *interior finger punching*, *cane-punched applique* (pl. 11, d) are the same as in Guamuchal Brushed. *Exterior finger punching* is found on one sherd only (pl. 11, g) from a Jocotal level.

REMARKS: This type shares many features with Guamuchal Brushed, but there are some differences in vessel size and in frequency of decorative modes. Chronological differences in the type are apparent as one moves into Jocotal levels, in which (1) there is a tendency for vessels to lack the convex zone, and thus to approach Suchiate Brushed in form; (2) the red slip on the rim band becomes thinner; and (3) there is a high frequency of incised or impressed lines in the zone below the rim band, with diagonals, arcs, and especially paired sigmoid curves, which are peculiar to Jocotal. The function of these vessels was presumably culinary, as in Guamuchal Brushed.

COMPARATIVE MATERIAL: Chiapa de Corzo: Chiapa I (Pit 50) Phase, 20 percent of "unslipped" *tecomates* have red slip on a grooved rim band, these *tecomates* also having such decorative modes as brushing, diagonal incising, and plain stamping (Dixon, 1959, pp. 16-17); similar red rimmed *tecomates* also occur in the Chiapa II (Pit 38) Phase, but their frequency drops to 3 percent of all *tecomates* (Dixon, 1959, pp. 33-34). Santa Marta Rock shelter: unslipped *tecomates* with brushed surface and red slipped rim bands are almost identical to Méndez Red-rimmed examples of the Jocotal Phase (MacNeish and Peterson, 1962, p. 32, pl. 6, c). Padre Piedra (Navarrete, 1960, p. 24): the Chiapa I Phase has brushed *tecomates* with red slipped rim bands. Santa Cruz (Sanders, 1961, p. 17): Burrero Phase, Burrero Red *tecomates* have a red slip on the rim band, brushed bodies, and approach Jocotal examples of the type, as do Burrero Tecomate sherds, which are decorated with incised arcs, etc. (Sanders, 1961, pl. 7A).

#### "Brushed" or "Striated" Tecomate Tradition

During the second half of the Early Formative and the first half of the Middle Formative, over much of southern Mesoamerica from Tehuacán to Guatemala, "brushed" or "striated" *tecomates* seem to have been greatly in vogue. These were large, heavy, neckless jars with a plain band at the rim, whose exteriors below the band were decorated by raking or brushing with a multiple toothed instrument like a comb, corncob, or bristle brush. Brushed *tecomates* were not present in the Ocós Phase levels at La Victoria, but they must have begun soon after that, for by the time of the earliest Cuadros Phase levels at Salinas La Blanca they already accounted for more than half the classifiable sherds. A few Cuadros Phase examples still show the rocker stamping characteristic of Ocós Phase *tecomates*. The Cuadros Phase saw the maximum production of brushed *tecomates*, but they lasted (with some stylistic change) through Jocotal times and into the Conchas I Subphase. During the La Victoria analysis, brushed *tecomate* sherds of this type were simply lumped into the residual category "Victoria Coarse." Coe, 1961, figure 52, a-e, g-i, shows sherds now known to be

Suchiate Brushed, a type defined in the present report. (pp. 30-32.)

Thanks to the much larger sample of brushed *tecomates* from Salinas La Blanca, we have now been able to reclassify the brushed sherds from the Conchas I Subphase; the type descriptions given below take precedence over the La Victoria report. We have divided the brushed *tecomate* tradition into two types, Guamuchal Brushed and Suchiate Brushed, each with a somewhat different chronological span. Guamuchal Brushed *tecomates*, characterized by a more complex rim profile, were made in great quantities during the Cuadros Phase, but tapered off during Jocotal times. Suchiate Brushed *tecomates*, with a simpler rim profile, were not made until the Jocotal Phase; they eventually came to replace Guamuchal Brushed, however, and by the Conchas I Subphase they accounted for all the brushed *tecomates* being produced.

Note that in the case of Méndez Red-rimmed (p. 27), the "Red-rimmed *tecomate* tradition" and the "Brushed *tecomate* tradition" overlapped in a single type.

#### Guamuchal Brushed

(figs. 11-12; pls. 6-9)

PASTE: Typically bentonitic, with many small, faceted, quartz crystals, platelets of yellowish-brown biotite, and small lumps of rust-red, altered fayalite (Appendix 5). Hollow casts of small seeds and pieces of grass stems and leaves are sometimes present within walls or on surface. Flattened coils can be seen on very eroded sherds, while some sherds exhibit the rounded tops of coils at breaks, and there are many examples of imperfectly smoothed coils on interiors. Fired at fairly low temperatures, with a wide difference in firing conditions for same pot, producing strong color variations. Unoxidized cores are usually thick, and dark gray; on very hard sherds with light buff surfaces, cores are medium to light gray, becoming buff near the exteriors.

SURFACE: Interiors were smoothed with fingers when wet and/or scraped with the slightly curved edge of a smooth object like a piece of gourd, leaving marks of that tool on some sherds (pl. 9, b); exteriors are roughly polished on the rim band and over the lip to just inside the rim, and the entire exterior below the brushed zone is also roughly polished, with horizontal strokes of what probably was a pebble. Surfaces are always unslipped, and show occasional flecks of yellowish biotite. The clay used has a wide firing range and was also subject to great color changes in postmanufacture burning (i.e., from use in cooking). On sherds which are not altered by later burning (i.e., from use in cooking), the color ranges from 10 YR 6/3 (pale brown) to 10 YR 4.5/2 (grayish brown) to 2.5 YR 5/5 (reddish brown), such colors sometimes appearing on the same sherd. Burned sherds vary from 10 R 5/4 (weak red) through ashy white-gray to black.

FORM: Neckless, globular jars or *tecomates*, somewhat squat in outline, the width being slightly greater than the height. Rims usually are tapered rounded, with slight interior thickening below the lip; less common are blunt rounded or squarish lips with no tapering or thickening. Most jars have a complex profile, with a recurved, strongly convex, horizontal zone or band encircling vessel just below the rim band. Bases seem to have been usually flattened, plain; two examples of dimpled base are known. Appendages are absent, with the exception of three examples of double-strand, vertical handles (pl. 8, *l*), each with "collars" where they meet the vessel wall; these are small, extending from the convex zone to the beginning of the brushed zone below.

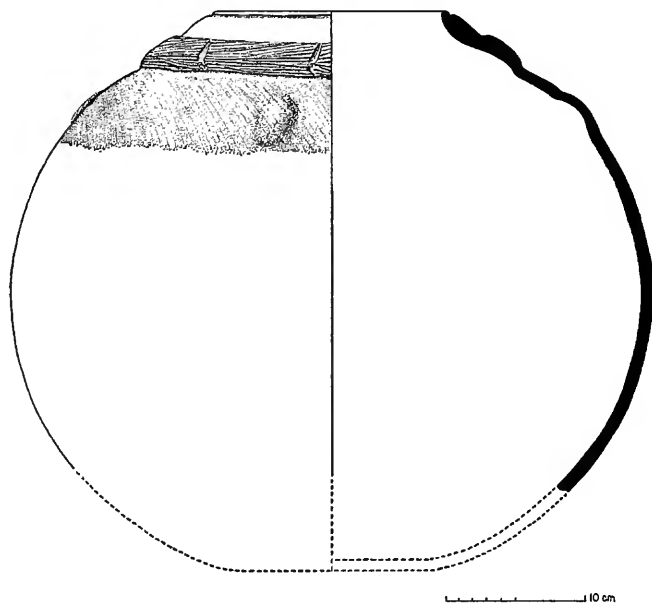


FIGURE 11.—Reconstructed Guamuchal Brushed *tecomate*, Cuadros Phase.

DIMENSIONS: Inner rim diameters 14–23 cm., mean 17 cm.; wall thickness (below convex zone) 0.6–0.9 cm., mean 0.8 cm.; height unknown. One almost complete vessel measures ca. 40 cm. in height, 46 cm. in maximum body diameter, 0.9 cm. in wall thickness.

DECORATION: Entirely by plastic alteration.

1. *Grooving*, used to set off a horizontal, polished band at the rim from the rest of the vessel; after polishing, a broad, shallow, horizontal groove was made just below lip on exterior with an indenting tool, and a second groove placed below this at the junction of the rim band and the brushed zone below.
2. *Brushing* (or "raking"), produced by a tool 3–6 cm. wide, with multiple bristles or teeth set in row, usually 3 mm. apart. All vessels are brushed on the convex band, usually horizontally but sometimes vertically or down-and-to-the-right; on the body below the convex band, extending down 4–8 cm. from it, all vessels are brushed, usually down-and-to-the-right, but sometimes vertically; cross strokes are rare.

3. *Spaced herringbone gouges* (pl. 6), confined to the convex band and done after brushing; made by rapidly gouging in wet clay two opposing lines with a stick, punching up the clay toward the end of strokes; pairs of lines are spaced from 1–20 cm. apart, most 4–5 cm; right pointing herringbones are slightly more frequent than left pointing.
4. *Spaced stepped jabs* (pl. 7), an alternate method of decorating the convex band, postbrushing; punches or jabs of a stick were made from the bottom up, the jabs stepped diagonally, with the clay pushed aside at end of strokes; rows of jabs are 3–10 cm. apart; sometimes pairs of rows are close together, or a row is paralleled by a single incised line.
5. *Close stepped jabs* (pl. 8, *e-g*).
6. *Multiple horizontal punctation* (pl. 9, *a, h*), an alternate method of decorating the convex band after brushing; several rows of simple, spaced punctations are placed along the band.
7. *Plain rocker stamping* (pl. 8, *l*), also an alternate mode on convex bands, the stamping done vertically after brushing and carried out vertically; very rare. This is a carryover from the Ocós Phase.
8. *Horizontal punctation, single row* (pl. 9, *d-g, i*), on some vessels; a row of spaced punctations is placed at the juncture of the polished rim band and the brushed zone; on all such vessels, the convex zone is absent, and the brushing is vertical or down-and-to-the-right.
9. *Indented filleting* (pl. 8, *m-r*), on a majority of vessels but not on all; after brushing, a strip of clay is placed along the juncture of the brushed zone and the polished surface below, then indented; the fillets are discontinuous, some beginning and ending in a horizontal line, while others extend down from the convex band or from the juncture just below it, and turn to left; strips sometimes have an indented blob of clay at the right end.
10. *Cane-punched applique* (pl. 8, *h-k*), bloblike, crude faces applied to juncture of brushed zone and polished body, usually turned on the side; the "eyes" are formed from rounded, flat pellets of clay outlined by impressing with the end of a cane tube; the nose or mouth (?) is formed by pushing out a "bubble" from inside the vessel with a finger, adding extra clay, and jabbing with a tool; a few are daubed with red paint.
11. *Interior finger punching* (pl. 9, *c*), present on all vessels except the latest; near the bottom of the brushed zone, a horizontal row of spaced "bubbles" is made by pushing out the wall from the interior with a finger; all fingers except the thumb could be used, most fingernails being worn completely down, but some impressions show the nail mark; while the finger is pressing out, either one or two jabs or punches are made on the exterior of the bubble with a stick (most frequent) or else an arched groove is made to outline the upper edge of the bubble (rare).
12. *Exterior finger punching*, rare and confined to Jocotal; the pad on the last joint of the finger is used to

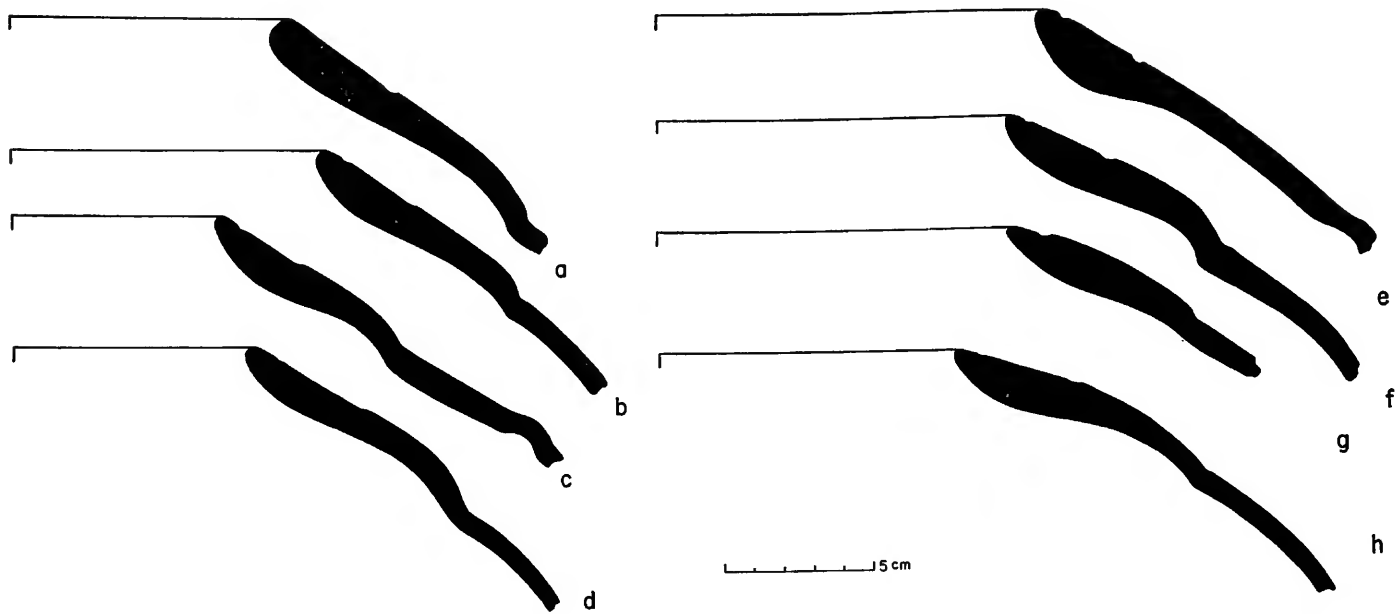


FIGURE 12.—Rim profiles of Guamuchal Brushed *tecomates*, Cuadros Phase.

produce a horizontal row of shallow impressions which are spaced in the brushed zone just above the indented fillet.

13. *Diagonal incising* (pls. 7, *d, i*; 9, *f*), a kind of line impressing, down-and-to-the-left on the convex band and on the brushed zone below, usually with paired parallel lines; rare.
14. *Incised arcs*, very rare, consisting of a series of arcs in a row, produced by indenting the polished wall of the vessel body.

**REMARKS:** In Jocotal levels, Guamuchal Brushed approaches Suchiate Brushed in conformation, as the convex band flattens out and disappears, brushing becomes vertical and down-and-to-the-right rather than horizontal, cross-brushing becomes more frequent, and exterior replaces interior finger punching. From fire marks on large vessel fragments and from basal sherds, we conclude that these *tecomates* functioned as cooking vessels, although some could have been used for storage; charred calcareous deposits on basal interiors reinforce this conclusion.

**COMPARATIVE MATERIAL:** Chiapa de Corzo (Dixon, 1959) has *tecomates* almost identical to Guamuchal Brushed; Chiapa I (Pit 50 period) has brushing, grooved rim bands, spaced stepped jabs, indented filleting, plain rocker stamping, and interior finger punching outlined by incised arcs (Dixon, 1959, fig. 52), as in Cuadros Phase examples of the type; in Chiapa II (Pit 38 period), *tecomates* more closely resemble Jocotal sherds, with a greater emphasis on exterior finger punching, diagonal incising, and incised arcs. Vergel, Chiapas (Lowe, 1959, fig. 35*b*) has *tecomates* with spaced herringbone gouges. Santa Marta Rock shelter (MacNeish and Peterson, 1962, pl. 6): the earliest ceramic period (Cotorra or Chiapa I) is characterized by *tecomates*, of

which some are very similar to Guamuchal Brushed, including close stepped jabs, brushing, and interior finger punching; other *tecomates* are more closely aligned with Suchiate Brushed. In the Ajalpan Phase of the Tehuacán Valley (MacNeish, 1962, p. 37), some *tecomates* are decorated by zoned brushing.

#### Suchiate Brushed

(fig. 13; pls. 16, *c-m*, 17; see also Coe, 1961, fig. 52, *a-e*, *g-i*)

**PASTE:** The same as Guamuchal Brushed, except that dark-gray cores are rarer, with more uniform firing color prevailing. Several sherds give evidence for coiled construction.

**SURFACE:** Unslipped, showing the same range of firing colors as Guamuchal Brushed. Interiors were usually smoothed by finger swipes just inside the rim, and by a scraping tool on the rest of the interior (a few show use of a bunch of fibers). Exteriors were first smoothed by wiping, then the upper one-fourth of the body was brushed, after which the rim was roughly polished by horizontal pebble strokes 0.6–2.5 cm. down from the lip and sometimes about 1.0 cm. inside the rim; the body below the brushed zone is completely polished in the same fashion.

**FORM:** Neckless globular jars (*tecomates*). These are similar to Guamuchal Brushed in general outline, but the convex zone of the latter type is completely lacking. About one-half of all rims have a lip section in the form of a rounded square, or with a slight bevel on top. The rest are simple rounded or tapered rounded (these are occasionally flattened on top).

**DIMENSIONS:** Inner rim diameter 18–28 cm., mean 22 cm. Wall thickness 0.6–1.1 cm., mean 0.9 cm. Other dimensions are unknown, but probably are in the same range as Guamuchal Brushed.



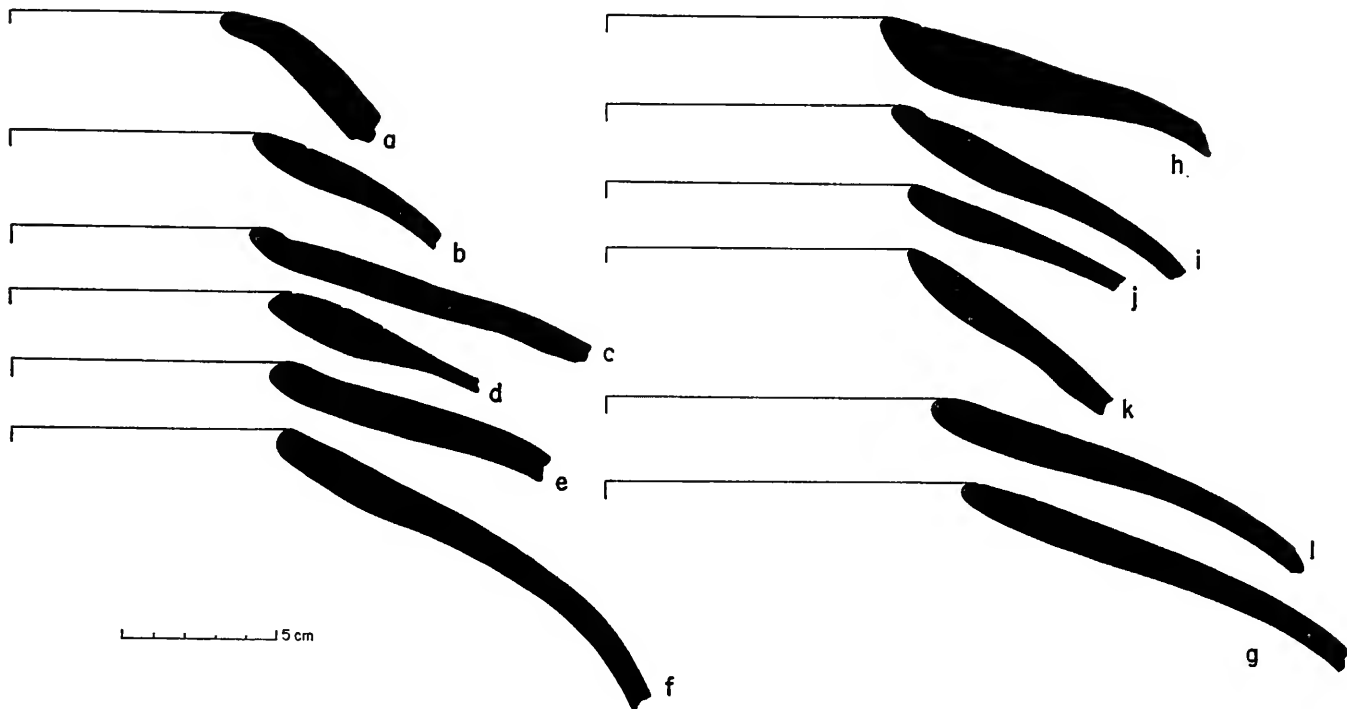


FIGURE 13.—Rim profiles of Suchiate Brushed *tecomates*, Jocotal Phase.

#### DECORATION:

1. *Brushing* on all vessels, sometimes so light that it is hardly apparent; this is confined to a zone 6.0 cm. to more than 10.0 cm. wide, just below the polished rim; usually cross brushing carried out, producing opposed areas, after which a horizontal band of brushing was made just below the rim. Sometimes the brushed zone is separated from the polished rim by several centimeters of wiped matte surface. A few sherds have down-and-to-the-right brushing only.
2. *Grooving*, present on a minority of vessel rims, consisting of 1–2 parallel lines, the lowermost separating the rim band from the brushed or matte area below.
3. *Horizontal punctation* (pls. 16, e, f, j; 17, b), on a small number of examples, consisting of a single row of closely spaced punctations encircling the vessel just below the polished rim zone.
4. *Stick punctation* (pl. 17, j–q), spaced, carelessly executed gouges on the brushed or matte zone below the polished rim, usually produced by downward strokes or jabs of a frayed stick 1–6 mm. wide at end, pushing the clay to end of stroke; some are arranged as in horizontal punctation, the stick end being pushed from right to left.
5. *Low-relief indented filleting* (pl. 16, e, f, h–j), produced on the brushed zone by raising the surface of the wet clay between two fingers, the fillets undulating over the entire brushed zone; they are discontinuous and indented at close intervals with a tool.
6. *Impressed or incised lines* (pl. 17, a, c, d, f), on the brushed zone of some vessels; following brushing,

diagonal (most often down-and-to-the-left) lines and rows of arcs were impressed or incised, as in Jocotal examples of Méndez Red-rimmed.

7. *Exterior finger punching* (pl. 17, u–x). Some vessels had closely spaced and shallow punches on the brushed zone, produced by pressing in the wet clay with the flat pad of a finger from the outside; occasionally this is just a deep finger swipe, placed vertically, on the wet surface.

8. *Cane-punched applique* (two sherds only; pl. 17, h, i), one example consists merely of end-of-cane punching on the brushed zone, while the other is an applique face as in Guamuchal Brushed.

**REMARKS:** Suchiate Brushed is the characteristic brushed *tecomate* type of the Jocotal and Conchas I Phases, and evolves directly from Guamuchal Brushed. It can be differentiated from the latter by the form of rim, lack of a convex band, type of brushing, and decorative techniques like low-relief indented filleting (Guamuchal Brushed fillets are built up from applied strips of clay) and stick punctation. However, many features continue, and there are more than a few sherds that were intermediate between the two types in transitional levels and were therefore hard to place.

**COMPARATIVE MATERIAL:** Santa Cruz: Burrero Phase, some Burrero *Tecomate* sherds resemble the type (Sanders, 1961, pl. 7A), especially incised arcs in combination with straight lines. Chiapa de Corzo: Chiapa I has similar brushed *tecomates* (Dixon, 1959, fig. 52, a, m), as does Chiapa II (*ibid.*, fig. 54, j, l, the latter with exterior finger punching exactly as in Suchiate Brushed). Vergel:

Chiapas (Lowe, 1959, fig. 35, *b*) *tecomate* with exterior finger punching. Kaminaljuyú: Arévalo Phase (Lot C-100-a, Museo Nacional de Arqueología y Etnología, Guatemala City), brushed *tecomates* identical to Jocotal examples, with low-relief, curvilinear, indented filleting.

#### Incised Black Ware Tradition

As at Pánuco on the gulf coast (MacNeish, 1954), the tradition of manufacturing incised black pottery was already strong in the Early Formative at Ocós. Black pottery reached its highest frequency in the Middle Formative, however, and seems to have lasted into Late Formative levels only as a trickle of sherds (most probably redeposited).

During his analysis of the ceramics of La Victoria, Coe regarded all black wares from the Ocós and Conchas Phases as belonging to a single type, Ocós Black. He noted, however, that during the Conchas Phase approximately 10 to 16 percent of this pottery showed differential firing which had produced a "black-rimmed white" or "white-rimmed black" effect (Coe, 1961, p. 71).

The large sherd sample from Salinas La Blanca has now made it possible to further subdivide this tradition into two new types, Morena Black and Pampas Black-and-white. The latter type may now be seen to include all examples of differential "white-black" firing which were originally considered as a variant of Ocós Black. We have been forced to restrict the term "Ocós Black" to black pottery of the Ocós Phase, which had no differential firing and was often decorated by rocker stamping. The lumping of later, Conchas Phase, pottery into this type unfortunately obscured the fact that differential "white-rim-black" firing is a horizon marker for the Cuadros, Jocotal, and Conchas I Phases. Ocós Black, as we now redefine it, does not last into Conchas times, but is replaced by Morena Black and Pampas Black-and-white during the Cuadros Phase.

This history of the black ware tradition is as follows. During the Ocós Phase, Ocós Black constituted the only black pottery manufactured. Shapes included thin-walled *tecomates*, and flat-based bowls with outslanting sides and a variety of rim profiles. Decoration included zoned dentate, shell-edge, or shellback rocker stamping, cord marking, and simple shell stamping. These techniques did not last beyond the Ocós Phase.

During the Cuadros Phase, black flat-bottomed bowls with outslanting sides continued to appear, but were no longer elaborately decorated; necked jars and deeper bowls in black monochrome were added. We call this assemblage Morena Black. In addition, a new type, Pampas Black-and-white (characterized by differential firing) made its first appear-

ance in the Cuadros Phase. Both Morena and Pampas types continued through the Jocotal Phase.

The Conchas Phase saw the maximum output of black pottery during the whole Formative sequence. It is now clear that two types were present in Conchas times: Morena Black, accounting for the 80-90 percent with *no* differential firing, and Pampas Black-and-white, accounting for the 10-20 percent with a differential "white-rim-black" appearance. Probably the white-rim effect did not last beyond the Conchas I Subphase. Vessel shapes during this period included thick-walled *tecomates*, necked jars, bowls and dishes with outslanting sides, and a few other forms which had lasted from Jocotal times. New shapes, beginning in the Conchas I Subphase, were composite silhouette bowls, barrel-shaped jars, and cuspidors (Coe, 1961, pp. 70-73). Morena Black was eventually replaced by Streaky Brown-black pottery during the Late Formative Crucero Phase. The relationships of all these pottery types are shown in figure 8.

#### Ocós Black

(Coe, 1961, fig. 22)

Originally defined in Coe, 1961, pp. 54-55. We now restrict the definition to the black pottery of the Ocós Phase, with its limited repertoire of shapes but wide variety of plastic surface-decoration techniques. There are resemblances with black vessels of the Ajalpan Phase at Tehuacán (MacNeish, personal communication).

#### Morena Black

(*pl. 16, a, b; Coe, 1961, figs. 28, 29, a-g, i-k, n, o*)

**PASTE:** The usual bentonitic clay. Cores are black toward the interior surface (a few are black throughout), light buff or reddish toward the exterior surface.

**SURFACE:** Slipped and polished on the interior, the slip being somewhat thick and crackled; exteriors are left rough. Interiors on pre-Conchas examples were fired black, and the exteriors to a light buff color, suggesting that these bowls were inverted over smudging material, and that the outside fire had an oxidizing atmosphere.

**FORM** (during the Cuadros and Jocotal Phases):

1. *Flat-bottomed bowls with outslanting sides* (80 percent). Walls are usually straight or with a slight outward flare, and rims are squared to slightly rounded. Rim diameter 32-38 cm., mean 34 cm.; height 5.9-7.5 cm., mean 6.3 cm.; wall thickness 0.8-1.0 cm., mean 0.9 cm.
2. *Deep, restricted orifice bowls* (19 percent). Subglobular to barrel-shaped bowls. The form of the base is unknown, but probably flat. Rim profiles are variable, including tapered rims with interior thickening, rounded rims with exterior thickening, and squared rims. Inner rim diameter 18-32 cm., mean 26 cm.; maximum body diameter averages about 34 cm.; wall thickness 0.7-0.9 cm., mean 0.8 cm.; height unknown.

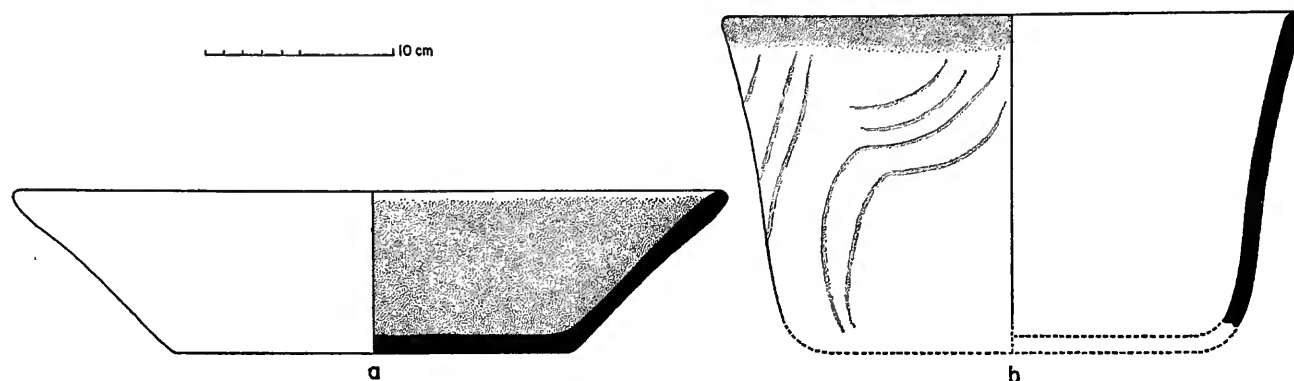


FIGURE 14.—Pampas Black-and-white pottery, Cuadros and Jocotal Phases. *a*, Flat-bottomed bowl with outslanting sides, oxidized rim, Cuadros Phase. *b*, Deep bowl with shallow incising on exterior, from offering in Level 7 of Cut 1, Jocotal Phase.

3. *Necked jar* (1 percent). Small fragment only, but the neck is quite vertical. Diameter of neck ca. 14 cm., wall thickness 1.2 cm.

**DECORATION:** Form 1 usually has none, except for one sherd with a branching form incised on the wall interior (pl. 16, *b*), and two basal sherds which are decorated on upper surfaces with matte and polished zones separated by shallow grooving; these are all from the Jocotal Phase. Form 2, 70 percent have incising on the exterior, in parallel diagonal lines, pendant semicircles, or free form.

**REMARKS:** Chronological differences within the type at Salinas La Blanca include a greater relative frequency of Form 1 in late Jocotal levels, and confining of incised decoration on Form 1 to Jocotal. The type is probably closely related to Pampas Black-and-white in the mode of production.

**COMPARATIVE MATERIAL:** For the range of vessel forms in this type during the Conchas Phase, see Coe, 1961, pp. 70-73.

#### Pampas Black-and-White

(figs. 14, 15; pls. 14, 15; Coe, 1961, fig. 29, h, l, m)

**PASTE:** Bentonitic and somewhat coarse, as in Guamuchal Brushed (see Appendix 5). Coiled construction is apparent from the characteristic sherd fracture and from a badly obliterated coil juncture on one sherd. The paste is light buff to whitish gray where the adjacent surface is white, but dark gray to black where that surface is also black. Where white rims were produced with alternative *A* (see below), the dark core extends up into the interior of the white-rimmed zone.

**SURFACE:** Differential firing of a single slip to produce black areas and white areas was used on all vessels of this type. The white can shade into a buff color. Forms 1, 2, 4, and 6 are slipped on interiors; on exteriors they are slipped 2-3 cms. down from the rim. Forms 3 and 5 are slipped on exteriors only. All slipped surfaces were roughly polished, the rest being coarsely smoothed. *White-rim technique* (so-called "white-rimmed black ware"), used on all examples of Forms 1 and 3, and on one sherd of Form 2. The following description of the reconstructed technique applies only to Form 1, where the

width of the white rim zone on the interior varies from 0.5-4.0 cm., but is usually wider on the exterior.

1. Slip applied, with a second coat for the area which is to become the white rim (this was determined from a sherd which was given only preliminary oxidation for alternative *A*; pl. 15, *d*). Slipped areas are then polished.

#### 2. Firing alternatives:

*A.* For a vessel with white rim, black interior and black exterior: First, the entire vessel is fired so as to oxidize to white (or clear buff). Then, the inverted vessel is placed on a material like loose sand so that a portion of the rim is buried, with smudging material (possibly corncobs) inside and over it; it is fired for the second time in a reducing smudging atmosphere which blackens all but the buried rim.

*B.* For the same kind of vessel, it is theoretically possible that the vessel first is smudged black all over, then buried upright in sand with only the rim protruding, and fired for a second time in oxidizing atmosphere. However, one sherd (pl. 15, *d*) in which only the first step in alternative *A* was used is evidence against use of *B*.

*C.* For a vessel with a white rim, black interior, clear buff exterior (pl. 14): The inverted vessel is placed over a second bowl which contains smudging material to ignite when fired. The exterior is fired in an oxidizing atmosphere, that portion of interior enclosed by the second bowl being reduced to black; the slip inside the rim fires to white, unslipped exterior to clear buff. On 25 percent of Form 1 vessels the white area extends just barely inside the rim, probably because the diameter of the bottom vessel approached that of upper.

**FORM** (during the Cuadros and Jocotal Phases):

1. *Flat-bottomed bowls with outslanting sides* (74 percent; figs. 14, *a*, 15, *a-c*). Sides are slightly convex to

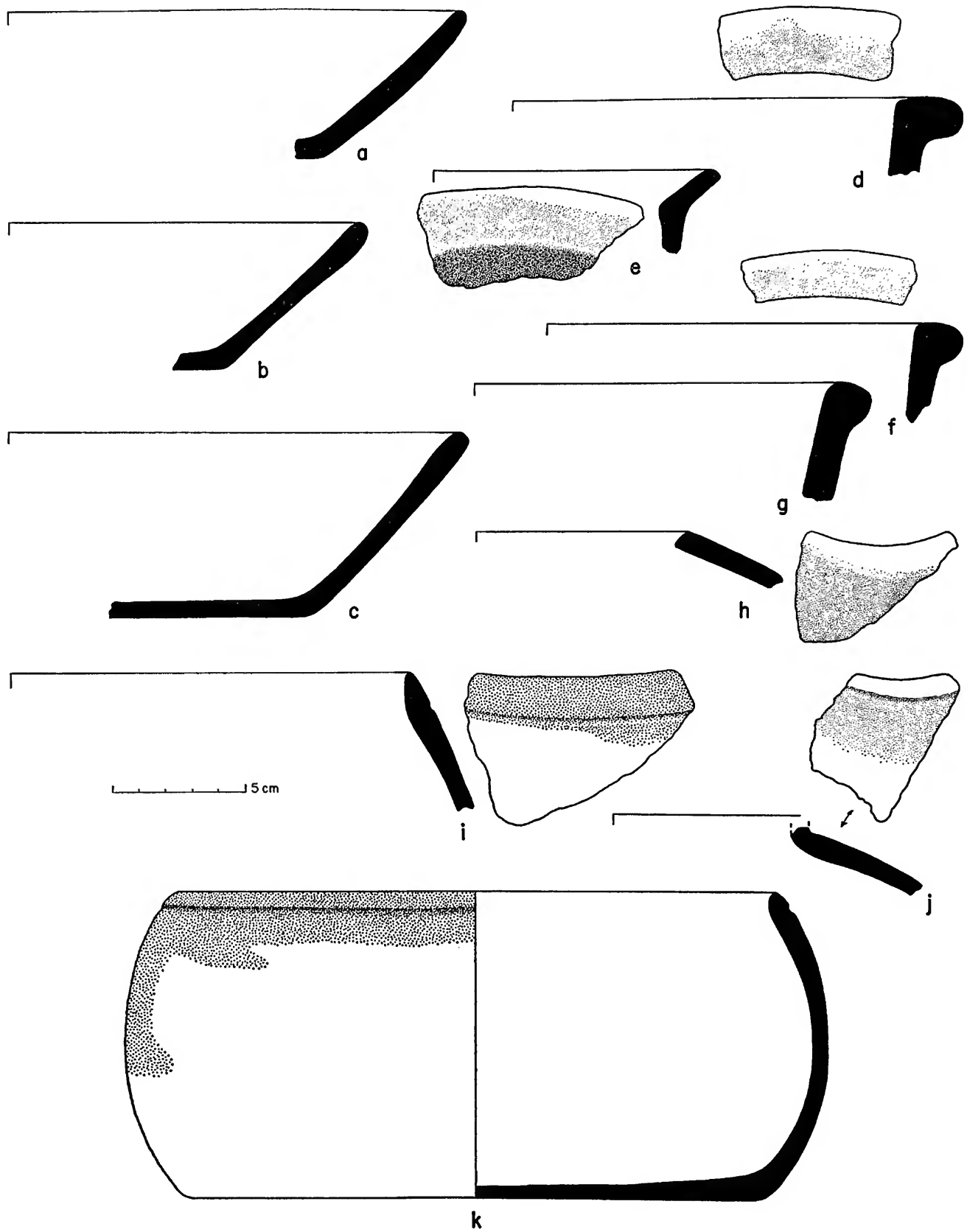


FIGURE 15.—Pampas Black-and-white pottery, Cuadros and Jocotal Phases. *a-c*, Flat-bottomed bowls with outslanting sides. *d-g*, Bowls with thick everted rims. *h, i*, *Tecomates*. *j*, Fragment of necked jar. *k*, Subglobular jar. *i*, From surface of SM-10. *b, d-g, j, k*, Cuadros Phase; rest Jocotal.

straight, with a few slightly concave; exactly like Form 1 of Tilapa Red-on-white. Rims are direct, tapered rounded to somewhat squarish; occasionally there is a slight thickening of the vessel wall exteriors near the rim. Rim diameter 28–40 cm., mean 34 cm. Height 5.5–9.0 cm., mean 6.9 cm. Wall thickness 0.7–1.1 cm., mean 0.8 cm.

2. *Bowls with thick everted rims* (11 percent; fig. 15, *d-g*). Bowls which are probably fairly deep; rims are everted and considerably thickened on exterior; sides are unrestricted to slightly restricted and always convex. The form of base is unknown. Inner rim diameter 23–24 cm., mean 30 cm. Height is unknown. Wall thickness 0.8–1.1 cm., mean 0.9 cm.
3. *Neckless globular jars* (6 percent; fig. 15, *h, i*). *Tecomates* of moderate dimensions, rims squarish in profile. The base form is unknown. Inner rim diameter (one sherd) 13.0 cm. Wall thickness 0.7–1.0 cm.
4. *Deep bowls* (5 percent; fig. 14, *b*). Walls are vertical to gently recurved, bases flat, and rims direct and rounded to slightly squared. Rim diameter 21–35 cm., mean 28 cm. Height (one example) 17.0 cm. Wall thickness 0.7–0.8 cm., mean 0.8 cm.
5. *Necked jars* (3 percent; fig. 15, *j*). Two sherds from jars, with necks broken but probably vertical. Neck diameter ca. 11 cm., wall thickness 0.9 cm.
6. *Subglobular bowl* (1 percent; fig. 15, *k*). One example of a bowl with a flat base, and convex and restricted sides. The rim has a Gothic-arch profile, exteriorly thickened above a horizontal groove. Rim diameter 22 cm. Height 11.3 cm. Wall thickness 0.6 cm.

**DECORATION:** Other than differential firing of slip, it is restricted to a few examples of linear pattern burnishing on the exterior surfaces where matte. Form 1, one sherd with curvilinear pattern burnishing. Form 4, a large vessel of Jocotal Phase with alternating groups of three parallel diagonal lines and three to four parallel sigmoid lines (fig. 14, *b*). On one sherd, possibly Form 2, the exterior has short linear incisions (pl. 15, *c*).

*Simple differential firing*, to produce vessels of Forms 2 and 6 with black interior, clear exterior, with no white rimming. Vessel is slipped on interior and exterior, polished, then inverted on the ground over the smudging material, and fired in an oxidizing atmosphere. In vessels of Form 6, the slip on the exterior extends only to the groove below the thickening; blackening of the rim is probably the result of escaping smoke which deposited carbon on the rim before it was fully oxidized.

*Other.* In Form 5, the blackened area is confined to the neck and about 2 cm. down on the body exterior; the technique is unknown, but perhaps the smudging material is placed directly against area to be blackened. Form 3 rims are white, exteriors black, and interiors clear buff; the technique is difficult to reconstruct but possibly the entire vessel is fired black,

then buried in sand with the rim and interior exposed to a second, oxidizing, fire.

**REMARKS:** No pronounced chronological changes are observable within the type at Salinas La Blanca. However, Form 2 is more strongly represented in Cuadros levels, and Form 4 is confined to Jocotal. The sigmoid curve in linear pattern burnishing is a typical Jocotal motif. White rimming is found from the earliest Cuadros through the latest Jocotal, and continues into Conchas 1 (Coe, 1961, pp. 70–73).

**COMPARATIVE MATERIAL:** White-black differential firing has a wide distribution in time and space in southern Mesoamerica, and has been thoroughly discussed by Peterson (1963). Early occurrences of simple differential firing include Chiapa I (Dixon, 1959, p. 7), on vessels similar to Forms 1, 2, and 5, as well as Chiapa II; and Las Canoas, Tehuacán Valley (Peterson, 1963, p. 261). Early occurrences of white rimming of flat-bottomed bowls with outflaring sides are La Venta (Drucker, 1952, p. 92), El Trapiche (García Payón, 1950, pl. 9, in his "Período Antiguo"), and in the Early Santa María Phase in the Tehuacán Valley. At Chiapa de Corzo, the first true white-rimmed black ware does not appear until Chiapa V, or Late Formative, although there are earlier imitations (Warren, 1961). White rimming is unknown in south Guatemala except for Salinas La Blanca; the Cuadros Phase is probably one of its earliest known appearances.

#### Red Monochrome Tradition

One of the most persistent traditions of the Pacific coastal Formative was that involving red monochrome ceramics. We have divided this tradition into four pottery types with chronological significance. Two of these types were originally defined in the La Victoria report, and two came to light at Salinas La Blanca.

While each of these four red pottery types has certain relationships to ceramics from other sites in southern Mesoamerica, the tradition as a whole is not as closely paralleled elsewhere as are (for example) our incised white ware and black ware traditions. Some of the Formative sequences in other areas seem to lack either the first half or the second half of the tradition. At Ocos every phase of the Formative was characterized by its own particular red monochrome.

The oldest type, Ocos Specular Red, was well represented throughout Ocos levels at La Victoria. The slip was thick and well burnished, made from a pigment containing high concentrations of crystalline hematite which produced a sparkling effect when turned to the light (Coe, 1961, p. 51). Common shapes were thin-walled *tecomates*, dishes, and simple silhouette bowls. Resemblances can be seen to vessels

of the Ajalpan Phase in the Tehuacán Valley, which sometimes had a specular hematite slip (MacNeish, 1962, p. 38). Ocos Specular Red disappeared rapidly after the Ocos Phase, and was replaced during Cuadros times by Pacaya Red.

Pacaya Red was also red slipped and polished, but the slip was no longer specular hematite (cf. the same change in Mapache Red-rimmed during and after the Ocos Phase). It occurred in the form of *tecomates*, simple silhouette bowls (with less elaborate rims than Ocos Specular Red), and necked jars. Once again, resemblances can be seen to the Early Formative Ajalpan Phase at Tehuacán, which had *tecomates* "with a red wash over their whole bodies" (MacNeish, 1962, pp. 37-38). Analogous types also appeared in the Central Depression of Chiapas (Sanders, 1961, p. 17). Pacaya Red was never very abundant during the Cuadros Phase; it reached its peak early in the Jocotal period, and during the Conchas 1 Subphase it was totally replaced by Conchas Red Unburnished.

Conchas Red Unburnished consisted mainly of very heavy, thick-walled *tecomates* and necked jars, which were coated with a drab, unburnished, red slip. It began as a rather minor type at the start of the Conchas 1 Subphase, but grew to be one of the most common pottery types present during Conchas 2, its period of greatest frequency. Wares analogous to Conchas Red Unburnished appeared in Middle Formative levels at La Venta, Kaminaljuyú, and Chiapa de Corzo (see Coe, 1961, p. 63). The type did not last beyond the Conchas Phase.

Late in Conchas 2 there appeared a new type of vessel which Coe tentatively lumped within Conchas Red Unburnished. This was a small, very thin-walled jar with a constricted orifice, a flask-shaped body, and an everted rim. At that time, Coe commented: "Future investigators may be justified in creating a separate type from this kind of vessel. At any rate, it constitutes a rather distinct variety within Conchas Red Unburnished, recognizable by its thinness and hardness" (Coe, 1961, p. 64). Excavations at Salinas La Blanca have now led us to regard this hard red pottery as a separate type, Mareas Coarse Red, because of its value as a horizon marker. Mareas Coarse Red thin-walled jars begin in Conchas 2 and last well into the Late Formative Crucero Phase. Thus they differ from Conchas Red Burnished in their temporal distribution as well as in form and surface treatment.

To recapitulate briefly: During the Early Formative, polished specular hematite slipped *tecomates* give way to polished nonspecular *tecomates*. These are in turn replaced in the Middle Formative by unpolished, drab red-slipped *tecomates*. Thin, hard

red-slipped jars appear in the last stages of the Middle Formative and constitute the only red monochrome during the Late Formative.

#### Ocos Specular Red

(Coe, 1961, figs. 17, 18, 19, a-1)

See original definition in Coe (1961, pp. 51-53). Restricted to the Ocos Phase.

#### Pacaya Red

(fig. 16)

**PASTE:** Coiled construction is apparent in imperfectly smoothed coil junctures on the interiors. Features are generally the same as in Guamuchal Brushed. Cores are usually light to dark gray, light buff-brown where they are adjacent to red slipped surface.

**SURFACE:** All have one surface completely slipped weak red (7.5 R. 4/4) and polished; the other surface is wiped smooth with the fingers when wet, and unpolished. Forms 1 and 2, exteriors are slipped, the slip extending over just inside the rim. Form 3 is slipped on the interior, Form 4 only on the exterior.

#### FORMS:

1. *Necked jars* (78 percent; fig. 16, c-h). The majority are high necked; the necks are slightly outcurved, or vertical, or slightly leaned-in and convex; rims are tapered and slightly rounded. Two examples (early Cuadros Phase) are low necked, the rims slightly outcurved and thickened on the exterior to produce a comma-shaped profile. Form of the base is unknown. Rim diameter 16-20 cm., mean 18 cm. Rim height 2.5-9.5 cm., mean 6.2 cm. Wall thickness: necks 0.8-1.2 cm., mean 1.0 cm.; body 0.7-1.0 cm., mean 0.8 cm. Maximum body diameter and height of vessel are unknown.
2. *Neckless globular jar* (3 percent). One very fragmentary sherd with an unknown rim diameter, and body thickness of 1.0 cm.
3. *Flat-bottomed bowls with outslanting sides* (13 percent; fig. 16, a). Two-thirds have slightly convex walls, the rims being tapered on one surface and flattened on the other. Rim diameter 20-35 cm., mean 30 cm.; wall thickness 1.0-1.2 cm.; other dimensions are unknown.
4. *Cylindrical jars* (6 percent; fig. 16, b). Known only from basal fragments. Basal diameter ca. 20 cm., wall thickness 0.8 cm.

**DECORATION:** In Form 1, two sherds from the same low-necked jar (fig. 16, h) have two horizontal grooves encircling the neck; between them, postslip diagonal lines are incised in opposed, parallel pairs. Form 2, two horizontal grooves are placed 0.8 and 2.5 cm. down from rim encircling the vessel.

**REMARKS:** The red slip is the same as that on Tilapa Red-on-white, and tiny sherds of the latter type may have been counted with Pacaya Red. Chronological differences within the type are a tendency for the slip of Jocotal Phase sherds to run to 10 R 4.5/5 and to be thinner, and for low-necked jars in Form 1 to appear mainly in the Cuadros Phase.

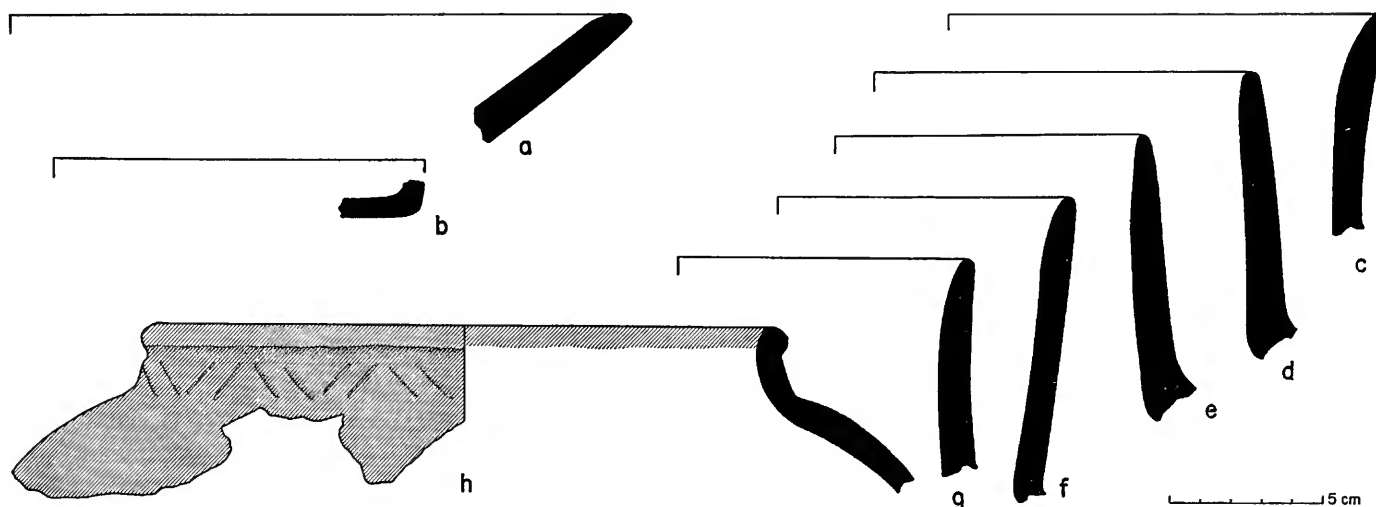


FIGURE 16.—Pacaya Red pottery, Cuadros and Jocotal Phases. *a*, Flat-bottomed bowl with outslanting sides. *b*, Basal sherd from cylindrical jar. *c-h*, Necked jars. *h* is of the Cuadros Phase, the rest are Jocotal.

COMPARATIVE MATERIAL: Santa Cruz: Burrero Red of the Burrero Phase is possibly related (Form 3 shared), but the color of slip is slightly different (Sanders, 1961, p. 17).

**Conchas Red Unburnished**

(Coe, 1961, fig. 24, c-k)

See original definition in Coe (1961, pp. 63–64). Restricted to Conchas 1 and 2.

**Mareas Coarse Red**

(see Coe, 1961, fig. 24, h)

**PASTE:** Construction was possibly the lump method. The clay is bentonitic, with a medium texture. Reddish buff to brown in color, those with thicker walls having a dark-gray core.

**SURFACE:** Roughly smoothed and unslipped. This pottery resembles Juláin Coarse in surface treatment, but there are no finger swipes. The color varies from light buff to reddish brown (2.5 YR 4/4).

**FORM:** Very small, thin-walled jars with restricted orifices. Rims are slightly everted and thickened.

**DIMENSIONS:** Rim diameter 7–10 cm., mean 9 cm.; wall thickness 0.3–0.7 cm., mean 0.5 cm. Vessel height is not known.

**DECORATION:** None.

**REMARKS:** Mareas Coarse Red was described in the final report on La Victoria as “small jars, everted rims” of the Conchas Red Unburnished type (Coe, 1961, p. 64, and fig. 24, *h*), and ascribed to Conchas 2 and possibly to Crucero. We hereby set it up as a distinct type, differing in form and surface treatment from Conchas Red Unburnished, and occurring in the Crucero Phase as well as in Conchas 2.

**Red and White Bichrome Tradition**

Red and white bichrome ceramics characterized a

number of Formative periods in lowland Mesoamerica, notably Chiapa I and II (Dixon, 1959). Such bichromes, however, were absent from the initial stages of the Early Formative—the Ocos Phase, the Pavón Phase at Pánuco (MacNeish, 1954), and Early Ajalpan (MacNeish, 1962, pp. 37–38). They seem to have made their first appearance during the last half of the Early Formative, about 1100 or 1200 B.C.

Two distinct concepts seem to have been involved in the making of red and white bichromes on the Pacific coast of Guatemala. One concept saw the red slip as decoration to be applied directly over the white slip, as in Tilapa Red-on-white (below). The other concept saw the red slip as something to be separated from the white slip by zoning, as in Conchas Red-and-white (Coe, 1961, p. 74). In the latter case, the two colors were never applied one over the other. These two concepts have different temporal distributions, as follows.

The Ocos Phase was without bichromes. Beginning in the Cuadros Phase at Salinas La Blanca, however, Tilapa Red-on-white appeared; common shapes were flat-bottomed bowls with outslanting sides, necked jars, and subglobular jars with restricted rims. Decoration was by application of red slip over white slip, and this type of bichrome actually reached its highest frequency in the Jocotal Phase.

After the start of the Conchas Phase, Tilapa Red-on-white was rather rapidly replaced by Conchas Red-and-white, a bichrome that featured zoned separation of red and white slipped areas. Conchas Red-and-white consisted of both heavy *tecomates* and small *tecomates*, flat-based bowls or dishes, and cuspidors (Coe, 1961, pp. 73–75). Reaching its peak in the Conchas 2 Subphase, this zoned bichrome lasted



into the Crucero Phase in approximately the same vessel forms—*tecomates* and bowls with outslanting sides.

During the Conchas 2 Subphase a new bichrome, Conchas Fine Red-on-Cream, made its only appearance in the Formative sequence (Coe, 1961, pp. 81–82). This type was produced by the application of red slip directly *over* cream slip, as in Tilapa Red-on-white, but its paste and temper were much finer than the latter. Coe (1961, p. 81) reported it to be “indistinguishable and, in practice, unsortable, from the fine red-on-cream pottery of the Las Charcas Phase in the Valley of Guatemala.”

To recapitulate: The later stages of the Early Formative saw a use of red *over* white pottery, while the Middle Formative villages produced *zoned* red-and-white bichrome. In the late Middle Formative, a new and finer red *over* cream pottery, affiliated with Las Charcas, made its brief but distinctive appearance. The relationship of these three types is shown in figure 8.

#### Tilapa Red-on-white

(figs. 17–19; pl. 13)

PASTE: Typically bentonitic, like Guamuchal Brushed. Coiled construction, with a few cases of imperfectly obliterated coils. The color is light buff near the surface,

the core usually light gray to dark.

#### SURFACE:

1. White slip on the interior, and over lip 2–3 cm. below the rim exterior; this is thin and uneven, and appears to have been applied with a rag. A red decorative slip is added, then the entire slipped area is roughly polished; the rest of the vessel is unslipped, and roughly smoothed with a scraper.
2. Extremely thin, uneven, white slip extending from just inside the rim down the exterior to the tangent point on the side of body, the body paste color often showing through. Interiors are unslipped, wiped smooth with fingers while wet.
3. Somewhat thicker white slip, applied over the entire exterior surface and 2–3 cm. over the inside of the rim. After red slip was added for decoration, all slipped surfaces were polished.
4. Interiors slipped white from the tops of rims, the exteriors left rough; red slip along on top of the rim. All slipped surfaces were polished.
5. About one-half of the vessels have interiors slipped white and exteriors left rough; one-half have the reverse treatment. Slipped areas were roughly polished.
6. White slip usually on the interior as well as exterior; all slipped areas were roughly polished after red slip decoration was added.
7. Extremely thin white slip or wash on the interior, the exterior being rough and unslipped; no polishing.

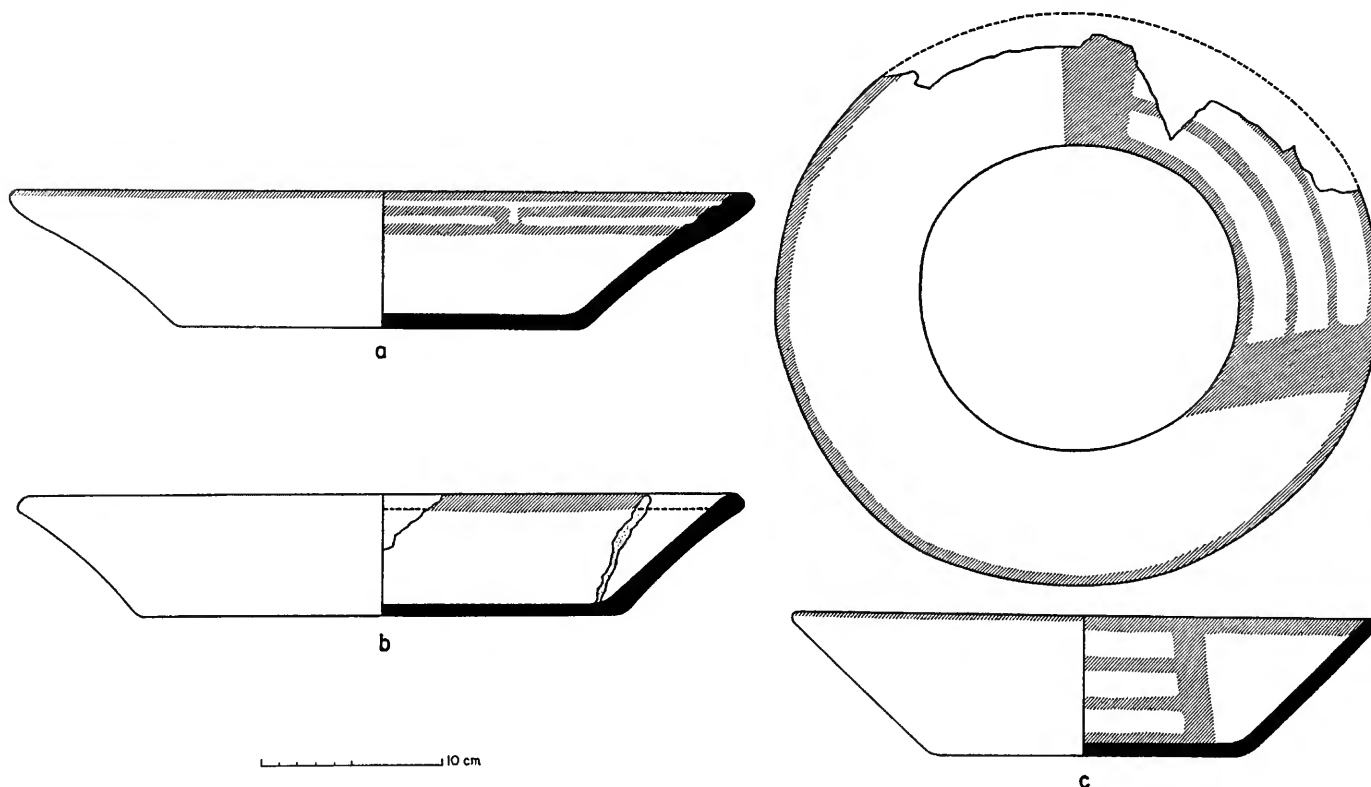


FIGURE 17.—Tilapa Red-on-white flat-bottomed bowls with outslanting sides, Cuadros Phase. *a*, Rim interior with triple-line-break motif carried out by excising through the red slip. *b*, Reconstruction.

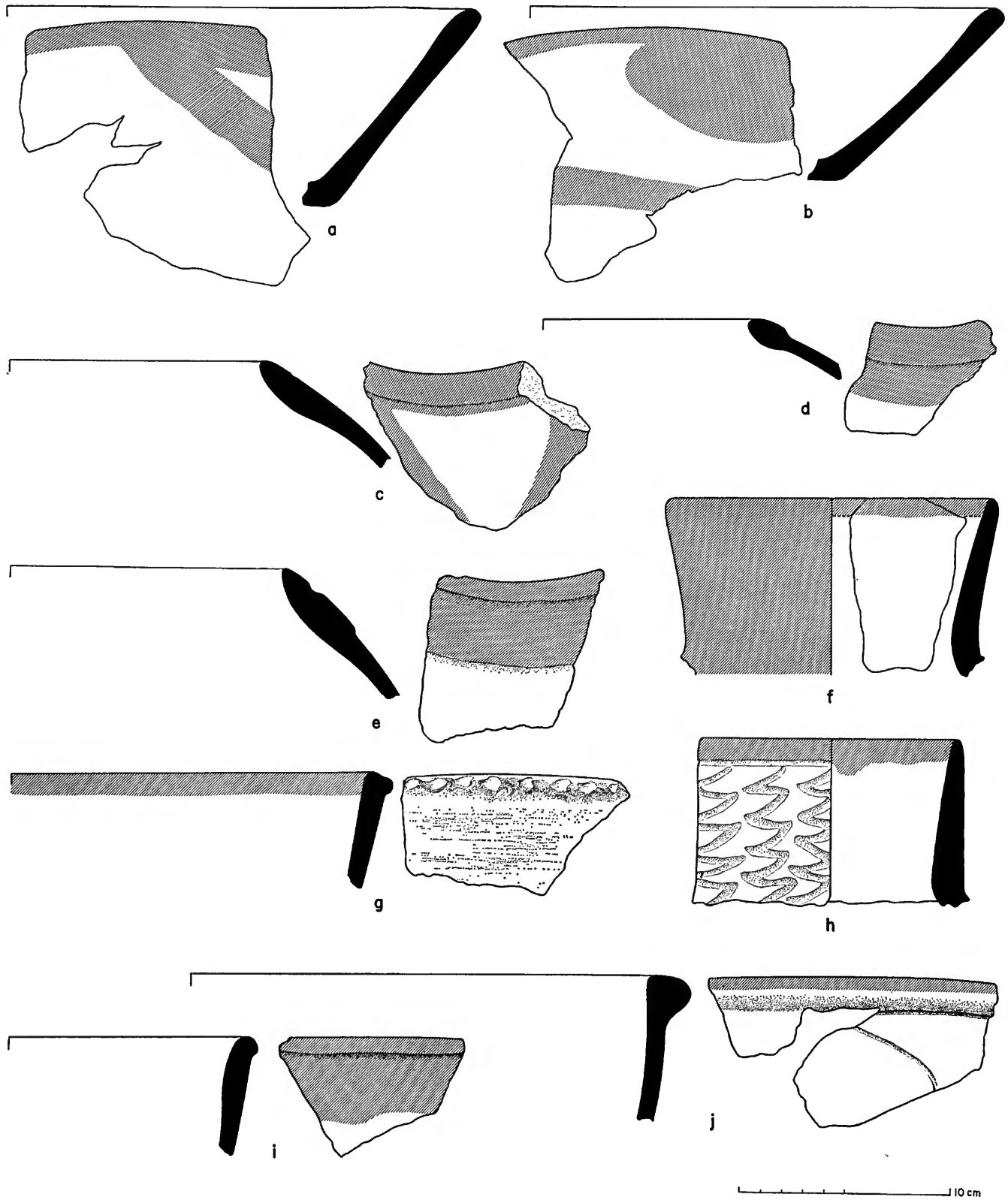


FIGURE 18.—Tilapa Red-on-white pottery, Cuadros Phase. *a, b*, Flat-bottomed bowls with outslanting sides. *c-e*, *Tecomates*. *f, h*, Necks from jars. *g, i, j*, Bowls with thickened rim.

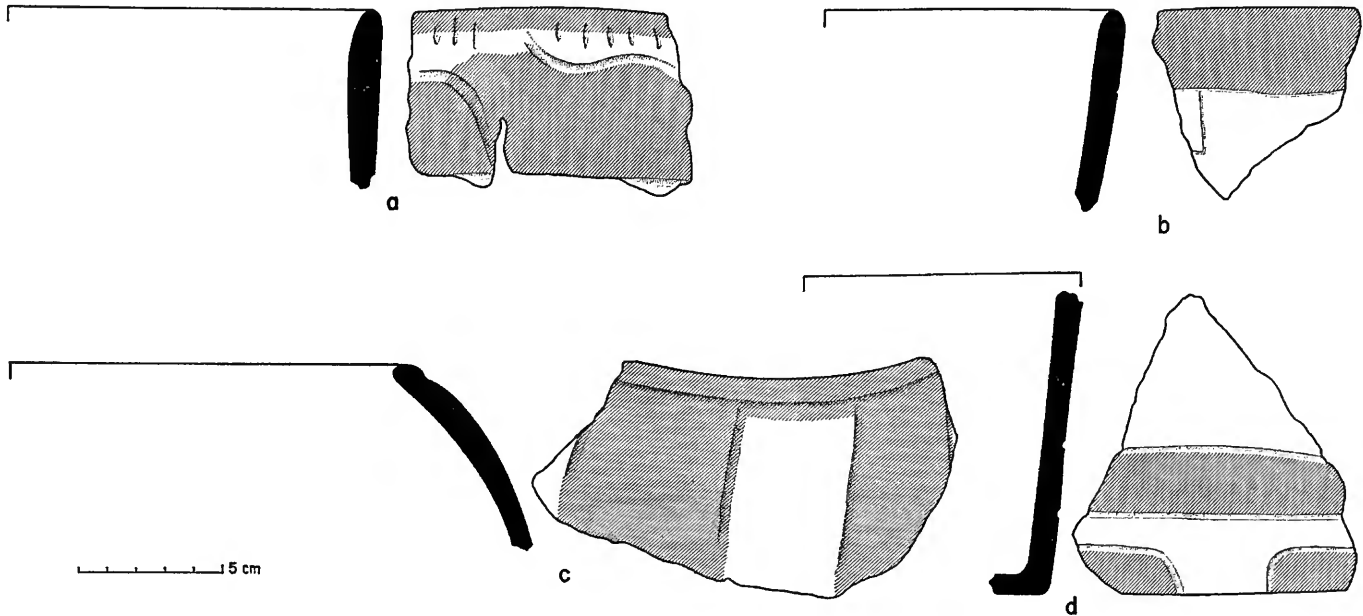


FIGURE 19.—Tilapa Red-on-white pottery, Cuadros Phase. *a, b, d*, Deep, unrestricted orifice bowls. *c*, Subglobular jar.

FORM:

1. *Flat bottomed bowls with outslanting sides* (40 percent of total; figs. 17, 18, *a, b*). Rims are direct, rounded to squarish, with occasionally a slightly thickened exterior. Rim diameters 33–40 cm., mean 36 cm. Height 6.6–9.0 cm., mean 7.6 cm. Body thickness of walls, 0.7–1.1 cm., mean 0.9 cm.; of bases, 0.6–0.9 cm., mean 0.7 cm.
2. *Necked jars* (31 percent; fig. 18, *f, h*; pl. 13, *e, g, i*). Necks are straight to slightly concave, with direct rims which are rounded to slightly squared. The form of the base is unknown. Bodies are somewhat squat. Rim diameters 13–14 cm., maximum body diameter 36 cm.
3. *Neckless globular jars* (5 percent; fig. 18, *c–e*). *Tecomates*, one group being quite thin and the other being thick; three sherds of the heavy group have a rim form like Guamuchal Brushed. The form of the base is unknown. Dimensions of heavy group: inner rim diameters 18–22 cm., mean 20 cm., body thickness 0.6–1.0 cm., mean 0.9 cm. Thin group: rim diameter 8 cm., body thickness 0.4 cm.
4. *Bowls with thickened rims* (3 percent; fig. 18, *g, i, j*). Wide bowls with slightly convex sides, restricted rims which are heavily bolstered on the rim exterior. Form of base is unknown. Inner rim diameters 24–42 cm., mean 34 cm. Body thickness 0.8–0.9 cm., mean 0.8 cm. Height unknown.
5. *Subglobular jars* (14 percent; fig. 19, *c*). Squat jars with convex sides, restricted rims which are tapered to rounded and only slightly thickened above an exterior groove encircling rim. The form of base is unknown. Inner rim diameter is 21–27 cm., mean 25 cm. Maximum body diameter 28–31 cm., mean 30 cm. Body thickness 0.7–1.0 cm., mean 0.8 cm. Height unknown.
6. *Deep, unrestricted bowls* (5 percent; fig. 19, *d*). Vase-

like bowls with flat bases; walls are slightly convex to straight to slightly concave. Rims are direct, somewhat tapered, and rounded. Rim diameter 18–32 cm., mean 25 cm. Body thickness 0.9–1.0 cm., mean 1.0 cm. The height is unknown, but probably greater than 15 cm.

7. *Small, hemispherical bowl* (1 percent). Single example of a crudely made, simple, open bowl. Rim diameter 9 cm., height 2.0 cm.

DECORATION: All vessels have decoration in weak red (7.5 R 4/4) on a white background. The usual modes include red painted bands encircling rims and opposed diagonal bands in red on the sides. The bands, and bloblike forms associated with them, appear to have been applied rapidly and carelessly. Other decorative features are excising of the red band around the rim interior to produce a “triple-line break” design (on a Form 1 vessel from a deep Cuadros level; fig. 17, *a*); plain, bold, rocker stamping, on two necks and a body sherd of Form 2 (fig. 18, *h*; pl. 13, *e, g, i*); indented line burnishing, on the exterior of a vessel of Form 4; and punctuation, usually linear (Forms 5 and 6).

REMARKS: No discernible chronological changes within type. COMPARATIVE MATERIAL: Chiapa de Corzo: Chiapa I (Pit 50) Phase, red-and-white bichrome sherds appear very similar to this type (Dixon, 1959, pp. 12–16), but the high frequency of bowls with everted or exteriorly thickened rims is not met with in Tilapa Red-on-white; Chiapa II (Pit 38) also has red-and-white bichrome, restricted convex-walled jars like Form 5 (Dixon, 1959, fig. 41). Kaminaljuyú: Arévalo Phase (Lot C-100-a, Museo Nacional de Arqueología y Etnología, Guatemala City) has *tecomates* similar to Form 3 with red rims on white background; Las Charcas Phase (Shook, 1951, fig. 1) also has red-on-white pottery, but it resembles Conchas Fine Red-on-cream (Coe, 1961, pp. 81–82) rather than Tilapa Red-on-white.

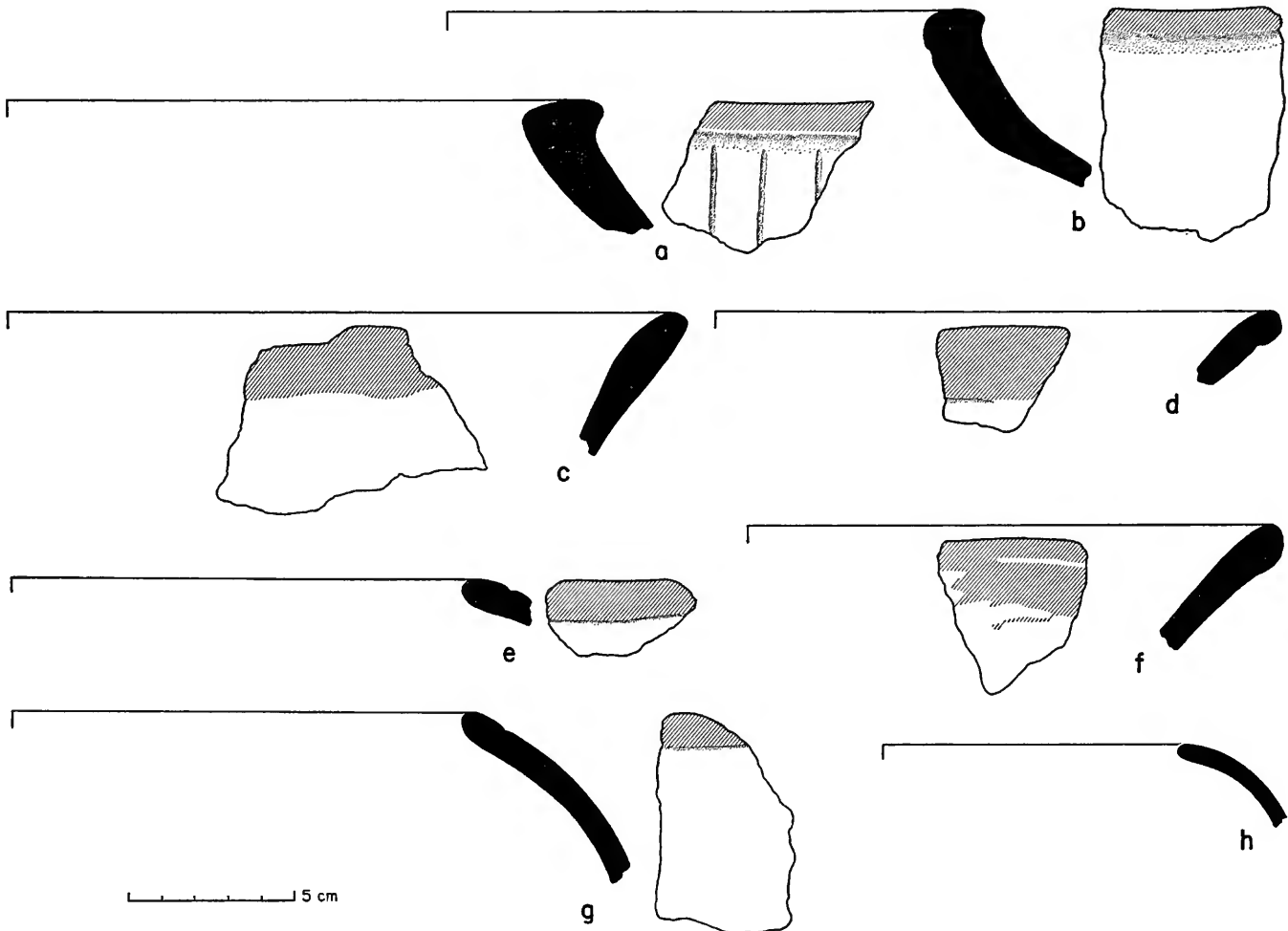


FIGURE 20.—Conchas Red-and-white pottery, late Jocotal Phase. *a, b*, Restricted orifice jars. *c, d, f*, Bowls with outslanting sides. *e, g, h*, Neckless globular jars.

#### Conchas Red-and-white

(*fig. 20; Coe 1961, figs. 34, 35, a-h*)

This type was originally described by Coe (1961, pp. 73–75) on the basis of sherds from La Victoria. This new definition, based on sherds from late Jocotal deposits at Salinas La Blanca, concerns itself only with the forms present at the latter site.

**PASTE:** Bentonitic and relatively coarse. Coiled construction is indicated by one example which has an imperfectly smoothed coil juncture. Light brown to reddish brown in color, with dark-gray cores.

**SURFACE:** White slipped on one or both surfaces, with red (10 R 4/6) slip applied next to the white slip. All slipped surfaces are polished. Form 1, slipped on exterior and lip only; Form 2, most are slipped on the exterior alone, one on both surfaces; Form 3, on the exterior only; Form 4, on the interior and rim only. Unslipped surfaces were wiped with the fingers or roughly scraped.

#### FORM:

1. *Restricted orifice jars* (19 percent; *fig. 20, a, b*). Vessels with restricted orifices, with rims which are flattened to roundish on the upper surfaces and thickened on the exterior. One vessel has a recurving of the walls

to produce a pseudoneck. Walls are relatively thick; the form of the base is unknown. Inner rim diameter ca. 30 cm.; wall thickness 1.0–2.0 cm., mean 1.6 cm.

2. *Bowls with outslanting sides* (50 percent; *fig. 20, c, d, f*). Walls are usually slightly outflaring and rims often slightly thickened on the exterior. The form of the base is unknown but probably flat. Rim diameter is about 40 cm.; height unknown; wall thickness 0.8–1.0 cm., mean 0.9 cm.
3. *Neckless globular jars* (25 percent; *fig. 20, e, g, h*). *Tecomates* with rounded rims which are slightly tapered. The basal form is unknown. Wall thickness 0.7–0.8 cm., mean 0.7 cm.
4. *Small bowl, constricted orifice* (6 percent). The rim is direct and rounded; the form of the base is unknown. Maximum diameter 18 cm., inner rim diameter 14 cm., wall thickness 0.7 cm.

**DECORATION:** Form 1, red slip applied on the upper part of the rim; one exterior has spaced, vertical, engraved lines. Form 3, red slip on the rim exterior, contained by a horizontal grooved line. Form 4, red slip along the rim, two sherds having red stripes on the body.

**COMPARATIVE MATERIAL:** See Coe, 1961, p. 75.

## Conchas Fine Red-on-cream

(Coe, 1961, fig. 36, g-k)

See definition in Coe (1961, pp. 81-82). Restricted to Conchas 2.

## Incised White Ware Tradition

Strong resemblances are seen between the Guatemalan coast and the Grijalva Depression, gulf coast, and Tehuacán Valley in the way in which the incised white ware tradition made its appearance and ran its course. Further similarities exist in the *types* of white pottery involved, and the order of their succession.

Two major types of white monochrome (and two or three minor types) were involved in this tradition in southern Mesoamerica. The first of the two major types featured a soft, yellowish-white slip, over a crumbly buff or orange paste with a dark core; it occurred mainly as flat-based bowls decorated with incised lines, although there were many minor shapes. Analogous types would include Conchas White-to-buff (on the Guatemalan coast), Canoas White (in the Tehuacán Valley), El Trapiche II white (on the gulf coast) and Chiapa de Corzo II white monochrome (Dixon, 1959). The second of the two major types featured a slick white slip, over a hard fired paste (usually gray) with much finer temper. Analogous types would include Conchas Fine White-to-buff (on the Guatemalan coast), Coatepec White (in the Tehuacán Valley), Chila White (on the northern gulf coast), and some of the Monte Albán I white wares, notably Bernal's "C5" type. The distribution in time of these two major wares overlapped, but the soft yellow-white type began and reached its peak earlier—usually at the outset of the Middle Formative, rather than the later stages of that period.

Minor white wares, of sporadic occurrence, included (1) vessels which were "white-clear-through," including pure white paste, found in the Santa María Phase in the Tehuacán Valley, at Salinas La Blanca, and at Chalahuites, Veracruz; and (2) a variety of other fine white wares, some with pumice or sand temper. Most of these appeared in the Middle Formative and lasted for only a brief interval (our observations are based on examination of sherd collections from all the sites mentioned above).

By Late Formative times the incised white monochrome tradition had essentially run its course. A few of the slick surfaced gray-paste white wares lasted on as a small part of the ceramic assemblage in certain areas. In other areas they were totally abandoned in favor of reduction-fired gray or black wares, cloudy reds and oranges, and resist painted types.

## Conchas White-to-buff

(fig. 21; Coe, 1961, figs. 25-27)

This type was originally defined in the La Victoria report (Coe, 1961, pp. 64-69), and only the shapes occurring during the Cuadros and Jocotal Phases will be dealt with here. The excavations at Salinas La Blanca did little to expand our knowledge of the type except with regard to its temporal distribution. We now know that Conchas White-to-buff began just before the end of the Cuadros Phase, about 1000-900 B.C., increased in frequency during Jocotal times, and reached its maximum popularity during the Conchas Phase, for which it was one of the "hallmarks" (Coe, 1961, p. 61). It disappeared rapidly after Conchas 2.

Conchas White-to-buff is the earlier of the two major incised white wares referred to in the Introduction. During late Cuadros and Jocotal times it consisted mainly of flat-bottomed bowls with outslanting sides, a form which continued into the Conchas Phase. Jocotal examples, however, lack the "fish-scale" effect seen on the surface of Conchas bowls (from minute, pearly-white flecks of mica), and they usually lack an exterior slip. They already exhibit the smudging and "double-line-break" incising of Conchas Phase specimens.

**PASTE:** Bentonitic, like Guamuchal Brushed. Coiled construction was used, with imperfectly smoothed coil joints visible on some sherds. The color is light buff to reddish brown, often with light to dark-gray thin cores.

**SURFACE:** A thin, streaky white slip was applied to one or both surfaces. Slips are always polished, and fire from white to a reddish buff. Unslipped surfaces are generally scraped, and fairly coarse. Form 1 usually is slipped on the interior only, the rest on exterior only, with the exception of Forms 3, 5, and 7 which are slipped on both surfaces. A minority of Form 1 bowls also are slipped on both surfaces. Later Conchas examples are completely slipped in this manner.

**FORM** (during Cuadros and Jocotal Phases):

1. *Flat-bottomed bowls with outslanting sides* (63 percent; fig. 21, a-g). Sides are outflaring or straight or slightly convex; rims are generally rounded but some are tapered to a point (in section), while some are squarish rounded. Rim diameter 25-44 cm., mean 33 cm.; height 6.5-8.0 cm., mean 7.3 cm.; wall thickness 0.7-1.0 cm., mean 0.9 cm.
2. *Deep bowls with convex sides, restricted orifice* (18 percent; fig. 21, j-n). Rather barrel shaped in outline, the rims being tapered rounded and bases flat. Rim diameter 10-28 cm., mean 15 cm.; wall thickness 0.5-0.8 cm., mean 0.7 cm.; height unknown.
3. *Deep bowls with thickened and everted rims* (4 percent; fig. 21, h, i). Sides are convex, vessels are slightly constricted at the orifice to almost vertical walled. Thickened rims are everted to a tapered rounded lip. Form of base is unknown. Rim diameter (exterior) 28-41 cm., mean 35 cm.; wall thickness 0.7-0.9 cm., mean 0.8 cm.; height unknown.
4. *Neckless globular jar* (2 percent, two sherds probably from same *tecomate*; fig. 21, o). The rim is swollen

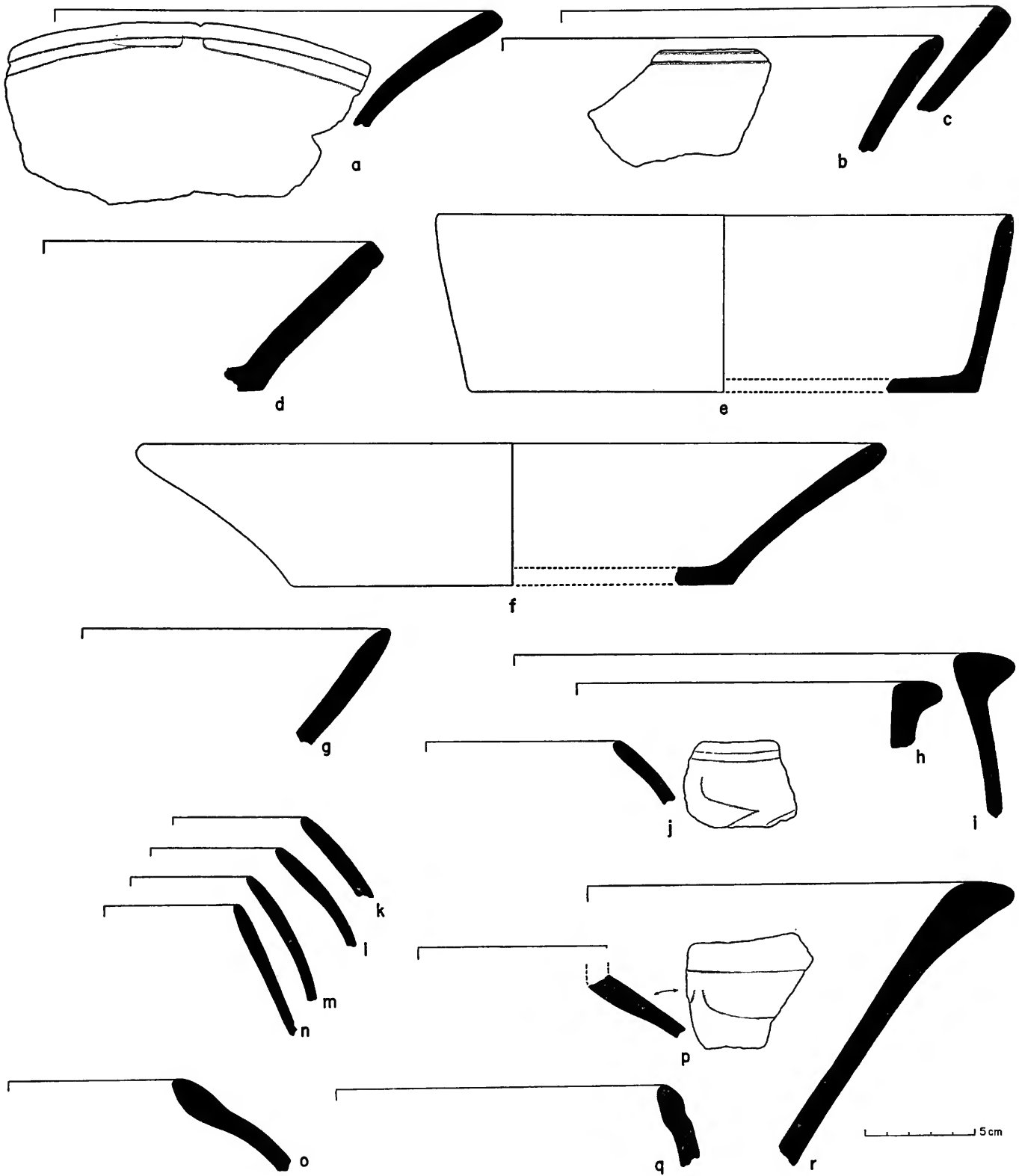


FIGURE 21.—Conchas White-to-buff pottery, Cuadros and Jocotal Phases. *a-g*, Flat-bottomed bowls with outslanting sides. *h, i*, Deep bowls with thickened and everted rims. *j-n*, Deep bowls with convex sides and restricted orifice. *p*, Fragment of necked jar with double line-break motif incised on the exterior. *o*, *Tecomate*. *q*, Restricted bowl. *r*, Deep bowl with interiorly thickened rim. *h, i, k-o*, are Cuadros Phase, the rest are Jocotal.

above a slight depression encircling the wall exterior, and is tapered to a Gothic arch profile. Form of base is unknown. Inner rim diameter 15 cm., wall thickness 0.8 cm.

5. *Restricted orifice bowls* (4 percent; fig. 21, *q*). Low squat bowls with constricted orifices and relatively thick walls; rims are rounded to squared; there is a broad groove along the rim or below it on most vessels; basal form is unknown. Rim diameter (one sherd) 32 cm.; wall thickness 0.9–1.1 cm., mean 1.0 cm.
6. *Necked jars* (5 percent; fig. 21, *p*). Too fragmentary for measurement.
7. *Deep bowls with interiorly thickened rims* (2 percent; fig. 21, *r*). Very deep vessels with outslanting walls and slight rim eversion; form of the base is unknown. One sherd from a very large bowl has a rim diameter of ca. 50 cm.; height at least 16 cm.; wall thickness 0.9–1.1 cm.
8. *Bowls with exteriorly thickened rims* (2 percent). Sides are convex, the orifice is restricted to open, and rims are thickened and somewhat flat on top; form of the base is unknown. Rim diameter ca. 34–40 cm., wall thickness 1.0–1.1 cm., height unknown.

**DECORATION:** Restricted to incising and negative smudging. The distribution of the former is as follows. Form 1, about 20 percent have one or two parallel lines incised after slipping just inside the rim and encircling the vessel; one sherd (fig. 21, *a*) shows that this was the double-line-break motif; a small number of sherds have horizontal lines incised on the exterior. Form 2, most have incising of straight or curved lines on the exterior. Form 3, two sherds have widely spaced diagonal lines on exterior just below the neck. Negative smudging is the same as that described for vessels of the Conchas Phase (Coe, 1961, p. 61), present on only two small body sherds. One (Cuadros Phase) has light smudging in a rectilinear pattern; the other (late Jocotal) has smudging contained between incised lines.

**REMARKS:** Forms 3 and 4 are purely Cuadros Phase. In Form 2, thinner undecorated vessels belong to Cuadros, the rest to Jocotal. Beginning in Jocotal are Forms 1, 5, 6, 7, 8; Forms 1, 5, 6, 7 start late in the phase. The double-line-break motif begins in Jocotal, and continues into the Conchas Phase. For a list of forms occurring in the Conchas Phase, see Coe, 1961, pp. 65–69.

**COMPARATIVE MATERIAL:** This type is virtually identical to the white monochromes of late Chiapa I–Chiapa II (Dixon, 1959, fig. 3, pp. 11, 27–28), Canoas White in the Tehuacán Valley (MacNeish, Peterson, and Flannery, unpublished data), La Venta “Coarse Paste Buff Ware” (collections in the U.S. National Museum), El Trapiche II white ware (collections of the R. S. Peabody Tehuacán project), and a number of contemporary southern Mesoamerican white ceramic types (see Coe, 1961, pp. 64–65).

**Conchas Fine White-to-buff**  
(Coe, 1961, fig. 36, a–f)

The second “major type” of incised white ware mentioned

in the Introduction appeared in the Conchas 2 Subphase of the Guatemalan coastal sequence. Conchas Fine White-to-buff has already been described (Coe, 1961, pp. 80–81), and we will simply repeat here that it is a hard-fired, burnished white pottery made on a fine gray paste, analogous to the fine white monochromes of the Las Charcas Phase (Kaminaljuyú), Coatepec White in the Tehuacán Valley (MacNeish, Peterson, and Flannery, unpublished field notes), and some of the Monte Albán I white sherds (collections of the Frissell Museum in Mitla). All these white wares existed at about 500–200 B.C.

*Minor white wares*, occurring sporadically in the Jocotal Phase, include Temblor White and California White, described below, and “white-clear-through” pottery, described with the rest of the rare or unclassifiable sherds.

**Temblor White**  
(fig. 22), *Rare*

**PASTE:** Bentonitic, but much finer than Conchas White-to-buff. Light brown in color (7.5 YR 5/4), usually with a narrow, light- to dark-gray core.

**SURFACE:** Exteriors are slipped white and lightly polished. The slip is thin, often almost worn from the surface of sherds. Interiors are unslipped and wiped smooth with fingers or scraped.

**FORM:**

1. *Deep bowls with convex sides, restricted orifice* (88 percent; fig. 22, *a–f*). Rather barrel shaped in outline, the bases being flat, with rims tapered rounded to pointed in section. Rim diameter 18–27 cm., average 23 cm. Wall thickness 0.5–0.8 cm., average 0.7 cm. The height is unknown.
2. *Bowls with outslanting sides* (6 percent, fig. 22, *h*). The rim is tapered rounded, the base presumably flat. Rim diameter 28 cm.; wall thickness 0.7 cm.
3. *Complex-silhouette jar* (6 percent, fig. 22, *g*). A jar with a constricted waist, the rim and base shape being unknown. Maximum diameter of lower body 14 cm.; wall thickness 0.5–0.9 cm.

**DECORATION:** Most sherds have postslip incising in straight lines, sometimes in combination with excising in linear patterns.

**REMARKS:** Found in the uppermost levels of the site, and ascribed to the late Jocotal Phase on admittedly inconclusive evidence; at least one sherd occurred in two definitely pre-Crucero levels.

**California White**  
(fig. 23), *Rare*

**PASTE:** Bentonitic, but pumice fragments are abundant in comparison to other pottery types. The color varies from light gray to reddish buff; cores are usually present, and are light to dark gray.

**SURFACE:** There is a rather thick, smooth white slip on one or both surfaces, mottled rusty-brown in places, and well polished. Form 1 is slipped on the interior only, Form 2 on the exterior only.



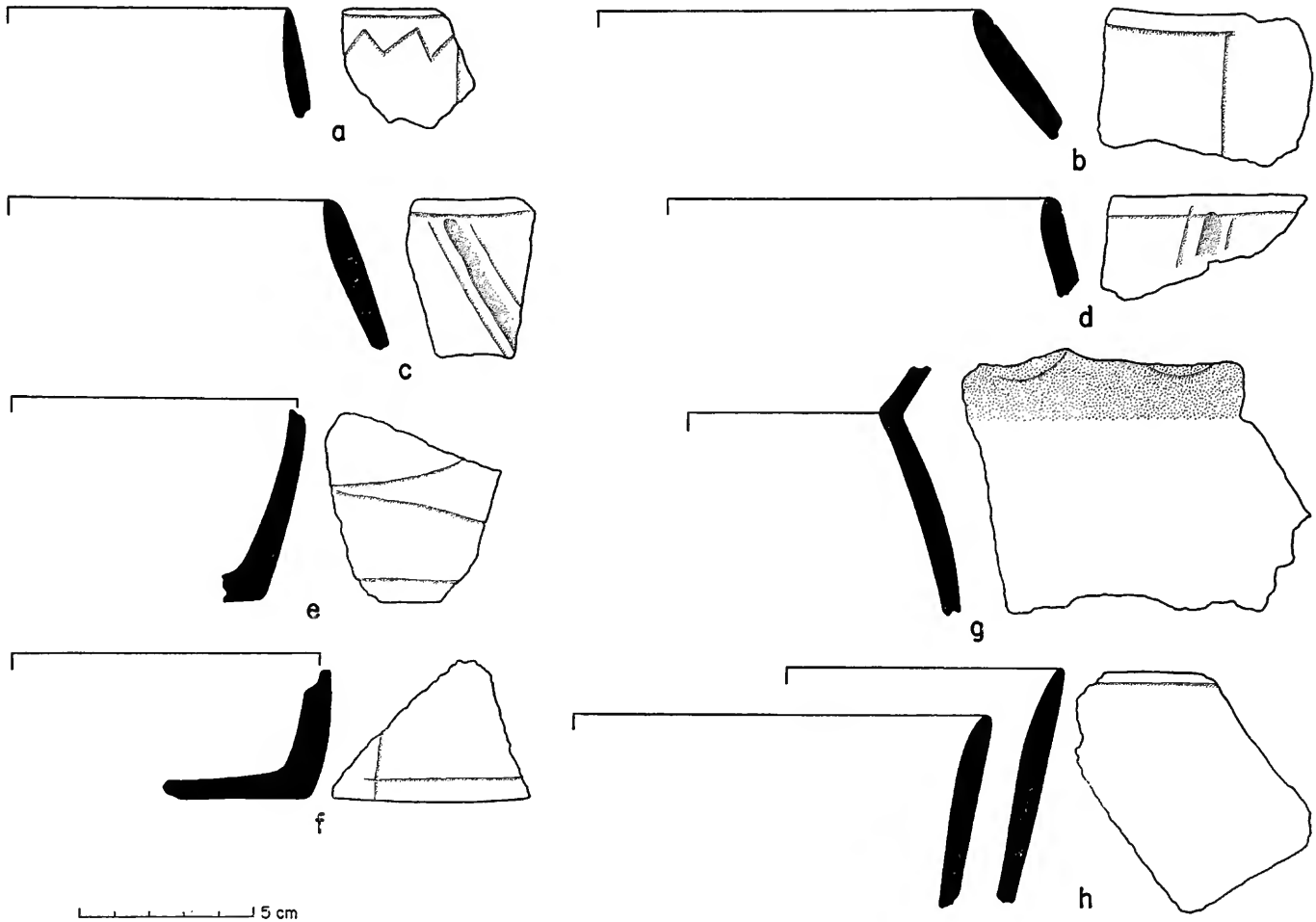


FIGURE 22.—Temblor White pottery, Jocotal Phase. *a-f*, Deep bowls with convex sides and restricted orifice. *g*, Complex-silhouette jar. *h*, Bowls with outslanting sides.

FORM:

1. *Flat bottomed bowl with outslanting sides* (Four sherds only; fig. 23, *a, b*). Sides are somewhat outflaring, the rims squared, or tapered on the interior and rounded. Rim diameter ca. 38 cm.; wall thickness 0.7–1.4 cm.; height 7.0 cm.
2. *Necked jar* (? One very doubtful sherd).
3. *Restricted orifice bowls* (? Two doubtful sherds; fig. 23, *c*).

DECORATION: One sherd, probably of Form 1, has postslip incising, in a design of parallel vertical lines bordered by a row of connected arcs (fig. 23, *b*).

REMARKS: Probably terminal Jocotal. California White differs from other white-slipped types at the site principally in the high frequency of pumice fragments in the paste, probably indicating exploitation of a separate clay bed.

COMPARATIVE MATERIAL: At Chiapa de Corzo a decorative motif like that on a Form 1 sherd is known on white monochrome of the Chiapa II Phase (Dixon, 1959, figs. 24 *f*, 31 *b*, 34 *a*). At Chalcatzingo (Morelos), same motif incised on white monochrome (Piña Chán, 1955, pl.7, *d*).

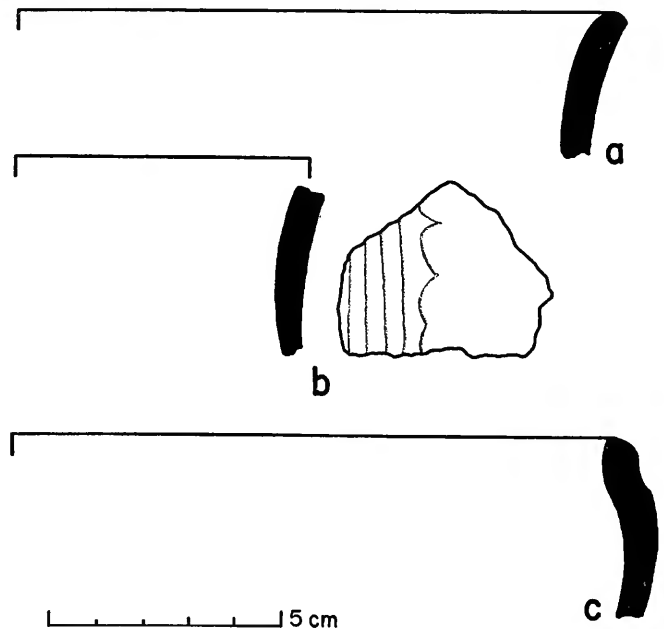


FIGURE 23.—California White pottery, Jocotal Phase. *a, b*, Flat-bottomed bowls with outslanting sides. *c*, Restricted-orifice bowl.

## Incised Gray Monochrome Tradition

## Ocós Gray

(fig. 24; Coe, 1961, fig. 30, h-m)

Ocós Gray was originally defined in the La Victoria monograph (Coe, 1961, pp. 55-56). It is now in serious need of revision, and the following redefinition takes precedence over the La Victoria report. The title is perhaps not very appropriate, for the type does not actually occur in the Ocós Phase; nevertheless, we have preserved it, rather than burdening the literature with yet another name, and have redefined its temporal distribution.

We have now critically reexamined sherds of so-called "Ocós Gray" from Ocós Phase levels in the type collections in the U.S. National Museum. We are convinced that these few sherds of "gray ware" from the Ocós strata—all of them sherds of thin walled *tecomates* with zoned dentate, shell edge, or shellback rocker stamping, cord marking, etc.—were merely offcolor examples of Ocós Black. The latter type was rich in sherds of this very kind (Coe, 1961, p. 55). Thus the Ocós Phase resembles Ajalpan, Pavón, and other phases from the beginning of the Early Formative, in its lack of incised gray monochrome ceramics.

It was not until the Jocotal Phase that true gray ware made its appearance, and most of its lifespan was spent in the Middle Formative Conchas Phase. A similar temporal distribution is seen at Chiapa de Corzo. In this respect, Chiapas and the Guatemalan coast differ from the Valleys of Oaxaca and Tehuacán; in the latter areas, incised gray ware went on to be the dominant Late Formative ceramic. On the Guatemalan coast, Ocós Gray began late in the Early Formative and had essentially run its course by Late Formative times, at which point it was swamped by the oranges and streaky brown-blacks of the Maya-Kaminaljuyú tradition.

During the Jocotal Phase, Ocós Gray appeared in the form of flat-based bowls, necked and collared jars, and barrel-shaped or cylindrical jars. The simple bowls, necked jars, and cylinders continued into the Conchas Phase; new shapes of that period included thick-walled *tecomates* and bowls with eccentric tabs on their rims. All these shapes occurred in contemporary vessels of Río Salado Gray during the early Santa María Phase in the Tehuacán Valley (MacNeish, Peterson, and Flannery, unpublished field notes).

**PASTE:** Bentonitic, rather finer than the usual Cuadros or Jocotal paste, with prominent hornblende inclusions; occasional casts of grass leaves or stems are visible. Generally light gray in color, sometimes with darker gray core, this paste tends to be darker near the interior surfaces of restricted vessels. It is usually extremely hard, giving off a metallic ring when struck.

**SURFACE:** Wiped with a thin slip on one surface only, the slipped area being carefully polished. The slip fires a streaky gray, blending into blackish or white streaks. Unslipped surfaces were smoothed with the fingers and/or a rag, and are usually a uniform gray in color. Form 1 interiors are slipped, the slip having been allowed to dribble down the exterior where it fires white. Form 3 and 4 exteriors only are slipped.

**FORM** (during the Jocotal Phase):

1. *Flat bottomed bowls with outslanting sides* (66 percent; fig. 24, a-d). Sides are somewhat convex to slightly outcurved and rims are rounded, tapered rounded, or pointed in profile. Rim diameter 18-38 cm., mean 28 cm. Wall thickness 0.5-0.9 cm., mean 0.7 cm. The height of one vessel is 10.2 cm.
2. *Necked jars* (9 percent). The necks are missing from the sherds, but are probably vertical. Walls 0.7-1.0 cm. thick, mean 0.8 cm. The form of the base and total height are unknown.

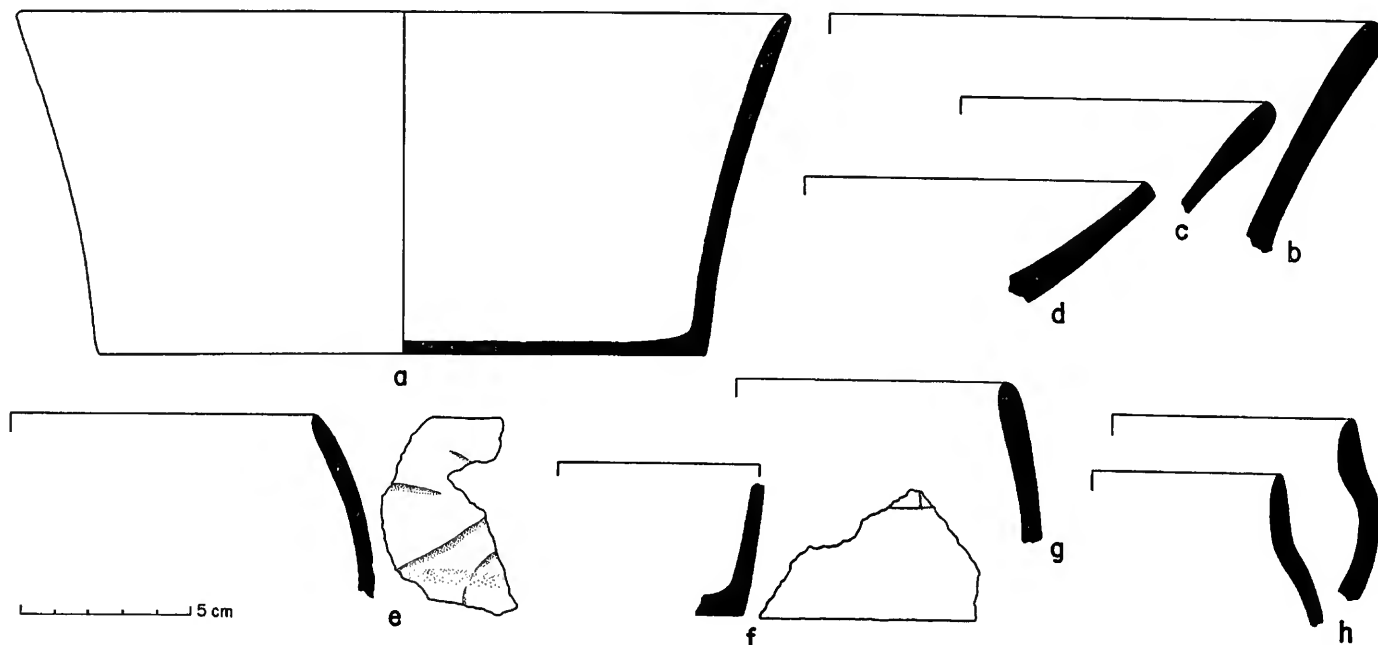


FIGURE 24.—Ocós Gray pottery, Jocotal Phase. a-d, Flat-bottomed bowls with outslanting sides. e-g, Deep bowls with convex sides and restricted orifice. h, Collared jars.

3. *Collared jars* (9 percent; fig. 24, *h*). Restricted orifice jars with low necks or collars, producing a complex profile. Rims are tapered rounded to pointed. The form of the base is unknown. Rim diameter 11–14 cm., mean 13 cm. Maximum body diameter 12–15 cm., mean 14 cm. Wall thickness 0.3–0.7 cm., mean 0.5 cm.
4. *Deep bowls with convex sides, restricted orifice* (16 percent; fig. 24, *e–g*). Somewhat barrel shaped, flat bottomed vases, which are thin walled; rims are tapered squarish to tapered pointed. Rim diameter 9–14 cm., mean 12 cm. Maximum body diameter 12–16 cm., mean 14 cm. Wall thickness 0.4–0.5 cm., mean 0.5 cm. The height is unknown.

For forms in use during the Conchas Phase, see Coe, 1961, p. 73.

**DECORATION:** Rather sparse during the Jocotal Phase. Form 4, 40 percent of the sherds have incising on the exterior, in straight lines producing a geometric design. During the Conchas Phase, postslip incising with “double-line-break” motifs is common (Coe, 1961, p. 73).

**COMPARATIVE MATERIAL:** Río Salado Gray, a horizon marker for the Santa María Phase in the Tehuacán Valley, shows many similarities in shape and incising. Some Monte Albán I sherds in the collections of the Frissell Museum also seem to be related to Conchas 2 examples, especially the open bowls with scalloped rims or rims with eccentric tabs (Coe, 1961, p. 73).

#### Zoned Red-on-buff Pottery

Conchas Red-on-Buff was originally defined in the La Victoria report (Coe, 1961, pp. 75–76), and our description here merely expands its distribution in time. Zoned red-on-buff ceramics first appeared in the Jocotal Phase (850–800 B.C. ?) and achieved their greatest variety and popularity during Conchas times. They seem to have disappeared rapidly at the end of Conchas 2. Jocotal specimens consist of a handful of sherds from globular jars; during the Conchas Phase, however, not only globular or sub-globular jars but also flat-based dishes and bowls had zoned decoration over an unslipped buff background.

Red-on-buff pottery was widespread during the Middle Formative from the Valley of Mexico to Playa de los Muertos, Honduras. El Trapiche II zoned red-on-buff bowls were identical to Conchas examples (Coe, 1961, p. 76). Red-on-buff sherds were less common at Tehuacán, but their temporal distribution was identical to that on the Guatemalan coast—they appeared late in the Early Formative and continued throughout the Middle Formative (MacNeish, Peterson, and Flannery, unpublished field notes).

#### Conchas Red-on-buff

(*pl. 18, a–c; Coe, 1961, fig. 33, d–p*)

**PASTE:** Bentonitic, but relatively fine. The color is light

brown to reddish brown, most sherds with dark-gray to black cores.

**SURFACE:** Slipped red (10 R 4/6–4/4) in zones on exterior, the slipped areas being polished, the rest matte smoothed. Interiors are unslipped, and wiped with the fingers.

**FORMS:** Sherds from globular jars, but since rims are lacking it is not known whether they were necked or neckless. Walls of jars are quite thin, 0.6–0.9 cm., mean 0.7 cm.

**DECORATION:** Red slipped zones in curvilinear patterns separated from unslipped, matte areas by postslip incised lines.

**COMPARATIVE MATERIAL:** See Coe, 1961, p. 76. Orange Monochrome and Bichrome Traditions

At about 500 or 400 B.C., halfway through the Middle Formative, orange monochrome ceramics first seem to have arisen in the Chiapas-southern Guatemalan area. They seem to have appeared fairly simultaneously in the Conchas 2 Subphase at La Victoria (Coe, 1961, p. 62) and in the Chiapa III period in the Grijalva Depression (Warren, 1961, p. 78). The thick orange slip was often crazed or crackly, and in some cases bore negative painting of “Usulután” type. Resist painting increased with time, becoming more frequent during the Crucero Phase—Chiapa V period, ca. A.D. 1. About this time, orange wares decorated with red paint also appeared.

Three pottery types were originally set up by Coe in 1961 to describe this sequence of events, and the excavations at Salinas La Blanca indicate they are still valid. Conchas Orange began at the start of the Conchas 2 Subphase, in the form of composite silhouette bowls, cuspidors, cylinders, dishes with wide everted rims or labial ridges, and necked jars. During the succeeding Crucero Phase the composite silhouette bowls continued, and some had “S” or “Z-angle” rims. More of these vessels, some decorated with Usulután resist painting, were recovered from Crucero Phase levels at Salinas La Blanca.

Another orange monochrome, Río Blanco Orange, was found in Conchas 2 levels at La Victoria (Coe, 1961, pp. 79–80). It may be a trade ware from the Guatemalan highlands.

During the Late Formative Crucero Phase, a bichrome—Crucero Red-on-orange—was also manufactured. In many respects it resembles “Conchas Orange with the application of red slip areas” (Coe, 1961, p. 85), but its different temporal distribution makes it a useful horizon marker. Crucero Red-on-orange resembles a number of Late Formative pottery types from highland and lowland Chiapas and Guatemala (see Coe, 1961, p. 86). It had occasional Usulután resist decoration, and its forms included simple silhouette and composite silhouette bowls, some

with S-Z angle rims and labial flanges. All these traits characterize the Late Formative of the Maya area.

#### Conchas Orange

(fig. 25, a-h; pl. 20, k; Coe, 1961, figs. 31, 32)

This type has already been defined in Coe, 1961, pp. 76-79. Only the forms present in Crucero Phase pits at Salinas La Blanca will be discussed here.

**PASTE:** Typically bentonitic in origin, untempered (see Appendix 5). The texture is very fine. The color toward the surfaces is very light buff to reddish brown, with light to medium gray cores.

**SURFACE:** All surfaces are coated with a thick, extremely fine, cream colored slip which fires to orange (usually 2.5 YR 6/6, light red) on the surface. It was finely polished after slipping. Under magnification, the slip appears crackly. Samples which were burned in ancient fires had been altered to a mottled dirty-yellow and black.

**FORM** (during the Crucero Phase):

1. *Composite silhouette bowls, vertical sides* (6 percent; fig. 25, d). Same as Form 5, Conchas Streaky Brown-black. Bases are dimpled. Rim diameter 22 cm. Height 7.1 cm. Wall thickness 0.6-0.8 cm., mean 0.7 cm.
2. *Composite silhouette bowls, outslanting sides* (18 percent). Upper walls are straight to slightly outflaring; horizontal grooves usually encircle the vessel at the angle where the walls meet the lower body, or sometimes

there is scalloped thickening. Form of rim, base unknown. Dimensions are probably same as Form 1. Wall thickness 0.5-0.6 cm., mean 0.6 cm.

3. *Composite silhouette bowls, restricted* (9 percent; fig. 25, a, b). Shallow bowls with insloping upper walls and pronounced thickening of the angle ("Z-angle") where they meet the lower body. Rims are tapered rounded. There is a small decorative "handle," unpierced, on one example, extending from the rim to the angle. Rim diameter 21-28 cm., mean 25 cm. Height is unknown. The wall thickness is highly variable on individual vessels.
4. *Composite silhouette bowls, everted rim* (9 percent). Sides are outslanting and sometimes flaring, rims strongly everted. The form of the base is unknown. Rim diameter ca. 19 cm. Wall thickness varies from 0.3-0.9 cm. on each vessel.
5. *Cylindrical jars* (33 percent; fig. 25, c, f). Deep jars or vases with vertical sides. Rims are tapered rounded, bases flat. Horizontal grooves are typical. Rim diameter 16 cm. Height 16 cm. Wall thickness 0.6-0.7 cm.
6. *Bowls or jars with outflaring sides* (15 percent; fig. 25, g, h). Sides are strongly outcurved near the rim. The form of the base is unknown. Rim diameter 22 cm. Wall thickness 0.3-0.6 cm., mean 0.5 cm.
7. *Simple open bowls* (10 percent; fig. 25, e). Convex sided vessels, the form of base being unknown. Rim diameter 22 cm. Wall thickness 0.8 cm.

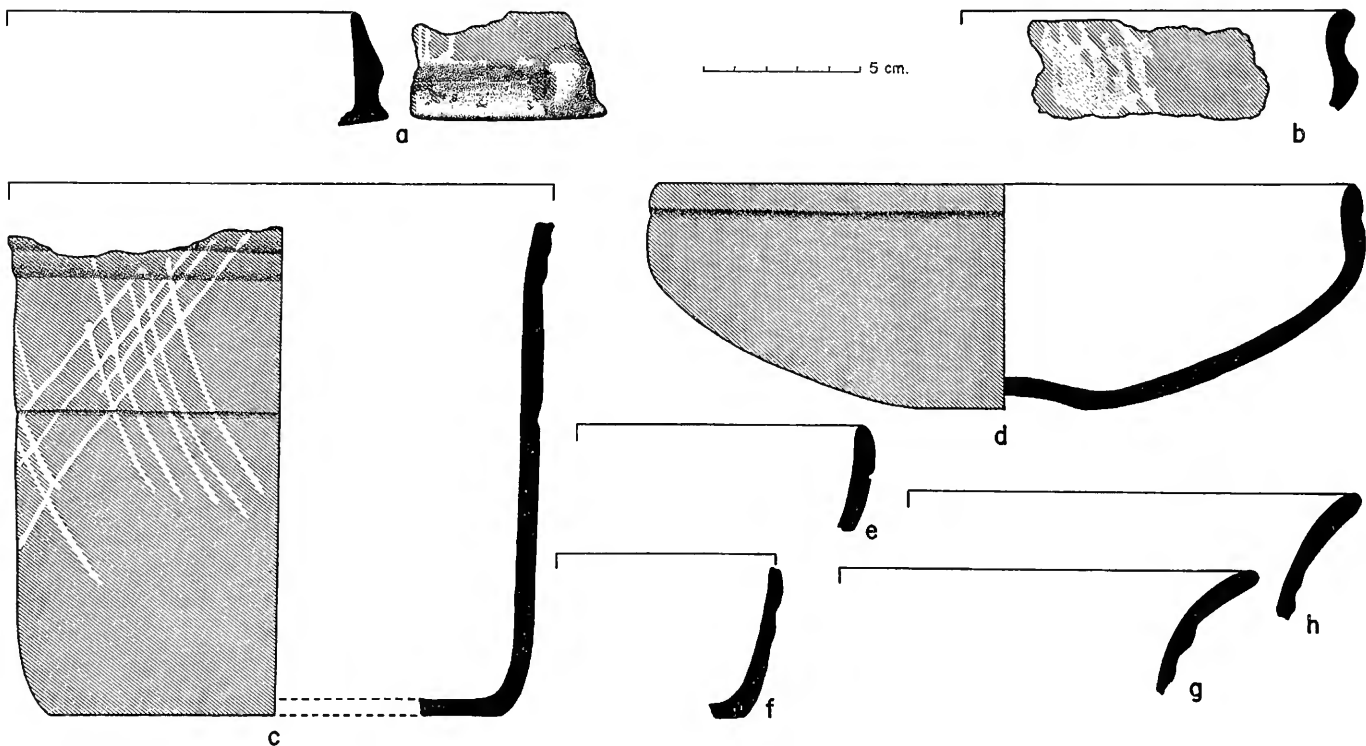


FIGURE 25.—Conchas Orange pottery, Crucero Phase. a, b, Composite silhouette bowls, restricted orifice. c, f, Cylindrical jar. d, Composite silhouette bowl with vertical sides. e, Simple bowl. g, h, Bowls or jars with outflaring sides. Usulután striping is found on a, b, and c.

8. See also Coe, 1961, pp. 84–85, for shapes found in Crucero Phase levels at La Victoria.

**DECORATION:** Usulután resist technique, applied by a multiple-brush tool, leaving parallel whitish to yellowish lines on an orange background. The lines are usually straight, applied to both surfaces. On a cylindrical jar (fig. 25, *c*), groups of diagonal lines form crisscrosses on the exterior, while the interior has only vertical lines.

**COMPARATIVE MATERIAL:** See Coe, 1961, pp. 77–79 (Conchas 2 Subphase), p. 85 (Crucero Phase).

**Río Blanco Orange**  
(Coe, 1961, fig. 33, a–c)

See description in Coe, 1961, pp. 79–80. This is probably a trade ware of Conchas 2 times.

**Crucero Red-on-orange**  
(fig. 26, a–d; Coe, 1961, fig. 37, a–f)

This type was originally defined in Coe, 1961, pp. 85–86. Our description below increases knowledge of the type by correcting the petrographic analysis, and adding three new vessel forms not unearthed in Crucero levels at La Victoria.

**PASTE:** The usual bentonitic clay, fine in texture, with conspicuous pumice fragments. The color is mostly light gray or white, with dark gray-black cores. One example has a reddish-buff paste and light gray core.

**SURFACE:** Slipped orange (5 YR 6/6, reddish yellow) and polished on all surfaces. A red slip is added to selected areas (see below).

**FORM** (in Crucero levels at Salinas La Blanca):

1. *Deep, open bowls* (two examples; fig. 26, *a*). Blunt-rounded rim, dimpled base. Rim diameter 22 cm.; height 11.2 cm.; wall thickness 0.7 cm.
2. *Bowls with outslanting sides* (two examples; fig. 26, *c*). Rims are beveled on the exterior, the form of the base is unknown. Rim diameter ca. 36 cm.; other dimensions are unknown.

3. *Cylindrical vase* (two examples; fig. 26, *b, d*). This has a flat base, and vertical walls. The dimensions are unknown.

**DECORATION:** Red (2.5 YR 4/6) bands and designs over the surface slip, applied before the final polishing. Form 1, a red band painted along the rim on both sides; the interior of one nearly complete vessel has a crude step-and-fret design repeated three times (fig. 26, *a*). Form 2, a red band along the rim on both sides; Usulután stripes are on both surfaces, including the red painted band (fig. 26, *c*). Form 3, the exterior has curvilinear red bands zoned by postslip incising.

**REMARKS:** Confined to the Crucero Phase. Similar to Conchas Orange, with the addition of red decoration. The extension of Usulután stripes into the red zone (where resist areas are clear red against a smoked red background) shows that vessels with this technique were subjected to a smudging or reducing fire after the resist material had been applied with a multiple brush.

**COMPARATIVE MATERIAL:** See Coe, 1961, p. 86.

**Streaky Brown-black Pottery**

Conchas Streaky Brown-black was originally defined in the La Victoria report on the basis of a relatively small sample of sherds (Coe, 1961, pp. 69–70). The much larger number of sherds and restorable vessels recovered at Salinas La Blanca now makes possible its redefinition. This description takes precedence over that of the La Victoria report.

Streaky Brown-black ceramics begin in the late Middle Formative (Conchas 2 Subphase), but as in the rest of Guatemala, they reach their peak frequency in the Late Formative. Such phases as Miraflores and Arenal at Kaminaljuyú, Chicanel in the Petén, and the Late Formative at Izapa share streaky brown-black pottery with the Crucero Phase at Salinas La Blanca.

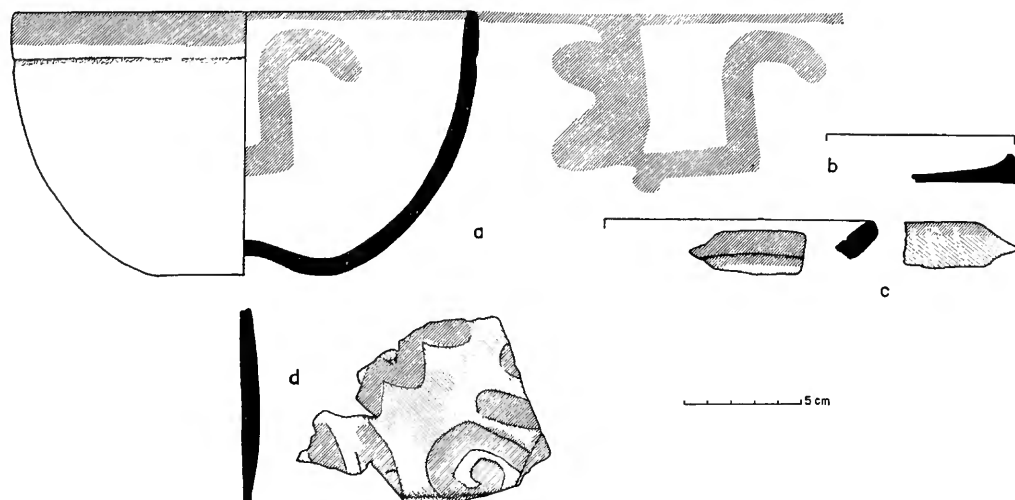


FIGURE 26.—Crucero Red-on-orange pottery, Crucero Phase. *a*, Deep open bowl with interior design repeated three times in red on an orange background. *b*, Base from cylindrical vase. *c*, Rim from bowl with outslanting sides. *d*, Sherd from wall of cylindrical vase. Usulután striping is found on *c*.

During Conchas 2 times, the type is known only from sherds of composite silhouette bowls; during the Crucero Phase a much wider variety appeared, including both composite and simple silhouette bowls, constricted-orifice and cylindrical jars. Certain decorative techniques, such as fine-line engraving, occur in the Crucero Phase but not in Conchas 2. We feel, therefore, that from a chronological point of view there is some merit in dividing the type into two varieties, one restricted to the late Middle Formative, the other characterizing the Late Formative.

#### Conchas Streaky Brown-black

*Conchas 2 Variety* (Coe, 1961, fig. 35, *i*).

This variety has already been described in Coe, 1961, pp. 69–70. It is quite restricted in vessel shape and decoration as compared with the Crucero Variety (below).

*Crucero Variety* (figs. 27–34; pls. 18, *i–q*, 19, 20, *l*).

**PASTE:** Bentonitic in origin (see Appendix 5), with prominent quartz crystals, rusty-red decomposed fayalite lumps, and numerous small golden flecks of biotite. The texture is less coarse than that of Guamuchal Brushed. It appears to be quite carbonaceous, with thick dark cores of frequent occurrence as well as carbonized vegetal material. Near surfaces, the paste is buff to reddish buff in color. In general appearance, it is very similar to Julafn Coarse. Coiled construction is visible on the edges of some sherds.

**SURFACE:** There is no detectable slip on any sherd, but all surfaces are medium to well polished. The marks of a pebble polisher are usually visible, and the surfaces have

a leathery and sometimes “waxy” feel to the touch. The color is streaky, but reasonably uniform on any particular vessel. Vessel colors vary from 7.5 YR 6/4 (light brown) through 10 YR 5/2 (grayish brown) and 10 YR 3.5/1 (dark gray) to black, all produced by varying the firing atmosphere. Darker vessels sometimes have small whitish mica flecks on the surface; lighter ones are usually speckled with what appear to be iron oxide stains (similar to those on Colima tomb figures).

#### FORM:

1. *Simple unrestricted orifice bowls, convex sides* (31 percent; fig. 27). Rims are tapered rounded, bases are dimpled, or slightly concave on exterior. Rim diameter 20–25 cm., mean 22 cm. Height 4.7–8.1 cm., mean 6.4 cm. Wall thickness 0.6–0.8 cm., mean 0.7 cm.
2. *Simple unrestricted orifice bowls, everted rim* (3 percent; fig. 28). Sides are outslanting and slightly convex, the rims are everted, usually with scalloped edges, and bases flat. Rim diameter 19–24 cm., mean 22 cm. Height (one example) 5.0 cm. The wall thickness averages 0.5 cm.

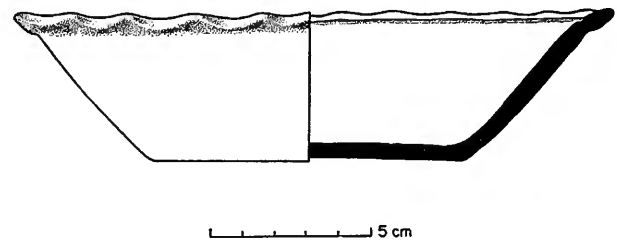


FIGURE 28.—Conchas Streaky Brown-black, simple unrestricted orifice bowl with everted, scalloped rim; Crucero Phase.

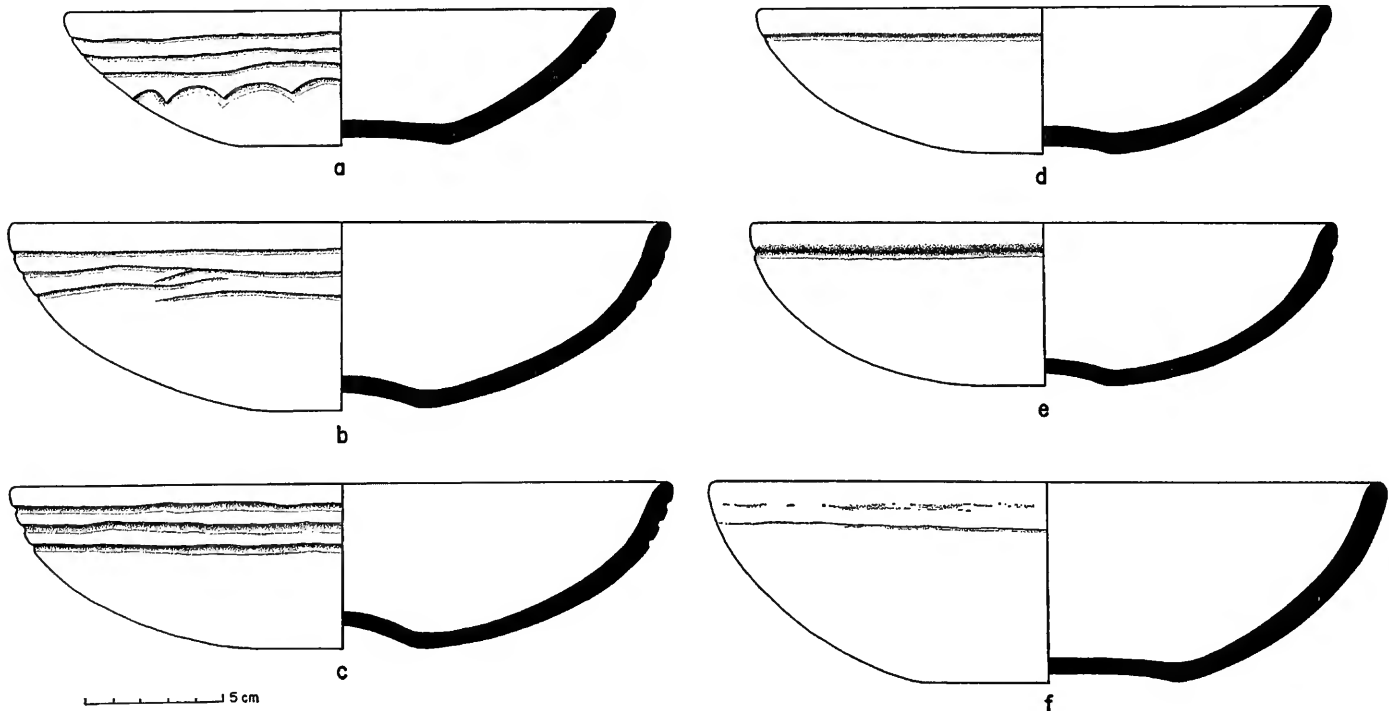


FIGURE 27.—Conchas Streaky Brown-black, simple unrestricted orifice bowls with convex sides, Crucero Phase.

3. *Deep bowls* (12 percent; fig. 29). Fairly thick walled vessels with unrestricted or only slightly restricted orifices, and deep sides which are straight to somewhat recurved to gently insloping. Rims are rounded to tapered rounded. Most bases are dimpled, but some flat. Rim diameter 17–20 cm., mean 19 cm. Height 11.4–15.2 cm., mean 13.6 cm. Wall thickness 0.5–1.1 cm., mean 0.8 cm.

4. *Simple unrestricted bowl, outflaring sides* (less than 1 percent). Rim tapered rounded, form of base unknown. Rim diameter 34 cm., wall thickness 0.7 cm.

5. *Composite silhouette bowls, vertical or restricted walls* (14 percent; fig. 30). Composite silhouette vessels, wide and low, with convex bottoms meeting vertical to insloping walls above a fairly well defined angle.

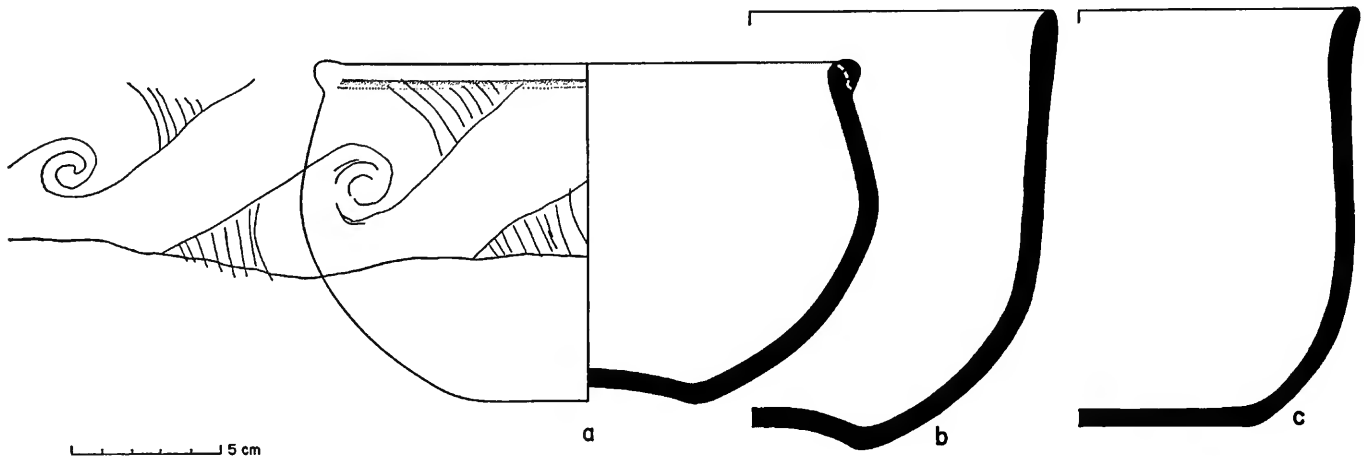


FIGURE 29.—Conchas Streaky Brown-black, deep bowls, Crucero Phase. *a*, Exterior engraved with interlocking-scroll design.

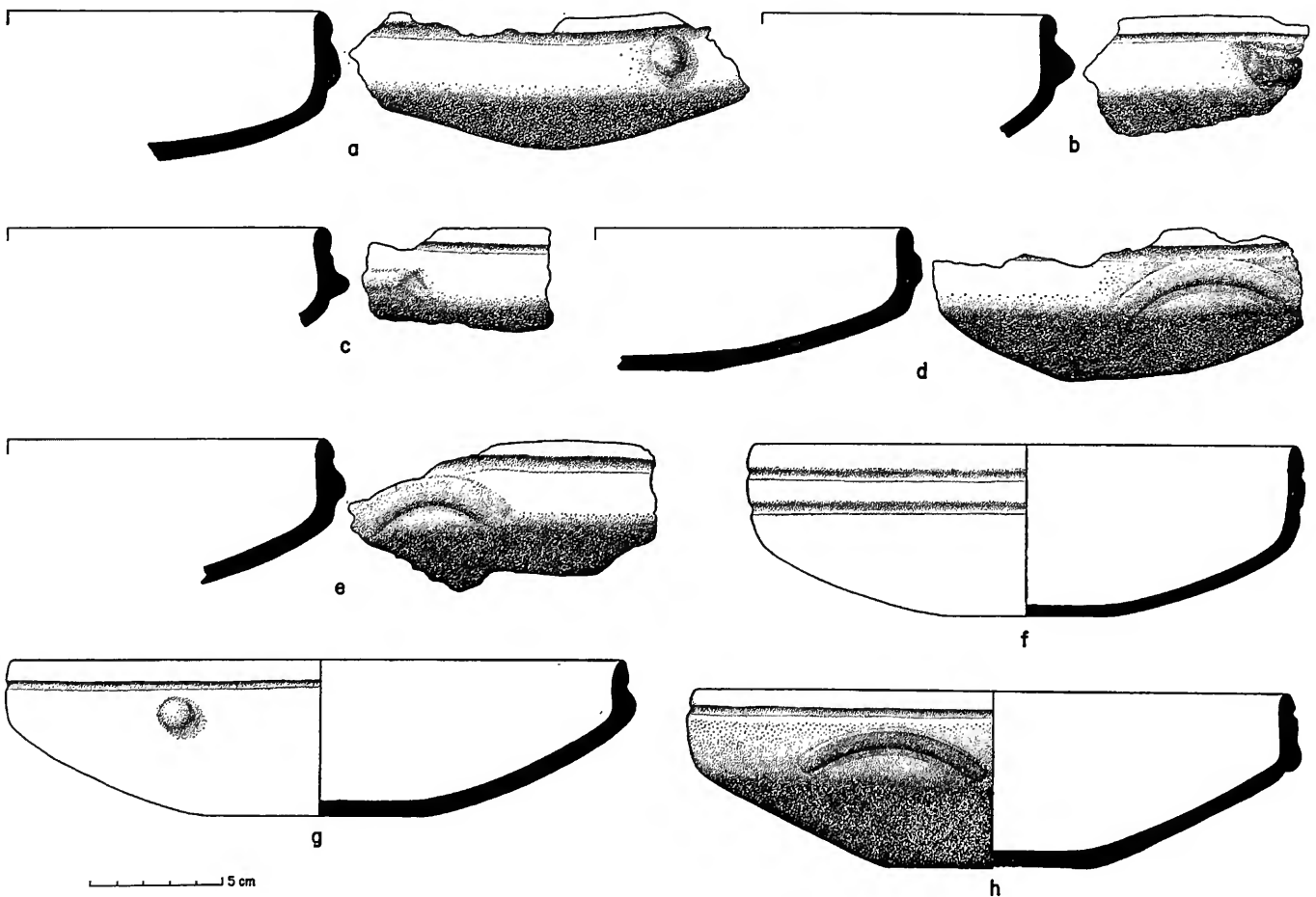


FIGURE 30.—Conchas Streaky Brown-black, Crucero Phase, composite silhouette bowls with vertical or restricted walls.



Rims are tapered rounded. Bases are slightly concave on the exterior. Rim diameter 21–26 cm., mean 24 cm. Height 6.0–6.8 cm., mean 6.4 cm. Wall thickness 0.5–0.9 cm., mean 0.7 cm.

6. *Composite silhouette bowls, everted or flanged rims* (8 percent; fig. 31). Unrestricted bowls with slightly convex upper walls meeting the lower part of the body at an angle which is not so pronounced as in Form 5. Rims are usually everted, one with an eccentric tab on lip; three examples have narrow flanges below the rim exterior. Bases are dimpled. Rim diameter 24–25 cm., mean 25 cm. Height 6.1 cm. Wall thickness 0.5–0.7 cm., mean 0.6 cm.

7. *Composite silhouette bowls, outslanting sides* (5 percent; fig. 32). Unrestricted bowls, upper walls straight to

slightly concave, meeting the lower, convex, part of the body at an angle which has a pronounced exterior thickening. Rims are tapered rounded, bases are dimpled. Rim diameter 22–23 cm., mean 22 cm. Height 5.7 cm. Wall thickness 0.6–0.9 cm., mean 0.8 cm.

8. *Restricted orifice jars, composite silhouette* (3 percent; fig. 33). Fairly squat jars with low necks, the upper and lower walls of the body meeting to form a well marked "shoulder" or angle which is often accentuated by a ridge or by scalloping. Rims are rounded to squarish. Bases are slightly concave on the exterior, and a few are dimpled. One jar has small, thick, vertical handles or pierced lugs extending from the rim to the body, showing wear through use as a means

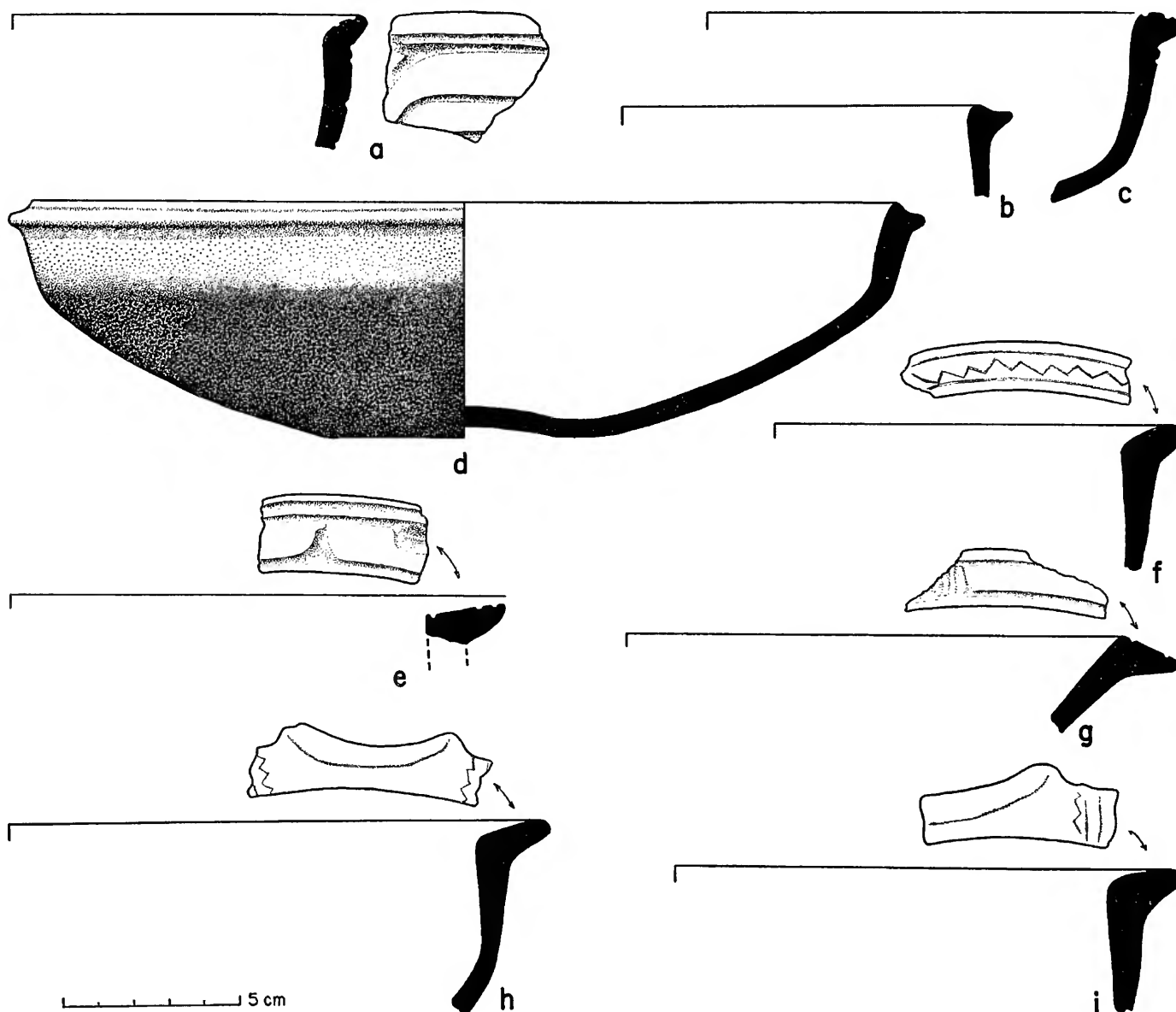


FIGURE 31.—Conchas Streaky Brown-black, Crucero Phase, composite silhouette bowls with everted or flanged rims.

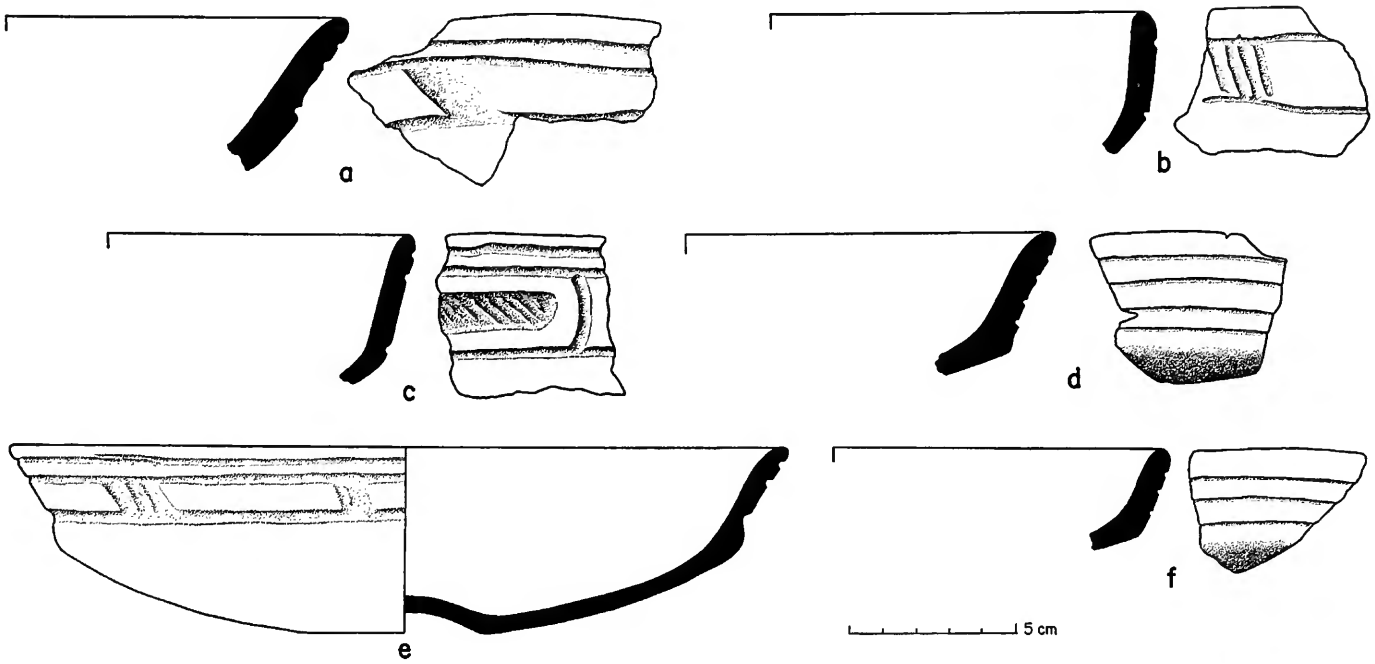


FIGURE 32.—Conchas Streaky Brown-black, Crucero Phase, composite silhouette bowls with outslanting sides.

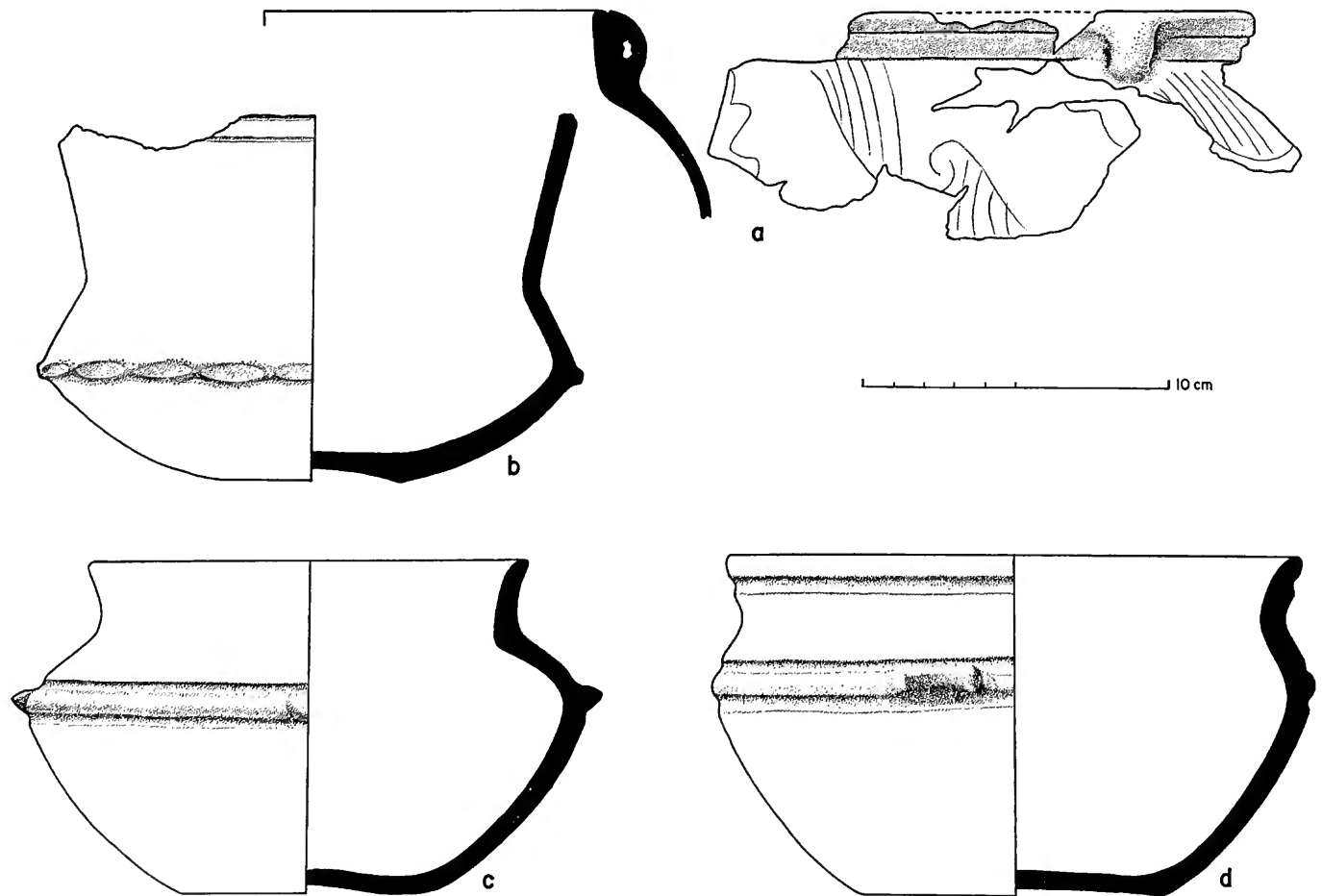


FIGURE 33.—Conchas Streaky Brown-black, Crucero Phase, restricted orifice jars with composite silhouette. *a*, exterior engraved with interlocking-scroll design.

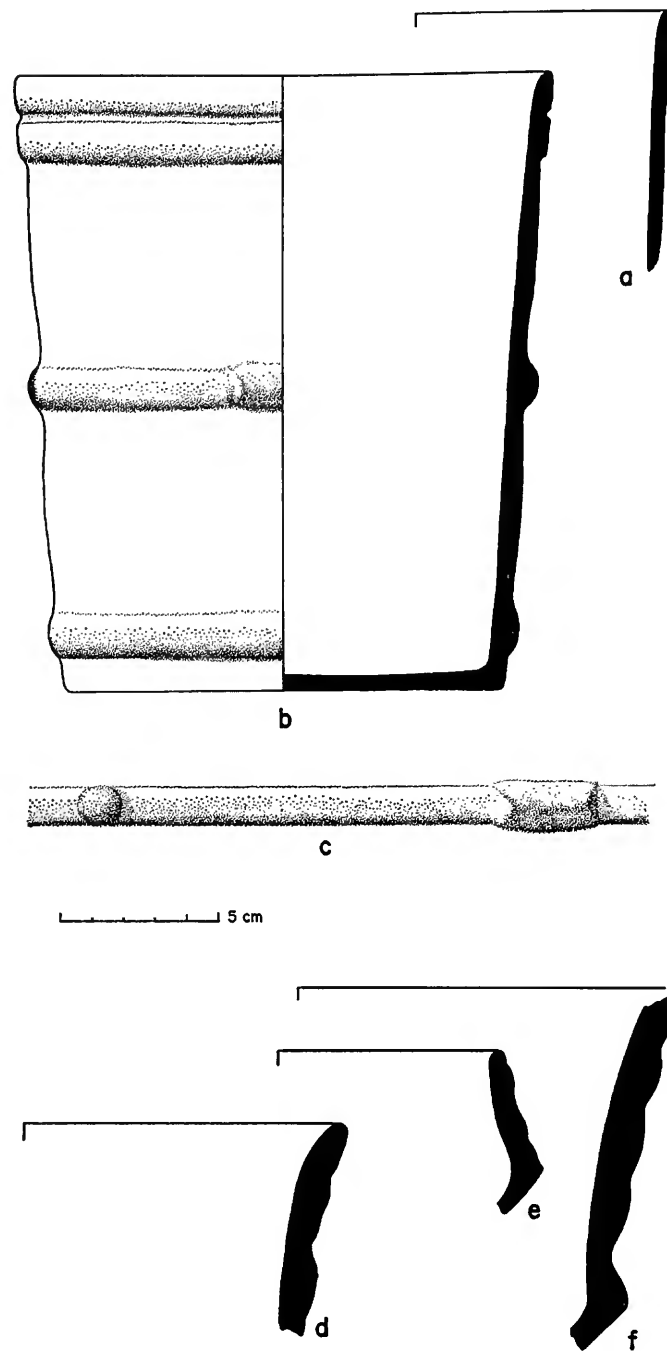


FIGURE 34.—Conchas Streaky Brown-black pottery, Crucero phase. *a, b*, Cylindrical jars. *c*, Development of one half of central raised band on *b*. *d-f*, Composite silhouette bowls with ribbed upper walls.

of suspending the vessel by a string. Rim diameter 14–20 cm., mean 17 cm. Height 11.0–11.5 cm., mean 11.3 cm. Wall thickness 0.4–1.0 cm., mean 0.7 cm.

9. *Cylindrical jars* (19 percent; fig. 34, *a-c*). Deep, flat-bottomed vessels, the walls approximately vertical but varying from slightly concave to barely convex. Rims are tapered rounded. Groups of decorative raised bands or grooves encircle most vessels. Rim diameter

16–18 cm., mean 17 cm. Height 17.3 cm. Wall thickness 0.6–0.7 cm., mean 0.7 cm.

10. *Composite silhouette bowls, ribbed upper walls* (5 percent; fig. 34, *d-f*). Fairly deep, large bowls with moderately thick walls; sides are vertical to outslanting and with strong horizontal ribbing or grooving on the exterior, meeting the lower part of the body at an angle which is usually thickened on the exterior. Rims are

rounded. The form of the base is unknown. Rim diameter 14–22 cm., mean 18 cm. The height probably was between 6 and 14 cm. Wall thickness 0.7–1.0 cm., mean 0.9 cm.

**DECORATION:** Grooving, engraving (both fine and coarse), excising combined with coarse engraving, and the raising of areas like bands. Red pigment is rubbed into the excised areas. Form 1—coarse engraving was executed on most, consisting of three lines encircling the vessel below the rim exterior, with a scalloped line below this. Form 2—the lip of the everted rim is scalloped along the edge, and a grooved line placed just inside this; there is one example of coarse engraving with excised areas on the upper surface of the rim. Form 3—coarse engraving in a geometric design on the exterior, with two examples of fine-line engraving in a joined scroll design. Form 4—a single sherd has coarse engraving and excising on the interior. Form 5—typically consists of a single horizontal groove below the rim on exterior; between this and the wall angle, there is a raised applique design of either three rounded bumps alone, or bumps interspersed with a series of three arches; also, a few have coarse engraving, and there is one sherd with two horizontal grooves only. Form 6—coarse and fine engraving, usually on the upper surface of the everted rim but also on the wall exterior. Form 7—most have horizontal lines coarsely engraved on the wall exterior, in combination with excision. Form 8—shallow grooves outlining raised band on the shoulder angle; two examples have a pair of concave-edged lugs and a pair of round lugs on the band;

two others have scalloping of the band along the shoulder angle; one jar has fine-line engraving of a joined-scroll design on the upper wall, below the neck. Form 9—usually about three raised bands around the exterior, the middle band having concave lugs alternating with rounded bumps; others have multiple horizontal grooves at intervals; there are two examples of fine-line engraving, probably in a joined-scroll design. Form 10—horizontal ribbing only.

**REMARKS:** Conchas Streaky Brown-black is the dominant type of the Crucero Phase. Possibly the thicker, lighter-in-color sherds of Forms 1, 3, and 10 belong to a distinct variety within the type. All vessels show much sign of wear, and from this and from the high frequency in Crucero deposits, the type must have been for everyday use, particularly as food bowls.

**COMPARATIVE MATERIAL:** Kaminaljuyú: Miraflores Phase tombs in E-III-3 (Shook and Kidder, 1952), brown-black pottery with identical shapes, decorated with coarse and fine engraving in identical joined scrolls, scalloped lines, etc., indicating the exact contemporaneity of Crucero and Miraflores; "Arenal" Phase (Lots C-33, C-41, C-87), many coarsely engraved sherds resemble the lighter colored vessels of Forms 1 and 3, and were definitely associated with Miraflores pottery in the deposits where they were found. Other phases or sites with pottery similar to the type include Izapa (New World Archaeological Foundation collection), Monte Alto (M. D. Coe collection), and Tikal (Late Chicanel Phase tomb, Coe and McGinn, 1963).

## MINOR POTTERY TYPES AND TRADITIONS OF THE COASTAL FORMATIVE

Also appearing in the Formative sequence on the Guatemalan coast were 10 pottery types which, although distinctive, did not occur in sufficient quantity to warrant their inclusion in the major traditions of the region. Four are Early Formative types that would rarely be found on surface survey, and would probably only be recovered from excavation if a large sherd sample were obtained. These are:

1. Ocós Iridescent
2. Ocós Red Burnished
3. Oso Brushed
4. Teófilo Punctate

A fifth rare type is of Middle Formative date:

5. Conchas Brown Unburnished

The remainder are Late Formative (Crucero) or Late Classic (Marcos) types, which will remain poorly known until more excavation in sites of that age has been conducted. They include:

6. Juláin Coarse
7. Encuentros Orange
8. Argelia Black-Gray
9. Violeta Plain
10. Manchuria Plain

We present them here in the order in which they make their appearance in the stratigraphic column, from earliest to latest.

### Ocós Phase

#### Ocós Red Burnished (Coe, 1961, fig. 19, m)

See description in Coe (1961, p. 51). Rare dishes with gadrooned rims and a burnished red slip seem to have been restricted to the late Ocós Phase.

#### Ocós Iridescent (Coe, 1961, fig. 23, p-r, t-u)

See description in Coe (1961, p. 56). *Tecomates* and simple silhouette bowls with a burnished, iridescent slip appeared briefly, late in the Ocós Phase; they are lacking in Cuadros deposits.

### Cuadros Phase

#### Oso Brushed (fig. 39, c, d)

**PASTE:** Identical in all features to Guamuchal Brushed.

**SURFACE:** The exteriors of necks are polished, just over to inside of rim; interiors are smoothed with fingers when wet.

**FORM:** Necked globular jars. The necks are wide, vertical to slightly constricted; rims are tapered toward the lip, with Gothic arch profile. The form of base is unknown.

**DIMENSIONS:** Rim diameter of one example is 25 cm., others probably being less than 22 cm. Neck height 6.5 cm. Walls are quite thick, 0.5–1.3 cm., mean 1.0 cm.

**DECORATION:** Brushed or raked on body wall exteriors below the neck, with cross strokes usual. One sherd has crisscrossed diagonal lines made by indenting a tool over the brushed area.

**REMARKS:** Confined to early Cuadros, and hence a useful horizon marker.

**Teófilo Punctate**  
(*fig. 39, f, g; pl. 12, k–q*)

**PASTE:** Identical to Guamuchal Brushed. When unburned, the color is usually a light brown, sometimes with a thick, dark-gray core; where the adjacent surface is black, the paste is also black. Firing conditions were relatively uncontrolled, with signs of irregular oxidization; the temperature was not uniform over the whole vessel.

**SURFACE:** Unslipped and roughly polished on the exterior rim band to interior of the lip, smoothed or scraped on the interior. The rest of the exterior was smoothed when wet. The color is in the same range as Guamuchal Brushed; on unburned sherds it ranges from light gray (10 YR 6.5/2) to red (2.5 YR 4/6) to black. Black firing clouds are common near the rim.

**FORM:** Globular, neckless jars (*tecomates*). Rims are the same form as those of Guamuchal Brushed but lack the brushing. Form of base unknown.

**DIMENSIONS:** Inner rim diameter 16–20 cm., mean 18 cm.; body thickness (6–7 cm. below rim) 0.5–1.0 cm., mean 0.6 cm. Other dimensions are probably like those of Guamuchal Brushed *tecomates*.

**DECORATION:** Usually a single row of punctations encircling the vessel just below the lower groove of the rim band, done with a pointed stick or an instrument with triangular cross section at the end; two sherds have a partial second row below this (*pl. 12, p*). One example has diagonal linear punctations confined to a zone (*pl. 12, l*). Rim bands are usually formed by two parallel grooves; one near the rim, the other 2.5–5.3 cm. below the rim. Two sherds have linear pattern burnishing in a crisscross pattern, beginning just below the punctations (*pl. 12, m*).

**REMARKS:** More common in Cuadros than in Jocotal levels. This type is the unpainted analogue to Mapache Red-rimmed.

**COMPARATIVE MATERIAL:** Chiapa de Corzo: Chiapa I Phase, *tecomates* with horizontal punctations below the rim band (Dixon, 1959, *fig. 52, c, m*).

Conchas Phase

**Conchas Brown Unburnished**  
(*Coe, 1961, fig. 24, b*)

See description in Coe (1961, p. 64). Brown unburnished *tecomates* were found only in early Conchas 1 Subphase deposits at La Victoria.

Crucero Phase

**Julaín Coarse**  
(*fig. 35; pl. 18, d–h*)

**PASTE:** Bentonitic, with the usual inclusions, but fairly coarse, poorly kneaded, and lumpy in texture. There is evidence for coiling, but the workmanship is extremely crude. The color is buff near surfaces, with the cores being grayish brown.

**SURFACE:** Unslipped. Interior of bowls were wiped with a horizontal motion, with well marked finger swipes. Most of the pedestal exterior (see Form, below) has an extremely rough and pitted appearance; the bottom of the pedestal was smoothed on both surfaces by rotary finger swipes. The upper surface of the pedestal interior is completely unfinished and lumpy. The surface is buff in color and typically spotted with small, brownish-black stains, as in Conchas Streaky Brown-black.

**FORM:** Open bowls on tall pedestal bases. The walls of the pedestal are relatively thin, slightly convex to straight, somewhat constricted near the bottom and recurved to a slight flare.

**DIMENSIONS:** Rim diameter 15–26 cm., mean 20 cm. Height unknown. Basal diameter 15–16 cm., mean 19 cm.

**DECORATION:** None.

**REMARKS:** There are definite marks of smoke blackening on bowl interiors, this being absent elsewhere; it is highly probable that these were incense burners, but there are no signs of prongs or of a central hole, as in three-pronged *incensarios*. The type is confined to the Crucero Phase, sizable fragments occurring in intrusive pits of Cut 1.

**COMPARATIVE MATERIAL:** Kaminaljuyú: Miraflores Phase, tall black-brown vase (Shook and Kidder, 1952, pp. 85, 86, *fig. 32*) probably of identical form and same size; shown inverted in the figure, as the interior of the bowl-like “base” is well polished.

**Encuentros Orange**  
(*fig. 36, a–e*)

**PASTE:** The usual bentonitic clay, with a medium texture. Coiled construction is inferred from sherd fracture. Light buff in color near surfaces, most having thick, dark-gray to black cores.

**SURFACE:** Exteriors are slipped a reddish orange (2.5 YR 4.5/6 through 2.5 YR 4/8 to 10 R 4/8, all red), usually thin and streaky. Interiors are unslipped, and wiped with a bundle of fibers or scraped.

**FORM:** Necked jars. Necks are slightly outflaring, rims tapered rounded but some are squared with moderate thickening on the exterior; all are relatively low, a few being vertical. Bodies are globular, and handles are absent; base unknown.

**DIMENSIONS:** Rim diameter 18–24 cm., mean 20 cm. Neck height 4.0–5.3 cm., mean 4.7 cm.

**DECORATION:** One sherd has a painted band in darker red (10 R 4/8) just below the neck on the body exterior.

**REMARKS:** In uppermost deposits, probably Crucero.

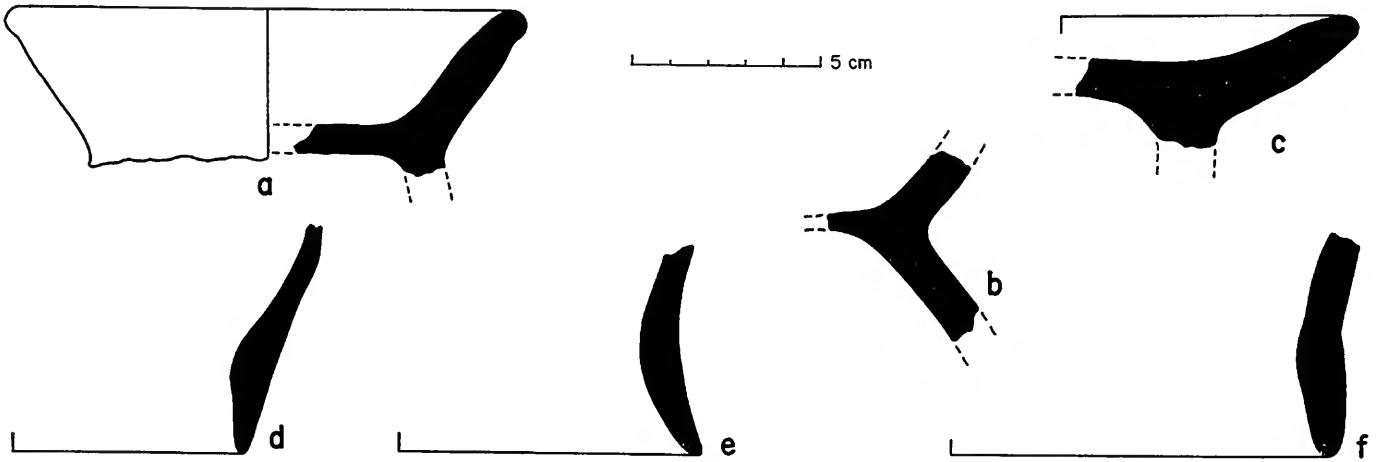


FIGURE 35.—Fragments of Julain Coarse pottery incense burners, Crucero Phase. *a* and *c*, Represent the upper bowls. *b*, From the juncture of upper bowl and lower pedestal. *d-f*, Fragments of pedestals.

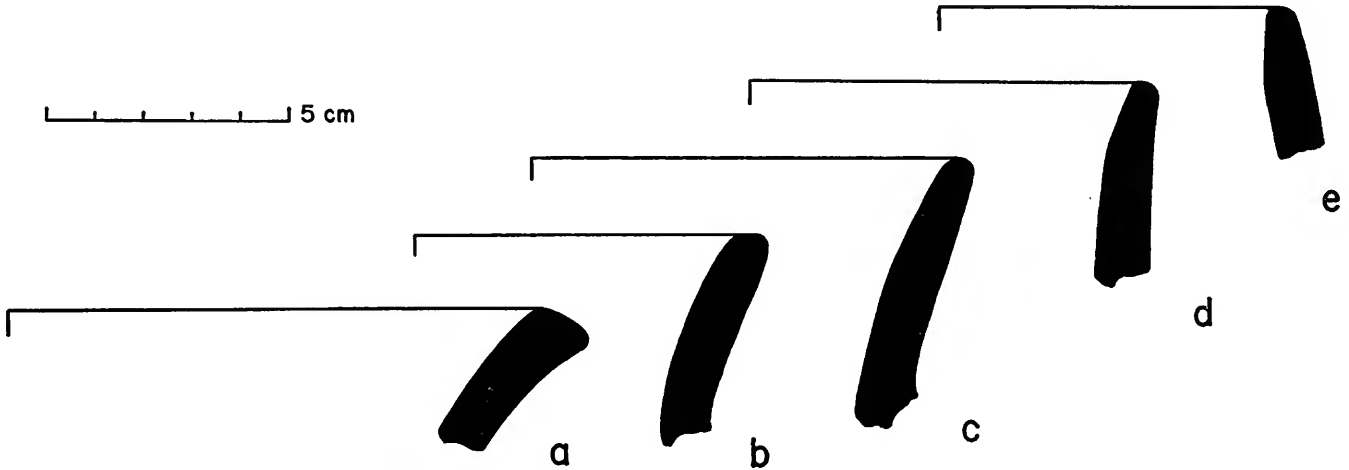


FIGURE 36.—Encuentros Orange pottery, Crucero Phase. *a-e*, Rims from necked jars.

**Argelia Black-Gray**  
(*fig. 41, a-d*)

**PASTE:** Bentonitic. The color is grayish-tan to reddish-buff, with thin, gray cores.

**SURFACE:** Usually blackish gray and polished on the exterior to just inside the collared rim, the remainder of the exterior being rough; this is reversed on one sherd. The color varies from black to gray to grayish buff. Possibly all are unslipped.

**FORM:** Slightly restricted orifice bowls or jars, with low collars. The form of the base is unknown.

**DIMENSIONS:** Rim diameter is about 34 cm.

**REMARKS:** Confined to Crucero levels.

Phase Uncertain

**Violeta Plain**  
(*fig. 37, a-e; pl. 28, n, o*)

**PASTE:** The usual bentonitic clay.

**SURFACE:** Smoothed with horizontal finger swipes. About half have a thin red slip or wash on the exterior, and rough polishing where present extends over into the unslipped interior. One has a polished red wash on the interior.

**FORM:** Bowls with thick and somewhat outflaring walls, the rims having a flangelike exterior thickening; two out of nine rims have horizontal ribbing on the thickening surface.

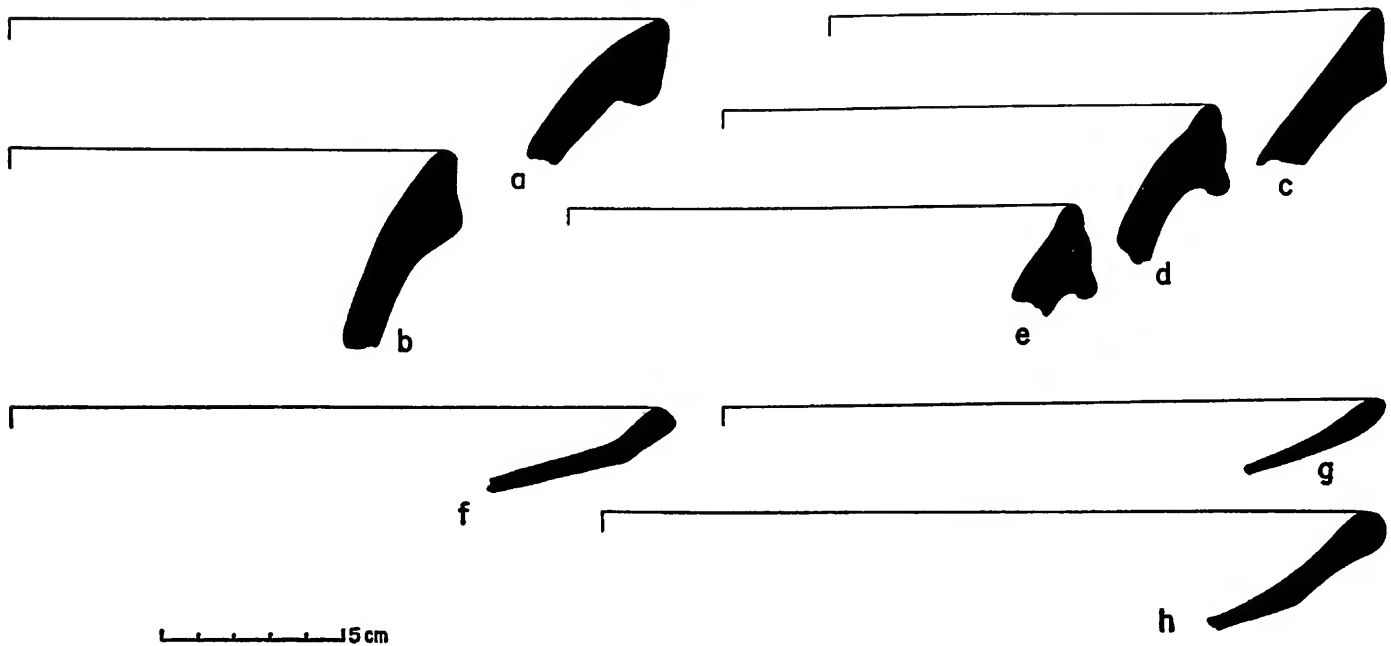


FIGURE 37.—Violeta Plain and Manchuria Plain pottery from the surface and upper levels of Salinas La Blanca. *a-e*, Violeta Plain bowls. *f-h*, Manchuria Plain *comal* fragments.

**DIMENSIONS:** Rim diameter 26–32 cm., mean 29 cm.  
Wall thickness 0.8–1.3 cm., mean 1.1 cm. The height is unknown.

**DECORATION:** None.

**REMARKS:** Phase position uncertain. Illustrated in Coe, 1961 (fig. 38, *g, h*), as Marcos Phase, Victoria Coarse. However, the type could be Crucero instead; it appears as part of the Cerro del Tiestal Complex in a number of sites in the Ocosingo area (see pp. 91–92).

**Manchuria Plain**  
(*fig. 37, f-h; pl. 20, h, i*)

**PASTE:** Appears to be the usual bentonitic type, very hard.

From horizontal finger marks, it has the appearance of being wheel made, but this may be deceptive. The color is salmon pink.

**SURFACE:** Unslipped, no polishing.

**FORM:** Thin, very shallow *comal*, with the walls bending slightly up near the rim. The rims are somewhat thickened and rounded.

**DECORATION:** One sherd has small indentions along the inside of the rim.

**REMARKS:** Confined to the surface and to Level 1 of both cuts. Probably Marcos Phase (see pp. 93–97). Two are thickly coated with a white, limelike substance on the interior.

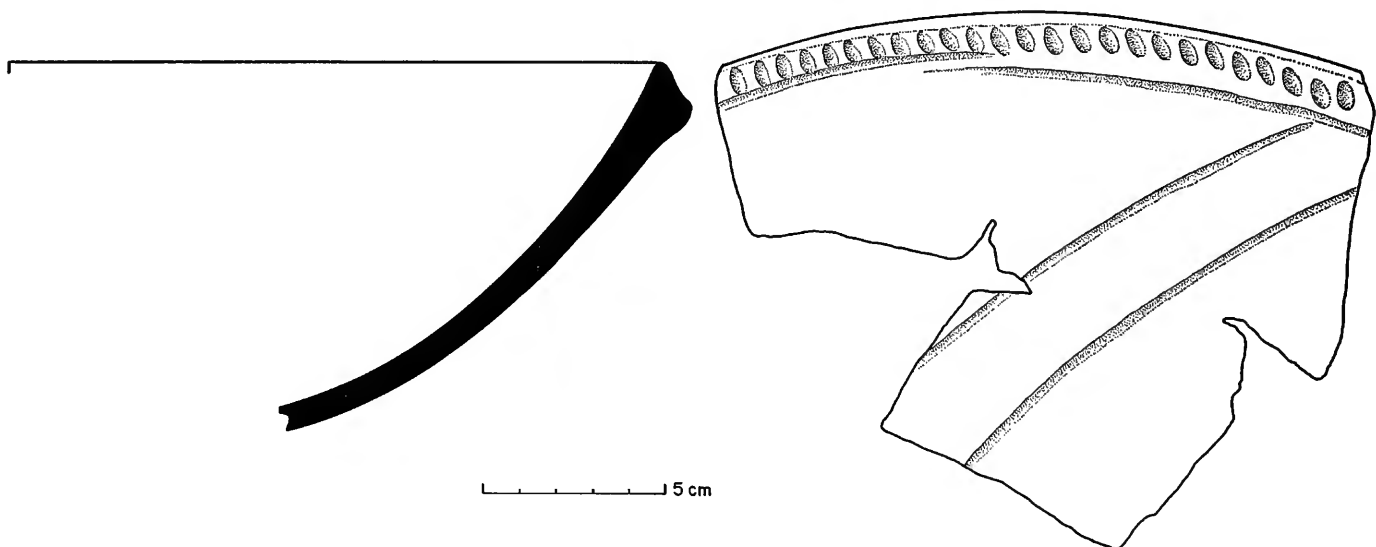


FIGURE 38.—Miscellaneous coarse pottery, Cuadros Phase. Sherd from large, open bowl.



## MISCELLANEOUS COARSE WARES FROM SALINAS LA BLANCA

This is a residual category made up of coarse wares too poorly represented in our collections to be classified. Each example is simply described in its own right, beginning with the Cuadros Phase and running through to the Marcos Phase.

## Cuadros Phase

*Open bowl with thickened angle below rim exterior* (fig. 38). The paste is the same as Guamuchal Brushed. Unslipped, with a very roughly polished interior and rim exterior above the thickening, the rest of the exterior being coarsely scraped. The angle below the rim is indented, like fillets of Guamuchal Brushed. The rim is tapered; the form of base is unknown. Rim diameter 34 cm., height about 11 cm., wall thickness 0.7 cm. Pairs of spaced, down-and-to-the-left lines are indented on the exterior below the thickening.

*Simple open bowl* (pl. 20, c). The paste is like Guamuchal Brushed; coiled construction is obvious, all coils being imperfectly smoothed. The surface is very rough, and coarsely worked with the fingers. No slip. The rim is scraped off on top to form a rounded bevel; the form of the base is not known. Rim diameter 38 cm., wall thickness 1.0 cm.

*Other sherds.* Unslipped, unclassifiable body sherds which include as decorative techniques incising, linear pattern burnishing, and fine dentate stamping. The latter is an obvious carryover from the Ocós Phase, which had dentate rocker stamping (Coe, 1961, p. 57).

## Jocotal Phase

*Effigy jar fragment.* The paste is like Suchiate Brushed. The surface is unslipped, and the exterior well smoothed but not polished; the interior was wiped with a rag. The upper wall bulges, and the rim is squared. Rim diameter 11 cm., wall thickness 0.18 cm. There was an applique

face on the exterior, the sherd showing only the "coffee-bean" eye.

*Deep bowls with outslanting sides* (pl. 20, d). The paste is like that of Suchiate Brushed. Unslipped, and smoothed on both surfaces to a matte finish. Rims are thickened on the exterior, and flat on top. The form of the base is not known. Rim diameter 34 cm., wall thickness 1.0-1.1 cm., mean 1.0 cm. Exterior finger punching was carried out, usually by pushing up the rim with the pad of the finger; in one example, the rim was pushed down at close intervals from the top.

*Necked jars.* The paste is like that of Suchiate Brushed. The vessels were wiped smooth with the fingers on both surfaces; one example shows badly smoothed coils. Necks are vertical to slightly outslanting, rims are tapered rounded. Rim diameter 12 cm. Height of neck is 6.0-8.5 cm., mean 7.0 cm. One sherd has raised areas on body, perhaps an effigy fragment.

*Simple, constricted-orifice bowl.* The paste is like Suchiate Brushed. Unslipped. The interior was scraped smooth, the exterior smoothed to a matte finish. The rim is flattened on top; the form of base is not known. Rim diameter ca. 26 cm., wall thickness 0.8 cm. A very fine line was indented along the rim exterior, and semicircles made on the body by fine engraving and shallow excising.

## Cerro del Tiestal Complex

Three sherds (two from the surface, and one from Level 1 of Cut 1) from deep, coarse, restricted orifice jars with slightly recurved necks and tapering rims (see pp. 91-92).

## Marcos Phase

From the surface, one sherd from a neckless jar with a vertical strap handle and a row of indented fillets, probably Late Classic.

## RARE SHERDS OR TRADE SHERDS FROM SALINAS LA BLANCA

## Cuadros Phase

Unusual Striated Sherds  
(pl. 15, k, l)

**PASTE:** Same as Guamuchal Brushed. One sherd has a black core, while the other (which has been accidentally refired) is reddish brown.

**SURFACE:** Unslipped, exteriors wiped smooth but not polished. One interior is smoothed, the other (Form 1) being coarsely scraped.

**FORM:**

1. *Neckless, globular jar* (pl. 15, k). One sherd only. The rim profile tapers to a point; the form of the base is unknown. Inner rim diameter 16 cm. Maximum body diameter is unknown, but probably much less than Guamuchal Brushed. Wall thickness 1.1 cm.
2. *Deep, constricted-orifice bowl* (one sherd only; pl. 15, l). The rim is rounded and exteriorly thickened. The

basal form is unknown, but probably flat. Inner rim diameter about 30 cm., maximum body diameter ca. 36 cm. Wall thickness 0.9 cm.

**DECORATION:** Fairly crude, vertical or diagonal incised lines. These are confined to a raised band on Form 1, on which there is exterior finger punching as well.

Excised Sherds  
(fig. 39, a, b)

**PASTE:** Usual bentonitic clay; the color is reddish brown, due to burning.

**SURFACE:** Possibly unslipped; but it may have had a white slip which has been worn away. Polished, then excised on the exterior, and wiped smooth on the interior. Accidentally refired to a reddish brown (2.5 YR 5/4) and weak red (10 R 5/3).

**FORM:** Probably a deep, flat-bottomed bowl with outslanting sides. The rim form is unknown. Diameter at

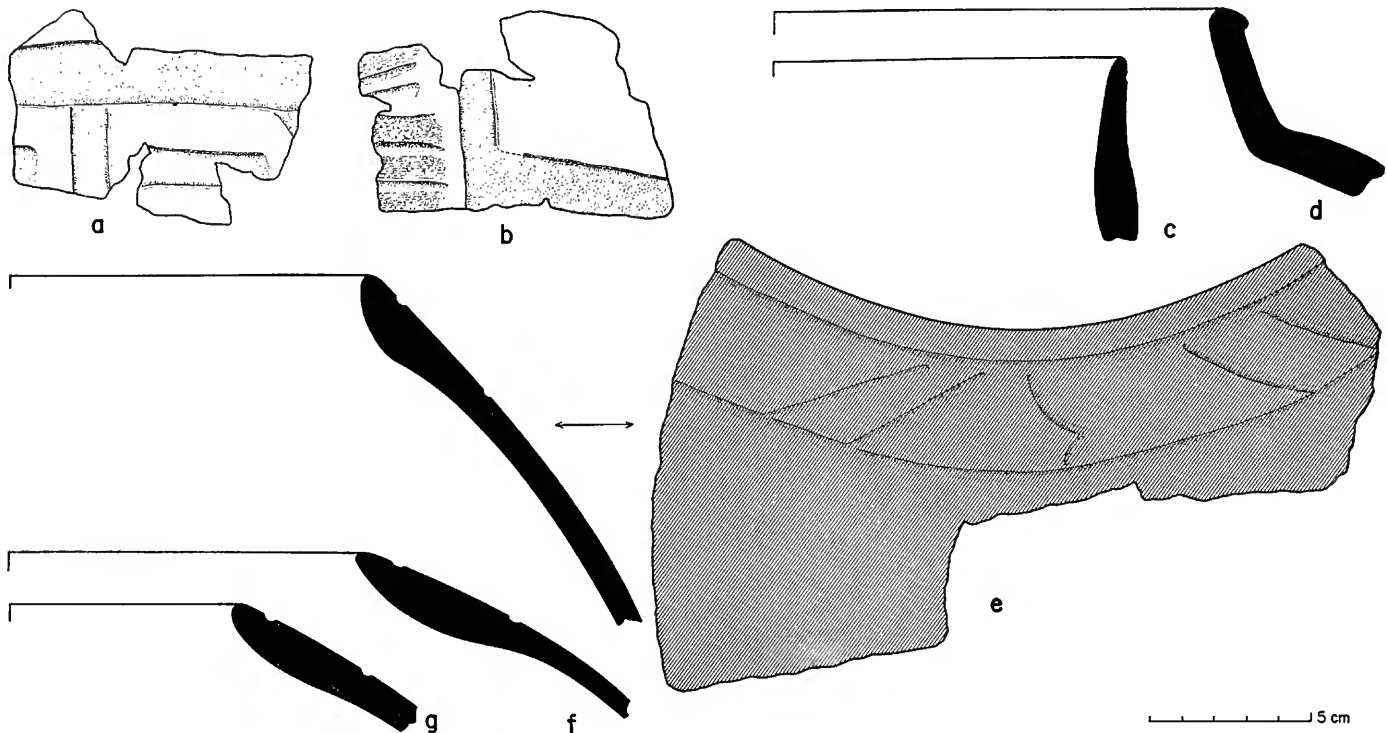


FIGURE 39.—Rare or minor pottery types from the Cuadros and Jocotal Phases. *a, b*, Excised sherds, probably from the same vessel. *c, d*, Osó Brushed jar necks. *e*, *Tecomate* with thick red slip. *f, g*, Teófilo Punctate *tecomates*. All Cuadros Phase except *d*, which is Jocotal.

rim unknown, but probably more than 28–30 cm. Body wall thickness 0.8–1.0 cm.

DECORATION: Excising or carving in rectilinear to curved bands, reserve zones being polished all over or pattern burnished.

REMARKS: Sherds probably are from a single vessel, early in the Cuadros Phase.

COMPARATIVE MATERIAL: Chiapa de Corzo: Chiapa I Phase, an identical sherd which is “possibly slipped buff-white” (Dixon, 1959, fig. 11, *b*).

*Tecomate* with Thick Red Slip  
(fig. 39, *e*)

PASTE: Like that of Guamuchal Brushed, but the glass particles include larger pieces of pumice.

SURFACE: Exterior has a thickly applied red slip (weak red, 10 R 4/4), the slip being carried over just inside rim. This slipped area is polished. Interiors are unslipped, and smoothed with the fingers when wet just inside the rim, the rest being smoothed by scraping with the smooth hard edge of something like a piece of gourd.

FORM: Neckless globular jar (*tecomate*), of which there is only one example. Less rounded, less restricted than Guamuchal Brushed *tecomates*. The rim is tapered rounded, with a slight interior thickening below the lip.

DIMENSIONS: Inner rim diameter 22 cm., wall thickness 0.9 cm.; other dimensions are unknown.

DECORATION: Two horizontal grooved lines encircle the vessel below the rim, containing between them paired diagonal curvilinear grooved lines, this embellishment being preslip.

REMARKS: The rarity of the type suggests that it was traded in from an outside area. Early Cuadros Phase.

Jocotal Phase

Fine White Vessels  
(fig. 40, *b, c*)

PASTE: Apparently bentonitic, untempered, but pumice spicules and glass fragments are very conspicuous. The paste is pure white throughout, very fine, and light in weight.

SURFACE: A thick, white, roughly polished slip is present on both surfaces.

FORM:

1. *Deep bowl or vase with restricted orifice* (one sherd; fig. 40, *c*). The rim is tapered, and squared at the lip. The basal form is unknown. Rim diameter 21 cm., wall thickness 1.0 cm.

2. *Neck of jar(?) or tall annular base?* (one sherd; fig. 40, *b*). Diameter at rim 17 cm., height 6.5 cm., wall thickness 1.0 cm.

DECORATION: Form 1, a combination of incising and excising on the exterior in a design of straight lines and semicircles. Form 2, engraving in a curvilinear motif which is hard to define.

COMPARATIVE MATERIAL: Sherds which are “white-clear-through” also occur in small numbers at the transition from Early to Middle Formative in the Tehuacán Valley (MacNeish and Peterson, personal communication).

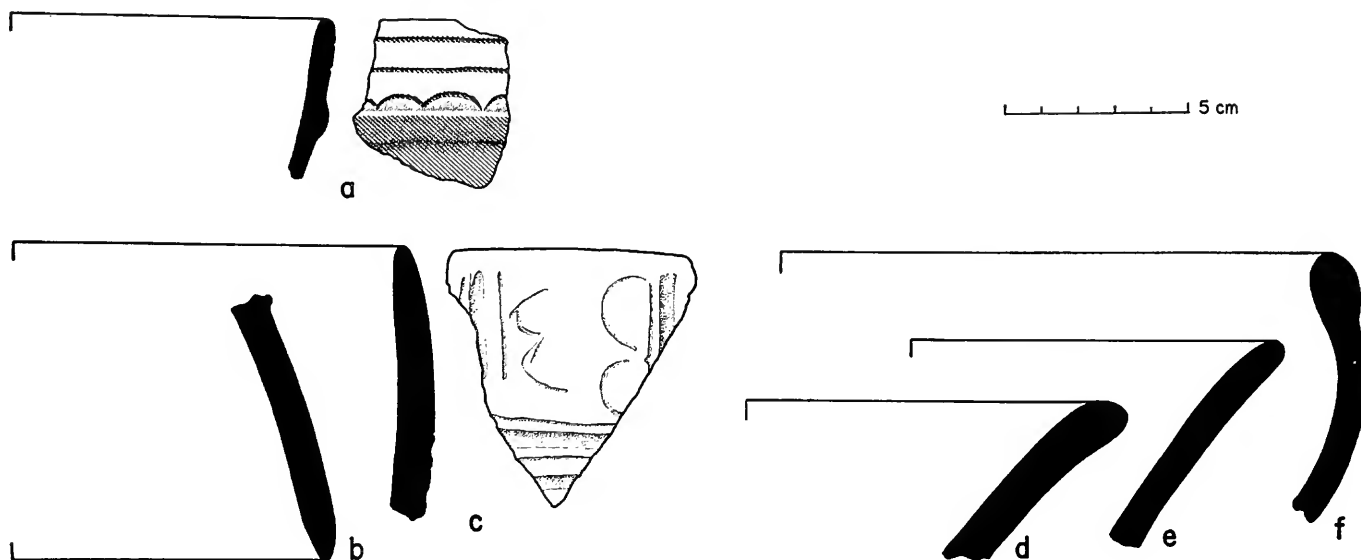


FIGURE 40.—Rare pottery elements of the Crucero and Jocotal Phases. *a*, White-on-orange open bowl. *b, c*, Possible annular base and a rim of a deep bowl, fine white ("clear through") pottery. *d-f*, Polished red flat-bottomed bowls with outslanting sides and polished red restricted orifice bowl. *b, c*, Jocotal Phase, rest Crucero.

#### Crucero Phase

##### White-on-orange Bowl (fig. 40, a)

**PASTE:** Typically bentonitic clay, relatively fine textured. The color is buff near the surface, with a whitish gray core.

**SURFACE:** Thick, orange (2.5 YR 5/6) slip was applied on both surfaces. On the exterior, a white (7.5 YR 7.5/4) slip was applied over this in a horizontal band extending 2.7 cm. down from the rim, the white slip having abundant white mica flecks on the surface. After slipping, both sides were well polished.

**FORM:** Open bowl, probably hemispherical with convex walls. The form of the base is unknown.

**DIMENSIONS:** Rim diameter 24 cm., wall thickness 0.5 cm.

**DECORATION:** After polishing, two broad horizontal lines and a row of joined arcs were deeply incised through both slips in the white slipped zone.

**REMARKS:** One sherd only, Crucero Phase. The decoration is the same as on Conchas Streaky Brown-black bowls.

##### Black-on-orange Jar (pl. 20, f)

**PASTE:** Bentonitic, fairly coarse texture. Pinkish buff, with a narrow gray core.

**SURFACE:** Exterior is slipped orange (2.5 YR 5/5), the slip being polished and crackly; the interior is unslipped, and wiped with the fingers when wet.

**FORM:** Probably a convex-walled jar or deep bowl.

**DECORATION:** A lustrous black paint was dribbled or daubed on the exterior in vertical stripes; a thin line was incised down the center of the two stripes after the paint had been applied.

**REMARKS:** Crucero Phase, one sherd only.

**COMPARATIVE MATERIAL:** Kaminaljuyú: Miraflores Phase, Fine Red tetrapod vases are decorated with parallel stripes of a very similar lustrous paint (Shook and Kidder, 1952, p. 92).

##### Polished Red Bowls (fig. 40, d-f; pl. 20, a-b)

**PASTE:** Bentonitic in origin, with a relatively coarse texture. Brownish buff in color, three out of four having dark gray cores.

**SURFACE:** Interiors are slipped red (10 R 4/5) and roughly polished; on Form 2, this extends over onto the exterior thickening. Exteriors are unslipped and are scraped smooth.

**FORM:**

1. *Flat-bottomed bowls with outslanting sides* (two sherds; fig. 40, d, e). Sides are slightly outflared, and rims tapered rounded. Rim diameter 25 cm., height ca. 6.0 cm., wall thickness 0.9–1.0 cm.
2. *Bowls with restricted orifice* (two sherds; fig. 40, f). These have convex sides, and rounded rims which are slightly thickened on the exterior. Rim diameter 35 cm., wall thickness 0.8 cm., height unknown.

**DECORATION:** None.

**REMARKS:** Probably Crucero Phase.

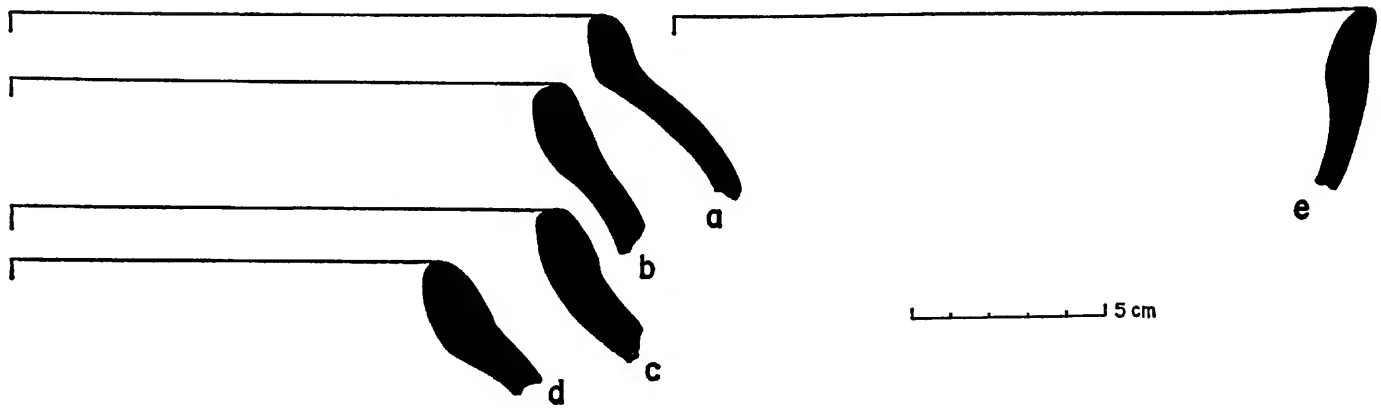


FIGURE 41.—Pottery of the Crucero Phase. *a-d*, Argelia Black-gray bowls or jars with slightly restricted orifice. *e*, Bowl of hard, thin plainware (rare).

**Hard, Thin Plain Ware**  
(*fig. 41, e; pl. 20, e*)

**PASTE:** Bentonitic and very hard, giving a metallic ring when struck. The color is pink, with a thin gray core.

**SURFACE:** Unslipped. The interior of the vessel and rim exterior were polished with horizontal pebble strokes, leaving slight ridges as marks. The rest of the exterior was scraped, with pitting resulting from inclusions being dragged along by the tool. The polished area is crackled, and the color is 2.5 YR 6/4 (light reddish brown).

**FORM:** A bowl with convex sides which are slightly recurved to produce a moderate flare at rim. The rim is tapered rounded with a flattened thickening on the interior. Basal form is unknown.

**DIMENSIONS:** Rim diameter 38 cm., wall thickness 0.15 cm.

**DECORATION:** None.

**REMARKS:** Only one sherd of this distinctive type is known and is probably a trade piece. It is most likely of the Crucero Phase, from its form and from its position in the deposits.

# The Artifacts of Salinas La Blanca

## GENERAL REMARKS

The artifact assemblage from Salinas La Blanca (Appendix 2, table 13; pls. 21-23) is remarkably scanty in contrast to the very large quantity of potsherds recovered from the excavations. Particularly strange is the virtual absence of clay figurines, which were abundant in the Ocós and Conchas Phases at La Victoria. Although it has been stated that the Chicanel Phase at Uaxactún, for instance, lacks figurines (Smith, 1955, p. 21), it has also been doubted that any Formative Phase in Mesoamerica actually is without them (Coe, 1961, p. 99). The evidence from Salinas La Blanca invalidates the latter claim. With one exception, there are no figurines in Cuadros, nor any in Jocotal or Crucero; in fact, we now feel confident that the Type 7 figurine torsos from La Victoria described as possibly of the Crucero Phase (Coe, 1961, fig. 61, *i*) are almost surely Conchas 2. In other words, there is a strong break in the figurine-making tradition after the Ocós Phase, and another after Conchas.

The rest of the artifacts largely consist of ground stone tools, manufactured from river cobbles of various sizes. Since there are no stones in the lower reaches of the Naranjo and Suchiate rivers, these must have been brought in from farther upstream. The rocks from which they were made have been identified by Dr. Matt Walton, of Yale University, and fall into three rough groupings, all volcanic in origin:

*Dacite group*.—Reddish brown to grayish brown in color, containing feldspar phenocrysts and hornblende in an aphanitic matrix; there is variation in the degree of vesicularity. River cobbles of this group were utilized for the manufacture of metates.

*Basalt or basaltic andesite group*.—Grayish-brown to dark gray in color, containing hornblende phenocrysts in an aphanitic matrix. Vesicular to finely vesicular. Commonly used for manos and hammerstones.

*Dark felsite* (only one example).—A coarsely vesicular rock, used as raw material for a mano.

In general, these rounded cobbles and pebbles have been only slightly altered to make the desired tools; there are also completely unaltered river rocks which must have been introduced to the site, and a few barely altered hammerstones.

Projectile points are also missing from the assemblage, as are woodcutting tools. Carefully chipped stone tools are absent in the Cuadros Phase, the anomalous obsidian chips of that phase barely meriting the term "artifacts." The narrow prismatic blades struck from specially prepared cores, so characteristic of Mesoamerica through much of its culture history, do not appear in the areal sequence until the Conchas Phase, after which they are abundant.

Sherd and pumice abraders, and shell polishers and a pendant of the same material, just about complete the meager artifact inventory.

## CUADROS PHASE

### Metate (*pl. 21, l*)

Manufactured from a rock of the dacite group, and shaped by pecking and grinding. The specimen is broken, but it was originally oval with a slightly trough-shaped, concave, upper surface and a flat base with no supports. The probable length was about 35 cm., the width about 22 cm. Under magnification, back-and-forth striations show its use as a metate, most likely in conjunction with a loaf-shaped mano.

### Mano (*pl. 21, k*)

The material is rock of the dacite group, shaped by pecking and grinding. The specimen is broken, but originally it was loaf shaped with an oval cross section. The length was about 15-16 cm.; its width is 7.7 cm., its depth 5.0 cm. Both surfaces show slight striations under magnification, indicating a use as a mano in a back-and-forth motion; the lack of flattening implies that wrist action was used in milling. This mano fits the upper surface of the previously described metate perfectly.

### Hammerstones (*pl. 21, j*)

Unaltered, subspherical river cobbles of the dacite and basaltic groups, now broken. The largest diameter varies from 9 to 12 cm. Pounding marks show their use as hammerstones.

### River Pebbles (*pl. 21, e, h, i*)

Small, ovoid river pebbles of the basalt or basaltic andesite group, 3.5-6.4 cm. long, showing no signs of

use. Strictly speaking, these are not artifacts, but they had to have been brought in for some purpose, since such pebbles do not occur as far downstream as Salinas La Blanca.

**Pumice Abrader**  
(*pl. 21, f, g*)

Basically unshaped rhyolite pumice which had been brought (or floated) downstream, in ovoid or irregular rounded lumps. The largest is 8.5 cm. long, and had been used on its widest surface to "sand" down a flat object, perhaps of wood; a smaller one had been similarly used on its edge, also on a flat surface.

**Obsidian Chips**

The material is fairly good quality, banded gray obsidian, quite translucent to transparent. These are chips or very small waste flakes of no definite form, about half of which show no signs of use. Two have very fine unifacial retouch along the end of thin triangular flakes; perhaps they were "end-of-chip scrapers." The unused examples are reminiscent of the waste flakes of the Ocós Phase.

**Sherd Abrader**  
(*pl. 21, b*)

A small sherd, probably from the lower part of a Guamuchal Brushed *tecomate*, one edge having been ground down to make a slightly concave abrader or "saw."

**Figurine Fragment**  
(*pl. 21, a*)

A leg from a solid, handmade pottery figurine, unslipped. The paste is like that of Guamuchal Brushed, and quite hard. The specimen differs from the legs of both Ocós and Conchas figurines.

**Tonguelike Tab**  
(*pl. 21, c*)

A thin, unslipped, polished pottery fragment broken from some unknown artifact.

**Shell *Columella***  
(*pl. 21, d*)

A beach-worn fragment from some large gastropod; it may have been used as a polisher or smoother.

**Shell Smoothers**  
(*pl. 23, h-n*)

Beach valves mainly of pelecypods, the edges of which show gloss from use as smoothers or polishers. Four are *Noetia reversa*, the beaks purposely smashed off for ease in holding between the thumb and forefinger; were they used to scrape pottery? Two are *Anadara aequatorialis*, with holes pierced in the umbos, possibly for suspension while working. One is *Cominella* sp. (a gastropod), considerably broken; there is a high gloss on the lip and exterior of the lip, and faint

striations show under magnification, at right angles to the lip. Because of the laminar structure of shell, it is hard to determine the exact use of these artifacts.

**Petate**  
(*pl. 23, a-c*)

In Level 14 of Cut 2, we encountered an impression in the clay floor of fragments from a sleeping mat or *petate*. The original had been constructed of palm leaves 2.5–3.0 cm. wide, and was twilled (over two, under two). Latex casts indicate a joining in some places (i.e., another set of elements beneath). Unfortunately, it was too fragmentary to determine the overall dimensions.

## JOCOTAL PHASE

**Hammerstones**  
(*pl. 21, v, w*)

Irregular river cobbles, usually broken, of the basalt or basaltic andesite group, almost completely unaltered. These measure 6.1–8.0 cm. in their largest dimensions. Battering of rounded edges indicates a use as hammerstones; one specimen has a naturally troughlike surface in which something had been polished by a back-and-forth motion.

**River Pebble**  
(*pl. 21, t*)

A small pebble of the basalt or basaltic andesite group, 4.2 cm. long, ovoid in shape but unaltered. There are no signs of use.

**Pumice Abrader**  
(*pl. 21, u*)

A round flattened lump of rhyolite pumice, 10.8 cm. long. It had been used as an abrader on its flat surfaces, to smooth other flat surfaces (of wood?).

**Obsidian Chips**

Good quality, gray, banded obsidian, in small waste flakes or fractured chunks. Some chips show bulb of percussion. Two have had long thin flakes removed from one or both surfaces by a bipolar percussion technique. One flake was retouched, the retouching being unifacial along the edge of an amorphous chip, probably the result of its use as a scraper. One fragment is from a better made spokeshave with bifacial retouch on the concave scraping surface; it was used to "shave" a stick about 1.5 cm. in diameter.

**Sherd Disks**  
(*pl. 21, p, q*)

Approximately circular sherds from the lower part of Suchiate Brushed or Guamuchal Brushed *tecomates*, one shaped by breaking only, the other by grinding the edges. The diameter varies from 4.5–6.0 cm. Their use is unknown.

**Sherd Trapezoids**  
(*pl.* 21, m-o)

Very carefully made objects fashioned by grinding sherds along their edges into long trapezoids; the apex of the trapezoid is not ground. Two sherds are from Morena Black flat-bottomed bowls; one is from the side of an Ocos Gray flat-bottomed bowl. Length 3.8–5.3 cm. These are restricted to the Jocotal Phase.

**Effigy Fragment**  
(*pl.* 21, s)

A solid, hand-modeled fragment of a lug or possibly of a figurine, slipped weak red (7.5 R 4/4) and unpolished. There is a resemblance to the snout of an animal.

**Shell Pendant**  
(*pl.* 21, r)

A valve of *Mulinia palida*, with a small hole punched through the beak from the outside, below the umbo.

### CRUCERO PHASE

**Metates**  
(*pl.* 22, s)

These are manufactured from rocks of the dacite group by pecking and grinding. Flat bottomed and trough shaped, they have raised sides. Probably they were more than 42 cm. long; they measure 3.2 cm. thick in the middle and 7.3 cm. thick along the center line near the end. Microscopic back-and-forth striations show use as metates with the mano.

**Manos**  
(*pl.* 22, g-k)

Two are of dacite and one of basalt or basaltic-andesite group. The technique of manufacture was pecking and grinding. They are loaf shaped, with slight constriction toward the ends; all but one are convex on both surfaces. Dimensions range from 9.1–14.4 cm. in length, 6.9–7.8 cm. in width, and 5.0–5.6 cm. in thickness. Striations on grinding surfaces show use as manos, with wrist action; one planoconvex specimen has striations only on the convex surface. All have pecking marks on both ends, indicating use in pounding; two have pitting on both grinding surfaces, possibly through utilization as nut stones. One of the latter has red pigment in the surface vesicles, from which may be inferred its use for grinding that substance.

**Hammerstones**  
(*pl.* 22, e, f)

Ovoid to irregular river cobbles (two are basaltic andesite, one is dacite, and one is a bleached rock of the dacite group); 7.2–13.0 cm. long, used for battering and pounding, especially on ends. Faint striations on smooth convex surfaces of one show use

as a smoothing or polishing tool in a back-and-forth motion; another was possibly employed as a mano.

**River Pebbles**  
(*pl.* 22, p-r)

Small, spherical or ovoid flattish river stones, two made from dacite and one from basaltic andesite; 1.9–4.1 cm. in their longest dimension. There are no signs of use.

**Pumice Abrader**  
(*pl.* 22, d)

A lump of rhyolite pumice, flattish with a somewhat triangular outline, probably a natural shape; 8.0 cm. long, 2.5 cm. thick. One side has a concave surface which was used for abrading some cylindrical object with a diameter of about 18 cms., probably of wood.

**Obsidian Flakes, Retouched**  
(*pl.* 22, l)

Poor quality, black obsidian with a coallike appearance; a few are of better quality. These amorphous flakes have unifacial retouch along one edge, for use as small scrapers.

**Prismatic Blades, Obsidian**  
(*pl.* 22, m, o)

Good quality, banded, gray obsidian. All blades are fragmentary, none over 4.5 cm. long. The width ranges from 1–2 cm. Almost all show considerable "use-retouch" along both edges, which are very irregular and clearly worn from use as knives or side scrapers. The blades and poor-quality flakes probably came from different places, the former most likely originating in the highlands near Guatemala City and traded down by Miraflores people. However, the blades must have been in small supply, as they are worn to such an extent that they would have long since been discarded by the Mirafloresños.

**Blades with Accidental Burinlike Blows?**  
(*pl.* 22, n)

Two obsidian blade fragments with "burinlike" blows on the sides, producing the typical "beaks" and bulbs of percussion, as well as long scars and hinge fractures. Almost certainly accidental.

**Sherd Abraders**  
(*pl.* 22, a, c)

Sherds ground along one or more edges to form a "saw" or abrader. One is from Julaín Coarse; one is from Argelia Black-gray, two from Conchas Streaky Brown-black, and one from Morena Black (redeposited from Jocotal?).

**Figurine?**  
(*pl.* 22, b)

A solid, handmade, crude and unslipped fragment, possibly a torso from a very poorly made figurine, but dubious.



DATES	PERIODS	OCOS AREA, GUATEMALA	CENTRAL CHIAPAS	HIGHLAND GUATEMALA	CENTRAL MAYA AREA	SO. VERACRUZ, TABASCO	NORTHERN VERACRUZ	TEHUACAN, PUEBLA	VALLEY OF MEXICO
1521	LATE POSTCLASSIC	?	Chiapa XII	Mixco Viejo, Chiuautla	Tayasal	Torres site	Panuco VI	Late Venta Salada	Aztec
1200	EARLY POSTCLASSIC	?	Chiapa XI	Ayampuc	—	Soncautla	Panuco V	Venta Salada	Tula - Toltec
900	LATE CLASSIC	Marcos	Chiapa X	Amatle-Pamplona	3 Tepau 2 1	Nopitla	Panuco IV	Early Venta Salada - Late Palo Blanco	Coyotlatelco
600	EARLY CLASSIC	?	Chiapa IX Chiapa VIII	Esperanza Aurora	3 Tzakol 2 1	Matacapan Cerro de las Mesas III	Panuco III	Late Palo Blanco	Teotihuacan III
300	PROTO-CLASSIC	?	Chiapa VII	Santa Clara	Matzanel	Cerro de las Mesas II Tres Zapotes II	Early Palo Blanco	Early Palo Blanco	Teotihuacan II
100 0 B.C.	LATE FORMATIVE	Crucero	Chiapa VI Chiapa V	Miraflores - Arenal	Chicanel	Cerro de las Mesas I Tres Zapotes I	Panuco II Chila	Late Santa Maria	Teotihuacan I Cuicuilco - Ticoman Late Zacatenco
500	MIDDLE FORMATIVE	Conchas 2 Conchas 1	Chiapa IV Chiapa III Chiapa II	Las Charcas	Chicanel Mamom Xe	La Venta	Aguilar Ponce	Early Santa Maria	Middle Zacatenco Early Zacatenco El Arbolillo I
1000	EARLY FORMATIVE	Jocotal Cuadros Ocos	Chiapa I	Arevalo			Pavon	Late Ajalpan	Tlalpan
1500								Early Ajalpan	

FIGURE 42.—Archeological chronology of Mesoamerica and the Ocos area.

# Dating the Archeological Sequence

## CULTURAL STRATIGRAPHY IN THE OCÓS AREA

Until 1962, our knowledge of the archeological succession in the Ocós area was entirely based on the stratigraphic record at La Victoria. The oldest culture at that site was the Ocós Phase, ascribed to the Early Formative period and aligned in the final report with Chiapa I at Chiapa de Corzo. This was followed by Conchas 1 and 2, and it was believed at that time that Conchas 1 had directly evolved from Ocós without a stratigraphic break; both of the subphases of Conchas were placed in the Middle Formative, and aligned with Chiapa II through IV as well as with Mamom and Las Charcas. The Late Formative Crucero Phase followed on the heels of Conchas but was sorted out from mixed deposits on a typological basis, mainly through Coe's knowledge of Late Formative ceramics at Kaminaljuyú in the Miraflores Phase. The Proto-Classic and Early Classic were unrepresented at La Victoria, but the site was reoccupied toward the end of the Late Classic by villagers of the Marcos Phase, characterized by abundant San Juan Plumbate pottery.

At Salinas La Blanca, a somewhat complementary series of phases helps to expand the sequence in the Ocós area. The Cuadros Phase, earliest of the periods at Salinas La Blanca, because of its deceptive simplicity was at first glance thought to antedate the Ocós Phase, which is not represented at the site. Ceramic analysis later showed, however, that the few Ocós traits present (like rocker stamping) occur only on the *earliest* Cuadros vessels, while later Cuadros evolves in situ and without a break into the Jocotal Phase. Analysis also showed that Jocotal leads directly into Conchas 1—and in fact, it is now clear that there was a thin layer of Jocotal material present at La Victoria, immediately underlying Conchas levels in at least some of the pits. Unfortunately, the Conchas Phase is missing at Salinas La Blanca; after Jocotal, with its many “incipient Conchas” traits, there was a hiatus in the sequence. The site was briefly reoccupied in Crucero times, and the many restorable vessels left in refuse pits of that phase now leave us in a far better position to define Crucero than did the evidence from La Victoria alone. The two stratigraphic records can then be correlated as shown in table 2.

It is readily apparent that we still lack knowledge of the Proto-Classic and Early Classic periods in the Ocós area. Furthermore, while Ocós can be demonstrated to be earlier than Cuadros, we lack data on the transition from the former to the latter.

TABLE 2.—RELATIONSHIP BETWEEN LA VICTORIA AND SALINAS LA BLANCA STRATIGRAPHIC CUTS

Period	La Victoria	Salinas La Blanca
Late Classic.....	Marcos.....	—
Early Classic.....	—	—
Proto-Classic.....	—	—
Late Formative.....	Crucero.....	Crucero
Middle Formative.....	Conchas 2.....	—
	Conchas 1.....	—
Early Formative.....	—	Jocotal
	—	Cuadros
	Ocós.....	—

The foregoing represents the relative chronology in a small and well delimited region of Mesoamerica. To fix dates to this sequence, we must examine radiocarbon determinations from this and other sites, and move further afield to broader ceramic comparisons in southeastern Mesoamerica (fig. 42). We do not intend to go over such correlations as have already been made in the report on La Victoria (Coe, 1961, pp. 120-134), but will content ourselves with the discussion of newer information which throws further light on the scheme presented there.

### Radiocarbon Dates

Four samples of charcoal from Salinas La Blanca were tested for Carbon-14 content in the Geochronometric Laboratory of Yale University. All of these came from hearths belonging to the Cuadros Phase at the site. We extracted the charcoal ourselves with the blade of a clean pocketknife, transferring the fragments directly to polyethylene bags. These were taken as soon as possible to Guatemala City, where each sample was thoroughly dried in the soil-testing laboratory of the Instituto Agropecuario, to avert

contamination by mold. All of the charcoal came from twigs or small branches.

The radiocarbon determinations are listed below; to obtain the Christian date, A.D. 1950 was subtracted from years "B.P." All of the dates were calculated on the basis of a Carbon-14 half life of 5,570 years.

	<i>Date</i>
Y-1150 Salinas La Blanca. Charcoal from a small hearth in the northeast corner of Cut 2, 3.38 m. below datum in Level 15.	2928±105 978 B.C.
Y-1151 Salinas La Blanca. Charcoal from a hearth, northeast quadrant of Cut 2, 4.50 m. below datum in Level 21.	2715±105 765 B.C.
Y-1154 Salinas La Blanca. Charcoal from a hearth in a heavy layer of sherds and other debris in Cut 1, Level 28 (5.8-6.0 m.)	2878±105 928 B.C.
Y-1166 Salinas La Blanca. From a hearth, northwest quadrant of Cut 1, Level 29 (6.0-6.2 m.). The sample probably consisted entirely of charred bone; it dissolved completely in an alkali solution. The alkali precipitate has been dated.	2764±90 814 B.C.

In addition, we have one date for the Conchas Phase, obtained from the site of Río Naranjo (SM-37). This site lies along the east bank of the river some 40 m. downstream from Salinas La Blanca. It also has been partially cut away by the waters of the Naranjo,

leaving an eroded profile several meters high. A hearth exposed in that profile yielded us a large quantity of Conchas I sherds and a radiocarbon sample dated as follows:

Y-1167 Río Naranjo (SM-37). Charcoal from face of mound cut by river, 3-4 m. below the summit.	<i>Date</i> 2740±60 790 B.C.
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This date of 790 B.C. for the Conchas I Subphase is in perfect agreement with dates for contemporaneous material in the Valley of Tehuacán, Puebla. There the site of Las Canoas, belonging to the early Santa María Phase and characterized by pottery which in many respects is indistinguishable from Conchas I, has been radiocarbon dated at 750 B.C. (Richard S. MacNeish, personal communication). Our feeling, therefore, is that the slightly earlier Jocotal Phase must date in the neighborhood of 850-800 B.C. On the basis of the four Cuadros Phase radiocarbon dates already discussed above, we feel that Cuadros must date to approximately 1000-850 B.C. Such a placement is supported by a radiocarbon date for the closely related Chiapa I period, which suggests a span of roughly 1152-955 B.C. (Dixon, 1959, p. 41). On the basis of the present limited evidence, it would probably be a mistake to attempt to be too precise about the beginning and end of the Cuadros and Jocotal Phases.

## CULTURAL AFFILIATIONS OF THE CUADROS PHASE

As can be seen on pages 25-44, there is a strong similarity between the ceramic assemblage of Cuadros and that of Chiapa I (Cotorra or "Pit 50") at Chiapa de Corzo—far more convincing than similarities between Ocos and Chiapa I. These resemblances include a heavy emphasis upon brushed *tecomates* with zoned rim bands and interior finger-punching, *tecomates* with red-painted rim bands, red-and-white bichrome pottery, white-black differential firing, and white-slipped pottery, among others. Many specific vessel forms are shared.

In terms of artifactual assemblages, Cuadros shares with Chiapa I a rarity or near absence of figurines, a similar type of oval metate, and sherds with ground edges, as well as a lack of obsidian prismatic blades.

The earliest ceramics of the Santa Marta Rock Shelter also bear a close resemblance to those of Cuadros, with a high proportion of brushed *tecomates*, some with close stepped jabs on the exterior and with interior finger punching (MacNeish and Peterson, 1962, pl. 6). The authors rightly align this horizon with Chiapa I, but it seems to us to converge even more on Cuadros. However, a few of the *tecomate*

sherds which they exhibit appear to be more closely related to Jocotal than to Cuadros.

A ceramic assemblage geographically closer to Salinas La Blanca comes from Altamira, a village site on the Chiapas side of the Suchiate River investigated by the New World Archaeological Foundation (Dee F. Green, personal communication). Much of the pottery which we have seen appears to be of the Conchas Phase. However, some of it clearly is affiliated with Jocotal, and some with Cuadros, the latter including brushed *tecomates* with interior finger punching. The earlier levels at Izapa also seem to have Cuadros-like pottery (Gareth W. Lowe, personal communication).

Apart from these sites in Chiapas, no ceramic complexes elsewhere in Mesoamerica seem to us to be firmly related to that of Cuadros.

Does Cuadros, then, align itself strictly with all of Chiapa I? We think not. Chiapa I *does* have some indubitable relation on the one hand to Ocos (Coe, 1961, p. 123), and on the other to Jocotal. We agree with Dee F. Green (personal communication) that Chiapa I, thus far described only on the basis of the

Pit 50 deposit (Dixon, 1959), is a long period that could be further subdivided on the basis of future stratigraphic excavations. We view Ocos as beginning before the Chiapa de Corzo sequence, but overlapping with early Chiapa I; Cuadros as being contemporary with middle Chiapa I; and Jocotal as overlapping with late Chiapa I.

We have mentioned the dates on Cuadros, centering on the 10th century B.C. and believed by us to be reliable. A date on midden charcoal from Pit 50 at Chiapa de Corzo (GRO 774) is  $3010 \pm 100$ , or 1060

B.C., well within the one sigma range for the Cuadros determinations (Dixon, 1959, p. 41); and Dixon feels, as we do, that Chiapa I may have lasted until some time between 950 and 750 B.C. At the Santa Marta Rock Shelter (MacNeish and Peterson, 1962, p. 38), sample M-978, charcoal from the stratum containing the first ceramics measured  $3280 \pm 200$  years, or 1330 B.C. This is somewhat older than we would expect for Chiapa I-Cuadros style ceramics, but it is also within one sigma (200 years) of the Cuadros dates.

### CULTURAL AFFILIATIONS OF THE JOCOTAL PHASE

Jocotal should be alined with the latter part of Chiapa I and with the earlier portion of Chiapa II. In support of such a contention, we might first list those ceramic traits which are also known in late Chiapa I: *tecomates* with diagonal brushing below the rim zone and with rows of connected, incised arcs; and deep, recurved bowls (Dixon, 1959, fig. 16). However, more intimate connections are shown with *tecomates* from Chiapa II: they include exterior finger punching and rows of arcs, on sherds which could easily be mistaken for Jocotal specimens. The presence of white-slipped pottery with engraved motifs as specific as the "double-line-break" is another firm trait tying in the two. Nonetheless, Chiapa II has incised white pottery in such abundance that the bulk of that period must be alined with Conchas I (Coe, 1961, p. 123).

It has already been stated that some of the illustrated sherds from the first pottery-bearing level at the Santa Marta Rock Shelter look like Jocotal; most are *tecomates* which we would identify as extremely close to Suchiate Brushed (MacNeish and Peterson, 1962, pl. 6, *a-d, i*).

The Burrero Phase at Santa Cruz, Chiapas, which Sanders (1961, pp. 48-49) convincingly equates with Chiapa II or Dili, also is strongly affiliated with Jocotal. The type "Burrero Tecomate" as a whole includes many sherds of Suchiate Brushed (although the trait of brushing itself is not as frequent on the Santa Cruz pottery as it is in Jocotal). Also to be noted is the resemblance of "Burrero Cream" to incised Conchas White-to-buff sherds of the Jocotal and Conchas Phases.

In the New World Archaeological Foundation collection from Altamira, Chiapas, some *tecomate* rims of Suchiate Brushed were also noted.

One of the more interesting correlations of Jocotal centers on Kaminaljuyú, in highland Guatemala.

The Arévalo Phase at that site shows clear-cut relationships with Jocotal, especially in cross-brushed *tecomates* with curvilinear indented fillets which are very close to some examples of Suchiate Brushed (and also to Méndez Red-rimmed *tecomates* of the Jocotal Phase). Tilapa Red-on-white *tecomates*, which continue from Cuadros into the Jocotal Phase, also seem to be related to the red-on-white *tecomates* of Arévalo. Arévalo has other ceramic traits which seem to tie in better with Conchas. In particular, it has plain, red, unslipped *tecomates* which in form are identical with Conchas Red Unburnished.

The exact relative position of Arévalo in the Kaminaljuyú sequence has for some time been in doubt. The sequence was originally supposed to have opened with Las Charcas, estimated at 2000-1800 B.C., followed by Arévalo, 1800-1600 B.C. (Shook, 1957). In the years subsequent to 1957, doubts were cast on the very early placement of Las Charcas (particularly in Coe, 1961, pp. 127-128), since that phase was demonstrated to be crosstied with Conchas 2 on the Pacific coast. On stylistic grounds, Las Charcas was therefore moved to the Middle Formative, a position confirmed by several radiocarbon dates (see comment by de Borhegyi on M-1257, a Las Charcas sample, in Crane and Griffin, 1964, p. 16). On the other hand, many archeologists working in southeastern Mesoamerica have felt that Arévalo was probably the earlier phase, and in a recent chart (Delgado, 1961, p. 102) it is placed after Chiapa I and before Las Charcas (the latter being alined with Chiapa II, a placement with which we disagree).

The strong evidence that Arévalo and Jocotal are contemporaries confirms the view that the former is the earliest village culture known thus far in the Guatemalan highlands, and that Las Charcas is coeval with Conchas.

## CULTURAL AFFILIATIONS OF THE CRUCERO PHASE

The evidence is overwhelming that Crucero is to be aligned with the Miraflores Phase at Kaminaljuyú. The assemblage of whole or nearly complete vessels recovered from the intrusive pits at Salinas La Blanca is astonishingly close to the assemblage accompanying the two burials in E-III-3 (Shook and Kidder, 1952), which especially emphasizes Usulután decoration and brown-black vessels of composite-silhouette and bucket-like forms, as well as a highly specific kind of decoration, finely engraved interlocking scroll bands. Crucero is a kind of "country cousin" of Miraflores.

Similar but not quite so identical ceramics are found in the Petén (late Chicanel), on the Pacific coast of Guatemala (Finca Arizona, Monte Alto) and Chiapas (Izapa), as well as in the Central Depression of Chiapas (Chiapa V or Guanacaste Phase), all these manifestations considered as Late Formative (see discussion in Coe, 1961, p. 133).

An earlier series of dates on Miraflores was definitely out of line with current ideas of Mesoamerican chro-

nology (*ibid.*, p. 131). Significantly, both of these were charcoal samples extracted from fill: C-884 ( $3142 \pm 240$ , 1192 B.C.) from the fill of Stratum 4 in E-III-3 (Shook and Kidder, 1952, p. 52; Libby, 1955, p. 131), and C-887 ( $2490 \pm 300$ , 540 B.C.) from the fill of Stratum 5 in E-III-3 (Libby, *loc. cit.*). Both samples were probably redeposited, and do not date the phase. Y-377 ( $1940 \pm 60$ , A.D. 10) is from Tomb 1 in the same mound (Deevey, Gralenski, and Hofren, 1959), and presumably falls within the actual span for Miraflores.

Burned pine from the late Chicanel Burial 85 at Tikal yielded a radiocarbon date of about the time of Christ (Coe and McGinn, 1963, p. 31), which is very close to the Miraflores date cited above.

Thus, on the basis of a few reliable samples which are not picked out from fill, one can say that at least part of the Crucero Phase falls at the very beginning of the Christian Era.

## CULTURAL AFFILIATIONS OF THE OCÓS PHASE

Lastly, we come to the Ocós Phase and its probable dating. The 1962 excavations at Salinas La Blanca shed little light on the problem except to suggest that the Ocós Phase probably ends before 1000 B.C., when Cuadros begins. Excavations by MacNeish at Tehuacán, Puebla, however, have recently disclosed material strikingly similar to Ocós in spite of the long intervening distance. These materials belong to the phase MacNeish has called late Ajalpan (ca. 1300 B.C.). Some overlapping Ocós-Ajalpan traits have been listed by MacNeish in a preliminary report (MacNeish, 1962, pp. 37-38), and we discussed others with him in conversations in 1963. Late Ajalpan and the Ocós Phase share *tecomates* with a red wash or slip over their whole bodies; *tecomates* with a band of specular hematite at the rim; thin-walled *tecomates* with zoned decoration, either paint or surface-texture alteration; polished black flat-bottomed bowls with zoned dentate rocker stamping; and a whole series of *tecomate* rim profiles, including MacNeish's "pumpkin-shaped" and "turned-up-rim" types. Other ceramic

complexes, obviously related but as yet not published in detail, include the lowest levels at the site of El Trapiche, Veracruz (José García Payón, personal communication) and deep levels at the mound of Chalahuites in central Veracruz (James A. Ford, personal communication). Taking all the available radiocarbon dates and cultural cross-ties into consideration, we are left with the tentative Formative chronology for the Guatemalan Pacific coast as detailed in table 3.

TABLE 3.—CHRONOLOGY OF THE GUATEMALAN COAST <sup>1</sup>

Phase	Date
Ocós.....	1300-1100 B.C. (?)
Cuadros.....	1000-850 B.C.
Jocotal.....	850-800 B.C. (?)
Conchas 1.....	800-500 B.C.
Conchas 2.....	500-300 B.C.
Crucero.....	300 B.C.-A.D. 100

<sup>1</sup> Based on available radiocarbon dates.

## Subsistence in the Cuadros and Jocotal Phases

An unusual combination of circumstances has resulted in a good deal of information on the subsistence of the Early Formative people who lived at Salinas La Blanca—far more, in fact, than was available at La Victoria or at most other Formative sites in southeastern Mesoamerica. These circumstances were (1) the alternation of clay floor construction with the spreading about of household debris and (2) the high amount of calcium carbonate in this clay. These factors allowed the formation of excellent impressions of perishable food remains in the clay strata, and even the “fossilization” of plant tissue by carbonate replacement within these casts.

Furthermore, while mammal remains were unusually, and significantly, scarce, our study of the present-day animals of the area, of the microenvironments which they inhabit, and of their exploitation by

the modern Ocoseños, have given us some insight into hunting and collecting practices in ancient times. Since we had complete skeletons available for most of the important food mammals and reptiles, Flannery had little trouble in identifying the bones from our excavations. For other remains, we had to turn to various specialists in these fields.

The total picture which we have gained from our analysis of Cuadros and Jocotal food remains is of a people whose principal livelihood was gained by farming, supplemented by collecting activities in the local lagoon-estuary system. They could hardly be considered hunters in the usual sense of that term. The picture is one of a successful, self-sufficient, and totally sedentary hamlet, well adapted to a coastal farming life.

### PLANT FOODS

#### Maize

A total of 50 impressions of maize cobs (pls. 5, *c*, *d*; 24) were found on and in clay floor layers of the Cuadros occupation at Salinas La Blanca. Of these, 18 were simple negative casts; 32 contained the mineralized cobs themselves inside the clay casts. We trimmed each block of clay as close as possible to the actual impression, and dried it over a period of days. A very thin solution of Duco cement was carefully dropped onto the clay as it dried, so as to consolidate the matrix. For transport, each small block, after drying, was wrapped with a layer of surgical cotton, then in aluminum foil, and bound all around with Scotch tape. In Guatemala City, we took latex molds of those impressions that did not contain mineralized tissue, the drawback here being that it was necessary to break the block to extract the mold.

In addition to the evidence of the cobs themselves, impressions of maize stalks were found in Level 16 of Cut 1 and Level 17 of Cut 2, and of maize leaves in Level 15 of Cut 2.

The mineralized maize cobs were analyzed by Dr. Paul C. Mangelsdorf (Appendix 3); the latex molds, however, show too few details to be useful. As reported by him, the preservation of even the tiniest

details on the mineralized cobs was remarkable, and he was able to take measurements on 26 of them. He concludes that a single race of maize was being grown by the Cuadros villagers, a race of pod corn which strongly resembles the two primitive Mexican races of Nal-Tel and Chapalote, and which shows no signs of hybridization or introgression with *Tripsacum* or teosinte. The ears were apparently borne on very slender stalks, and the cobs averaged 12 rows of kernels each.

It is extremely difficult to distinguish between the two closely related races, Nal-Tel and Chapalote, on the basis of cobs alone, since the main feature that differentiates them is the color of the kernels (Mangelsdorf et al., 1964, p. 544). However, Chapalote is today confined to northwestern Mexico and archeologically “is the predominating early corn in all sites excavated in northwestern Mexico and the southwestern United States” (ibid.); it is best adapted to low elevations but can thrive up to 1800 m. (Wellhausen et al., 1952, p. 54). Nal-Tel, on the other hand, has its main distribution in southeastern Mexico and in Central America (as far south as Nicaragua). In Guatemala alone it is divided into five subraces, which would argue a considerable antiquity in that country; it seems not unlikely that this was the race

TABLE 4.—MAIZE COB REMAINS FROM SALINAS LA BLANCA

Phase	Cut	Level	Number of cobs		Total	
			Simple negative cast	Cast containing mineralized tissues		
Cuadros....	2	14	2	—	2	
	1	15	1	30	31	
	2	15	1	—	1	
	1	16	—	2	2	
	2	21	1	—	1	
	2	22	3	—	3	
	2	24	3	—	3	
	2	26	1	—	1	
	1	27	3	—	3	
	2	27	2	—	2	
	1	28	1	—	1	
	Totals			18	32	50

at Salinas La Blanca. Like Chapalote, it does best in the lowlands but is found up to 2325 m. (Wellhausen et al., 1957).

Many collections of the "Nal-Tel-Chapalote complex" show some degree of teosinte hybridization, and this is true of the specimens from Tehuacán. "Early Tripsacoid" maize makes its appearance there in the Abejas Phase (3400–2300 B.C.), so that the original hybridization between maize and *Tripsacum* must have taken place at least by this time. The offspring of the two, teosinte, is known to have been growing in Tamaulipas by 1800–1400 B.C. (Mangelsdorf et al., 1964, p. 538). It is thought that the "Nal-Tel-Chapalote complex" arose from this "Early Tripsacoid" corn, a few specimens being dated to the late Abejas Phase.

For this reason, it is interesting that our Cuadros cobs are a form of pod corn free from infusions of tripsacoid genes. Mangelsdorf and his associates believe that the origin point of tripsacoid maize may have been in the Balsas River basin of Guerrero. It seems to us quite possible that cultivated maize spread into the Guatemala area before such crossing had taken place (i.e., before 3000 B.C.).

As noted in pp. 14–15, the best agricultural soils in the area were formerly occupied by mixed tropical forest, now replaced in part by cleared fields and second growth. It will be recalled that the founders of Salinas La Blanca, early in the Cuadros Phase, had moved onto a relatively high spot in the mangrove forest, and further built it up with abundant applications of clay layers. This locality could not have been very far from the cleared fields, for a sample of the deposits in Level 29 (6.0–6.2 m.) of Cut 1 proved to have, on analysis by Dr. Matsuo Tsukada, a number

of pollen grains from *Trema* sp., clustered together as though from a single anther (no pollen was discovered in any of the other samples submitted, with the exception of wild *Gramineae* in Cut 2, Level 14, and Cut 1, Level 6). Standley and Steyermark (1946 a, pp. 8–9) list only one species of *Trema* in Guatemala, *T. micrantha* (local name, *capulín*). This is a shrub or tree, sometimes 15 m. high or more, which is a typical pioneer of abandoned cornfields, and therefore an important indicator of cultivation.

We have built up a picture of farming in fields which were quite near the banks of the estuary or the river, fields which were probably planted with Nal-Tel or Chapalote maize by means of the typical lowland digging stick. There was some degree of fallowing of plots, as indicated by the *Trema* pollen, although the soils are so good that fallowing with its concomitant cutting and burning of new plots is not practiced today (Coe, 1961, pp. 13–14). The modern Ocos farmers bring in three maize crops each year. However, they have 10 races of maize from which to choose for each sowing, these races having distinct growing seasons, habits, and culinary uses. Did the Cuadros people also have the opportunity for three annual harvests of maize? Both Nal-Tel and Chapalote are early maturing, and it does not seem unreasonable in this frost-free area to suppose that even though only one race was present, it might have been harvested twice (or even three times) a year.

We suspect that, given the deep, volcanic-derived soils of the region, maize agriculture was highly successful and provided the major sustenance of the Cuadros and Jocotal people at Salinas La Blanca.

### Other Cultigens

A number of impressions in clay of larger seeds, some from important fruit trees, were found as follows:

#### Cut 1

LEVEL 3: Large seed which is smaller than avocado and unidentifiable. The wrinkled integument was preserved by carbonate replacement. Length about 3.3 cm. Jocotal or Crucero Phase.

LEVEL 13: Unidentifiable seed, similar in size to *jocote* (*Spondias purpurea*), with carbonate replacement of the integument. Jocotal Phase.

LEVEL 15: Seed of the *jocote*, including part of the stem. Length of seed 2.1 cm., width 1.4 cm., thickness 1.1 cm. This is one of the most popular cultivated fruits in Guatemala today. Cuadros Phase.

Seed of the *matasano* tree (*Casimiroa sapota*). Only a part was preserved. Cultivated widely in Central America for its sweet fruit. Cuadros Phase.

Seed distorted by crushing, relatively smaller than modern avocado, but it may be avocado. Diameter ca. 4 cm. Cuadros Phase.



Very fragmentary seed, not identifiable. The interior was preserved through carbonate replacement, showing a highly reticulated architecture. Cuadros Phase.

LEVEL 16: Fragmentary avocado seed (*Persea americana*), with mineralized integument. Diameter 5.1 cm., within size range of cultivated avocado. Cuadros Phase.

Very fragmentary seed about the size of a peach pit, not identifiable. Cuadros Phase.

Cut 2

LEVEL 13: Avocado seed. Lateral diameter about 4.4 cm. Cuadros Phase.

LEVEL 14: Small, round, unidentifiable seed about 4 mm. in diameter. Cuadros Phase.

LEVEL 23: Avocado seed. Integument mineralized. Lateral diameter 4.8–4.9 cm. Cuadros Phase.

Two fragments from a flattish, almond-shaped seed, unidentifiable. Smooth, well-preserved integument. About 2.1 cm. long, 5 mm. thick. Cuadros Phase.

LEVEL 24: Impression of the concave side of a strongly concave-convex seed or seed pod. Width 2.0 cm. Cuadros Phase.

One may therefore conclude that avocado, *matasano*, and *jocote* were eaten at Salinas La Blanca during the Cuadros Phase, avocado being the more important of these fruits both in numbers and in actual food value; size range of the seeds suggests avocados probably were cultivated, as they were during the

early Formative at Tehuacán (MacNeish, 1964, p. 536).

*Jocotes* were also widely eaten in pre-Columbian Mesoamerica. Lowe (1959, p. 7) mentions their use by the Chiapanecs of the Grijalva Depression, and fruits of the same genus (*Spondias* sp.) were eaten during the Formative periods in the Valley of Tehuacán (C. Earle Smith, personal communication).

TABLE 5.—IMPRESSIONS OF FRUIT SEEDS FROM SALINAS LA BLANCA

Phase	Cut	Level	Number of Seeds				Total
			Avocado	Mata-sano	Jocote	Unidentifiable	
Jocotal.....	1	3	—	—	—	1	1
	1	13	—	—	—	1	1
Cuadros.....	2	13	1	—	—	—	1
	2	14	—	—	—	1	1
	1	15	?	1	1	1	4(?)
	1	16	1	—	—	1	2
	2	23	1	—	—	1	2
	2	24	—	—	—	1	1
Totals.....			4(?)	1	1	7	13(?)

ANIMAL FOODS

White-tailed Deer

The only nonhuman mammal remains identified at Salinas La Blanca were of the white-tailed deer (*Odocoileus virginianus*). Their distribution is as follows:

Cut 1

LEVEL 1: *Odocoileus*. One 2d phalanx; possibly a mandible fragment; other splinters. Badly eroded and rodent gnawed. Probably Crucero Phase.

LEVEL 13: *Odocoileus*. Fragments from the distal end of humerus and from the unfused proximal end of humerus. Subadult deer, less than 2 years old. Jocotal Phase.

LEVEL 30: *Odocoileus*. A very young fawn, represented by several vertebrae; fragments of mandible and palate with teeth; both metacarpals, a radius and humerus; and a fully articulated hind limb (tibia, metatarsal, astragalus, calcaneum, and 1st, 2d, 3d phalanges). Unerupted first molar suggests an age of less than 6 months, probably 3–4 months at most. No signs of cutting, chopping, or scorching. Cuadros Phase.

Cut 2

LEVEL 1: *Odocoileus*. One 2d phalanx, two 3d phalanges. Probably Crucero Phase.

LEVEL 2: *Odocoileus*. Small chips from the distal end of a left tibia and from other bones. All show evidence of cutting part way through with an obsidian blade, after which the bone was snapped open. Probably Crucero.

LEVEL 3: *Odocoileus*? Small fragment from left acetabulum. Jocotal Phase.

LEVEL 23: *Odocoileus*. Three rib fragments. Cuadros Phase.

LEVEL 24: *Odocoileus*. Four rib fragments, probably from the same discarded brisket as in Level 23. Cuadros Phase.

White-tailed deer are now seriously reduced in numbers in the Ocos area because of unrestricted hunting. Because of their scarcity, we were unable to find out much about the local subspecies of *Odocoileus*, but their bones indicate that these were small—probably near the lower end of the size range for the species. Tropical forest is not really an ideal habitat for these deer, which are much more at home in pine-oak woodland.

Deer avoid the mangrove forest—an utterly unsuitable environment, where ground travel is very difficult because of the dense stilt roots and marshy soil—and are apparently bothered by the many bloodsucking parasites in the heart of the mixed tropical forest. One local hunter described coming upon a deer so blinded by a dense cloud of mosquitoes that it leaned against a tree with its eyes shut, trying to rub the insects off its head, until he approached close enough to shoot it. White-tails live in the savanna, hiding in the brushy thickets and feeding on grass in the

evening; they are also quite at home in second growth. They apparently browse on twigs and buds in the more open *madresal* groves, and would in Cuadros and Jocotal times have occurred in the immediate vicinity of Salinas La Blanca. Even if the present salt *playa* had been a lagoon in the Early Formative, there still would have been *madresalares* in the area along the remnants of still older lagoon estuary systems.

Exploitation of this species was light. The herds on the coast are small, moving about periodically from one resource to another, and their scattered remains in Cuts 1 and 2 indicate that Cuadros villagers simply picked off a deer whenever a herd happened to be in the vicinity, without pursuing them intensively.

Two of the deer at Salinas La Blanca were immature, and one—in Level 30 of Cut 1—was a very young fawn. Its first molar had not yet erupted, making it under 6 months old (Villa R., 1953, p. 475), and its size suggests it was probably no more than 3 or 4 months of age. Evidently the Salinas La Blanca villagers took advantage of fawns, strays, and youthful stragglers. Because the age of the fawn in Level 30 of Cut 1 can be ascertained within limits, some speculation can be made about the time of year it was killed. Leopold (1959, p. 510), drawing on a number of reports from different parts of Mexico, notes a tendency for births of *Odocoileus* to occur earlier in the year the farther south one goes; records for Sinaloa are in the June–July period, while those from Yucatan fall between April and June. The April to July period is probably a safe bet for the time during which fawns are born in the Ocos area; this suggests that the fawn found in Level 30 was probably killed around the end of the rainy season.

### Homo Sapiens

At La Victoria, fragments of human bone, often charred or cut, showed up in the refuse in enough frequency to suggest some ritual cannibalism was practiced, especially in the Conchas Phase (Coe, 1961, p. 117). The same kind of evidence is present at Salinas La Blanca, although in less profusion, while there was no indication of intentional burials being made in the refuse. Bones from *Homo sapiens* were found as follows:

#### Cut 1

LEVEL 3: Fragments of human tibia showing clearly marked cuts. Crucero Phase.

LEVEL 22: Human baby or foetus—pelvis, ribs, some limb bones. Cuadros Phase.

LEVELS 24, 27: Charred fragments of the same adult human radius; the two pieces fitted together. Cuadros Phase.

We hesitate to say that the baby was eaten; stillborn or very young infants are often cast into the refuse by peoples of nonindustrial societies. However, the absence of the skull or vertebrae must be explained.

### Birds

Five individual birds were represented by bones at Salinas la Blanca, and they have been analyzed by Dr. Raymond A. Paynter, Jr., as follows:

#### Cut 1

LEVEL 3: Pathological humerus of an unidentifiable, moderate-sized bird. The bone appears very fresh. Probably Crucero Phase.

LEVEL 8: Carpometacarpus of brown pelican (*Pelecanus occidentalis*). Early in Jocotal Phase.

#### Cut 2

LEVEL 9: Rather complete body skeleton (lacks the skull and outer extremities) of a moderately large bird, preserved in articulation through deposition of carbonate concretion. The bird is not fully grown; probably it was about half grown and still confined to its nest. Not identifiable, but *possibly* a hawk. It is interesting in that the legs had been manipulated so that they were on top of the wings. Jocotal Phase.

LEVEL 17: Fragment of humerus from bird about the size of small hawk, but not identifiable (even to family). Cuadros Phase.

LEVEL 30: Central portion of the tibia of a moderately large bird, unidentifiable. Cuadros Phase.

Birds seem not to have been an important part of the diet of the Early Formative villagers at Salinas La Blanca, even though the population and numbers of species of birds are very high in the Ocos area (Griscom, 1932). Today, there are particularly dense populations of the *pijije* (Black-bellied tree duck, *Dendrocygna autumnalis*), which seems to have been overlooked as a source of food by the prehistoric inhabitants.

Again, the kinds of bird remains and their scarcity testify to the lack of interest in hunting by the Cuadros and Jocotal people. The brown pelican can be seen flying in long lines just beyond the surf of the Ocos beach every evening, each bird soaring very close to the water and rising and falling expertly with the swells. A well-aimed rock could probably down one of them. The fledgling bird in Level 9 of Cut 2 was probably encountered accidentally, fallen to the ground from its nest; the wretched corpse, with its legs twisted over the wings, shows that somebody had tried to gnaw on the meat from the body without disarticulating the creature.

### Reptiles

The reptilian remains listed below consisted of

fresh-water turtles and two species of iguanas (*Iguana iguana*, the green iguana; *Ctenosaura similis*, the black iguana).

## Cut 1

LEVEL 22: *Iguana iguana*. Proximal end of a right femur. Cuadros Phase.

LEVEL 27: Large fresh-water turtle. Several carapace fragments. Cuadros Phase.

## Cut 2

LEVEL 3: Small turtle. Fragments of plastron. Jocotal Phase?

LEVEL 15: *Ctenosaura similis*. Right ilium. Cuadros Phase.

LEVEL 17: *Iguana iguana*? One reptile rib which closely matches a specimen collected by us. Cuadros Phase.

LEVEL 21: *Iguana iguana*. One vertebra, cooked to an ashy white. Cuadros Phase.

The two genera of iguanas eaten at Salinas La Blanca have somewhat different habits. The restriction of the green iguana (locally known as the "dorada" if male, or simply "iguana" if female) to humid environments such as the riverbank *monte* along the Naranjo has already been mentioned (pp. 12-13). During February and March it appeared that the density of green iguanas in the trees along the Naranjo was at least one adult for every hundred meters of riverbank. The density of all iguanas in the same area (young and old, green and black alike) was occasionally as high as three per hundred meters. Peak activity seemed to be between 3 and 4 p.m., and this was the time when most iguana hunting was done. Green iguanas, being almost exclusively arboreal, are most often hunted from a dugout canoe by small boys who stun them with rocks or sticks thrown into the riverbank trees. During the afternoons when the density of iguanas is at its height, this activity might almost be considered "collecting" rather than hunting. Green iguanas are usually captured alive and, since they make no attempt to bite, are brought back with their feet tied together and kept around the house until sold or eaten.

Females of this species descend to the ground in late March or thereabouts to lay their eggs, at which time they can be hunted with dogs. According to Alvarez del Toro (1952, p. 61), adult green iguanas in Chiapas may lay up to 60 or 80 eggs; three dozen was the most anyone in the Ocos area could remember, however, and we ourselves never observed more than 33 in our admittedly brief stay. During February and March, female iguanas are pursued intensely for their eggs, which are regarded as even more delicious than the meat. Often a sort of gustatory "caesarean" is practiced, whereby the female is relieved of her eggs, sewn up, and released in the belief that she will bear more the following year. "Of course," says

Alvarez del Toro (*ibid.*), "it is doubtful that iguanas so operated upon recover normally."

The same author describes "great quantities" of green iguanas frequenting the estuary systems of the Chiapas coast and sleeping in mobs among the mangrove roots along the Mar Muerto. We saw no evidence, however, that *Iguana iguana* ever penetrated into the dark *interior* of the mangrove forest. Basically, the green iguana is a creature of the banks, whether estuarine or riverine—diurnal, arboreal, and extremely nonaggressive.

*Ctenosaura similis*, the black iguana (locally known as *giota*), is primarily a terrestrial form, and its hunting represents a somewhat different problem from that of *Iguana*. These black, spiny-tailed lizards are more omnivorous and far more aggressive than their arboreal cousins, and must be attacked with greater care. Although they are captured alive (and kept in homemade cages until ready for eating) as are green iguanas, they are brought back to the village with their mouths sewn shut, a reflection of the respect the local boys have for their bite. Black iguanas range far inland from the river and can be encountered in the *madresalar* or even down on the sandy beaches. They are usually hunted with dogs, who overtake them and shake the iguanas until they are sufficiently groggy for capture. A small boy with a club is almost as effective, except that the speed of the black iguana frequently takes him out of range.

*Ctenosaura* is all white meat, and the Ocoseños regard it as better eating than the green iguana. However, it is not pursued extensively for its eggs. Black iguanas are smaller on the average than green iguanas, but a very big adult may weight as much as 2 pounds. During the excavations at Salinas La Blanca, the local children caught three or four black iguanas per week within easy walking distance of the site, and the same situation may have been true in Cuadros times. In fact, these iguanas, along with green iguanas, fish, and mouthless crabs, represent most of the meat eaten today by the family living at the site.

The large river turtle seen in Cut 1, Level 27, is an aquatic form of the family Emydidae, a group which includes the edible terrapins of the United States. These turtles sun themselves on sandbars in the middle of the Naranjo and take to the water when startled. Except during the egg-laying season, they would be rarely encountered on shore. The specimen we obtained at Ocos was caught in shallow water near the riverbank in the early morning by a fisherman. Such turtles, like iguanas, are kept alive (often for several days) by the villagers until time for eating. We have no idea of the population density of river turtles near Salinas La Blanca; only one was caught during our 3-month stay, and only one occurred in

Cuadros levels in the excavation. Probably they were an occasional and unpredictable food source, rather than the staple that crabs seem to have been.

TABLE 6.—MAMMAL, BIRD, AND REPTILE REMAINS FROM SALINAS LA BLANCA

Phase	Cut	Level	Number of individual animals						Total	
			White-tailed deer	Human	Brown pelican	Unidentified birds	Green iguana	Black iguana		Turtle
Crucero...	1	1	1	-	-	-	-	-	-	
	2	1	1	-	-	-	-	-	-	
	2	2	1	-	-	-	-	-	-	
	1	3	-	1	-	1	-	-	-	
Jocotal...	2	3	1	-	-	-	-	-	1	
	1	8	-	-	1	-	-	-	-	
	2	9	-	-	-	1	-	-	-	
	1	13	1	-	-	-	-	-	-	
Cuadros...	2	15	-	-	-	-	-	1	-	
	2	17	-	-	-	1	1	-	-	
	2	21	-	-	-	-	1	-	-	
	1	22	-	1	-	-	1	-	-	
	2	23	1	-	-	-	-	-	-	
	1	24	-	<sup>2</sup> 1	-	-	-	-	-	
	2	24	1	-	-	-	-	-	-	
	1	27	-	<sup>2</sup> 1	-	-	-	-	1	
	1	30	1	-	-	-	-	-	-	
	2	30	-	-	-	1	-	-	-	
	Totals			7	3	1	4	3	1	2

<sup>1</sup> Bones from same individual.  
<sup>2</sup> Bones from same individual.

Fish

Fish were a real mainstay in the diet at Salinas La Blanca, and their remains were exceeded in number only by crabs and mollusks. More than 100 fragments, belonging to a minimum of 35 individual fish of 11 different genera, were recovered by our 1962 excavations. The remains have been studied and identified by Dr. W. I. Follett, curator of fishes, California Academy of Sciences, whose report constitutes Appendix 4 of the present volume.

Most common in the Cuadros Phase deposits were bones of gar (*Lepisosteus tropicus*), snook (*Centropomus nigrescens*), snapper (*Lutjanus* spp.), grunt (*Pomadasy macracanthus*), and sea catfish (*Sciades troscheli*). According to Follett (p. 132), all of these fish are estuarine species which could have been taken by gill net in the immediate vicinity of the site. Species whose remains were less frequently recovered include mojarras (*Gerres* sp. and *Eugerres* sp.), machete (*Elops*

*affinis*), crevalle jack (*Caranx hippos*), needlefish (*Strongylura stolzmanni*), and spotted sleeper (*Eleotris picta*). Only the gar and grunt have been identified from Jocotal levels, and there were no fish remains in Crucero levels at all (table 7).

TABLE 7.—FISH REMAINS FROM SALINAS LA BLANCA

Phase	Cut	Level	Number of individuals of each species										Total		
			Sea catfish	Gar	Snook	Mojarra	Machete	Snapper	Grunt	Crevalle jack	Yellowfin Mojarra	Needlefish		Spotted sleeper	Unidentified
Jocotal....	1	7	-	-	-	-	-	-	-	1	-	-	-	-	-
	2	7	-	1	-	-	-	-	-	-	-	-	-	-	-
	2	12	-	-	-	-	-	-	-	-	-	-	-	-	1
Cuadros....	2	13	-	-	-	-	-	-	-	-	-	-	-	-	1
	2	14	-	1	1	-	-	-	-	-	-	-	-	-	-
	2	15	-	-	-	-	-	-	-	-	-	-	-	-	1
	2	16	-	-	-	-	1	1	-	-	-	1	-	-	-
	2	17	-	1	1	-	-	1	-	-	1	1	-	-	-
	2	18	-	-	-	-	-	-	-	-	-	-	-	-	1
	1	19	1	-	-	-	-	-	-	-	-	-	-	-	-
	1	19	-	-	-	-	-	1	-	-	-	-	-	-	-
	2	23	-	1	-	-	-	-	1	1	-	-	-	-	-
	1	24	-	-	-	-	-	-	-	-	-	-	-	-	1
	2	24	-	-	-	-	-	1	-	-	-	-	-	-	-
	1	25	-	-	1	-	1	-	-	-	-	-	-	-	-
	2	25	-	-	-	-	-	-	-	-	-	-	-	-	1
	1	26	-	-	1	1	-	-	-	-	-	-	-	-	-
	2	26	1	-	-	-	-	-	-	-	-	-	-	-	-
	1	27	-	-	-	-	-	-	-	-	-	-	-	-	1
1	28	-	1	-	-	-	-	-	-	-	-	-	-	-	
2	28	-	-	-	-	-	-	-	-	-	-	-	-	1	
2	29	1	-	-	-	-	-	-	-	-	-	-	-	1	
Totals			3	5	4	1	1	4	4	1	1	2	1	8	35

Today at Ocos, all these fish are netted with the exception of the sea catfish, which is fished for with hook and line during the predawn hours. This species, known locally as the *tacazonte*, may measure up to a meter in length; other large food fish include the *machete* (a member of the tarpon family), snook, snapper, and crevalle jack, all of which may reach or exceed a meter in length. In a single stratum, Level 17 of Cut 2 at Salinas La Blanca, well over 100 kilos of fish meat may be represented.

Follett comments that both gar and needlefish are difficult to hook because of their jaw construction (p. 132). It is therefore a reasonable assumption that most fish (with the possible exception of sea catfish) were netted during the Cuadros Phase, either

in the tidewater river or nearby estuary. This conclusion is supported by the fact that at La Victoria, although fishhooks were absent in the refuse, a variety of cordage suitable for netmaking was already known in the Ocos Phase and pottery net sinkers were known in Ocos and Conchas times (Coe, 1961, pp. 115-117).

The presence of snook in Levels 25 and 26 of Cut 1, and Levels 14 and 17 of Cut 2, indicates that these particular deposits were probably laid down in the dry season. The anadromous snook spends the winter months in the lagoon-estuary system, then migrates upstream when summer rains swell the rivers.

Crabs

In terms of individuals represented, by far the most abundant nonmolluskan faunal remains in Salinas La Blanca were those of crabs (pl. 25, a). The identifications presented in table 8 were made by Dr. Willard Hartman and Dr. Fenner Chace with the use of a collection of modern decapods from the vicinity of the site.

Of the total number of 63 crabs, more than half belong to the species *Cardisoma crassum* Smith, the mouthless crab, known locally as the *cangrejo azul* (pl. 25, b). The abundance of mouthless crabs in the mangrove forest and the *madresalar* has already been noted (pp. 11-14). These beautiful crabs (with deep blue carapace, red legs, and white claws) weigh about a quarter of a pound each and are widely eaten by the modern Ocosenos, who catch them in small, wooden, box traps baited with the fruit of the *piñuela*, a spiny bromeliad that grows abundantly in areas with salty soil. The traps are set in the late afternoon and checked in the early morning; they seem to be far more effective than a frontal assault, for *Cardisoma* is an alert, speedy, escape artist. Sometime in June or July, according to local informants, the female of this species bears eggs.

The tremendous quantity of crab fragments throughout the Cuadros levels at Salinas La Blanca indicates that mouthless crabs were constantly being caught. Crab trapping is an easy and steady source of meat, a kind of "collecting" that can be carried out night after night by villagers without interrupting their agricultural routine. Furthermore, it is a type of food getting that children can undertake. It went on continuously at Salinas La Blanca during our stay, without any apparent decrease in the local crab population.

Ocosenos set traps only for *Cardisoma*, but smaller land crabs which frequent the same mangrove forest environment frequently get caught in them, such as *Sesarma sulcatum* Smith (marsh crab, locally termed *cangrejo brujo*) and *Goniopsis pulchra* (mangrove crab, also called *brujo*). Today, these are not eaten, but in Cuadros times they were cooked along with the mouth-

less crabs. About a fourth of all crab remains were of small fiddlers, which could be caught by hand along muddy estuary banks or in swampy areas.

It is interesting that the *jaiba* (*Callinectes toxotes* Ordway), a large river crab much prized today, is not represented at all in the Salinas La Blanca deposits. It would seem that most if not all crab collecting in Cuadros and Jocotal times was done in the mangrove forest and *madresal* groves, while the high crab potential of the Naranjo River and the beaches was totally ignored.

TABLE 8.—CRAB REMAINS FROM SALINAS LA BLANCA

Phase	Cut	Level	Number of individuals						Total	
			Mouthless crabs	Marsh crabs	Mangrove crabs	Xanthid crabs ( <i>Eurytium</i> sp.?)	Fiddler crabs	Unidentified		
Jocotal.....	1	7	3	-	-	-	-	-		
	2	7	-	-	-	-	-	2		
	1	8	1	-	-	-	-	-		
	1	9	1	-	-	-	-	-		
	1	10	-	-	-	-	1	-		
	1	11	1	-	1	-	-	-		
	2	11	-	-	-	-	2	-		
	1	12	2	-	-	-	-	-		
	2	12	1	-	-	-	-	-		
	1	13	2	-	-	-	-	-		
	1	14	2	-	-	-	-	-		
	Cuadros... ..	2	13	1	-	-	-	-	-	
		2	14	1	-	-	-	-	1	
		1	15	2	-	-	-	1	-	
2		16	1	-	-	-	-	1		
2		17	1	1	-	-	3	1		
2		18	-	-	-	1	1	-		
1		19	2	-	-	-	-	-		
2		19	1	-	-	-	-	-		
1		20	1	-	-	-	-	-		
1		21	1	-	-	-	-	-		
2		21	-	-	-	-	1	-		
1		22	1	1	-	-	-	-		
2		22	1	-	-	-	1	-		
1		23	1	-	-	-	1	-		
2		23	-	1	-	-	-	-		
2		24	2	-	-	-	-	-		
1		25	-	-	-	-	1	-		
2		25	1	1	-	-	-	-		
1		26	1	-	-	-	1	-		
2	26	-	1	-	-	-	-			
1	27	1	-	-	-	-	1			
2	27	1	1	-	-	-	-			
1	28	-	-	-	-	1	-			
2	28	1	-	-	-	1	-			
Totals.....			34	6	1	1	15	6	63	

TABLE 9.—MOLLUSKS

Mollusk	Cut 1 (at indicated phase and level)																													
	CRUCERO						JOCOTAL							CUADROS																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
PELECYPODS																														
<i>Amphichaena kindermanni</i> .....	-	-	-	-	-	-	-	1	1	-	1	-	3	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Anadara aequatorialis</i> .....	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	1	1	-	-	-	-	-	-	-	-	-	
<i>Anadara grandis</i> .....	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Cardita laticostata</i> .....	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Harvella elegans</i> .....	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Iphigenia altior</i> .....	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	-	-	-
<i>Mulinia palida</i> .....	-	-	-	-	-	-	-	-	1	-	-	1	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-
<i>Mytella falcata</i> .....	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Nephronais</i> sp.....	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Noetia reversa</i> .....	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Ostrea colombiensis</i> .....	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-	-	-	-	-	-	-	-	-	-
<i>Pitar consanguineus</i> .....	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Pitar lupanaria</i> .....	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Polymesoda radiata</i> .....	-	-	-	-	-	-	-	-	-	-	-	1	1	5	-	4	3	1	2	3	5	9	10	1	14	145	226	26	-	-
<i>Sanguinolaria bertini</i> .....	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Tivela planulata</i> .....	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GASTROPODS																														
<i>Agaronia testacea</i> .....	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Cerithidea mazatlanica</i> .....	-	-	-	-	1	-	-	3	2	-	1	-	6	-	2	-	-	-	-	1	-	-	-	-	1	2	-	-	-	
<i>Cerithidea valida</i> .....	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Melampus tabogensis</i> .....	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Neritina luteofasciata</i> .....	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-
<i>Olivella semistriata</i> .....	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Strombus galeatus</i> .....	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Thais melones</i> .....	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

<sup>1</sup> Dr. William J. Clench, personal communication.<sup>2</sup> Keen, 1958.

FROM SALINAS LA BLANCA

Cut 2 (at indicated phase and level)																														Preferred environment	
CRUCERO												CUADROS																			
JOCOTAL																															
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30		
-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	2	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	Brackish water. <sup>1</sup>
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-	-	-	-	-	-	-	-	-	Offshore, 6-40 fathoms depth. <sup>2</sup>
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Extreme low tide on sandbars. <sup>2</sup>
-	-	-	-	-	1	-	-	-	-	-	-	-	1	-	3	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Extreme low tide line in sand under rocks, or offshore to 15 fathoms. <sup>2</sup>
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	Offshore in 14-40 fathoms mud. Beach valves not uncommon. <sup>2</sup>
-	-	-	-	-	7	-	-	-	-	-	-	-	6	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	Intertidally and to 13 fathoms. <sup>2</sup>
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	Intertidally and to 13 fathoms. Not uncommon. <sup>2</sup>
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	3	1	-	-	-	-	-	-	Intertidally on mudflats and in shallow lagoons to 6 fathoms; Not uncommon. <sup>2</sup>
-	-	-	-	-	-	-	-	1	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Fresh water. <sup>1</sup>
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	1	1	-	-	-	-	-	-	Intertidal, buried in mud. <sup>2</sup>
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Common in mangrove swamps. <sup>2</sup>
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	Rare, mostly offshore in depths of 2.5-24.0 fathoms. <sup>2</sup>
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Common on sandy beaches and offshore to 13 fathoms. <sup>2</sup>
-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	4	1	1	2	1	1	4	8	2	3	-	2	1	1	-	-	Brackish to fresh water. <sup>2</sup>
-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Intertidal, not common. <sup>2</sup>
-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Sandy beaches and bars. <sup>2</sup>
-	-	-	-	-	4	12	7	-	1	-	2	1	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	High on beach. Intertidal in sand. <sup>2</sup>
-	-	-	-	-	-	-	-	-	-	1	-	1	9	-	2	1	-	-	-	-	1	-	2	2	7	1	1	2	-	-	Salt marshes, climbs on sedges. <sup>1</sup>
-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Mudflats (brackish water). <sup>2</sup>
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Mudflats (brackish water). <sup>2</sup>
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Cobble beaches and under drift at high tide line, common. <sup>2</sup>
-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	On margins of mangrove swamps or on mudflats. <sup>2</sup>
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	Common. <sup>2</sup>
-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	1	-	Just below high tide line, fairly common. <sup>2</sup>
-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Not common. <sup>2</sup>

## Mollusks

The distribution of mollusks that were found in the Salinas La Blanca deposits is given in table 9. It is obvious that they were a very important source of animal protein for the ancient inhabitants, as they had been for the people of La Victoria. Those that occur in greatest number are typically brackish water species for the most part, inhabiting the muddy banks of the estuaries and lagoons. This is the habitat of the marsh clam *Polymesoda radiata* (pl. 26, *g*), which was heavily exploited during Cuadros times, particularly in the early part of the phase. According to Keen (1958, p. 90) this species now ranges from Nicaragua to Panama, considerably to the south of Guatemala, while the *Polymesoda* collected by us from the muddy margins of mangrove forests in the Ocos area belonged entirely to the species *P. mexicana*. There can be little doubt of the identification, for the latter has a much thinner shell than the former. *P. radiata* is the only instance in the Salinas La Blanca faunal assemblage of a species the range of which now lies outside the area under study.

Other denizens of the mangrove-lined estuaries which were eaten in Cuadros times include oysters (*Ostrea colombiensis*), mussels (*Mytella falcata*), and *Cerithidea mazatlanica* (pl. 26, *a*), a small snail. Oysters and mussels are, however, very rare, and there is good evidence that they were overpicked almost to extinction by the end of the preceding Ocos Phase (Coe, 1961, p. 113).

As the Cuadros Phase draws to a close, the exploitation of *Polymesoda* dwindles, and instead there appears a new mollusk, *Agaronia testacea* (pl. 26, *d*), an olive that may be found plowing about the sandy shore at low tide, just under the surface. *Agaronia*, though, is never found in the great numbers that had previously typified *Polymesoda*. By Jocotal times, the assemblage consisted mainly of *Agaronia* and *Iphigenia altior* (a pelecypod also of the intertidal zone).

It is quite reasonable to suppose that most of the intertidal or deepwater forms, which never reach a frequency of over three in any level and which often

are represented only once, were beach valves gathered for use as scrapers or ornaments. Thus, for example, *Anadara grandis* and *Noetia reversa* were certainly used as scrapers or smoothers and *Mulinia palida* as a pendant (pp. 64–65). The valves of many of these shore species are considerably eroded and must have been picked up as curiosities on the beach.

We have been much struck by the fact that in the Formative period of the Ocos region, each phase is characterized by a distinct complex of high-frequency mollusks, testifying to food-getting patterns which were just as peculiar to these phases as were the ceramic types then in use. These are as follows:

### Ocos:

*Mytella falcata*  
*Ostrea colombiensis*  
*Strombus galeatus*

### Cuadros:

*Polymesoda radiata*  
*Cerithidea mazatlanica*

### Jocotal:

*Iphigenia altior*  
*Agaronia testacea*

### Conchas:

*Amphichaena kindermanni* (especially Conchas 1)  
*Iphigenia altior*  
*Polymesoda radiata*  
*Agaronia testacea*

### Crucero—None

The shift was from large, estuarine and lagoon species, to smaller species of the same habitat, to shoreline forms, and back to small, brackish water species. We could with some confidence ascribe a given stratum to its proper Formative Phase on the basis of the mollusk frequencies alone, without looking at the pottery.

It should be stressed that at no time during the prehistory of the Ocos area were people relying mainly on molluskan food: there have been no shell middens encountered here. Rather, mollusks were gathered, probably by women and children digging in the estuarine mudbanks, as a supplement to a diet which consisted mainly of maize.

## FOOD PREPARATION

We have no information on means of food storage at Salinas La Blanca, but the present occupants of the site use aboveground cribs to keep maize from rotting in the tropical humidity. Whether Formative villagers also did so is unknown.

As for their main food, maize, we suspect for the reasons given below that it was eaten in the form of cooked dough balls or *tamales*:

1. The cobs we recovered had been shelled, which

means that corn was not usually eaten as roasting ears or simply chewed when green, as was often the case in Tamaulipas (MacNeish, 1958, p. 146).

2. The total absence of the *comal*, or pottery griddle, in Cuadros and Jocotal levels suggests that *tortillas* were probably not being made. In fact, it is suspected by many investigators that the *tortilla*, so universal in Mesoamerica today, was a relatively late arrival in the Maya area; most early sources on the Maya,



including Landa, fail to mention it at all, although describing the *tamal* (Tozzer, 1941, p. 90). Griddles do not appear in Pacific coastal Guatemala until Late Classic times.

3. As explained below, there is evidence that food of some kind was being boiled and even steamed in large neckless jars of the Cuadros Phase. This is the way *tamales* are typically prepared in the area.

Shelled corn is prepared in roughly the same way whether it is to be made into *tortillas* or *tamales*. The kernels are removed from the dried ears and soaked or boiled overnight in water to which lime (*cal*) has been added, to swell the grain and separate the outer coating from it. Next, the soaked kernels or *nixtamal* are ground into an unleavened dough or *masa*. Grinding stones appropriate for such activity were found in Cuadros Phase levels at Salinas La Blanca.

In Indian communities today, *tamales* are made by wrapping a ball of *masa* in cornhusks or in some large leaf (domestic bananas and *Heliconia* are often preferred), and then boiling them in a cooking pot to which only a small amount of water has been added—the steaming probably being more important than the boiling itself. As a luxury, the *tamales* may first be filled with meat, condiments, and so forth, but the simple, quickly prepared dough balls (termed *poches* in some parts of Guatemala) are a more common staple in some regions of the Maya country.

We suspect that the large neckless jars of the Guamuchal Brushed ceramic type were principally employed to cook *tamales*. As pointed out in pages 28–30, there is firm evidence from fire marks that these large *tecomates* were cooking vessels which had been placed over the typical three-stone hearth. Furthermore, calcareous deposits on the interior of basal sherds are a sign that frequent and prolonged boiling of lime-rich water had been practiced; the bottoms of the vessels are charred not only on the exterior but also in the interior, which would suggest that boiling was carried out with so little water that it often cooked away, burning the contents. Since steaming is more important to the production of *tamales* than boiling, it is significant that the shape of Guamuchal Brushed vessels, with a strongly restricted orifice, would be most efficient in retaining steam.

We have no way of knowing how the infrequently encountered deer were butchered and eaten, but since none of the bones in the Cuadros levels were burned or scorched, we presume that the villagers either cut pieces of the meat from the bone and cooked them by roasting or boiling, or else quartered the animal and threw the sections in the boiling pot. Since the scanty deer remains are largely of immature animals, this latter method would have been most convenient; the fact that the fawn in Level 30 of Cut 1

consisted of about half an articulated skeleton suggests that it was eaten without disjoints. Similar habits of preparation and consumption are inferred from the few bird remains of Cuadros and Jocotal.

The usual method of preparing crabs today in Ocos consists of boiling them in a pot with a soup. From the calcined nature of the crab claws recovered from early deposits at Salinas La Blanca, and from a pincer found still adhering to the interior of a body sherd of Guamuchal Brushed, we assume that these important food animals were treated in the same way by the ancients. A few, however, are charred, and it is possible that some were roasted. Some fishbones are also carbonized, and it may be induced that these were roasted also.

Roasting was definitely the principal method of preparation for mollusks. Many *Polymesoda radiata* valves are calcined, and about 25 percent of them are charred black on the exterior, particularly toward the beaks. A brief exposure to a bed of glowing coals is about the speediest method of opening clams, and it seems plausible that this procedure was adopted by the Cuadros villagers. In the Jocotal Phase we have several examples of cooking pits containing shells of the then popular mollusk *Agaronia testacea*, and one would believe from this that the roasting process was still the accepted method for cooking these shellfish.

We submitted charcoal specimens from Cuadros and Jocotal hearths to Dr. B. Francis Kukachka of the Forest Products Laboratory, U.S. Department of Agriculture, with the following results:

#### Cut 1

- LEVEL 9: (6 fragments.) *Rhizophora*. Jocotal Phase.  
 LEVEL 23: (17 fragments.) Two different hardwoods not further identified. Cuadros Phase.  
 LEVEL 28: (8 fragments.) Monocot (grass or palm). Cuadros Phase.

#### Cut 2

- Level 12: (5 fragments.) *Rhizophora*. Early in Jocotal Phase.  
 LEVEL 14: (10 fragments.) *Pouteria*. Cuadros Phase.  
 (1 fragment.) Hardwood not further identified (different from Level 23, Cut 1). Cuadros Phase.  
 LEVEL 15: (5 fragments.) *Pouteria* and another hardwood. Cuadros Phase.  
 LEVEL 18: (8 fragments.) Hardwood not further identified. Cuadros Phase.  
 LEVEL 21: (4 fragments.) Hardwood not further identified. Cuadros Phase.  
 (11 fragments.) Monocot (grass or palm). Cuadros Phase.

From a cutting made into the riverbank into the Mound I deposits, and never completed by us, came three fragments of charcoal from a wood identified as *Platymiscium*; the associated pottery was all early

Jocotal. According to a letter from Dr. Kukachka, much of the material submitted was extremely fragile, which accounts in part for the difficulty of making a more complete analysis. Furthermore, the small stems encountered in the lot sent to him may be from shrubs which in general are poorly known from the anatomical point of view, and a diagnosis of such material would be practically impossible.

*Rhizophora* is probably the red mangrove (*Rhizophora mangle*). According to Standley and Williams (1963, p. 268), charcoal from red mangrove has a general reputation in Central America for being the best of all for the culinary hearth. Standley and Steyermark (1946 b, pp. 338-9) list only one species of *Platymiscium* for Guatemala, *P. dimorphandrum*, a large tree sometimes 30 m. high, the wood of which is favored for the making of marimba keys, from which comes its local name, *marimbero*. It is found on the Pacific coast as well as elsewhere in Guatemala, in wet or rather dry, mixed forest. One of the species of *Pouteria*, *P. campechiana* or yellow sapote, is widely cultivated for its fruit in the tropical lowlands from Mexico to Panama (Dressler, 1953), and may have been the source for some of our samples. The gathering of firewood is typically a woman's activity in many parts of Mesoamerica, and we may assume with some justification that Early Formative villagers at Salinas

La Blanca collected fuel for their kitchen fires by frequent forays into the neighboring mangrove forest and into those patches of forest not already felled for cultivation.

TABLE 10.—CHARCOAL FROM FIREWOOD IN HEARTHES AT SALINAS LA BLANCA

Phase	Cut	Level	Number of fragments					Total
			Mangrove	Yellow sapote	<i>Marimbero</i>	Unidentified hardwood	Unidentified grass or palm	
Jocotal.....	(1)	(1)	-	-	3	-	-	
	1	9	6	-	-	-	-	
	2	12	5	-	-	-	-	
Cuadros .....	2	14	-	10	-	1	-	
	2	15	-	5	-	1	-	
	2	18	-	-	-	8	-	
	2	21	-	-	-	4	11	
	1	23	-	-	-	17	-	
	1	28	-	-	-	-	8	
Totals			11	15	3	31	19	79

<sup>1</sup> Bank cut; see p. 81.

## SUMMARY

The people of the Cuadros and Jocotal Phases were full-time farmers who grew and ate a primitive race of pod-popcorn unhybridized with *Tripsacum*, planting it on river and estuary terraces so fertile that today two or even three annual harvests of maize are possible. They also cultivated avocados. Other fruits like *jocote* and *matasano* were eaten, and possibly cultivated as well. Carbonized wood of the yellow sapote is present in their debris, leading us to suspect that this fruit may have been eaten also. Concrete evidence for the growing of beans, squash, and chile is lacking, perhaps only through lack of preservation.

The larger game known for the Pacific coast of Guatemala and Chiapas—tapir, peccary, and deer—is conspicuous mainly for its absence or scarcity at the site. Of the few deer unlucky enough to end up in the cooking pot, two were immature and one was only a few months old. Larger deer and peccary seem not to have been taken, and in fact the latter is represented in the entire Formative sequence from the area by a single tooth from Ocós levels at La Victoria. A few birds were eaten, and iguanas of two species

appear to have been captured with fair frequency, just as they are today in the immediate vicinity of the site. The pits made at La Victoria (Coe, 1961) generally verify the lack of interest in hunting seen at Salinas La Blanca.

Fishing, and the collection of shellfish, were of considerable importance and probably provided most of the meat intake during the Ocós, Cuadros, Jocotal, and Conchas Phases. The bar graph (fig. 43) gives some idea of the relative roles of collecting vs. hunting in the lives of the inhabitants of Salinas La Blanca. While they may, on their return from the milpa, have picked off an occasional deer which straggled behind the herd, and while the village boys may have caught an occasional iguana or turtle, their most reliable sources of meat appear to have been fish, crabs, and mollusks. These are the animals which, given the location of the site, could have been collected with a minimum of effort and no travel at all. There is no evidence that Cuadros or Jocotal farmers ever ranged very far in pursuit of game or traveled to distant microenvironments as did Tehuacán Valley villagers.

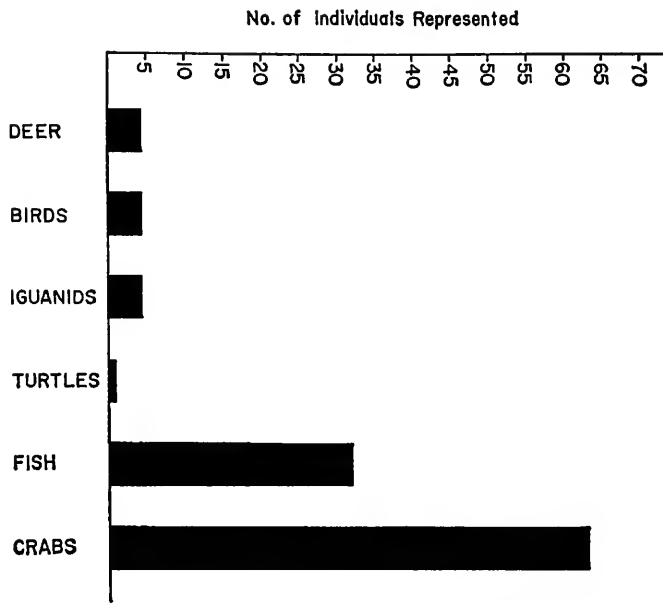


FIGURE 43.—Animal remains, exclusive of mollusks, found in Cuadros and Jocotal Phase levels at Salinas La Blanca.

The daily fare at Salinas La Blanca consisted primarily of *tamales*, steamed in Guamuchal Brushed (and later in Suchiate Brushed) *tecomates*, over fires fueled with red mangrove, yellow sapote, *marimbero*, and other hardwoods. Mollusks were roasted until they opened their valves, and crabs were boiled or roasted.

The entire food-collecting complex, at least insofar as revealed by archeological investigation, seems to reflect a fully sedentary people exploiting one particularly productive habitat out of the several available to them. In the tidewater zone they had access to the resources of the mangrove-lined estuary and lagoon as well as the fertile terrace of the lower river and the cultivable alluvial flats stretching inland from the estuary. The food resources of more distant micro-environments, such as the tropical savanna, were largely ignored in favor of those near at hand, which, properly manipulated, provided everything needed to maintain a stable village-farming way of life.

## Settlement Patterns in the Ocos Area

One of the aims of the 1962 fieldwork was to provide a better picture of the ancient occupation of the Ocos area than had resulted from the 1958 season—not only in terms of stratigraphic sequences, but also in regard to the spatial distribution of sites over a long period of time. For this reason, we carried out the survey described in this chapter.

Chang (1958, p. 299) has made an important distinction between the two meanings which the term “settlement pattern” usually carries: *Settlement pattern*, strictly defined, is the manner in which human settlements are arranged over the landscape in relation to the physiographic environment, while *community pattern* is the manner in which the inhabitants arrange their various structures within the community and their communities within the aggregate. He defines the aggregate as “a gathering of certain number of communities which are bound by close social, political, military, commercial, or religious ties.”

We intend to attempt a description of only the settlement pattern in its restricted sense. There is hardly any information on the internal structure of villages or other communities in our area, nor at this stage of our knowledge could we attempt to trace the social connections which may have bound certain hamlets and villages to each other. Instead, we shall concentrate only on those aspects emphasized by Sanders (1956, p. 115):

The study of settlement pattern is a study of the ecological and demographic aspects of culture. Settlement pattern is, in effect, human ecology, since it is concerned with the distribution of population over the landscape and an investigation of the reasons behind that distribution.

We are now able to pinpoint on the maps (figs. 45–47, 49, 50) a total of 58 sites in an area of about 13 by 10 km. This extremely high density of archeological remains immediately raises the question of how we have defined the word “site.” To us, a site is any archeological feature, such as a sherd concentration on the surface of the ground, or an artificial mound, sufficiently isolated from other manifestations to suggest that it was anciently the location of either a discrete community, albeit only a hamlet, or a ceremonial center of some sort. The conditions of this definition, however, cannot always be met, as for instance in the lowland Maya area where house ruins

are scattered over the landscape for kilometers, without any clear-cut dividing line between “sites.” We ran into a similar situation with the Cerro del Tiestal remains scattered around the salt *playa* just to the east of Salinas La Blanca.

This survey (summarized in fig. 44) makes no pretensions of being complete, nor does it meet the stringent requirements of probability sampling (see Binford, 1964). It was designed only to reveal some general trends of ancient settlement. The part best covered by our survey (and by the reconnaissance carried out by Shook in 1948, who found four sites in the area) is bounded on the east and west by the Naranjo and Suchiate Rivers, respectively, and by Santa Clara on the north and Ocos on the south. We also covered with reasonable thoroughness the east bank of the Naranjo below Bocana, the salt *playa* and mangrove forest east of Salinas La Blanca, and the small river estuary system above this as far as the Pampa La Morena. The upper right quadrant

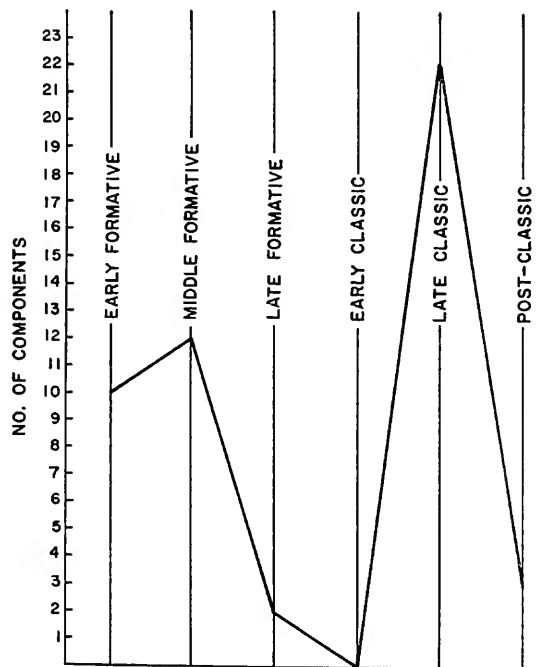


FIGURE 44.—Population trends in the Ocos area, as indicated by the number of components for each period found by the 1962 site survey.

of our survey maps is therefore largely a blank, although there must be sites in that forested area as well. The chances are good that in the area covered by these maps, there are actually over 100 sites, a very high density of ancient occupation.

Before proceeding to the analysis of changing settlement patterns in a phase by phase study, a few words should be said about the one artifact located on survey that may *possibly* belong to the preceramic era. This is the basal half of a large obsidian spear point (pl. 27, *a*), found half-buried in the sand of the "street" outside one of the local beer parlors (no area was left unsampled on survey). The point was made on a large long flake struck from a prepared core; no trace of the original platform remains, but part of the bulb of percussion is just visible above the base. Secondary chipping, confined to the edges, gave the point its final form. Originally it must have measured about 10.3 cm. in length; the maximum width is 4.5 cm., and the greatest thickness is 1.4 cm.

Superficially, the point resembles the large Ensor Side-notched type (Suhm and Jelks, 1962, p. 189, pl. 95), with convex base and broad, shallow notching. Unfortunately, the dating of this type is somewhat of a problem. Ensor points *do* occur in a preceramic context in the Tehuacán Valley, Puebla (MacNeish, 1962, pp. 31–36), but there is evidence that they may have lasted into the Classic period in areas like central Chiapas (MacNeish and Peterson, 1962, p. 23). Since no Early Classic sites are known yet for the Ocos area—and since not a single projectile point has ever appeared in excavated Formative strata, or in our extensive surface collections from Late Classic sites—we think it somewhat more likely that our lone Ensor point belongs to the preceramic. Certainly it would be out of place in any of the periods we know from excavation, where chipped stone is conspicuous mainly by its absence. Our dating of the object is, admittedly, unsupported by any stratigraphic evidence.

## EARLY FORMATIVE SITES (fig. 45)

### Archeological Criteria

Our knowledge of ceramics of the three sequent phases considered by us as Early Formative—Ocos, Cuadros, and Jocotal—is based upon excavations in La Victoria and Salinas La Blanca. Ocos pottery is so distinctive, especially in its frequency of sherds decorated with iridescent paint, cord marking, and rocker stamping, that it is doubtful that it would be missed in a surface sample if present. To a lesser extent this is also true of Cuadros and Jocotal, since Guamuchal Brushed and Suchiate Brushed *tecomate* rims respectively are good criteria for these two phases.

### Sites

SM-1: SALINAS LA BLANCA. Two occupation mounds, largely of the Cuadros and Jocotal Phases.

SM-4: AGUILAR (called "Villa Angela" in Coe, 1961, p. 147). A possible ceremonial mound or pyramid, 7 to 8 m. high, in pasture land to the west of the Ayutla-Ocos road. There are several lower mounds nearby, possibly house sites. Willey and Smith collected 49 sherds from the site in 1958, of which 18 were identifiable; of these, 15 were Ocos and 3 Conchas (Middle Formative). We picked up 30 identifiable sherds in 1962, of which 27 were Ocos, 2 were San Juan Plumbate (Marcos Phase, Late Classic), and 1 was modern glazed. The mound fill obviously contains Ocos materials, though it may possibly have been built during later times.

SM-10: CERRO DEL TAMBITO. A broad, flat mound, 5 m. high and several hundred meters in diameter, on a defunct tributary of the Zanjón Pacaya in the heart of

the Pampa La Morena. There were numerous sherds of both the Cuadros and Jocotal Phases scattered on the surface; 19 sherds of Suchiate Brushed were found as opposed to only 10 of Guamuchal Brushed, probably because the Cuadros component is deeply buried.

SM-12: CERRO DE LA BOMBA. A mound 4 m. high and 20 m. in diameter, in the *madresal* groves on the south edge of the Salinas La Victoria salt *playa*. An exposed profile on one side, revealing layer after layer of sherd filled midden, including "white-rimmed black ware" of the Pampas Black-and-white variety, shows that this mound is pure Cuadros from top to bottom.

SM-15: GROUP OF MOUNDS about half a kilometer west of the El Crucero railway crossing (see p. 96). Two sherds indicate that the earliest occupation was Jocotal: one is a Suchiate Brushed sherd, the other Conchas White-to-buff.

SM-20: MOUND 1.5 m. high and 50 m. long, on the defunct estuary running west from Salinas La Victoria, about 1 km. northwest of Ocos. All 18 sherds picked up from the surface belonged to the Cuadros Phase.

SM-38: LA VICTORIA. The earliest of four components at this stratified village site belongs to the Ocos Phase.

SM-41: EL JOCOTAL. A mound 1 m. high and perhaps 200 m. in diameter, near an old estuary remnant in the Potrero El Jocotal, about 3 km. northwest of Ocos, between the salt *playas* "Culebra" and "La Gloria." This site has midden areas of almost pure shell, including mainly *Anomalocardia subrugosa*, *Amphichaena kindermanni*, and *Agaronia testacea*. *Chione (Lirophera) kelletti* and *Trachycardium (Acrosterigma) pristipleura* were also present. The surface collection consists entirely of Jocotal sherds, mainly from the earlier part of that phase; Suchiate Brushed is represented in greatest abundance.

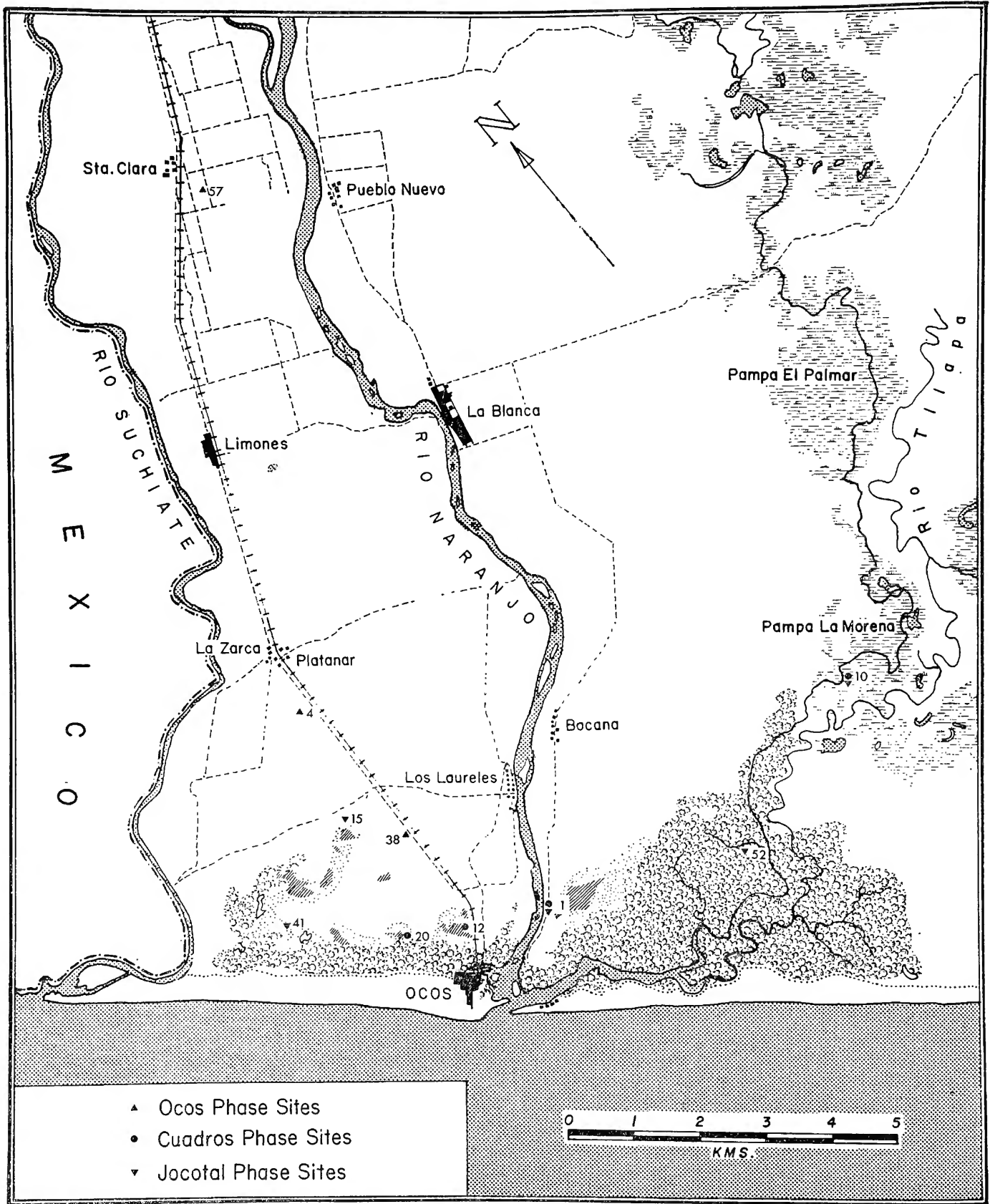


FIGURE 45.—Distribution of sites in the Ocos area during the Early Formative period.

SM-52: CERRO DEL TIESTAL (described in detail on p. 92). The earlier component at this mound site up the Zanjón Pacaya is Jocotal, represented by a single Suchiate Brushed sherd with low-relief filleting.

SM-57: SANTA CLARA BANANAL. This is a 4-m. high mound in the banana grove just to the east of the Santa Clara finca house on the other side of the road, described in Coe (1961, p. 148). Three sherds from the site were of the Ocós Phase.

### Discussion

By far the most puzzling phase in the area is Ocós. In spite of a fairly diligent search, only three sites within our transect have ever produced sherds of the distinctive and exotically decorated Ocós pottery, the ties of which have been traced as far as Ecuador. Settlement in the Ocós Phase is not limited to estuaries, and shuns the mangrove forest. The layout at La Victoria suggests that villages were without apparent planning or arrangement. In comparison to succeeding Formative phases, the population density during Ocós times was certainly very low.

It proved impossible to pin down a site that definitely contained pottery of both the Ocós and Cuadros

Phases, although the surfaces of all *tecomate*-bearing mounds were diligently searched. All Cuadros sites are located on estuaries or vestiges of prehistoric estuaries—where canoe travel would have been possible—yet within walking distance of the mixed tropical forest which could easily have been cleared for cornfields. None is in the heart of the mangrove forest, but rather at the transition from mangrove to low *monte* or even in the low *pampa*; and none sits on the edge of the wide deep estuaries, but rather on the narrow backwaters where the currents move slowly and mollusks abound. We have located only four Cuadros sites, all of them large wide occupation mounds which supported communities from extended family to small village size. They apparently all have deep midden deposits; since the phase is almost surely of no great duration, this would argue for a fairly intensive occupation of these sites.

There would seem to be little if any difference in settlement pattern or subsistence between Cuadros and Jocotal. They have the same lateral distribution along the same estuary arms. Five Jocotal components are known, though the phase was very brief.

## MIDDLE FORMATIVE SITES (fig. 46)

### Archeological Criteria

The Middle Formative period in the Ocós area is represented by the Conchas Phase, with two sub-phases. A Conchas component in a site would be indicated by a high frequency of the large undecorated *tecomates* of the Conchas Red Unburnished type, as well as by the very distinctive, hard, white, monochrome pottery of the Conchas White-to-buff type (pl. 27, *b-l*). Conchas figurines are also indicative of the phase. Since certain Conchas types evolve from Jocotal prototypes, there is a slight danger of confusion in phase identification of surface collections, but this can be overcome with a large surface sample.

### Sites

SM-4: AGUILAR. See p. 85. The Willey and Smith collection from the surface contained three Conchas sherds.

SM-7: CERRO DE LAS CUEVAS. A small mound on the east bank of the Zanjón Pacaya estuary, 2 km. downstream from the Pampa La Morena. This occupation site is in mangrove forest very near the transition to mixed tropical forest. Of the 15 identifiable sherds collected from the surface, 8 were Conchas (Conchas Red Unburnished *tecomates*) and 7 belonged to the Cerro del Tiestal Complex.

SM-8: VUELTA DE LA DANTA. A small mound on the east bank of the Zanjón Pacaya where it passes through

low *monte* on the outskirts of the Pampa La Morena. The surface material consisted entirely of Conchas Red Unburnished *tecomates*.

SM-11: VERY SHALLOW SITE, merely a layer of sherds eroding out of the south bank of the Zanjón Pacaya. The collection consists only of Conchas pottery (10 Conchas Red Unburnished *tecomates* and 2 necked jars of the same type).

SM-19: MOUND 1.5 m. high and 10–15 m. in diameter, on an old estuary remnant about 0.5 km. northwest of Salinas La Victoria. The entire surface sample was Conchas, largely Conchas Red Unburnished *tecomates*.

SM-28: MOUND 5 m. high and about 100 m. long (north-south), located on the north edge of the Salinas La Blanca salt *playa*. The surface collection consisted of nine Conchas Red Unburnished *tecomates* and one Conchas White-to-buff sherd. One of the largest Conchas mounds in the area.

SM-31: MOUND 3 m. high and 100 m. in diameter, about 100 m. east of the Salinas La Blanca salt *playa*. Two sherds belonged to the Conchas Phase (Conchas Red Unburnished jar fragments), with the bulk being of the Cerro del Tiestal Complex.

SM-37: RÍO NARANJO. A mound 5 m. high and 100 m. long north-south, lying on the east bank of the Naranjo River and cut by it, 0.5 km. downstream from SM-1. A very large sample of pottery from the cut face consisted almost entirely of Conchas Red Unburnished *tecomates*, with two Conchas White-to-buff flat bottomed dishes; one small, oval, grinding stone (pl. 27, *h*) was



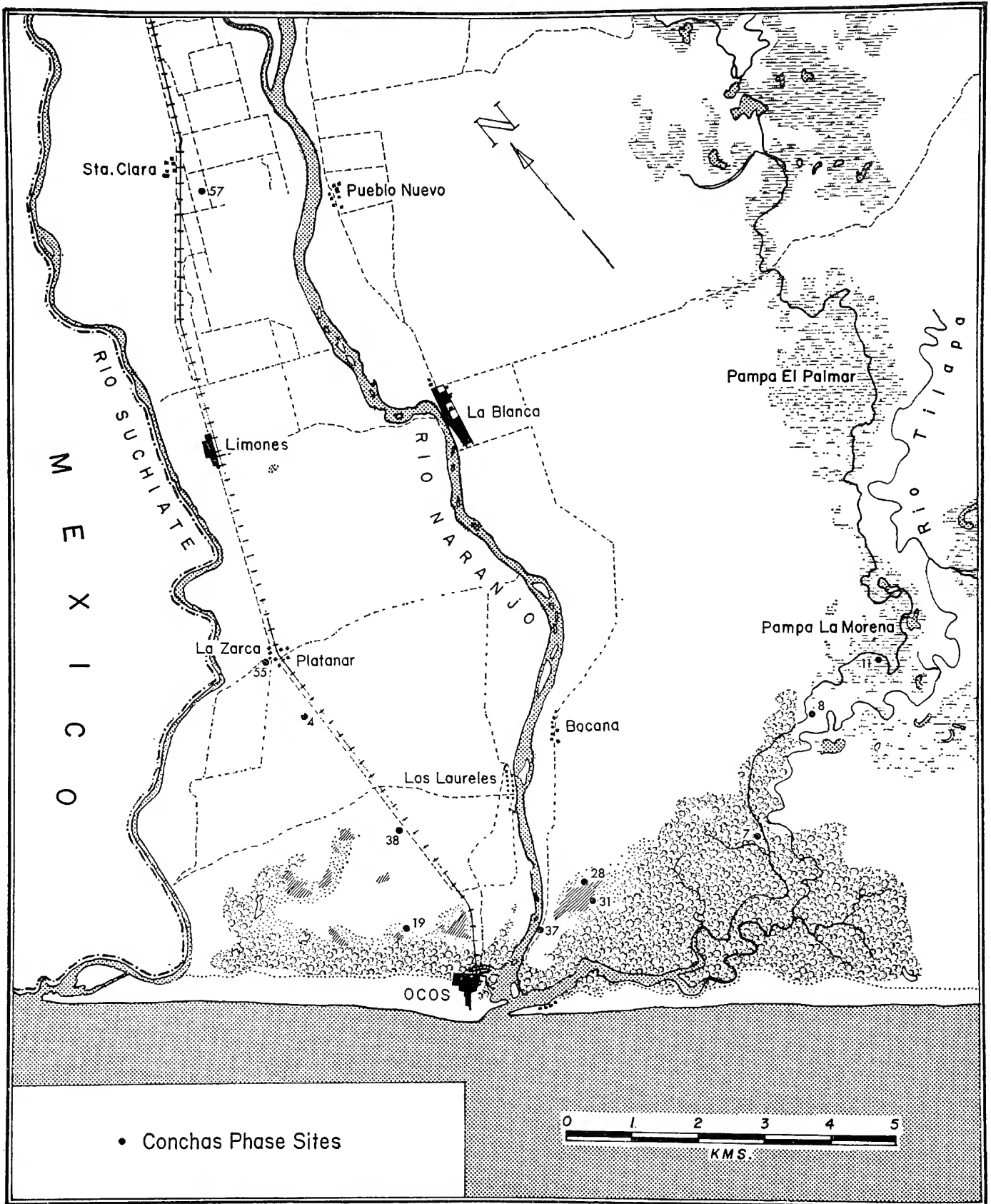


FIGURE 46.—Distribution of sites during the Middle Formative period in the Ocosingo area.



also recovered, with a convex interior. A 50-cm.-thick shell layer exposed in the northern half of the mound consisted mainly of *Iphigenia altior* valves, with *Amphichaena kindermanni* and other mollusks. Also recovered was a clay corn cob impression and a sample of charcoal which was radiocarbon dated to 790 B.C.  $\pm 60$  (see p. 68).

SM-38: LA VICTORIA. The bulk of the occupation at this site, an unplanned village of some 10 to 12 houses on low mounds, is Conchas.

SM-53: CERRO DEL ESCOBASAL. A mound 3 m. high and 100 m. in diameter, located 0.5 km. up the estuary "El Escobasal." This site is hidden in mangrove forest, a considerable walk from *monte* suitable for milpa clearance under present-day conditions. The large surface sample was entirely Conchas, mostly Conchas Red Unburnished *tecomates*, but also including Conchas White-to-buff, Conchas Red-and-white, and two Ocos Black sherds of the Conchas Phase. In the collection was a leg from a large solid Conchas figurine (pl. 27, *i*) and a small stone with a pecked depression on one surface (pl. 27, *g*). Most importantly, a rim sherd from a large-necked jar of the Conchas Red Unburnished type featured a bearded face (pl. 27, *l*), probably that of a were-jaguar, in Olmec style, thus confirming the contemporaneity of Conchas and La Venta.

SM-55: LA ZARCA. A large site 13 km. south of Ayutla, just to the west of the Ayutla-Ocos road. The site consists of a number of high mounds on which houses of the finca headquarters have been built. La Zarca must have been one of the most important ceremonial centers in the area. The collection purchased by E. M. Shook from the site (see Coe, 1961, p. 147) contains two Conchas figurine fragments.

SM-57: SANTA CLARA BANANAL. See description on p. 87. The bulk of the sherds collected by Coe in 1958 belong to the Conchas Phase.

## Discussion

The first noticeable population increase in the Ocos area took place during Conchas times, the most widespread and important of the local Formative phases. The transitional look of the antecedent Jocotal ceramics, the frequent tendency of Conchas settlements to overlies earlier Formative deposits, and the continued estuary orientation of many sites during this period make it seem likely that normal population growth, rather than immigration, was responsible for the increase. Conchas has many new ceramic and other cultural traits, but does not as a whole look "foreign" to the area.

Developments during this phase are not spectacular, but they are stable. Villages do not appear to have been much larger than in Early Formative times, but they are more numerous: There are more than twice as many Conchas components than there are in Jocotal. Conchas *tecomates* are scattered everywhere in the estuary system, not only spread over most of the previous settlements but also consistently present under later ones, as if the Middle Formative had been responsible for the opening up of new village sites. Middens of the phase are still replete with mollusk shells. Clay platform building, begun in Jocotal times, is still in evidence, and the use of pyramidal mounds is indicated by SM-57 and perhaps by SM-4. Maximum occupation of the Zanjón Pacaya estuary and the Pampa La Morena savanna may have occurred during the Conchas Phase.

Enough inland Conchas sites are known to make it likely that this phase was oriented both to the estuaries and the inland plain, in contrast to the Cuadros and Jocotal Phases. It may be that settlement moved steadily inland toward the piedmont during Conchas times.

## LATE FORMATIVE SITES (fig. 47)

### Archeological Criteria

The Late Formative of the Ocos area is, of course, the Crucero Phase, defined on the basis of a ceramic complex found in the upper levels of La Victoria and in a series of ancient pits cut down from the surface of Salinas La Blanca. Conchas Streaky Brown-black would be the hallmark of the phase, but certain decorative techniques such as multiple-brush Usulután could also be considered diagnostic. The characteristic form is the composite silhouette bowl, often with thickened angle at the break and with dimple base.

### Sites

SM-1: SALINAS LA BLANCA. Crucero is the latest component at the site.

SM-38: LA VICTORIA. Crucero pottery was segregated from Marcos (Late Classic) on typological grounds.

### Discussion

By Crucero times, a significant population decrease had taken place in the Ocos area and most settlement had moved inland to the piedmont. The Late Formative in the Guatemalan highlands and along the foothills of the Pacific coast (the so-called "Boca Costa") of both Guatemala and Chiapas was a time

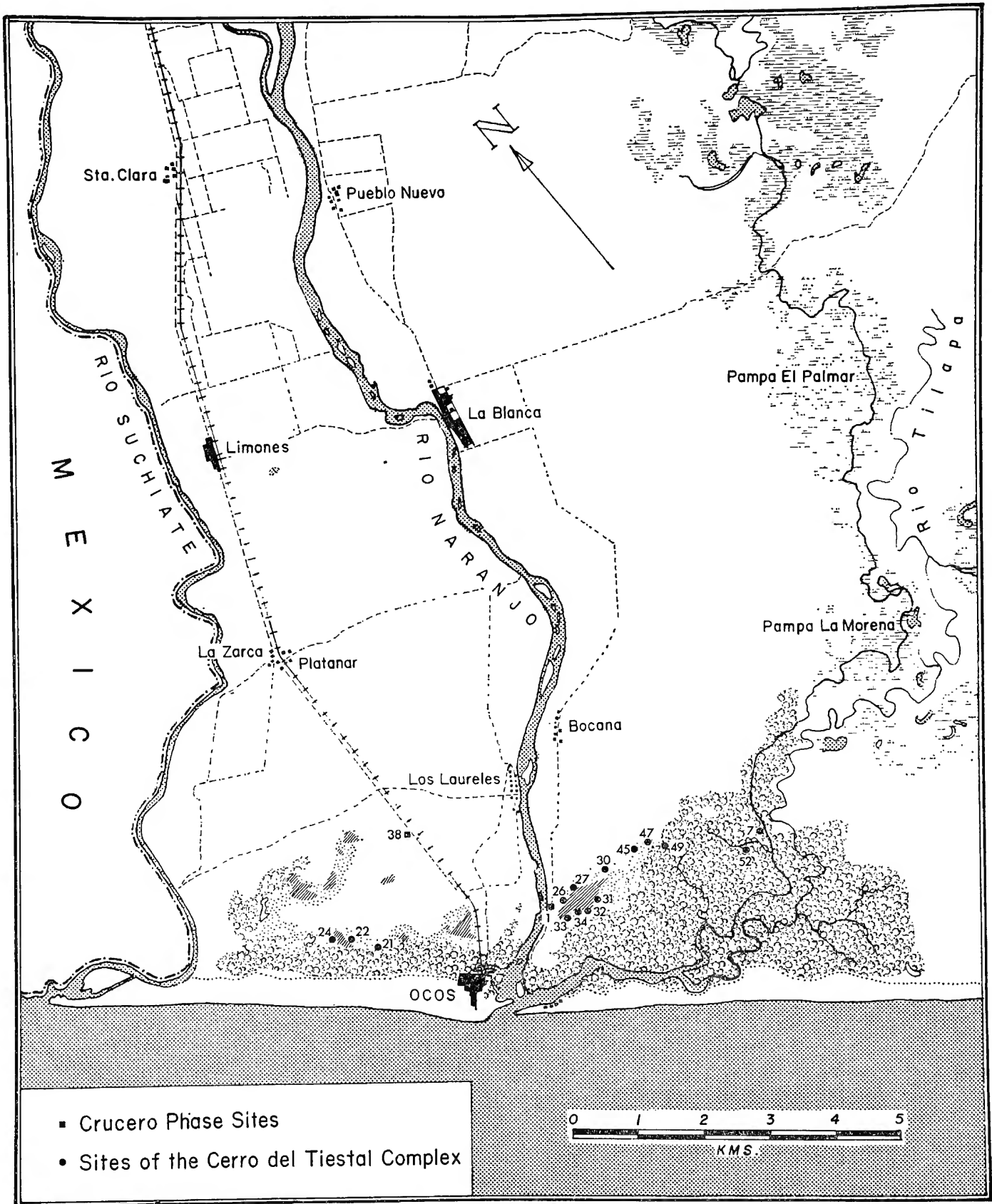


FIGURE 47.—Late Formative and Cerro del Tiestal Complex sites in the Ocosingo area.

of substantial pyramid building and monumental sculpture. Kaminaljuyú in the Miraflores Phase, Monte Alto, El Baúl, and Izapa are some of the most impressive ceremonial sites of this period, and made important contributions to the development of Maya civilization. At El Jobo, only 15 km. north of our survey area, Shook found a kilometer-long site with 15-m.-high pyramidal mounds, one of which was topped by an Izapan style stela, probably dating from Crucero times (Shook, 1947, p. 181).

Such florescence evidently did not reach the sea in the immediate Ocós area. Crucero sites within the survey area are small mounds of midden at best, really little more than thin skins of Late Formative pottery above more impressive Middle or Early Formative deposits. The major developments of the period took place in the highlands and in the piedmont or *Boca Costa*; the scanty Crucero remains near Ocós probably represent nothing more than outliers from these areas.

## SITES OF THE CERRO DEL TIESTAL COMPLEX (fig. 47)

### Archeological Criteria

At a number of sites, the surface pottery as a whole bore little resemblance to any known to us from our excavations, either in La Victoria or in Salinas La Blanca. We have the feeling that these collections pertain to a single time period, but in view of the possibility that they do not (this could not be proved one way or the other without further excavation in selected sites) we have hesitated to invent a new phase. Accordingly, the noncommittal term "Cerro del Tiestal Complex," adapted from the name of site SM-52, has been assigned to this material (pl. 28).

The large collection from the surface of SM-52 (Cerro del Tiestal) featured mainly thick, crude vessels with rather coarse bentonitic paste. The surfaces were much worn, but occasionally there are signs of a red or flesh-colored slip; however, the largest and coarsest of the vessels were definitely unslipped, and their form suggests that they may well have played a part in salt extraction. The forms include: (1) deep bowls with a slight recurving toward the orifices, which are usually somewhat restricted, the rims being tapered rounded (pl. 28, *k,m*); (2) strongly restricted, squat or globular neckless jars (pl. 28, *c*); (3) jars with vertical to outflaring necks (pl. 28, *h-j*); and (4) open bowls or vases (pl. 28, *g*). The decoration is confined to rare incising on Forms 2 and 4 and is linear, with hatched triangles, branching designs (pl. 28, *g*), and opposed diagonals (pl. 28, *l*).

At other sites with pottery of the same complex, associated sherds include composite silhouette bowls with black interior and exterior horizontal ribbing (pl. 28, *d*); broad, wavy Usulután designs on the interior of a deep bowl (SM-21; pl. 28, *e*); red on pinkish-buff or cream sherds (SM-33); and quite often Violeta Plain rims, with their characteristic complex profile (pl. 28, *n,o*). All of the foregoing suggests a placement in the Late Formative for the complex, if in fact we are dealing with a chronologically restricted assortment of sherds; if so, then a placement just after

Crucero might be most suitable, but it would be very rash at the present time to form any definite conclusions.

From a significant number of sites of the Cerro del Tiestal Complex some curious handmade, crude, and unslipped pottery objects (pl. 28, *p-s*) were collected. All are solid and cylindrical or slightly pointed, and were fired at a fairly low temperature. They are *not* prongs for incense burners. They resemble nothing so much as the clay cylinders known to have been used in great numbers as supports for salt-molding vessels in prehistoric Europe (Riehm, 1961), and which one of us (Coe) found at a late salt-making site on the coast of Guanacaste, Costa Rica. The purpose of these porous supports is first of all to hold the mold up near the fire to hasten drying, and to draw away excess mother-liquor through the walls of the mold, which itself is of a porous clay. Such objects are typical of many regions where primitive saltmaking from brine was carried out. It is possible, therefore, that sites of the Cerro del Tiestal Complex were saltmaking stations which supplied the large Late Formative sites farther inland on the Boca Costa piedmont.

### Sites

- SM-7: CERRO DE LAS CUEVAS (see p. 87). Out of 15 sherds, 7 belong to the Cerro del Tiestal Complex.
- SM-21: TWIN MOUNDS located on the north bank of a now-defunct estuary running northwest from Ocós. Cerro del Tiestal sherds include an example of wavy-line Usulután and a red-slipped bowl with everted rim. Three salt-mold supports were also found. There is a Marcos Phase component at this site.
- SM-22: MOUND 4 m. high and about 70 m. in diameter on the edge of the salt *playa* "Salinas Madresal" (about 0.25 km. west of SM-21). Two Violeta Plain necks and three strongly outcurved and exteriorly thickened necks from jars suggest a placement in the Cerro del Tiestal Complex. A Marcos component is also present.
- SM-24: MOUND 3 m. high and 10 m. in diameter, on the west margin of the salt *playa* "Salinas Madresal," and about 150 m. north of SM-23. All sherds assigned to

the Cerro del Tiestal Complex, mainly consisting of coarse, deep, restricted jars with slightly curved walls near the rim; one Violeta Plain rim.

- SM-26: MOUND on the north margin of the Salinas La Blanca salt *playa*, just west of SM-28 (a large Conchas site). Only three identifiable sherds, all of the Cerro del Tiestal Complex, and including one Violeta Plain.
- SM-27: MOUND near SM-26. Four identifiable sherds, all Cerro del Tiestal.
- SM-30: LOW MOUND, among a string of eight others (SM-29, -44, -45, -46, -47, -48, -49, -50) reaching east along the bank of one of the defunct estuaries feeding the Salinas La Blanca salt *playa*. Four identifiable sherds, all Cerro del Tiestal, and including an eroded composite silhouette bowl with coarse engraving on the exterior.
- SM-31: See p. 87. Seven out of nine sherds are Cerro del Tiestal.
- SM-32: LOW MOUND on the southwest edge of the Salinas La Blanca salt *playa*. With the possible exception of one very eroded sherd which looks like San Juan Plumbate, all surface material is Cerro del Tiestal. There are seven coarse, deep, restricted jars of bag shaped form, three fragments of red-slipped jars with outflaring, exteriorly thickened neck rims, two sherds from deep, red-slipped bowls or vases, and a cylindrical pottery salt-mold support.
- SM-33: LOW MOUND to the west of SM-32 and SM-34. All sherds of the Cerro del Tiestal Complex, including red-on-cream or pinkish buff examples, as well as several fragments which recall Juláin Coarse.
- SM-34: LOW MOUND between SM-32 and SM-33. Six sherds are Cerro del Tiestal, with one high neck from a jar which may be Marcos.
- SM-45: LOW MOUND to the east of SM-30. All seven identifiable sherds, which feature the characteristic deep, coarse, restricted jars, are Cerro del Tiestal.
- SM-47: LOW MOUND just to the east of SM-45. All 11 sherds belong to the Cerro del Tiestal complex; 9 of them are coarse, deep, restricted jars.
- SM-49: LOW MOUND just southeast of SM-47. Only four identifiable sherds, all of them coarse, deep, restricted jars of the Cerro del Tiestal Complex.
- SM-52: CERRO DEL TIESTAL. A mound 1.5 m. high and 20 m. in diameter, about 200 m. up the estuary "El Tiestal"; the site can be reached only by water because of the density of mangrove stilt roots in the surrounding forest. The Cerro del Tiestal Complex was defined from the surface collection made there.

### Discussion

This ceramic complex is a temporary formulation made on the basis of very incomplete evidence. Some of the pottery, especially the engraved and Usulután examples, appears to us to be terminal Formative, probably post-Crucero. We see some interesting resemblances with the ceramics from Salinas de Ixtán, near Champerico (Kidder, 1940).

As opposed to Crucero, there are certainly a great number of sites assigned to this complex, some 15 in all. These have a highly significant relation to the salt *playas* of the Ocos area, and are almost all strung out along the edges of these formations. Today and in the recent past, the salt *playas* have been the locations of commercial salt-extraction ventures; the salt is extracted from the brine-permeated clay on the bed of the flats. It is not unreasonable to suppose from the presence of certain distinctive artifacts that the people who made the Cerro del Tiestal Complex pottery were also in the salt business, and that this industry is largely responsible for the observed settlement pattern—lots of small house sites or perhaps even salt-boiling stations surrounding the *playas*. It may be, in fact, that most of the "sites" around the Salinas La Blanca salt *playa* actually belonged to a single dispersed community.

Aboriginal methods of salt production from salt *playas* on the Pacific coast of Guatemala were described in the year 1579 by Juan de Estrada (translation by Coe):

Salt is made on this coast in a way that seems of more trouble than profit. They take earth from near the sea and throw it into some great trough-like canoes which have been pierced through the bottom. Inside them they put some mats and on these they throw the earth taken from near the sea, and which appears to be even more salty. On top of the earth they pour water little by little and it percolates through the earth and filters through the mats and through the holes, falling into some pots (*ollas*) below. And they boil this water in another *olla* until it congeals, producing salt only in small, scanty, and puny amounts. [Estrada, 1955.]

Some of the constricted orifice jars of the Cerro del Tiestal Complex may have been used for the boiling process only, and these would have been the more impermeable ones, since boiling brine would have the tendency to burst the walls of porous vessels. On the other hand, those with porous fabric could have been used as molds for the wet salt as it was recovered from the boiling jars; these would have been placed on the clay supports which we found.

We would like to call attention to another site located right on the edge of a coastal salt *playa*, the Salinas de Ixtán above mentioned. The pottery, which appears to be salt eroded very much like many Cerro del Tiestal sherds, is surely terminal Formative as well, with wavy line Usulután and vessels with mammiform supports; there are many resemblances to the engraved pottery of Cerro del Tiestal (Kidder, 1940; Coe, 1961, pp. 148-149). We would venture the guess that this also was a salting site and that many others will be discovered for the terminal Formative along the south coast of Guatemala. At any rate, such activity seems to have been responsible for a large, but short-lived, population increase in the Ocos area, followed by an apparent abandonment.

## LATE CLASSIC SITES (fig. 49)

## Archeological Criteria

The only Late Classic Phase which has been defined for the Ocos area is Marcos (pl. 29, *b-j*, 30), which is principally characterized by an abundance of San Juan Plumbate pottery. San Juan Plumbate is common in many Pacific coast sites, and was ascribed by Thompson to the Late Classic period on the basis of his stratigraphic work at El Baúl (Thompson, 1948). According to more recent archeological work in the Cotzumalhuapa area, mainly at the Finca El Bilbao, this type is distinctive of the last part of the period, and does not appear until that time. At the present state of our knowledge, we have no idea of what the ceramics of the earlier part of the Late Classic (corresponding to Tepeu 1 and 2) would look like in our area, nor do there seem to be any sites or collections that can be assigned to it.

The San Juan Plumbate type is described by Thompson (1948) and Coe (1961). In our area the forms are as follows: (1) large, deep bowls with everted rims and dimple bases (pl. 29, *e-g*, *i*, *j*); (2) squat jars with low, vertical necks (pl. 30 *a*, *c-e*); (3) simple silhouette bowls; (4) bowls with exteriorly thickened rims and lateral moldings or ridges (pl. 30, *f*, *g*); (5) composite silhouette bowls; (6) "basal-flange" bowls; and (7) cylindrical vases (pl. 29, *d*).

There are clear-cut differences between sites in the frequencies reached by Form 1, on the one hand, and by Forms 2 and 4, on the other—these may well reflect important chronological differences within the type. At El Baúl, furthermore, Form 1 was missing, and there was a preponderance of Form 4, so that there may be differences between areas as well.

Unfortunately, no large-scale excavations have been carried out in sites which are mainly of the Marcos Phase. However, in the spring of 1958, the construction of a drainage ditch in SM-6 (Limones), in a banana grove just to the east of the Ayutla-Ocos road, destroyed a mound and revealed a large cache of San Juan Plumbate vessels, which were collected by Don Gustavo Espinosa of the Instituto de Antropología e Historia and deposited by him in the museum of Guatemala City. They unfortunately have never been studied. The most extraordinary find in this cache was a circular gold plaque (pl. 29, *h*), which was contained within a bowl of Form 1 (pl. 29, *i*, *j*). Its diameter varies from 9.5 to 9.6 cm., and it is quite heavy. A stylized owl is hammered out in relief; in shape and style, it falls into a group with two other repoussé gold plaques from Guatemala.

One of these plaques (fig. 48, *b*) comes from the Mexico-Guatemala border region, probably from the vicinity of Ayutla (Nottebohm, 1945, and personal

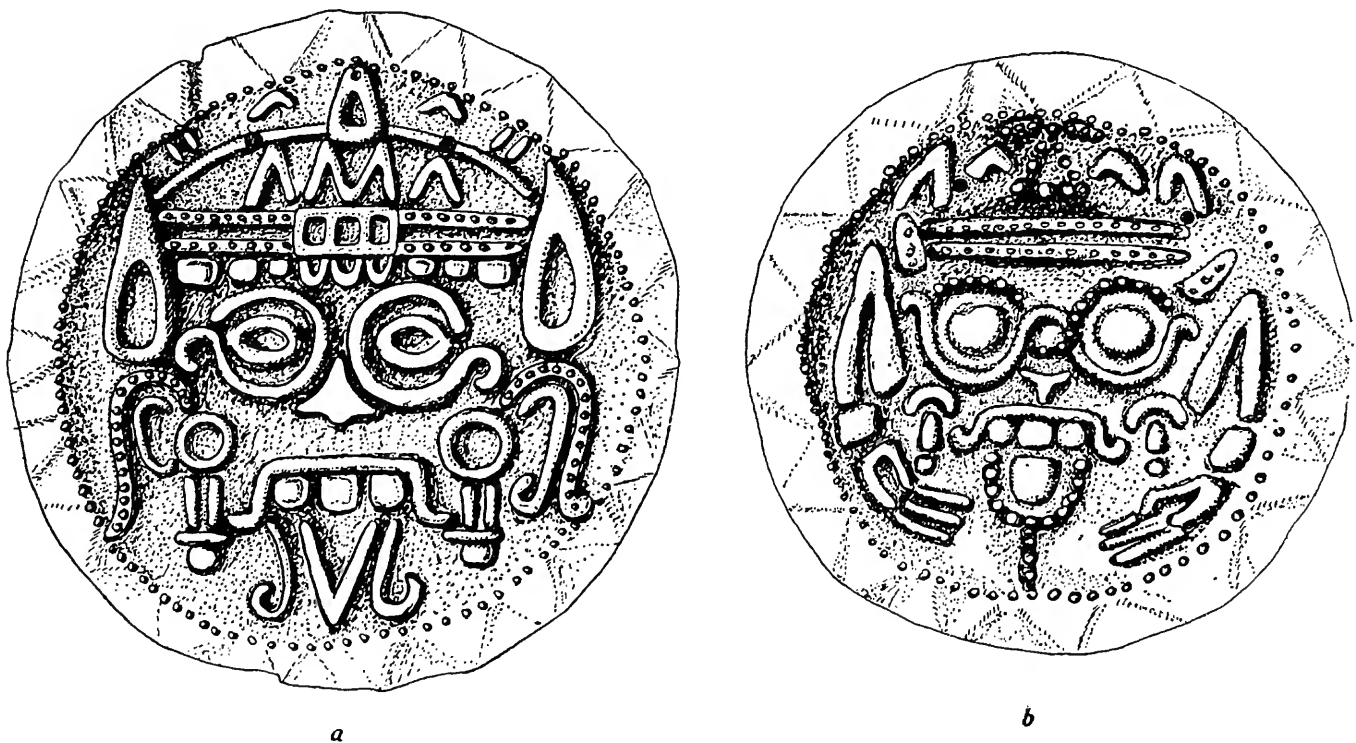


FIGURE 48.—Embossed gold plaques from Guatemala. *a*, Found at Zacualpa. *b*, Said to be from the Ayutla area, north of Ocos. After Nottebohm, 1945.

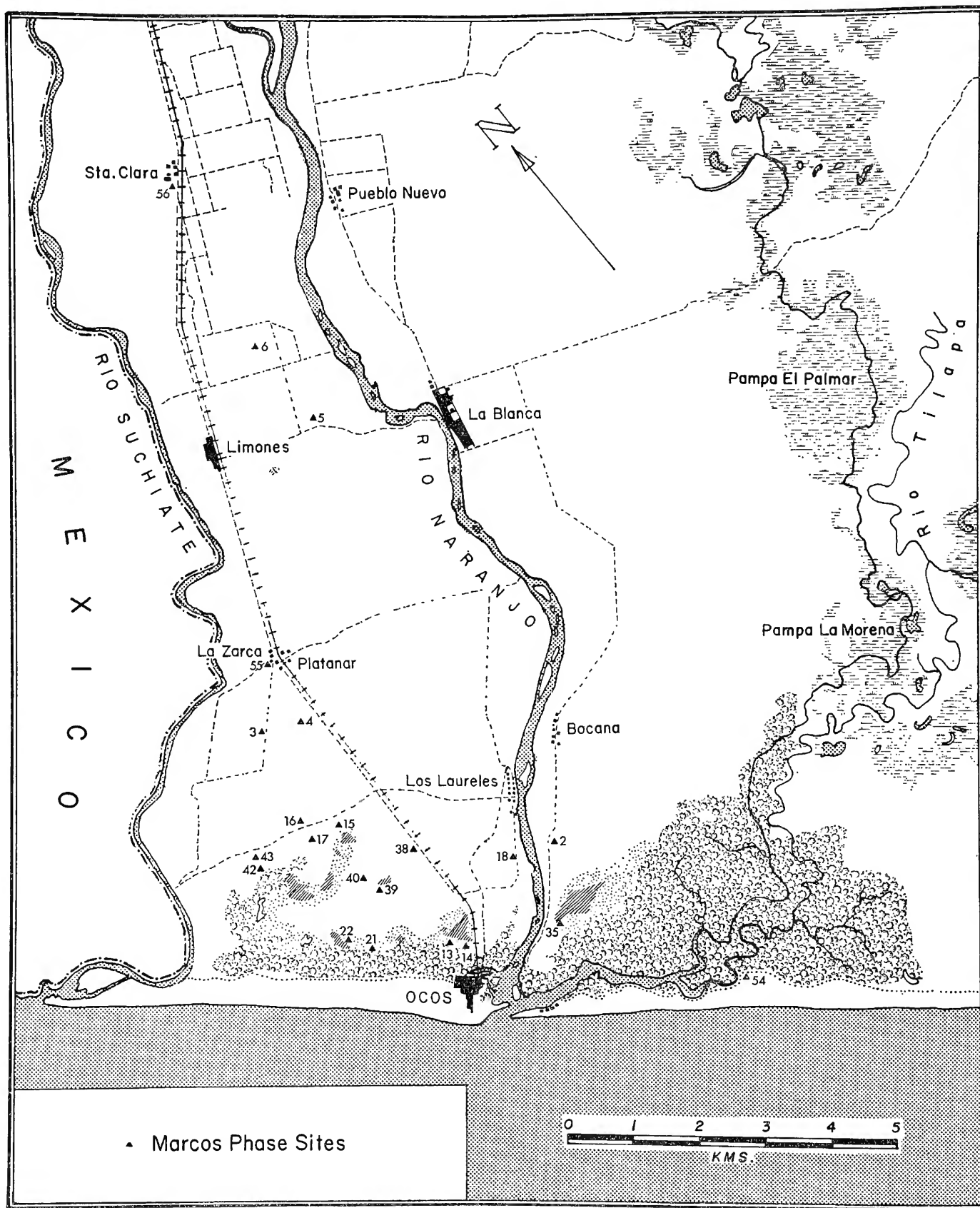


FIGURE 49.—Distribution of Late Classic sites in the Ocosingo area.



communication), and represents a stylized Tlaloc face in the same border of triangles that can be seen on the Limones plaque. The other (fig. 48, *a*) was one of two found at Zacualpa (Lothrop, 1936, fig. 68, *b*) in Tomb A, the contents of which had been removed by local looters but recovered by Father Rossbach. Again, the embossed design is of a Tlaloc face in a border of triangles, in a style which is, like those of the others, more "Mexican" than Maya. Nine pottery vessels were associated with the Zacualpa plaque. One of these is a cylindrical vase with a finely incised figure of a seated man and glyphs, in the most sophisticated Late Classic Maya style (Lothrop, 1936, pl. 1, *a*). The remaining eight comprised seven tall, cylindrical vases and one tripod bowl, all with negative decoration consisting of alternating parallel lines and rows of dots combined with life forms; all had been covered with painted stucco. This kind of negative pottery appears in Late Classic context at El Baúl (Thompson, 1948, fig. 53), at Finca El Bilbao (Lee Parsons, personal communication), and at Palo Gordo (collection in Museo Nacional de Arqueología e Etnología, Guatemala City). The Zacualpa disk therefore would also date to the Late Classic, probably to its later part. The other gold plaque in the tomb, parenthetically, was welded from two pieces of metal and embossed with what seems to be a parrot in profile.

All three of these gold plaques, then, belong to the Late Classic period. This dating is not particularly surprising in view of the metal associated with San Juan Plumbate in a tomb in the Motagua valley (Kidder and Smith, 1943, p. 170), and with Copador Ware at Chalchuapa, El Salvador (Kidder, 1948, from information supplied by Stanley Boggs); one also calls to mind the well-known occurrence of a fragmentary gold figurine in the substela cache of Stela A at Copan (Stromsvik, 1941). In spite of many assertions to the contrary, some gold objects had found their way into the Maya area before the final Classic collapse, perhaps from both highland Mexico and from lower Central America. From its style, the plaque from the Marcos Phase plumbate cache at Limones appears to have been a Mexican rather than Maya production, as do the Nottebohm and Zacualpa specimens.

Other wares which characterize the Marcos Phase, besides San Juan Plumbate, include a pottery with specular red slip, sometimes over a white underslip (pl. 30, *k, l*); cylindrical vases and bowls both are among the forms. Polished red or orange bowls with everted rim are also found, as well as plain, necked or neckless jars (pl. 30, *m-p*) with a single horizontal row of indented filleting on the shoulder or below the neckless rim. "Flesh-ware" sherds occur, but no forms have been surely identified. Some sites have a few

Manchuria Plain sherds, including fragments of comals.

Various other artifacts in Marcos Phase surface collections are footed metates, a double-end flute (pl. 30, *q*), and two effigy heads (pl. 29, *b, c*) (one a human face made in a mold and the other a spider monkey) from San Juan Plumbate vessels; the latter are definitely not in the later Tohil Plumbate style.

### Sites

SM-2: BOCANA. This is the site called "La Blanca" by Coe (1961). It is an impressive ceremonial group of six large mounds, ranging in height from 3 to 10 m., located in pastureland to the east of the Naranjo River about 1.2 km. upstream from Salinas La Blanca. The approximate dimensions of the site are about 300 m. from north to south, and 100 m. east to west. The surface collection is entirely Marcos, consisting mainly of San Juan Plumbate sherds among which Form 1 predominates.

SM-3: EL JÍCARO. A group of two 4-m.-high mounds and several lower ones in pastureland about 1 km. southwest of the Platanar railroad crossing. The surface sherds are all Marcos, of which 18 out of 22 identifiable specimens are San Juan Plumbate, with Form 1 predominating.

SM-4: AGUILAR. See p. 85. Two San Juan Plumbate sherds were among those collected.

SM-5: SAN ANTONIO. A small ceremonial center, or a ceremonial mound surrounded by habitation mounds, in a cottonfield 1.5 km. southeast of the village of Limones. The dimensions are about 30 by 30 m. Five out of six sherds picked up were San Juan Plumbate. The remaining sherd is polished black ware with zoned white-filled hatchure on the exterior; it may be of the Crucero Phase.

SM-6: LOS LIMONES. Located in a banana plantation to the northeast of the village of Limones; first reconnoitered by E. M. Shook (1947; see also Coe, 1961, p. 147, describing a surface collection made by Willey and Smith in 1958). This unusual group consists of several fairly large, low mounds. At least one of these has vertical masonry walls consisting of river cobbles set in shell lime mortar; the exterior side of each cobble has been carefully cut or smoothed down to present an even wall surface. The surface sherds collected in 1958 and 1962 are almost all ascribable to the Marcos Phase, with much San Juan Plumbate; some large jars in cream monochrome with thick everted rims, and a flat stone metate with slab legs were also collected. Shook reports another group of mounds lying between Limones village and the Suchiate River. The gold plaque and San Juan Plumbate vessels recovered from a destroyed mound near the village have been discussed above.

SM-13: MOUND roughly 2 m. high and 10 m. in diameter, located 100 m. south of SM-12 (see p. 85), along an extinct estuary north of Ocos. Of 22 identifiable sherds,

- 21 were San Juan Plumbate, among which Form 2 predominates.
- SM-14: SMALL MOUND, 50 m. east of SM-13 and roughly the same size; both may constitute a single Marcos settlement. Surface pottery was abundant, all of the Marcos Phase with much San Juan Plumbate. Of 48 plumbate sherds, 19 could be identified as Form 2.
- SM-15: FAIRLY EXTENSIVE CEREMONIAL MOUND GROUP in second-growth *monte*, 1 km. west of the El Crucero railroad crossing. Overlying an earlier Jocotal component is an important Marcos Phase occupation, consisting mainly of San Juan Plumbate, with Form 2 predominating. From this site was collected the only object in the Ocos area which might be of Early Classic date: an apparent slab leg from a vessel, solid, with carved decoration on the exterior surface (pl. 29, *a*).
- SM-16: SERIES OF LOW MOUNDS to the northwest of SM-15. These are obviously village mounds, each about 1 m. high and 100 m. wide; quite possibly this was a village associated with SM-15. The pottery is entirely Marcos, with mainly Form 1 sherds of San Juan Plumbate and a Manchuria Plain comal.
- SM-17: MOUND 1 m. high and 15 m. in diameter, almost pure midden, located a few hundred meters south of SM-16. The identifiable pottery on the surface is Marcos, with San Juan Plumbate (mainly Form 1), specular red ware, and a basal flanged bowl fragment which apparently is also San Juan Plumbate. Two polished red sherds may be Late Formative: one is a fragment from a composite silhouette bowl, and the other a flange from a laterally flanged bowl.
- SM-18: IMPORTANT CEREMONIAL GROUP near the west bank of the Naranjo River, facing across to SM-2. This site has a plaza framed with low mounds, as well as an open end ball court like that at SM-56 (Santa Clara). All of the surface pottery is Marcos, with a good deal of San Juan Plumbate including both Forms 1 and 2; specular red and "flesh" wares are also present, as well as a metate fragment of hornblende dacite with low broad feet.
- SM-21. (See p. 91.) Those sherds which do not belong to the Cerro del Tiestal Complex are mainly plumbate, but of a type which may be Robles rather than San Juan—the paste is softer, and the slip is more reddish or brownish than in the usual San Juan examples (see description of Robles Plumbate in Shepard, 1948, pp. 125–126). Squat, necked jars of Form 2 predominate in the plumbate group.
- SM-22. (See p. 91.) Two sherds of San Juan Plumbate were picked up, including one of Form 2.
- SM-35: GROUP OF FIVE MOUNDS, 200 m. west of the Salinas La Blanca salt *playa*. One is 1.5 m. high and 30 m. in diameter; another is 1 m. high and 10 m. in diameter; the others are smaller. Out of 18 sherds, 16 are San Juan Plumbate.
- SM-38. LA VICTORIA. Marcos is the latest component at this stratified site.
- SM-39: EL MANGO. A mound 2 m. high and 100 m. in diameter, in the Potrero "El Mango," to the west of SM-38. The very small surface sample is all Marcos, with two tiny San Juan Plumbate sherds and a sherd from a specular red ware cylindrical vase.
- SM-40: MOUND 1 m. high and 100 m. in diameter, about 300 m. north of SM-39. A handful of San Juan Plumbate sherds was picked up, mainly of Form 1.
- SM-42: MOUND 2 m. high and 100 m. in diameter, located 200 m. north of the salt *playa* "Esperanza." The large surface sample was entirely of the Marcos Phase, mainly San Juan Plumbate; included in the latter was a modeled spider-monkey head "*adorno*" (pl. 29, *c*).
- SM-43: MOUND 2 m. high and 15 m. in diameter, just north of SM-42 and probably part of the same site during Marcos times. The large surface collection was principally San Juan Plumbate, with Form 1 predominating; a small, human moldmade effigy head with elaborate headdress (pl. 29, *b*) probably was broken from a plumbate vessel. Also present was a sherd of specular red ware, and a fragment of a Manchuria Plain comal. Two artifacts were picked up: a fragmentary double-end flute of pottery (pl. 30, *q*), and a mano of weathered dacite.
- SM-54: SMALL MOUND GROUP located between the Pacific Ocean and the estuary "El Río Ocosito," about 0.5 km. west of the abandoned Tilapa airstrip. Surface pottery was incredibly abundant, all of it Marcos. Of 93 "diagnostic" sherds, 84 were San Juan Plumbate, of which 34 were of Form 2, and 5 of Form 4. One fragment of plumbate came from a squash-shaped effigy with a reddish glaze of Robles appearance. Four fragments of specular red-on-white were in the collection, as well as a sherd of Manchuria Plain. Three solid, tapered, pronglike pottery fragments may be from three-pronged incensarios; they are centrally pierced along almost their entire length, as though each had been built up over a stick.
- SM-55: LA ZARCA. (See p. 89.) Much San Juan Plumbate was collected by E. M. Shook from this site, and there is the possibility that its construction as a ceremonial group took place in the Marcos Phase.
- SM-56: SANTA CLARA. This large, planned, ceremonial mound group lies just to the south of the houses of the Finca Santa Clara, in a cleared pasture, and was reconnoitered by Shook (1947), who excavated from one of the mounds a San Juan Plumbate burial urn containing an infant skeleton. There is an open end ball court at the site.

## Discussion

Following what appears to have been complete neglect of the Ocos area for 500 or 600 years, there came a wave of population such as it had never seen before. Twenty-two sites, more than a third of all sites thus far plotted, belong to the Marcos Phase, a period of planned ceremonial centers, open end ball courts, and San Juan Plumbate pottery.

This reinvasion of the Ocos region during terminal Late Classic times was not limited to the estuaries,



although they may well have continued to serve as a prime means of transportation, a function they fulfilled as late as the Colonial period (*Relación de la Provincia de Soconusco*, translated in Coe, 1961, pp. 139–140). There is no evidence of mollusk collecting at Marcos sites, which often occur in open fields or in flats along the Naranjo River, and in one case almost to the beach. The reasons for this sudden and dramatic revival of interest in the area are unfortunately as obscure as the reasons for its previous abandonment. An interesting aspect of the Marcos Phase is a tendency to settle on Formative mounds or mound groups, some of which had been unoccupied for over a thousand years; since the land is subject to flooding during the rainy season, this practice is understandable. Although settlement of the area was widespread during this phase, no sites are yet known for the Zanjón Pacaya or the Pampa La Morena region, the savanna areas being apparently avoided. Many sites occur in locations where well-drained virgin forest would have to have been cleared

for the first time. Does this mean that some commercial crop not suitable to the swampy savanna—like cotton or cacao—was more important during this phase than maize?

For the first and only time in our survey area, a site (SM-54) is located in the beach sand and scrub area, on the inland side toward the estuaries and mangrove forest. There is sufficient evidence in aerial photographs to conclude that the Pacific coast of Guatemala is prograding, building up beaches and offshore bars in back of which lies a system of lagoons and estuaries. The lagoons eventually become filled with silts and “fossilized” into salt *playas* and *madresal* groves, while new beaches are being formed (see discussion in Coe, 1961, pp. 111–113). This would suggest two things: (1) that the fossil beach on which SM-54 is located is as old or older than the Late Classic and (2) that this beach as well as those stretching to the west of Ocos postdate the end of the Formative period.

## POST-CLASSIC SITES (fig. 50)

### Archeological Criteria

So little is known about the Post-Classic period on the Pacific coast of Guatemala and Chiapas, that one would hesitate to make any generalizations about it for the Ocos area. Tohil (or “effigy”) Plumbate is a good marker for the Early Post-Classic, or Toltec period, and has been well described by Dutton and Hobbs (1943) from their excavations at Tajumulco, in the highlands of San Marcos on one of the headwaters of the Suchiate River. The marker for the latest part of the Post-Classic is Chinautla Polychrome, a black-and-red-on-white type which has been defined by Navarrete (1962) based on the French excavations at Mixco Viejo; characteristic ceramic forms of the Late Post-Classic in Guatemala are bowls with effigy-head feet (often of birds), stamped grater bowls, and high-necked jars with vertical strap handles. Very few traces of this period have been discovered in the Ocos area, however.

### Sites

- SM-6: LOS LIMONES. (See p. 95.) Two red-on-white sherds were collected at the site in 1962, one with parallel lines as well as a diagonal ticked line on the interior; both are Mixco Viejo Red-on-white (compare Navarrete, 1962, fig. 5, a), Late Post-Classic period.
- SM-38: LA VICTORIA. Near the surface, one probably Tohil Plumbate sherd was collected, along with two Chinautla Polychrome sherds (Coe, 1961, fig. 38, j–l).

- SM-55: LA ZARCA. (See pp. 89, 96.) Among the sherds collected by Shook at this large ceremonial mound site were some long, bird-headed feet, probably from Late Post-Classic tripod grater bowls (Coe, 1961, p. 147).

### Discussion

The Post-Classic period in the survey area was one of striking population decline, similar to that which took place at the end of the Late Formative. All of the early Spanish observers of the situation along the Pacific coast of Chiapas and Guatemala comment upon the small numbers of people living there after the Conquest. Soconusco, in fact, a province of which the Ocos area was the easternmost extension, became known as the “*Despoblado*.” One could travel many kilometers over the coastal plain without encountering anything but high forest interspersed with savannas. Occasional settlements were located between rivers; we are told by Estrada (1955), writing in 1579, that saltmaking was sometimes carried out near the coast proper, but that there were practically no persons then living there.

This depopulation was strange to the Spaniards, who noted the high fertility of the soils and the high per capita production of maize, cotton, and other necessities. The coastal plain of Chiapas and Guatemala was once noted for its excellent cacao, which

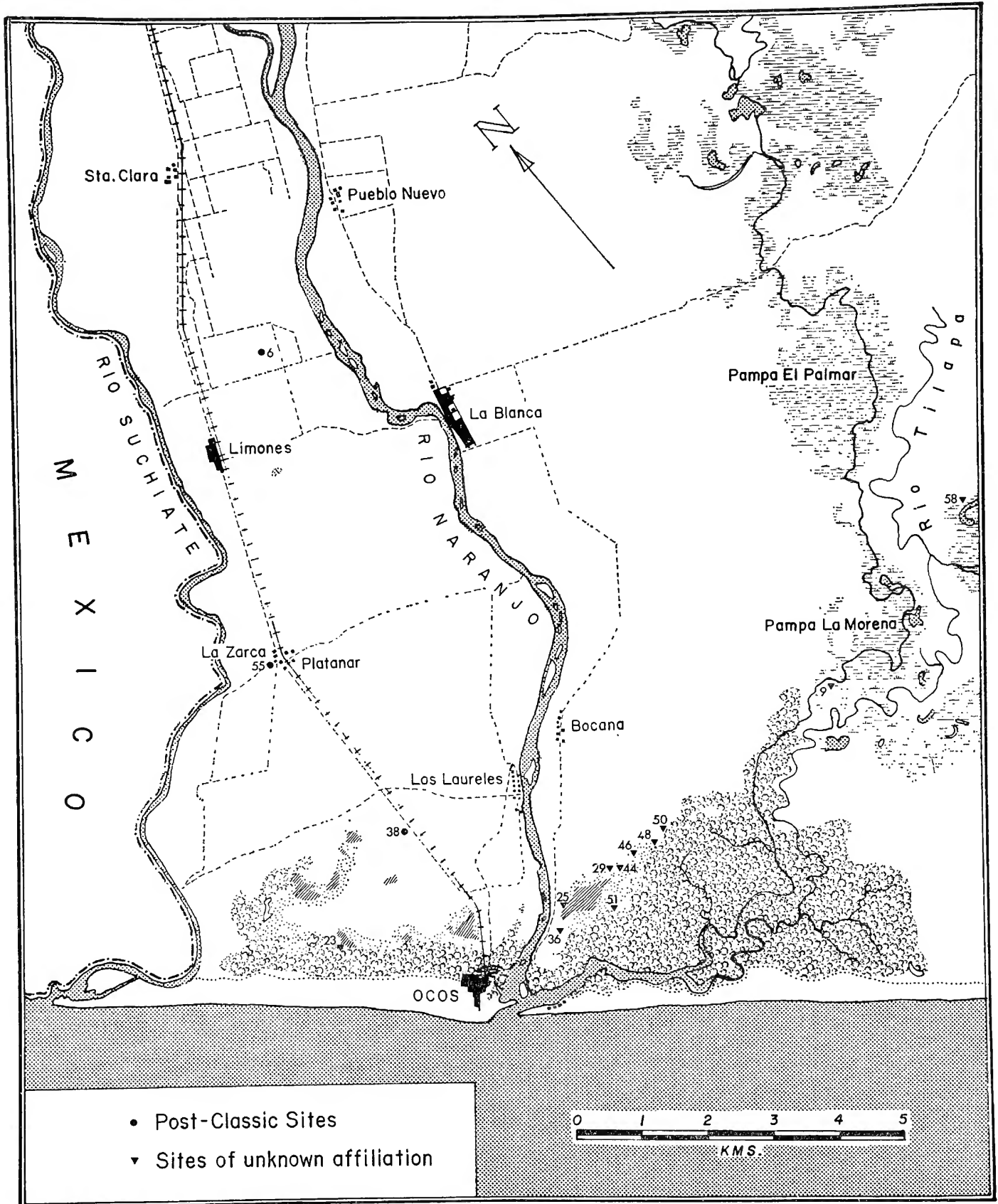


FIGURE 50.—Distribution of Post-Classic sites and sites of unknown affiliation in the Ocós area.

was imported in quantity by the native kings of Mexico in pre-Spanish times, and which continued to be exported from the region all through the Colonial period, until ousted from favor by coffee. The Spanish commentators laid the blame partly at the door of administrative oppression, and partly to disease, and they may well have been right. Estrada describes as quite common a disease which resulted in fevers followed by shaking, and which most likely was malaria. It was certainly malaria which blocked resettlement of the Pacific coast of Guatemala by highland peoples until the recent introduction of mosquito control and antimalarial drugs. Shattuck (1938, p. 45) believes the "chills and fever" said by

Fuentes y Guzman to have been introduced to Antigua by infected persons coming from the Pacific coast to have been malaria.

If disease, particularly malaria, has been and continues to exert a depressing effect upon population density on the Pacific coast, could disease also account for the known decline which took place after the Late Classic? If malaria, for instance, was introduced to the lowlands of Mesoamerica not with the Spanish Conquest but at the end of the Classic, this might go far to explain the Post-Classic near-abandonment of the coastal plain, and of the Ocós area. We dislike relying upon such a *deus ex machina*, but have no other explanation to offer.

### SITES OF UNKNOWN AFFILIATION (fig. 50)

Certain artificial mounds in the survey area, most of them quite small, are clearly recognizable as artificial, but produced either only a few nondiagnostic sherds or none at all, so that an exact assignment to any cultural phase would be impossible. These are as follows:

- SM-9: TWO MOUNDS. One low, flat mound with a smaller one just to the southwest of it, in pastureland on the south margin of the Pampa La Morena. A handful of sherds was collected.
- SM-23: MOUND 3 m. high and 20 m. in diameter on the south margin of the Salinas "Madresal," about 200 m. southwest of SM-22 (see under Cerro del Tiestal Complex). Very small sherd sample.

SM-25: MOUND on the north margin of the Salinas La Blanca salt *playa*, just west of SM-28 (see p. 87).

SM-29,-44,-46,-48,-50: FIVE OF A STRING OF NINE LOW MOUNDS reaching east along the bank of one of the defunct estuaries feeding the Salinas La Blanca salt *playa*, and stretching east through the *madresal* groves.

SM-36: ONE OF A STRING OF FOUR MOUNDS along the southwest edge of the Salinas La Blanca salt *playa*. A few thick, crude sherds.

SM-51: LONE MOUND on the southeast edge of the Salinas La Blanca salt *playa*.

SM-58?: EXTENSIVE MOUND SITE is locally reported to exist on the Laguna Media Luna, but we were unable to visit it in the time at our disposal.

# Conclusions and Interpretations

## SUMMARY OF THE SALINAS LA BLANCA SEQUENCE

Our investigations on the Pacific coast of Guatemala during 1962 centered mainly on the small site of Salinas La Blanca, on the east bank of the Naranjo River, near the village of Ocós. Two cuts were made in the more extensive of the two occupational mounds forming the site, and reached a depth of 6.5 m. below datum. Three components were represented in the deposits, all of them of the Formative period: Cuadros, Jocotal, and Crucero, the first two being new to south coast archeology.

Cuadros is an Early Formative Phase, but later than Ocós, which was the oldest culture defined at La Victoria. Like Ocós, it is characterized by a preponderance of *tecomates* with plastic surface decoration, but unlike it, Cuadros has no cord marking, iridescent painting, or other unusual decorative devices. Most *tecomates* are brushed, and typically have a raised convex band below the rim zone, along with filleting and interior finger punching. On two ceramic types, the rims have a horizontal zone of red slip, but otherwise painting is absent on *tecomates*. Occasionally, plain, bold rocker stamping is present, as it is on a fairly common red-on-white type. Vessels with black and white areas produced by differential firing are found in Cuadros, with some white rimmed black ware. As far as the Ocós area is concerned, white slipped ceramics make their first appearance in Cuadros. Another trait which is introduced with this culture is the very rare multiple-line-break motif.

Artifacts other than pottery vessels were uncommon in Cuadros deposits, and figurines were virtually nonexistent. A few simple manos and metates, pounding stones, obsidian chips, pumice abraders, and shell smoothers make up the assemblage.

Jocotal evolves directly from Cuadros and gives every indication of being a brief, terminal Early Formative Phase. Brushed *tecomates* continue to be dominant, with certain changes in form and decoration, and white-rimmed black ware reaches the height of its popularity. Certain Conchas ceramics are clearly foreshadowed, and the appearance of

Conchas White-to-buff pottery is most striking; there is ample reason to believe that Jocotal leads directly into Conchas 1. The artifacts are again scanty, and are a continuation of those already seen in Cuadros.

Four Carbon-14 dates on wood charcoal from stratified hearths indicate that the Cuadros Phase lasted from 1000 to 850 B.C. A Carbon-14 date on a nearby site of the Conchas Phase suggests that Jocotal had ended by 800 B.C.

These dates fit reasonably well with the comparative chronology of southeastern Mesoamerica (pp. 67-70 and fig. 42). The Early Formative phases in the Ocós area (Ocós, Cuadros, and Jocotal) form part of what one might call a "banded *tecomate*" horizon, in which the predominant ceramic form is the neckless globular jar with some sort of zoned band encircling the rim just below the lip. Such pottery is found in the Ajalpan Phase at Tehuacán (R. S. MacNeish and F. Peterson, personal communication), in the first ceramic period at Santa Marta (MacNeish and Peterson, 1962), in Chiapa I at both Chiapa de Corzo and Padre Piedra (Dixon, 1959; Navarrete, 1960), and in the earliest levels at Izapa (G. W. Lowe, personal communication). Banded *tecomates* persist in some areas (i.e., at Chiapa de Corzo and at Santa Cruz) into the beginning of the Middle Formative, but as a whole they comprise a good marker for the earliest pottery of which we have any knowledge in Chiapas and in the Maya region. Cuadros is unambiguously aligned with Chiapa I (Cotorra), with which it shares a host of traits, while Ocós is probably earlier in general than Chiapa I but overlaps its initial stages.

The clear-cut affiliations of Jocotal with Arévalo, the earliest phase known thus far in the Guatemala highlands, enables one to correlate the Kaminaljuyú sequence with that of the Ocós area. A prior placement of Las Charcas in the Middle Formative, and temporally aligned with Conchas 2, is confirmed by this newer data, and by a number of radiocarbon dates

Crucero, known from a sizable collection of complete and near-complete vessels recovered from pits dug in ancient times into the top of the deposits at Salinas La Blanca, belongs to a highly developed, Late Formative network of cultures which extends from Kaminaljuyú, down along the Pacific slopes, as far as Izapa in southeastern Chiapas. Miraflores is among the most important phases of this network, and its ceramic traditions obviously played an important role in the

development of Crucero pottery. However, none of the advanced traits characterizing Miraflores and Izapa, such as the construction of great ceremonial mounds, the stela-altar complex, and an involved bas-relief style, are found in the peripherally placed Ocos area. It is quite likely that, during the Late Formative, much of the area's population lay in the neighborhood of greater sites to the north, such as El Jobo and Izapa.

## ANCIENT LIFE IN THE CUADROS AND JOCOTAL PHASES

Salinas La Blanca is inhabited today by two extended families, each one localized on the top of a mound so as to avoid the annual flooding of the surrounding countryside. We derived much profit from watching how the family of our friend Don Vicente Cuadros contributes to the overall history of the west mound in their daily activities, in the houses in which they live, and in their subsistence. In many respects their own way of life differs very little from that of the ancients whose many meters of accumulated debris lie under their feet.

During the Early Formative period, the hamlet of Salinas La Blanca may have been similarly composed of a few extended families, the members of which were dispersed through several thatched-roof houses and outbuildings with pole walls. Today, a hamlet the size of the two mounds at Salinas La Blanca would be occupied by no more than 20 or 25 persons. The prehistoric population, judging by the depth of the stratified refuse, must have been somewhat larger. It is even possible that additional mounds, now destroyed by the Naranjo River in much the same way as the western half of Mound I, were present in antiquity. If so, our conservative estimate of 25 persons may be far too small.

More important is the fact that this small settlement seems to have been occupied year round. Virtually all seasons of the year are represented in the floral or faunal remains, from the dry season (avocados, *jocotes*, snook) to the rainy season (maize, 3-to-4-month-old deer). Many species are ones which would be available year round, especially those from the estuary system. Rather than shifting seasonally from one microenvironment to another as a supplement to cultivation, the Early Formative villagers on the coast chose to concentrate their settlement along the banks of the one microenvironment which guaranteed them a steady source of food. Relying on the products of the estuary, and the cornfields which grew along its alluvial banks, they seem to have had little use for exploiting distant habitats like savanna and mixed

tropical forest. Their agriculture, based on non-hybridized maize of the early Nal-Tel-Chapalote complex, seems to have been very successful; they appear to have cultivated avocados, and quite possibly other local fruits as well.

We have concluded from the faunal remains that collecting was far more important than hunting, which in fact could hardly be said to exist. The few specimens of white-tail deer were mainly juveniles. Of some scanty bird remains, one was a fledgling, and another was a brown pelican which some small boy might have downed with a lucky rock thrown from a beach. On the other hand, the crabs which were plentiful on the floor of the mangrove forest and among the *madresal* trees made a considerable contribution to the diet of these Early Formative people, particularly the gaudily colored mouthless crab. As they do today, the boys of the hamlet could have trapped them among the mangroves at night. The capture of iguanas was probably also the work of boys, and of moderate importance in the Cuadros and Jocotal cuisine. The point to be stressed is that crabs and iguanas could be caught at any time they were wanted without one's venturing far from the hamlet and without committing the men to an occupation that might take them away from their fields. The same can be said for the collecting of mollusks, which provided a major source of animal protein: The women and children could easily have extracted marsh clams from the estuary mud at the edge of mangrove forest or picked *Cerethidea* snails from the edges of the salt marshes. Fishing was probably the only subsistence activity in which the men would have had a role apart from that of farmer, and this is still today the major activity of the local *milperos* in Ocos when they are not engaged in their fields. The brackish waters of the estuaries and lagoons are rich in marine fauna; in ancient times, snook, gar, snapper, mojarra, catfish, and needlefish provided an addition to the steady diet of maize.

Maize that had been soaked or boiled in limewater was ground into dough by means of oval footless metates of dacite and loaf-shaped manos of the same material. The dough was apparently cooked as tamales in the very large *tecomates* which are so prevalent in Early Formative levels at Salinas La Blanca, over a fire of mangrove branches or other hardwood. Crabs and mollusks were boiled or roasted, specially made cooking pits being reserved for the latter method of cooking in the Jocotal Phase.

We suspect that most of the pottery at Salinas La Blanca was made locally; in particular, the extremely abundant Guamuchal Brushed *tecomates* must have been of local manufacture. All vessels, of whatever type, were fashioned by the coiling method and usually decorated by some plastic means, such as brushing,

zoning with grooves, incising, punctation, finger punching, and rocker stamping, when the clay was still wet.

Little can be inferred of the ancient way of life from the artifacts alone. Obsidian chips and spokeshaves, sherd "saws," and pumice abraders suggest a good deal of woodworking, none of which has survived. Beyond the structure of the houses themselves, we may assume that such items as digging sticks, wooden bowls, and loom parts (if such existed) have all disappeared through the ravages of a hot damp climate. A chance impression in clay, however, showed that twilled mats were made and used, and we can only guess that many kinds of baskets were present. In the succeeding Conchas Phase, there is definite evidence of the twining of baskets (Coe, 1961, fig. 60, *e-i*).

### PATTERNS OF LAND USE IN COASTAL GUATEMALA

The history of changing land-use patterns on the Pacific coast of Guatemala is interesting enough to merit considerable future study. During the Early Formative, the estuary belt along the coast was settled relatively densely by a fishing, corn-farming population; the Middle Formative saw the climax in population growth supported by these activities. Land clearance seems to have moved steadily inland toward the higher rainfall area of the piedmont, and in the Late Formative most of the coastal population was concentrated in the highly productive *Boca Costa*. By the end of the Formative, all that remained in the estuary belt were salt-producing communities—or so our evidence suggests.

Total abandonment of the estuary system followed, during the Early Classic. For many hundreds of years we have no hint of the land-use pattern on the coast. Then, in Late Classic times, the Ocos area was reoccupied on a tremendous scale, with extensive clearing of forested areas that had never been occupied in the past. The poorly drained savannas were avoided, and there is no suggestion of fishing or shell-fishing, from which we conclude that the extensive land clearance was for commercial cropping of cotton or cacao, two plants which need well-drained soil.

In the Post-Classic period, for reasons as yet unknown, the coastal estuary region once again fell into disuse, never to regain its past importance.

### SALINAS LA BLANCA AND THE ESTABLISHMENT OF VILLAGE LIFE IN MESOAMERICA

Today most of the world's population lives in villages and towns. Yet permanently occupied, nucleated settlements have existed for only the last one-hundredth of man's total span on earth.

For this reason, V. Gordon Childe held the view that the transition from hunting and gathering to village-farming was really a profound and abrupt change, for which he coined the term "Neolithic Revolution." Twenty years ago this view seemed to be valid, for the shift from Paleolithic to "Neolithic" in both hemispheres seemed to be little more than a narrow line of transition, hardly occupying more than a brief moment in archeological time. In lieu of adequate data, very little could be offered to explain how the process of plant and animal domestication and the move to nucleated settlement ever came about in the first place.

In more recent years, the story has been considerably expanded by the archeological work of American, British, Danish, and French expeditions to the Near East, the work of MacNeish in Mesoamerica, and studies by Bird, Engel, and Lanning on the coast of Peru. In the course of this work, the "Revolution" has become instead the "Neolithic Evolution."

In one very real sense, the "great transition," as Braidwood calls it, was "revolutionary," and this is in the enormous population increase which resulted from it. The speculative estimates made by Braidwood and Reed (1957) suggest the explosive nature of the population curve: Pleistocene Near Eastern food-gatherers had a density of perhaps 3.0 persons per 100 square miles; specialized food-collectors reached 12.5 per 100 square miles; while by the time of the primary village-farming community, the density was possibly

2,500 persons per 100 square miles. The geometric nature of this rise can be explained by the far higher amounts of energy offered by domestication under an advancing technology than by the collection of wild plants alone.

Braidwood and Reed (*ibid.*) have proposed the following succession of stages in the process of settling down: (1) food gathering; (2) specialized food-collecting (or terminal food-gathering); (3) vegetation (a mixed food-getting activity carried out in conjunction with specialized food-collecting); (4) incipient agriculture (also combined with specialized food-collecting); and (5) the primary village-farming community. These stages, which have been abstracted from Near Eastern data, imply a considerable timelag between the first step in the domestication of food plants and the establishment of permanent villages. Such a lag is evident in coastal Peru, and to a lesser extent in the Tehuacán Valley of south-central Mexico (pp. 4-5; Coe and Flannery, 1964). In Tehuacán, all available data indicate that maize was domesticated in the Coxcatlán Phase, about 5000 B.C. Semi-permanent pit-house villages appear by Abejas times (3400-2300 B.C.), but population density remained low until the introduction of complex irrigation works, about 600 B.C.

The mere possession of a domesticated plant, obviously, does not lead immediately to fully settled life. Maize was introduced to the Southwestern United States by 2500 B.C., yet some two thousand years elapsed between this event and the appearance of village life "and other concomitants signaling fully sedentary living" (Haury, 1962, p. 126). Nor is it a foregone conclusion that once a group comes into contact with farming, it will be adopted. One could cite the case of the Indians of California, who, although definitely in touch over many centuries with the farming societies of the Southwest, never planted a seed in the ground until forced to do so by the Spanish friars.

Why should this be so? In certain anthropological and philosophical quarters it is believed that technology rules supreme, that such timelags and cultural differences in the evolution of plant domestication and village life as we see must have been caused by differing means of production. But the tool inventory of California or the Southwest was nowise inferior to that of the Mesoamericans, nor is there much of a change apparent in tool types through the many millennia of Mesoamerican prehistory which witnessed such great cultural advances.

It is clear that the established preagricultural pattern had a great deal to do with channeling

development along certain lines. Caldwell (1958) has proposed a concept of "efficiency" of economies to explain some of the observable differences in development of various peoples in pre-Conquest America, and his views have been amplified recently by Struever (1964) and others. In the deciduous woodlands of the Eastern United States, Caldwell (1958) feels a "primary forest efficiency" was established as early as Archaic times, centered on ambush hunting and the intensive collecting of wild plant foods. Struever (1964) has suggested that this "efficiency" allowed a degree of sedentary life which made possible experiments with domestication of commensal plants, plus ready acceptance of maize when introduced from the south. On the other hand, the "efficiency" of the California Indian was evidently not one which produced—to use Struever's term—an "adaptive milieu" conducive to experiments with domestication.

In other words, human populations may become so well adapted to making a living in certain environments that new traits will not be taken up except under very unusual circumstances. This is reminiscent of Zipf's "Principle of Least Effort," which states that a person will strive to solve his immediate and probable future problems (as judged by himself) in such a way that the minimal amount of effort will be expended (Zipf, 1949).

To the early Californian, with one of the most effective food-collection economies ever developed, the initial adoption of corn farming would (at the outset) probably have involved more effort for less results, and have actually *reduced* rather than raised the total amount of food available to him in relation to the work expended. He had reached an "efficiency," a degree of adaptation to his surroundings, which it would have seemed to him impractical to alter. The Southwesterner, and the Tehuacán Indian, for that matter, had attained a "desert efficiency" which for a very long time represented the path of best adaptation in a dry and inhospitable environment. This adaptation involved an annual cycle of foraging trips to a variety of widely spaced "microenvironments" at times when key wild resources were available. Later, even after farming of maize, beans, and squash had begun (but before sophisticated irrigation), food collecting was still necessary to supplement the single crop a year that could be grown in the arid environment. Since the pattern of seasonal rounds was well established (and efficient), the Early Formative peoples of the Tehuacán Valley persisted in their long-distance foraging trips. This restricted the size, number, and permanence of early villages.



## THE HIGHLAND AND COASTAL TRADITIONS

Maize and other important cultigens were first developed in the highlands of Mesoamerica. In the lowlands, especially along the Pacific coast of Guatemala and Chiapas, and the gulf coast of Veracruz and Tabasco, we suspect that another kind of "efficiency" was evolving, centering on the collection of the wild resources of lagoons, estuaries, tidewater rivers, and tropical forests. We have few sites to document such a way of life in Mesoamerica; the Isona de Chantuto in coastal Chiapas (Drucker, 1948; Lorenzo, 1955) and a site on the Bay of Alvarado, Veracruz (Lorenzo, 1961) are both "aceramic" sites with layers of mollusks, although photographs of the pit profiles do not suggest they are "shell middens" per se (cf. Lorenzo, 1955, lám. IV). From Isona de Chantuto, Lorenzo (ibid., pp. 56-47) reports beds of calcined mollusks, fish vertebrae, turtle carapace, bird bones, fragments of carnivore (possibly domestic dog?), and bones of "deer or tapir." Deer hunting may have figured more prominently in the preagricultural horizons of the coast than it did in the Formative, but along the estuaries at least a semisedentary mode of settlement may have been possible even before agriculture.

Our evidence suggests that a primitive form of pod corn, forming part of the Nal-Tel-Chapalote complex, was traded down to the alluvial coasts of Mesoamerica (probably first to the gulf coast), where it was rapidly added to a local economy based on a coastal-marine estuary "efficiency." We have no inkling of when this took place; it certainly must have been before 2000 B.C., when maize pollen shows up in the pollen diagrams from the Petén (Matsuo Tsukada, personal communication), and possibly before the crossing of highland maize with *Tripsacum* (3000 B.C.). By this, it is not implied that a kind of migration down to the coast was involved; more likely, dried maize kernels were being traded by highland folk for coastal products like seashells, salt, and feathers. At any rate, the coastal dwellers seem to have been highly receptive to

the idea of maize planting. Its adoption would not disturb their collecting activities (which, as we have already explained, could be successfully carried on by women and children, with fishing left as a male role), but would effectively supplement them. This is the "Principle of Least Effort" once more. A similar situation is believed to account for the favorable reception of farming by lakeside or coastal peoples in Subsaharan Africa (Clark, 1962, p. 14).

Eventually a new kind of "efficiency" (which could almost be called a double economy) crystallized. It was oriented toward collecting mollusks and fishing in the lagoons and estuaries of the coast, while farming the alluvial flats that surrounded them. Such an "efficiency" represented the concentration of the whole Formative population in one single "microenvironment" out of a possible six or eight; extensive forays to different habitats were unnecessary, and villages numerous and permanent. This is the way of life we have examined for the Early Formative of coastal Guatemala, where it was already underway in the Cuadros Phase and presumably as far back as the Ocós Phase (ca. 1300 B.C.).

Three additional factors contributing to the profound difference between the Ocós area and Tehuacán (and, by extension, many arid valleys in the Mesoamerican highlands) were the higher rainfall, high water table, and rich farming soil of Ocós. Once the land had been cleared, two or three maize crops a year could be brought in with little or no rotation or fallowing of milpas. The high numbers of early villages on the Pacific coast are surely a byproduct of such favorable conditions for cultivation (even though the major cultigen was a rather primitive variety of maize); they enabled a further reduction to take place in the number and spacing of microenvironments that had to be exploited. Our limited survey suggests there may have been one Early Formative village per kilometer along the whole estuary system of the Chiapas-Guatemala coast.



## VILLAGE LIFE AND POTTERYMAKING

We have said nothing of the addition of pottery-making to this way of life. Ceramics have long been considered an index of settled life, at least of a semi-sedentary existence. Ocós pottery is the earliest on the Pacific coast of Guatemala, and among the most ancient for which we have evidence in southeastern Mesoamerica. Unfortunately, it is highly sophisticated and cannot possibly represent the origin of the ceramic art in Mesoamerica.

Some extremely crude ceramics have been found in the Purrón Phase of Tehuacán (MacNeish, 1964), which is estimated to span the period from 2300 to 1500 B.C.; what is really of great interest here is that the Purrón forms (the *tecomate* and flat-bottomed bowl with outslanting sides) are presaged by identical shapes in ground stone vessels of the earlier Abejas Phase (3400 to 2300 B.C.). It is not yet known whether such stone vessels are true forerunners of pottery, or imitations of pottery being made outside the Highlands of Mexico.

The *idea* of pottery-making could have had multiple roots. The early villages of northern South America and Panama are all characterized by pottery, and by

a series of radiocarbon determinations which extend from around 3000 to 2100 B.C. (we refer to such cultures as Valdivia, Puerto Hormiga, and Monagrillo). It is entirely plausible that the idea of firing clay to make containers was carried from there to Mesoamerica before 2000 B.C., where that material was fashioned into containers similar to the stone bowls and neckless jars of the Abejas Phase at Tehuacán, but never became common until sedentary village life had become more surely established on the alluvial coasts.

We do not pretend to have found the oldest village in Mesoamerica, nor to have turned up from the Ocós soil the earliest ceramics of Mexico or Guatemala. What we have tried to do was to throw light on the general conditions under which village-farming life developed, through an analysis of the subsistence of an unspectacular ancient settlement. J. G. D. Clark (1952) has said, "One of the principal attractions of prehistory is the opportunity it offers for studying the interplay of social aspirations and environing nature over long periods of time." We have tried to view the coastal Guatemalan sequence in those terms.

## LITERATURE CITED

- ALVAREZ DEL TORO, MIGUEL  
1952. Los animales silvestres de Chiapas. Tuxtla Gutiérrez. Chiapas.
- BINFORD, LEWIS R.  
1964. A consideration of archaeological research design. *Amer. Antiq.*, vol. 29, no. 4, pp. 425-441.
- BORHEGYI, STEPHAN F. DE  
1959. Pre-Columbian cultural connections between Mesoamerica and Ecuador. *Tulane Univ., Middle American Res. Rec.*, vol. 2, no. 6.
- BRAIDWOOD, ROBERT J., AND HOWE, BRUCE  
1960. Prehistoric investigations in Iraqi Kurdistan. *Oriental Inst., Studies in Ancient Oriental Civilization*, no. 31. Chicago.
- BRAIDWOOD, ROBERT J., AND REED, CHARLES A.  
1957. The achievement and early consequences of food-production: a consideration of the archeological and natural-historical evidence. *In* "Cold Spring Harbor Symposia on Quantitative Biology," vol. 22, pp. 19-31.
- BULLEN, RIPLEY P.  
1961. Radiocarbon dates for southeastern fiber-tempered pottery. *Amer. Antiq.*, vol. 27, no. 1, pp. 104-106.
- CALDWELL, JOSEPH R.  
1958. Trend and tradition in the prehistory of the eastern United States. *Amer. Anthrop. Assoc., Mem.* no. 88.
- CHANG, KWANG-CHIH  
1958. Study of the Neolithic social grouping: examples from the New World. *Amer. Anthrop.*, n.s., vol. 60, no. 2, pt. 1, pp. 298-334.
- CLARK, DESMOND  
1962. Africa south of the Sahara. *In* "Courses toward urban life," Viking Fund Publ. *Anthrop.* no. 32, pp. 1-33.
- CLARK, J. G. D.  
1952. *Prehistoric Europe: the economic basis.* New York.
- COE, MICHAEL D.  
1960. Archaeological linkages with North and South America at La Victoria, Guatemala. *Amer. Anthrop.*, n.s., vol. 62, no. 3, pp. 363-393.  
1961. La Victoria, an early site on the Pacific coast of Guatemala. *Harvard Univ., Peabody Mus. Archaeol. and Ethnol., Pap.*, vol. 53. Cambridge.
- COE, MICHAEL D., AND FLANNERY, KENT V.  
1964. Microenvironments and Mesoamerican prehistory. *Science*, vol. 143, no. 3607, pp. 650-654.
- COE, WILLIAM R., AND MCGINN, JOHN J.  
1963. Tikal: the North Acropolis and an early tomb. *Expedition*, vol. 5, no. 2, pp. 25-32.
- COWGILL, GEORGE L.  
1964. The selection of samples from large sherd collections. *Amer. Antiq.*, vol. 29, no. 4, pp. 467-473.
- CRANE, J. R., AND GRIFFIN, JAMES B.  
1964. University of Michigan radiocarbon dates IX. *Radiocarbon*, vol. 6, pp. 1-24.
- DAVIS, JOHN H., JR.  
1940. The ecology and geologic role of mangroves in Florida. *Carnegie Inst. Washington, Publ.* no. 517, pp. 303-412.
- DEEVEY, EDWARD S.; GRALENSKI, L. J.; AND HOFFREN, VÄINÖ  
1959. Yale natural radiocarbon measurements IV. *Radiocarbon Suppl.*, vol. 1, pp. 144-172.
- DELGADO, AGUSTÍN  
1961. La secuencia arqueológica en el Istmo de Tehuantepec. *In* "Los mayas del sur y sus relaciones con los nahuas meridionales," pp. 93-104. *Soc. Mexicana Antrop.*, VIII Mesa Redonda. Mexico.

- DIXON, KEITH A.  
1959. Ceramics from two Preclassic periods at Chiapa de Corzo, Chiapas. *New World Archaeol. Found., Pap. no. 5.* Orinda.
- DRESSLER, ROBERT L.  
1953. The pre-Columbian cultivated plants of Mexico. *Harvard Univ., Botanical Mus. Leaf., vol. 16, no. 6,* pp. 115-173.
- DRUCKER, PHILIP  
1948. Preliminary notes on an archaeological survey of the Chiapas coast. *Tulane Univ., Middle Amer. Res. Rec., vol. 1, no. 11.*  
1952. La Venta, Tabasco: a study of Olmec ceramics and art. *Bur. Amer. Ethnol. Bull.* 153.
- DRUCKER, PHILIP; HEIZER, ROBERT F.; AND SQUIER, ROBERT J.  
1959. Excavations at La Venta, Tabasco, 1955. *Bur. Amer. Ethnol. Bull.* 170.
- DUTTON, BERTHA P., AND HOBBS, HULDA R.  
1943. Excavations at Tajumulco, Guatemala. *School Amer. Res., Mono. no. 9.*
- EKHOLM, GORDON F.  
1964. Transpacific contacts. In "Prehistoric man in the New World," edited by J. B. Jennings and Edward Norbeck, pp. 489-510. Chicago.
- ESTRADA, EMLIO, AND EVANS, CLIFFORD  
1963. Cultural development in Ecuador. In "Aboriginal cultural development in Latin America." *Smithsonian Misc. Coll., vol. 146, no. 1,* pp. 77-88.
- ESTRADA, JUAN DE.  
1955. Descripción de la Provincia de Zapotitlán y Suchitepéquez. *Anales Soc. Geogr. e Hist., vol. 28,* pp. 68-83. Guatemala.
- FORDE, C. DARYLL  
1952. *Habitat, economy, and society.* New York.
- GARCÍA PAYÓN, JOSÉ  
1950. Restos de una cultura prehistórica encontrados en la región de Zempoala, Ver. *Univer, año 2, tomo 2, no. 15,* pp. 90-130.
- GRIFFIN, JAMES B.  
1964. The Northeast Woodlands area. In "Prehistoric man in the New World," pp. 223-258. Chicago.
- GRISCOM, LUDLOW  
1932. The distribution of bird-life in Guatemala. *Amer. Mus. Nat. Hist. Bull.* 64.
- HALL, E. RAYMOND, AND KELSON, KEITH R.  
1959. *The mammals of North America.* 2 vols. New York.
- HARRIS, W. P., JR.  
1937. Revision of *Sciurus variegatoides*, a species of Central American squirrel. *Univ. Michigan Mus. Zool., Misc. Publ. no. 38.*
- HAURY, EMIL W.  
1962. The greater American Southwest. In "Courses toward urban life," edited by R. J. Braidwood and Gordon R. Willey, pp. 106-131. *Viking Fund Publ. Anthropol. no. 32.*
- JENNINGS, JESSE D.  
1956. The American Southwest: a problem in cultural isolation. In "Seminars in archaeology: 1955," edited by Jesse D. Jennings, pp. 59-127. *Soc. Amer. Archaeol., Mem. no. 11.*
- KEEN, A. MYRA  
1958. *Sea shells of tropical west America.* Stanford, Calif.
- KENDEIGH, S. CHARLES  
1961. *Animal ecology.* New Jersey.
- KIDDER, ALFRED V.  
1940. Pottery from Champerico, Guatemala. *Carnegie Inst. Washington, Notes on Middle Amer. Archaeol. and Ethnol., no. 2,* pp. 4-10.  
1948. Kaminaljuyú, Guatemala: addenda and corrigenda. *Carnegie Inst. Washington, Notes on Middle Amer. Archaeol. and Ethnol., no. 89,* pp. 224-239.
- KIDDER, ALFRED V., AND SMITH, A. LEDYARD  
1943. Explorations in the Motagua Valley, Guatemala. *Carnegie Inst. Washington, Contr. Amer. Anthropol. and Hist., no. 41.*
- KIDDER II, ALFRED; LUMBREERAS, LUIS G.; AND SMITH, DAVID B.  
1963. Cultural development in the central Andes—Peru and Bolivia. In "Aboriginal cultural development in Latin America." *Smithsonian Misc. Coll., vol. 146, no. 1,* pp. 89-101.

- LANNING, EDWARD P.  
1963. Olmec and Chavin: reply to Michael D. Coe. *Amer. Antiq.*, vol. 29, no. 1, pp. 99-101.
- LEOPOLD, A. STARKER  
1959. *Wildlife of Mexico*. Berkeley and Los Angeles.
- LIBBY, WILLARD F.  
1955. *Radiocarbon dating*. [2d ed.] Chicago.
- LORENZO, JOSÉ LUIS  
1955. Los concheros de la costa de Chiapas. *Inst. Nac. Antrop. e Hist., Anales*, Tomo 7, pp. 41-50. Mexico, D.F.  
1961. La revolución neolítica en Mesoamérica. *Inst. Nac. Antrop. e Hist., Dept. Prehistoria*, Publ. no. 11. Mexico, D.F.
- LOTHROP, SAMUEL K.  
1936. Zacualpa; a study of ancient Quiché artifacts. *Carnegie Inst. Washington*, Publ. 472.
- LOWE, GARETH W.  
1959. Archeological exploration of the upper Grijalva River, Chiapas, Mexico. *New World Archaeol. Found.*, Pap. no. 2.
- MACNEISH, RICHARD S.  
1954. An early archaeological site near Panuco, Vera Cruz. *Trans. Amer. Philos. Soc.*, n.s., vol. 44, pt. 5, pp. 539-641. Philadelphia.  
1958. Preliminary archaeological investigations in the Sierra de Tamaulipas, Mexico. *Trans. Amer. Philos. Soc.*, n.s., vol. 48, pt. 6.  
1961. First annual report of the Tehuacan archaeological-botanical project. Phillips Academy, Andover, Mass.  
1962. Second annual report of the Tehuacan archaeological-botanical project. Phillips Academy, Andover, Mass.  
1964. Ancient Mesoamerican civilization. *Science*, vol. 143, no. 3606, pp. 531-537.
- MACNEISH, RICHARD S., AND PETERSON, FREDRICK A.  
1962. The Santa Marta rock shelter, Ocozocoautla, Chiapas, Mexico. *New World Archaeol. Found.*, Pap. no. 14.
- MANGELSDORF, PAUL C.  
1958. Ancestor of corn. *Science*, vol. 128, no. 3325, pp. 1313-1320.
- MANGELSDORF, PAUL C.; MACNEISH, RICHARD S.; AND GALINAT, WALTON C.  
1964. Domestication of corn. *Science*, vol. 143, no. 3606, pp. 538-545.
- MEGGERS, BETTY J.  
1954. Environmental limitation on the development of culture. *Amer. Anthropol.*, vol. 56, pp. 801-824.  
1963. Cultural development in Latin America: an interpretative overview. In "Aboriginal cultural development in Latin America." *Smithsonian Misc. Coll.*, vol. 146, no. 1, pp. 131-145.  
1964. North and South American cultural connections and convergences. In "Prehistoric man in the New World," pp. 511-526. Chicago.
- MILLER, GERRITT S., JR., AND KELLOGG, REMINGTON  
1955. List of North American recent mammals. *U.S. Nat. Mus., Bull.* no. 205.
- MIRANDA, FAUSTINO  
1952-53. La vegetación de Chiapas. Tuxtla Gutiérrez, Chiapas.
- MUNSELL COLOR COMPANY  
1954. *Munsell soil color charts*. Baltimore.
- NAVARRETE, CARLOS  
1960. Archeological explorations in the region of the Frailesca, Chiapas, Mexico. *New World Archaeol. Found.*, Pap. no. 7.  
1962. La cerámica de Mixco Viejo. *Inst. Invest. Hist., Facultad Humanidades, Univ. San Carlos de Guatemala*.
- NOTTEBOHM, KARL-HEINZ  
1945. A second Tlaloc gold plaque from Guatemala. *Carnegie Inst. Washington, Notes on Middle Amer. Archaeol. and Ethnol.*, no. 51, pp. 170-172.
- PETERSON, FREDRICK A.  
1963. A white-black tradition in Mesoamerican ceramics. *Tlalocan*, vol. 4, no. 3, pp. 259-264.
- PHILLIPS, PHILIP; FORD, JAMES A.; AND GRIFFIN, JAMES B.  
1951. Archeological survey in the lower Mississippi Alluvial Valley. *Harvard Univ., Peabody Mus. Archaeol. and Ethnol.*, Pap., vol. 25.

- PIÑA CHÁN, ROMÁN  
1955. Chalcatzingo, Morelos. *Inst. Nac. Antrop. e Hist., Dirección de Monumentos Prehispánicos, Informes no. 4.* Mexico.
- PORTER, MURIEL NOÉ  
1953. Tlatilco and the Pre-Classic cultures of the New World. *Viking Fund Publ. Anthrop.* no. 19. New York.
- REED, CHARLES A., AND BRAIDWOOD, ROBERT J.  
1960. Toward the reconstruction of the environmental sequence of northeastern Iraq. *In* "Prehistoric investigations in Iraqi Kurdistan," *Stud. Ancient Oriental Civilization,* no. 31, pp. 163-173. Chicago.
- REICHEL-DOLMATOFF, GERARDO  
1961. Puerto Hormiga: un complejo prehistórico marginal de Colombia. *Rev. Colombiana Antrop.,* vol. 10, pp. 347-354.
- REICHEL-DOLMATOFF, GERARDO, AND REICHEL-DOLMATOFF, ALICIA  
1956. Momil: excavaciones en el Sinú. *Rev. Colombiana Antrop.,* vol. 5, pp. 109-333. Bogota.
- RIEHM, KARL  
1961. Prehistoric salt-boiling. *Antiquity,* vol. 35, no. 139, pp. 181-191.
- SANDERS, WILLIAM T.  
1956. The central Mexican symbiotic region: a study in prehistoric settlement patterns. *In* "Prehistoric settlement patterns in the New World," *Viking Fund Publ. Anthrop.* no. 23, pp. 115-127.  
1961. Ceramic stratigraphy at Santa Cruz, Chiapas, Mexico. *New World Archaeol. Found., Pap. no. 13.*
- SAUER, CARL O.  
1959. Age and area of American cultivated plants. *Act. XXXIII Congr. Internac. Amer., San José 1958, tomo 1,* pp. 215-229.
- SAUNDERS, GEORGE B.; HOLLOWAY, ANCIL D.; AND HANDLEY, CHARLES O., JR.  
1950. A fish and wildlife survey of Guatemala. *U.S. Dept. Int., Fish and Wildlife Serv., Spec. Scien. Rep.—Wildlife,* no. 5.
- SEARS, WILLIAM H.  
1960. Ceramic systems and Eastern archaeology. *Amer. Antiq.,* vol. 25, no. 3, pp. 324-329.
- SHATTUCK, GEORGE CHEEVER  
1938. A medical survey of the Republic of Guatemala. *Carnegie Inst. Washington, Publ.* no. 499.
- SHEPARD, ANNA O.  
1948. Plumbate, a Mesoamerican trade ware. *Carnegie Inst. Washington, Publ. no. 573.*
- SHOOK, EDWIN M.  
1945. Archaeological discovery at Finca Arizona, Guatemala. *Carnegie Inst. Washington. Notes on Middle Amer. Archaeol. and Ethnol.,* no. 57.  
1947. Guatemala highlands. *Carnegie Inst. Washington, Year Book,* no. 46, pp. 179-184. [For 1946-47.]  
1951. The present status of research on the Pre-classic horizons in Guatemala. *In* "The civilizations of ancient America," edited by Sol Tax. *29th Intern. Congr. Amer., Selected Pap.,* vol. 1, pp. 93-100. Chicago.  
1957. Lugares arqueológicos del Altiplano Meridional Central de Guatemala. *In* "Arqueología guatemalteca," pp. 65-128. Guatemala.
- SHOOK, EDWIN M., AND KIDDER, ALFRED V.  
1952. Mound E-III-3, Kaminaljuyú, Guatemala. *Carnegie Inst. Washington, Contr. Amer. Anthrop. and Hist.,* vol. 11, no. 53. Publ. 596.
- SIGALOVE, JOEL J., AND LONG, AUSTIN  
1964. Smithsonian Institution radiocarbon measurements I. *Radiocarbon,* vol. 6, pp. 182-188.
- SMITH, ROBERT E.  
1955. Ceramic sequence at Uaxactún, Guatemala. [2 vols.] *Tulane Univ., Middle Amer. Res. Inst., Publ. no. 20.*
- SMITH, ROBERT E.; WILLEY, GORDON R.; AND JAMES C. GIFFORD  
1960. The type-variety concept as a basis for the analysis of Maya pottery. *Amer. Antiq.,* vol. 25, no. 3, pp. 330-340.

- STANDLEY, PAUL C., AND STEYERMARK, JULIAN A.  
 1946a. Flora of Guatemala. *Fieldiana: Botany*, vol. 24, pt. 4.  
 1946b. Flora of Guatemala. *Fieldiana: Botany*, vol. 24, pt. 5.
- STANDLEY, PAUL C., AND WILLIAMS, LOUIS O.  
 1963. Flora of Guatemala. *Fieldiana: Botany*, vol. 24, pt. 7.
- STROMSVIK, GUSTAV  
 1941. Substela caches and stela foundations at Copan and Quirigua. *Carnegie Inst. Washington, Contr. Amer. Anthrop. and Hist.* no. 37.
- STRONG, WILLIAM DUNCAN  
 1943. Cross sections of New World prehistory. *Smithsonian Misc. Coll.*, vol. 104, no. 2, pp. 1-46.
- STRUEVER, STUART  
 1964. The Hopewell interaction sphere in riverine-western Great Lakes culture history. *Illinois State Mus., Scien. Pap.* vol. 12, no. 3.
- SUHM, DEE ANN, AND JELKS, EDWARD B.  
 1952. Handbook of Texas archeology: type descriptions. *Texas Archeol. Soc., Spec. Publ.* no. 1; *Texas Memorial Mus., Bull.* no. 4. Austin.
- THOMPSON, J. ERIC S.  
 1948. An archaeological reconnaissance in the Cotzumalhuapa region, Escuintla, Guatemala. *Carnegie Inst. Washington, Contr. Amer. Anthrop. and Hist.* no. 44.
- TOZZER, ALFRED M., EDITOR  
 1941. Landa's *Relacion de las cosas de Yucatan*: a translation. *Harvard Univ., Peabody Mus. Amer. Archaeol. and Ethnol., Pap.*, vol. 18.
- VILLA R., BERNARDO  
 1948. Mamíferos del Soconusco, Chiapas. *Anales Inst. Biol.*, tomo 19, no. 2, pp. 485-528. Mexico, D.F.  
 1953. Mamíferos silvestres del Valle de México. *Anales Inst. Biol.*, tomo 23, nos. 1-2, pp. 269-492. *Univ. Autónoma de México, Mexico, D.F.*
- WARREN, BRUCE W.  
 1961. The archaeological sequence at Chiapa de Corzo. *In* "Los mayas del sur y sus relaciones con los nahuas meridionales." *Soc. Mexicana Antrop., VIII Mesa Redonda*, pp. 75-83.
- WAUCHOPE, ROBERT  
 1964. Southern Mesoamerica. *In* "Prehistoric man in the New World," pp. 331-386. Chicago.
- WELLHAUSEN, E. J.; FUENTES O., ALEJANDRO; AND HERNÁNDEZ CORZO, ANTONIO, in collaboration with MANGELSDORF, PAUL C.  
 1957. Races of maize in Central America. *Nat. Acad. Sci.—Nat. Res. Council, Publ.* no. 511.
- WELLHAUSEN, E. J.; ROBERTS, L. M.; AND HERNANDEZ X., E., in collaboration with MANGELSDORF, PAUL C.  
 1952. Races of maize in Mexico. *Harvard Univ., Bussey Inst.* Cambridge.
- WILLEY, GORDON R.  
 1955a. The interrelated rise of the native cultures of Middle and South America. *In* "New interpretations of aboriginal American culture history." Washington.  
 1955b. The prehistoric civilizations of nuclear America. *Amer. Anthrop., n.s.*, vol. 57, no. 3, pt. 1, pp. 571-593.  
 1960. New World prehistory. *Science*, vol. 131, no. 3393, pp. 73-86.
- WILLEY, GORDON R., AND MCGIMSEY, CHARLES R., III  
 1954. The Monagrillo culture of Panama. *Harvard Univ., Peabody Mus. Archaeol. and Ethnol., Pap.*, vol. 49, no. 2.
- ZIPF, GEORGE KINGSLEY  
 1949. Human behavior and the principle of least effort. Cambridge.

## Appendixes 1–5





# Appendix I

## LARGER MAMMALS AND REPTILES KNOWN FROM THE OCÓS TRANSECT

During February and March of 1962, we were able to collect more than 30 mammals and reptiles of various species from the vicinity of Ocos. All of these animals came from within the "transect" we have defined in pp. 9-11: a strip of coast bounded on the west by the Suchiate River and on the east by the Pampa la Morena, and extending inland no more than 15 km. The various biotopes occurring within this transect have previously been described. In the discussion that follows we restrict ourselves to the fauna of the transect exclusively—to the animals, in other words, that would have been available within a short walk or canoe trip of Salinas La Blanca. Moreover, we will deal only with the "game" mammals and the largest of the reptiles. We made no effort to collect small rodents, shrews, bats, lizards, or snakes, and with few exceptions they do not seem to have figured in the prehistoric food supply.

Note that a number of forms, like the brocket deer and the tropical forest rabbit, which are known to occur on other parts of the Pacific coast, are barely covered by us. These species are numerous inland, in the coffee-plantation country of the piedmont or *Boca Costa*, where the annual rainfall exceeds 2,000 mm. While it is probable that they occasionally reach the Salinas La Blanca area, we have no concrete evidence of their presence there today or prehistorically. Therefore our report distinguishes between animals which we *know* occur within five km. of Salinas La Blanca and other animals which *probably* occur there or did in prehistoric time. In the latter case, we have relied on the work of Handley (Saunders et al., 1950), who collected on the Guatemalan Pacific coast; Villa (1948), who collected just across the border on the Chiapas coast; and the general distribution data in Miller and Kellogg (1955) and Hall and Kelson (1959).

### Mammals

Order Marsupialia  
Family Didelphidae

*Didelphis marsupialis*  
(Common opossum; *Tacuazín*)

MODERN SPECIMENS COLLECTED: 1 male and 2 females.

#### MEASUREMENTS:

*Total lengths:* 750 mm. (male), 815 and 860 mm. (females)

*Tail:* 390 mm. (male), 380 and 400 mm. (females)

*Hind foot:* 50 mm. (male), 62 and 60 mm. (females)

*Ear:* 40 mm. (male), 50 and 50 mm. (females)

*Weight:* 0.68 kg. (male), 1.8 and 1.1 kg. (females)

COLLECTING LOCALITIES: The male was captured at 8:30 a.m. February 21 in second-growth *monte* just west of the El Crucero railway crossing (3 km. north of Ocos). One female was captured early in the morning of February 20 in second-growth *monte* near Los Laureles, on the west bank of the Río Naranjo (3 km. upstream from Ocos); the other female was encountered trying to excavate a burrow under the floor of a house just inland from the Pacific Ocean, on stabilized sand, in the afternoon of February 18, within the village of Ocos.

BIOLOGICAL NOTES: The female collected February 20 was pregnant (three late-term foetuses). The female collected February 18 was carrying two recently born young in her pouch.

*Philander opossum*  
(Gray-masked or Four-eyed opossum; *Comadreja*)

MODERN SPECIMENS COLLECTED: 4 males.

#### MEASUREMENTS:

*Total length:* Avg. 590 mm. (range 545-615 mm.)

*Tail:* Avg. 309 mm. (range 290-330 mm.)

*Hind foot:* Avg. 43 mm. (range 38-47 mm.)

*Ear:* Avg. 30.25 mm. (range 30-31 mm.)

*Weight:* Avg. 0.54 kg. (range 0.46-0.68 kg.)

COLLECTING LOCALITIES: Near the east bank of the Río Suchiate, 4 km. west of Ocos (5:00 a.m., Feb. 15); in second-growth *monte* on the west bank of the Río Naranjo

near Los Laureles, 3 km. upstream from Ocós (early in the morning, Feb. 20); in the red mangrove forest east of Ocós and about 1 km. from Tilapa (8:00 p.m., Feb. 19); on the outskirts of the village of Ocós (9:30 p.m., Feb. 21).  
**HABITS AND DIET:** The specimen captured February 15 near the Suchiate River was reported to have been eating fish when discovered. The specimen taken February 21 was inside a house, trying to get into a hen's nest (either for eggs or baby chicks); its stomach contents were fish meat, scales, and skin, perhaps scavenged from the garbage dump outside the house.

*Marmosa mexicana?*  
 (Mouse-opossum)

Villa (1948, p. 497) reports this tiny opossum from the Soconusco area of Chiapas, but since we made no effort to pick up animals as small as this we are uncertain about its presence in the Ocós transect.

Order Insectivora  
 (None collected.)

Order Chiroptera  
 (None collected.)

Order Edentata  
 Family Myrmecophagidae

*Tamandua tetradactyla*  
 (Collared anteater; *Oso hormiguero*)

**MODERN SPECIMENS COLLECTED:** 1 male and 1 female

**MEASUREMENTS:**

*Total length:* 1170 mm. (male); 1070 mm. (female)  
*Tail:* 555 mm. (male); 555 mm. (female)  
*Hind foot:* 88 mm. (male); 87 mm. (female)  
*Ear:* 43 mm. (male); 42 mm. (female)  
*Weight:* 5.4 kg. (male); 3.2 kg. (female)

**COLLECTING LOCALITIES:** The male was captured during the day, February 20, in the red mangrove forest near Playa La Culebra, a small salt flat on the remnant of an extinct estuary system about 2.5 km. west of Ocós. The female was shot at night, February 22, by "jacklight" hunters in the mixed tropical forest near Ojo de Agua, 4 km. east of Ocós.

**HABITS AND DIET:** The female, shot around midnight, was active arboreally at that hour. The male was encountered on the ground, digging into a termite nest attached to the base of a red mangrove, some time before noon.

**BIOLOGICAL NOTES:** The female shot February 20 was pregnant (two late-term fetuses).

Family Dasypocidae

*Dasybus novemcinctus*  
 (Nine-banded armadillo)

**MODERN SPECIMENS COLLECTED:** 1 male.

**MEASUREMENTS:**

*Total length:* 820 mm.  
*Tail:* 370 mm.  
*Hind foot:* 95 mm.  
*Ear:* 40 mm.  
*Weight (with armor):* 5.2 kg.  
*Weight (without armor):* 3.9 kg.

**COLLECTING LOCALITY:** On the beach, about 1 km. northwest up the coast from Ocós, March 6.

Order Lagomorpha  
 Family Leporidae

*Sylvilagus floridanus*  
 (Eastern cottontail rabbit; *Conejo*)

**MODERN SPECIMENS COLLECTED:** 1 male and 2 females.

**MEASUREMENTS:**

*Total length:* 430 mm. (male), 425 and 415 mm. (females)  
*Tail:* 40 mm. (male), 40 and 45 mm. (females)  
*Hind foot:* 85 mm. (male), 89 and 88 mm. (females)  
*Ear:* 60 mm. (male), 62 and 64 mm. (females)  
*Weight:* 1.1 kg. (male), 1.1 and 1.4 kg. (females)

**COLLECTING LOCALITIES:** The male was shot at 3:00 a.m., February 25, in the Pampa La Morena, a tropical savanna 8 km. east of Ocós. One female was collected the night of February 22 in a cleared pasture 1 km. southeast of Bocana, on the Finca Nacional "La Blanca" (4 km. north of Ocós); the other female was shot the night of March 25 in an open cattle pasture 3 km. north of Ocós.

**BIOLOGICAL NOTES:** Both females were lactating (February 22 and March 25).

*Sylvilagus brasiliensis?*  
 (Tropical forest rabbit)

This cottontail is known from the Soconusco region of the Chiapas coast (Hall and Kelson, 1959, p. 256), but the collecting locality (Huehuetán) is 30 km. inland, in the *Boca Costa*. We are uncertain whether it reaches the tidewater marine estuary area within our transect.

Order Rodentia  
 Family Sciuridae

*Sciurus variegatoides*  
 (Variegated squirrel; *Ardilla*)

Local hunters assured us there were many squirrels in the mixed tropical forest near Ocós, but during our stay they failed to produce one. Handley found *S. variegatoides* very common on the Guatemalan Pacific coast (Saunders et al., 1950), and it does seem to reach the tidewater area at several points, including Concepción del Mar (Harris, 1937). Its presence in our transect is highly probable.

Family Geomyidae

*Orthogeomys grandis*  
 (Pocket gopher; *Tuza*)

**MODERN SPECIMENS COLLECTED:** 1 male and 2 females.

**MEASUREMENTS:**

*Total length:* 385 mm. (male), 355 and 350 mm. (females)  
*Tail:* 110 mm. (male), 105 and 110 mm. (females)  
*Hind foot:* 50 mm. (male), 47 and 44 mm. (females)  
*Ear:* 5 mm. (all 3 specimens)  
*Weight:* 0.9 kg. (male), 0.7 kg. (both females)

**COLLECTING LOCALITIES:** All specimens were trapped in cornfields between Ocós and Los Laureles, 3 km. to the northeast. The male was collected February 19, the

females on March 4 and 22. In addition, bones of *O. grandis* were recovered from Formative levels at La Victoria (Coe, 1961, p. 141).

Family Heteromyidae  
(None collected.)

Family Cricetidae

Small rodents were not collected by us in 1962, but one Cricetid, the cotton rat *Sigmodon hispidus*, was recovered archeologically in Ocós Phase levels at La Victoria (ibid.)

Family Erethizontidae

*Coendou mexicanus*  
(Mexican porcupine; *Puerco espín*)

MODERN SPECIMENS COLLECTED: 1 male and 1 juvenile female.

MEASUREMENTS:

*Total length:* 730 mm. (male), 520 mm. (female)  
*Tail:* 310 mm. (male), 220 mm. (female)  
*Hind foot:* 70 mm. (male), 60 mm. (female)  
*Ear:* 15 mm. (male), 10 mm. (female)  
*Weight:* 2.3 kg. (male), 1.2 kg. (female)

COLLECTING LOCALITIES: Both specimens are from the red mangrove forest a kilometer or so to the northwest of Ocós. They were collected between 2:00 and 3:00 p.m. on February 18, while active arboreally.

BIOLOGICAL NOTES: An additional specimen, for which we have no measurements, was collected March 27 in the vicinity of Salinas La Blanca. This was a nursing *Coendou mexicanus* weighing between 0.11 and 0.12 kg., quite recently born, with quills only a centimeter in length. The animal was fed with an eye dropper and by the end of its first week of captivity was consuming 40–50 cc. of milk a day. The youngster grew steadily, and by April 11 was chewing bark, although apparently not yet up to swallowing it—just “teething.”

Family Dasyproctidae

*Cuniculus (Agouti) paca*  
(Spotted cavy; *Tepescuintli*)

*Dasyprocta punctata*  
(Agouti; *Cuautuza*)

Local hunters in the Ocós transect distinguish between the *tepescuintli* and *cuautuza* and can describe them fairly accurately; many times they pointed out to us places where they had gone in the past to hunt both animals successfully. Unfortunately, no specimens of these shy nocturnal animals were collected during our brief stay. Villa (1948, p. 522) recovered a spotted cavy in the Soconusco region of the Chiapas coast, and there are several finds of *Dasyprocta* recorded from coastal Chiapas and southern Guatemala (Hall and Kelson, 1959, pp. 791–792). The Ocós hunters pursue the cavy almost as relentlessly as the white-tailed deer.

Order Carnivora  
Family Canidae

*Canis familiaris*  
(Domestic dog; *Perro, Chucho*)

The domestic dog has been present on the Pacific coast of Guatemala since the Ocós Phase, ca. 1500–1000 B.C., on the basis of archeological remains from La Victoria (Coe, 1961, p. 141).

*Urocyon cinereoargenteus*  
(Gray fox; *Zorra, Gato montés*)

MODERN SPECIMENS COLLECTED: 2 males.

MEASUREMENTS:

*Total length:* 820 and 870 mm.  
*Tail:* 315 and 350 mm.  
*Hind foot:* 120 and 122 mm.  
*Ear:* 54 and 62 mm.  
*Weight:* 3.0 kg. (both)

COLLECTING LOCALITIES: The Pampa La Morena, a tropical savanna, 8 km. east of Ocós (2:00 a.m., Feb. 25); an open cattle pasture 3 km. northeast of Ocós (night of March 25).

HABITS AND DIET: The stomach contents of the specimen from Pampa La Morena included 14 seeds from the fruit of the *marachán* or fan palm, and two small gray mice. The large intestine of the specimen from the cattle pasture contained 30 seeds of *marachán* (*Sabal mexicana*).

Family Procyonidae

*Procyon lotor*  
(Raccoon; *Mapache*)

MODERN SPECIMENS COLLECTED: 1 adult female; 1 juvenile male, 1 juvenile female.

MEASUREMENTS:

*Total length:* 780 mm. (adult); 680 and 730 mm. (juveniles)  
*Tail:* 270 mm. (adult); 250 and 270 mm. (juveniles)  
*Hind foot:* 115 mm. (adult); 105 and 110 mm. (juveniles)  
*Ear:* 56 mm. (adult); 48 and 49 mm. (juveniles)  
*Weight:* 5.0 kg. (adult); 2.3 kg. (both juveniles)

COLLECTING LOCALITIES: The adult female was shot the night of March 25 in second-growth *monte* near the railroad line at El Crucero, 3 km. north of Ocós. Both juveniles were captured the night of February 20 at the edge of the red mangrove forest which flanks the Tilapa estuary, about 2.5 km. southeast of Ocós.

HABITS AND DIET: Both juvenile specimens were what local hunters call “*mapaches de partida*,” i.e., members of a large band of young raccoons traveling together; when encountered, they were crab hunting in the mangrove forest. The adult female (pl. 2, b) shot the night of March 25 was referred to as a “*mapache anda-sola*,” i.e., a large elderly individual who had isolated herself from the group and was foraging alone. Her stomach contents included 18 seeds from the fruit of *Sabal mexicana*, a fan palm growing abundantly in the second-growth *monte* where she was recovered; fragments of fish in the stomach indicated that she had also been eating near the river, more than 2 km. to the east, on that same evening.

*Nasua narica*  
(Coati; *Pisote*)

MODERN SPECIMENS COLLECTED: 1 male.

MEASUREMENTS:

*Total length:* 1,130 mm.

*Tail:* 580 mm.

*Hind foot:* 90 mm.

*Ear:* 35 mm.

*Weight:* 3.4 kg.

COLLECTING LOCALITY: Near the margin between second-growth *monte* and red mangrove forest in the vicinity of Playa La Culebra, a small salt flat on the remnant of an extinct estuary system 2.5 km. northwest of Ocos (11:00 a.m., Feb. 26).

HABITS AND DIET: When encountered, this coati was eating fruit of the *piñuela*, a low, saw-tooth-leafed bromeliad growing around the margins of the salt *playa*. Its stomach contents included seven seeds of *piñuela*, six seeds of a smaller fruit known locally as *pimiento*, and one seed of *Annona* sp., as well as one cockroach.

*Potos flavus*  
(Kinkajou; *Mico de noche*)

MODERN SPECIMENS COLLECTED: 1 male and 1 female.

MEASUREMENTS:

*Total length:* 1,020 mm. (male), 890 mm. (female)

*Tail:* 510 mm. (male), 455 mm. (female)

*Hind foot:* 95 mm. (male), 90 mm. (female)

*Ear:* 30 mm. (male), 36 mm. (female)

*Weight:* 3.2 kg. (male), 2.3 kg. (female)

COLLECTING LOCALITIES: The male was shot at 1:00 a.m. on February 21 while active in the treetops in the high tropical forest near "Ojo de Agua," about 4 km. east of Ocos. The female was collected at 11:00 p.m., February 25, in the tropical forest near Pampa El Palmar, about 8 km. east of Ocos.

HABITS, DIET, AND BIOLOGICAL NOTES: The female (pl. 2, *a*) was lactating (Feb. 25). Her stomach contents were 24 seeds from the fruit of the *marachán* fan palm, which occurs abundantly in the understory of the mixed tropical forest as well as in the pampa.

*Bassariscus sumichrasti?*  
(Ring-tailed cat; *cacomistle*)

*Bassariscus* is known from several localities in southern Guatemala (Hall and Kelson, 1959, pp. 882-883), but we are in doubt about its presence within our transect.

Family Mustelidae

*Mustela frenata?*  
(Weasel)

This animal is widely distributed along the Pacific coast of Central America (Hall and Kelson, 1959, p. 911), but we failed to collect a specimen during our stay at Ocos. Local informants were not much help regarding the weasel, since the common name applied to it ("*comadreja*") is also used at Ocos to refer to the gray-masked opossum (*Philander*).

*Eira barbara?*  
(Tayra)

*Galictis allamandi?*  
(Grison)

Tayras and grisons both have been collected near the Ocos area (Hall and Kelson, 1959, pp. 920-921), but we are uncertain about their presence in our transect.

*Mephitis macroura*  
(Hooded skunk; *Zorillo*)

Hunters at Ocos claimed that skunks could be seen from time to time during night hunting trips in second-growth *monte* or in the savannas; unfortunately, they failed to collect one for us. The distribution maps in Hall and Kelson (1959, p. 938) suggest that our transect is well within the range of this animal, which reaches the ocean at several points on the Pacific coast.

*Lutra annectens*  
(River otter; *Perro de agua*)

MODERN SPECIMENS COLLECTED: 1 male.

MEASUREMENTS:

*Total length:* 1030 mm.

*Tail:* 420 mm.

*Hind foot:* 110 mm.

*Ear:* 21 mm.

*Weight:* 5.5 kg.

COLLECTING LOCALITY: This specimen was shot while swimming near the east bank of the Río Naranjo near La Blanca, about 8 km. upstream from Ocos, at 5:00 p.m., on March 5. Other otters were sighted, in the Naranjo closer to Ocos, but were not collected.

Family Felidae

*Felis onca*  
(Jaguar)

During our stay, tracks of jaguar were sighted not far from Tilapa, and the animal was reported to have been seen near Salinas La Blanca, on the east bank of the Río Naranjo. A pair of hunters from Ocos searched for the "*tigre*" for several weeks with no success, although they claimed to have come across his track on numerous occasions. The locals said the jaguar was most often seen in the mixed tropical forest, but might leave it to steal calves from the cattle ranches.

*Felis yagouaroundi*  
(Jaguarundi; *Onza*)

MODERN SPECIMENS COLLECTED: 1 male.

MEASUREMENTS:

*Total length:* 1070 mm.

*Tail:* 46 mm.

*Hind foot:* 135 mm.

*Ear:* 37 mm.

*Weight:* 5.0 kg.

COLLECTING LOCALITY: Second-growth *monte* along the west bank of the Río Naranjo near Los Laureles, 3 km. upstream from Ocos (11:00 a.m., Feb. 22). We also sighted jaguarundis hunting black iguanas in the *madresal* groves near Salinas La Blanca.

HABITS, DIET, AND BIOLOGICAL NOTES: This specimen exhibited the dusky black coat color (jaguarundis are dichromatic, and may be either black or reddish; see Hall and Kelson, 1959, p. 964). Its stomach contents consisted of one partially digested bird which appeared to be a young domestic turkey. Residents of Los Laureles claimed the animal had been robbing their henhouses for weeks before they succeeded in shooting him.

Order Perissodactyla  
Family Tapiridae

*Tapirella bairdii*  
(Tapir; *Danta*)

Villa (1948, p. 489) sighted a tapir near Paval, in Soconusco, Chiapas. Residents of Ocós spoke of seeing tapirs, though only rarely, in the upper reaches of the estuary in the pampas or tropical forest.

Order Artiodactyla  
Family Tayassuidae

*Tayassu tajacu*  
(Collared peccary; *Jabali*)

*Tayassu pecari?*  
(White-lipped peccary; *Senso*)

Ocós hunters are quite familiar with the collared peccary, which occurs in the *madresalares*, pampas, and forests of the Pacific coast of Guatemala and Chiapas (Villa, 1948, p. 523; Handley, 1950, p. 156). Hunters insisted this was the only kind of peccary in the transect area, and could not describe nor remember seeing the white-lipped "*senso*." Actually, the cutover vegetation of most of the transect today would seem a little skimpy for *T. pecari*, a predominantly rain forest species often occurring in great herds of up to 100 individuals (Hall and Kelson, 1959, p. 998; Alvarez del Toro, 1952, p. 192). However, a single peccary tooth from Ocós Phase levels at La Victoria seemed to agree a bit more with *T. pecari* than *T. tajacu* (Coe, 1961, p. 141); on the basis of this rather slim evidence, we will therefore keep in mind the possibility that at 1500 B.C., before intensive agriculture had made many inroads on the tropical forest, white-lipped peccaries may have reached the transect.

*Odocoileus virginianus*  
(White-tailed deer; *Venado*)

We came across the tracks of white-tailed deer many times during our surveys of the salt *playas* and *madresal* groves of the extinct estuary systems at Ocós, and bones of this animal were present in the refuse at La Victoria (ibid.) and Salinas La Blanca. Hunters from the Finca Nacional La Blanca shot one specimen during our stay, but unfortunately we were unable to recover the skeleton.

*Mazama americana?*  
(Brocket deer; *Temazate*)

Villa (1948, p. 527) recovered a brocket from the Soconusco region of Chiapas, but the specimen came from the *Boca Costa* or coffee country at an elevation of 1,160 m. The brocket is clearly a resident of the inland jungles of the Pacific coast, but we have no evidence for it from within

our somewhat drier transect. Hunters who had worked on the *Boca Costa* were familiar with the "*temazate*," and stated that they had not seen any within 5 or 10 km. of Ocós.

## Larger Reptiles

Order Chelonia  
Family Cheloniidae

*Chelonia mydas*  
(Green sea turtle; *Parlama*)

Both the meat and eggs of this animal are eaten at Ocós when the turtle comes ashore to lay the latter (see Coe, 1961, p. 12).

Order Crocodilia  
Family Crocodylidae

*Crocodylus acutus*  
(Crocodile)

*Caiman fuscus*  
(Cayman)

Crocodiles and caymans were common in the Ocós region as recently as the time of the Spanish Conquest (ibid.). Today they are greatly reduced in numbers; during our stay we were able to observe only one very young cayman captured in the estuary of the Pampa La Morena.

Order Squamata  
Family Iguanidae

*Iguana iguana*  
(Green iguana; *Iguana* or *Dorada*)

MODERN SPECIMENS COLLECTED: 2 females.

MEASUREMENTS:

*Total length*: 1,120 and 1,150 mm.

*Tail*: 810 and 820 mm.

*Hind foot*: 105 and 110 mm.

*Weight* (without eggs): 0.9 kg.

COLLECTING LOCALITY: Both specimens were captured in the branches of low trees in second-growth *monte* along the east bank of the Río Naranjo, about 1.5 km. upstream from Ocós (Feb. 17 and 18).

BIOLOGICAL NOTES: Both females were gravid, one with 27 eggs and the other with 33. Apparently the eggs are laid in late February and March.

*Ctenosaura similis*  
(Black iguana; *Giota*)

MODERN SPECIMENS COLLECTED: 2 adult males, 2 juvenile females.

MEASUREMENTS (adult males):

*Total length*: 810 and 890 mm.

*Tail*: 525 and 570 mm.

*Hind foot*: 80 and 90 mm.

*Weight*: Both 0.7 kg.

COLLECTING LOCALITIES: Both adult males were captured February 18 in second-growth *monte* just east of the Río Naranjo, 1.5 km. east of Ocós. Both juvenile females were captured near their burrows on the beach sand near the Pacific Ocean (Feb. 13).

# Appendix 2

## TABLES 11-13

TABLE 11.—DISTRIBUTION OF POTTERY TYPES

Pottery type	Cut 1														
	Level														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Guamuchal Brushed.....	134	49	60	6	14	3	9	3	6	-	14	12	15	10	15
Méndez Red-rimmed.....	2	1	4	-	1	2	2	4	2	-	2	2	3	3	1
Mapache Red-rimmed.....	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tilapa Red-on-white.....	-	-	1	1	-	-	-	1	-	-	2	2	4	1	1
Pampas Black-and-white.....	6	2	4	-	1	1	-	1	-	-	1	-	-	-	-
Unusual striated sherds.....	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Excised sherds.....	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Oso Brushed.....	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Teófilo Punctate.....	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-
<i>Tecomate</i> , thick red slip.....	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Morena Black.....	7	1	5	-	4	1	2	1	-	-	1	-	1	2	6
Conchas White-to-buff.....	60	19	20	-	2	1	1	-	1	-	1	2	-	4	-
Pacaya Red.....	4	1	-	1	2	1	3	-	1	-	-	2	-	3	2
Suchiate Brushed.....	221	72	66	3	6	-	1	-	-	-	-	-	-	-	-
Ocos Gray.....	-	2	-	-	-	3	-	1	4	-	-	-	2	2	-
Conchas Red-on-buff.....	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-
Temblor White.....	5	1	-	-	-	-	-	-	-	-	-	-	-	-	-
California White.....	3	3	-	-	-	-	-	1	-	-	-	-	-	-	-
Conchas Streaky Brown-black.....	263	79	141	4	14	-	-	-	-	-	-	-	-	-	-
Julain Coarse.....	20	8	11	-	1	-	-	-	-	-	-	-	-	-	-
Conchas Orange.....	29	6	12	-	-	-	-	-	-	-	-	-	-	-	-
Encuentros Orange.....	17	3	7	-	-	-	-	-	-	-	-	-	-	-	-
Crucero Red-on-orange.....	3	-	2	-	-	-	-	-	-	-	-	-	-	-	-
White-on-orange bowl.....	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Black-on-orange jar.....	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-
Fine white ("clear-through").....	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-
Polished red bowls.....	-	1	3	-	-	-	-	-	-	-	-	-	-	-	-
Conchas Red-and-white.....	7	3	3	-	-	-	-	-	-	-	-	-	-	-	-
Argelia Black-gray.....	4	1	-	-	-	-	-	-	-	-	-	-	-	-	-
Hard, thin plain ware.....	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-
Mareas Coarse Red.....	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-
Violeta Plain.....	8	1	-	-	-	-	-	-	-	-	-	-	-	-	-
Manchuria Plain.....	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Glazed ware.....	6	-	-	-	1	-	-	-	-	-	-	-	-	-	-
Miscellaneous coarse wares.....	6	4	2	-	-	-	-	-	-	-	-	-	-	-	-
Total diagnostics.....	811	257	343	16	48	12	18	12	14	0	21	20	27	25	25
Nondiagnostic body sherds.....	6,460	1,328	1,244	333	229	33	55	33	53	18	87	156	204	243	98
Total sherds in level.....	7,271	1,585	1,587	349	277	45	73	45	67	18	108	176	231	268	123

BY SHERD COUNT, SALINAS LA BLANCA

Cut 1—Continued																Grand total
Level—Continued																
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
4	20	30	123	147	142	105	97	113	186	654	756	416	112	103	-	3,358
1	1	1	17	9	11	9	9	6	4	12	9	13	-	2	-	133
-	-	1	-	-	2	1	-	-	1	-	1	2	-	-	-	8
-	3	1	7	3	3	3	5	4	5	-	8	8	-	-	-	63
-	-	-	-	1	5	-	-	1	-	1	-	-	-	1	-	25
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
-	-	-	1	-	-	-	1	-	-	1	1	4	3	1	-	14
-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	1
1	-	1	-	-	-	-	-	-	-	-	2	1	-	-	-	36
-	-	-	1	1	2	-	1	1	-	3	4	3	-	-	-	127
1	-	-	1	7	1	1	1	4	4	4	4	11	1	-	-	60
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	369
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	501
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	40
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	47
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	27
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	13
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7
-	-	-	1	-	-	-	-	-	-	1	1	-	-	-	-	15
7	24	34	151	168	166	119	114	129	200	676	786	459	116	107	-	4,905
66	141	245	695	927	972	989	586	612	974	3,792	4,317	2,840	681	256	-	28,667
73	165	279	846	1,095	1,138	1,108	700	741	1,174	4,468	5,103	3,299	797	363	-	33,572

TABLE 11.—DISTRIBUTION OF POTTERY

Pottery type	Cut 1—Continued														
	Level—Continued														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Guamuchal Brushed.....	60	31	20	64	31	20	34	17	10	7	3	9	10	43	99
Méndez Red-rimmed.....	-	-	2	3	8	4	1	-	1	-	1	1	1	15	26
Mapache Red-rimmed.....	-	-	-	1	2	-	-	-	-	-	-	-	1	2	-
Tilapa Red-on-white.....	-	-	-	2	4	1	-	-	-	3	1	1	2	5	6
Pampas Black-and-white.....	2	-	2	9	5	-	2	-	2	1	-	-	-	2	5
Unusual striated sherds.....	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Excised sherds.....	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Oso Brushed.....	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Teófilo Punctate.....	-	-	-	-	1	-	-	-	-	-	-	-	-	1	1
<i>Tecomate</i> , thick red slip.....	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Morena Black.....	6	2	5	9	7	3	4	-	2	2	-	-	3	1	3
Conchas White-to-buff.....	28	11	11	8	3	1	3	2	1	1	-	-	5	-	3
Pacaya Red.....	7	2	-	6	4	4	2	5	1	3	-	-	-	-	5
Suchiate Brushed.....	64	26	19	26	20	10	18	13	2	-	-	3	-	-	-
Ocós Gray.....	4	-	2	1	6	2	3	-	4	2	1	-	-	-	-
Conchas Red-on-buff.....	-	2	-	4	1	-	2	-	-	-	-	-	-	-	-
Temblor White.....	11	3	-	-	-	-	1	-	-	-	-	-	-	-	-
California White.....	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-
Conchas Streaky Brown-black.....	81	26	28	3	-	-	-	-	-	-	-	-	-	-	-
Julaín Coarse.....	4	4	3	1	-	-	-	-	-	-	-	-	-	-	-
Conchas Orange.....	19	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Encuentros Orange.....	6	2	6	-	-	-	-	-	-	-	-	-	-	-	-
Crucero Red-on-orange.....	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
White-on-orange bowl.....	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Black-on-orange jar.....	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fine white ("clear through").....	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Polished red bowls.....	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conchas Red-and-white.....	2	1	3	-	-	-	-	-	-	-	-	-	-	-	-
Argelia Black-gray.....	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-
Hard, thin plain ware.....	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mareas Coarse Red.....	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-
Violeta Plain.....	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manchuria Plain.....	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Glazed ware.....	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Miscellaneous coarse wares.....	13	5	7	7	5	4	4	4	-	-	-	3	-	-	1
Total diagnostics.....	333	120	110	144	97	49	74	41	23	19	6	17	22	69	149
Nondiagnostic body sherds.....	3,942	1,060	1,019	865	611	941	1,295	1,010	125	46	35	56	231	422	652
Total sherds in level.....	4,275	1,180	1,129	1,009	708	990	1,369	1,051	148	65	41	73	253	491	801



TYPES BY SHERD COUNT, SALINAS LA BLANCA—Continued

Cut 1—Continued																Grand total
Level—Continued																
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
311	310	38	31	62	137	162	140	146	65	44	81	151	450	303	24	2,913
48	50	2	1	2	16	13	8	12	3	3	2	2	9	1	1	236
5	3	-	-	-	2	2	2	4	1	2	-	2	3	3	-	35
19	19	3	-	1	8	1	4	10	5	2	7	1	2	8	1	116
3	2	-	-	-	-	-	-	1	-	1	-	1	2	2	1	43
-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-	2
-	-	-	-	-	-	-	-	-	-	-	-	-	1	2	-	3
-	-	-	-	-	-	-	-	1	-	2	-	-	2	-	-	6
4	4	-	-	-	1	1	-	2	-	-	2	-	2	-	-	19
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
1	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	49
3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	80
2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	41
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	201
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	15
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	138
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	23
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	53
396	388	43	32	65	164	179	154	177	74	54	92	157	472	320	27	4,067
2,286	2,498	304	167	451	877	978	965	1,323	654	448	862	575	2,155	1,636	94	28,583
2,682	2,886	347	199	516	1,041	1,157	1,119	1,500	728	502	954	732	2,627	1,956	121	32,650

TABLE 12.—DISTRIBUTION OF DECORATIVE

Decorative mode	Cut 1, Level—																													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
<b>Interior finger-punching:</b>																														
Guamuchal Brushed . . . . .	3	-	3	-	2	-	-	-	1	-	-	1	1	1	-	-	3	2	16	16	18	10	15	13	27	87	82	57	25	18
Méendez Red-rimmed . . . . .	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	1	-	-	
<b>Exterior finger-punching:</b>																														
Guamuchal Brushed . . . . .	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Unusual striated sherds . . . . .	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Suchiate Brushed . . . . .	12	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Miscellaneous coarse wares . . . . .	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
<b>Spaced herringbone gouges:</b>																														
Guamuchal Brushed . . . . .	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	1	3	10	7	6	6	6	13	18	53	60	32	5	12	
Méendez Red-rimmed . . . . .	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	1	2	1	-	-		
<b>Spaced stepped jabs:</b>																														
Guamuchal Brushed . . . . .	-	-	-	-	-	-	-	-	-	1	1	-	1	1	-	-	-	5	14	6	8	1	2	5	28	54	36	16	7	
Méendez Red-rimmed . . . . .	-	-	-	1	-	1	-	-	-	1	-	1	-	-	-	-	1	-	1	2	1	1	-	1	3-	-	-	-		
<b>Close stepped jabs:</b>																														
Guamuchal Brushed . . . . .	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	3	-	4	4	4	3	2	1	3	3	2	8	2	-	
Méendez Red-rimmed . . . . .	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8	-	1	-	-	-	-	-	1	-	4	-		
<b>Diagonal incising:</b>																														
Guamuchal Brushed . . . . .	2	1	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	2	1	-	1	-	-	4	5	3	-	-		
Méendez Red-rimmed . . . . .	-	-	1	-	-	1	-	2	1	-	-	1	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-		
Mapache Red-rimmed . . . . .	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-		
Teófilo Punctate . . . . .	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Oso Brushed . . . . .	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Morena Black . . . . .	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Pacaya Red . . . . .	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-		
Conchas White-to-buff . . . . .	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Suchiate Brushed . . . . .	1	3	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Miscellaneous coarse wares . . . . .	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	1	-	-	-		
<b>Horizontal punctation, single-row:</b>																														
Guamuchal Brushed . . . . .	-	-	-	-	-	-	-	-	-	1	1	-	-	1	-	-	-	4	2	4	-	4	3	-	5	8	4	-	1	
Méendez Red-rimmed . . . . .	-	-	-	-	1	-	1	-	-	-	1	-	-	-	-	1	1	3	-	1	1	2	2	-	2	-	1	-	1	
Mapache Red-rimmed . . . . .	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	2	1	-	1	1	-	1	2	-	-	
Teófilo Punctate . . . . .	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	1	-	-	1	1	6	3	1
Suchiate Brushed . . . . .	-	2	3	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
<b>Indented filleting:</b>																														
Guamuchal Brushed . . . . .	8	3	5	-	3	1	1	1	3	3	3	2	1	2	2	-	3	2	9	17	10	4	10	1	1	8	2	4	-	
Méendez Red-rimmed . . . . .	-	-	-	1	-	-	-	1	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	
<b>Low-relief indented filleting:</b>																														
Suchiate Brushed . . . . .	48	16	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
<b>Cane-punched applique:</b>																														
Guamuchal Brushed . . . . .	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	2	1	1	-	-	1	1	2	-
Méendez Red-rimmed . . . . .	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	
Suchiate Brushed . . . . .	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
<b>Stick-punching:</b>																														
Suchiate Brushed . . . . .	11	2	3	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
<b>Rocker-stamping:</b>																														
Guamuchal Brushed . . . . .	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Méendez Red-rimmed . . . . .	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	
Tilapa Red-on-white . . . . .	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	
Suchiate Brushed . . . . .	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
<b>Incised arcs:</b>																														
Guamuchal Brushed . . . . .	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	
Méendez Red-rimmed . . . . .	-	-	1	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Suchiate Brushed . . . . .	3	2	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
<b>Linear pattern-burnishing:</b>																														
Mapache Red-rimmed . . . . .	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	1	-	-	1	-	
Teófilo Punctate . . . . .	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	
Miscellaneous coarse wares . . . . .	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	









# Appendix 3

## REPORT ON MINERALIZED CORNCOBS AND OTHER PREHISTORIC SPECIMENS FROM SALINAS LA BLANCA

Paul C. Mangelsdorf  
*Botanical Museum, Harvard University*

The collection of corncobs from Salinas La Blanca consists of 32 specimens of which 29 are mineralized parts of the cobs—the first “petrified” corn to be discovered. The mineralization is probably due to impregnation of the tissues with carbonates and not with silica since there is profuse bubbling when hydrochloric acid is applied. The preservation of details in some of the specimens is quite remarkable (pl. 24). In some the venation in the glumes and other floral bracts is still apparent, in others the tiny hairs which beset the cupule (depressions in the rachis) have been preserved. In several there are mineralized remains of the vascular system which supplied the kernels. The pith, however, has not been preserved, consequently our observations on the cupules and floral bracts are made from the unusual position of inside the cobs looking outward. It was possible to make observations or obtain measurements on 26 of the 29 mineralized specimens of cobs.

On the basis of the measurements and observations we can reconstruct this prehistoric corn in the majority of its dimensions. The diameter of the two cobs measured was 22 mm. but an estimated diameter, calculated by adding to the rachis diameter of 11.1 mm. twice the average length (6.2) of the glumes, is 23.5 mm. Multiplying this by  $\pi$  we get a cob circumference of 73.84 mm. Dividing this by 12, the modal kernel row number, we get 6.2 mm. for the average kernel width. Kernel thickness based on 24 specimens is 3.9 mm. Kernel length should be about the same as glume length since several observations indicate that the glumes were rounded at the top as though they had enclosed the kernels.

Our measurements of the width of a pair of spikelets were made at their bases which are at about the same

level as the outside of the rachis. This has the diameter of 11.1 mm. Multiplying by  $\pi$  we get a circumference of 34.87 mm. for the rachis. Dividing this by 6.6 (half the average row number) we find that the space available for the attachment of a pair of spikelets is 5.3 mm. This agrees reasonably well with the average width, 6.7 mm., based on our measurements. Part of the difference between the two figures may be due to the fact that some of the measurements of spikelet pairs were made at a slightly higher level than the actual rachis diameter.

The measurements obtained from these prehistoric specimens agree rather closely with the published data on the two still-existing Mexican races, Nal-Tel and Chapalote (cf. Wellhausen et al., 1952) as shown in table 14.

TABLE 14.—CHARACTERISTICS OF SALINAS LA BLANCA MINERALIZED COBS COMPARED WITH THOSE OF MODERN NAL-TEL AND CHAPALOTE

Characteristic	Nal-Tel	Chapalote	Salinas La Blanca
Kernel row (number).....	11.4	12.3	13.2
Diameter cob (mm.).....	19.2	22.0	<sup>1</sup> 22.0
Diameter rachis (mm.).....	9.2	11.2	11.1
Kernel width (mm.).....	6.7	6.7	<sup>2</sup> 6.2
Kernel thickness (mm.).....	3.9	4.1	3.9
Kernel length (mm.).....	7.4	7.2	<sup>2</sup> 6.6
Glume length (mm.).....	5.0	5.4	6.2

<sup>1</sup> Or estimated 23.5.

<sup>2</sup> Estimate.

So far as the measurements go, the prehistoric specimens resemble Chapalote a little more closely than Nal-Tel, and since Chapalote was one of the races represented in the prehistoric corn uncovered in

TABLE 15.—MEASUREMENTS AND OBSERVATIONS ON MINERALIZED COBS FROM SALINAS LA BLANCA

Specimen Number	Kernel rows (Number)	Cob diameter (mm.)	Rachis diameter (mm.)	Space occupied by kernels		Kernel thickness (mm.)	Glume length (mm.)	Width spikelet pair at base	Other observations
				Space (mm.)	Number kernels				
1	16	22	10	11	3	3.7	6.0	-	-
2	14	22	13	23	6	3.8	-	-	-
3	12	-	-	28	6	4.7	-	-	Glumes long, rumpled. Some show venation.
4	-	-	-	23	6	3.8	-	-	Glumes rumpled.
5	16	-	12	16	4	4.0	-	5	Remains of a fibro-vascular bundle.
6	-	-	-	17	4	4.2	7.0	6	-
7	12	-	11	18	4	4.5	-	-	Glumes rumpled.
8	-	-	-	16	5	3.2	-	8	Many bundles.
9	16?	-	-	13	4	3.2	-	8	-
10	-	-	-	12	3	4.0	-	-	Glumes long, rumpled; hairs in cupules.
11	12	-	9	14	4	3.5	-	-	Glumes long, rumpled.
12	-	-	-	14	4	3.5	5.5	6	Glumes curved outward.
13	-	-	-	14	4	3.5	6.5	6	Do.
14	12	-	11	-	-	-	-	-	-
15	12	-	12	-	-	-	-	-	-
16	-	-	-	14	4	3.5	6.0	-	Hairs in cupules.
17	-	-	-	7	2	3.5	-	-	Glumes long, round at top.
18	-	-	-	20	5	4.0	-	-	Glumes long, rumpled; probably pod corn.
19	-	-	-	11	3	3.7	-	7	Glumes rumpled, probably pod corn.
20	12-14	-	-	20	4	5.0	-	7	Lower glume thicker than upper.
21	12	-	-	15	4	3.8	6.0	-	Glumes rounded at top.
22	-	-	-	21	6	3.5	-	-	Glumes long, rounded at top.
23	12	-	-	14	4	3.5	-	-	Glumes rumpled.
24	-	-	-	15	3	5.0	-	7	-
25	-	-	-	7	2	3.5	-	7	-
26	-	-	-	16	4	4.0	-	-	-
Average..	13.2	22	11.1	-	-	3.9	6.2	6.7	

five caves in the Tehuacán Valley of Mexico (Mangelsdorf et al., 1964) these specimens from Guatemala may well be related to Chapalote. The deep cupules are also suggestive of Chapalote. The hairy cupules, however, are more characteristic of Nal-Tel than of Chapalote. It is probably safe to say that the specimens represent either Chapalote or Nal-Tel, and since the two races are themselves closely related one conclusion is about as good as another.

The prehistoric specimens differ from both modern Chapalote and Nal-Tel in having longer and softer glumes, often rumpled, and in the fact that the glumes seem, in some specimens at least, to have partially or completely enclosed the kernels. These character-

istics suggest that this corn was a form of pod corn and that it had not yet been contaminated by corn's relatives, teosinte or *Tripsacum*.

Three additional specimens represent impressions. The impression of a short section of stalk has a diameter of about 12 cm. Modern corn, unless stunted by growing under poor conditions, seldom has a stalk as slender as this. Leaf impressions (pl. 24, *b*) show 10 veins in a distance of 17 cm. in one specimen and 5 veins in 10 cm. in the other. These represent venation indexes of 6.1 and 5.0 respectively. These are much higher indexes than are found in any modern races but are of the same order as that of leaves of corn from the lower levels of the Tehuacán sites.



# Appendix 4

## FISH REMAINS FROM SALINAS LA BLANCA, AN ARCHEOLOGICAL SITE ON THE PACIFIC COAST OF GUATEMALA

W. I. Follett

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### Introduction

This is an account of the fish remains collected by Michael D. Coe and Kent V. Flannery at Salinas La Blanca (SM-1), an archeological site on the alluvial plain of the Pacific coast of Guatemala, a few kilometers from the Mexican border.

Salinas La Blanca is 1.5 km. from the Pacific Ocean, on the east bank of the Naranjo River, which connects with a lagoon-estuary system not far from its mouth. The site is a short distance upstream from the town of Ocos, which is on the west bank of the river.

Four radiocarbon samples indicate that the site was occupied from about 1000 to 850 B.C.

The specimens are deposited at Yale University, Department of Anthropology.

### Fishes Represented <sup>1</sup>

The fish material comprises more than 100 remains, referable to 11 genera and 10 families, many of which are so fragmentary that their identification is impracticable. Most of the remains were partially covered by a hard encrustation of carbonates, which was found to be soluble, without appreciable damage to the fish remains, in a mixture of one part, by volume, of glacial acetic acid to three parts of water.

<sup>1</sup> The common names employed are those adopted by the American Fisheries Society (1960). Only five were adopted for particular species represented in this collection: machete, California needlefish, yellowfin mojarra, crevalle jack, spotted sleeper. The others were each adopted for a family, but are here employed (in the singular) for a species of that family.

I wish to express my appreciation to Lillian J. Dempster and Maurice C. Giles, of the California Academy of Sciences. Mrs. Dempster assisted extensively with the manuscript and Mr. Giles expertly printed the photographs.

### Discussion

#### Gars—Lepisosteidae

##### *Lepisosteus tropicus* (Gill) <sup>2</sup> (Gar)

This is the southernmost representative of the gars, and the only one known from Pacific drainages, where it occurs in brackish estuaries and coastal waterways (Miller, 1954, p. 231). The flesh of gars has been said to be "tough and rank, valueless as food" (Jordan and Evermann, 1896, p. 109). However, Lindner (1947, p. 76) wrote, "The garfish (*Lepisosteus*) is used for food in Mexico and is usually called 'catán' although in Chiapas it goes by the name of 'cherna.' More than 15,000 pounds were taken in 1941." According to Herald (1962, pp. 70-71), the Seminole Indians in the Florida Everglades include gars in their diet; these Indians "remove the head and tail, then shuck them out by making a slit from one end to the other along the undersurface of the body."

**MATERIAL:** Scales (169), from fish about 45 to 55 cm. in total length. These scales (except for one single scale) are in patches of two to nine rows, held in their natural alinement by encrusting carbonates. The patches appear to represent discarded pieces of skin. Two such pieces, one with six rows of scales (pl. 31, *a*) and the other with nine, are doubled upon themselves. The identification to species is presumptive.

<sup>2</sup> I follow Suttkus (1963, p. 70) in regarding this species as valid.

## Tarpons—Elopidae

*Elops affinis* Regan<sup>3</sup>  
(Machete)

This fish (see Walford, 1937, pl. 24, fig. *a*) is edible (Berdegué, 1956, p. 137). It attains a total length of nearly a meter (Cannon, 1964, p. 196). One of the specimens mentioned by Meek and Hildebrand (1923, p. 177) "was taken in a muddy tide stream 6 miles inland."

**MATERIAL:** Precaudal vertebral centra (four, complete; two attached to each other; pl. 31, *b*), from a fish about 36 cm. in total length.

## Sea Catfishes—Ariidae

*Sciades troschelii* Gill<sup>4</sup>  
(Sea catfish)

This important food fish (Meek and Hildebrand, 1923, p. 104, as *Sciadeichthys troschelii*), "one of the largest species" of sea catfishes (Jordan and Evermann, 1896, p. 122), abounds in the lagoons of Chiapas, where it is taken in seines and cast nets (Lindner, 1947, p. 76).

**MATERIAL:** Partial cranium (pl. 31, *c*, including the basioccipital, prootics, and right posttemporal, parts of the parasphenoid, frontals, sphenotics, pterotics, right supraclithrum, supraoccipital, and transverse processes of the fifth to seventh vertebrae, and a fragment of the left crescentic process of the tripus), from a fish about 50 cm. in total length. Left preopercle attached to the left hyomandibular and left quadrate (all incomplete), from a fish about 40 cm. in total length. Left cleithrum (incomplete), attached to the left coracoid (incomplete), from a fish about 50 cm. in total length. Right cleithrum (incomplete), from a fish about 80 cm. in total length.

Identification of the cranium is based on the strongly developed ventral process of the basioccipital, which in size and shape closely resembles that of a skeleton of this species (Stanford University 12067, standard length 41 cm.). In the archeological specimen, the upper surface is granular, and much rougher than in the Stanford specimen. This difference is apparently not significant, since the upper surface of the head in this species is "much rougher in some specimens than

others" (Meek and Hildebrand, 1923, p. 103). Similarly, the humeral process of the right cleithrum, unlike that of the Stanford specimen, is coarsely granular—a character of this species noted by Jordan and Evermann (1898 b, p. 2758).

## Needlefishes—Belonidae

*Strongylura exilis* (Girard)  
(California needlefish)

This species (see Walford, 1931, fig. 29), which attains a total length of more than a meter, is a very good food fish (Cannon, 1964, p. 212). I follow Collette and Berry (1965, pp. 390, 392) in regarding *Belone stolzmanni* Steindachner as a synonym of *Belone exilis* Girard.

**MATERIAL:** Dentaries (incomplete pair), from a fish about 50 cm. in total length. Premaxillaries (incomplete pair, slightly charred; pl. 31, *d*), from a fish about 50 cm. in total length. The enlarged teeth of this species are conical, the dark base (in alcoholic specimens) contrasting sharply with the white cusp. This contrast is accentuated in the several enlarged teeth remaining in the dentaries of the archeological specimen.

## Snooks—Centropomidae

*Centropomus nigrescens* Günther  
(Snook)

This species (see Kumada and Hiyama, 1937, col. pl. 19, as *Centropomus viridis*), which attains a total length of about a meter (Walford, 1937, p. 127), is a valuable food fish (Jordan and Evermann, 1896, p. 1118). Meek and Hildebrand (1925, p. 428)—whom I follow in regarding *C. viridis* Lockington as a synonym of *C. nigrescens*—said that some of their specimens of this species had been taken in fresh water streams above tide influence. In the Ocosingo area, snook occur in the brackish waters of the mangrove-lined estuaries and in the channels of the sluggish Naranjo River (Coe and Flannery, 1964, p. 653).

**MATERIAL:** Partial cranium (including the supraoccipital, left epiotic, left parietal, and left frontal), from a fish about 75 cm. in total length. Left frontal (incomplete, comminuted but the fragments held together by encrusting carbonates), from a fish about 97 cm. in total length. Right preopercle (incomplete), from a fish about 50 cm. in total length. Right quadrate (complete; pl. 31, *e*), from a fish about 89 cm. in total length. Vertebra (incomplete, possibly from the fish represented by the incomplete cranium).

These remains are identified to species on the basis of their large size.

<sup>3</sup> In a recent review of the genus *Elops*, Whitehead (1962, pp. 321, 327, 328) recognized this species as distinct from *Elops saurus* Linnaeus, of the Atlantic coast of tropical America.

<sup>4</sup> I follow Hildebrand (1946, p. 123) in referring this species to the genus *Sciades* Müller and Troschel, 1894.

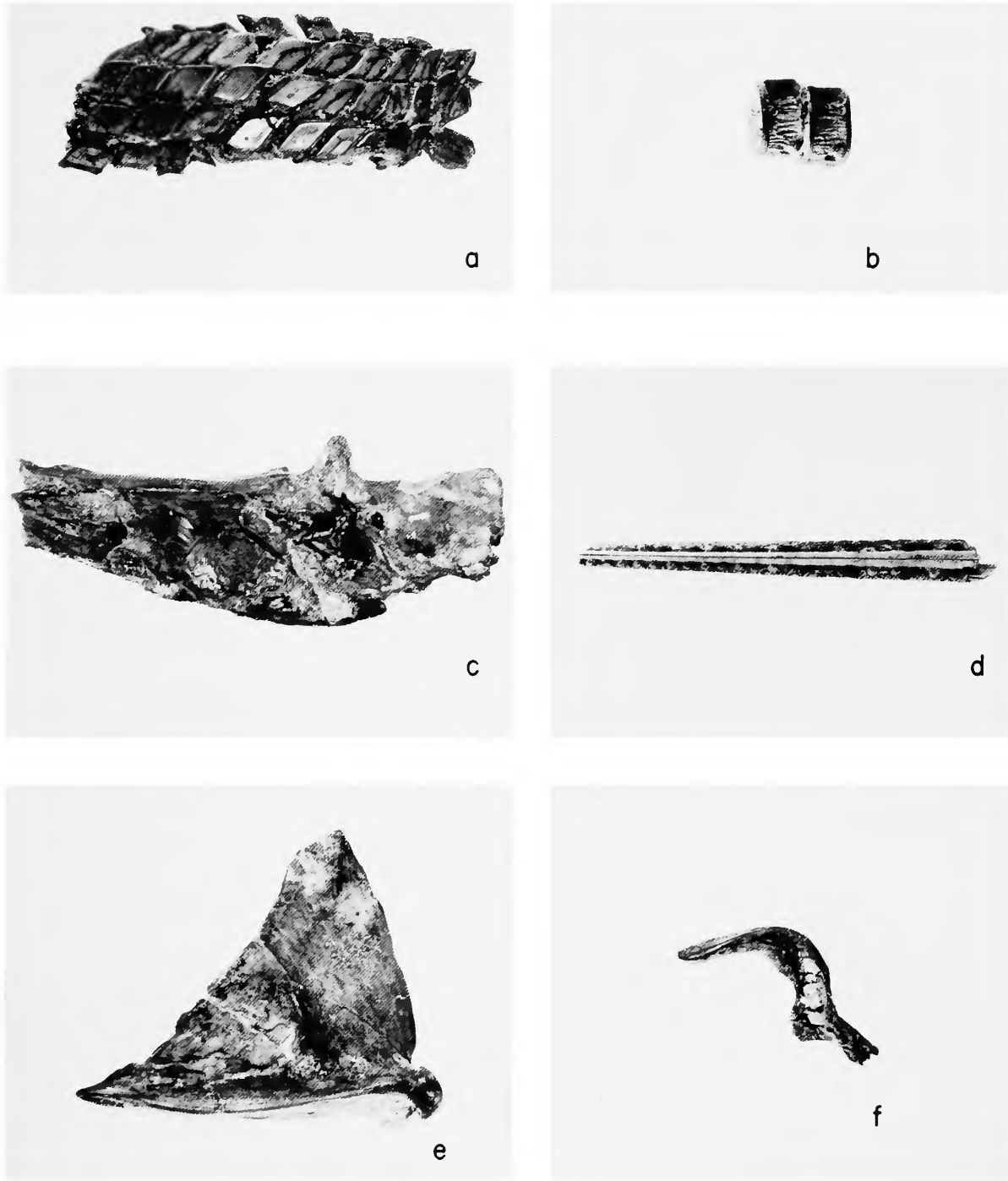


PLATE 31

Fish remains from Salinas La Blanca. *a*, Gar (*Lepisosteus tropicus*): patch of scales, length 50 mm.; Cut 2, Level 17 (depth 36–38 dm.). *b*, Machete (*Elops affinis*): two precaudal vertebral centra, horizontal diameter 4.3 mm.; Cut 1, Level 25 (depth 52–54 dm.). *c*, Sea catfish (*Sciades troschelii*): partial cranium (lateroventral aspect), length 102 mm.; Cut 1, Level 29 (depth 60–62 dm.). *d*, California needlefish (*Strongylura exilis*): premaxillaries, length 40 mm.; Cut 2, Level 17 (depth 36–38 dm.). *e*, Snook (*Centropomus nigrescens*): right quadrate, length 47 mm.; Cut 2, Level 17 (depth 36–38 dm.). *f*, Yellowfin mojarra (*Gerres cinereus*): left palatine, length 20 mm.; Cut 2, Level 17 (depth 36–38 dm.).

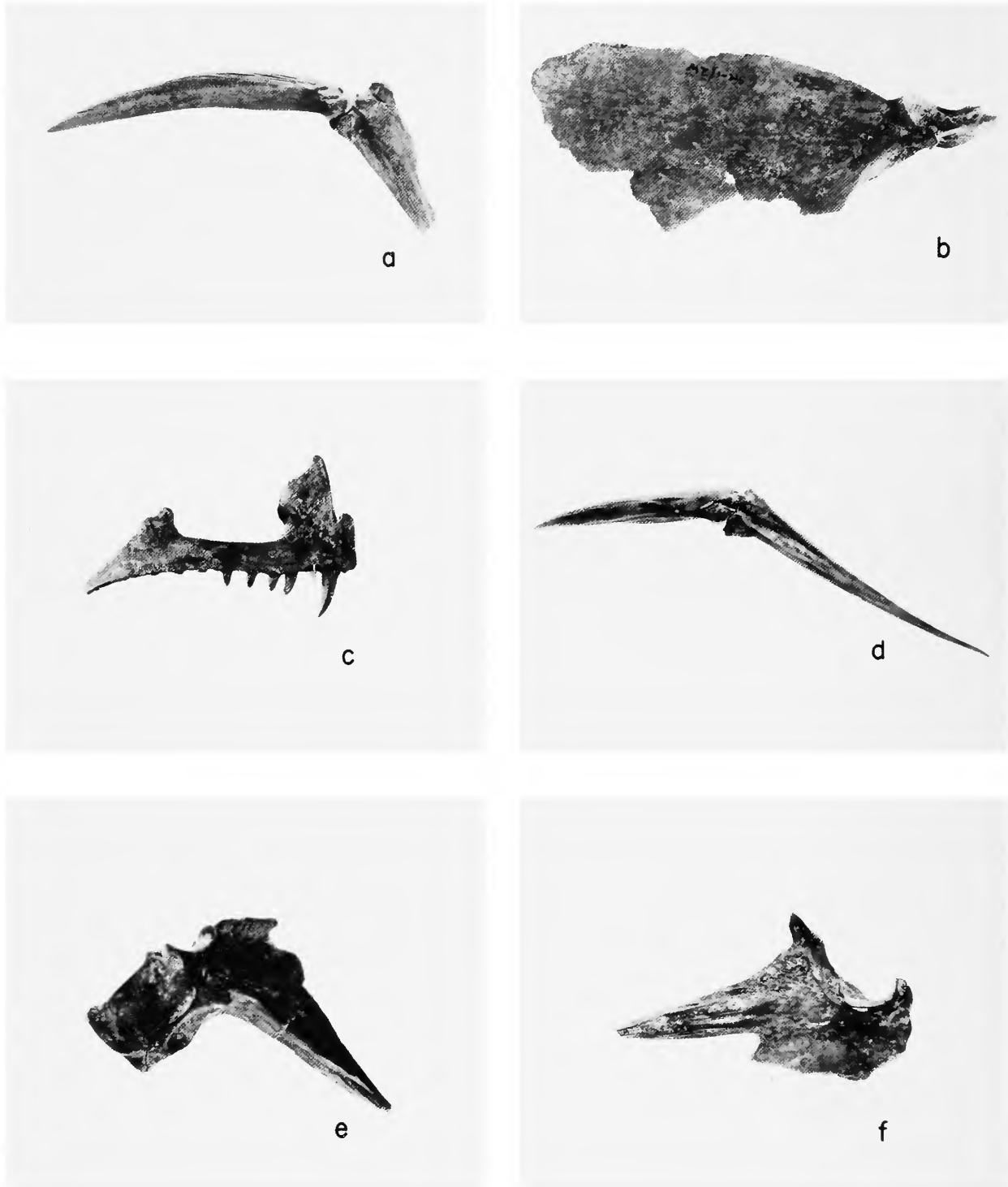


PLATE 32

Fish remains from Salinas La Blanca. *a*, Mojarra (*Eugerres lineatus*): 2d anal spine and 1st interhaemal, length 55 mm.; Cut 1, Level 26 (depth 54–56 dm.). *b*, Crevalle jack (*Caranx hippos*): right opercle, length 97 mm.; Cut 1, Level 23 (depth 48–50 dm.). *c*, Snapper (*Lutjanus novemfasciatus*): right premaxillary, length 29 mm.; Cut 1, Level 20 (depth 42–44 dm.). *d*, Snapper (*Lutjanus colorado*): 1st and 2d anal spines and 1st interhaemal, length 74 mm.; Cut 2, Level 17 (depth 36–38 dm.). *e*, Grunt (*Pomadasys macracanthus*): right articular and angular, length 33 mm.; Cut 2, Level 15 (depth 32–34 dm.). *f*, Spotted sleeper (*Eleotris picta*): left articular, length 26 mm.; Cut 2, Level 15 (depth 32–34 dm.).

Mojarras—Gerridae<sup>5</sup>*Gerres cinereus* (Walbaum)  
(Yellowfin mojarra)

This important food fish (see Regan, 1906–08, pl. 8, fig. 2, as *Gerres simillimus*), which is known to enter rivers, attains a total length of about 38 cm. (Jordan and Evermann, 1898 a, p. 1372).

MATERIAL: Left palatine (incomplete; pl. 31, *f*), from a fish about 38 cm. in total length.

*Eugerres lineatus* (Humboldt)  
(in Humboldt and Valenciennes)  
(Mojarra)

This species (see Humboldt and Bonpland, 1812, pl. 46, fig. 2), a food fish of some importance, which attains a length of about 30 cm. (Jordan and Evermann, 1898 a, p. 1378, as *Gerres lineatus*), is known to enter fresh water (Meek and Hildebrand, 1925, p. 602, as *Diapterus lineatus*).<sup>6</sup>

MATERIAL: Second anal spine (complete) articulated with the first interhaemal (incomplete), pl. 32, *a*; from a fish about 30 cm. in total length.

## Jacks—Carangidae

*Caranx hippos* (Linnaeus)<sup>7</sup>  
(Crevalle jack)

Walford (1937, pp. 72, 73, col. pl. 51, fig. *a*, as *Caranx caninus*) stated that this fish attains a total length of about a meter and a weight of about 60 kg.; also that “on the Pacific coast this fish is generally considered so unpalatable that not even the Indians will eat it—and, as fish eaters, they have the reputation, probably deserved, of being gastronomically stoic.” On the other hand, Kumada and Hiyama (1937, p. 33) described it as a “good food fish.” It has been recorded from tide streams (Meek and Hildebrand, 1925, p. 351).

MATERIAL: Right opercle (incomplete; pl. 32, *b*), from a fish more than 60 cm. in total length.

<sup>5</sup> Bailey and Moore (1963, p. 307) have applied to the International Commission on Zoological Nomenclature to emend the spelling of this family-group name to Gerreidae to eliminate the homonymy with the insect family-group name Gerridae. Article 80 of the International Code of Zoological Nomenclature requires the retention of existing usage pending a ruling by the Commission.

<sup>6</sup> I follow Schultz (1949, pp. 138, 146) in recognizing the genus *Eugerres* Jordan and Evermann, 1927.

<sup>7</sup> Pending an adequate study of possible subspeciation, I follow Berry (1959, p. 504) in regarding this fish as representing a single circumtropical species.

## Snappers—Lutjanidae

*Lutjanus novemfasciatus* Gill  
(Snapper)

This good food fish (Kumada and Hiyama, 1937, p. 43, as *Neomaenis novemfasciatus*) has been said to attain a total length of about 120 cm. and a weight of about 35 kg. (Walford, 1937, p. 87, col. pl. 57, fig. *a*). A 47.5-cm. specimen was taken in strictly fresh water (Hildebrand, 1925, p. 286).

MATERIAL: Right premaxillary (incomplete; pl. 32, *c*), from a fish about 32 cm. in total length.

Several other species of *Lutjanus* occur in the region of Ocos; at least two of these, *L. colorado* Jordan and Gilbert and *L. argentiventris* (Peters), are also known to enter tidal streams (Meek and Hildebrand, 1925, pp. 498, 501, 514). *L. novemfasciatus* has somewhat stronger canine teeth in the premaxillaries than either of the others. The second canine in the Salinas La Blanca specimen had been lost, and was in process of replacement, but its size, indicated by that of its alveolus, was relatively greater than that of the second canine in the other species.

*Lutjanus colorado* Jordan and Gilbert  
(Snapper)

This good food fish (Kumada and Hiyama, 1937, p. 42, as *Neomaenis colorado*) has been said to attain a length of about 91 cm. (Walford, 1937, col. pl. 57, fig. 6). On the alluvial plain of the Pacific coast of Guatemala, this snapper is abundant in the brackish water of the estuaries (Coe and Flannery, 1964, pp. 652–653).

MATERIAL: Partial cranium (including the supra-occipital, epiotics, and exoccipitals), from a fish about 34 cm. in total length. Right quadrates (1 complete, 1 incomplete), from fish about 50 cm. in total length. First anal spine and second anal spine articulated with the first interhaemal (all complete; pl. 32, *d*), from a fish about 31 cm. in total length.

## Grunts—Haemulidae

*Pomadasys macracanthus* (Günther)  
(Grunt)

This species (see Günther, 1868, pl. 64, fig. 1, as *Pristipoma macracanthum*), which is of value as a food fish (Evermann and Jenkins, 1891, p. 151), has been said to attain a total length of about 38 cm. (Jordan and Evermann, 1898 a, p. 1332). It is known to enter rivers (Regan, 1906–1908, p. 43).

MATERIAL: Right angular (complete) attached to the right articular (incomplete), pl. 32, *e*; right pre-

maxillary (incomplete); right preopercle (incomplete); right opercle (incomplete); right cleithrum (incomplete); second anal spine (complete); first interhaemal (complete)—from fish about 27 to 35 cm. in total length. First to seventh precaudal vertebrae (incomplete), the first six held in their normal articulation by encrusting carbonates; from a fish about 40 cm. in total length. Second anal spine (complete), from a fish about 31 cm. in total length.

#### Sleepers—Eleotridae

##### *Eleotris picta* Kner and Steindachner (Spotted sleeper)

This fish (see Kner and Steindachner, 1865, pl. 3, fig. 1), which is known to attain a total length of 49.5 cm., is said to be not valued as food, possibly because its heavy coating of mucus makes it repulsive (Hildebrand, 1938, pp. 345–347)—an esthetic consideration that may well have been overlooked by the aborigines. It inhabits coastwise waters, chiefly in the lower parts of rivers (Hubbs, 1953, p. 69).

**MATERIAL:** Left articular (incomplete; pl. 32, *f*) and precaudal vertebrae (three, incomplete), from a fish about 32 cm. in total length.

#### Conclusions

The 12 species represented in this collection could all have been caught in the immediate vicinity of the site.

Nets (possibly manipulated from some kind of watercraft) would have provided an efficient means of catching every species represented. This conclusion is corroborated by the following statement of Holloway (1950, p. 116): "Near Ocos, an overnight set with 450 feet (137 meters) of gill-nets in brackish waters affected by tidal action resulted in a catch of approximately 80 kilograms of fish . . . of nine genera . . . including *Centropomus* and *Lutjanus*."

Fishing with hook and line would have been effective for catching every species except the gar and the needlefish—which are difficult to hook because of their elongate bony jaws. This type of fishing could have been conducted at favorable spots on the banks of the river, or—perhaps more advantageously—from watercraft.

#### Fish Remains, by Level

- Cut 1, Level 7  
Grunt, *Pomadasys macracanthus*: opercle.
- Cut 2, Level 7  
Gar, *Lepisosteus tropicus*: scales (31).
- Cut 2, Level 14  
Gar, *Lepisosteus tropicus*: scales (65).  
Snook, *Centropomus nigrescens*: preopercle.
- Cut 2, Level 15  
Grunt, *Pomadasys macracanthus*: articular and angular (pl. 32, *e*); premaxillary; preopercle; cleithrum; interhaemal; anal spine.  
Spotted sleeper, *Eleotris picta*: articular (pl. 32, *f*); precaudal vertebrae (3).
- Cut 2, Level 16  
California needlefish, *Strongylura exilis*: pair of dentaries.  
Snapper, *Lutjanus colorado*: quadrates (2).  
Grunt, *Pomadasys macracanthus*: 1st to 7th precaudal vertebrae (first 6 articulated).
- Cut 2, Level 17  
Gar, *Lepisosteus tropicus*: scales (61), (pl. 31, *a*).  
California needlefish, *Strongylura exilis*: pair of premaxillaries (pl. 31, *d*).  
Snook, *Centropomus nigrescens*: quadrate (pl. 31, *e*).  
Yellowfin mojarra, *Gerres cinereus*: palatine (pl. 31, *f*).  
Snapper, *Lutjanus colorado*: 1st and 2d anal spines articulated with the 1st interhaemal (pl. 32, *d*).
- Cut 1, Level 19  
Sea catfish, *Sciades troschelii*: cleithrum attached to the coracoid; preopercle attached to the hyomandibular and quadrate.
- Cut 1, Level 20  
Snapper, *Lutjanus novemfasciatus*: premaxillary (pl. 32, *c*).
- Cut 2, Level 23  
Gar, *Lepisosteus tropicus*: scales (11).  
Crevalle jack, *Caranx hippos*: opercle (pl. 32, *b*).  
Grunt, *Pomadasys macracanthus*: anal spine.
- Cut 2, Level 24  
Snapper, *Lutjanus colorado*: cranium.
- Cut 1, Level 25  
Machete, *Elops affinis*: precaudal vertebral centra (4) (two articulated; pl. 31, *b*).  
Snook, *Centropomus nigrescens*: frontal.
- Cut 1, Level 26  
Snook, *Centropomus nigrescens*: cranium; vertebra.  
Mojarra, *Eugerres lineatus*: 2d anal spine articulated with the first interhaemal (pl. 32, *a*).
- Cut 2, Level 26  
Sea catfish, *Sciades troschelii*: cleithrum.
- Cut 1, Level 28  
Gar, *Lepisosteus tropicus*: scale.
- Cut 1, Level 29  
Sea catfish, *Sciades troschelii*: cranium (pl. 31, *c*).

## LITERATURE CITED

- AMERICAN FISHERIES SOCIETY COMMITTEE ON NAMES OF FISHES  
 1960. A list of common and scientific names of fishes from the United States and Canada. Amer. Fish. Soc., Special Publ. no. 2. 2d ed. 102 pp. Ann Arbor.
- BAILEY, REEVE M., and MOORE, THOMAS E.  
 1963. Request that the International Commission rule to correct homonymy in names of the family-group based on *Gerris* and *Gerres*. Bull. Zool. Nomencl., vol. 20, pt. 4, pp. 307-308.
- BERDEGUÉ A., JULIO  
 1956. Peces de importancia comercial en la costa nor-occidental de México. 345 pp., 206 figs., 2 maps. Mexico.
- BERRY, FREDERICK H.  
 1959. Young jack crevalles (*Caranx* species) off the southeastern Atlantic coast of the United States. U.S. Fish and Wildlife Service, Fishery Bulletin, vol. 59, no. 152, pp. i-iv, 417-535, figs. 1-98.
- CANNON, RAY  
 1964. How to fish the Pacific Coast. A manual for salt water fishermen. 2d ed. xi+337 pp., 203 figs. Menlo Park, Calif.
- COE, MICHAEL D., and FLANNERY, KENT V.  
 1964. Microenvironments and Mesoamerican prehistory. Science, vol. 143, no. 3607, pp. 650-654, figs. 1-3.
- COLLETTE, BRUCE B., and BERRY, FREDERICK H.  
 1965. Recent studies on the needlefishes (Belonidae): an evaluation. Copeia, 1965, no. 3, pp. 386-392.
- EVERMANN, BARTON W., and JENKINS, OLIVER P.  
 1891. Report upon a collection of fishes made at Guaymas, Sonora, Mexico, with descriptions of new species. Proc. U.S. Nat. Mus., vol. 14, pp. 121-165, pls. 1-2.
- GÜNTHER, ALBERT  
 1868. An account of the fishes of the States of Central America, based on collections made by Capt. J. M. Dow, F. Godman, Esq., and O. Salvin, Esq. Trans. Zool. Soc. London, vol. 6, pt. 7, pp. 377-494, pls. 63-87.
- HERALD, EARL S.  
 1962. Living fishes of the world. Revised ed. 304 pp., 87 pls. Garden City, N.Y.
- HILDEBRAND, SAMUEL F.  
 1925. Fishes of the Republic of El Salvador, Central America. U.S. Bur. Fish. Bull., vol. 41, pp. 237-287, figs. 1-20.  
 1938. A new catalogue of the fresh-water fishes of Panama. Field Mus. Nat. Hist., Zool. Ser., vol. 22, no. 4, pp. 215-359, figs. 2-13.  
 1946. A descriptive catalog of the shore fishes of Peru. U.S. Nat. Mus. Bull., vol. 189, pp. i-xi, 1-530, figs. 1-95.
- HOLLOWAY, ANCIL D.  
 1950. Recommendations for the development of the fishery resources of Guatemala. In A Fish and Wildlife Survey of Guatemala. U.S. Dept. Int., Fish and Wildlife Service, Spl. Sci. Rept.: Wildlife no. 5 (iii+162 pp.), pp. 99-140.
- HUBBS, CARL L.  
 1953. *Eleotris picta* added to the fish fauna of California. California Fish and Game, vol. 39, no. 1, pp. 69-76, figs. 1-2.
- HUMBOLDT, F. H. A. VON, and BONPLAND, A. J. A.  
 1812. Voyage aux régions équinoxiales du nouveau continent, fait en 1799-1804 . . . vol. 1, pt. 2, "1811," pls. 1-57. [1812 date from Sherborn, 1899.]
- JORDAN, DAVID STARR, and EVERMANN, BARTON WARREN  
 1896. The fishes of North and Middle America: a descriptive catalogue of the species of fish-like vertebrates found in the waters of North America, north of the isthmus of Panama. U.S. Nat. Mus. Bull., vol. 47, pt. 1, pp. i-LX, 1-1240.  
 1898 a. The fishes of North and Middle America . . . U.S. Nat. Mus. Bull., vol. 47, pt. 2, pp. i-xxx, 1241-2183.  
 1898 b. The fishes of North and Middle America . . . U.S. Nat. Mus. Bull., vol. 47, pt. 3, pp. i-xxiv, 2183a-3136.

- KNER, RUDOLF, and STEINDACHNER, FRANZ  
1865. Neue Gattungen und Arten von Fischen aus Central-Amerika; gesammelt von Prof. Moritz Wagner. Abh. Akad. Wissensch. München, Bd. 10, Abt. 1, pp. 1-61, pls. 1-6.
- KUMADA, TOSIO, and HIYAMA, YOSIO  
1937. Marine fishes of the Pacific coast of Mexico. 75 pp., 102 pls. Odawara, Japan.
- LINDNER, MILTON J.  
1947. The commercial marine fishes, crustaceans and molluscs of the west coast of Mexico. Trans. Amer. Fish. Soc., vol. 74, for the year 1944, pp. 71-80.
- MEEK, SETH E., and HILDEBRAND, SAMUEL F.  
1923. The marine fishes of Panama. Field Mus. Nat. Hist., Publ. no. 215, Zool. Ser., vol. 15, pt. 1, pp. 1-xi, 1-330, pls. 1-24.  
1925. The marine fishes of Panama. Field Mus. Nat. Hist., Publ. no. 226, Zool. Ser., vol. 15, pt. 2, pp. 1-xix, 331-707, pls. 25-71.
- MILLER, ROBERT RUSH  
1954. The southern limit of the garfishes, family Lepisosteidae. Copeia, 1954, no. 3, pp. 230-231.
- REGAN, C. TATE  
1906-1908. Pisces. In F. D. Godman and O. Salvin, "Biologia Centrali-Americana." xxxii+203 pp., 26 pls., 2 maps. London.
- SCHULTZ, LEONARD P.  
1949. A further contribution to the ichthyology of Venezuela. Proc. U.S. Nat. Mus., vol. 99, no. 3235, pp. 1-211, figs. 1-20, pls. 1-3.
- SHERBORN, C. DAVIES  
1899. A note on the date of the parts of 'Humboldt and Bonpland's voyage: observations de zoologie.' Ann. Mag. Nat. Hist., ser. 7, vol. 3, p. 428.
- SUTTKUS, ROYAL D.  
1963. Order Lepisostei. In "Fishes of the Western North Atlantic," Part 3 (xxi+630 pp.), pp. 61-88, figs. 11-18.
- WALFORD, LIONEL A.  
1931. Handbook of common commercial and game fishes of California. Div. Fish and Game California, Fish Bull. no. 28, pp. 1-181, frontis., figs. 1-137.  
1937. Marine game fishes of the Pacific Coast from Alaska to the Equator. 205 pp., 69 pls. Berkeley.
- WHITEHEAD, P. J. P.  
1962. The species of *Elops* (Pisces: Elopidae). Ann. Mag. Nat. Hist., ser. 13, vol. 5, no. 54, pp. 321-329, figs. 1-3.



# Appendix 5

## PETROGRAPHY OF POTTERY THIN SECTIONS FROM SALINAS LA BLANCA

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Thin sections were prepared from the following sherds of the Salinas La Blanca site.

1. Guamuchal Brushed (Cut 2, Level 15)
2. Guamuchal Brushed (Cut 2, Level 29)
3. Tilapa Red-on-white (Cut 2, Level 21)
4. Morena Black (Cut 2, Level 15)
5. Pampas Black-and-white (Cut 1, Level 7; has oxidized rim)
6. Conchas White-to-Buff (Cut 1, Level 3)
7. Ocós Gray (Cut 2, Level 5)
8. Suchiate Brushed (Cut 2, Level 1)
9. Conchas Streaky Brown-black (Cut 2, Level 2)
10. Conchas Orange (Cut 2, Level 1; with Usulután decoration)

A textural feature common to all 10 slides is crystal and rock fragments embedded in a submicroscopic matrix. The amount of matrix to fragments is usually dominant by two to one. Grain size of the fragments ranges from 1/16 mm. to 2 mm., with an average of 1/4 mm. One slide (No. 7) has a smaller average size, only 1/16 mm. The majority of the crystal fragments have at least one crystallographic boundary with the remainder of the outline being angular. They do not appear to be corroded with deep embayments. The interstitial filling or matrix is composed of glass particles (shards) and submicroscopic rusty yellow-brown crystalline material. The shards exhibit cusplike shapes that are quite *undeformed*. One slide (No. 10) is especially rich in these forms. All slides have an oxidized rind on both surfaces of the pottery. Its thickness is variable, being about 1 mm., for slides Nos. 1, 3, 7, 8, 9, and 10, and about 1 to 2 cm. for Nos. 2, 4, 5, and 6.

The precise mineralogic identity of the rusty yellow-brown material could not be resolved with 500-power magnification. It does have crystalline properties, first order birefringence, indices of refraction less than 1.556 and wavy extinction. There is a faint suggestion of platy morphology which is generally parallel to the pottery surface.

At least nine minerals are present as identifiable fragments. Conspicuous pseudomorphs of "idding-site" alteration products of fayalite (iron-rich olivine) are present in small amounts in all slides. Some are idiomorphic and have remnant fayalite cores. Plagioclase feldspar, which predominates, has an andesine composition between An<sub>43</sub> and An<sub>35</sub>. Most of these crystals are oscillatory zoned with calcic (An<sub>43</sub> cores and An<sub>30</sub> rims). Their composition was determined by measuring the extinction angle in section perpendicular to (010) and (001). This was difficult to do because (001) cleavage was seldom developed. Quartz fragments are slightly strained as illustrated by weak undulatory extinction; however, 2V was zero. Idiomorphic green hornblende has the pleochroic scheme X=yellow brown, Y=green brown, Z=green. Minor amounts of brown biotite, sanidine, magnetite, hyperthene, and hematite are present in idiomorphic crystals. Rock fragments which are not angular but rounded are plagioclase and hyperthene intergrowths, rounded quartz aggregates, and pumice fragments.

The presence of glass particles with their delicate cusplike form indicates tuffaceous material which has not been reworked because the plagioclase and sanidine are exceedingly fresh and the shards have been neither destroyed nor damaged. The presence of volcanic rock fragments indicates a combined origin for the tuffaceous sediment. Probably these tuffs

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fell into a standing body of water which was receiving sediment by stream erosion from surrounding volcanic uplands. The rapid deposition of tuff imposed on this stream deposition essentially masked the reworked detritus. Subsequent weathering and exposure to the atmosphere was slight enough only to alter the fayalite and the interstitial volcanic dust.

From the petrography of these 10 slides, it is

evident that the pottery workers had already found a suitable tuff bed, yielding material which when fired produced an indurated pottery. The firing process apparently did not significantly alter the mineralogy of the crystal and rock fragments. Glass particles of the matrix were also unmodified; however, the remainder of the matrix was transformed into an unknown "ceramic" material.

# Plates 2–30





PLATE 2

The collection of modern animal specimens from the Ocos area. *a*, Kinkajou (*Potus flavus*). *b*, Skinning a raccoon (*Procyon lotor*).



a



b

PLATE 3

The present-day inhabitants of Salinas La Blanca. a, Don Vicente Cuadros repairing a hand net for fishing. b, The house of the Cuadros family, probably not very different from those which anciently occupied the site.

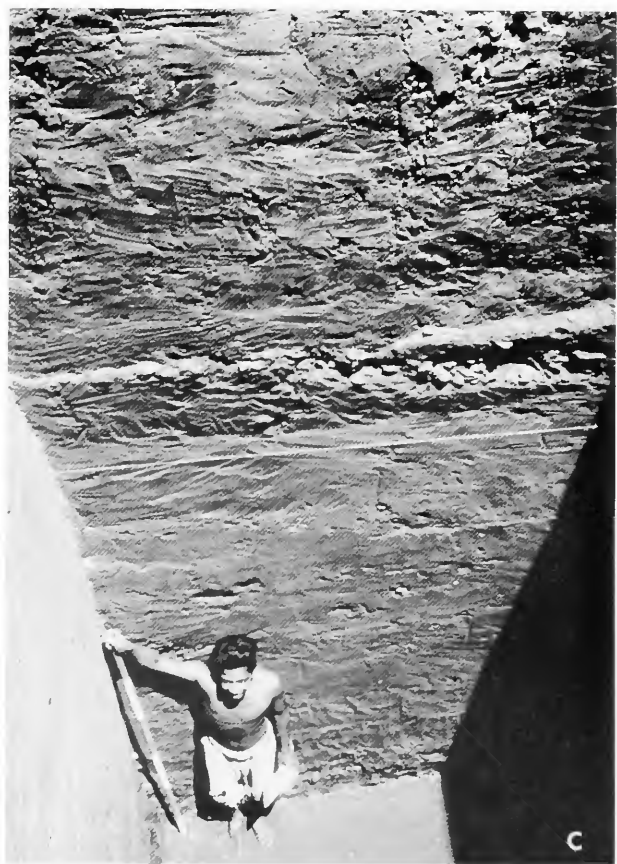


PLATE 4

Excavations at Salinas La Blanca. *a*, View north of Cuts 1 and 2. *b*, Use of a bucket was necessary in deep levels of Cut 1. *c*, Workman standing in seeping water in the deepest level reached in Cut 2; above the string can be seen a thick layer of sherds and shells.



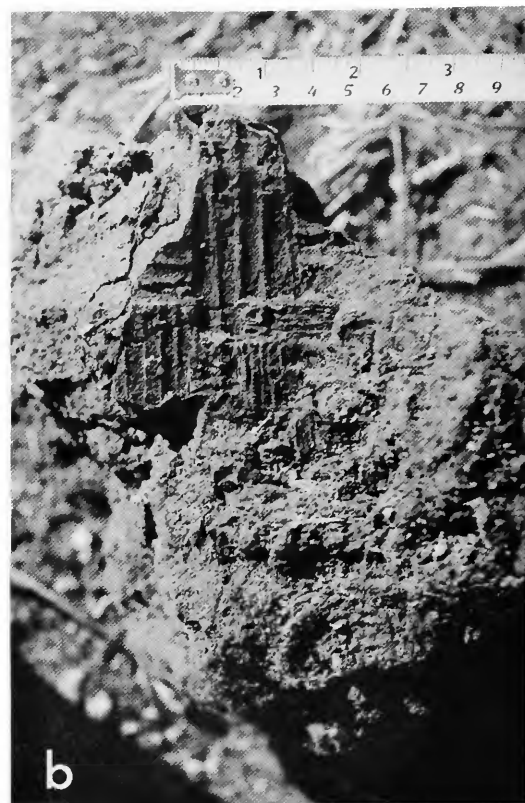


PLATE 5

Impressions found in clay during excavations at Salinas La Blanca. *a*, Stalk of a monocotyledon and leaves from a dicotyledon and a monocotyledon. *b*, Fragment of matting. *c* and *d*, Negative impressions left by corn cobs.



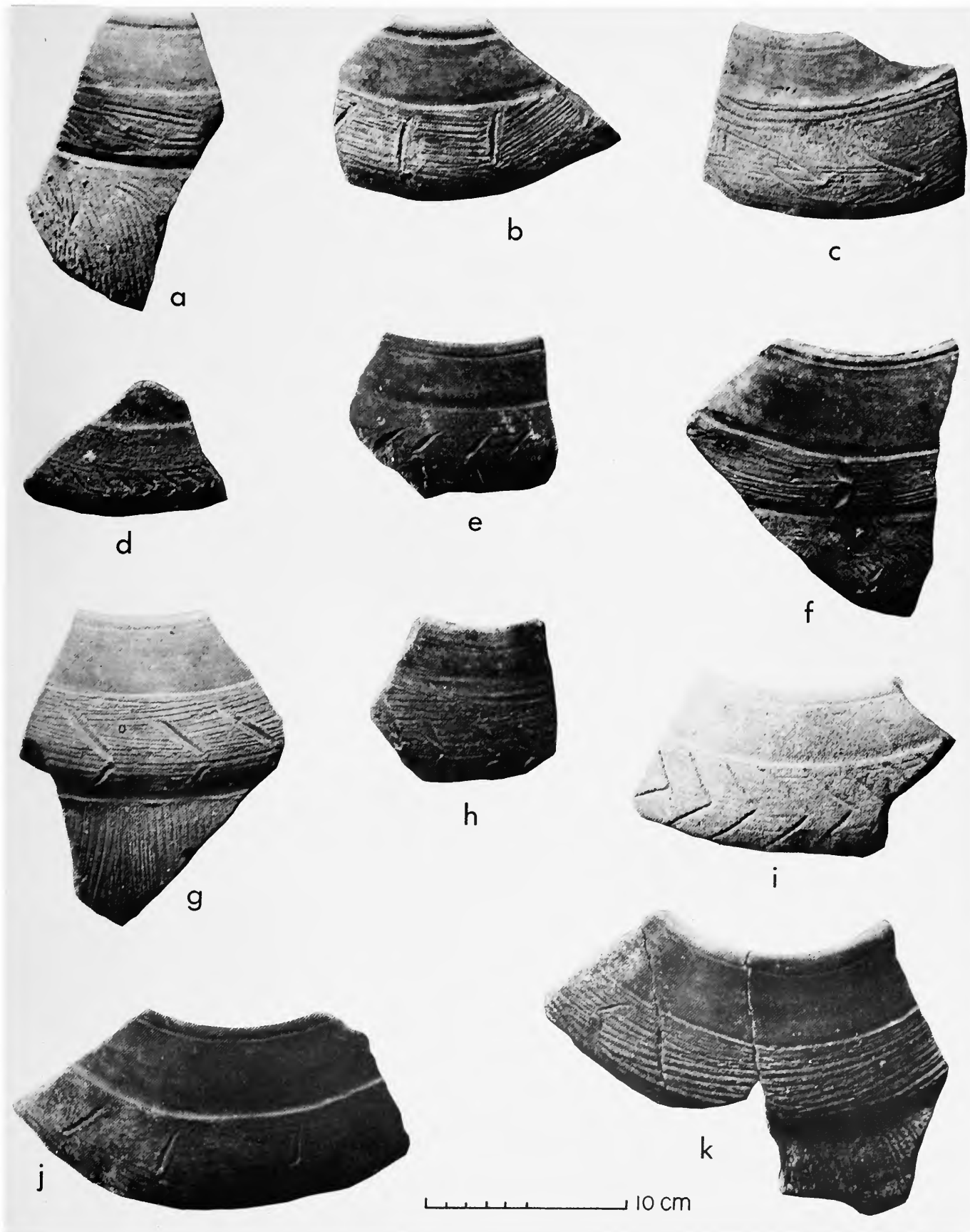


PLATE 6

Guamuchal Brushed sherds, Cuadros Phase. Spaced herringbone gouges are placed on the convex zone.



PLATE 7

Guamuchal Brushed sherds, Cuadros Phase. The convex zone is decorated with spaced stepped jabs.

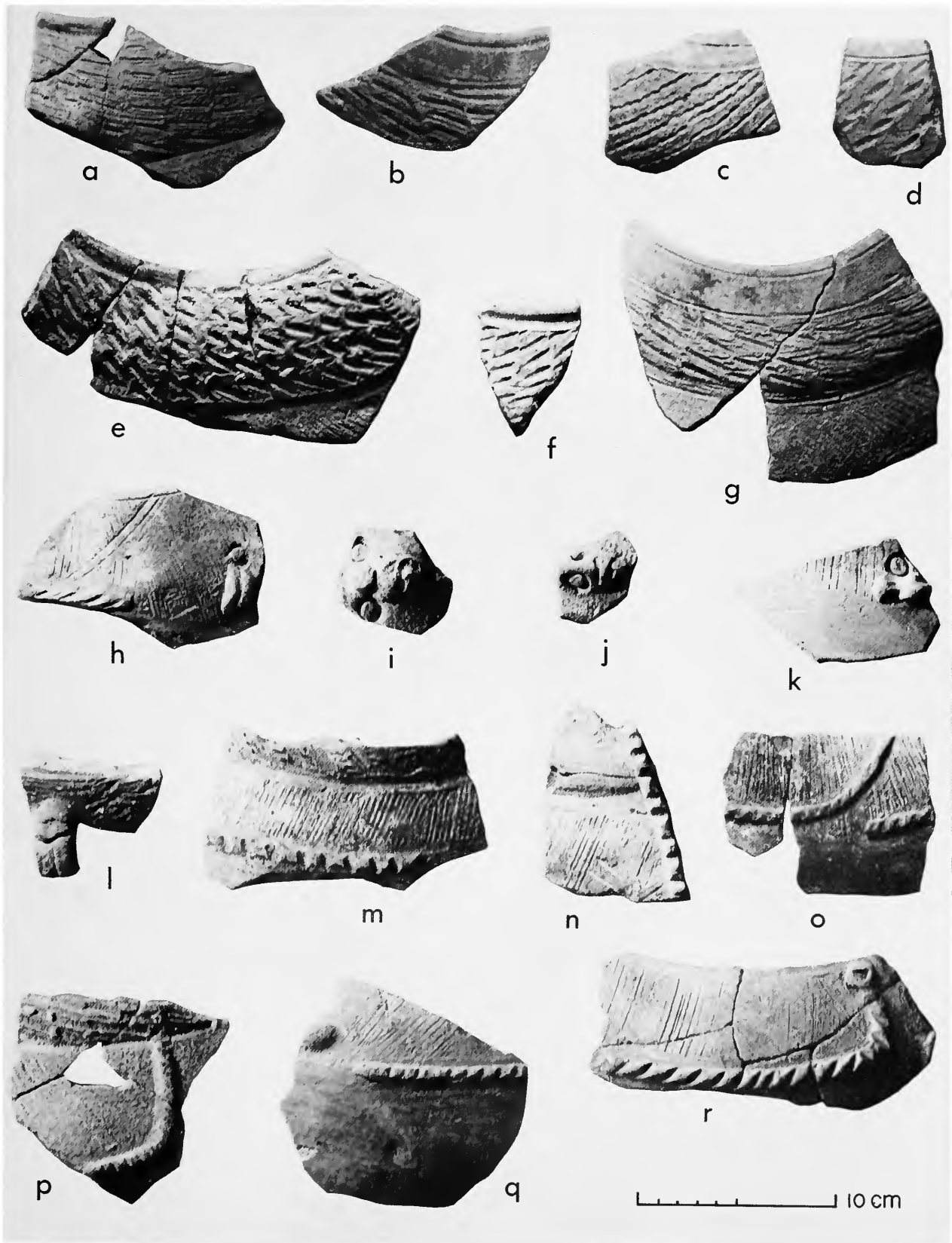


PLATE 8

Guamuchal Brushed sherds, Cuadros Phase. *a-g*, Close stepped jabs on the convex zone. *h-k*, Cane-punched applique faces. *l*, Small decorative handle on a rocker-stamped sherd. *m-r*, Indented filleting.

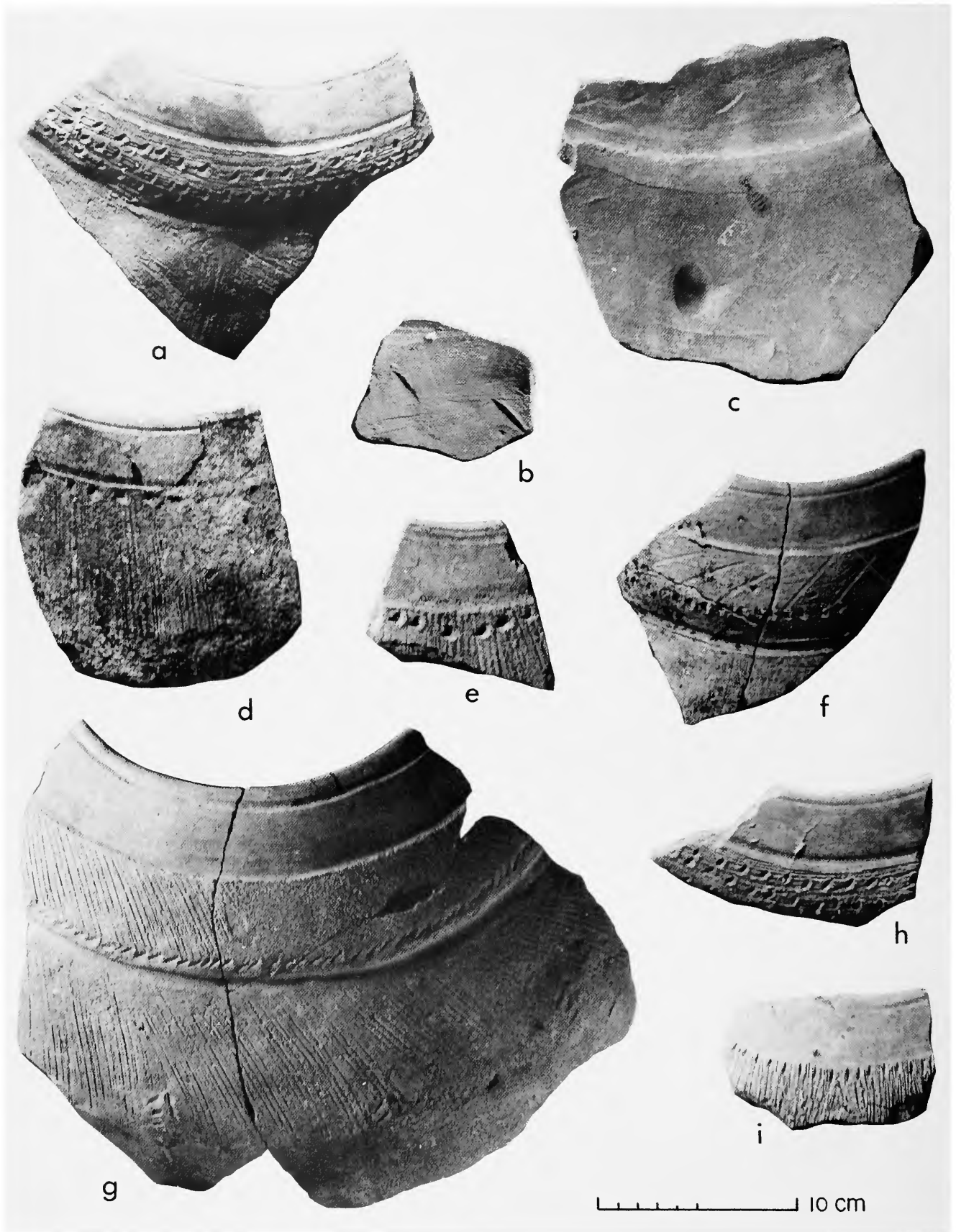


PLATE 9

Guamuchal Brushed sherds, Cuadros Phase. *a, h*, Multiple horizontal punctation. *b*, Marks of scraping tool on the interior of a body sherd. *c*, Interior view of finger punch. *d, g, i*, Single-row punctation.

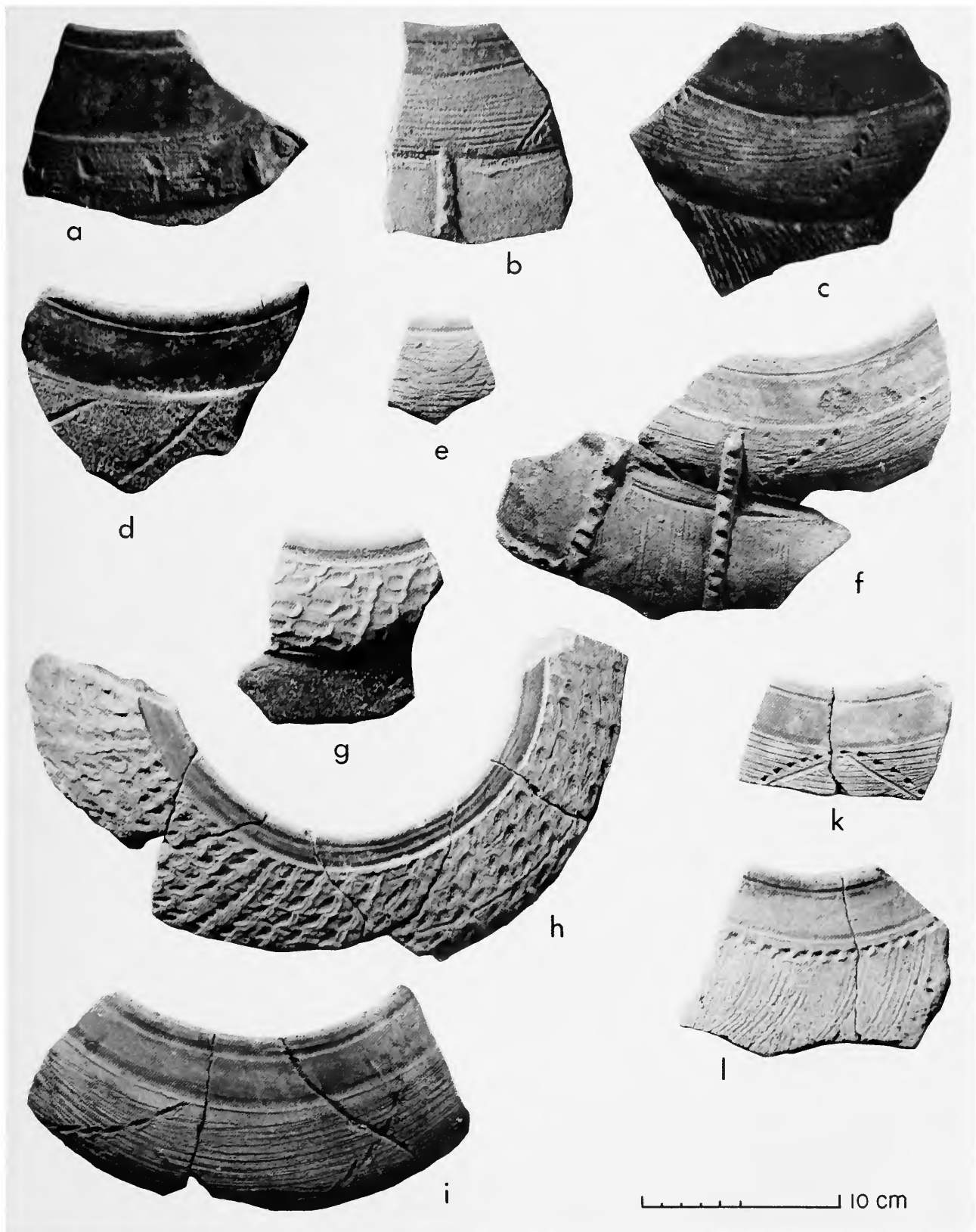


PLATE 10

Méndez Red-rimmed sherds, Cuadros and Jocotal Phases. *a*, Spaced herringbone gouges. *b-d, f, i, k*, Spaced stepped jabs, combined with diagonal incising in *b, k*. *e*, Plain rocker stamping. *g, h*, Close stepped jabs. *l*, Horizontal punctation, single row. *b* is Jocotal, the rest are Cuadros.



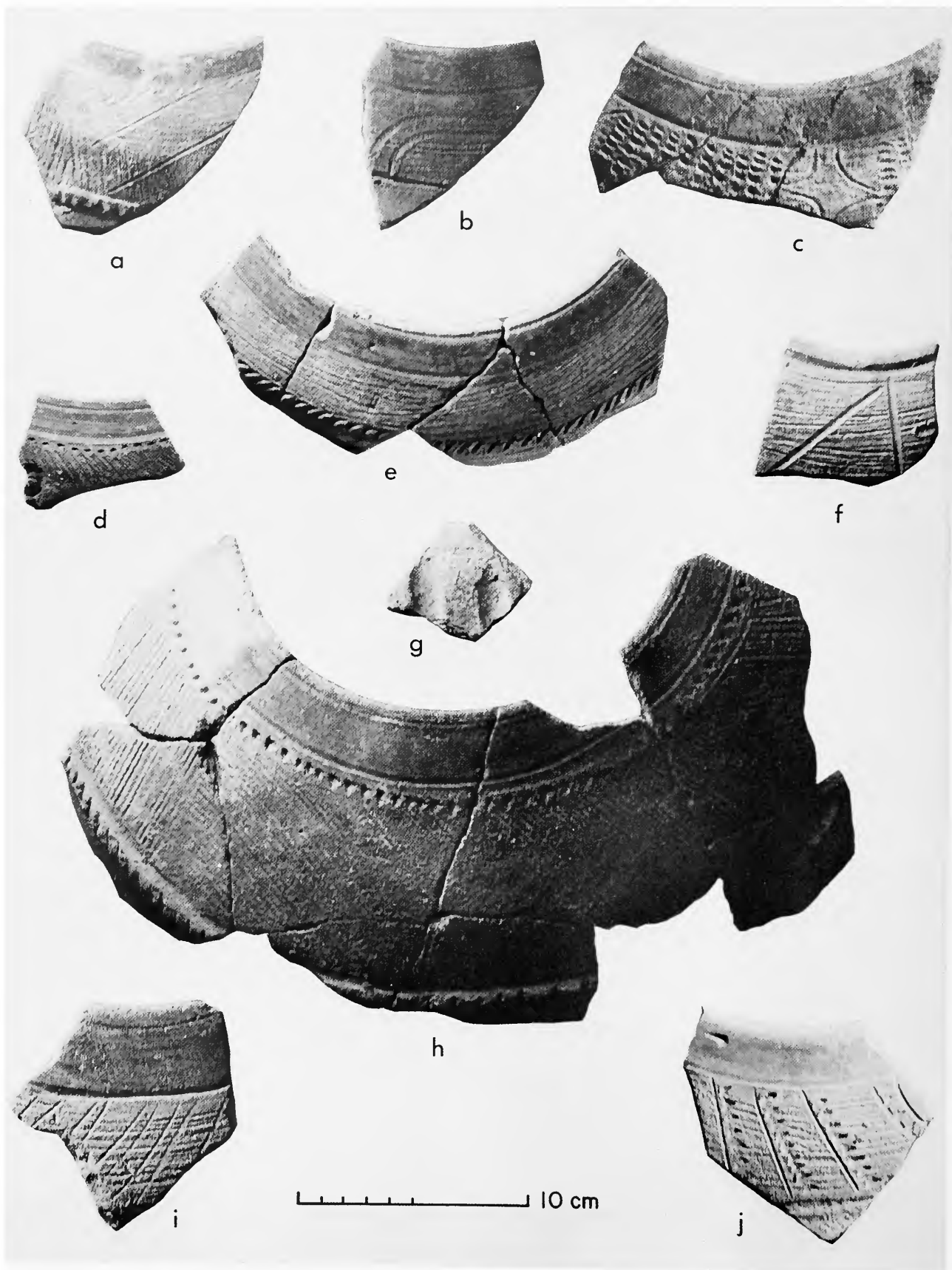


PLATE 11

Méndez Red-rimmed sherds, Cuadros and Jocotal Phases. *a, f, i, j*, Diagonal incising. *b*, Curvilinear incising in sigmoid curves. *c*, Multiple punctation confined in zones. *d, e, h*, Single-row horizontal punctation. *g*, Exterior finger-punching. *a, b, g, i, j* are Jocotal, the rest Cuadros.

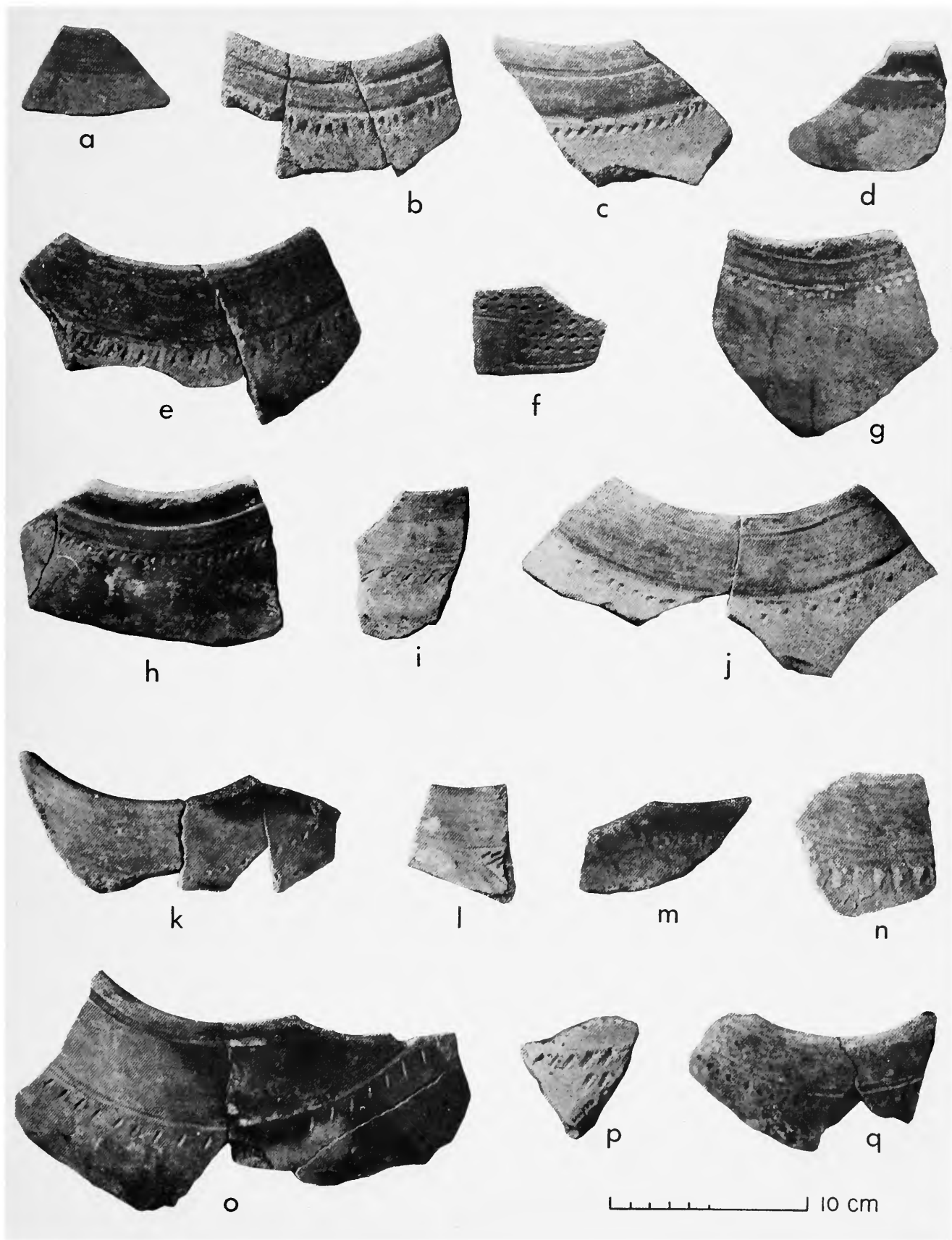


PLATE 12

Mapache Red-rimmed and Teófilo Punctate sherds, Cuadros Phase, *a-j*, Mapache Red-rimmed; *k-q*, Teófilo Punctate. Linear pattern burnishing is present on *g*, *m*, and *o*.

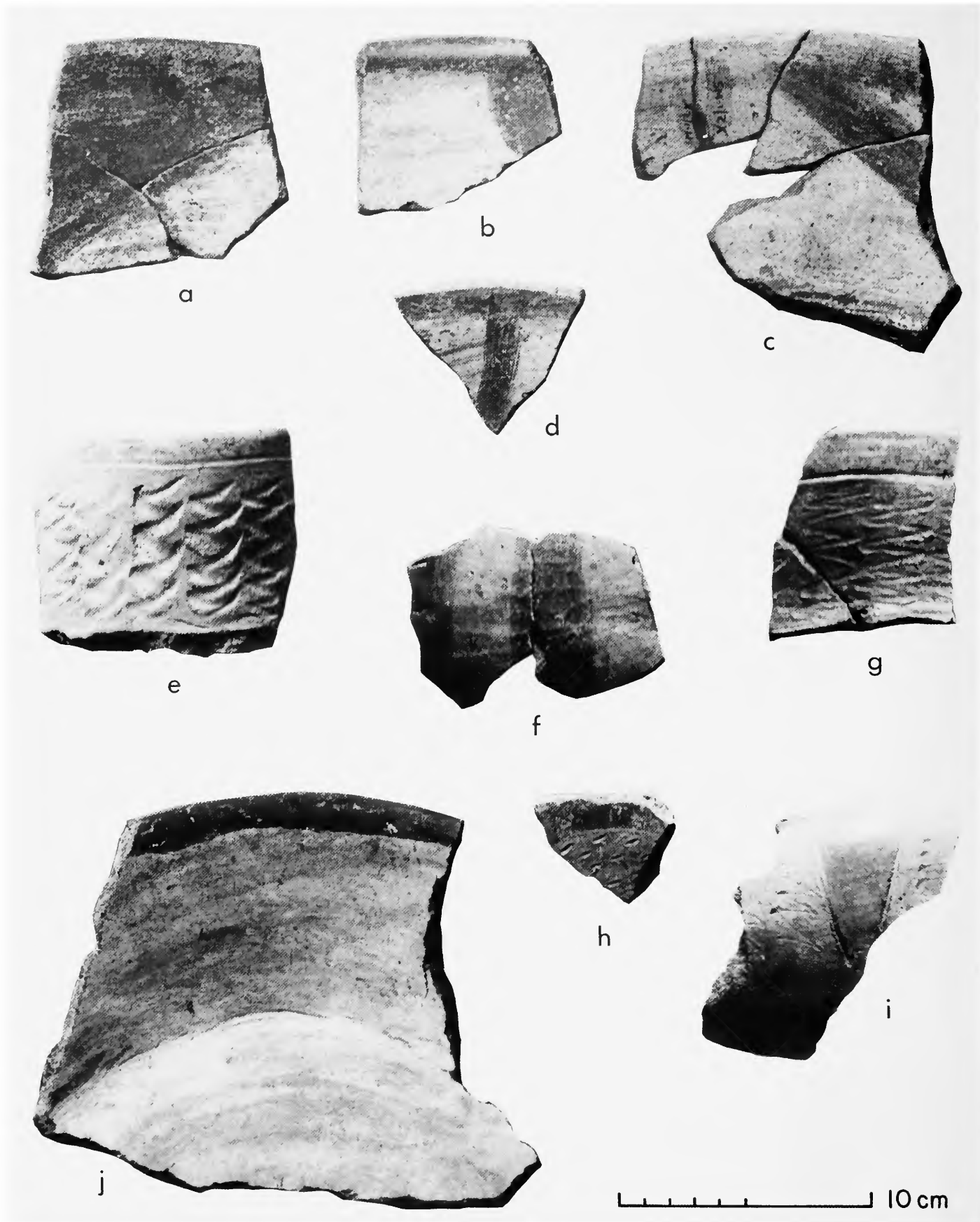


PLATE 13

Tilapa Red-on-white sherds, Cuadros Phase. *e, g, i*, Jar necks and a jar body with plain rocker stamping.





PLATE 14

Interior and exterior of a Pampas Black-and-white bowl, Cuadros Phase. The typical slip can be seen on the rim exterior, where it has fired white.

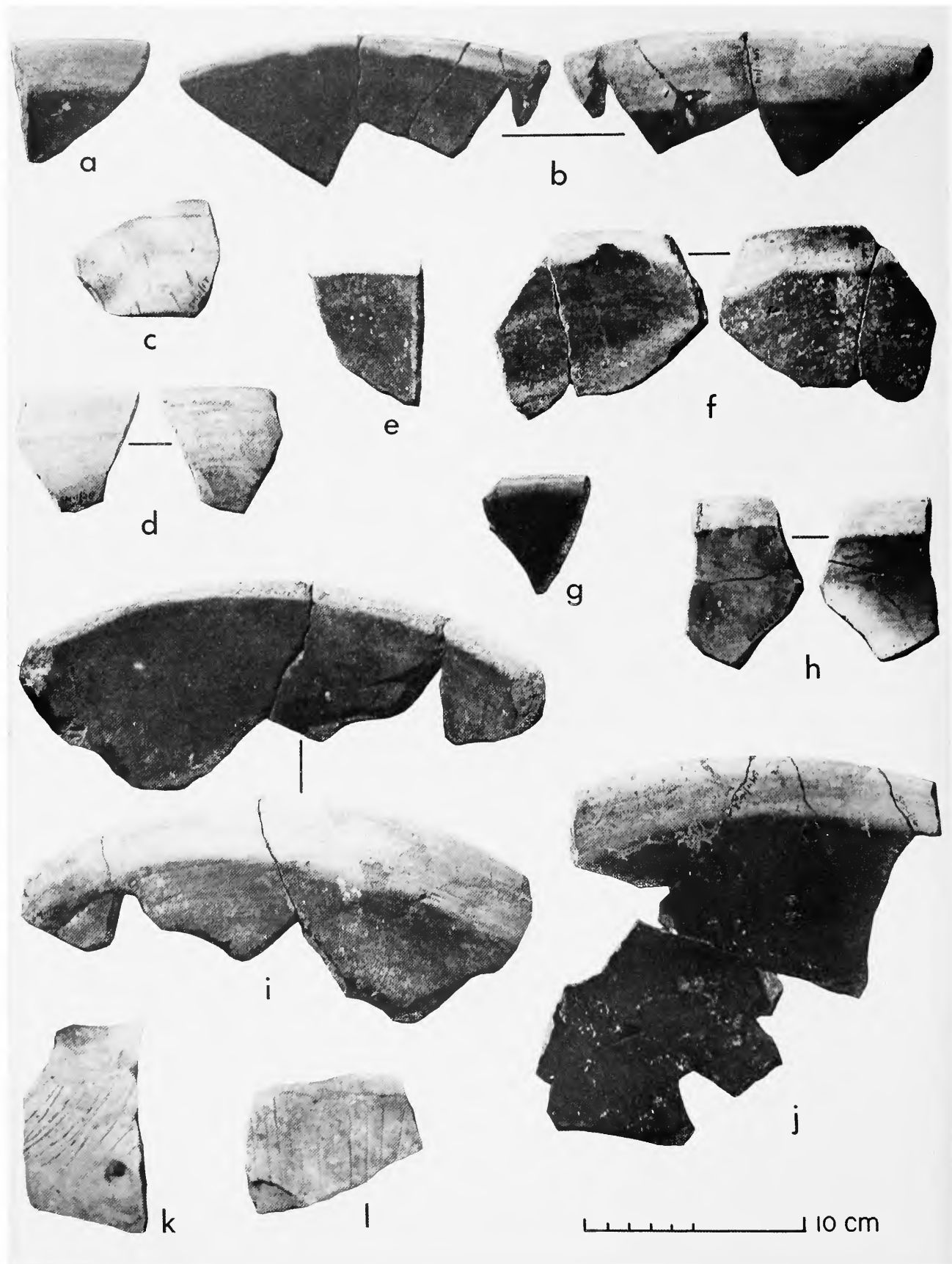


PLATE 15

Pampas Black-and-white sherds, and unusual striated sherds, Cuadros Phase. *k* and *l* are striated, and the rest are Pampas Black-and-white. Interiors are to the left or above exteriors. On *d* may be seen the second slip along the rim interior which was to be oxidized white; in this case, the subsequent smudging was not carried out. *h*, Shows linear pattern burnishing on the exterior. *k*, Exterior finger-punching.

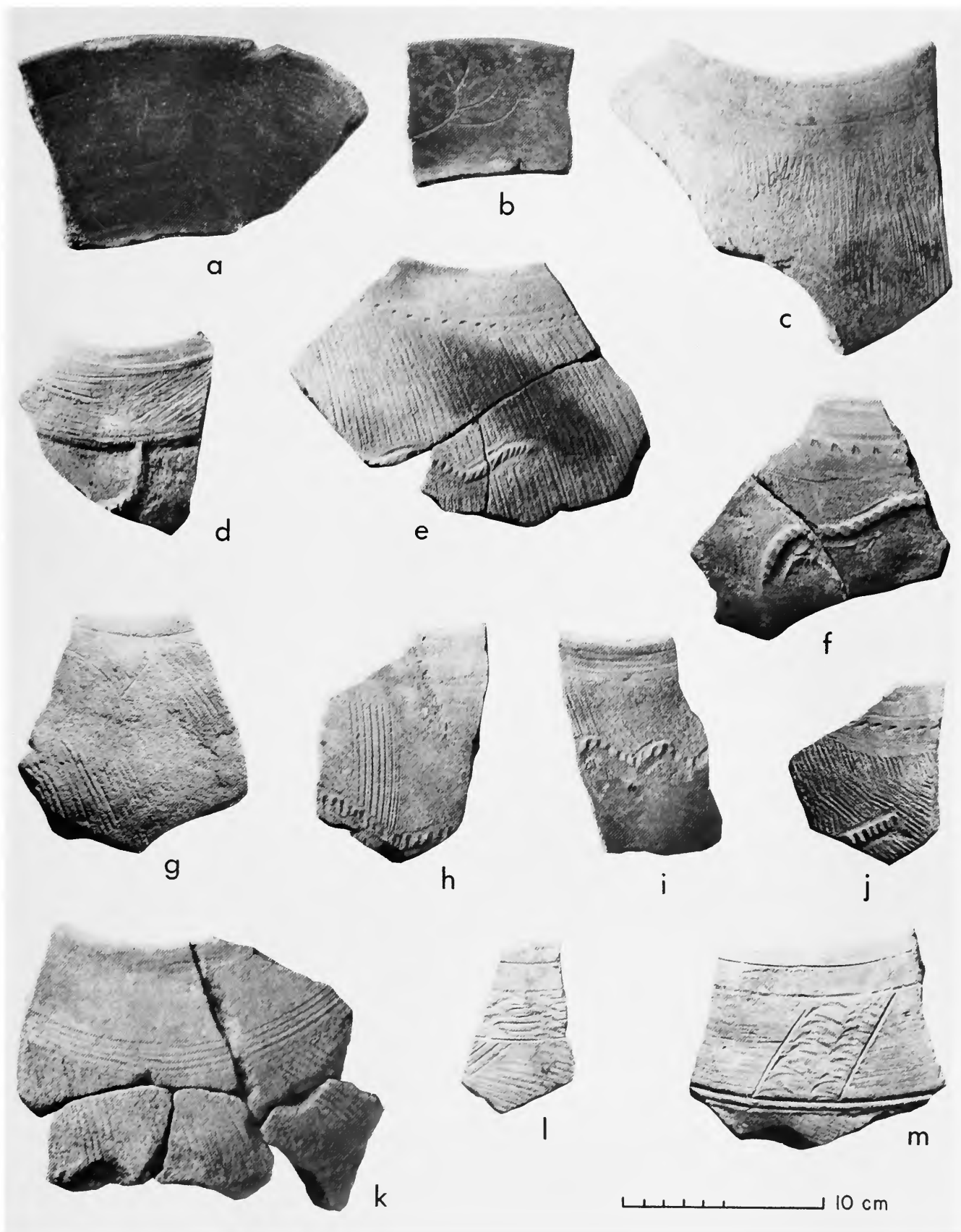


PLATE 16

Morena Black and Suchiate Brushed sherds, Jocotal Phase. *a, b*, Morena Black; *c-m*, Suchiate Brushed. *a* and *b*, Flat-bottomed bowls with outslanting sides; interior of *b* is incised with a branching motif. All Suchiate Brushed sherds are rims from *tecomates*. *e, f, h-j*, Sherds with low-relief indented filleting. *l, m*, Plain rocker-stamping.

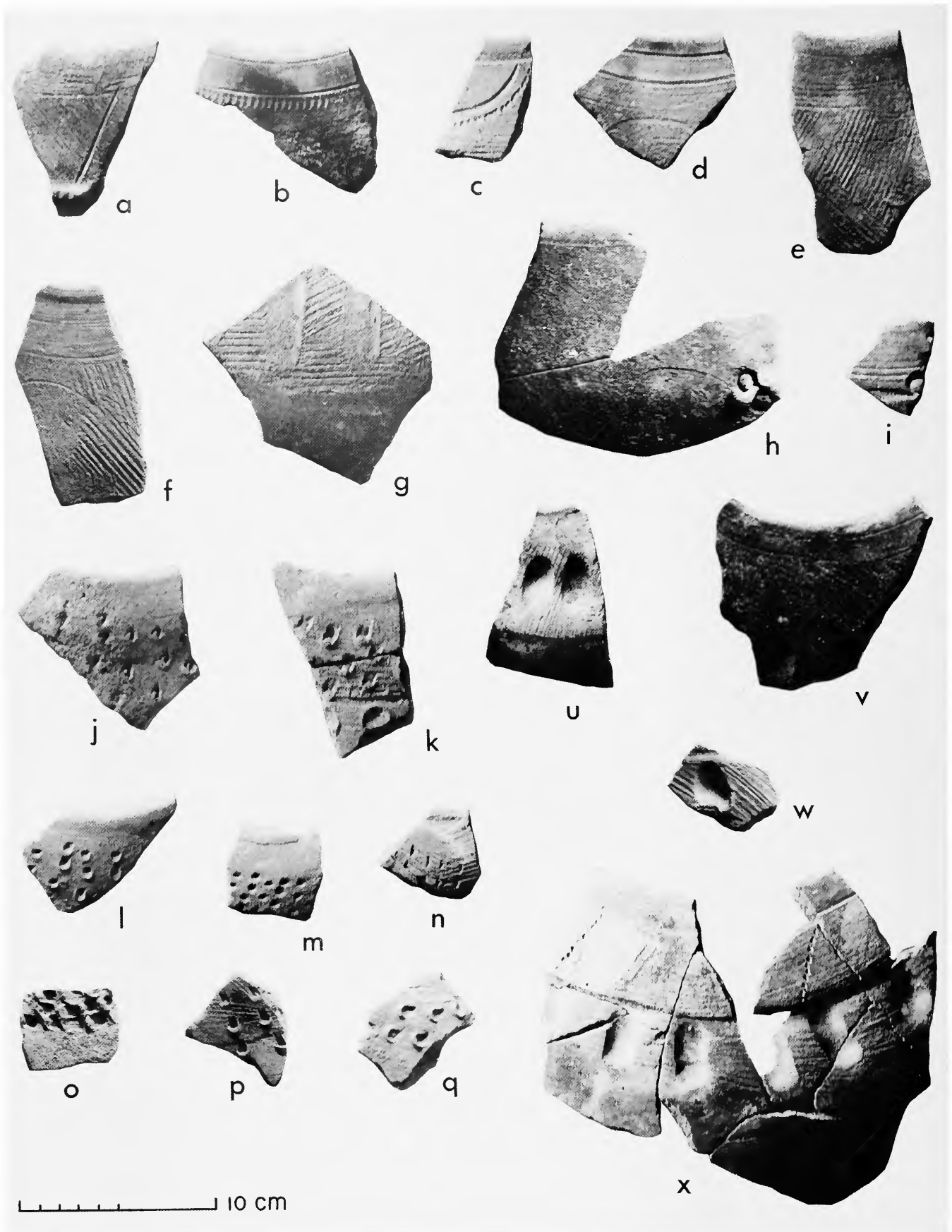


PLATE 17

Suchiate Brushed *tecomate* sherds, Jocotal Phase. *a, c, d, f, h*, Grooved decoration. Exterior finger-punching on *g, u-x*. *h, i*, Cane-punched applique. *j-q*, Stick punctation. *x*, Spaced stepped jabs on a vessel which is intermediate between Guamuchal Brushed and Suchiate Brushed.

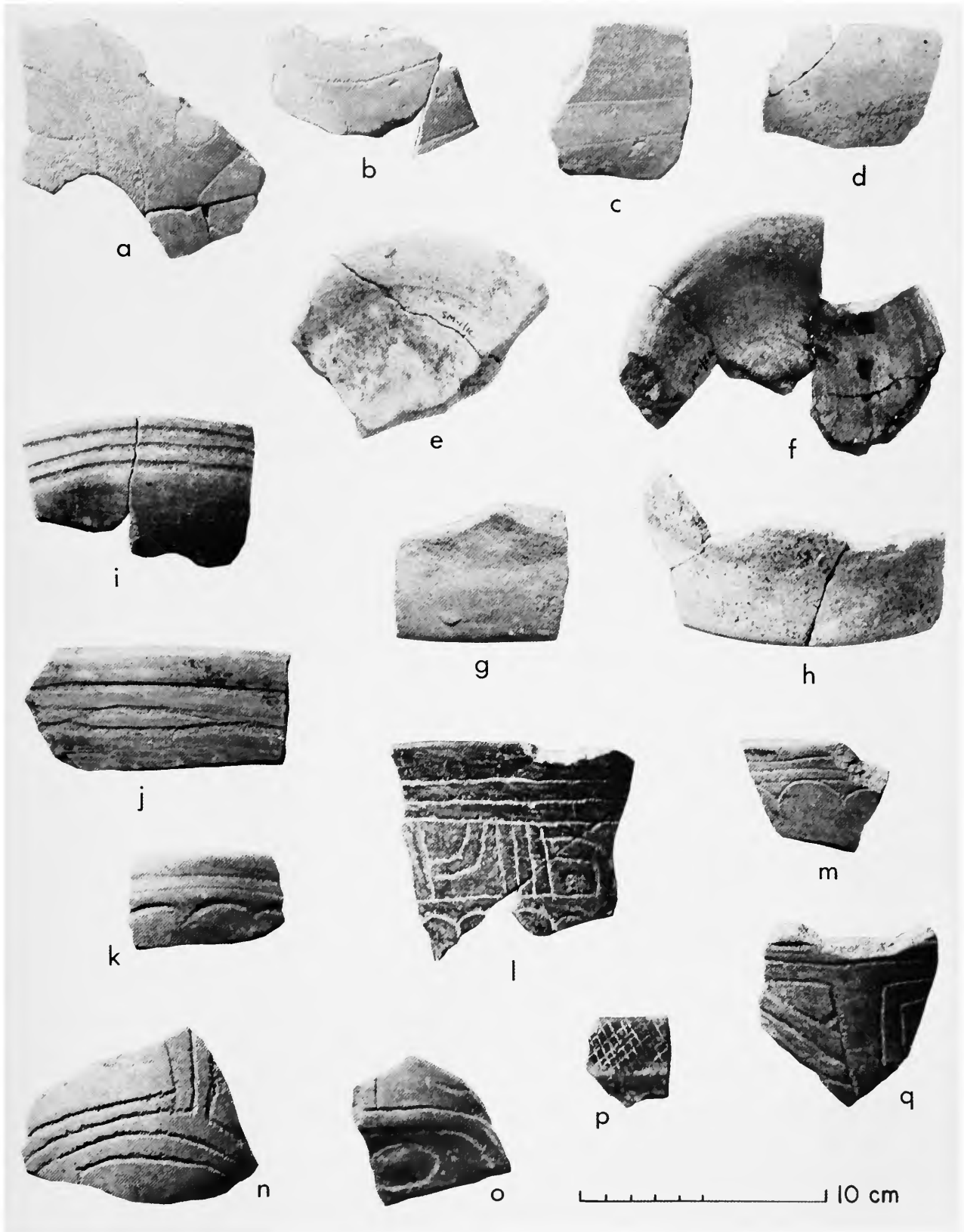


PLATE 18

Conchas Red-on-buff, Julain Coarse, and Conchas Streaky Brown-black sherds, Jocotal and Crucero Phases. *a-c*, Conchas Red-on-buff; *d-h*, Julain Coarse; *i-q*, Conchas Streaky Brown-black. *a-c*. Late Jocotal Phase; the rest are Crucero.



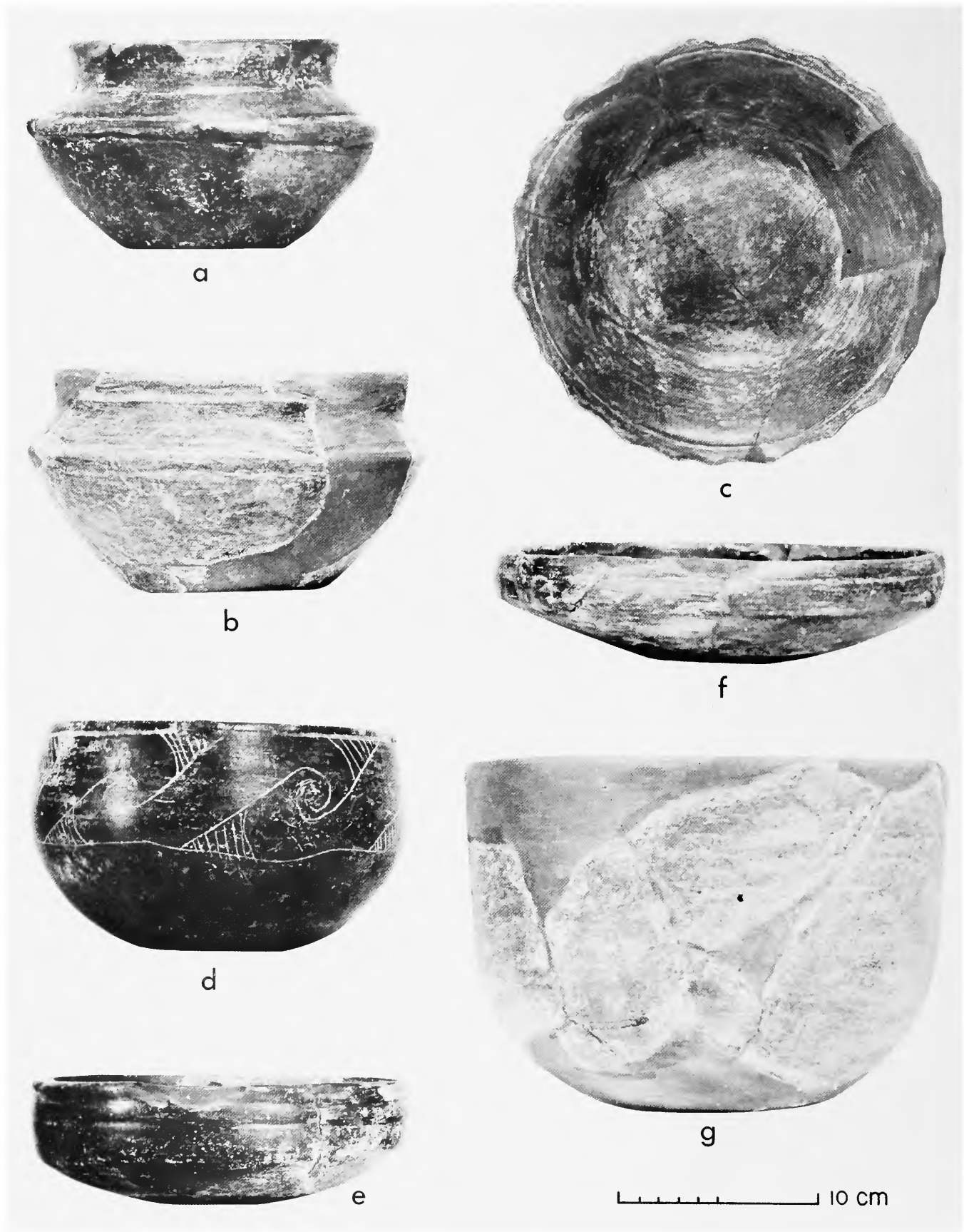


PLATE 19

Conchas Streaky Brown-black vessels from pits of the Crucero Phase.

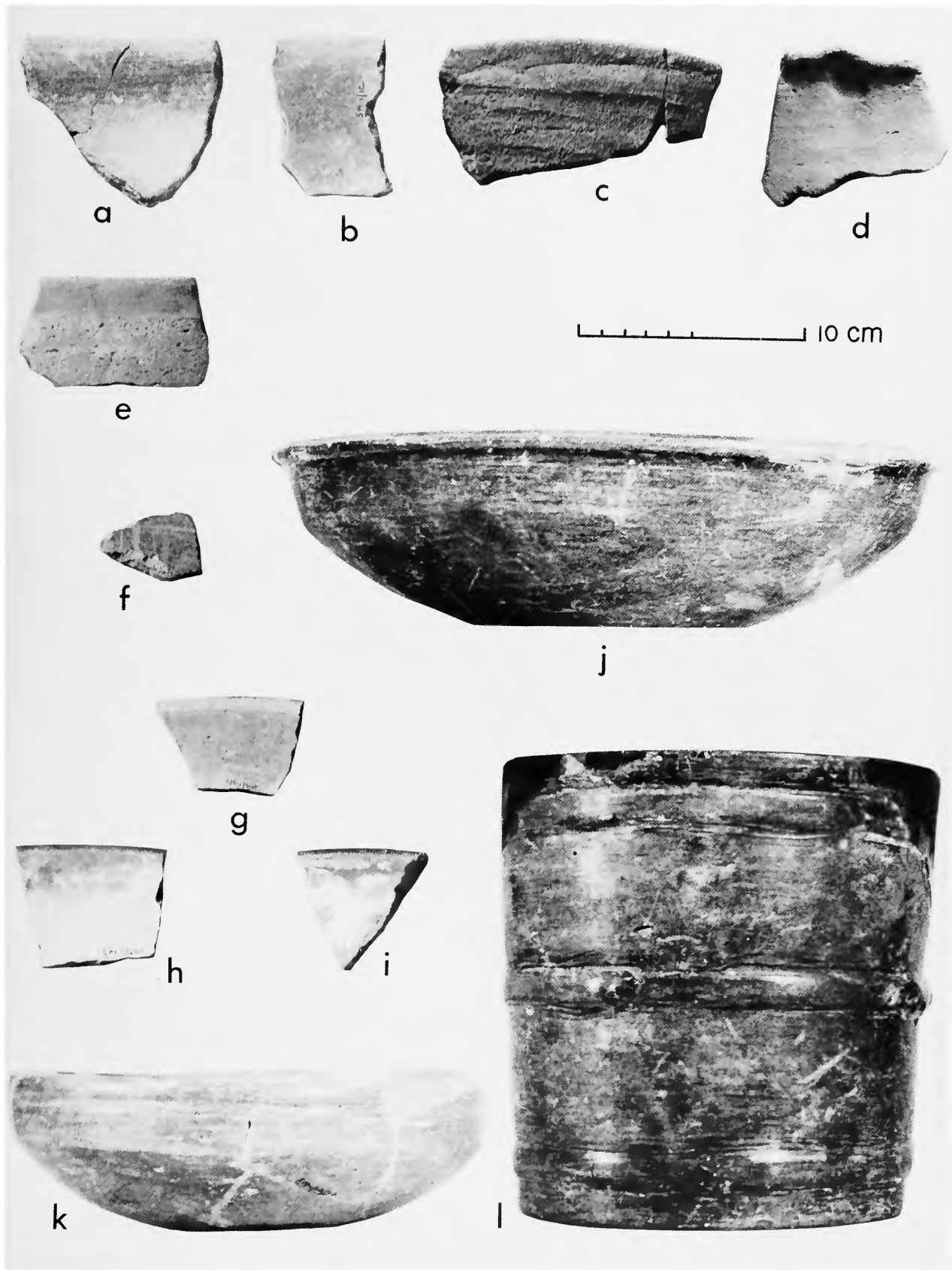


PLATE 20

Various pottery types, Salinas La Blanca. *a, b*, Polished red bowls, Crucero Phase. *c*, Miscellaneous coarse bowl, Cuadros Phase. *d*, Miscellaneous coarse vessel with exterior finger-punching, Jocotal Phase. *e*, Hard, thin plain ware bowl, Crucero Phase. *f*, Rare black-on-orange, Crucero Phase. *h, i*, Manchuria Plain *comal* fragments, probably Marcos Phase. *k*, Conchas Orange bowl, Crucero Phase. *l*, Conchas Streaky Brown-black cylindrical jar, Crucero Phase.

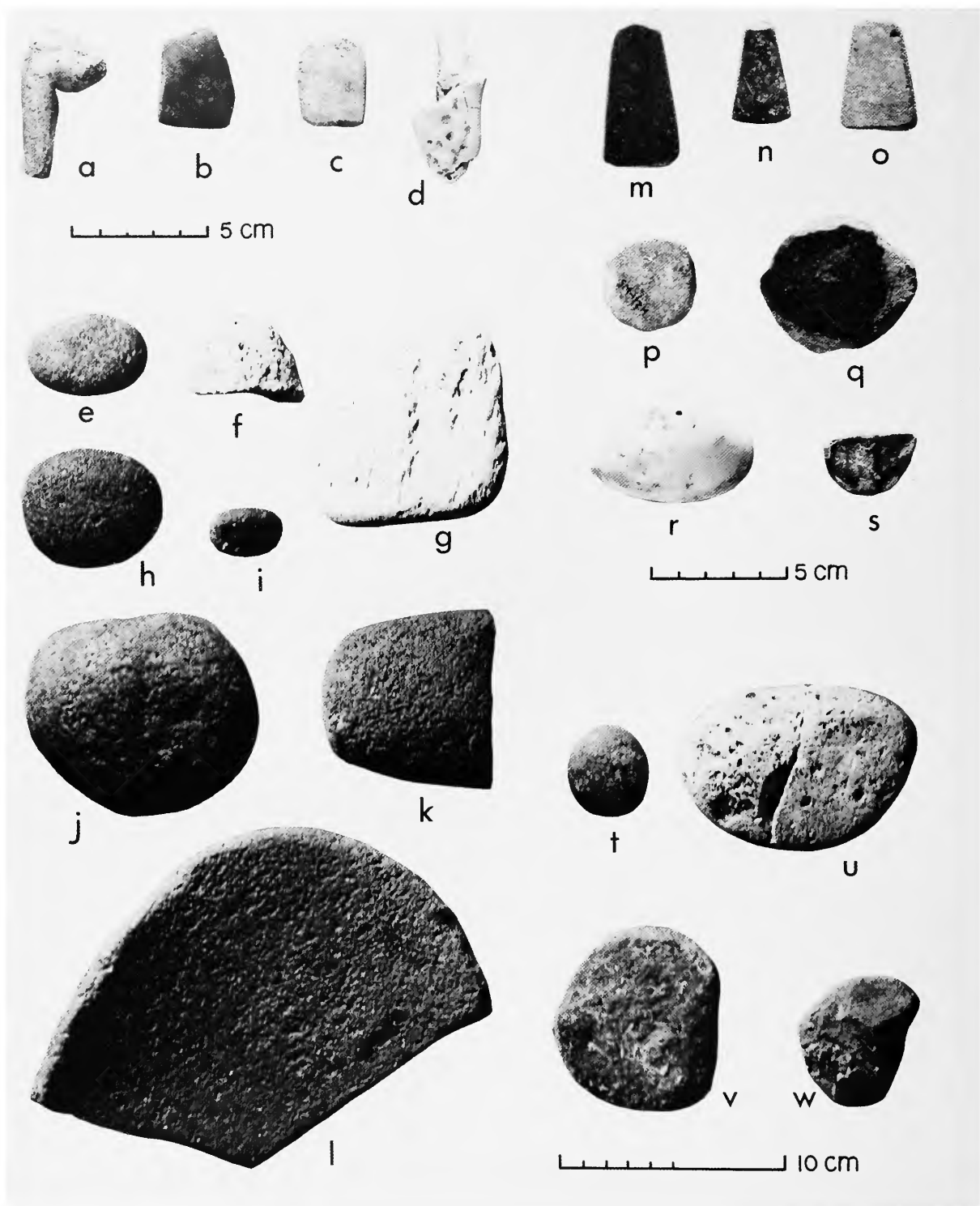


PLATE 21

Stone, shell and pottery artifacts of the Cuadros and Jocotal Phases. *a-l*, Cuadros; *m-w*, Jocotal. *a*, Figurine fragment. *b*, Sherd abrader. *c*, Tongue-like tab. *d*, Shell columella. *e, h, i, t*, River pebbles. *f, g, u*, Pumice abraders. *j, v, w*, Hammerstones. *k*, Mano fragment. *l*, Fragment of oval metate. *m, o*, Sherd trapezoids. *p, q*, Sherd disks. *r*, Shell pendant. *s*, Effigy fragment.



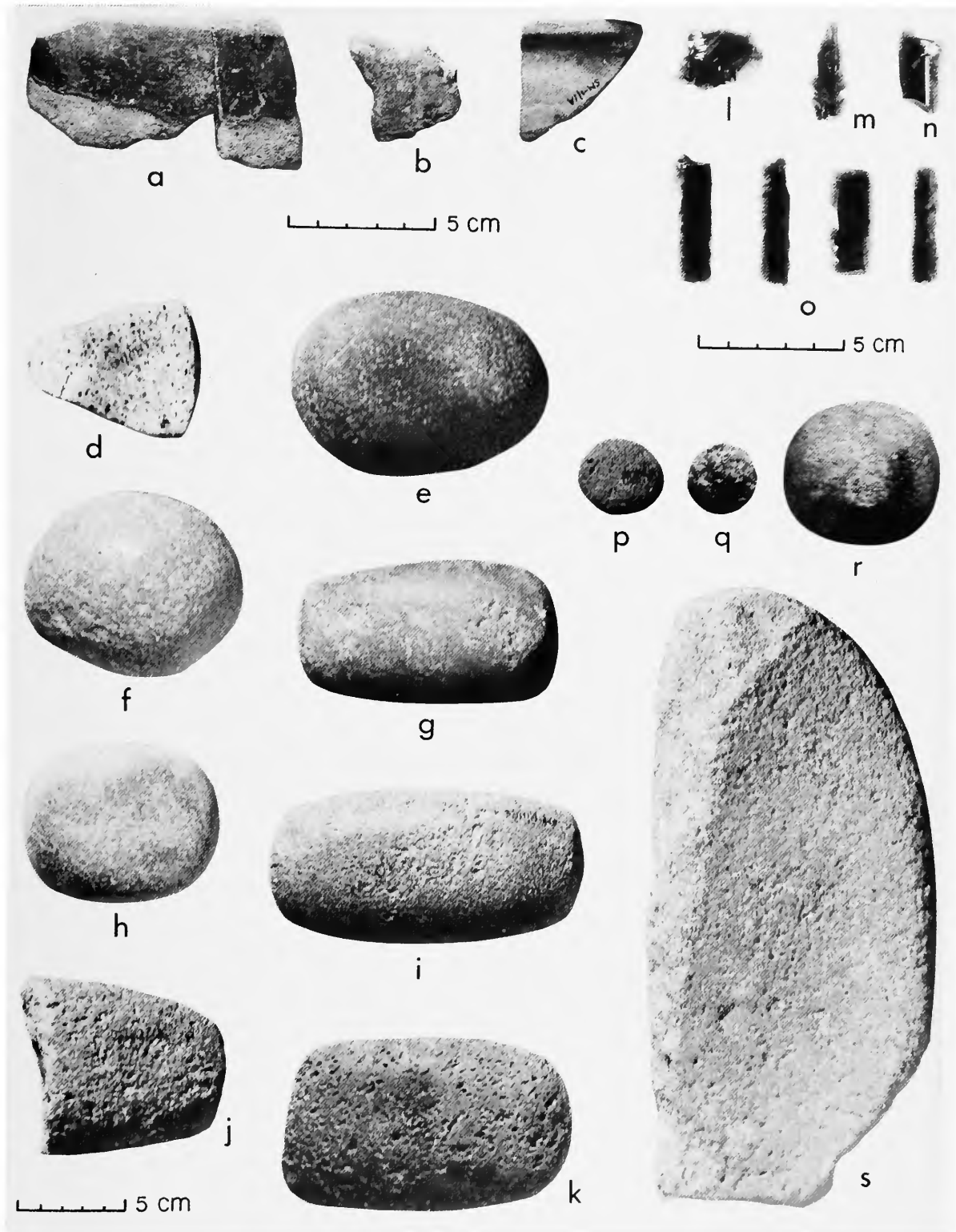


PLATE 22

Stone and pottery artifacts, Crucero Phase. *a, c*, Sherd abraders. *b*, Possible figurine fragment. *d*, Pumice abrader. *e, f*, Hammerstones. *g-k*, Manos. *l*, Retouched obsidian flake. *m, o*, Prismatic blades of obsidian. *n*, Obsidian blade with accidental burin blow? *p-r*, River pebbles. *s*, Metate fragment.

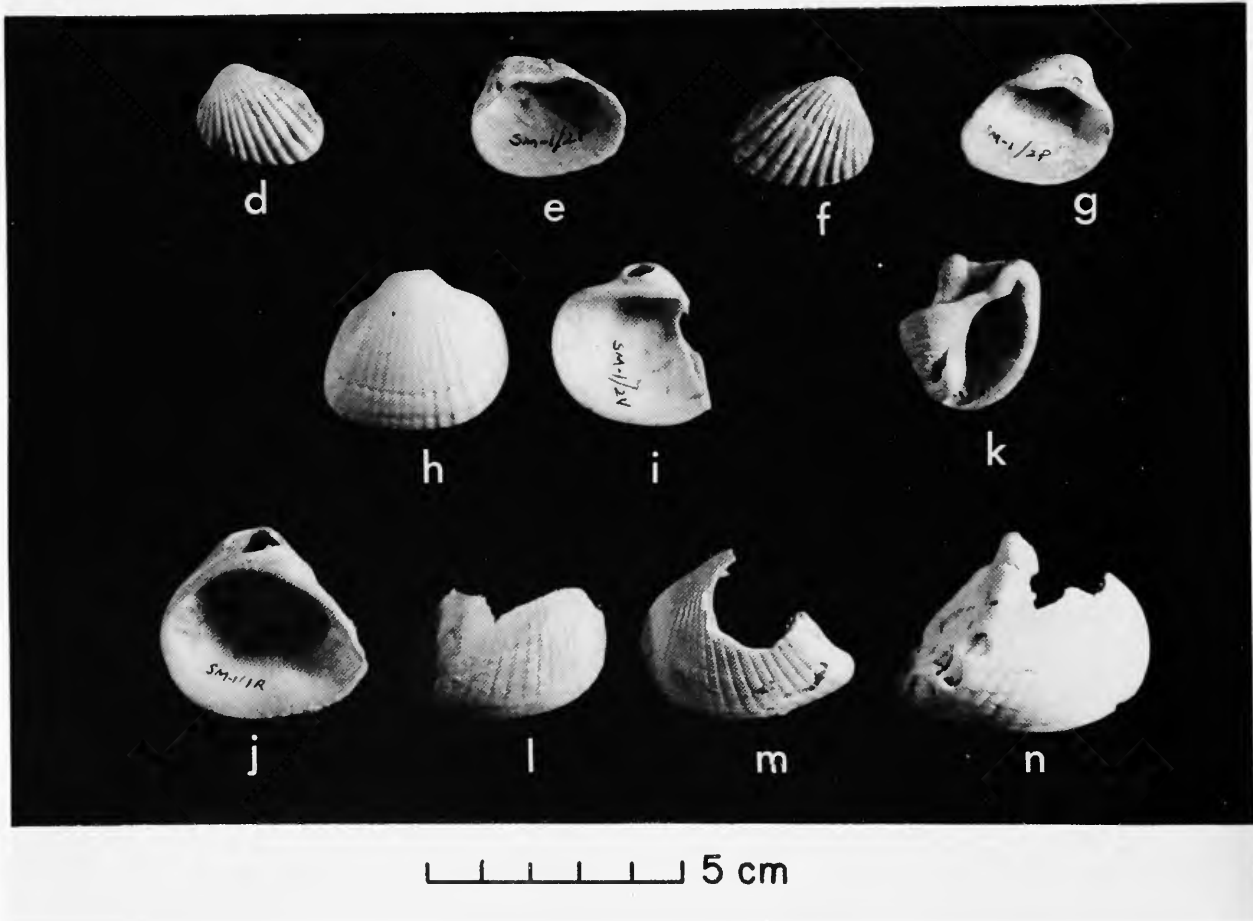
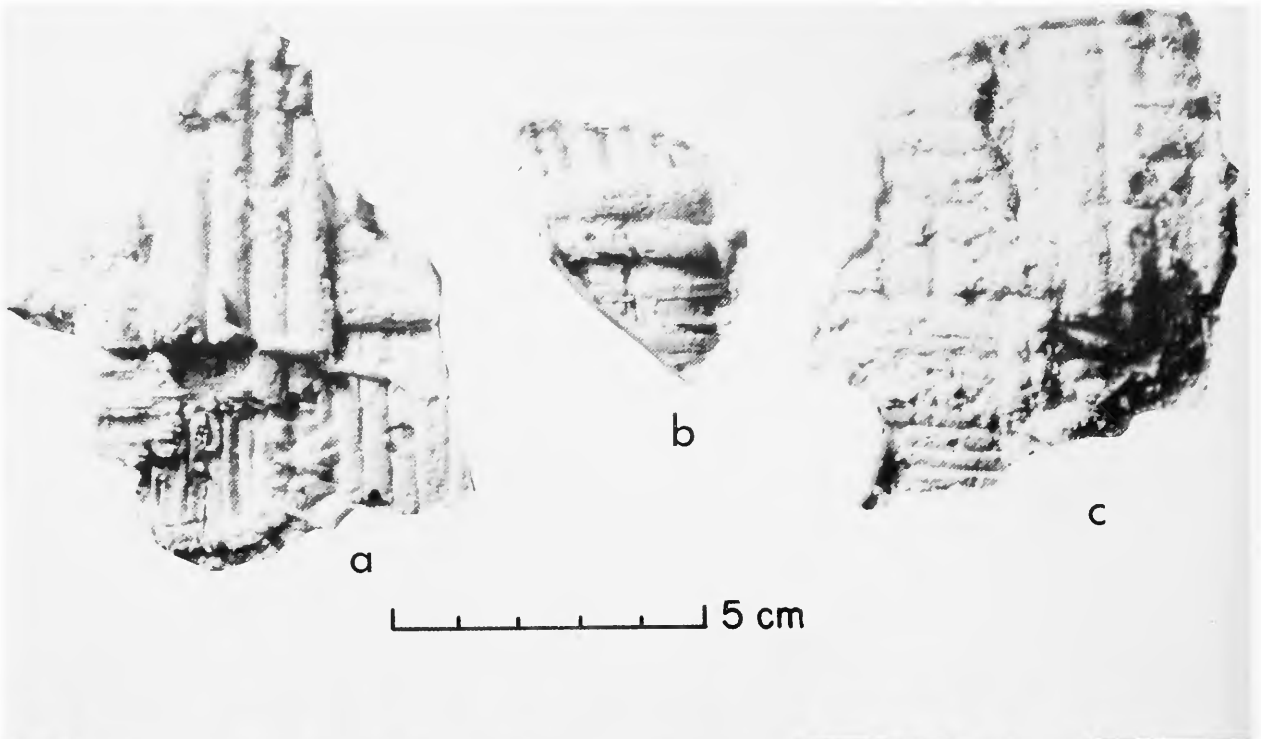


PLATE 23

Matting and shells, Cuadros Phase. *a-c*, Latex casts from impressions in clay of a twilled mat or *petate*. *d-g*, Beach valves brought in to the site, for no apparent use. *h, i*, *Anadara aequatorialis* valves used as smoothers. *k*, Much worn smoother made from *Colimella* sp. *j-n*, *Noetia reversa* smoothers.

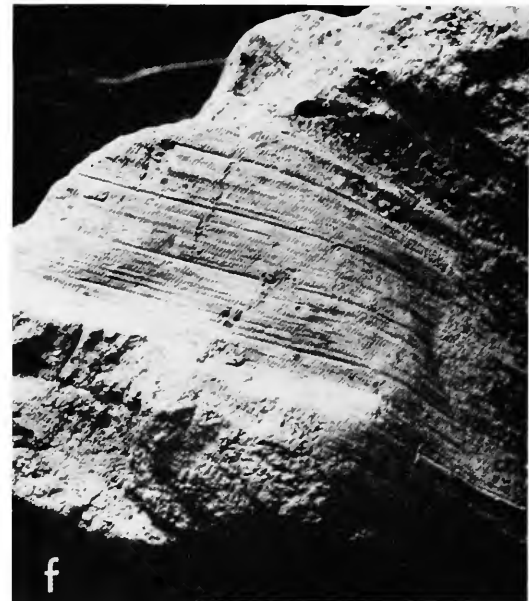
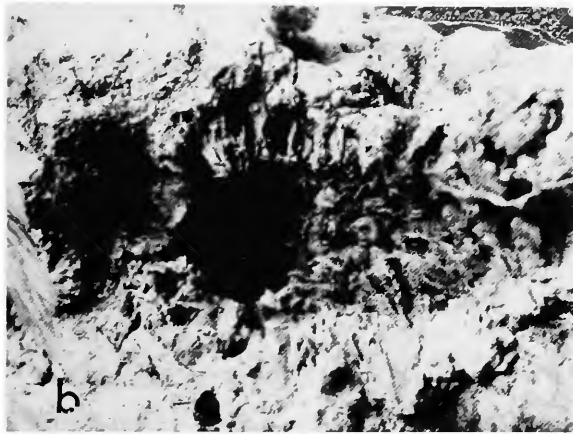
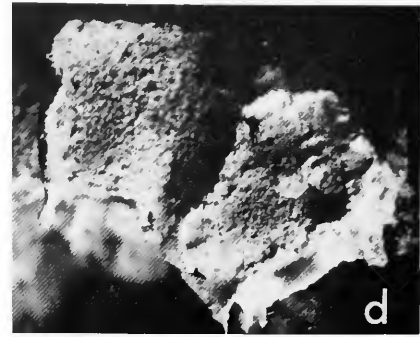
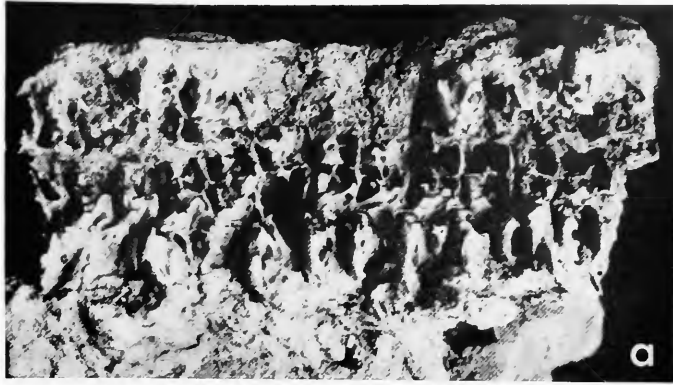


PLATE 24

Mineralized corncobs and other parts of the maize plant from deposits of the Cuadros Phase, Salinas La Blanca. *a*, Mineralized portion of a corncob looking outward from the pith (2X), showing one row of intact cupules, one row of paired spikelets with the cupules broken off. *b*, *c*, Cross-sections of mineralized cobs (2X). *d*, Two glumes from the specimen in *a*, enlarged (5X). *e*, Impression of a stalk (actual size). *f*, Impression of a leaf (2X).

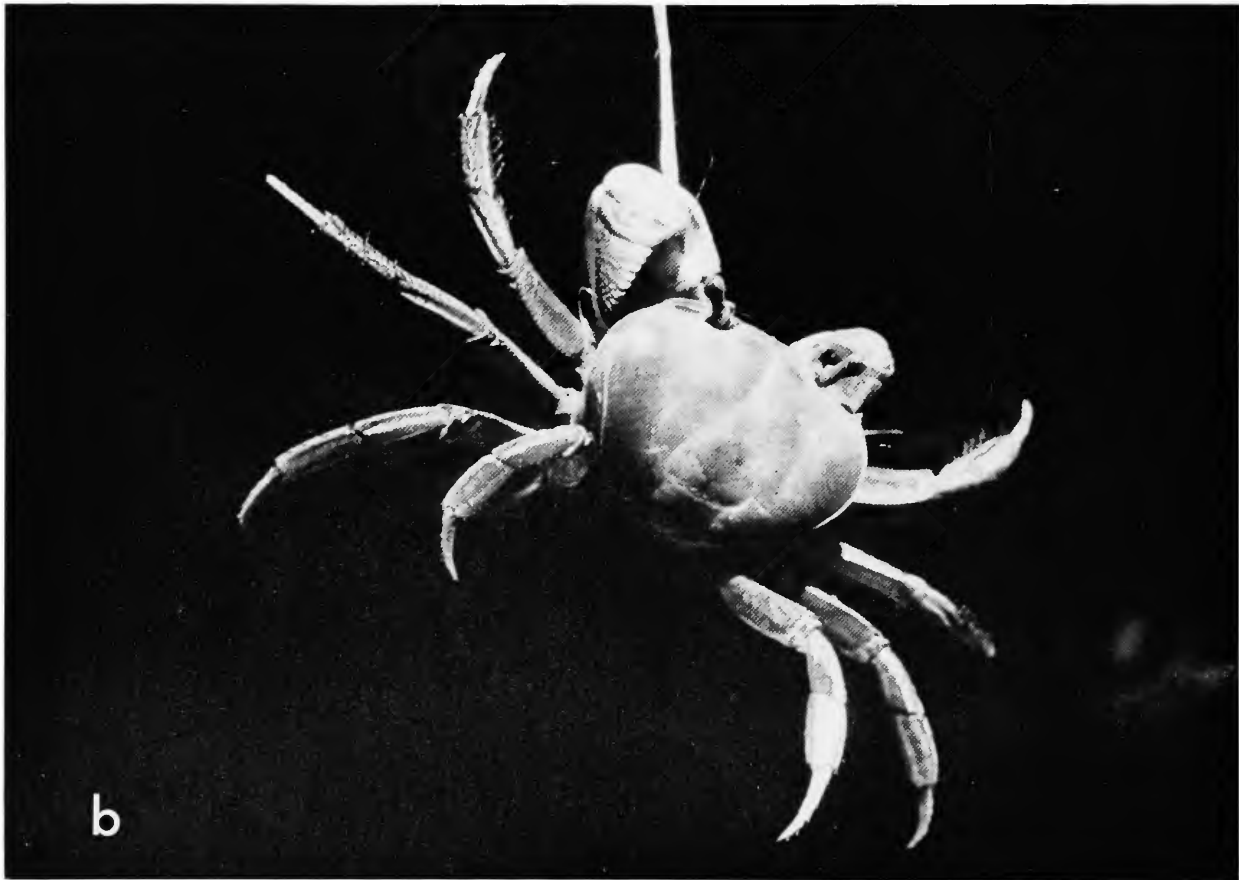


PLATE 25

Ancient crab claw fragment, Cuadros Phase, and modern mouthless crab, Salinas La Blanca. *a*, Crab claw adhering to sherd interior.  
*b*, Live specimen of mouthless crab (*Cardisoma crassum*), one of the principal foods of the Cuadros and Jocotal people.

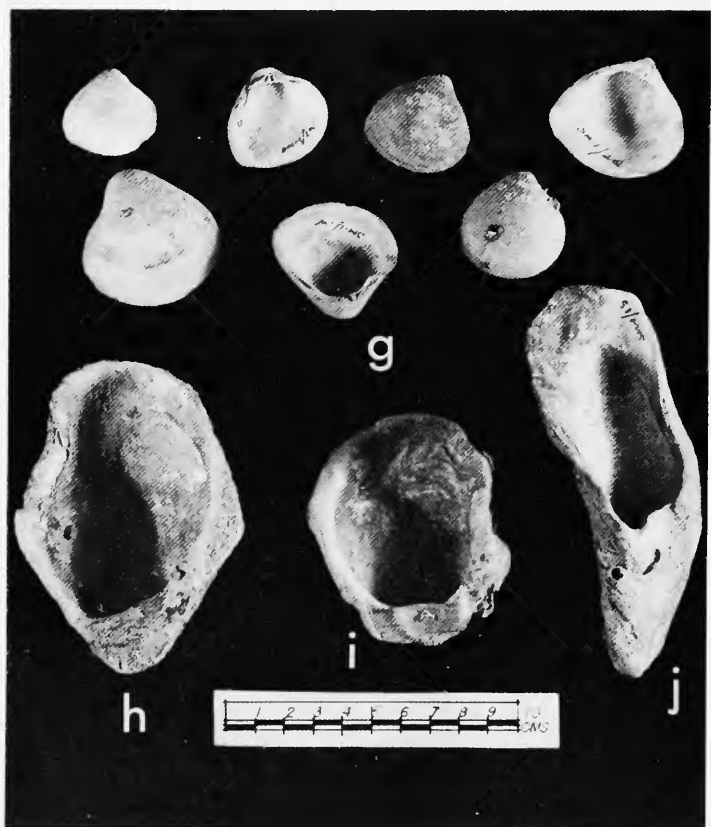
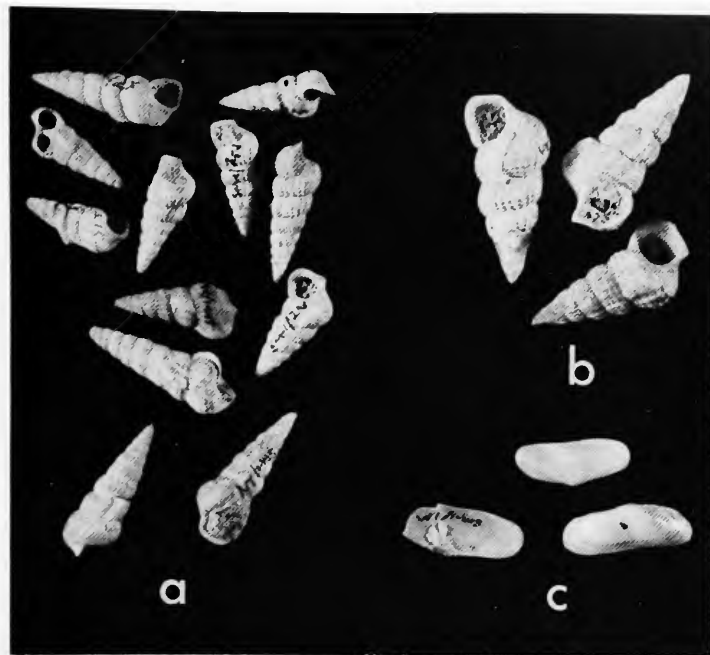


PLATE 26

Molluskan and fish remains from the Cuadros and Jocotal Phases. *a*, *Cerithidea mazatlanica*. *b*, *Cerithidea valida*. *c*, *Amphichaena kindermanni*. *d*, *Agaronia testacea*. *e*, Mineralized strips of gar pike skin. *g*, *Polymesoda radiata*. *h-j*, *Ostrea colombiensis*.

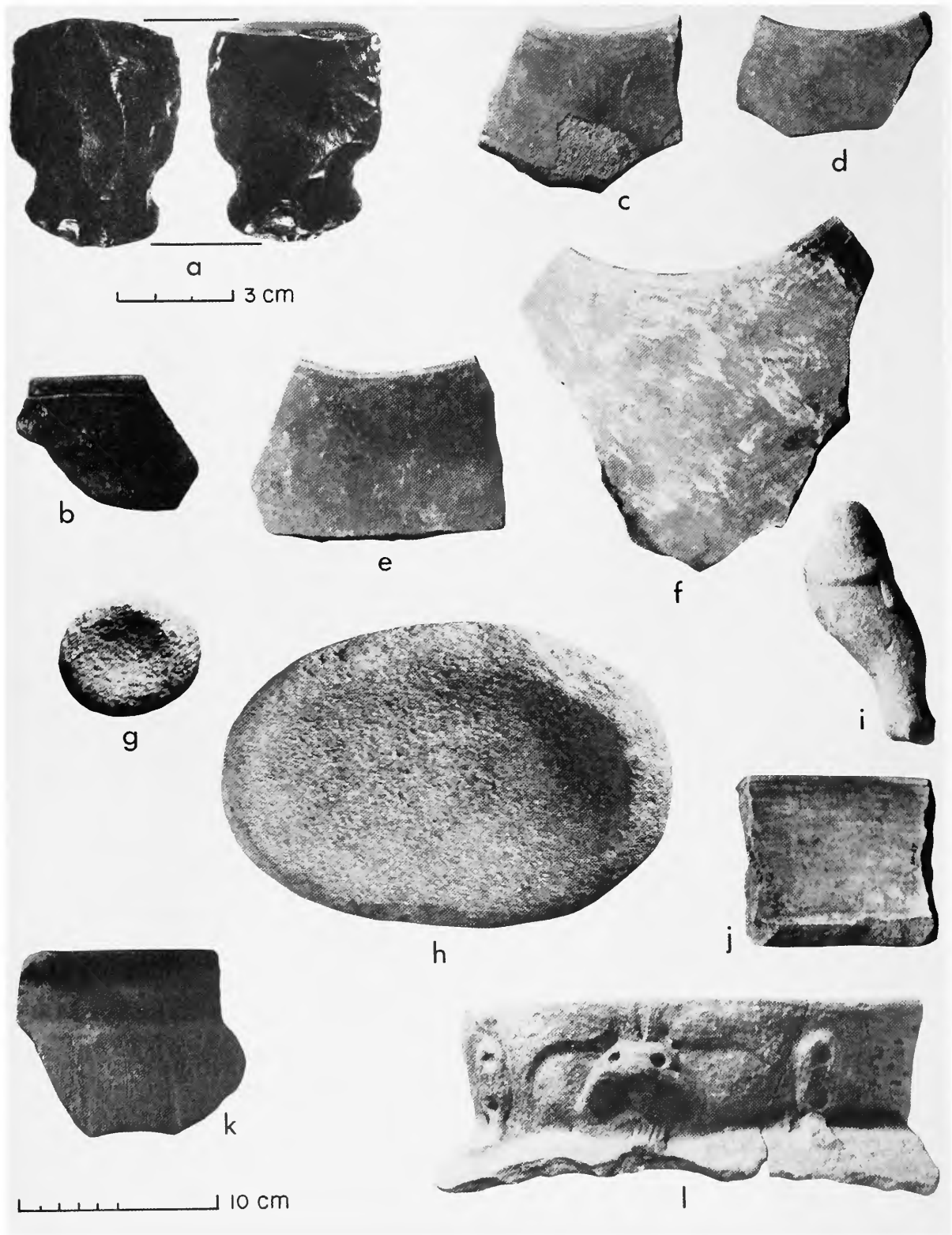


PLATE 27

Projectile point from survey, and pottery and stone artifacts of the Conchas Phase from the site survey. *a*, Basal half of obsidian projectile point found on survey. *c-f*, Conchas Red Unburnished *tecomate* rims. *b*, *k*, Morena Black, Conchas Phase. *g-h*, Conchas stone artifacts. *i*, Leg of Conchas figurine. *j*, Conchas White-to-buff. *l*, Fragment of Conchas Red Unburnished necked jar, with Olmecoid face in relief.



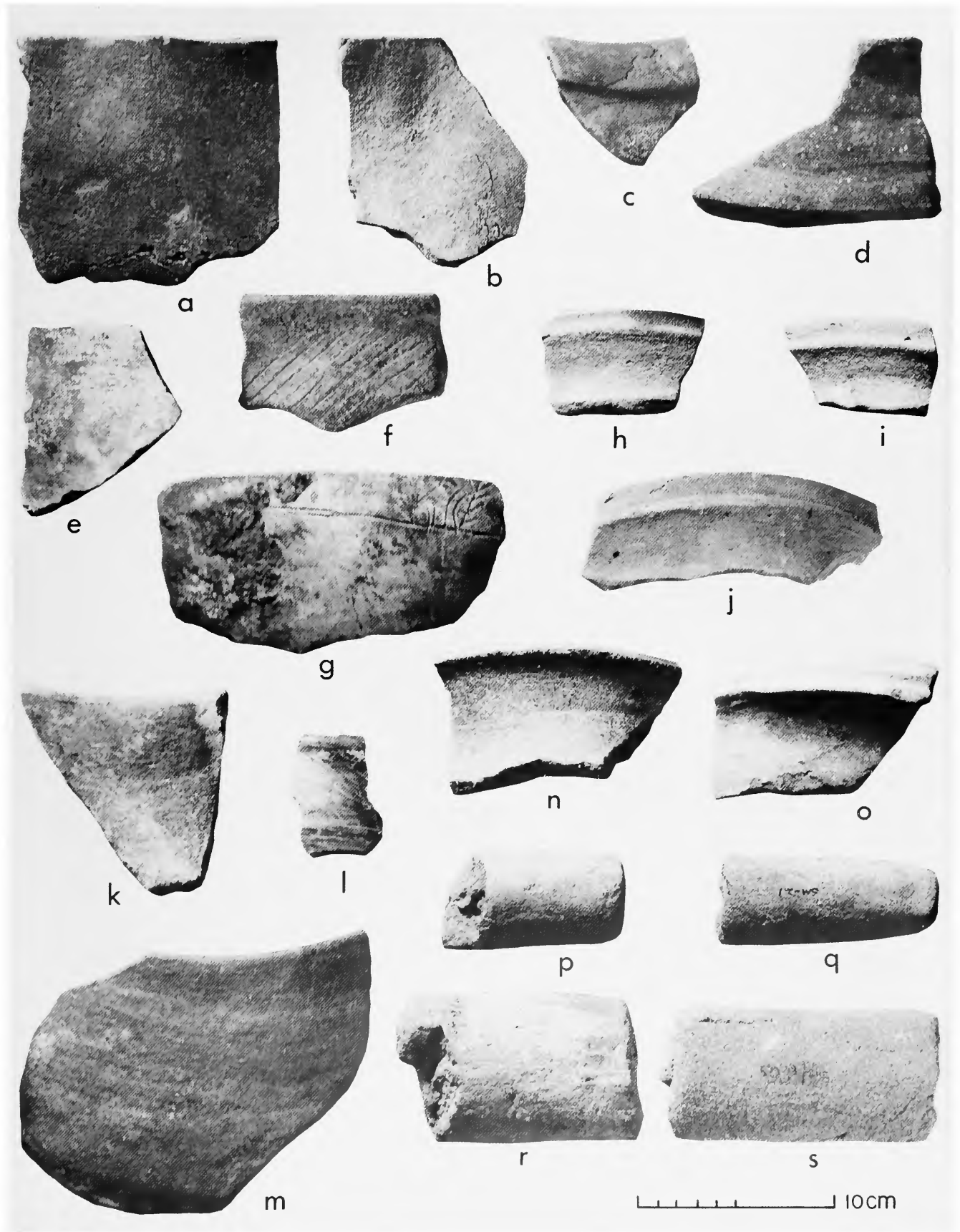


PLATE 28

Pottery of the Cerro del Tiestal Complex. *e*, Sherd with wavy-line Usulután decoration. *n, o*, Violeta Plain rims. *p-s*, Fragments of solid pottery cylinders believed to be supports for salt-molding vessels.



PLATE 29

A possible Early Classic vessel support and Marcos Phase pottery and other artifacts from the Ocós area. *a*, Fragment of slab leg from what was apparently a cylindrical vessel. *b*, *c*, Hollow effigy heads from San Juan Plumbate vessels. *d-g*, San Juan Plumbate sherds. *h*, Gold disk found in 1958 in cache of San Juan Plumbate vessels, Los Limones (SM-6). *i*, *j*, San Juan Plumbate bowl which contained the object in *h*. Scale applies to *a-g* only. Diameter of *h*, 9.5 cm.; diameter of *i*, *j*, 50.8 cm.



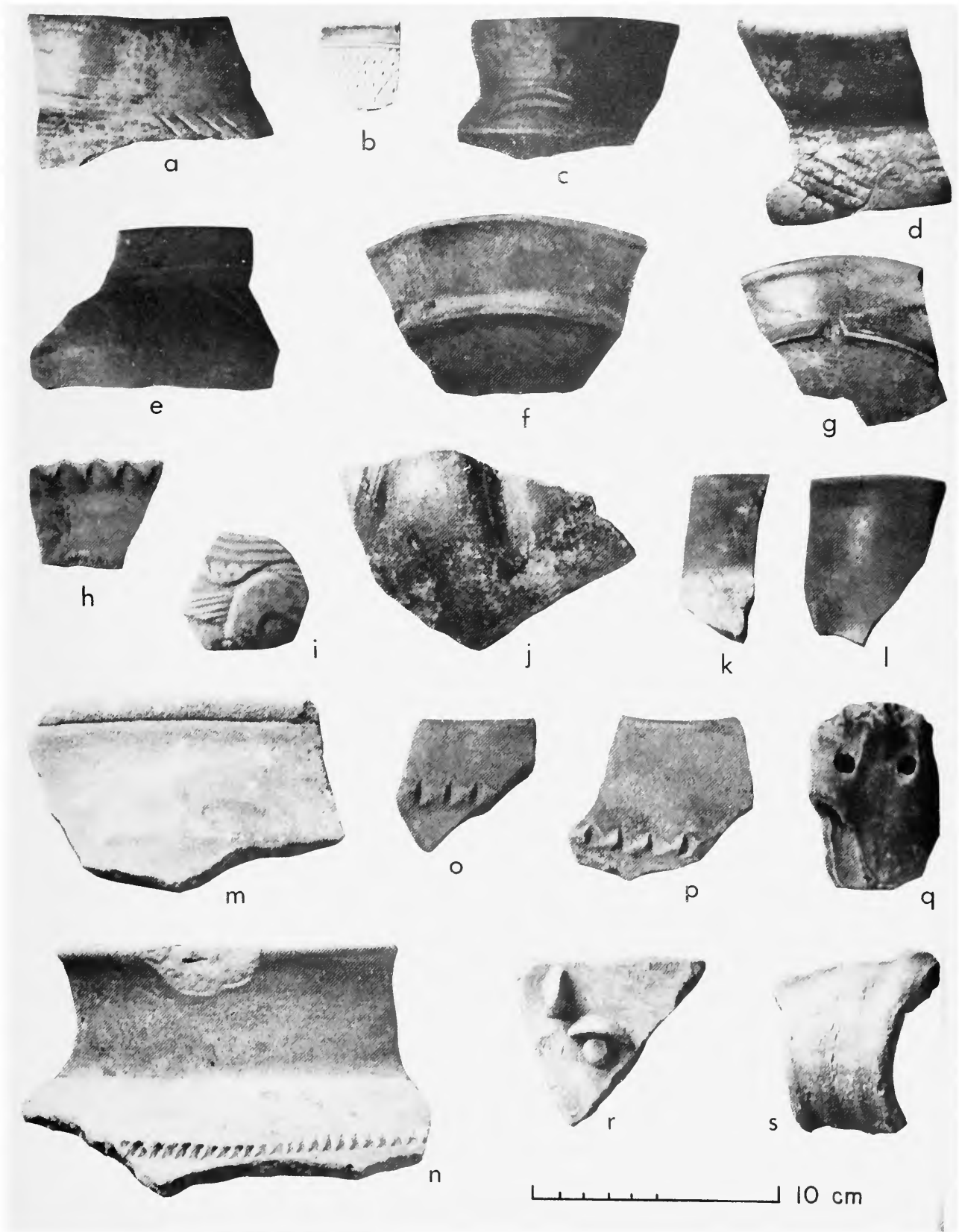


PLATE 30

Pottery of the Marcos Phase from sites in the Oco's area. *a-j*, San Juan Plumbate. *k, l*, Specular red-on-white. *m, n*, Coarse ware necked jars. *o, p*, Coarse *tecomates* with indented filleting. *q*, Fragment of double-end flute of clay. *s*, Strap handle from jar.











