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UNIVERSITY OF CALIFORNIA
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Number 16 October, 1972

STUDIES IN THE ARCHAEOLOGY OF MEXICO AND GUATEMALA

Edited by John A. Graham

UNIVERSITY OF CALIFORNIA
DEPARTMENT OF ANTHROPOLOGY
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Department of Anthropology

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PREFACE

With the present volume, a total of 16 numbers of the Contributions of the University of California Archaeological Research Facility have appeared during the eight years since the series was inaugurated in 1965. The first volume was Sources of Stone Used in Prehistoric Mesoamerican Sites, but subsequent volumes have alternated somewhat irregularly between Mexican and Central American archaeology on the one hand, California and Great Basin archaeology on the other, an aim set forth in the editorial announcement of the series's founding. Originally, Contributions were distributed upon a gratis basis. But severe budgetary reductions imposed upon the Facility required that a modest charge be made for subsequent numbers, and it has been the proceeds from these sales that have been a major factor enabling the Facility to maintain publication in these difficult times. Most past numbers of the Contributions have become out-of-print shortly after appearance, perhaps an indication of their success.

The first volume of the Contributions contained two papers exploring the feasibility and potentials of x-ray fluorescence analysis in the identification of obsidian types and their sources, one line of investigation that has continued to be pursued and refined through subsequent numbers of the series into the present volume. Two symposia have seen the light of publication in the Contributions: "The Emergence of Civilization in Mesoamerica," organized by R. F. Heizer and J. A. Graham and held at Burg Wartenstein, Austria, in July of 1970 under sponsorship of the Wenner-Gren Foundation for Anthropological Research (Contribution 11), and "The Application of the Physical Sciences to Archaeology" (Contribution 12), a symposium held on June 23, 1970 under the auspices of the Pacific Division of the American Association for the Advancement of Science, the California Section of the American Chemical Society, and the San Francisco Society of the Archaeological Institute of America. Although most of the papers appearing in the Contributions series have been authored by associates and students working in the Archaeological Research Facility, it has been possible at times to include important papers prepared by colleagues at other institutions, as in the case of the present volume.

With the exception of the two papers on trace-element analyses of obsidian samples from Cholula and Veracruz, the present volume of studies is devoted entirely to Maya archaeology. The collection represents a geographical range extending from the Huaxtec Maya zone in San Luis Potosi to the Guatemalan highlands and Honduras and embraces a temporal range from earliest levels to the ethnohistoric period as well as including a review of methods of recording Maya sculpture in the modern epoch of study and research.

John A. Graham
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I. MAYA HIGHLAND PREHISTORY; NEW DATA AND IMPLICATIONS

Richard E. W. Adams

The Maya culture areas of Mesoamerica have always been of special interest to prehistorians due to the fact that the Maya anciently occupied several distinct ecological zones. The highly diverse cultural patterns found within these zones seem to fall into two broad groupings: those associated with tropical highland environments as contrasted to those in tropical lowland surroundings. The Maya are also of special interest in that the tropical forest cultures, although apparently beginning their florescence later, reached a higher degree of complexity than those of the highlands. Prehistorians have generally assumed that civilizations cannot develop independently in tropical forest regions (viz. Sanders and Price 1968:142; also Meggers 1954). Further, it has been known for some time that in the southern highlands of Guatemala, and especially at the site of Kaminaljuyu, there were early and sophisticated cultural achievements (in architecture and sculpture, for example) earlier than those in lowlands (M.D. Coe 1966:63-73). The ecological assumption and the fact of cultural priority led to the conclusion that much of high culture in the lowlands was donated from the highlands. In spite of the weakening of the ecological argument due to recent work, this conclusion has retained its strength as a premise in thinking about Maya prehistory.

Another premise was that the Guatemalan Highlands must have been part of the area in which wild ancestors of native American food plants were domesticated and, therefore, in which a settled and agriculturally based life was developed. No evidence was or is available to indicate early prehistoric plant domestication in the tropical forest zones. It was, therefore, assumed that the Maya lowlands had initially been colonized by agriculturalists from the adjacent Maya highlands (M.D. Coe 1966:39). These assumptions and arguments have not been seriously questioned until recently. However, with the exception of the largely unpublished data from Kaminaljuyu, no significant quantity of intensive work had been done in the highlands which seemed to bear upon these problems. In fact, in no case did we possess a continuous ceramic sequence.

A two season program of archaeological excavation in the north Guatemalan highlands was carried on in 1965 and 1966 by a University of Minnesota project headed by the writer (1). The objectives of the project were (i) to define in detail a continuous ceramic sequence for a Maya highland region, and (ii) to detect and define the nature of cultural relationships between parts of the Maya highlands and lowlands, especially on an early (i.e. Preclassic) level. There was also the (unstated, as usual) objective of exploiting unexpected information. For these purposes we selected a small valley in the north Guatemalan highlands through which the Cotzal River runs north and, therefore, down toward the tropical forest lowlands (Figure 1). In ancient times, rivers would be likely to constitute major routes of access from one ecological zone to another and, therefore, our chances of meeting our objectives would be greater by working on such a route.

Based on our research, we have established a continuous ceramic sequence beginning about 0 AD and ending about 1550 AD. We have also come to the conclusions (i) that the earliest occupation in the northern Guatemalan highlands generally begins with the Classic period (i.e. shortly before or about the time of Christ), (ii) that early cultural developments of the preclassic period (ca. 900-0 BC) in the Maya highlands and lowlands were largely independent, and (iii) that the Maya lowlands were likely colonized by agriculturalists from adjacent lowlands; i.e. from the Veracruz-Tabasco coastal plain of Mexico. Several implications flow from these tentative conclusions and are presented and discussed below.

Ceramic chronology of the Cotzal region.

Several archaeological surveys had previously been carried out in the Northern Guatemalan highlands by Robert Burkitt (1930), Franz Termer (1936, 1941), and A. L. Smith (1955), among others. In addition, large amounts of tomb pottery had been excavated and studied by several archaeologists (Butler 1940, R.E. Smith 1952, A.L. Smith and A.V. Kidder 1951). Both the surveys and the excavations included the Cotzal zone. Tentative ceramic sequences had been set up on the basis of this work but necessarily with temporal gaps. Furthermore, since ancient Mesoamerican burials of the more distinguished members of society often utilized exotic and specially made

pottery, there is no assurance that the tomb ceramics are representative of the burial period. Nevertheless, this prior work allowed us to pick the sites most likely to give us the longest ceramic sequences in a physically stratified manner.

Most of the project's activities were carried out at four sites in the middle Cotzal Valley; Tzicuay, San Francisco, San Francisco del Norte, and Palo Viejo (Figures 1 and 2). Forty-two stratigraphic test pits, four meters square, were dug in these sites and some other excavation done. We also carried out survey and limited excavation at the site of Chajcar about 78 kms. to the east, in Alta Verapaz. Three large private collections comprising hundreds of intact pottery vessels were utilized for comparative purposes. Sherd collections from sixteen other sites in the Cotzal and nearby regions were studied. Thus, the excavated sample was greatly augmented in quantity and in spatial distribution by both previous work and unpublished material. This perhaps lends a greater degree of confidence to the conclusions.

Utilizing the above data, a continuous and unbroken ceramic chronology has been established for the Cotzal Valley running from the time of the Spanish conquest back to about the time of Christ; i.e. ca. 1530 to 0 AD (see table 1). Typological description of the pottery combined with stratigraphic evidence from the test pits has allowed us to establish three ceramic complexes, and to arrange these into a sequence. Without dealing with the details of ceramic types, which will be described fully in a monograph now in preparation, certain observations can be made about the sequence.

First, there is an indisputable continuity of types from complex to complex, especially in the types probably used for domestic purposes, i.e., for cooking, carrying water, etc. This continuity in ceramic type would seem to indicate a basic continuity of population within the valley, without significant disturbances due to large-scale migrations.

Second, there are few typological linkages through the domestic types with lowland Maya pottery, but many with the pottery of adjacent highland regions. The implication here is that culture flow -- and hence population flow -- is from these adjacent highland regions into the middle Cotzal region. Further, there is no indication on the earliest level, about the beginning of the Christian era, that there is any significant population flow from highlands to lowlands, or vice versa.

Third, there are typological linkages to the lowlands through elaborate and typologically rare tomb pottery (Figure 3). These burial pieces, would indicate that such highland-lowland contacts as there were, were largely restricted to the upper levels of society and to the earliest complex and the period of time thereby represented.

Finally, there is the complete and utter lack of pottery that can be classed as Preclassic in either stratigraphic situations, or as anomalous types mixed with later pottery. The implications of this point will be the subject of discussion in the final section of this paper.

Natural setting, settlement patterns, and land use.

The floor of the middle Cotzal Valley is at an altitude of about 1400 meters with surrounding ridges rising to between 2000 and 3000 meters. These ridges begin their rise nearly from the edge of the river; hence there is very little flat land in the middle Cotzal region.

Archaeological sites of the region fall into two classes; (i) ceremonial centers and (ii) individual habitation sites. Fairly small and compact ceremonial centers are characteristic of the northern highlands. In the Cotzal Valley, ceremonial center sites are usually located on low spurs running out from the massive ridges (Figure 4), although one site was found on the valley floor. The sites consist of plastered masonry buildings arranged about and oriented inward upon paved courts. The principal type of building in these groups is a rectangular platform which supported one or more structures with perishable roofs and, often, perishable walls. From analogy with other Mesoamerican ceremonial architecture, and from internal

evidence, these buildings functioned at least partly as temples. No permanent, multi-roomed structures of the "palace" type common to other parts of Mesoamerica have been found. However, it is possible that certain of the "temple" platforms may also have supported perishable, elite class housing. Most of the platforms contain masonry tombs when excavated; judging by the relatively sumptuous nature of the grave offerings, these tombs are the burial places of wealthy and important individuals. Perhaps the primary purposes of the ceremonial centers of the Cotzal region were as commemorative burial places for the distinguished dead and as residences for the distinguished living. Small platforms are often found in the courts upon which ritual activities might have been performed.

A final and invariable feature of the Cotzal ceremonial sites is a ball-court. These structures, with variations, consist of two parallel masonry walls between which the game was played in a central alley. Spanish accounts say that the game was played with a solid rubber ball and that hitting with feet and hands was disallowed. The same accounts also say that the game had both recreational and divinatory purposes (2). Additional specific functions of the ball game in this region and through time can only be speculated upon at present. However, the presence of important burials in ball court architecture at Tzicuay may indicate that perhaps the ancestors were expected to express their will through the outcome of the game.

Excavation showed that these ceremonial centers changed very little either in composition or, apparently, in function through time. In the Late Classic period, a trend to somewhat larger structures appears, but nowhere do we find the large scale fortified centers characteristic of the later periods in adjacent highland regions.

Individual habitation sites were found scattered in an apparently random manner over most of the lower mountain slopes, which today constitute the most desirable agricultural lands. Rainfall probably amounts to over 1000 mm annually with a cloud cover characteristic of most of the year. Subsistence agriculture in the Valley today is a highland variation of the slash-and-burn system, known in Mexico as tlacolol (3). This system

requires rotation of fields and consequent dispersion of the population. Presentday native residences are built on small ledges cut into the hillsides, and sometimes faced with stone. Similar ancient stone-faced terraces were found in association with refuse of domestic origin (potsherds of utility types, metate fragments, obsidian waste flakes, and ashes). Ancient post holes were also encountered in the terraces indicating that, as today, residences were of thatch and wattle construction. The present day pattern of dispersed houses and fields thus seems to be a perpetuation of the archaeological past.

A determinant in the location of present day houses in the Cotzal region is closeness to water, i.e. to the river. Our data indicate that the earliest occupied house sites are also the lowest in the valley; in other words, the protoclassic house sites are located closest to the river. Only during the Early and Late Postclassic periods do house sites appear higher up. House sites were located in these periods up to 200 meters above the river. All domestic house sites were occupied in the late phases of the sequence. This would indicate that population reached a maximum during the Postclassic, a demographic high probably maintained until European contact.

There is no indication of colonial pottery construction or population in the middle Cotzal. However, in the upper valley a 16th century church of the early colonial period was built in the present major population center of San Juan Cotzal (Colby and van den Berghe 1969:45). We conclude that the middle Cotzal region along with vast areas of Mesoamerica was drastically depopulated immediately after the Spanish conquest probably by disease, by the Spanish policy of concentration of native Americans into towns, and by decimation during the conquest. When the coffee plantation of San Francisco was founded in the middle Cotzal in 1910, the European founder encountered only two Indian families in the region; these living at the river junction. Thus, our interpretation is that, after the Spanish conquest, this region may have remained essentially vacant for 360 years. Much of the neighboring region is even today lightly or not at all populated.

Implications of the absence of preclassic cultures.

Both the Cotzal sites in Quiche and Chajcar site in Alta Verapaz lacked preclassic components; i.e. anything that could be surely dated back in time beyond about 100 BC. Examination of several hundred vessels in private collections from these regions showed that same lack of preclassic pottery. The surface collections from sixteen additional sites in Quiche also show the same absence. However, a couple of scattered finds from the Alta Verapaz (a pottery head from Coban, for example), hint at the existence of a Preclassic. A recent find of preclassic materials on the lowland slopes of Alta Verapaz at Sakajut has been made by Robert Sharer (personal communication 1971). Our conclusions are that the Alta Verapaz region was occupied by a feebly developed Preclassic and that the northern Quiche Zone was occupied lightly or was vacant prior to the Protoclassic.

The northern Quiche and the Alta Verapaz comprise the major headwater areas of the rivers leading to the lowlands from the northern side of the Maya Massif. Based on geographic accessibility and ethnographic data, we think that these rivers were probably the main route of communication in ancient days between highlands and lowlands. Indeed, today's Indian migrations from highlands to lowlands take place from the Alta Verapaz, both across country and down the Pasion River (R.N. Adams 1965). Yet these very regions seem to lack very much early cultural development. Thus it appears that contact between the precocious preclassic cultures of the southern highlands and those of the lowlands through these regions is highly unlikely.

Alternative routes of access from the southern highlands of Guatemala to the Maya lowlands would include that across the western plateau, west of the Cotzal zone. This seems a very improbable early route as it is topographically much more difficult than the northern Quiche and the Alta Verapaz routes. No historical migrations from western highlands to lowlands are known. Still further west, archaeological work has shown a similar lack of preclassic occupation in the highlands of Chiapas (R.M. Adams 1961:343-4; Culbert 1965:78). The remaining possibilities are the routes through the Motagua River valley and along the low highland valleys of western Honduras

to the east of the Alta Verapaz. Recent work by Robert Sharer has turned up typological linkages between the Chalchuapa region in El Salvador and early pottery dating about 900-1000 BC at Altar de Sacrificios and Barton Ramie in the Maya lowlands (Sharer and Gifford 1967). However, the majority of typological linkages of these early Maya lowlands complexes are to Gulf coastal Mexico, rather than to the Pacific side of Central America. Barbara Voorhies' work indicated late Preclassic occupation around Lago Izabal (1972:123).

Considering the above data, inferences and hints, the following implications can be drawn. (i) The preclassic vacancy of much of the north Maya highlands makes it unlikely that there was any significant contact between the precocious southern highland cultures and the contemporary lowland preclassic cultures. Therefore, a donor-recipient relationship between highlands and lowlands no longer seems probable. Contact between the Cotzal sites and the lowlands seems to have been later, tenuous and confined to the level of foreign trade and luxury goods. In addition, Wm. R. Coe has pointed out the impressive continuities and long temporal buildup in preclassic lowland culture at sites such as Tikal which argue against significant imposition of highly developed cultural patterns from outside (1965). On the other hand, that there were at least some later, protoclassic intrusions into some regions of the Maya lowlands by peoples of sophisticated cultural level is shown by evidence both at Barton Ramie and Altar de Sacrificios. (ii) The initial population of the Maya lowlands cannot be derived from the adjacent highlands if these were largely unoccupied in the Preclassic period. One must derive the earliest known agriculturalists of the lowlands (ca. 900 BC) from an adjacent lowland region. It seems to me, based on admittedly not very strong ceramic linkages, that Veracruz and Tabasco are the most likely origin regions. Indeed, Robert Rands has recently found Xe complex at Trinidad in eastern Tabasco dating probably ca. 800 BC (personal communication 1969). Moreover, early preclassic cultures of impressive sophistication have now been found in Veracruz dating about 1000 BC, thus predating the earliest Maya lowland material (Coe, Diehl and Stuiver 1967:1399-1401). (iii) Since the Maya Highlands as a whole seem to have been largely unoccupied until relatively late in the Preclassic, one must derive the earliest

settlers of the highlands from the temporally prior and physically adjacent Pacific coast. The earliest material in the southern highlands is from Kaminaljuyu and is at earliest probably 800 BC and possibly as late as 550 BC (4). Considering that there is well documented occupation on the Pacific coast of Guatemala as early as ca. 1200 BC in the La Victoria zone, it seems possible that the earliest settlers in the highlands came from this coast (Coe and Flannery 1967:68-69). There is also the fact of strong typological ties connect early pottery complexes from the coast and the southern lowlands. In view of the above, and that the earliest material in the northern highlands is thoroughly within the highland ceramic traditions, these northern regions must have been populated initially from adjacent highland regions, i.e. from south to north. (iv) All or most of the affiliations of the early pottery around La Victoria are with early cultures to the West and Northwest in Mexico; i.e. in Oaxaca (Flannery, personal communication 1967), and Chiapas (Coe and Flannery:ibid), and Veracruz (Coe, Diehl and Stuiver op. cit:1400). Even the early Salvadorean material has linkages in that direction (Sharer and Gifford 1970:452). Considering these data, it would seem that the stimulus initial shift to agricultural village life in both the Pacific coast and the southern highlands of Guatemala should have come from the Mexican lowlands. MacNeish has suggested in an important paper (1966) that the coastal zones of Mesoamerica may be where initial preagricultural sedentism was established. In other words, village life, based on exploitation of marine and estuary resources, and on wild plants and animals may have been the first form of sedentism in Mesoamerica. Later adaptation of agricultural plants and ideas from the highlands only transformed the kind of sedentism, but did not establish it. If this hypothetical construction should prove to be the case, the picture becomes one of the flow of ideas and plants through these initial sedentary populations, followed by physical and demographic expansion into zones more favorable for purposes of agricultural exploitation.

Summarized into map form (Figure 1), one sees that the initial populating of, and cultural flow into, the Maya areas ran from West to East ans split along the Maya highlands (5). This scheme would fit well with

that of Borhegyi's (1965) reconstruction of early highland Maya culture history except for the important feature of the Maya lowlands being colonized from Veracruz-Tabasco rather than from the highlands. There is also the difference of the possible additional later increment of population coming over the low mountain ranges of Salvador and Honduras.

Any future research should take account of the following possible routes which have not been touched upon in our work. The first leads from the vicinity of Kaminaljuyu and down the Motagua River Valley. To reach the Maya Lowlands Proper, one must then cross or skirt the Lake Izabal region. No preclassic is surely known from the Motagua, nor would the region have been very inviting to early farmers, if its extremely arid characteristics in some parts represent a prehistoric climatic aspect. However, this is certainly a zone which should be explored inasmuch as later cultural developments are known to have occurred there. A final possible route is that of the Uloa Valley in Honduras in which truly early material has already been found. The question here is whether or not the preclassic material represents an isolated phenomenon or is historically connected with settlement of the Maya Lowlands. This is certainly a matter of importance to be investigated (Strong 1948).

A site which is potentially of much importance in this matter of early cultural origins, is that of Dzibilchaltun, in the far northern lowlands which has pottery of an early aspect (Andrews 1968:40). However, this early pottery has no typological ties with any of the presently known contemporary pottery of the 9-600 BC time horizon (Willey, Culbert and Adams 1967:293). The arrow in Figure 1 implying historical ties to the south is therefore highly speculative. Obviously further work along the southwest coast of Yucatan is in order, and Jack Eaton has recently made an intensive reconnaissance in this area.

In terms of fulfilling our project objectives we have obviously made only a start. In addition, certain preconceptions, such as that there would be a preclassic to detect, have had to be discarded. A negative conclusion is obviously a problem of vastly greater magnitude than a positive one and also takes a greater amount of proof. For this reason, and also because the

implications are far reaching, the above conclusions have to be regarded as a series of more or less tenable hypotheses. These nevertheless can be combined to make an attractively integrated theory of the origins and sources of some of the early populations and cultures of the Maya areas.

Notes

1. Two field seasons were funded by National Science Foundation Grant no. GS-610 to the University of Minnesota for the project entitled: "The Ceramic Chronology of the Southern Maya." The Graduate School of the University of Minnesota also made a grant-in-aid to the project. R. E. W. Adams was principal investigator assisted in the field the first season by Kent Day, University of Minnesota, and in the second season by Ronald J. Nash, University of Alberta. I am indebted to Sr. Carlos Samayoa Chinchilla, former director of the Instituto Nacional de Anthropologia e Historia de Guatemala for official permission to work and for much other aid. I also thank the following persons in Guatemala for invaluable assistance: Srs. Celestino Brol, Edmundo Brol, Srta. Eluvia Brol, Sr. J. Brol, Sra. Bill Cox, Sr. J. Gonzalez, Sr. R. Mata, Dr. G. Mata, Sr. and Sra. Carolos Nottebohm, Lic. A. Molina Orantes, and Dr. H. Quirin. Thanks also go to Drs. P. Becquelin, S. F. de Borhegyi, J. C. Gifford, Lee Parsons, R. Sharer, and G. R. Willey, as well as to Mr. E. Ogan for constructive criticism and other help. Figure 1 is by Gordon Lothson. An earlier version of this paper was presented at the annual meeting of the American Anthropological Association at Pittsburgh in November, 1966. A final report is now in preparation.

2. F. Blom refers to many of these accounts in The Maya ball-game pok-ta-pok (called tlachtli by Aztec) (Mid. Amer. Res. Series, No. 4, Tulane University, New Orleans, 1932).

3. Described in detail in W. Sanders and B. Price, 1968, Mesoamerica, The Evolution of a Civilization New York: Random House, esp. pp. 123-4.

4. These dates are my own estimates based on comparative studies carried out both during the Altar de Sacrificios and Cotzal Projects. There is the possibility that Arevalo, the earliest Kaminaljuyu complex, may contain material earlier than 800 BC as it is presently constituted. A project presently under way at Kaminaljuyu under the direction of W. T. Sanders may answer many such questions.

5. Figure 1 has been somewhat anticipated by that of Jimenez Moreno in his 1959 synthesis article on Preclassic and Classic Mesoamerican prehistory (May 1). However, Jimenez's map differs in that it outlines the putative cultural movements of the Tenocelome (Olmec) culture into Eastern Mesoamerica, whereas I am not yet prepared to accept the initial population movements and cultural flow as being Tenocelome in origin. In addition Jimenez makes clear in another map (Map 3) that he conceives of the Maya in the Preclassic as having a cultural unity embracing both highland and lowland zones. W. Jimenez Moreno, 1966 "Mesoamerica Before the Toltecs," in Ancient Oaxaca, (Ed. by J. Paddock) Stanford University Press.

Table 1.

Correlation of the Cotzal Valley ceramic sequence with absolute time and the major cultural periods of Mesoamerican prehistory. Dates are based on ceramic comparisons with other sites and no C14 dates are available. The sequence names are those of the appropriate ceramic complexes.

TIME	COTZAL VALLEY SEQUENCE	MAJOR MESOAMERICAN PERIODS
1550		
1500	CHAJUL	LATE
1400		POSTCLASSIC
1300		
1200		
1100	LATE	EARLY
1000	COTZAL	POSTCLASSIC
900		
800		
700	EARLY	LATE
600	COTZAL	CLASSIC
500		EARLY
400		CLASSIC
300	TUBAN	
200		
100		PROTOCLASSIC
0 AD		

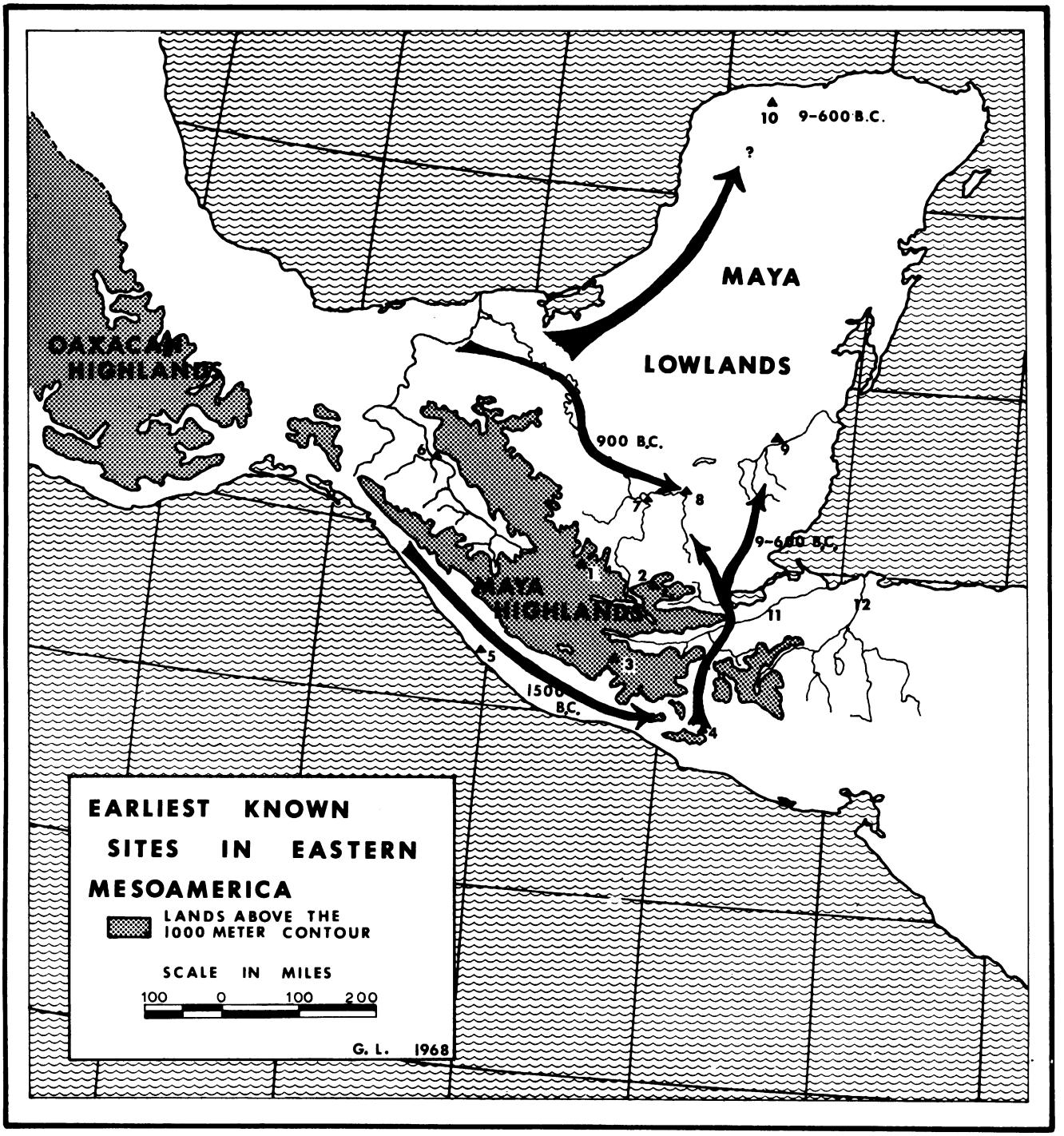
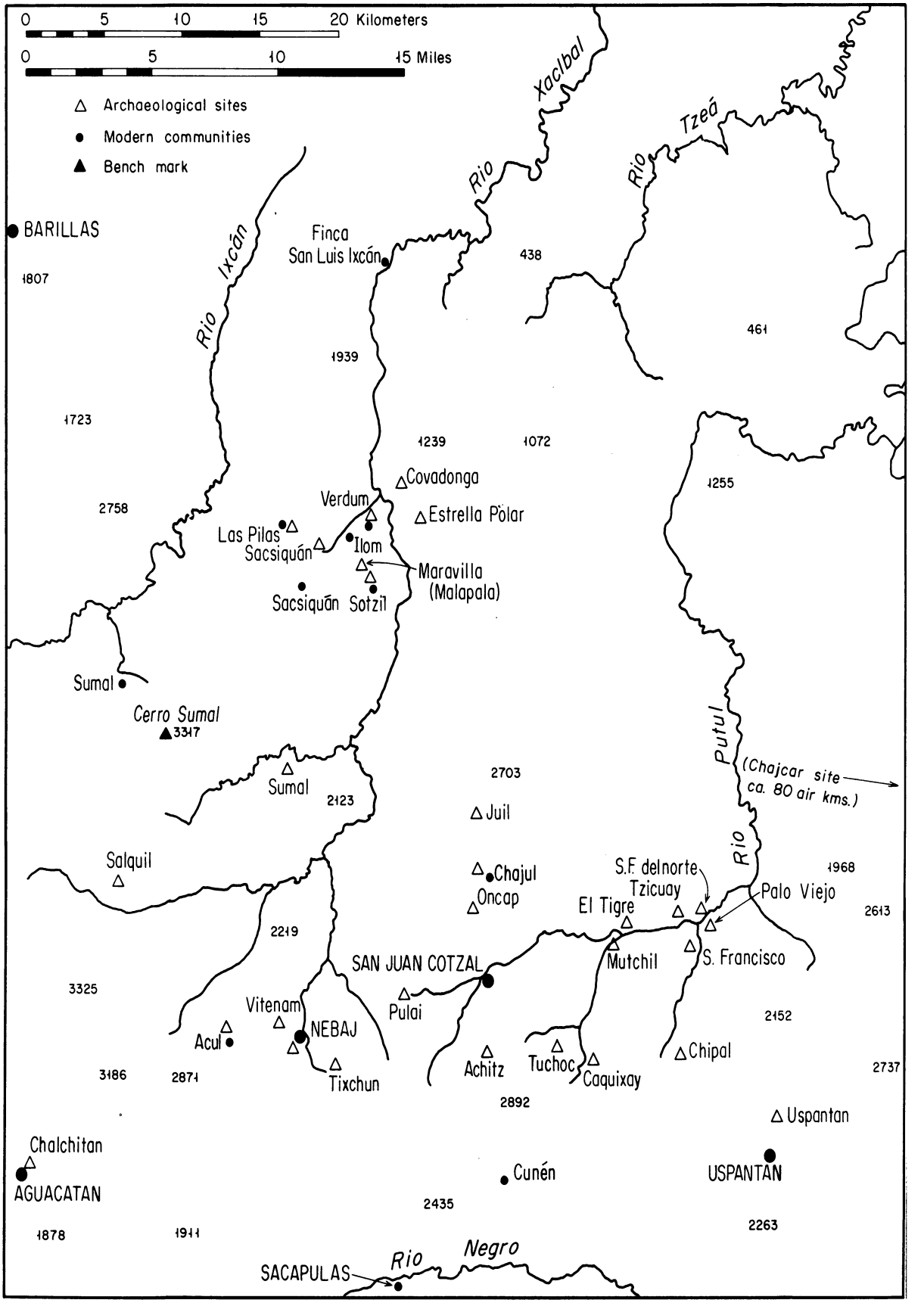


Figure 1. Earliest known sites in Eastern Mesoamerica and geographical features. Stippled areas are above the 1000 meter contour. 1. Cotzal sites, 2. Chajacar, 3. Kaminaljuyu, 4. Chalchuapa, 5. La Victoria and Salinas La Blanca, 6. Chiapa de Corzo, 7. Altar de Sacrificios, 8. Seibal, 9. Barton Ramie, 10. Dzibilchaltun, 11. Motagua River, 12. Ulua River.



After Map ND 15-4 series E503

Figure 2. Regional map of the Cotzal-Nebaj-Ilom region showing archaeological sites producing ceramic collections in this study.

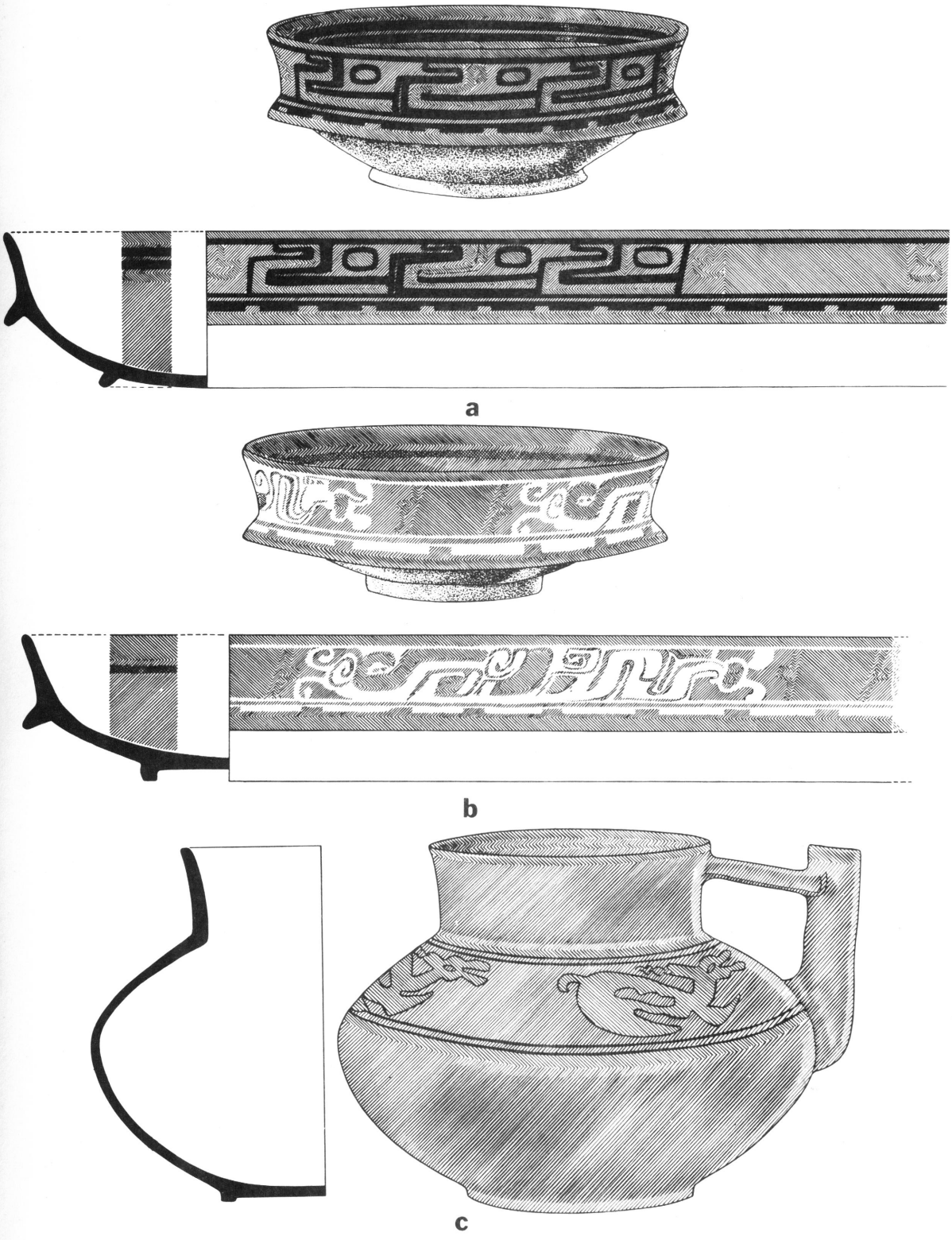


Figure 3. Early and Protoclassic lowland polychrome vessels found in a tomb at Tzicuay, by A. L. Smith.

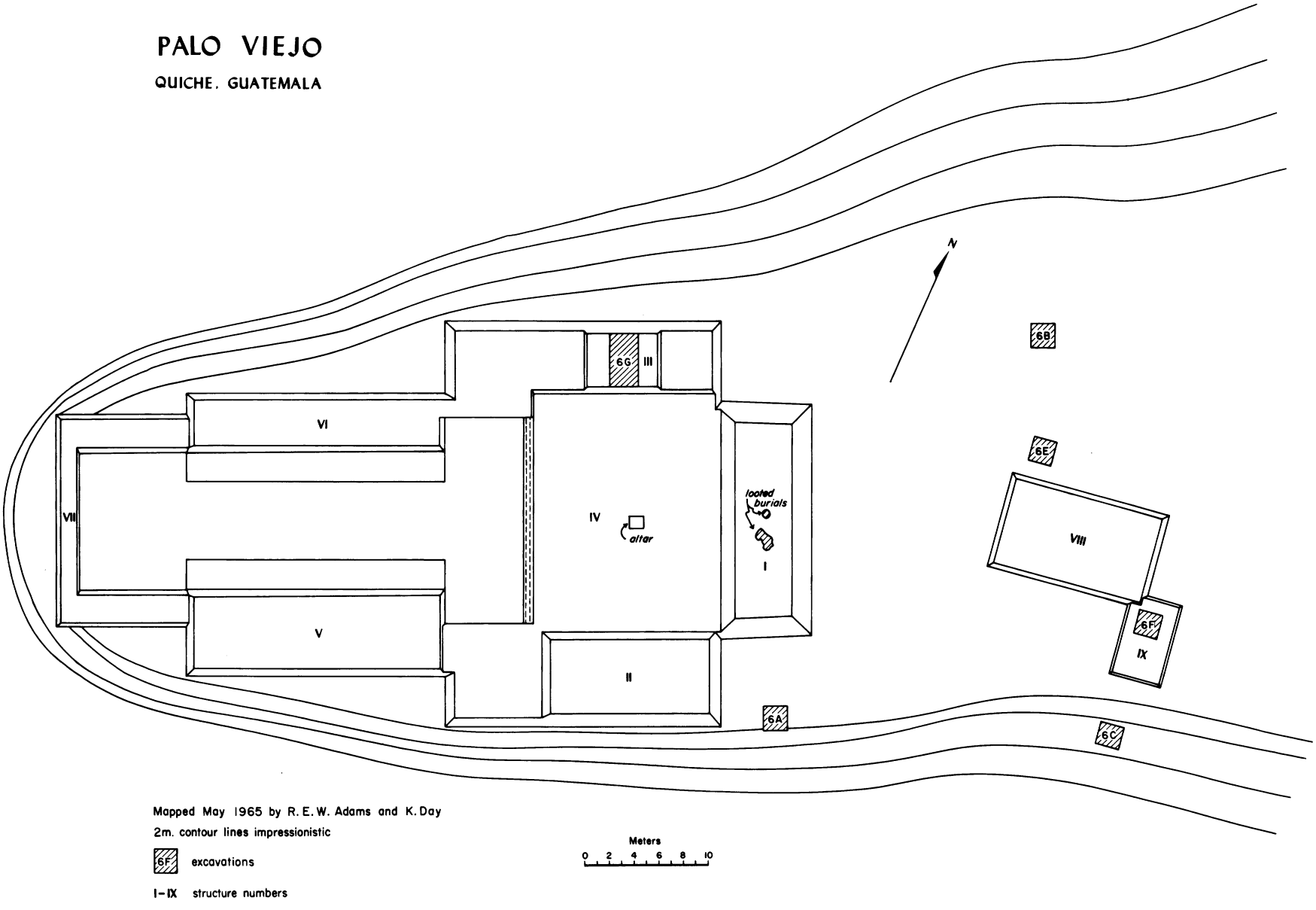


Figure 4. Site map of Palo Viejo, a typical ceremonial center.

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II. ARCHAEOLOGICAL INVESTIGATIONS IN THE NORTHERN MAYA NEW DATA ON THE MAYA PRECLASSIC

David W. Sedat and Robert J. Sharer

The origin of settled life in the southern Maya lowlands, a region that saw the later spectacular culmination of Classic Maya civilization, has been a problem of longstanding as well as contemporary interest. The earliest extant cultural remains in the southern lowlands are the Xe-Real ceramic complexes (Altar de Sacrificios and Seibal) confined to riverine settings of the southern portion of the area. As Willey, Culbert, and Adams have already noted, these early complexes are "diverse, apparently highly regional, and of uncertain time depth" (1967:293); although Xe-Real ceramics, on the basis of modal similarities, show possible ties to the Chiapas Grijalva Valley (Dili-Escalera phases), the Guatemalan Pacific Coast (Conchas phase), and the Gulf Coast Olmec region of Veracruz (La Venta and Tres Zapotes complexes) (Willey 1970:355). R. E. W. Adams feels that the most likely source for Xe-Real peoples is the adjacent lowlands of Tabasco and Veracruz (1969:21, 1971:154). On the other hand, Sharer and Gifford in a recent article (1970) postulate the southeastern Maya highlands, in view of the evidence from the site of Chalchuapa, El Salvador, to be one of the likely sources for certain segments of the earliest lowland populations.

The hypothesis advanced by Sharer and Gifford is based upon two factors, the first being the finding of ceramics at Chalchuapa (Colos ceramic complex ca. 900-650 B.C.) that are typologically closely related to Xe pottery at such Lowland Maya sites as Altar de Sacrificios and Seibal as well as with early Jenny Creek pottery from Barton Ramie. The second factor is the discovery of typological antecedents to these related ceramics in the stratigraphically preceding Tok ceramic complex (ca. 1200-900 B.C.) at Chalchuapa. This evidence indicates that the southeastern Maya highlands were not only the locus of an early sedentary population but also one of the probable sources for the migration of agricultural peoples to the Maya lowlands (Sharer 1969:64-68, Sharer and Gifford 1970:452-3).

The ceramic links between the southeastern highlands and the early settlements in the southern and eastern lowlands appear to relate pottery producing populations residing in these two regions, for the pottery involved, especially the Jocote group, is of a domestic nature and hence not explainable as a result of some other process such as trade (Gifford 1968:2, Sharer and Gifford 1970:450). If the southern highlands were indeed the origin region of some of the first lowland colonists, then the intervening areas should provide concrete evidence for early migrations. Sharer and Gifford have already suggested that the most direct migration routes to the lowlands from the southern highlands are through the Copan, Polochic and Mojo valleys, as well as parts of British Honduras (1970:453).

Although most of the area between the southern Maya lowlands and the Maya highlands is unknown archaeologically, there has been a great deal of speculation concerning the prehistory of this intermediate area and its role during the Preclassic eras. For example, the northern highland region of Guatemala (comprising in part the present-day departments of Alta Verapaz and El Quiche) is between the southern highlands (which contain such important sites as Kaminaljuyu and Chalchuapa) and the southern lowlands, and has a scant record of archaeological research. The northern highlands also harbor the sources of the Salinas-Chixoy and Pasion rivers, both important rivers in the Maya lowlands. These north-south trending river systems might have been used by early peoples as natural corridors into the lowlands from the highlands. However, R. E. W. Adams, after conducting an archaeological survey in the Cotzal Valley (northern El Quiche) and at Chajcar (Alta Verapaz), has concluded there was "an essential vacancy of much of the Maya highlands until relatively late in the Preclassic period" (1969:20). Adams also reports that his examination of three large private collections of intact pottery vessels from these regions revealed a lack of Preclassic pottery; thus, "if the adjacent highlands are largely vacant at the time of the earliest complexes now known in the lowlands, then we cannot derive cultural ideas, nor people, nor agriculture from these same vacant areas" (1969:20). Adams apparently wishes to infer from his examination that there was little or no contact between the Preclassic highland cultures and the first agriculturalists in the lowlands. Accordingly, Adams would not see the Late Preclassic floresence in the highlands

(for example, at Kaminaljuyu) to have greatly influenced the Lowland Maya's evolution towards civilization (1968:10, 1969:21). The declaration of the northern highlands to be a vacant or feebly developed region during the Preclassic has apparently received general acceptance by various writers in recent articles (Willey 1970:322, Puleston and Puleston 1971:332).

More recent excavations in the Alta Verapaz have provided preliminary evidence suggesting Adams' conclusions regarding the prehistory of the northern highlands may be somewhat premature. During the month of July, 1971 exploratory excavations were conducted at the site of Sakajut, Alta Verapaz (Figure 1). The site of Sakajut is located approximately 2 km. south of the town of San Juan Chamelco and an equal distance north of the previously reported archaeological site of Chichen (Smith, 1955:60-62). The site is in a region of karst topography and partially cleared pine forests; milpa is presently being planted over the site itself. Sakajut is a previously unreported site discovered by Sedat during an informal reconnaissance of the region in 1964. The site proper, consisting of five earthen mounds arranged around a central plaza (Group A) is situated on a terrace of the Sakajut River, a small tributary of the upper Coban or Cahabon River. Across this small river and to the south is another group of eight earthen mounds (Group B), including an open-ended ball court (Figure 2).

The 1971 excavations at Sakajut consisted of a single test pit located at the base of one mound (Structure 2) and a more thorough excavation of the base and summit of another mound (Structure 3; Figure 2). The test pit at the base of Structure 2, located on the apparent western axial line of the structure, revealed first a shallow humic layer followed by 1 m. of sterile yellow clay constructional material. At the base of the construction and resting on sterile clay was a single vessel (Cache #3) apparently deposited during the construction. Cache #3 is a Black-Brown ware vessel belonging to the Pinos Ceramic Group (Jorgia Incised: Variety Unspecified) common to both the sites of Kaminaljuyu and Chalchuapa. On the basis of shape comparisons to Chalchuapa ceramics, this vessel may date as early as the late Middle Preclassic (Kal Ceramic Complex, ca. 650-400 B.C.).

However, an assessment by Edwin M. Shook (Personal Communication, 1971), based upon the incised motif as it occurs at Kaminaljuyu, would place the vessel in the Late Preclassic (Miraflores phase). Based upon this limited evidence, the construction of Structure 2 may be placed in either the late Middle Preclassic or the Late Preclassic.

The excavations on Structure 3 were more extensive than those conducted on Structure 2. Briefly, a series of test pits were dug along the east-west and north-south axial lines. These excavations revealed at least three superimposed earthen rubble and clay constructions (Figure 3). The uppermost, presumably latest construction (Structure 3-1st), consists of sterile layers of banded red and yellow clays. There was no attempt to reveal the three-dimensional form of any structure; however, in section, a series of eroded simple terraces could be discerned for Structure 3-1st (Figure 3). Directly beneath this was Structure 3-2nd, an earthen construction with two simple terraces. Traces of an even earlier construction (Structure 3-3rd) were found near the center of the mound. Beneath all this construction was a black humic layer, approximately 20-30 cm. thick, which overlaid a sterile clay deposit. Partially intruded into this basal black level (and presumably contemporaneous with the construction of Structure 3-2nd) was a partial vessel and intact obsidian blade (Cache #1). This vessel is a flat-bottomed, flaring-walled bowl with a slightly incurving rim. A thick-line, blotchy resist technique was used to decorate both the interior and exterior of the vessel. The exact chronological placement of this vessel remains to be clarified, but it is certainly Preclassic and possibly related to the earliest Usulutan traditions of the Middle Preclassic in the southern Highlands (Puxtla Ceramic Group at Chalchuapa and Las Charcas Phase at Kaminaljuyu).

During the course of these rather brief and preliminary excavations, a total of 1066 sherds were recovered from the various test pits. Although the bulk of this material remains in Guatemala, the material from the earliest stratigraphic feature, the basal black layer, has been thoroughly studied. Sherds from this deposit are relatively sparse, but contain several important early types with close modal affinities with other ceramic complexes

of the Terminal Early Preclassic and Middle Preclassic eras. The exclusive vessel forms found in this basal stratum are tecomates and flat-bottomed bowls. Decorative modes include red-painted rims, exterior red slip, white-rimmed black ware, interior finger punching, impressed applique fillets, post-slip incising, fugitive black paint and red/orange paint, zoned punctations, and one example of possible rocker-stamping on a tecomate rim.

The entire sequence of cultural activity at Sakajut is not known at this time. A preliminary assessment of time depth for the site is provided by the excavations on Structure 3, however, only a very small portion of that mound was tested. The earliest evidence of occupation is the black earth stratum (Feature 3) underlying the three known structures of the mound. On the basis of the ceramic content, this stratum is dated from the terminal part of the Early Preclassic to the early Middle Preclassic. Feature 3 is interpreted as a preconstructional top soil, perhaps cultivated by early agriculturalists. This interpretation is supported by many charred carbon fragments of twigs and branches found within Feature 3 which could indicate slash-and-burn agriculture. Structure 3-3rd, the earliest revealed, was neither extensively uncovered nor sampled, but its position directly beneath Structure 3-2nd indicates its antecedence. Structure 3-2nd, on the other hand, is an earthen, terraced construction possibly dated as early as the Middle Preclassic based on the temporal assessment of a cache (Cache #1) already discussed. After an interval of undetermined length, Structure 3-2nd was covered over by Structure 3-1st. As revealed in profile, this clay construction approximates the architecture of Structure 3-2nd. The dating of Structure 3-1st is problematic due to the sterile nature of the clay fill and surfaces. However, on the basis of close constructional similarities to Structure 2 (dated as Middle Preclassic to Late Preclassic by Cache #3), Structure 3-1st may be regarded as contemporaneous with Structure 2. In other words, Structure 3-1st seems to date from late Middle to Late Preclassic. The abandonment or cessation of maintenance of Structure 3-1st (and possibly the site in toto) is inferred by the presence of a series of intrusive pits into the summit of the structure. One of these pits was filled with domestic debris and contained Classic period sherds. By the Classic period (ca. A.D. 300-900) the focus of local cultural activity

seems to have shifted to Chichen or Group B to the south. In sum, river terraces at Sakajut seem to have been occupied at an early date by agricultural peoples. Subsequently, this area became the focus of ceremonial activity during the Middle Preclassic based upon the various superimposed structures and associated cached vessels at Sakajut (Group A). Ceremonial activity apparently ceased during the Late Preclassic and presumably was relocated elsewhere, probably Group B. Sporadic activity at Group A, seemingly domestic, is indicated during the Classic period.

Bearing in mind the preliminary nature of this report, the 1971 excavations at Sakajut provide an important source of new data on the early occupation in the northern highlands. For the first time archaeological research has produced definite evidence of substantial Preclassic populations in the northern Maya highlands. Furthermore, the evidence indicates that these apparently initial sedentary populations date from a much earlier time than previously suspected.

Sakajut is not a unique or unusual site for the Alta Verapaz region, nor the only settlement of its time period in the region. A brief reconnaissance by Sedat and Sharer in the San Pedro Carcha area (about 10 kilometers north of Sakajut) revealed another site dating from the terminal Early Preclassic to Middle Preclassic based upon a surface collection of sherds. Furthermore, at the site of El Porton, near San Jeronimo, Baja Verapaz (Smith, 1955) surface collections made in 1970 and 1971 revealed material dating from the terminal Early Preclassic or Middle Preclassic. In this sample there were tecomate rims with interior finger punching, white-rimmed tecomates, and Jocote related types. Another important discovery was made at El Porton where a Preclassic monument with intriguing motifs reminiscent of Olmec and Izapan iconography was revealed (Sharer and Sedat 1971).

This supplemental information, when combined with the data from Sakajut, indicates that the northern highlands were not only substantially populated from an early date and that these populations may have been involved in the early cultural contact between the southern Maya highlands and the lowlands, but that they also participated in the cultural developments of the rest of Mesoamerica, particularly the Late Preclassic florescence of the southern highlands.

In regards to the significance and nature of the early occupation in the northern highlands, one may speculate that the first inhabitants of this region were pioneers moving into an essentially vacant area in search for agricultural lands. This movement of people beginning as early as the terminal part of the Early Preclassic might reflect population pressures already eminating from the southern highlands and Pacific Coast where village life and agriculture are demonstrably earlier (Coe and Flannery 1967, Green and Lowe 1967). Populations migrating to the northern highlands from these southern regions would have encountered a varied virgin environment, including tropical highland rain forest and stands of pine. Steep terrain would separate the inhabitable areas. Nevertheless, these migrating populations can reasonably be inferred to have also pushed further north until they finally reached the lowlands of the Peten. There, they might have found other newly established peoples, possibly from the lowlands of Tabasco and Veracruz.

Another speculation concerning the role of the northern highlands during the Preclassic is afforded by the location of Sakajut, both within its immediate geographical area as well as by its proximity to important highland natural resources. Located on an elevated river terrace, Sakajut commands the narrowing portion of the Chamelco valley. Through this portion of the valley runs an important system of native foot-paths leading south to Tactic and beyond. Branches of this trail system lead to the east via Tucuru to the Polochic valley; another trail system leads to the north into the Peten. The antiquity of many of these pathways may well go back to Preclassic times, but verification of this must await further archaeological reconnaissance along this trail system. Local informants indicate that these and other trails are still used by inhabitants and itinerate peddlers. Guatemala City is reported by these informants to be about four days unladen foot-travel from Chamelco (Sakajut) by these trails. The Peten is a week or less away from Sakajut. Thus, the position of Sakajut along a presently used trail system may be indicative of its ancient role as a trade center or control outpost.

Sakajut is not only favorably connected to a modern trail system, but is also in relatively close proximity to three important highland natural

resources: jade, quetzal feathers, and obsidian (Figure 1). Jade occurs in situ near Manzanal in the Middle Motagua River valley and possibly may also be found in other parts of the Sierra de las Minas (Alta Verapaz) and the Sierra de Chuacas (Northern El Quiche and Baja Verapaz) (Thompson 1970:139). These actual and potential sources for jade are only two to three days journey from Sakajut. Another resource originating in the Alta Verapaz region are quetzal feathers, prized by the Maya and Olmec for adornment. Finally, one of the most logical routes for the movement of El Chayal obsidian reportedly found at the Olmec Gulf coast site of San Lorenzo, Veracruz (Cobean et. al., 1971) could have been through the Alta Verapaz and down the Usumacinta drainage system.

In summary, Sakajut, even after only preliminary excations, has provided important evidence that the northern highlands were not vacant nor feebly developed during the crucial Middle and Late Preclassic periods. While it is not yet entirely clear just what the precise relationship of these initial populations was to other pouplation centers in Mesoamerica, the very presence of early agriculturalists in the northern highlands might be indicative of the migrations previously suggested (Sharer and Gifford 1970) to have played a part in the introduction of certain ceramic types in the lowlands. These same northern highland populations might also prove to have acted as intermediaries in early trading patterns or ritual exchange systems. Thus, the northern Maya highlands emerges as a crucial area of cultural contact and transition between the precocious southern area and the initial settlement and ultimate florescence of the lowlands. While this obvious importance of the northern highlands was noted as early as 30 years ago by A. V. Kidder (1940:121), only future research now being planned for this region can provide the data concerning the nature of Preclassic settlements in this area as well as the relationships to the Maya lowlands and the southern Maya highlands. The solution of the problem regarding the origins of lowland Maya populations and the rise of Maya civilization can only be further clarified by the results of these anticipated studies.

Figure 1. Map of Mesoamerica showing archaeological and mineral sites mentioned in the text.

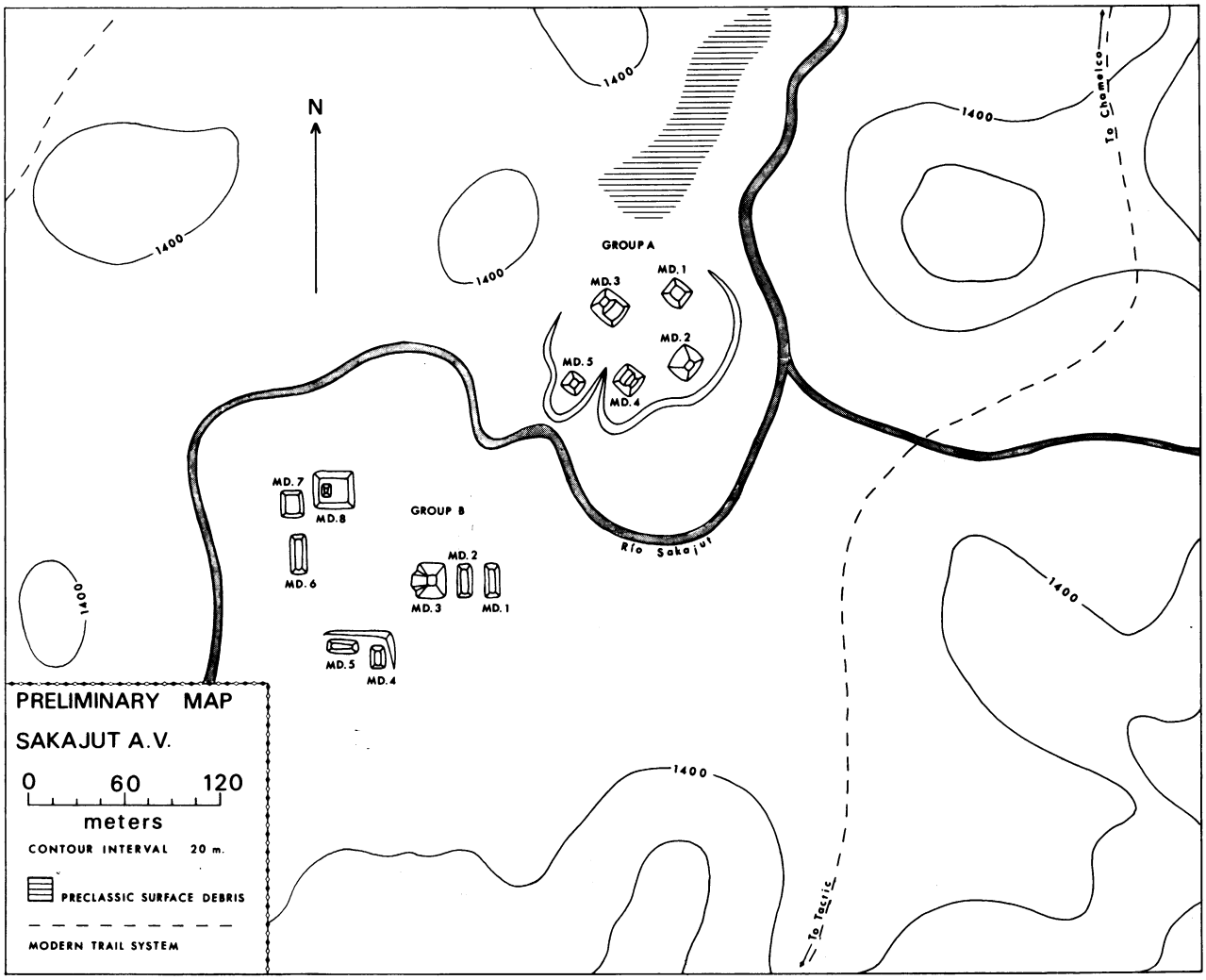

Figure 2. Preliminary map of Sakajut, Alta Verapaz, Guatemala.

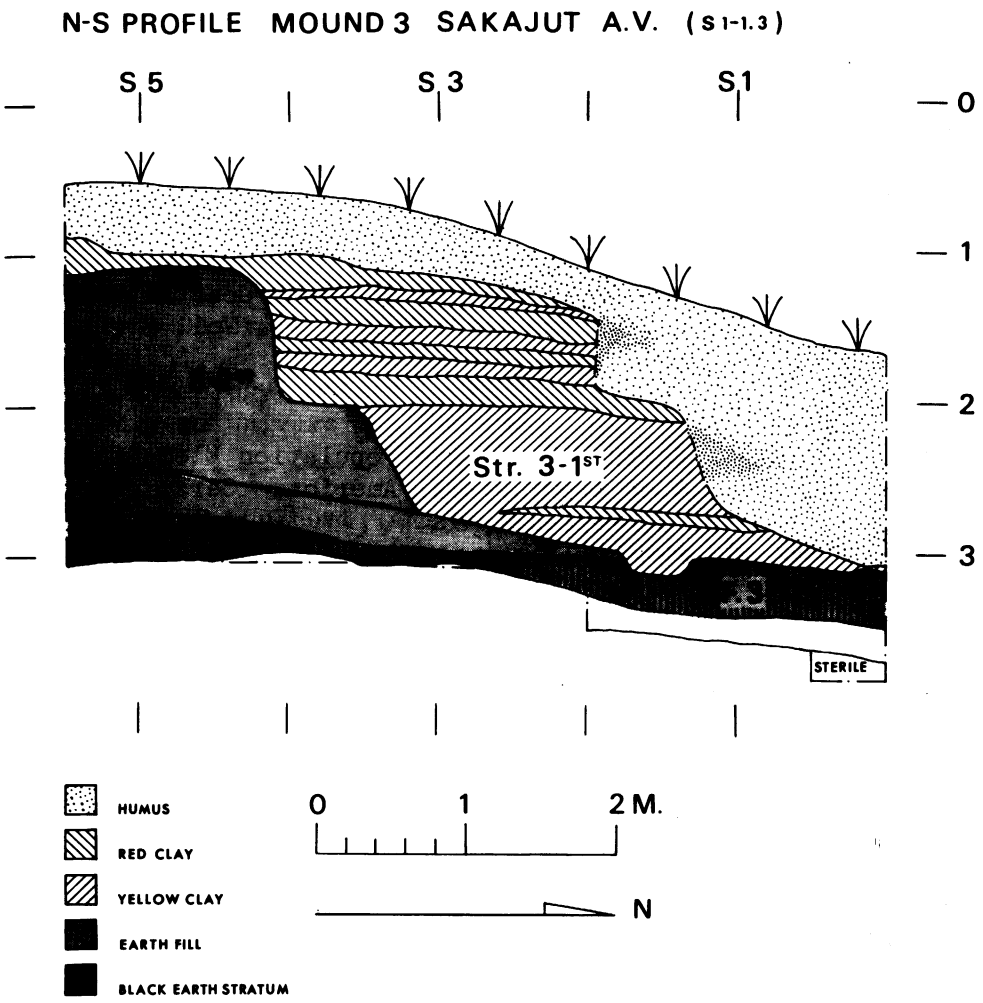

Figure 3. North-South profile, Mound 3, Sakajut, A.V.

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III. RADIOCARBON DATES FROM COPAN, HONDURAS

John A. Graham and Rainer Berger

The Maya ruins of Copan, located in western Honduras, lie on the very frontier of Classic Maya civilization. In spite of their peripheral situation, however, few indications of a frontier settlement are evident in the known remains which constitute one of the finest exponents of Classic Maya civilization (1). Extremely fine architecture and sculpture eloquently testify to the brilliance of the Copanec artists while the rich corpus of hieroglyphic inscriptions has frequently been interpreted to mark Copan as an intellectual leader among Maya communities. Although an intensive aspect of the Classic Maya tradition, the material expression of Copan culture is highly distinctive and testifies to the originality of its artists and the sophistication of their patrons. Perhaps the individuality of Copan derives in part from its frontier location even though the cultures beyond were only the palest reflections of the greater Maya splendor. And more likely, the wealth of Copan derived in part from international commerce and from its closely related role as a great center of pilgrimage (the ancient antecedent to Esquipulas?).

Although careful and painstaking research has been carried out in the Copan valley by a number of archaeological expeditions from Carnegie Institution of Washington, and earlier by Peabody Museum of Harvard, the magnitude of the task of recovering Copanec history is so great that many years of work remain to be completed before an adequate knowledge of the valley is obtained.

A preceramic occupation in the valley of Copan has been suggested but thus far remains to be confirmed and elucidated. Preclassic activities in the valley are more definitely established by several battered sculptures of quite early style as well as by good ceramic evidence. Although the nature and extent of the Preclassic occupation remains unknown, it was probably of considerable importance; the general impression of a rather scanty and uncomplicated Preclassic very likely derives from its obscuration and disturbance by the intensity of Classic Period use of the valley. Considerable Early Classic activity in the valley is well evidenced although it is the

fine Late Classic remains which have received most of our archaeological attention, partly because of their great accessibility at the main site of Copan. Although Classic standards of sculptural and inscriptional activity came to an end early in the ninth century, Postclassic occupation of the valley is established but is little known.

Since the ceramic, architectural, and sculptural aspects of Copanec cultural development are so highly distinctive and individual, only generalized features of these traditions can be correlated with the comparable developmental histories defined nearer the center of the Classic Maya heartland, and the basis of a more precise chronology for Copan's history has depended upon interpretation of the Classic period hieroglyphic dates. With this situation in mind, and as no radiocarbon age measurements were available for the southwestern region of Classic Maya civilization, an effort was made to collect suitable carbon samples for dating when R. F. Heizer, P. Drucker, H. Williams, and J. Graham visited Copan briefly during the course of archaeological research in southern Mesoamerica in 1967. Additional samples and data were collected by J. D. Clark and J. Graham in 1969. Our brief researches at Copan were greatly facilitated by the kindness and attentions of Dr. Jesus Nunez Chinchilla, Director of the Instituto Nacional de Antropologia in Tegucigalpa, while financial support and technical assistance were provided by the Archaeological Research Facility of the University of California, Berkeley.

One of the finest examples of Copan architecture is Mound 26 or the "Temple of the Hieroglyphic Stairway." Although only a small portion of the elaborately sculptured sanctuary, or temple proper, has survived, the approximately ninety feet high pyramidal substructure is famous for its magnificent hieroglyphic stairway. In addition to an ornamentation of various fine sculptures, some sixty odd risers of the stairway were carved with hieroglyphs to form the most extensive glyphic inscription to be preserved to us. Morley has suggested that work on the stairway may have begun shortly after A.D. 700 (2), and the epigraphic evidence strongly indicates dedication of the stairway very near A.D. 750. Stela M, erected immediately in front and centered upon the stairway, is inscribed with the certain dedicatory date of A.D. 756 (GMT correlation; Maya Long Count date 9.16.5.0.0).

During archaeological excavations on behalf of the Carnegie Institution of Washington in 1936, Gustav Stromsvik (3) opened a tunnel ("Copan Tunnel 2") through the base of Mound 26 along a west to east axis beginning just south of the hieroglyphic stairway. The tunnel encountered various stages of earlier construction buried by later activities before sloping downward to reach a basal deposit of naturally laid, dark gray fine silt containing some stream cobbles and which apparently represents floodplain deposits of the Copan river. Upon this sterile deposit the tunnel exposed a thin midden level containing sherds, charcoal, and animal bones. Dating of this pre-Mound 26 midden deposit has rested upon Longyear's identification of one or two sherds as "definitely Early Classic" (4).

Our first carbon sample consists of mixed earth and charcoal from the midden exposed at the very end of the tunnel. The radiocarbon age of 1700 ± 110 years, or about A.D. 250, is in excellent agreement with the available archaeological evidence and indicates an early Early Classic date for the sub-mound midden.

Our second sample, UCLA-1420, consists of charcoal removed from a floor matrix beneath, and associated with, the latest interior architecture exposed by the tunnel. The measured radiocarbon age of 1200 ± 70 years is to be adjusted to A.D. 600, 700, or 800 to correct for secular variations (5). Based upon stratigraphy, UCLA-1420 should date later than the pre-mound midden deposit placed at A.D. 250 ± 110 years by our first sample; similarly, it should date earlier than the age of the final construction of the hieroglyphic stairway which was completed about A.D. 750. Thus, the age of the second sample seems best at A.D. 600, with A.D. 700 being possible but less probable, and A.D. 800 being impossible.

In conclusion, the radiocarbon age measurements reported here are the first to be obtained for archaeological materials from the Copan area. Their ages are in excellent agreement with the current archaeological chronology and interpretation of Classic period Copan history. In addition the sample UCLA-1420 provides evidence from the southwestern corner of the Classic Maya realm bearing upon the European-Maya calendar correleation. With Stela M

securely dated at 9.16.5.0.0 in Maya chronology, a 12.9.0.0.0 or Spinden ("type A") correlation placing Stela M at about A.D. 500 is definitely incompatible with the indicated age of the latest pre-hieroglyphic stairway substructure architecture. The radiocarbon age is in agreement with an 11.16.0.0.0 or other later equation (6).

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IV. THE RECORDING OF MAYA SCULPTURE

John A. Graham and Steven R. Fitch

The beginnings of a useful recording of Maya sculpture may be said to date to the travels of John L. Stephens and Frederick Catherwood in the early 1840's. A number of earlier explorers undertook the drawing of Maya monuments, but the scope of their work was never so extensive and their renderings of sculptures were almost invariably Europeanized, as, for example, in the unfortunate neo-classic mannerisms of Waldeck in his drawings of Palenque stucco. But drawing upon the resources of the camera lucida and their own remarkable talents, Stephens and Catherwood succeeded in accumulating a record of extraordinary excellence which embraced an impressive sampling of Maya art from Copan to Chichen Itza. The wide circulation of Catherwood's drawings deriving from the success of Stephens' lively narratives was a major stimulus in the re-awakening of interest in the ancient civilizations of the New World and led eventually to the beginnings of scientific research. Although of outstanding importance for the age, Catherwood's drawings are by no means adequate for modern studies, and today they are to be valued mostly for their antiquarian charm and as works of art in their own right. The often repeated notion that "Catherwood's drawings are so accurate in their details that the hieroglyphs can be read" is true at times although much more accurate glyphic transcriptions are required for serious epigraphic investigations.

Four decades subsequent to the explorations of Stephens and Catherwood, and as a direct result of their stimulus, the beginnings of modern scientific field archaeology in Mesoamerica were initiated by A. P. Maudslay in the Maya area. The precise and detailed recording of Maya sculpture was at the forefront of Maudslay's plan of campaign, and the excellence with which he realized his goal has as yet not been surpassed in an endeavor of comparable magnitude. Relying upon photography and casting, already introduced into Maya field studies by Desire Charnay, Maudslay published in a lavish format magnificent photographic plates accompanied by line drawings of the sculptures. The drawings were prepared on the basis of photographs, casts, and

field notes, and then were often checked against the originals in the field. It is difficult to be overly generous in the praise of Maudslay's contributions which laid the foundations for modern studies of Maya art and epigraphy. It is therefore in no way depreciative of his outstanding accomplishments to remark that it is surely inevitable in any great project involving such extensive drawing that despite every precaution some errors occur in Maudslay's renderings. However, since Maudslay's drawings are ordinarily paired with excellent photographic illustrations, it is often possible to correct the errors by reference to the photographic plates.

The investigations of Teobert Maler largely overlap the period of Maudslay's field studies in the Maya area. Maler was not the scientist that Maudslay was, but with often meager resources and under frequently most difficult field conditions, he produced a photographic record of Maya sculpture that is of inestimable value. His drawings made little pretention to be beyond the level of field sketches.

Regretably, the superlative standards of Maudslay were not emulated in subsequent recording of Maya sculpture. The great contributions to Maya art and epigraphy of Sylvanus G. Morley and Herbert J. Spinden, while adding enormously to the corpus--above all in the case of Morley, seldom achieved the photographic level of excellence set by Maudslay and rarely even distantly approached the level of reliability of his drawings. Fortunately, however, recent years witness a renewed effort at careful and painstaking photography and drawing of Maya monuments, as in the work of the University Museum's Tikal project and the Maya text recording project of Ian Graham under auspices of Peabody Museum, Harvard.

The accurate drawing of Maya texts and sculptures is an extraordinarily difficult task, partly since few pieces exist in their pristine condition. While various scientific techniques have been developed to further the accuracy of drawings, such as tracing from enlargements or projections of various negatives made under varying lighting controls, the intangible property of artistic insight is required to interpret line in such a manner as to successfully evoke the artistic qualities of the original. Thus

literal line drawings, even when attaining a high and commendable level of accuracy and thus being invaluable for iconographic and similar inquiries, are seldom useful or even usable for purposes of critical or esthetic studies. The problem of sensitive and effective translation from the three dimensions of relief or sculpture to the two of drawing are almost insurrmountable in simple, direct line drawing, and thus there is the necessity of primary documentation by photographic and other means.

Another method of recording Maya sculpture is through rubbings. The first application of this technique in Maya field studies may have been undertaken by John H. Denison. At the suggestion of A. M. Tozzer, Denison undertook in 1932 to make rubbings of some of the sculptures at Chichen Itza and subsequently at sites visited by the Carnegie Institution of Washington's Campeche expeditions of 1933, 1934, and 1938 (Ruppert and Denison 1943:1-2, 99). We have not had the opportunity to examine any of these rubbings at first hand, but to judge from the published reproductions, there were significant limitations in Denison's techniques that prevented a fully adequate exploitation of the method. Although various students have subsequently utilized the technique of rubbing, it is only in recent years that a significant and large scale effort to record Maya sculpture with an advanced rubbing process has been initiated by Merle Greene Robertson (1). Although time consuming and clearly depending in no small degree upon the artistic sensitivity of Mrs. Robertson, an invaluable and accurate record of Maya sculpture is now emerging which provides an amazingly successful evocation of the original qualities of the sculpture. This record is invaluable to the study of Maya sculpture, and the enthusiastic reception of exhibitions of her rubbings at leading museums of the country testifies to the success of her efforts (2).

While the casting of Maya sculptures is clearly next best to having the original at hand for study, this method of reproduction is time consuming and is usually expensive. The introduction of liquid latex for mold making was a great advance, but latex has more recently been eclipsed by the vastly superior silastic materials which can be designed with a remarkably extensive range of qualities and potentialities. Unfortunately,

silastic continues to be very expensive although no doubt more economical techniques of its use can be devised while the cost of the material will decrease with its wider use in industry. A major remaining problem with casts and molds is the museum space required for their storage. There exists, however, still another method of easily recording Maya sculpture in such a manner that casts can always be made when needed and which has negligible requirements of space for storage--namely, photogrammetry.

Some years ago the photogrammetric recording and replication of some Egyptian sculptures was undertaken in Aswan Dam salvage archaeology, and the potentialities and capabilities of photogrammetry are being rapidly and increasingly realized and expanded today in such projects as NASA's program of lunar mapping and recording. Since photogrammetry is still not very familiar to many archaeologists, we venture here to sketch briefly the method as it might be applied to the recording of Maya sculpture (3). It is not our intention to propose or design a detailed program; thus far, we have carried out minimal field experimentation, and we assume that colleagues considering employing photogrammetry will carry out their own experiments as to equipment and procedures most suited to their own project requirements.

Basically, the process of photogrammetry involves simultaneously making two photographs from two cameras separated by a small distance. From this stereoscopic pair of photographs all the three dimensional information of the subject can be obtained. The principle is identical to the way in which the human eyes operate. In order to successfully record Maya sculpture photogrammetrically, minimal equipment additional to the usual field photographic inventory is required, and only two measurements need be made.

Although special and often prohibitively expensive camera apparatuses are manufactured for making a stereoscopic pair of photographs, the considerations of portability, as well as economy, suggest the use of a single camera probably to be best suited to Maya field work. In order to employ a single camera, a specially designed base must be used which consists of a precisely calibrated bar or tract which is mounted horizontally upon a sturdy, professional quality tripod. The base can be cheaply machined from a material such

as aluminum and should probably calibrated in half centimeters. The camera is mounted upon the base and is moved along the calibrated track to make the two pictures. The base serves to keep the camera back in exactly the same plane while the photographs are taken, and the calibrated track allows a simple reading of the distance between the two camera positions of the two photographs.

The base distance separating the positions from which the two photographs are made is one of the crucial measurements that must be recorded in the photogrammetric process. The second and final measurement that must be made in the field at the time of making the photogrammetric record is the focal length of the camera lens at the moment the photographs are taken. If the camera is focused upon infinity, the focal length is the given focal length of the lens. If the lens is focused at less than infinity, a table can be prepared, or obtained from the manufacturer of the camera, which will convert the focused distance (say 7 feet or 2 meters) into the corresponding focal length of the lens (in millimeters).

The camera employed for making the photographs should have a larger format than 35mm. The 2 1/4" x 2 1/4" format may be adequate since Maruyasu and Oshima (1964:11) report an accuracy of .3mm to 1.5mm attained in the recording of giant Buddha sculptures using the techniques described here with their 2 1/4" x 2 1/4" format stereo photography. If this format is adopted, then the Hasselblad 500C with an 80mm planar lens would seem to be an excellent choice for the camera.

Unfortunately, however, the square format is not an entirely efficient utilization of space. Partly for this reason, serious consideration should be given to employing the 4" x 5" format. The still larger negative area, of course, means greater detail and resolution and consequently more accuracy in the final construction of a contour map or replica of the sculpture. Naturally, to further guarantee high resolution in the negatives, whatever the size employed, a fine grain film such as Kodak Panatomic-X and fine grain developer such as Edwal's FG7 should be used. Similarly, film

should be stored in a can or similar air-tight cannister with a supply of desiccated silica gel to protect it from the tropical moisture (Life Library 1971:9-42).

Once the pair of photographs have been made and processed, the two prints are dry mounted onto cardboard separated by a distance somewhat less than between the human eyes (Manual 1960:106). The stereo pair can now be viewed through a stereoscope to give a three dimensional image.

While our concern here has been merely to illustrate the ease with which a photogrammetric record of Maya sculpture can be made at the time of regular photographic recording, it may be of interest to briefly indicate the use of the stereoscopic pair for the making of a contour map or a replica of the sculpture, and for this purpose the reader is referred to the appendix of this paper.

Since a stereoscopic pair of photographs carries so much more information than an ordinary single photograph, it seems urgent to develop techniques of photogrammetric recording especially in this age in which we witness the apalling destruction of Maya sculpture on a ghastly scale. Although it may not be necessary or feasible for archaeological projects or museums at present to realize all the potentials inherent in photogrammetry, the essential record can easily and inexpensively be made and will be available for future exploitation (4).

Appendix

In order to make a contour map of a photogrammetrically recorded sculpture an autograph machine is employed. With the autograph the contours of the three dimensional image seen while viewing the stereo pair through the stereoscope are traced.

To understand the basic geometry of the operation and why a stereoscopic pair contains three dimensional information, the procedure is outlined for finding the three coordinates (X, Y, and Z) of a chosen point on the image. On the pair of prints the x and y coordinate axis are drawn and the point A is located on each print. The x_a', y_a',, x_a and y_a measurements of point A are taken from the stereoscopic pair, the parallax, p, is computed, and the three formulae listed are used to compute X_a, Y_a, and Z_a. In these three formulae B and f were measured when the photograph was taken; the other measurements were made directly from the two prints. It is the parallax, or shifting of the position of a on the two negatives, that gives the three dimensional property to stereoscopic photogrammetry (Moffitt 1967).

Thus the final measurements theoretically required are the coordinates of a point A on each of the two photographs of a stereo pair. Without the autograph, it would be necessary to plot these measurements for a very large number of points in order to construct an accurate contour map. With the autograph the operator traces contours directly without having to plot each point and to interpolate between them with connecting lines. Thus the actual numerical determination by hand of these last measurements is unnecessary, and the only measurements actually made are the initial ones of camera position separation and focal length made at the time the photographs are taken.

In order to obtain a numerically contoured plaster replica of a photographed sculpture, a somewhat different machine is employed. The stereo pair is again viewed through a stereoscope and the various contours are followed. However, instead of actually drawing a contour map the

operator punches a button at regular intervals as he follows the different contours of the sculpture's image. Depressing the button automatically results in a computer card recording the X, Y, and Z coordinates for each of the points selected. Thus, a set of data cards is obtained recording a very large number of points on the sculpture; the greater the accuracy desired, the more points are digitalized. The data obtained is transferred to tape in accordance with an appropriate computer program, and the tape is fed into a milling machine to carve the replica in any material from plastic to plaster.

While milling machines exist capable of carving an actual size replica of a large Maya sculpture (such as are used in the automotive industry), common university mechanical engineering shops will probably possess the resources for carving replicas at about 50% actual scale. Although it may neither be feasible or desirable in the near future to produce any replicas of Maya sculpture by these means, having the properly made and recorded stereoscopic pair of photographs means that all the information necessary to produce an accurate copy of a Maya sculpture is on record for potential future needs. And simply having the stereo pair allows the scholar the very substantial advantage of being able to view the sculpture three dimensionally.

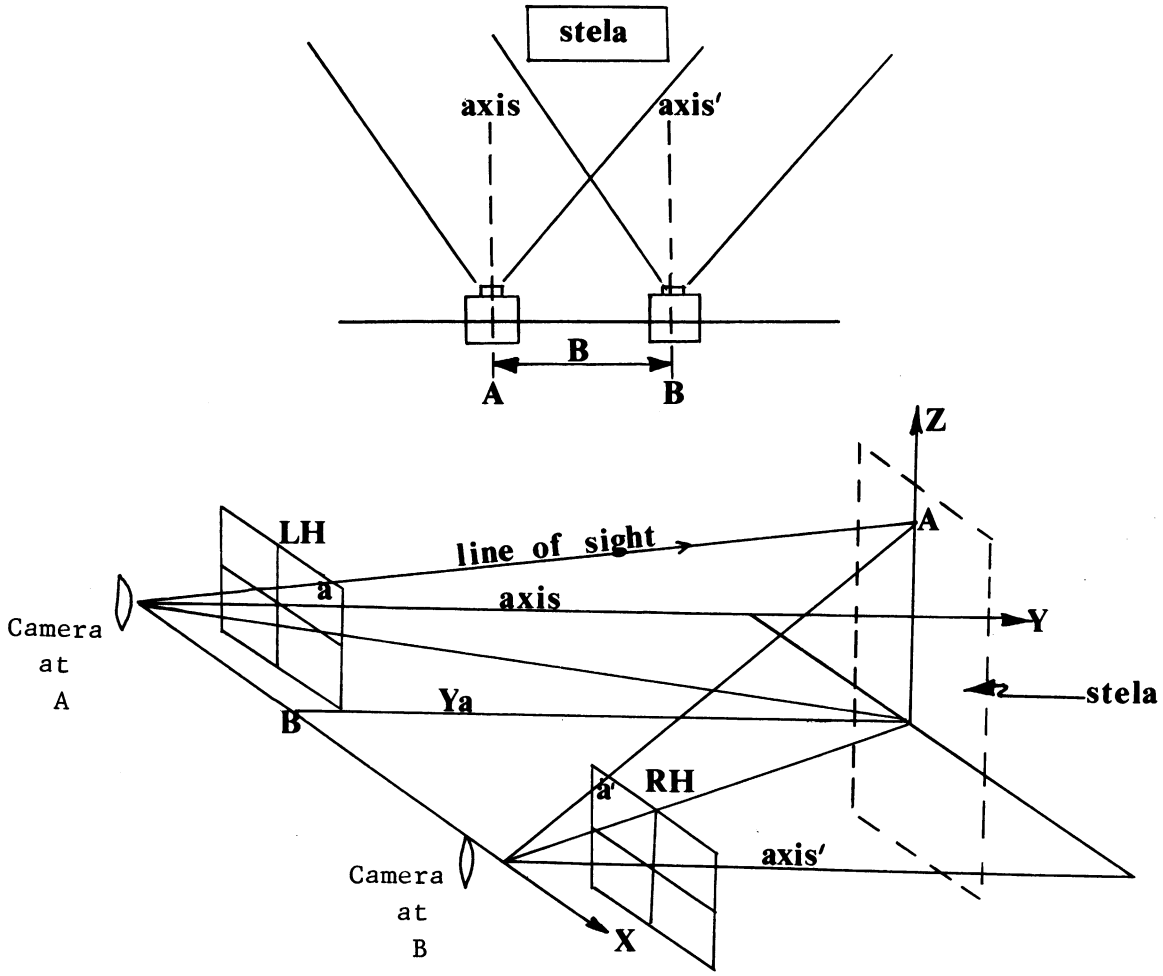
Notes

1. The first volume of rubbings resulting from Mrs. Robertson's work was published by the Museum of Primitive Art (1967) as Ancient Maya Relief Sculpture. A second and extensive collection of rubbings will be published shortly. Individual examples of Mrs. Robertson's work have appeared in numerous articles, including the present volume. The technique employed by Mrs. Robertson has been described fully (Robertson 1966).

2. The first public exhibition of Mrs. Robertson's rubbings of Maya monuments was held at the Lowie Museum of Anthropology, University of California, Berkeley, in 1965. Subsequent exhibitions include the following institutions: Chicago Natural History Museum, Museum of Primitive Art, University Museum (University of Pennsylvania), California Palace of the Legion of Honor, New Orleans Museum of Art.

3. The potentials of photogrammetry as applied to field archaeology are enormous, and it is surprising that so little use has thus far been made.

4. The Center for Latin American Studies, University of California, Berkeley, has supported this study.



$$X_a = \frac{B}{p} X$$

$$Y_a = \frac{B}{p} f$$

$$Z_a = \frac{B}{p} y$$

Where: 1) p (parallax) = $X_a - X_{a'}$

2) f (focal length) = 80 mm

3) X and Y are taken from LH negative

4) B = base

Figure 1. The basic geometry involved in photogrammetric recording of a stela.

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V. THE NINE LORDS OF THE NIGHT

David H. Kelley

The purpose of the present paper is to suggest the identity of the Mayan series of Nine Lords of the Night on the basis of comparative evidence from Mesoamerica and the Old World. The Old World comparisons are introduced because of what I think is good evidence that much of the Mesoamerican calendar system is of Old World derivation. They are not intended primarily as further evidence of that thesis but are rather introduced because of their potential help in understanding Maya data.

Although Eric Thompson recognized the general correspondence of the Lords of the Night mentioned in Mexican sources with a series of glyphs repeating at nine-day intervals on Maya monuments as long ago as 1929, there have been few attempts to compare them in detail. At that time, Thompson thought it possible to equate the two series specifically, but his later discussion (Thompson, 1950:208-210) indicates that the uncertainty of identification of the Maya series made attempts at comparison with the Mexican series unprofitable. Even with the limited data available, he thought that some similar gods were not in the same sequential order. More recently, Weitlaner (1958) reported the existence of a Zapotec calendar using a series of nine days, named for gods, in the Loxicha region of southern Oaxaca. A study by Weitlaner and DeCicco (1961) explained the nature of local variations in this calendar and discussed the attributes and hierarchical position of these deities.* Caso (1965:946) suggested the identity of seven of these gods with six of the Mexican series of Nine Lords, but not in sequential order. Many of his equations are not very compelling, although all are reasonable. Although I think a single series of gods ultimately lies behind the Mexican, Zapotec and Mayan lists, the discrepancies are such as to suggest a substantial time period of variation. Since all the gods are important in the local cultures, some distortions of sequence or of attributes may have been introduced by theologians trying to further the interests

* Thanks are due to Donald Brockington for access to a paper he has written on the Loxicha calendar, giving some additional traits of the gods.

of their own deities, ideas or priesthood. Other differences are probably due to the fact that equations between deities were made on the basis of partial correspondences of characteristics. I would assume that the local gods were mostly in existence as local gods long before they were ordered in sequences of nine (or in other sequences such as those of seven, thirteen and twenty). While deities may have taken on new attributes because of such equations, there must often have remained a considerable difference. However, as a series, there should be some mechanical interlocking points which would give equations for practical purposes.

I think that the Mexican and Zapotec series can be equated on the basis of three clear sequential similarities. The Zapotec Dubdo means 'Corn' and is the god of corn. His identity with Aztec Cinteotl, whose name means 'Corn-God', seems unarguable. In the comparative lists of Table 1, the numbers of the Zapotec list are given in accordance with their ordering by Weitlaner and DeCicco. However, both the Zatec and Zapotec lists are fitted to the 260-day calendar. Since 9 x 28 gives 261 rather than 260, the Zapotecs fitted the two by assigning both Mdi and Ndozin to the first day; the Aztecs assigned both Tepeyollotl and Tlaloc to the last day. The structural relationship may be shown thus:

	259th day	260th day	1st day	2nd day
Zapotec	8. Mse	9. Mbaz	1. Mdi	3. Ndo'yet
			2. Ndozin	
Aztec	7. Tlazolteotl	8. Tepeyollotl	1. Xiuhtecuhtli	2. Itztli
		9. Tlaloc		

The effect of this is that, although the numbers assigned in the table differ by one day, Dubdo would have ruled the 4th, 13th, 22nd etc. days of the 260 day cycle and Cinteotl would have ruled the same days.

The second equation is of Zapotec Mdi with Aztec Tlaloc. There are said to be four Tlalocs, who stand at the cardinal points and send rain; there are likewise sometimes said to be four Mdi who live on the tops of mountains at the cardinal points and send rain. Mdi means 'Lightning' and they are said to be in iguana form. In this latter aspect, they correspond better to Itzamna

of the Mayas than to Tlaloc. Both Tlaloc and Mdi rule the 9th, 18th, 27th etc. days of their respective 260-day cycles, but the extra Tlaloc/Mdi is assigned by the Aztecs to the 260th day and by the Zapotecs to the first day, as previously shown.

The third equation is of Zapotec Mbaz with Aztec Tepeyollotl. Mbaz is usually said to be an earth god (or goddess, for the sex of these Zapotec deities is strangely unstable), said by one informant to be the guardian of the animals and the spirit of the ancestors (Weitlaner and DeCicco:700). Elsewhere, he is said to be a serpent with seven heads or seven horns (Weitlaner and DeCicco:702). Aztec Tepeyollotl, 'Heart of the Mountain' is said to be the lord of animals. He has jaguar characteristics and is apparently associated with earth's interior (Thompson, 1950:74). Again the gods rule the same days of the 260-day cycle.

This evidence, supported by the structural data, seems adequate to make an alignment of the two series although, as will be shown later, there is some evidence that Piltzintecuhtli of the Aztec list, now in third place, may have been displaced (because of his cult importance?) from an original ninth position. The further equation of Zapotec Kedo, God of Justice, with Mictlantecuhtli, the Aztec god of the Dead is reasonable as Ndozin, 'Thirteen Spirit', is also called a god of justice and is associated with the dead (Caso, 1965:946 equates Ndozin with Mictlantecuhtli). Another interesting equation is of Chalchihuitlicue, 'Jace Skirt', an Aztec water goddess, with Ndan, the head of the Zapotec hierarchy. Ndan sometimes appears as male, sometimes as female and sometimes as bisexual. In Santa Lucia, she is goddess of the ocean (Weitlaner and DeCicco:704). The other deities of the two sequences show few analogies and some marked disagreements.

Despite the fact that we have no colonial Maya list of the Nine Lords and that the glyphs of these gods are largely undeciphered, I believe that there are now enough points of similarity to justify an equation of the Maya series with the Aztec and Zapotec series. This starts with the handicap that the Maya series had no fixed correspondence with the 260-day cycle but, instead, ran continuously; hence there is no possibility of strict correspondence of structure. Perhaps the best single correspondence is of G7, whose

glyphs include 'seven' and 'black' with Mbaz/Tepeyollotl. I have previously argued (Kelley, 1965:97-104) that some of these glyphs refer to a black god of war. The G7 glyphs, although containing 'seven' and 'black' are not identical with the glyphs referring to God L (believed to be the god of war). Nonetheless, they suggest a connection. Thompson (1950:209-210) suggests a connection with a feline deity, ruler of the month Pax, pointing out that the god of the number seven is a deity with jaguar characteristics. The parallel with Tepeyollotl is suggested by Thompson and I am in full agreement.

The fact that the Mdi are lightning and rain gods in iguana shape immediately equates them with Itzamna of the Maya. Thompson (1939:152-162) suggested that Itzamna was the name given to the celestial rain dragons, probably fourfold, standing at the cardinal points, frequently represented in Maya art, often as a two-headed animal (with the second head at the back), having characteristics of crocodiles, iguanas and other beasts. The idea was considerably strengthened by the discovery that 'itzam' is said to mean 'lizard' in the Vienna dictionary (Thompson, 1970:21). On the basis of the depictions, Thompson regards the 'lizard' as being, specifically, **'iguana'**. Thompson (1970:21) also points out that the **Kekchi** regard Itzam as both male and female, which is likewise true of the Zapotec Md. The characteristics constructed by Thompson for the Maya Itzamna from a variety of scattered sources correspond so closely to those attested for the Zapotec Mdi that the probability that the reconstruction is correct becomes much greater. In some of the depictions, the rear head of the two-headed dragon is a death's head with a sun glyph on the forehead, preceded by three glyphs of unknown meaning. In the series of Lords of the Night, G9 has been identified by Thompson as referring to the 'night sun', that is the sun in the underworld. The G9 glyph may be a simple sun glyph or may show the head of an old man with a sun glyph on the forehead (Thompson, 1950:fig. 34, nos. 46-57). Differing glyphs are associated and the sun glyph itself may either appear plain or with complete or partial cross-hatching to indicate darkness. The variation in this point is hard to understand if Thompson is correct in thinking that it was supposed to indicate the sun in the underworld. There are some indications that it may, instead, indicate eclipses of various sorts but the data

are by no means entirely clear and consistent. The Maya sun god is called Kin-ich Ahau, 'Sun-eye Lord' and Landa (ed. Tozzer, 1941:153) says that Kinich Ahau Itzamna was invoked by the priests in ceremonies of the month Zip, because he was regarded as the first priest. I would argue that this Kinich Ahau Itzamna is the rear head of the Rain Dragon and that his glyphs correspond to G9. This is one off from the position of Mdi-Tlaloc, if one accepts the previous equation of Mbaz-Tepeyollotl with G7. Because of this and because of Asian parallels to be cited, I would argue that the preceding G8 corresponded to Itzamna proper, the front head of the Rain Dragon. The glyph of G8 is the same as the top part of the glyph of the month called in Yucatec Cumku, and I believe it is to be read cum, 'pot'. Thompson (1950: 117) points out that Cumku could mean cum god and may be parallel with Cumhau, which he suggests is derived from Cum-ahau, or cum lord, said in the Motul dictionary to mean "Lucifer, chief of the devils" (i.e. of the pagan gods, probably). Thompson points out that the "patron deity of Cumku is a dragon", shown as a head which he thinks probably "represents the sky monster, Itzamna". If Cum-god is Itzamna and if cum is the glyph of G8, it seems reasonable, even on Maya grounds, that G8 stands for Itzamna.

Thompson (1939:160) also argued that God K was an anthropomorphic form of Itzamna, a view which he still held in 1972 (P. 41, w). In 1934 (p. 227) he had accepted Seler's view that God K was Ah Bolon Tzacab and that God D was the anthropomorphic form of Itzamna. His discussion (1970: 226-229) indicates that he thinks there is a very close association between Ah Bolon Tzacab and Itzamna, to the point of identity. The relationship does not seem to me quite so close, although there are some similarities. I think that God K is separable from Itzamna and is identifiable with Ah Bolon Tzacab, whom I believe to be identical with G1 of the Nine Lords of the Night. In one case, the glyph for G1 appears as '9' (bolon) followed by the fish-in-hand glyph. DeGruyter (1946:34) points out that tzac is Yucatec for a small fish and also cites Thompson's early view that G1 was Bolon Tzacab. More usually, the glyphs of G1 consist of '9' followed by a hand holding the head of God C. The nature of the connection with God C is completely unclear, but I do not think this kind of glyphic usage of a deity head necessarily refers directly to that deity. God K often appears as the serpent-footed

god and I have argued (Kelley, 1965:108) that the calendar name of God K was Hun Ahau, One Flower, a name found elsewhere in Mesoamerica for the sun god, as well as for various agricultural deities. The usual translation for Bolon Tzacab is 'nine generations' and the alignment suggested by the previous data would equate him with Zapotec Ndo'yet, translated as 'Nine Spirit', or 'Nine image'. Ndo'yet seems to be associated with death, although one informant called him 'patrón de la tierra', 'patron of the earth' (Weitlaner and DeCicco: 701). His characteristics seem to be poorly defined but the 'nine' in his name does seem a reasonable tie to Ah Bolon Tzacab.

General evidence for the nature of the Nine Lords in Mesoamerica is to be found in Cristobal del Castillo (cited by Caso, 1967:114-115); in an unclear context, he speaks of prognostication from "las estrellas que alli hablan que se llaman Planetas" ("the stars which speak there, which are called planets"). Then he goes on to speak apparently of the day lords and their companions, the night lords. Speaking of the lord of the day, he says "alli a la media noche, se ira a hacer su companero, la 2a. entidad; estrella Planeta" (freely translated, "there at midnight he goes to join the second star-planet"). Although these statements have never been taken at face value, they clearly imply that the Lords of the Night were a series of nine 'planets' who began their rule at mid-night. As I interpret the passage, the lords of the day ruled for twenty-four hours, accompanied by the lords of the night from midnight to mid-day. Caso's interpretation is rather different, but these particular problems are not too relevant here.

A principal reason for not taking such statements seriously may have been that most Mesoamericanists are unfamiliar with any plausible series of nine planets. However, in India, such a series is well-known. It consists of the five planets which are visible with the naked eye, plus sun and moon, both ranked with the planets in ancient times, plus two "invisible planets" which represent a compromise between theological and scientific views of the cause of eclipses.

In Alberuni's India written in 1030 A.D., we have a critical compendium of calendrical and religious data on India available to a well-educated Moslem

of that time. A list of the nine planets, with the deities which ruled them, is taken from the Vishnu-dharma (Alberuni, Sachau edition, ii, 121). A comparison of this table with his account of the names of the planets (Alberuni, i, 215) goes far to explain discrepancies for he gives from six to nine names for each of the seven 'regular' planets and, although many of these are deity names, they are completely distinct from the list of deities who rule the planets in the context of the sequence of Nine Lords. Some of the discrepancies are surprising. Agni, 'fire', rules the Sun, although he is often associated with Mars and Sun, himself, appears as a deity. Mercury is ruled by Vishnu who is usually believed to have been a sun god. Jupiter is ruled by Śukra, which actually appears in the list of planetary names, but as a name of Venus. The multiplicity of deity-names in India and the way in which names which started as simple attributes assumed personality or were applied to a wide range of deities makes it difficult to make adequate comparisons which are not misleading. Nonetheless, there are some striking similarities with the Mesoamerican sequences.

The most obvious is of the seventh lord, Saturn, with G7 of the Mayas, Mbaz of the Zapotecs and Tepeyollotl of the Aztecs. The lord of Saturn is called Prajàpati, which is translated as 'lord of creatures' (including human beings as well as all other animals (Mayrhofer, 1963, ii:355). The fact that both Tepeyollotl and Mbaz are specified as Lord of animals is an impressive correspondence. Saturn, himself, is represented as a dark-skinned man in black clothing (Pingree, 1964-5:267). Saturn is the seventh planet in both the 7-day and 9-day weeks, the seventh in the enumeration order as beneficent, neutral and maleficent, and the seventh in distance from the earth (i.e. the ruler of the seventh concentric sphere, or heaven, sometimes conceived as the seventh layer of heaven). The presence of 'seven' and 'black' among the glyphs of G7 of the Lords of the Night and in association with the glyphs of black gods constitutes an obvious and direct similarity. The seven serpent heads of Mbaz may also be related. Alberuni (ii:120) gives a list of two names of each of the 'Seven Snakes' associated, in succession, with the planets, who rule the years in the same order as they rule the days (with a 365-day year). Those listed for Saturn are Cakshabhadra and Saṅkha. Walker (1968,ii:389) lists Śaṅkhapāla as one of the snake

gods, seven-hooded, yellowish guardian of the southwest. It is possible that various seven-headed snakes have been differentiated from a single prototype in India, or that they have been confused in Mesoamerica, for Vāsuki, whose body served for the churning of the Sea of Milk, was a seven-headed green serpent king, associated with the north and sometimes identified with Śesha, the giant serpent who supports the earth on his head.

Another striking parallel is the alignment of Gauri, the goddess who rules the planet Venus, with Tlazolteotl. In India generally, Venus is identified as a male god, but here a goddess appears. According to Dowson (10th ed., 1961:111,86), this name is an epithet of Devī, 'Goddess', who has a great many other names and who appears in both a mild and a fierce aspect--in the latter, "bloody sacrifices are offered to her" and "indecent orgies" used to propitiate her. Tlazolteotl is a reasonably close parallel, identified in Sahagun and other early Spanish writers as Venus, patroness of sexual license and of prostitutes, likewise given a multiplicity of names, including Teteoinan, 'Mother of gods' (Thompson, 1939:136-7).

The parallels associated with G8 and G9 are extremely complex and involved but show remarkable similarities. The eighth and ninth 'planets' of the Hindu series are Rahu, the Head,and Ketu, the Tail, said to be invisible planets which cause eclipses, although the true cause of eclipses was well known. At an earlier stage, Rahu seems simply to have been regarded as a serpent which caused eclipses by eating the sun and moon. He is supposed to have stolen some of the amrita which confers immortality and which was obtained by the gods at the churning of the sea of milk. Because of the theft, Vishnu cut off his head and tail separately, attacked sun and moon and caused eclipses (Dowson, 1961:252-3). It is at first sight surprising to find Gaṇapati as lord of the Head for the name is an equivalent of Gaṇésa, the elephant-headed god. There is a curious parallel to the story of Rahu, for Gaṇeśa's head is also said to have been cut off, and replaced by that of an elephant. He was regarded in the early mediaeval period as a god of wisdom and patron of learning, whose name was inscribed at the beginning of all literary works (Walker, 1968,i:376-378). The elephant connections take us to the gods of rain. According to Alberuni (ii, 245), following the Matsya-Purâna, "The earth is

placed on four elephants, standing in the four cardinal directions, which raise the water by their trunks to make the seeds grow. They sprinkle water in summer and snow in winter." One of the names given to elephants was maha-nāga, 'great snake' (Mackenzie, n.d.:29) and rain was also believed to be sent by the nagas, of whom there were supposed to be four at the cardinal points (Mackenzie, n.d.:243). Mackenzie (n.d.:49) cites a Chinese Buddhist text which distinguishes serpent-dragons, lizard-dragons, fish-dragons, elephant-dragons and toad-dragons. Mackenzie's chapter 14 is dedicated to parallels between Aztec Tlaloc, god of rain, and the nagas and dragons of Asia. Among the Maya, the Itzamnas seem to represent 'lizard-dragons' and the Chacs represent 'elephant-dragons'. The famous controversy between the Mayanists and Elliot Smith about the elephantine representations of Mesoamerica needs a thorough review, but here it suffices to point out that the argument that the long-nosed god of Mesoamerica can't be an elephant because he is the god of rain, ignores the fact that the gods of rain of India, fourfold like the Chacs, were, in fact, elephants. The way in which these various strands inter-relate strongly suggests that at some time the eclipse demon was conceptualized as identical with the rain dragon, whether serpent or elephant, a rather surprising conclusion which is not directly attested either in Mesoamerica or India in sources known to me. Perhaps even more puzzling is the striking similarity between Itzamna, credited with teaching writing, and Gaṇeśa, patron of learning and literature, for this is usually regarded as a late development of ideas about Gaṇeśa in India.

It is quite unexpected to find Visvakarman, the carpenter and artisan of the gods, as regent of the planet Ketu, the Tail, or descending node. Dowson (1961:363-4) points out that the term Visvakarman was originally applied to any powerful god, but subsequently seems to have assumed an independent existence, already attested by the time of the Mahabharata. Although viśva is literally 'all' and karman is 'maker', Alberuni (i:178) points out that the Hindus used a wide variety of allegorical terms for numbers and that it is impossible to read their astronomical writings without a knowledge of this. In this system, viśva is used for 'thirteen'. The correspondence with 'thirteen spirit' or 'thirteen image' of the Zapotecs is striking. There is also the curious fact that Ndozin is specified as a god of justice and of

death, while Kedo, god of justice, is equated with Aztec Mictlantecuhtli, the death god. It looks as if there may have been some confusion and change here. The Zapotec Kedo could easily be a borrowing from Hindu Ketu. Given the general context, I have wondered if the latter might not be a borrowing from Greek Cetos, sea-monster, whale. It may be relevant that Maya itzam was a term applied not only to lizards but also to whales (Thompson, 1972:21). It will be noted that the proposed association of the G9 glyphs of the Maya series with eclipses is strongly supported by the Asian context. The structural equation of Aztec Xiuhtecuhtli with this day is, I think, brought about by a displacement of Piltzintecuhtli, 'Lord noble prince' into third position. Piltzintecuhtli is usually identified with Tonatiuh, the Sun god.

The parallel between Jupiter, Ndan and Chalchihuitlicue is a difficult one to appraise. It is disconcerting to find that Śukra, the ruler of the planet Jupiter is a name applied to "the planet Venus and its regent" (Dowson, 1961:307) although as the author of a code of laws, Śukra has some similarity to Jupiter of the Romans. According to Bhattacharyya (2nd ed., 1958:368), the Buddhists recognized Bṛhaspati, the usual name of Jupiter, in the sequence of Nine Gods and depicted him seated on a frog. He was a priest and teacher of the gods, and had "thunder for his voice" (Dowson, 1961:63-4). The traits rather suggest Jupiter Pluvius, or Jupiter as rain god, and the parallel with water holds for Ndan and Chalchihuitlicue. Moreover, the latter is actually said to appear in frog form (Mackenzie, n.d.:252). Nonetheless, one would rather have expected an equation with Tlaloc/Chac.

The shield glyph of G3 of the Maya series is a regular Mesoamerican symbol of war (Kelley, 1965:99) and corresponds appropriately with Mars, who is normally called Kārttikeya, foster-child of Krtikka, the Pleiades, and who was the Hindu war-god. His equation with the corn god may be due to displacement, although there are several other possible explanations which would require a lengthy digression. It may, however, be pointed out that Dubdo and Beydo are both sons of Mbaz as Earth Goddess and probably represent the Twin Gods one of whom is often a war god.

The equation of G1, if correctly identified both as Ah Bolon Tzacab and as God K, with Sun as first of the Hindu series is entirely reasonable, for Ah Bolon Tzacab's sun god affinities have already been mentioned. I have previously pointed out that there are strong parallels with the serpent-footed representations of Jahweh of the Hellenistic period, when he was equated with the sun god (Moran and Kelley, 1969:161-2). I did not at that time know that a serpent-footed god also appears on the coins of Kapisa (Tarn, 1966:333), in the heart of the area which I think is involved in the contacts with the Mesoamerican area. I now think that Xiuhtecuhtli, year-lord, and Lord of Fire, first of the Nine Lords of the Night of the Aztec sequence is to be directly equated with Agni, 'fire', the god who ruled the Sun in the Hindu sequence and that he was displaced from this alignment. However, the second Lord of the Night is Itztli, and this shows that there are some unresolved problems in this interpretation. Vaillant (1941:184) follows Seler in listing Itztli as a surrogate of Tezcatlipoca, in the guise of the sacrificial knife. He also says that Metztli, 'moon', is sometimes identified with Tezcatlipoca. All of this would equate him nicely with Moon, second of the Hindu series. However, Tezcatlipoca lost a foot and this foot was sometimes replaced by a mirror (in accordance with his name, 'Smoking Mirror') but sometimes with a serpent, which seems to equate him with Ah Bolon Tzacab rather than the Moon. These difficulties underline the fact that a simplistic equation of various series of names is very far from solving all problems of interpretation.

Despite the problems which remain, I feel that the Indian evidence throws a great deal of light on the Mesoamerican sequences and strongly indicates that the list of nine planets was borrowed from India. This raises major problems of chronology and has important implications for the history of science both in India and Mesoamerica. The attempt to recognize the correct sequence of planets in distance from the earth was an important astronomical study of the fourth to second centuries B.C. It may be pointed out that with a geocentric hypothesis the order of Sun, Mercury and Venus is particularly puzzling since any of them may pass in front of the others. The order Moon, Sun, Venus, Mercury, Mars was a preferred order to the second century B.C., when the improved but still incorrect order Moon, Mercury,

Venus, Sun became normal (Kuhn, 1959:54). From this order, the sequence of days of the week is determined by dividing the day into 24 hours and arbitrarily assigning each successive hour to a different planet, in descending order. By the 21st hour, the entire sequence has repeated three times and the remaining three hours shift through the sequence by that much. Hence the day-name order of Sun, Moon, Mars, Mercury, Jupiter, Venus and Saturn is dependent on a particular incorrect planetary sequence, on counting in descending order and on a use of a 24-hour day (Neugebauer, 1962:169-170). The Hindu nine-day week which uses the same sequence is apparently an unintelligent borrowing in which the two planets were simply added on without understanding that this ruined the entire mathematical basis of the system. The 'planets' Rahu and Ketu imply an interest in eclipses but leave uncertain how much was known about them.

The conceptual basis of the varying schemes of layers of heavens and underworlds warrants an extended study. Here it is worth pointing out that Thompson (1950:89) associates the number 1 with the Moon, 4 with the Sun and 7 with the Jaguar god, whom I have equated with Saturn. This puts all of these in their correct sequential positions and is enough to strongly suggest that the layered heavens, like the Nine Lords of the Night, originated in science, however they may have been affected by theology. The fact that Sun is in fourth position, rather than second, strongly suggests that the scheme post-dates the second century B.C. in its origin. This Asian material is now beginning to put strong limits on the Maya correlation problem. Neither the scientific nor the chronological implications have been dealt with adequately in this paper but the usefulness of the Asian materials for Mayan studies should now be apparent.

Table 1.

Comparison of the Nine Lords in Mesoamerica and India

AZTEC LORDS OF THE NIGHT	ZAPOTEC DAY-NAMES (also deity names)	Glyphic series of MAYAN LORDS	INDIA NINE PLANETS IN DAY-NAME ORDER	INDIA GODS OF THE NINE PLANETS (in this context only)
(1. Xiuhtecuhtli 'Year-lord' Lord of Fire)				
2. Itztli 'Obsidian' (equals Tezcatlipoca, 'Smoking Mirror', who lost one foot) (equals Metztli, 'Moon')	3. Bdi'yet 'Nine Spirit'	G1. Nine ('Fish-in-hand' or 'God C-in-hand') probably Ah Bolon Tzacab 'Nine Generations', a god of agriculture and of the sun, serpent-footed (one foot)	1. Sun	1. Agni, 'fire'
3. Piltzintecuhtli 'Lord noble prince' (equals Tonatiuh, Sun)	4. Beydo God of Wind and of agriculture	G2.	2. Moon	2. Vyana
4. Cinteotl 'Corn-god'	5. Dubdo 'Corn'	G3. Shield probably 'war'	3. Mars	3. Kalmasha 'stain, dirt, sin'
5. Mictlantecuhtli 'Lord of the place of the dead'	6. Kedo God of Justice	G4. Seven + moon glyph (possibly twenty-seven?)	4. Mercury	4. Vishnu (in origin, a sun-god)
6. Chalchihuitlicue 'Jade Skirt' a Water Goddess	7. Ndan God of ocean. Principal God of hierarchy. Sometimes Bisexual or a goddess.	G5. Five ??	5. Jupiter	5. Śukra a name of Venus! author of a code of laws

(Table 1 continued)

7. Tlazolteotl Goddess of Love. Synonym of Teteoinnan, 'Mother of Gods'	8. Mse	G6.	6. Venus	6. Gauri 'yellow, brilliant' name of wife of Śiva and of wife of Varuna. Synonym of Devi, 'Goddess', called Jagan-mata, 'Mother of the world'
8. Tepeyollotl 'Mountain-Heart' Lord of animals with jaguar traits.	9. Mbaz An earth god, Lord of animals. Sometimes a seven-headed serpent.	G7. Seven-black-?? Believed one of the black gods, associated with war, hunting and merchants.	7. Saturn (Saturn, called Sani, is represented as a black man in black clothing). Cf. seven-headed snake, probably associated.	7. Prajapati 'Lord of creatures'.
9. Tlaloc Fourfold rain god. with snake characteristics.	1. Mdi 'Thunder, Lightning' Four mdi at cardinal points, send rain. Iguana shape.	G8. Cum, 'pot' (Itzamna, 'Iguana House', fourfold?--front head of celestial rain dragon?) Itzamna in human form taught writing. First priest.	8. Ascending node, 'Head' (Rahu) (Head of the eclipse dragon, cut off from his body)	8. Ganapati, synonym of Ganeśa, the elephant-headed god, whose head was cut off and replaced with the elephant head. Cf. the four elephants who stand at the cardinal points and send the rains. God of wisdom.
1. Xiuhtecuhtli 'Year-lord' Lord of Fire	2. Ndozin 'Thirteen Spirit' A god of justice and of death	G9. Sun-god with 'blackness' and other glyphs. (Probably Kinich Ahua Itzamna, probably rear-head of rain dragon, associated with eclipses)	9. Descending node, 'Tail' (Ketu)	9. Viśvakarman 'Omnificent'--viśva, 'all', used for 'thirteen' Lord of arts, carpenter, architect, chariot-maker, maker of heavens and earths who sacrificed the worlds.

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VI. PRELIMINARY REPORT ON EXCAVATIONS IN THE ARCHEOLOGICAL ZONE OF RIOVERDE, SAN LUIS POTOSI, MEXICO

Rudolph C. Troike, Nancy P. Troike and John A. Graham

Introduction

During the month of July, 1957, exploratory excavations were carried out by the writers at the site of El Jaral, in the municipio of Rioverde, San Luis Potosi. At the same time a site survey was conducted in the western Rio Verde basin and several local collections were studied. The present paper represents a preliminary report on these activities (1).

The central portion of the State of San Luis Potosi is composed of an extensive meseta bounded on the east by the Sierra Madre Oriental and by the Sierra Gorda on the west. These mountain chains are composed of sedimentary formations, primarily limestone, with occasional volcanic intrusions. It is part of the tierra templada, and has an altitude of about 1,000 meters above sea level. Rainfall is largely confined to the summer. The climate has been classified as BS, or dry steppe, according to the system of Koeppen (Vivo:83-84). The meseta is drained by the Rio Verde and its tributaries, which in turn form part of the Panuco system, one of the largest in Mexico.

The first Spaniard known to have passed through this area was Fray Bernardo Cossin, late in the 16th century. He noted the presence of mounds, already covered by vegetation, and found the region inhabited only by Pame Indians with a simple hunting-and-gathering culture (Velazquez, I:358).

The accompanying map (Figure 1), adapted from one drawn by Sr. Octaviano Cabrera Ipiña, gives some idea of the distribution and concentration of sites in the Rio Verde basin. Within several days the authors saw or visited more than thirty sites in the western end of the basin alone. These sites averaged some 15 major mounds each, for a total of at least 450 mounds in this small area. In some areas the sites are so thickly clustered that from one it is often possible to see several others. The similarity in sherds found on the surface of all the sites visited suggests their contemporaneous occupation.

The Site of El Jaral (RV-4)

The site of El Jaral (designated in the site survey as RV-4) was chosen for excavation and study because it appeared to offer good opportunities for securing a ceramic sequence. Essentially, El Jaral consists of 16 major mounds of varying sizes and heights, grouped into a hollow rectangle measuring approximately 140 meters north-south by 120 meters east-west (Figure 2). A large central mound divides the rectangle into two plazas. On the western side of the site two parallel mounds about 50 meters long suggest a ball court (Mounds 10 and 13, Figure 2). Other sites visited during the reconnaissance showed similar indications of ball courts.

Excavations in Mound 14

The central mound, designated Mound 14 was chosen for the major work of excavation (Plate 1,a-d). Treasure-hunters in previous years had dug a large hole in the center of the mound and according to local information, had reached the bottom where they encountered a burial. Although erosion had filled in more than half of this pit, the upper part of the mound interior which still remained exposed revealed very clearly several distinct periods of construction. Consequently it was decided to perforate the mound from its highest point with a one-meter-square pit, to sample the ceramics and to study the construction of the mound. At the same time, since at best only a secondary ceramic sequence could be derived from the mound fill, it was decided to dig other test pits and trenches at various points in the site to obtain a primary ceramic sequence. In addition, a pit was dug just north of Mound 14 to provide a check on the basic stratigraphy underlying that mound. All deposits were passed through quarter-inch mesh screens.

The original occupation zone under Mound 14 was a thin(6-8cm.) carbon-stained soil layer with cultural materials in it. Built immediately upon this layer was a structure 1.30 meters high of untrimmed limestone slabs; these were laid in courses and cemented with a fine, compact clay, which was also used to cap the structure (Stage I). As seen in the profile of the north wall of this pit (Figure 3, and Plate 1,b), only a small portion of this structure was uncovered, so that its form was not determinable.

Subsequently this stone structure was covered over and around by an earth fill (Stage II) and topped by a good cemented floor of fragmented tezontle, with a prepared base of adobe. This structure had a height of 1.50 meters above the original occupation level (i.e., 20 cm. higher than Stage I). At a later time the process was repeated, and the mound grew to a height of 2.15 meters (Stage III), with a prepared floor of very small limestone fragments. In Stage IV, the mound was again covered with more soil of the same constituency as that used previously; the maximum height is unknown, since the profile shows an upward slope toward the center, but it probably was not over 4 meters. Lying atop this level was a small deposit of distinctive soil; its significance was not determinable, however.

To form Stage V, the slope of the mound was leveled off with an ash-clay fill, and an almost pure ash fill was placed over this. This ash layer produced the bulk of the decorated ware and distinctive artifacts encountered in the excavations. In Stage VI the slope of the ash layer was levelled off as seen in the northwest corner of the pit profile, and the mound was covered with a thick prepared surface of small limestone fragments; in this stage the mound attained a height of approximately 4.50 meters.

The western slopes of Stages VII and VIII were cut by the pit but owing to the previous sacking of the mound, the full height is not determinable for these stages.

Stages IX and X are somewhat different in nature from those preceding and are more difficult to interpret. Stage IX is formed by a facade applied to the southern face of the mound. This facade is made of uncut limestone slabs cemented in courses with fine clay mortar, exactly as in the structure of Stage I. The original south face of the mound was evidently cut away to a smooth slope before the facade was applied, since the interior earthern layers of the mound terminate horizontally abruptly against the inside face of the facade (Plate 1,d).

Stage X was formed by a prepared surface (floor) of medium-sized limestone fragments in a clay matrix. As it was used to cover up and level off

the slope of Stage VIII, it is thicker at the western side (15 cm.) than at the eastern edge (1.5 cm.) of the pit. As can be seen in the profile of the north wall of the pit the floor terminates abruptly against a sloping layer of dark, humus-stained soil. This soil, at its juncture with the floor, intrudes down into Stage VIII; however, it also extends up above the level of the floor. It should be observed that the fill of Stage VIII levels off at the same height as the prepared floor.

It may be suggested that the dark layer above Stage VIII does not form an additional stage of mound construction, but represents the decayed remnants of a wooden temple structure which once stood on top of the mound. The intrusion into Stage VIII fill probably was made by a wall-post, long since decayed. This hypothesis would account for the abrupt termination of the floor in a vertical edge. The clay deposit overlying the floor at the west edge of the pit could have come from the melted adobe of a wattle-and-daub wall. There is evidence for the use of this type of construction in burned adobe fragments from elsewhere in the fill of Mound 14. The floor of Stage X projects south beyond the pit and overlies the edge of the stone facade of Stage IX.

In this final stage (Stage X), the mound reached a height of 6.60 meters above the original occupation level. The uppermost level of fill seen in the profiles agrees in composition with the sub-mound sterile sand-clay, and undoubtedly is a result of the digging activities of the treasure-hunters.

Other Stratigraphic Trenches

Test Pit 2 was dug to a depth of 1.40 meters just north of Mound 14, to provide a control on the stratigraphy underlying that mound. Below the plow zone, at a depth of 15-25 cm., a prepared surface of limestone chunks in a clay matrix appeared to indicate the original plaza floor. Below this was a 5 cm. layer of carbon-stained soil with sherd material which corresponded to the original occupation level underlying Stage I of Mound 14. Sterile clay-gravel and coarse sands continued below this layer, as they did beneath Mound 14.

Pit 3 was dug in the field west of the mound cluster, near a mound almost completely obliterated by plowing (beyond the mapped area of Figure 2). This pit was carried to a depth of 1.20 meters, of which the upper 85 cm. bore cultural material, notably pipe fragments. Some indications were noted that a thick floor such as was found in Pit 2 might have existed, but plowing had disturbed the area too badly to be sure.

Pit 4 was dug between Mounds 4 and 5 (Figure 2), but work was suspended when structural debris was encountered.

Pit 5 was dug between Mounds 10 and 13 (Figure 2), close to the latter, to test the hypothesis that they formed a ball court. A very thick and well-made plastered floor was found at a depth of 45 cm., the only such floor found in the site. This discovery strengthened the ball-court hypothesis, although time did not permit more definitive explorations.

Burials

The only human remains encountered in the excavations were those of a child which had been interred under the floor of Stage III in Mound 14; the floor had not been broken above the burial. The bones had been dispersed by rodent activity, and the only artifact associated with them was a light-grey ceramic earspool. It was reported that the persons who sacked the mound had encountered a burial at the bottom of their pit.

Ceramics

The present discussion is based entirely on a preliminary examination.

The only previously reported excavations in this region were conducted by Du Solier and Ekholm (Du Solier, et al., 1947) at Buena Vista, Huaxcama, S. L. P. On the basis of Du Solier's descriptions and a brief examination of a collection from that area, it is possible to state that the ceramics of the two zones are alike. The following ceramics described by Du Solier are present also at El Jaral: polished blackware, both plain and incised, often with red or white pigment in the incisions; red-on-white

ware; red-on-buff ware; two varieties of fine paste ware; and brushed, smoothed, and polished-slipped utility wares. Several other minor wares from Buena Vista are also present at El Jaral. The design inventory at El Jaral duplicates that illustrated from Buena Vista by Du Solier.

However, the ceramic complex at El Jaral contains some additional varieties not reported by Du Solier. These include two kinds of white-on-red ware; a black-on-white ware with only a straight broad line as decoration; a polished white ware; a polished orange-red slipped ware which has a graphitic sheen; a polished brown ware with a streaked slip; and two distinct varieties of negative decoration. One of these last is a trichrome, with a stamped black design on a polished white slip, to which has been added a red band over the black design around the lip.

Other Ceramic Artifacts

Other distinctive artifact classes include very finely made earspools, so delicate that the pressure of one's fingers will crush them. Ceramic smoking pipes were found; they are primarily of polished brown ware, well fired, and with a delicate conical bowl affixed near the end of a straight, pencil-thick stem; this kind of pipe is also present at Buena Vista. A few stems were of red-on-white ware. Figurine fragments, both human and animal, were found in various parts of the excavation, as well as fragments of effigy-decorated vessels.

Non-Ceramic Artifacts

These were quite infrequent. One carved shell finger-ring with a crudely indicated human face on the front was recovered. Banded grey obsidian and fluorite crystals were found. One exceedingly small mussel shell pendant, carefully cut and drilled, was found, along with part of a larger one. Basalt metate fragments from the surface of the site and broken pieces of orange-red painted plaster from Pit 1 in Mound 14 complete this category of materials.

Artifacts In Local Collections

The writers examined several private collections of materials from the Rio Verde basin. The data thus acquired contribute important information to the archeological knowledge of this area.

Figurines

The most common artifact class in the collections was that of figurines. Sr. Cabrera Ipiña has done a preliminary study of the most outstanding types; his data have been very helpful in the preparation of this report. Many of the figurine types, so far as is known, are unique to the region. A few Archaic period figurines are present but these seem to be intrusive from the eastern part of the Rio Verde basin.

Human forms predominate but there are a few animal heads and effigies from vessel rims. Techniques of manufacture include hand-modelling, use of molds, and applique; many figurines combine all three techniques. Applique is used for most features of ornament and dress on the figurines. No sexual characteristics are indicated on most of the figures.

The hand-made forms range from very well made to extremely crude. Many have a headdress resembling a chef's cap. Decoration includes earspools, necklaces, breechcloths, and occasionally belts crossed diagonally on the chest. A distinctive posture found among these figurines is with the hands placed over the mouth.

The mold-made faces closely resemble late Teotihuacan forms, often with three rows of rosettes forming the headdress. These generally have hand-made bodies and applique decoration.

One type, representing a woman, is completely mold-made. The head is disproportionately large, the hands are sometimes folded across the waist, and a figured skirt is indicated. Hand-made imitations or precursors are also found.

Ball-Player Figurines

One particular class of figurines evidently depicts ball players, for they are shown carrying a ball held against the waist, or at times with something resembling a bat. They may be dressed with knee-guards and decorated belts crossed diagonally on the chest. These ball players are made by all three styles of manufacture described above. Some have punctated features as well.

Other Ceramic Artifacts

The feathered serpent motif was seen in two figurines. Effigy whistles of the open-resonance-chamber type are found. Spindle whorls are nearly flat or small truncated hemispheres. A number of pipes and pipe fragments were seen which resembled those from El Jaral, having delicate conical bowls and straight stems. Small hemispherical clay bells with a slit at the bottom were noted. Several crude "wheels" which may have been used with toys were also present.

Stone Artifacts

In view of the ball-player figurines and the existence of long parallel mounds at several sites, further confirmation of the presence of the Mesoamerican game in this area was found in the report of a carved stone ball court ring from a site near El Jaral, which was said to have been sent to the Museo Nacional in Mexico, D. F.

A small yoke carved only on the ends, and another one completely and beautifully carved, were seen in local collections. A third carved yoke, almost identical to this latter privately-held one from the Rioverde area, is from the Rayon region and is on display in the Museo Regional Potosino in San Luis Potosi. The Rioverde yoke is from a site near El Jaral and was reportedly encountered lying around the head of a burial. With this same burial were found several very finely carved stone bowls of the same basalt material as the yoke. One of these is a bird-effigy; another has a fret and 13 circles carved on it; a third is yoke-shaped and has a ledge cut around the lip as if a top had once fitted there.

Other stone objects include polished stone celts, a female effigy

pestle, a plaster polisher, a bark-beater, and two finely made obsidian ear-spools each 9 cm. in diameter.

Comparisons With The Huasteca

Joaquin Meade (1948), as a result of a site survey of the Huasteca which included the Rio Verde basin, has classified this latter area as archeologically part of the Huasteca. Ekholm (1944) and Du Solier (Du Solier, et al., 1947), on the basis of excavations in the zone of Huaxcama and a reconnaissance near Guadalcalzar in the northern Rio Verde basin, have identified the materials there with those of the eastern Huasteca. Du Solier (ibid.:25) considers the occupation at Buena Vista "contemporaneous...with the Tula Toltec epoch in Hidalgo." Ekholm (p. 585) has stated that in Buena Vista, "the pottery is sufficiently like that in the Tampico-Panuco area during Periods IV and V to postulate their contemporaneity."

On the basis of the excavations at El Jaral, the closest ceramic ties of the western Rio Verde basin appear to lie with late Period IV in Ekholm's Panuco sequence (pp. 352-358). Similarities include polished and incised blackware (Zaquil Black in Panuco); a partially red-slipped, flat-bottomed, fine paste ware (Panuco Fine Paste); one type of negative decoration; brushed exteriors on a thick utility ware (Heavy Plain); and a distinctive vessel form of Zaquil Red (found in black-ware at El Jaral) in which the upper part of the vessel wall is slipped and polished, while the lower part, separated from the upper by a low ridge, is unslipped and slightly scored. A later Panuco variety of this form with only a narrow red-slipped beveled rim and a white-slipped body is present in a few sherds from El Jaral.

Figurine ties with Panuco also fall in Periods IV and V (Ekholm:435-459). A few figurines of Panuco B type, with punctate eyes, are found, and occasional examples of the "portrait" type. Much more frequent is the class with mold-made faces, which resembles certain Panuco varieties and, like them, has applique decoration on the heads and bodies. These Panuco figurines have broad, indented-base legs and a chalky-white slip, also present in some Rioverde examples.

Another group of artifacts found in the Rio Verde materials occurs at Panuco principally in Period V. These include bark-beaters, ground stone axes, shell finger-rings, clay smoking pipes, and spindle whorls. The Rio Verde pipes generally have more delicate bowls and lack support legs. Aside from pipes, all of the artifacts in this group are very scarce in the Rioverde area. Also, none of the ceramics diagnostic of Panuco V have been encountered in the Rio Verde materials. Thus it appears either that most of the non-pottery traits are earlier on the meseta than they are on the coast, or that Period IV ceramics survived in the Rio Verde basin while other later materials diffused from the eastern Huasteca.

In addition to the above traits, carved stone yokes are also present in the eastern Huasteca, according to Prof. Stresser-Paen (personal communication), although not reported by Ekholm. Also, Joaquin Meade (1948) has identified ball courts at a number of sites in that area. He has also reported a stone ball court ring from the northern Huasteca (personal communication). These features undoubtedly represent influence from the Tajin region.

It is clear, however, that the Rio Verde basin supported a distinctly different variety of the late Classic Huasteca culture from that represented at Panuco. These distinguishing features will be briefly summarized. Traits present on the meseta but absent from the coast include red-on-white, white-on-red, and broad-line black-on-white wares, and a distinctive fine paste ware; the use of red or white pigments rubbed into the designs on incised blackware; two varieties of negative decoration; figurines with covered mouths; and carved stone bowls. As noted, the pipes also differ, and the design elements used on the incised wares are almost entirely distinct. Also, Prof. Stresser-Paen has stated (personal communication) that carved stone ball court rings and carved stone bowls have not been reported in the eastern Huasteca.

Comparisons With Other Areas

Du Solier (Du Solier, et al., 1947) has favorably compared the ceramics of Buena Vista and El Tajin, but from a study of his report on Tajin ceramics (Du Solier, 1945) the resemblances seem rather vague. However, the carved stone artifacts found in the Rio Verde meseta were almost certainly imported from the Tajin region.

The use of red pigment rubbed into incised designs on polished black or brown ware is found in Teotihuacan, in the states of Zacatecas and Durango, and at Toluquilla and Ranas in the state of Queretaro. From this last site Noguera (1945, lamina 6) has illustrated a sherd showing similar decorative techniques to some known from El Jaral. It is very possible that a line of contact existed between the Rio Verde basin and the zone of Toluquilla-Ranas by which this technique was transmitted from Teotihuacan. This possibility is of considerable importance and needs to be investigated.

This distinctive use of red pigment is found also in the Caddoan area of East Texas, where it apparently was first used in the Alto Focus of the Gibson Aspect (Newell and Krieger, 1949). Conversely, the pipe fragments illustrated from the Davis Site (Ibid.:149) resemble rather closely some of those from the Rioverde area. Krieger (1951) has published a radio-carbon date for the first occupation of the Davis Site of 1553 plus/minus 175 years, or about 400 A.D. As it is certain that the focus continued for some time after that date, the two cultures may well have been partly contemporaneous. Since the use of red pigment does not occur at Panuco, and the pipe forms there are less similar to Caddoan forms, it may be suggested that the Rio Verde area is closer to the route(s) of north-south exchange between the Caddoan area and the Huasteca. Further work in this region is certainly merited as a means of discovering this important trade route.

A third Caddoan-Huastecan element is that of T-shaped platform stone pipes. Many examples have been found in the vicinity of San Bartolo, S.L.P., primarily in caves. Some of these are sufficiently like Caddoan forms to have been actually imported from Texas. Krieger (in DuSolier, et al.:29) has discussed them briefly, but their significance has not been adequately emphasized. They reflect, however, a very different and circumscribed current of Caddoan influence in this region.

Summary

The present paper has reported the results of exploratory excavations at the site of El Jaral and reconnaissance in the municipio of Rioverde, S.L.P. The most important data were derived from work in Mound 14 at El

Jaral. Despite the evidence for ten stages of construction in this mound, the perseverance of the same pottery types and stone-masonry techniques throughout point to a relatively short time span. This inference is corroborated by the shallow deposit of cultural materials at El Jaral. This observation as to the brevity of occupation may be extended to the whole western end of the Rio Verde basin on the basis of the similarity in ceramics at all the sites visited.

At the same time, such tremendous constructional activity on a single mound confirms an inference based on the concentration of sites in the area: namely, that the population must have been very dense and must have had a firm agricultural base. The existence of maize culture is shown by the charred fragments of several corncobs collected from the fill of Stage IV of Mound 14.

The ceramic ties between the Rio Verde basin and Ekholm's Panuco sequence have been shown to belong mainly in the late Period IV, with a number of very basic resemblances being found in the pottery of the two areas. Certain other classes of artifacts found by Ekholm in Period V at Panuco, also occur in the Rio Verde area but without any Period V pottery. In spite of this, there are enough distinctive features found in the culture of the Rio Verde basin to set it off as a clearly demarcated branch of the Huasteca culture of that time.

In a further study of the Rio Verde basin there exists the tantalizing possibility of discovering one of the trade routes between Mesoamerica and the Caddo of Texas, a possibility strengthened by the profusion of Caddoan-like pipes found and similarities with certain types of Caddoan pottery noted by Krieger (in Du Solier, et al.:29). In addition, there is an excellent opportunity in the area to study such scientific questions as settlement patterns, demography and land utilization. Du Solier (Du Solier, et al.:1947) has published the only report on excavations at a site within this area, and there remains a great need for further and more refined archeological studies.

Acknowledgements

The writers wish to express their deep gratitude to Sr. Octaviano Cabrera Ipiña, through whose interest and generosity the expedition which is reported in this paper was made possible. In addition to supplying most of the material needed for the excavations, he gave freely of his time and his extensive knowledge of the geography and history of the area to aid us in our work and in the preparation of this report. He is an esteemed friend and it is with pleasure that we take this opportunity to acknowledge our indebtedness for his kindnesses and aid.

We also wish to express our sincere appreciation to Profa. Antonieta Espejo who introduced us to the archeology of San Luis Potosi, and who, as a representative of the Instituto Nacional de Antropologia e Historia, served as adviser during the excavations.

We are grateful to Prof. Roman Piña Chan, who has examined some of the pottery and made valuable suggestions regarding external relationships.

We would like to thank Sr. Joaquin Meade and Prof. Guy Stresser-Paen, who have generously shared their wide knowledge of the eastern Huasteca in the course of conversations which have provided information helpful in the preparation of this report.

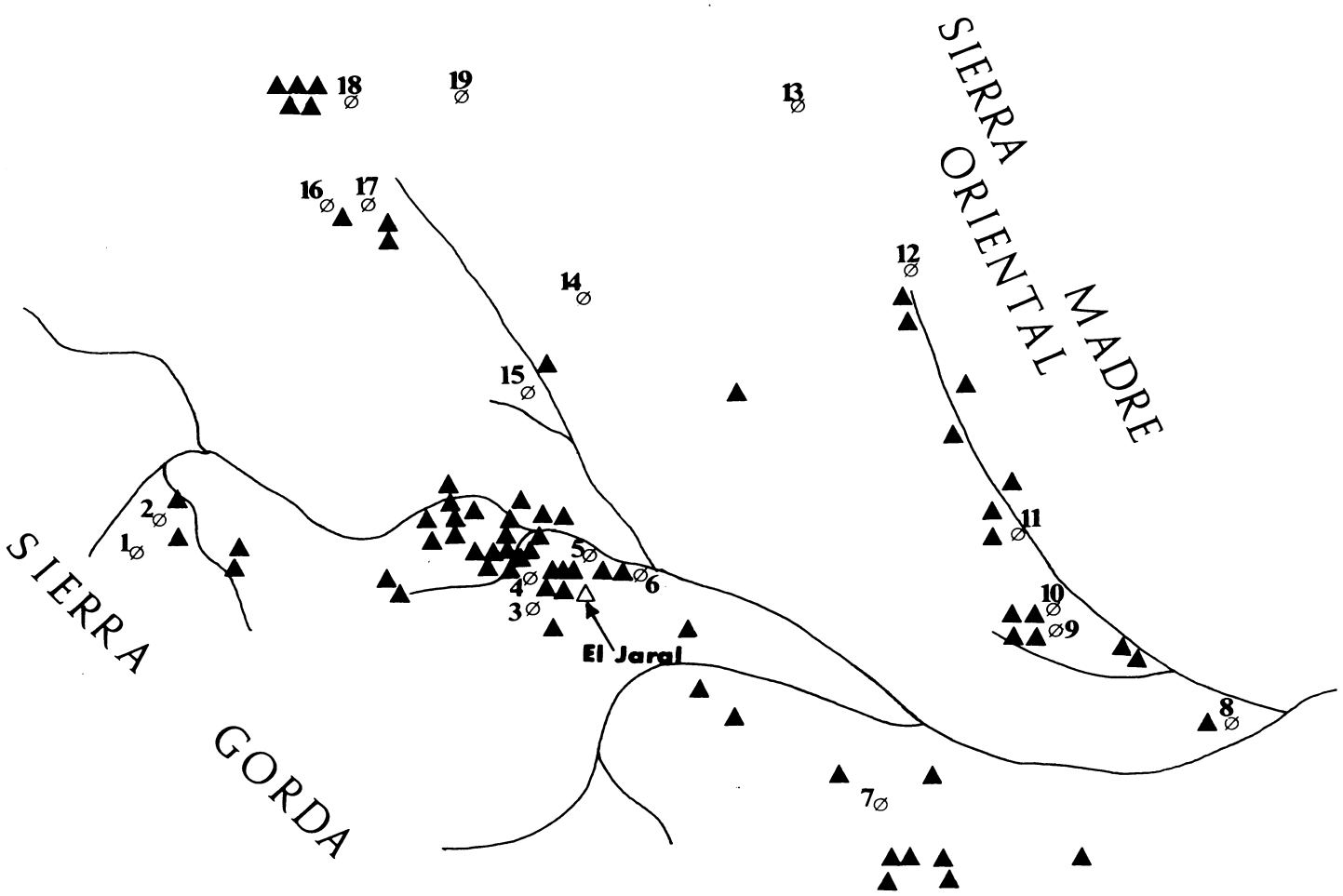
Notes

1. This paper was prepared in 1957, when the writers were students in the Escuela Nacional de Antropologia e Historia, Mexico, as an archival report for the Instituto Nacional de Antropologia e Historia. As there appears little likelihood that the writers will be able to carry out further work at the El Jaral site anytime in the near future, it seems advisable to now place this work on record. Nancy P. Troike prepared a preliminary report on the pottery types of El Jaral, "Preliminary report on excavations at El Jaral, Rioverde," presented at the X Mesa Redonda of the Sociedad Mexicana de Antropologia at San Luis Potosi in August of 1963; the proceedings of that conference, however, have never been published. The reconnaissance of the western Rio Verde basin in another paper by Nancy P. Troike, "Archeological reconnaissance in the drainage of the Rio Verde, San Luis Potosi, Mexico," Bulletin of the Texas Archeological Society, Vol. 32 (1961), pp.47-55.

Table 1.
(Supplement to Figure 2.)

Dimensions of the Unexcavated Mounds of El Jaral (in meters)

	North-South	East-West	Height Above Present Ground Level
Mound 1	21.50	12.40	1.53
Mound 2	34.30	18.60	4.59
Mound 3	17.00	20.00	2.51
Mound 4	19.00	18.40	1.53
Mound 5	19.80	21.00	1.53
Mound 6	15.40	15.00	1.53
Mound 7	22.00	28.00	3.06
Mound 7A	22.00	10.00	1.53
Mound 8	23.40	7.00	1.53
Mound 9	23.40	24.40	4.16
Mound 10	52.00	9.80	0.96
Mound 11	20.00	20.00	2.52
Mound 12	11.40	15.00	1.53
Mound 13	47.00	22.80	5.18
Mound 14	30.60	26.20	6.68
Mound 15	16.60	20.00	2.20
Mound 16	15.00	22.20	1.93



1. Altonilco
2. Sta. Catarina
3. La Loma
4. San Diego
5. Callejones
6. Rio Verde
7. Valle de San Ciro
8. Pinahuan
9. Ebano
10. Quemada
11. Villa de Gamotes
12. Alaquineso
13. Cd. del Maiz
14. San Bartolo
15. Valle de la Pastora
16. Buena Vista
17. Guascama
18. Guadalcalzar
19. Cerritos

Figure 1. The Rio Verde Basin. After Octaviano Cabrera Ipiña (1957). Archeological ruins are indicated by darkened triangles. The site of El Jaral is shown as a white triangle. Towns near ruins are numbered.

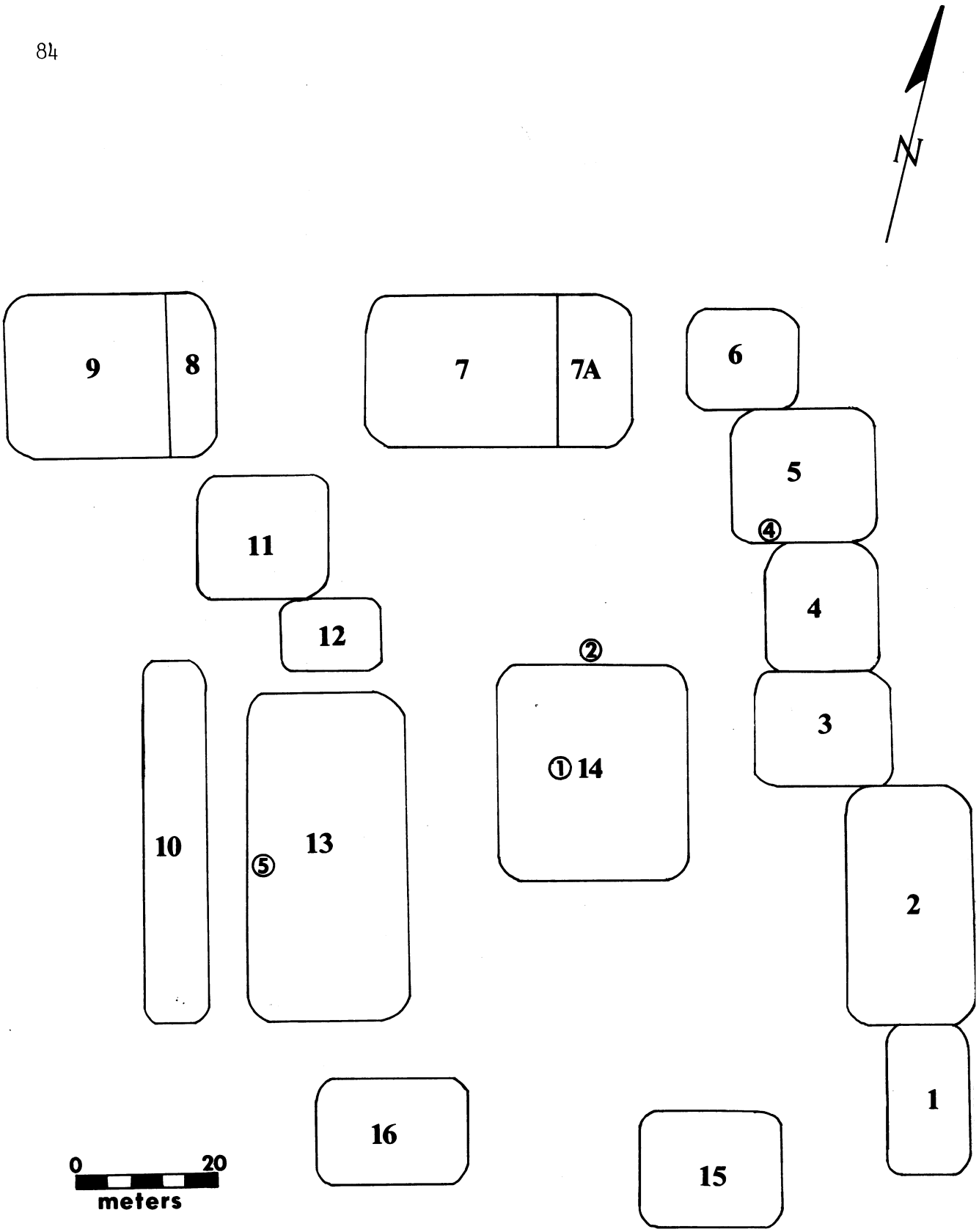


Figure 2. Plan of the Ruins of El Jaral, Rioverde, S.L.P., 1957. Mounds are numbered and are shown schematically. Encircled numbers indicate test pits. Test pit 3 is beyond the confines of the map.

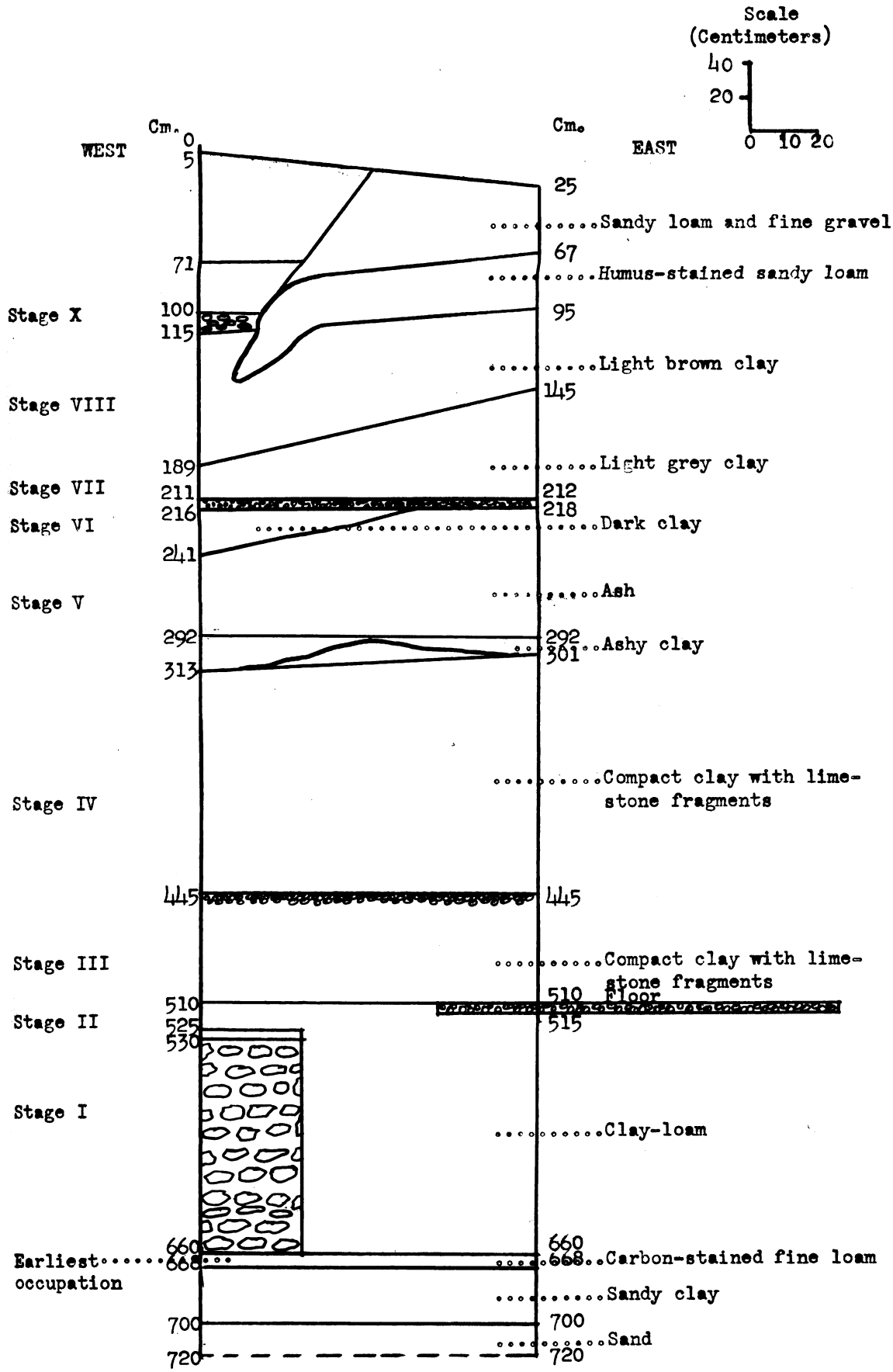


Figure 3. Profile of North Wall, Pit 1, Mound 14.

a

b

c

d

Plate 1. a, North side of Mound 14; b, Stage 1 in Pit 1, Mound 14; c, West wall of Pit 1, Mound 14; d, View west at Pit 1, Mound 14.

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VII. NOTES ON THE RUINS OF IXTUTZ, SOUTHEASTERN PETEN

Merle Greene Robertson

In July of 1970, while undertaking to record by rubbing the large Stela 1 at Ixkun, the existence of another ruin in the vicinity of Dolores was reported to me. My guide, Mirando Huil Obando, a Dolores Maya, indicated his family had known of the site for a long time, but he believed that no one else had visited the ruin. Accordingly, after completion of the work at Ixkun, we set out from Dolores to visit the new site. The site is located 8 kilometers southwest of Dolores. A trail leads through the pine forest surrounding Dolores down into the rain forest where a milpa was worked. From here, however, there was no trail and the way to the ruin was slow as passage way had to be hacked through thick underbrush. The jungle surrounding the site is very dense, effectively hiding construction from view even close at hand.

The site, known to the Huil family as Ixtutz, is 2 kilometers from the Poxte River and about 35 air kilometers from the Belize-Guatemalan border. The site is some 17 kilometers to the southwest of Ixkun, while the nearest large ceremonial site would be Pusilha, about 55 air kilometers to the southeast. The site lies just beyond the foothills of the Maya mountains in a humid rainforest in which there is an abundance of cacao and coroza palms.

The 1940 edition of the 1924 Blom-Ricketson Tulane archaeological map of the Maya area shows an unnamed archaeological site in the approximate vicinity of Ixtutz's location. As no other record of the site appears to be preserved, it is likely the site's existence was reported but never verified. Since we found sculptured monuments and other features of interest at the site, further investigation was called for, and in 1971 I revisited Ixtutz twice (1).

Site Layout

As is typical of Maya ceremonial centers, the ruins of Ixtutz consists of a series of distinctive architectural groups. Our explorations

revealed the existence of five groups, three of which were joined by causeways, and further exploration might reveal the existence of additional units.

Superstructures appear to have all been of perishable material with thatch roofs; no vault stones were observed in the clearing of mounds for mapping. Several stairways are preserved in good condition and are notable for their use of large well cut blocks. Artificial leveling of large areas of the site, by filling in low sections and bordering them with stone retaining walls, is another feature worthy of note.

The ruins can best be visualized by study of the accompanying map (Figure 1), to which a few supplementary observations can be made.

Plaza A of Group A appears to be the most important section of the site. This is a well confined space with the exception of the northwest corner where there is a large opening between Temples II and III. The highest of the Ixtutz temples (Temple II) is located here as well as the four carved stelae of the site. Evidence of still additional sculpture was found at Temple II where a series of 15 carved and inscribed blocks were found (Plate 5); the blocks may be parts of a wall panel and excavation should produce additional pieces.

Group B lies about 88 meters to the northeast of Plaza A and rests entirely upon a raised platform which reaches a height of 1.5 meters at its southeastern corner. This is also a well delimited space with entrances of no greater than two meters width at any corner.

The Western Acropolis of Group C occupies the 47 m. high summit of a large hill. Fairly gentle slopes provide approaches on the south and east sides while the north and west sides are comparatively steep. The hill is a natural outcropping of immense limestone blocks. Some of the blocks have been adapted and partly shaped to conform to associated constructions such as stairways or buildings.

Group D was the last section of the site to be investigated and may be more extensive than the map indicates.

An intriguing section of the site is the entire, roughly square area bounded by the Acropolis Causeway on the south, the North Causeway on the west, the Chapulte Causeway on the north, and the platform terrace of Group A on the east. The area is completely level without any mounds. It was not possible in the limited time available to satisfactorily investigate this area, and only a 24 x 7 m. zone could be mapped. This zone was 6 m. north of the Acropolis Causeway and parallel to it. The section contained four parallel rows of crudely cut stones about 20 x 30 cm. each which ran the entire 24 m. length, continuing an unknown distance both to the east and west. The first two parallel lines of stone were laid out 3 m. apart and the enclosed area was divided with similar stones at intervals of 3 and 2.5 m. as if divisions of market stalls. A third and fourth set of parallel stone lines were laid out 1 m. north of this series of enclosures and appeared to be designed in the same general pattern but with variations as to the size of the compartments. Further studies should be carried out in this region to determine the function of these interesting features.

Stelae

Six stelae have been found at Ixtutz, four of which are carved on one side and two of which are plain. One plain altar was found.

Stela 1.

Location:	Standing erect in Plaza A in front of the south corner of Str. 10 at a distance of 4.5 m. from the base of the eastern terrace. Sculptured side facing west.
Association:	None.
Date:	Late Classic.
Condition:	Poor; relief faint. Inscription illegible.
Material:	Limestone.
Shape:	Rectangular, squared top, irregular sides, not evened off.
Dimensions:	Height: 2.73 m., Width at top: 1.10 m., Thickness: .40 m.
Carved Area:	Front (west)carved. Back and sides plain.

Stela 1 with its wide plain border has a human figure carved on the front facing to the viewer's left. The body is slightly turned with the figure's left shoulder slightly raised. He appears to have a cape over the left shoulder. The figure's legs are spread widely apart and he wears sandals with large pom poms or bows. In his right hand he holds a ceremonial staff (Proskouriakoff's type L2) as depicted on Naranjo Stela 8, Bonampak Stela 1, and the Bonampak area stela in the Museum Rietberg, Zurich. His high, top heavy headdress is adorned with a mask on the front and large feathers to the rear. The figure stands upon a row of hieroglyphs beneath which a secondary figure is seated in a sharply reclining pose. The apparently bound smaller figure turns his head upward while his long switch of tightly tied hair hangs below.

Stela 2.

Location: Fallen in Plaza A in front of northwest corner of Structure 9 at a distance of 4.5 m. from the base of the eastern terrace. It was originally facing west and is 3.7 m. south of Stela 1.

Association: None.

Date: Late Classic.

Condition: Poor; relief shallow.

Material: Limestone.

Shape: Rectangular, top squared off but curved slightly at upper left corner and more rounded at upper right corner. It tapers at the base.

Dimensions: Height: 4.15 m., Width: 1.43 m., Thickness: .33 m.

Carved Area: Front (west) carved. Back and sides plain.

Stela 2 is a very tall monument on which is carved a human figure with body in front view but head turned to the viewer's left. The figure's legs are spread slightly apart, and he wears sandals with immense feather pom poms somewhat similar to those worn by the figure on the Itsimte Stela 4. His right hand holds a ceremonial staff with a manikin figure; the leg-appendage of the manikin falls in long flowing scrolls. The skirt has very large squared scrolls hanging to the side somewhat reminiscent of the apron scrolls on Seibal Stela 8 and somewhat like those of Polol Stela 4; however, on the latter the scrolls are

worn higher as if coming from the waist band. The large headdress has a panoply of feathers to the rear and a large lotus flower adorning the front. The figure stands on a double row of hieroglyphs beneath which the carving is too badly eroded to determine its nature.

Stela 3.

Location: Fallen in Plaza A in front of Structure 9 and 4.5 m. in front of the base of the eastern terrace. It originally faced west and is 2.9 m. south of Stela 2.

Association: Altar 3, uncarved, slightly conical in shape. Diam.:1.59 m., Thickness: .47 m.

Date: Late Classic.

Condition: Poor. Relief very deep but badly eroded.

Material: Limestone.

Shape: Rectangular, top rounded, tapers in slightly at base.

Dimensions: Height: 4.47 m., Width: 1.16 m., Thickness: .28 m.

Carved Area: Front (west) carved. Back plain, sides possibly carved but impossible to determine now.

Stela 3, the tallest at Ixtutz portrays a figure in animal attire, possibly a jaguar, standing in front body view with head turned toward the viewer's left and with the head slightly lowered, bringing the left shoulder higher as on Stela 1. The figure wears a mask which can be seen standing out from the face. His straight thin legs appear more animal than human, and his feet are animal. A long slim tail curves down behind and to the side. A distinctive feature is the claw-knife held in the left hand, reminiscent of the three-pronged claw knives held on the lintel of Temple III at Tikal as well as the Kaminaljuyu claw knife. A very unusual headdress is worn by the figure, and there appears to be a minikin held in the right hand. A large back cape completes the costume. The figure stands on a block which encloses another seated bound figure whose head is turned to the viewer's left and whose hair is reminiscent of that of a prisoner. A caption of 35 hieroglyphs is placed above the principal figure while a row of glyphs flank either side of the seated prisoner in the lower panel.

Stela 4.

Location: Fallen in the Plaza A in front of Structure 9. Originally in line with the other 3 stelae which were standing in front of the eastern terrace of the plaza.

Association: None

Date: 9.7.15.0.0

Condition: Inscription side in mint condition except for the bottom four hieroglyphs which are partially flaked off.

Material: Limestone.

Shape: Rectangular, squared top.

Dimensions: Height: 2.20 m., Width: 1.15 m., Thickness: .35 m.

Carved Area: A double row of almost mint condition hieroglyphs. Carved area: 1.55 m. x .445 m. The opposite side of the stela may have been carved, but is so eroded that it is impossible to determine original nature.

Inscribed Blocks of Temple II

Although portions of fifteen carved blocks were found along the base of Temple II, it was not possible to recover the entire sculpture without resorting to excavations. The blocks recovered cannot be fitted together and until additional parts of this feature are recovered, it is difficult to interpret. The blocks indicate that a single row of glyphs formed the border to a central composition, but insufficient details are present to determine the subject matter of the enframed center. The better preserved blocks are illustrated in Plate 5.

Notes

1. I returned to Ixtutz in March of 1971 for a visit of one month. Assisting in the explorations were Lawrence Robertson and a group of students: Tom Gardner, Arlen Chase, Kevin Monahan, and George Wing. A small group of laborers from Dolores were employed to clear portions of the site to facilitate mapping and study of the carved monuments. An additional brief visit was made in the following July to check certain map details. At this time a rubbing was also made of the underside of Stela 4, a monument which was turned by Ian Graham who visited the site in the interval between our explorations.

APPENDIX:
NOTES ON THE INSCRIPTION OF IXTUTZ STELA 4

John A. Graham

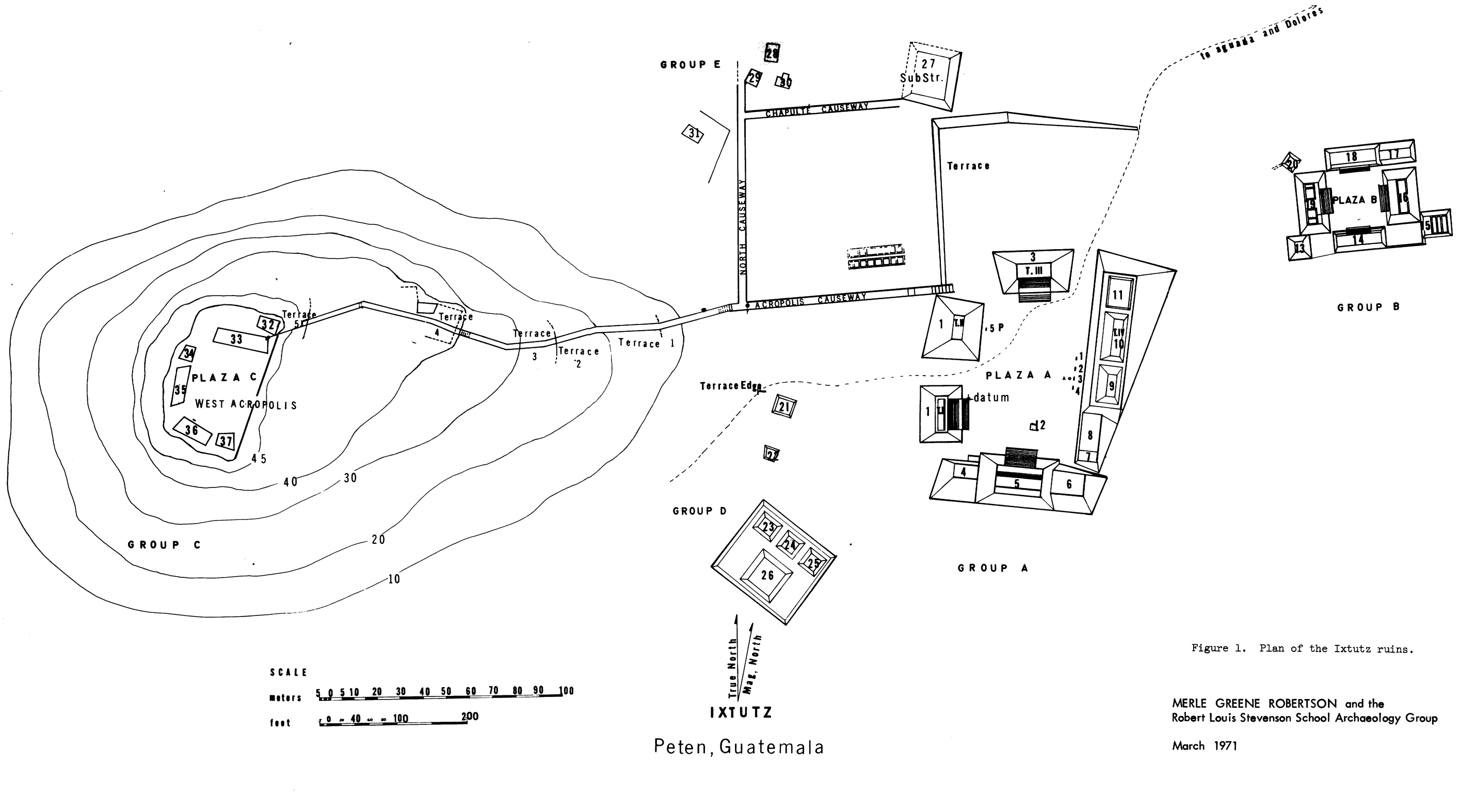
This important inscription opens with a very clear calendrical notation. At A1-B1 there is recorded 12 Ahau 8 te head-variant. At A2 is an extremely elaborate "5 haabs lacking" construction, indicating that the preceding calendar round is a period-ending declaration. Although the cleft-head feature of the personified month sign suggests a reading of "Pax," the "5 haabs lacking" statement places the date in the long count position of 9.7.15.0.0, 12 Ahau 8 Yax. Additional calendrical notations appear to have been present in the final blocks of the text, and it is a great misfortune that these blocks are almost entirely effaced.

The subject matter of the inscription is indicated by ritual phrases combined with a nominal phrase with emblem glyphs.

With respect to the emblem at A5b, it may be noted that Berlin (1958) originally defined T-778 as a Tikal emblem of the 9.14.0.0.0 to 9.16.0.0.0 epoch and suggested it was a personification of Tikal emblem T-569. Thompson, however, has referred to T-778 as the emblem of "Tikal and the Pasion confederation" (Thompson 1966:193). Glyph T-716 occurs frequently as an emblem in the texts of a number of Lower Pasion sites, but it is sometimes difficult to distinguish from T-778 and, as Thompson (1962:308) notes, seems to converge with T-778. Nevertheless, T-716 appears to be absent from Tikal and T-778 appears to be very rare in the Pasion although Tikal emblem T-569 is extremely well represented. Thompson's catalogue lists only two possible occurrences of T-778 in Pasion sites: at Aguateca on Stela 2 at F7 and a questionable example at Dos Pilas on Stela 2 at C6. The Aguateca example, however, lacks the "eye" of T-778 and I would regard it as T-716, assuming these really are separate glyphs. The Dos Pilas example (Stela 18 of the Guatemalan Dos Pilas expedition terminology; Navarrete and Lujan 1963) also lacks the "eye" and even more surely is T-716 which also occurs in a better state of preservation on the companion stela of the Dos Pilas ball court. Nevertheless, although I

question the two catalogue listings of T-778 for the Pasion, there is a well preserved example of T-778 upon the bottom step of the "processional" hieroglyphic stairway (Structure 1) at Dos Pilas. As Tikal emplem T-569 also occurs in this text, it seems likely that T-778 is not just a zoomorphic form of T-716 but that they are separate glyphs. And if the "eye" is taken as an important diagnostic of T-778, then the emblem at A5b of Ixtutz Stela 4 must be that characteristic of the Pasion.

This fine inscription, preserving so many details of its very elaborate glyphs, is an important addition to the corpus of Maya hieroglyphic texts.



IXTUTZ

Peten, Guatemala

Figure 1. Plan of the Ixtutz ruins.

MERLE GREENE ROBERTSON and the
Robert Louis Stevenson School Archaeology Group

March 1971

Plate 1. Ixtutz Stela 1.

Plate 2. Ixtutz Stela 2.

Plate 3. Ixtutz Stela 3.

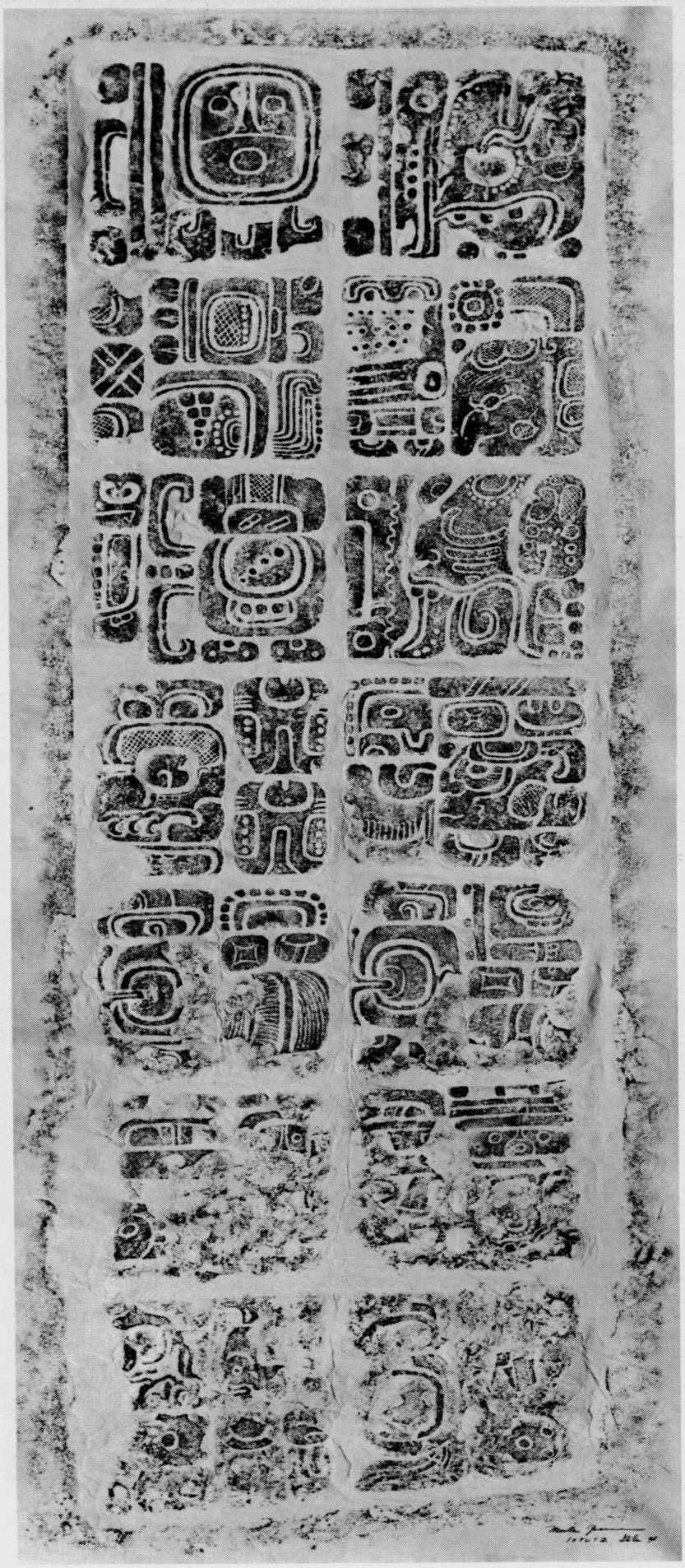


Plate 4. Ixtutz Stela 4.

a

b

c

d

Plate 5. Inscribed blocks from Temple II. a, Block 6 (35.5 x 37 x 25.8 cm.); b, Block 3 (36 x 24.3 x 27.7 cm.); c, Block 5 (29.1 x 26.3 x 30.7 cm.); d, Block 2 (35.5 x 27.5 x 38 cm.).

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VIII. TRACE ELEMENT ANALYSIS OF OBSIDIAN FROM THE SITE OF CHOLULA, MEXICO*

Thomas R. Hester, Robert N. Jack and Robert F. Heizer

The archaeological site of Cholula is located in the state of Puebla, central Mexico, about 65 miles southeast of Mexico City (Figure 1). During a brief visit to the site in 1970, we were able to obtain a sample of 89 obsidian artifacts. These specimens have been subjected to rapid-scan x-ray fluorescence analysis, a technique which we have previously used to determine the geologic sources of archaeological obsidian. Procedures followed in the analysis are the same as those outlined in Hester, Jack and Heizer (1971:93).

Our sample was collected from the surface of excavation backdirt on the west side of the Cholula pyramid and are undated. Presumably, the materials belong to the Classic period. We are fully concious of the desirability of analyzing obsidian samples recovered from dated archaeological contexts since only information secured from this kind of material can provide us with hints of changing obsidian trade or procurement patterns over time at specific sites. However, we consider data such as presented here of value in giving us some indication of the geologic sources which furnished obsidian to prehistoric sites. We caution that inferences on "trade networks" and the like cannot safely be drawn from information such as given here for the site of Cholula.

As shown in Table 1 and Figure 2, x-ray fluorescence analysis has revealed the presence of six distinct obsidian groups or types in the Cholula sample. These have been earlier designated as types A-G (Hester, Jack and Heizer 1971: Table 8). At the present, we are able to correlate the following types with a specific obsidian source: type A (Cerro de las Navajas, Hidalgo); type D (Zaragoza, Puebla); type E (Cerro de Minas, Puebla); and, type G (Guadalupe Victoria, Puebla). The geologic sources of types B and F (both represented at Cholula) are not known. Type C obsidian, another of the types whose source is unknown, does not appear in our sample.

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* We wish to thank Dean Sanford Elberg, Graduate Division, for funds to partially defray costs of the 1970 trip to Mexico (course Anthropology 296A), as well as the Archaeological Research Facility for support funds. The Ford Foundation Graduate Traineeships in Archaeology grant provided part of the travel and support funds.

Type D (Zaragoza) is the major type at Cholula, comprising almost 54% of the sample. This is of interest, since this type is the one used almost wholly by the peoples of Tres Zapotes, Veracruz (Hester, Jack and Heizer 1971). Similarly, type B (geologic source unknown) which is also prominent in the Cholula collection occurs as a major type at the site of La Venta, Tabasco (see Hester, Heizer, and Jack 1971) and is present at the site of San Lorenzo (Cobean et al. 1971).

All of the obsidian sources represented in our Cholula sample are fairly close at hand, lying within a 75-mile radius of the site (Figure 1). The most distant sources are Cerro de las Navajas and Zaragoza, both about 75 miles away. Guadalupe Victoria and Cerro de Minas are 65-70 miles east of the site. Although there is considerable evidence of Teotihuacan influence at the site of Cholula, it is somewhat puzzling that we found no obsidian from the Otumba (Teotihuacan) source. This geologic source is closer to Cholula than any of the others represented in our sample. Given the poor contextual data associated with our sample, it would not be wise to speculate on the reasons for the absence of Otumba obsidian at Cholula. However, Michels (1971:266) notes that during the Colonial period, sites within the Teotihuacan Valley "...show noticeably greater use of gray [Otumba] obsidian...". Perhaps during the Classic period, these same sites more or less controlled the distribution of Otumba obsidian, and most of it was allocated for local consumption. This seems likely, for little obsidian of this type is represented at sites outside the Valley of Mexico. On the other hand, Cerro de las Navajas obsidian (the other major Valley of Mexico source) is quite widely distributed (Stross et al., in press).

With a small sample such as ours, we cannot deal with the important question of whether obsidian from the various sources was being brought to Cholula as raw material or if perhaps some of it was being traded to the site in the form of blades or finished artifacts. Of the artifacts in our sample, 76% are blades or blade fragments. Eight of the blades have trimming or use retouch on the lateral edges; of these, seven are of type D (Zaragoza) obsidian. This is the only artifact group which is largely restricted to a specific obsidian type. The remainder of the Cholula sample is composed of flakes and flake fragments (20%) and unifacial and bifacial tools (4%).

Table 1.

Obsidian Types at Cholula, Puebla

Type and location	No. of samples	Percent
A (Cerro de las Navajas)	16	18.0%
B (unknown)	13	14.6
C (unknown)	0	0.0
D (Zaragoza)	48	53.9
E (Cerro de Minas)	3	3.4
F (unknown)	2	2.2
G (Guadalupe Victoria)	7	7.9
	(89)	(100.0)

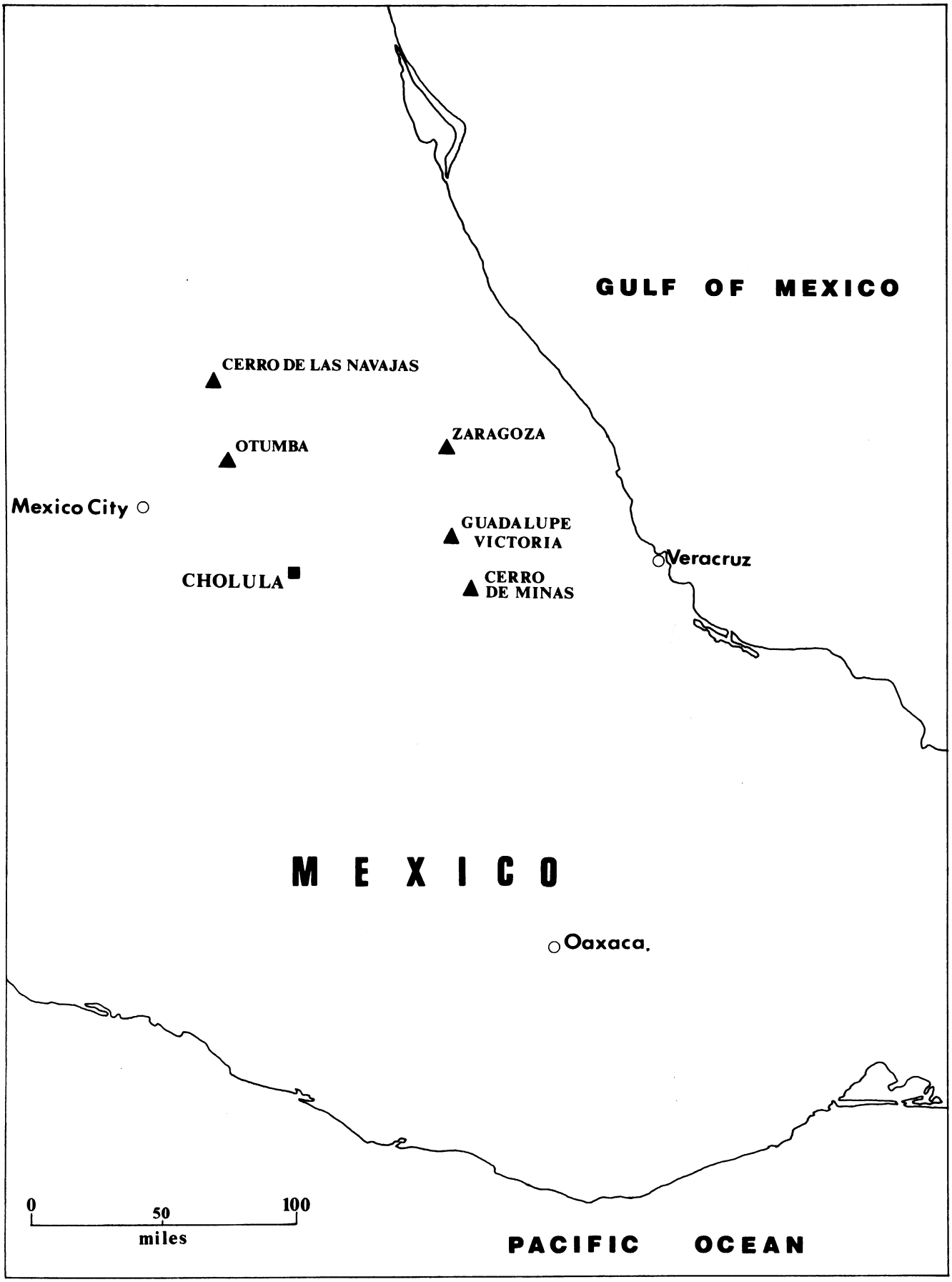

Figure 1. Location of the site of Cholula and geologic obsidian sources in central and southeastern Mexico.

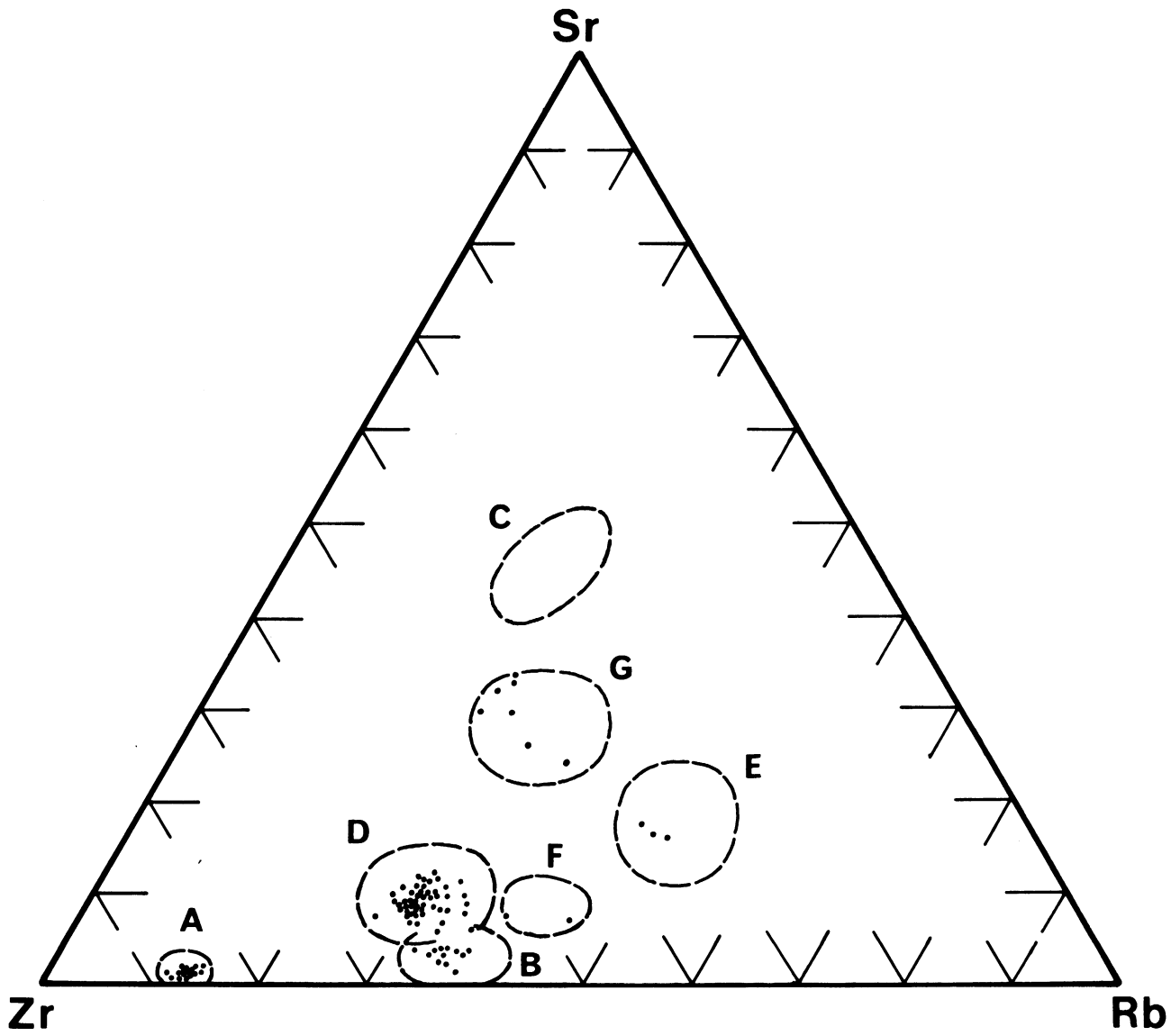

Figure 2. Plotted results of rapid-scan analysis of obsidian artifacts from Cholula, Puebla, Mexico. Each point represents the relative Rubidium (Rb) K-alpha, Strontium (Sr) K-alpha, and Zirconium (Zr) K-alpha intensities for one artifact.

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IX. SOURCES FOR THE OBSIDIAN AT THE RUINS OF SEIBAL, PETEN, GUATEMALA

John A. Graham, Thomas R. Hester and Robert N. Jack

Professor Gordon R. Willey of Harvard University has provided us with a sample of 14 obsidian artifacts (blades and blade fragments) from the ruins of Seibal, Guatemala. Seibal is an important lowland Maya site located on the Pasion River of southwestern Peten (Figure 1). Under Professor Willey's direction, the Peabody Museum of Harvard carried out excavations at the ruin from 1964 through 1968. These explorations have resulted in the discovery of the earliest as yet identified ceramic complex in the Southern Maya Lowlands, dating to about 800 B.C., and have yielded an important cultural sequence that leads through the PreClassic to a terminal Classic age characterized by an intrusive and exotic cultural tradition (1). Since the sample of obsidian artifacts can be linked to specific contexts within this cultural sequence, the specimens are especially useful for trace element analysis and source determination. The analyses reported here were undertaken by rapid-scan x-ray fluorescence techniques (Figure 2).

As might be anticipated, most of the obsidian in the sample is derived from geologic deposits in the volcanic highlands of Guatemala. Five specimens are identified as deriving from the deposits at El Chayal, and one specimen derives from Ixtepeque (Figure 1). Type C obsidian is represented by six artifacts. The problems involving the identification of the type C obsidian source have been discussed previously (Hester, Jack, and Heizer 1971), and on the basis of more recent comparisons we can say that it is highly probable that this type represents the source near San Martin Jilotepeque (Figure 1). This San Martin Jilotepeque source appears to be the same as Aldea Chatalun (Cobean et al. 1971). Since type C obsidian is found at sites outside the Maya area (for example, at La Venta, Tabasco), the matter of an accurate source identification is of considerable interest.

There is a single specimen of type D obsidian at Seibal. This type has been linked to a Mexican source near Zaragoza, Puebla (Hester, Jack, and

Heizer 1971), over 500 miles northwest of Seibal. Finally, there is one specimen in the sample which cannot now be identified as to source derivation (2).

Table 1 lists the obsidian specimens analyzed and indicates their geologic source identification as well as their phase context within the Seibal archaeological sequence. As noted, all but three of the 14 samples derive either from the obsidian deposits at El Chayal or source C (San Martin Jilotepeque). Although the sample is small, these two major sources appear to have been of importance in supplying obsidian to Seibal at different periods in the site's history. Of the early Real (800-600 B.C.) and Escoba (600-300 B.C.) phases, three samples are derived from source C and one sample from El Chayal. During the subsequent Cantutse phase (300 B.C.-A.D. 270), a single sample is present and derives from source C. Another sample, attributable to either Cantutse or the subsequent Junco (A.D. 270-500) phase, is also from source C. With the Tepejilote phase (A.D. 690-770), the El Chayal source begins to come into importance; two samples were analyzed for the phase, one being El Chayal derived and the other being of an unidentified source. Finally, during the Bayal phase (A.D. 770-930) five samples analyzed indicated that four were of El Chayal derivation while one is of source D origin (Zaragoza, Puebla). A sixth Bayal sample, but possibly of the preceding Tepejilote phase, is identified as derived from Ixtepeque.

To summarize briefly, source C appears to be the important source of Seibal obsidian during the Preclassic period while El Chayal figures as the important source during the Late Classic. As the Late Classic Bayal phase is a period in which many non-Classic features appear at Seibal, it is exciting to find the single Mexican sample (source D) occurring within this context. It will be interesting to see if analysis of a larger number of samples will substantiate this apparent pattern.

Notes

1. An outline of the Seibal sequence may be found in Willey (1970: 317-320).

2. Additional analyses of Seibal obsidian and of source samples from Guatemalan highland obsidian deposits can be found in Stross et al. (in press).

Table 1.

Obsidian Sources at Seibal

Spec. No.	Sample Identification and Phase	Obsidian Type or Source
1	S-2951; 107(B) 9 (Escoba or Real)	C (probably San Martin Jilotepeque)
2	S-2951; 107(B) 9; second specimen. (Escoba or Real)	C
3	S-2952; 107(B) 10 (Escoba or Real)	El Chayal
4	S-2989; 104(H) 2d (Bayal)	El Chayal
5	S-3019; 136(R) 1 (Bayal)	El Chayal
6	S-3042; 135(E) 11 (Bayal)	El Chayal
7	S-3131; 137(C) 3 (Bayal, possibly of Tepejilote origin)	Ixtepeque
8	S-3142; 138(B) 8 (Cantutse)	C
9	S-3149(A); 135(P) 1 (Bayal)	C
10	S-3149(B); 135(P) 1 (Bayal)	D (Zaragoza, Puebla)
11	S-3164; 140(B) 7 (Tepejilote)	unknown type
12	S-3165; 140(B) 8 (Tepejilote)	El Chayal
13	S-3266; 144(B) 10 (Junco or Cantutse)	C
14	S-3371; 162(B) 13 (Escoba)	C

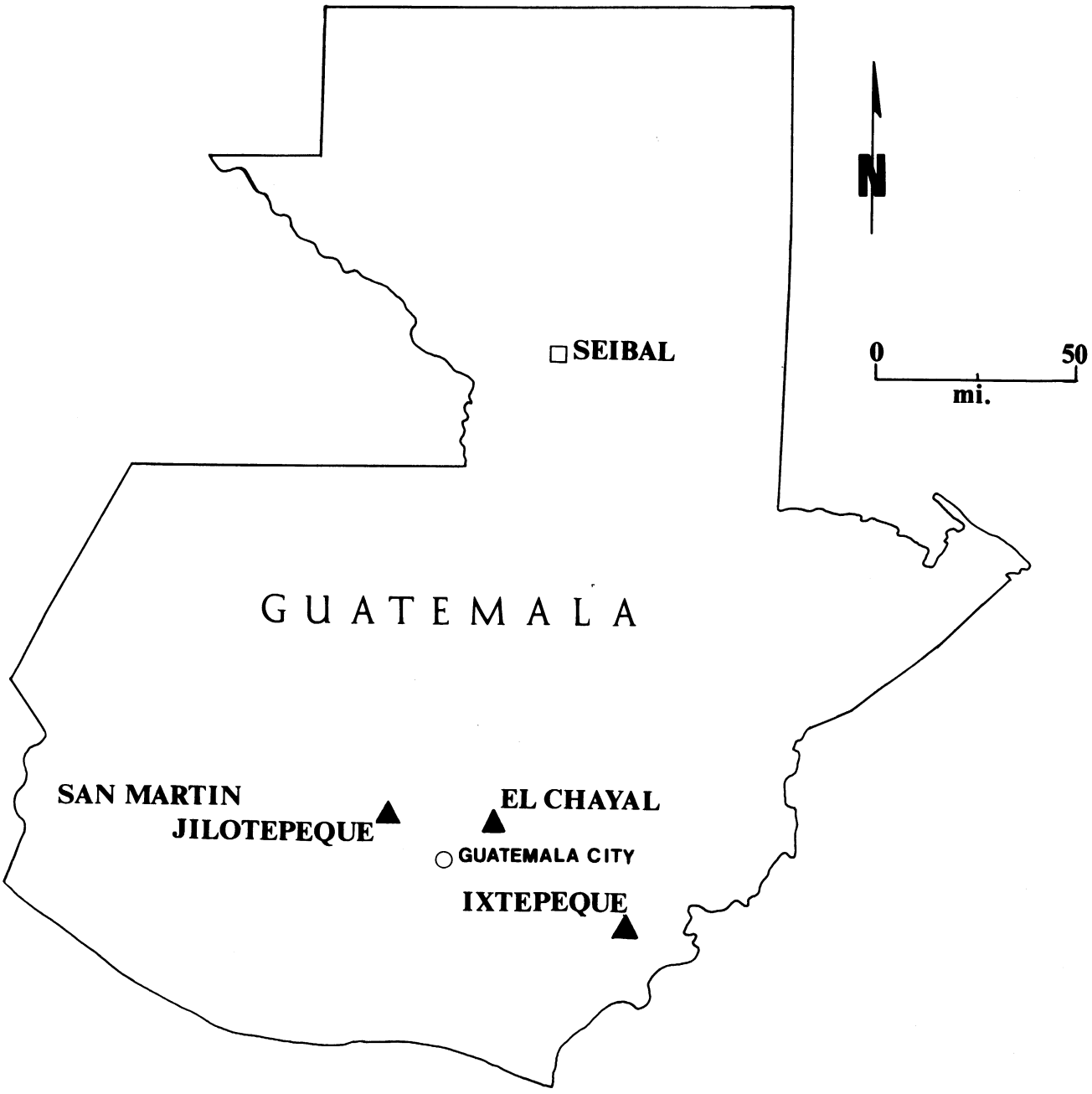

Figure 1. Location of the site of Seibal and of major geologic obsidian sources in Guatemala.

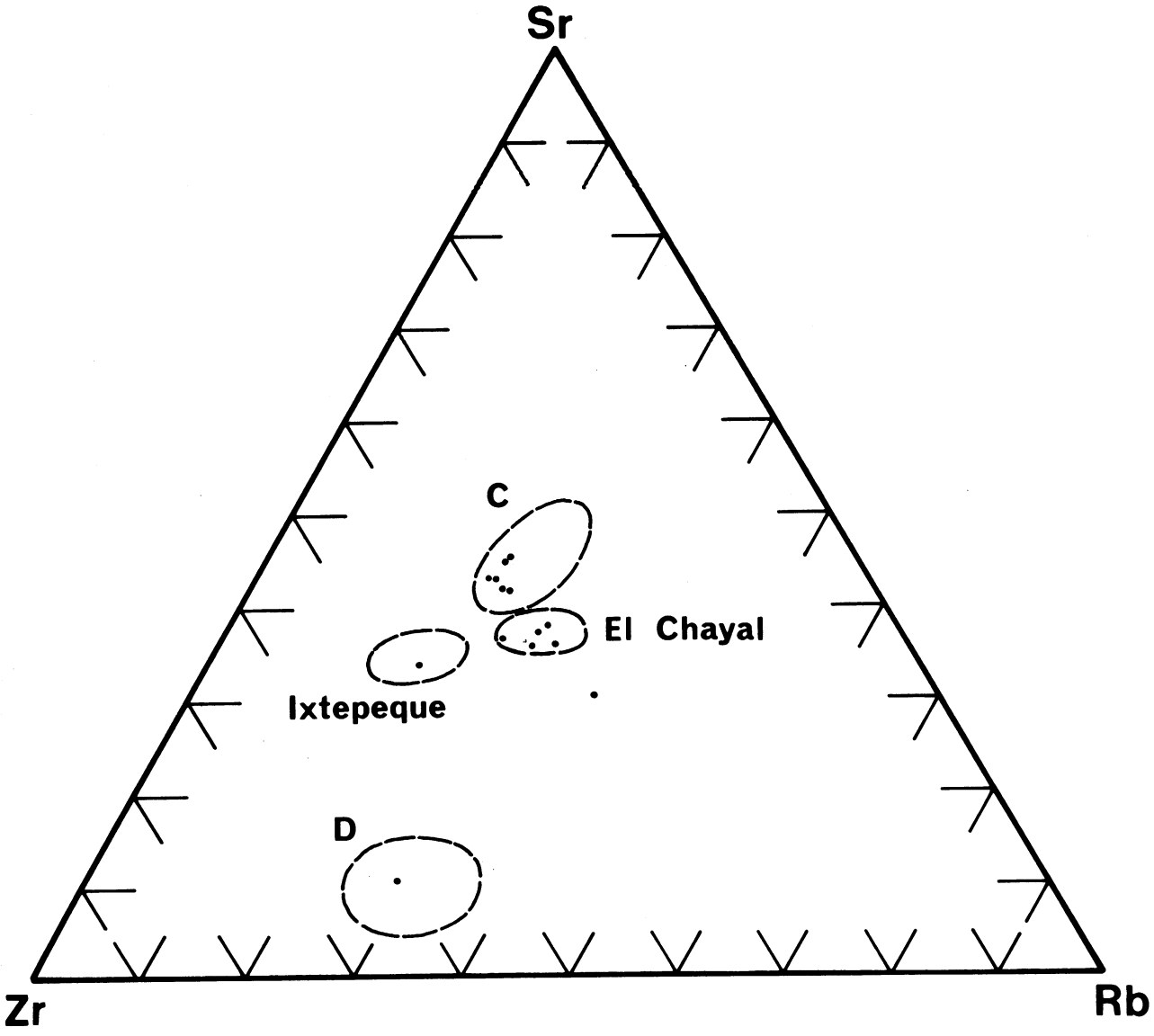

Figure 2. Plotted results of rapid-scan analysis of obsidian artifacts from Seibal, Peten, Guatemala. Each point represents the relative Rubidium (Rb) K-alpha, Strontium (Sr) K-alpha, and Zirconium (Zr) K-alpha intensities for one artifact.

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X. GEOLOGIC SOURCES OF ARCHAEOLOGICAL OBSIDIAN FROM SITES IN NORTHERN AND CENTRAL VERACRUZ, MEXICO

Robert N. Jack, Thomas R. Hester, and Robert F. Heizer

A sample of 102 obsidian artifacts from central and northern Veracruz, Mexico, has been analyzed by rapid-scan x-ray fluorescence techniques (cf. Hester, Jack and Heizer 1971:93) for the trace elements rubidium (Rb), zirconium (Zr) and strontium (Sr). Results of these analyses are plotted in Figure 2. The obsidian was obtained from the sites of Cempoala, Quiahuitzlan and El Tajin (Figure 1) during a research trip in the winter of 1970. All of the specimens are from surface contexts, but since nothing has been published regarding the geologic obsidian sources represented at sites in this area of Veracruz, we feel that it may be useful to make our findings available. Obsidian types discussed here are identical to those used by Hester Jack and Heizer (1972).

Thirty-nine obsidian specimens (blades, flakes and fragments) were secured from the site of Cempoala, the 16th century Totonac center located 25 miles above the city of Veracruz. Three distinct obsidian types were recognized: type A (23.1%; Cerro de las Navajas, Hidalgo); type D (33.3%; Zaragoza, Puebla); and, type E (43.6%; Cerro de Minas, Puebla).

The site of Quiahuitzlan is about 15 miles north of Cempoala. Most of the archaeological remains at this site can be attributed the Postclassic period. Fifty-six obsidian specimens-blades, flakes, and a blade core-were analyzed. The bulk of the sample (71.4%) is of type D (Zaragoza) obsidian. Type E (Cerro de Minas) obsidian constitutes 21.4% of the sample, with the remainder representing type A (1.8%; Cerro de las Navajas), the unidentified type B source (1.8%) and two specimens (3.6%) which fall outside the limits of previously recognized types.

Seven obsidian artifacts (blades and blade fragments) from the site of El Tajin were submitted to us by Mr. and Mrs. Ray Krotser; these specimens probably date from the Classic period. Six (85.7%) are of Zaragoza

obsidian, and the seventh is of type F, the geologic source of which remains unknown.

It is apparent from our data that the obsidian source located in the vicinity of Zaragoza, Puebla, was used quite heavily by each of these three Veracruz sites. This is not surprising in view of the proximity of this source; for example, the distance from Zaragoza to Cempoala is ca. 70 miles, to Quiahuitzlan, about 65 miles, and to El Tajin, only 45 miles. As we have earlier reported (Hester, Jack and Heizer, 1971; Hester, Jack and Heizer, 1972), Zaragoza obsidian is also a major type at the site of Tres Zapotes in southern Veracruz, and at Cholula in the central Mexican highlands. The predominant source at Cempoala is that of Cerro de Minas, lying 70 miles to the southwest. Also at Cempoala, there is a relatively large amount of the green obsidian characteristic of Cerro de las Navajas (Pachuca), about 100 miles to the northwest.

It is now well established that the Zaragoza obsidian source was much used by the occupants of sites in central and southeastern Mexico. We reiterate our awareness that archaeological site-geologic source correlations alone provide limited insight since sites occupied for long periods of time may have secured different materials at different times. Only stratigraphically controlled obsidian samples can throw light on this matter. Although we are now learning a great deal about the distribution of this type of obsidian, we still know very little about the source itself. It would be very useful if someone could carry out further studies at the source, and provide details on the nature and extent of the obsidian deposits. In addition, more extensive trace element analyses of source samples should be conducted so that we can more precisely define the chemical limits of this obsidian type.

We have now published a series of papers on x-ray fluorescence analysis of Mesoamerican obsidian. Many of the data obtained by these studies are summarized in Stross et al. (in press). However, for the reader's convenience we have prepared Table 1, in which we have listed the results of many of our recent analyses.

Table 1.

Distribution of Obsidian Types at Sites in Mesoamerica.
All figures are in percent.

	A (Cerro de las Navajas, Hidalgo)	B (Unknown)	C (Probably San Martin Jilotepeque)	D (Zaragoza, Puebla)	E (Cerro de Minas, Puebla)	F (Unknown)	G (Guadalupe Victoria, Puebla)	IXTE-PEQUE	EL CHAYAL	OTHER[1]
SEIBAL			42.9	7.1				7.1	35.7	7.1
LA VENTA (Excav.)	21.0	31.6	42.1							5.3*
LA VENTA (Surf.)	12.3	43.5	27.5	1.8	5.1	1.1	3.6			5.1*
CHOLULA	18.0	14.6		53.9	3.4	2.2	7.9			
TRES ZAP.	0.2	1.5	0.5	93.1	0.7	1.7	1.4			0.9
EL TAJIN				85.7		14.3				
QUIAHUIT-ZLAN	1.8	1.8		71.4	21.4					3.6
CEMPOALA	22.2			33.3	44.4					
CERRO DE LAS MESAS				18.8	75.0		6.2			

* Probably includes some El Chayal samples.

[1] This category includes obsidian types that have yet to be defined. Samples from La Venta (surface and excavated) may actually be derived from El Chayal, but this is not certain.

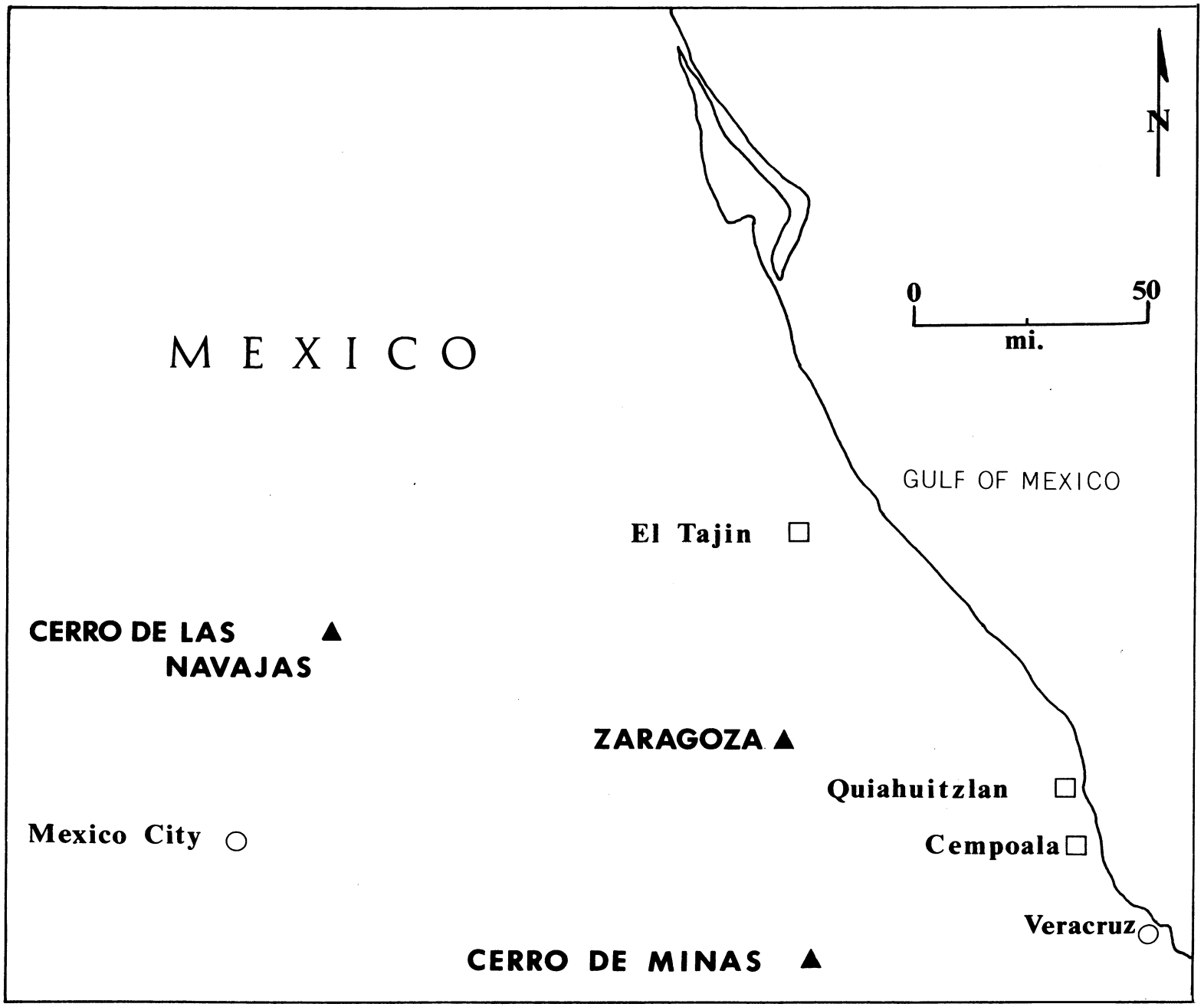

Figure 1. Geologic obsidian sources and archaeological sites in central and northern Veracruz, Mexico.

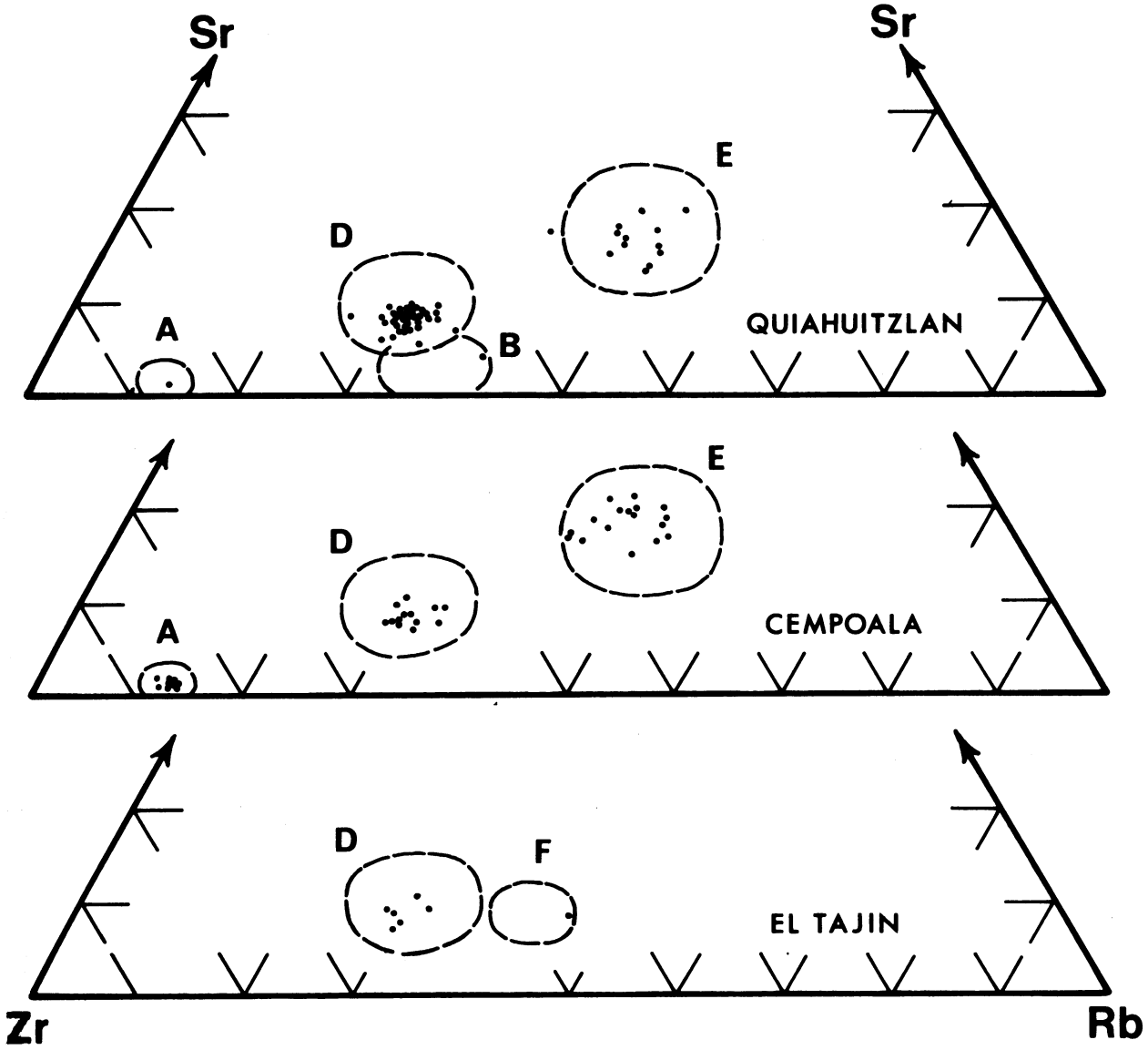

Figure 2. Plotted results of rapid-scan analysis of obsidian artifacts from central and northern Veracruz, Mexico. Each point represents the relative Rubidium (Rb) K-alpha, Strontium (Sr) K-alpha, and Zirconium (Zr) K-alpha intensities for one artifact.

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