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THE ARCHAEOLOGICAL CERAMICS OF YUCATAN

BY

GEORGE W. BRAINERD

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INTRODUCTION

This monograph is the first of its kind to be devoted to Yucatán Maya ceramics. Yucatán has for more than a hundred years been notable for pre-Columbian architectural remains which are among the most spectacular in the New World.¹

The reconstruction of the history of the area has heretofore leaned heavily on post-Conquest documentary sources and upon the dates which have been deciphered from Maya inscriptions, both more readily available sources of information than are usually obtainable for prehistoric cultures. The weaknesses inherent in these sources—confusion and contradictions in the documents, and restrictive distribution in time and space for the datable inscriptions—have left major blank areas and disagreements in the framework of Yucatecan Maya history, and have yielded descriptive materials weighted toward religion and politics to the near exclusion of reliable information on such matters as cultural dynamics, economics, and demography.

Archaeological ceramics are notably good working material for the recovery of chronology as well as prime indices for the study of trade, culture borrowing, and social patterning. They also allow the dating of associated archaeological finds; thus, although the Yucatán ceramics are drab in comparison with the magnificent architecture and sculpture with which they are associated, they are in a very real sense the key to the discovery of the history of the Yucatecan Maya. The Maya were, in Morley's flamboyant but quite accurate phrase, "the intellectuals of the New World." All archaeologists are of necessity romantics, and the chance of learning even a little about such an advanced and exotic group as the Maya has lightened the labor of combing through hundreds of thousands of grayish potsherds and reams of gradually yellowing notes.

EARLIER STUDIES

The setting of the Yucatán ceramic survey can best be given by a summary of the results of earlier attempts to formulate a historical framework for Yucatán. The Yucatán historical or legendary accounts describe the peopling of the area by two migrations, one from the east and one from the west (map 1). The datable Maya Initial Series inscriptions have been used in conjunction with the documents to construct a sort of history of colonization, on the assumption that the Maya could be defined exclusively as the people who carved the dates (Morley, 1946, ch. 4). The concept evolved that these date-carving, "Old Empire" Maya for some reason, hypothesized by Ellsworth Huntington (1914) as a change of climate, abandoned the sites of the central Maya area in the Petén lowlands and, abandoning also the custom of carving their Initial Series dates, gradually moved northward into Yucatán,

their travel being marked by the sites of the Río Bec and Chenes areas. Upon arrival, in a renaissance of cultural activity, they built the famous sites of the Puuc region and of Chichén Itzá and Mayapan. The chiefs of these three settlements in confederation ruled Yucatán, with Mayapan as capital according to the chronicles, until they disagreed about 100 years before the Conquest. This period of federation was characterized by Mexican rulers and much Mexican influence.²

Major changes in this reconstruction have gradually been made as the results of archaeological findings have become available. In addition, attempts to read the abbreviated Maya dates which occur in Yucatecan ruins have in some cases provided results which fit archaeological finds, and readjustments in the chronicle accounts have allowed their use to clothe the archaeological framework. The causes of the abandonment of the Petén have also been subjected to continued scrutiny, but no hypothesis is as yet universally accepted. The exact degree of interdependence of these kinds of evidence on Maya history—architectural and ceramic sequences, Yucatecan Maya dates, and chronicles—is hard to assess from the literature on the subject, but it can be said that in general these reconstructions now can be fitted together to give an integrated historical account.

The earliest ceramic sequence reconstructed for Yucatán was formulated by Vaillant in 1927 and was summarized and somewhat clarified by him in 1935.³ He found evidence of "very late Old Empire influence" followed by (1) a carved slate period, followed by a period (2) characterized by fine orange (of Isla de Sacrificios type) and plumbate, then a period (3) characterized by incensarios and porous wares, which included the slipped lacquer wares. Periods (2) and (3) were found stratigraphically at Chichén Itzá; period (1) was placed between (2) and the latest Central Maya area period, characterized by polychrome figure painting, on the basis of stylistic resemblances between the carved slateware and polychrome figures. These periods were named by Vaillant in 1935 as (1) Mexican Contact, (2) Mexican Occupation, and (3) Maya Reoccupation. This terminology was based on the then current chronicle reconstructions, supplemented by the presence of Isla de Sacrificios Fine Orangeware and many architectural features as Mexican imports in (2), and the presence of a redware superficially not unlike Classic-stage Maya pottery in (3).

The interpretation of the chronicles was altered to some degree and clarified by Roys (1933) who, as a supplement to his translation of the Chilam Balam of Chumayel, gave a chronology (p. 204), and in his description of the Hunac Ceel Episode concluded with an insight verified by later archaeologi-

cal findings: "After the end of the Twelfth Century we hear nothing more of Chichén Itzá as an important political power, but its sacred cenote continued to be a center of pilgrimage down to the time of the Spanish Conquest" (p. 181).

In 1931 Morley summarized the architectural findings of the Carnegie Institution staff at Chichén Itzá by listing a division of buildings there into three sequent periods. He concluded (1931, p. 107) that the Chichén Itzá Initial Series lintel which dates at 10.2.0.0.0 Maya, the extreme end of the central Maya occupation, must have antedated all architectural remains yet found at the site. He placed the better-known buildings in three chronologically sequent groupings, the first belonging to a "Maya Period," the second to the transitional, the third to a "Period of Mexican Influence." The first of these periods is the architectural equivalent of Vaillant's period (1) above, the third is Vaillant's period (2). On the basis of the excavation of the Temple of the Warriors, Morris (1931, pp. 165-177) was able to break period (2) into a stratigraphic architectural sequence, and Tozzer (1930) attempted a tentative chronological breakdown of the same period on the basis of the cultural content and style of bas reliefs in "Toltec" buildings at Chichén Itzá.

In 1931 Henry Roberts began the study of Yucatán Maya ceramics, and continued with four field seasons in 1932, 1933, 1935, and 1936 (see Roberts, 1931, 1932, 1933, 1934, 1935). In 1933 he reported a ceramic sequence from Chichén Itzá which was essentially similar to Vaillant's but which established for the first time a definite contemporaneity between the Puuc ruins and the earlier ceramics of "Maya" Chichén Itzá. Roberts' period I at Chichén Itzá (corresponding to Vaillant's (1) as given above) is called (p. 87) "Pre-Mexican period with pottery similar to that of the Labna-Puuc region." In 1934 he verified Vaillant's stylistically based hypothesis that period (1) followed the late Central Maya occupation by the excavation of "Old Empire" style polychrome pottery in lower levels of test trenches; in 1935, in a more detailed report, he specified the finding of such pottery at Cobá and Yaxuna in distinct strata, and at Kabah mixed with the earliest Puuc wares.⁴ In the same progress report he noted the absence of plumbate and fine orange pottery in the Puuc sites,⁵ claimed a Mexican period date for the Holactún pottery, and also referred to chronological subdivisions within the Puuc and Mexican periods.⁶

The dating of various inscriptions on Maya Chichén buildings was attempted in 1937 by both Beyer and Thompson. Beyer, relying on an assumed stylistic sequence based chiefly on varying forms of two glyphs, assigned to the inscriptions a chronological order which he fitted to the chronicles. In several instances this sequence was in conflict with then known archaeological placements, and additional discrepancies in it have been discovered during the ceramic studies reported here. Thompson, using a new theory of decipherment conforming to dating systems known to have been in use in Yucatán at the Conquest, dated the Chichén Itzá and certain other Yucatecan inscriptions in a shorter, earlier time span which in general fits the archaeological sequence. Both sets of dates discarded Morley's 1931 placement of the Chichén Itzá Initial Series lintel as earlier than the Maya (Puuc equivalent) period at Chichén Itzá. Morley's early placement of this date was made reasonable by the use of the 12.9.0.0.0 Maya-Christian correlation, which was abandoned by him and by most other workers during the 1930's.

In this account Eric Thompson's "Coördination of the History of Chichén Itzá with Ceramic Sequences in

Central Mexico" (1941) must be mentioned. Thompson pointed out that plumbate pottery, which is dated on the basis of chronicles as not later than 1300 A.D. in the Valley of Mexico, is found in occupational deposits of some of the buildings judged to be among the latest at Chichén Itzá, and an unbroken plumbate jar was found in such a position as to suggest that it was deposited after the fall of the Caracol Tower. With these data Thompson buttressed Roys' suggestion (1933) of the early decline of Chichén Itzá, and from his 1937 readings of Puuc and Maya Chichén dates suggested dating schemes for the beginnings of the newly identified Toltec period in Mexico.

Thus at the beginning of this study, three sequent periods had been recognized in the ceramic materials of Yucatán, although they had not been detailed in publication: (1) a Maya or pre-Mexican period represented by pottery from the Puuc sites, and from the "Maya style" buildings at Chichén Itzá; (2) a Mexican period or period of Toltec influence, represented by the majority of the pottery at Chichén Itzá; and (3) a period variously called Maya Reoccupation, or Maya Resurgence by Vaillant, and found in superficial, postoccupational deposits at Chichén Itzá and elsewhere. The first of these periods was believed either to postdate or slightly overlap the end of the Initial Series period on evidence of Thompson's readings of the Maya Chichén dates and, more firmly, by Roberts' 1935 determinations and by others from San José, British Honduras, published by Thompson (1939, pp. 149-150). A few ceramics datable to the early part of the Initial Series period had been located in collections from Yucatán, but no earlier ceramics had been recognized.

In his "The Maya New Empire" (1938), Morley elaborated his earlier reconstructions of the history of this part of the northern Yucatán Peninsula. He defined Maya culture as characterized by "the typical architecture and unique hieroglyphic writing," which he believed were introduced together from the south in the sixth century A.D. as evidenced by the earliest northern Initial Series stela at Tulum, followed by later dates also in the eastern part of the Peninsula. He noted that the Yucatecan inscriptions are late and clearly related to those of the Petén, and therefore must be derived from them, and assumed that the architecture was likewise derived from the south. The distinctive, indigenous character of the Yucatán slateware pottery was discussed by Morley, who suggested that it denoted the early presence of a people who were probably Maya-speaking agriculturalists of Maya racial stock who adopted southern stone architecture, hieroglyphic writing, astronomic learning, and religious philosophy (Morley's "Maya Culture") but retained their local ceramic craft, and developed the Yucatecan florescence of the Maya culture. Morley documented this story of the introduction of Maya culture into Yucatán by Lizana's account of a Maya tradition of the populating of Yucatán by two migrations, a "lesser descent" from the East, and a "greater descent" from the West, and later (1946, p. 76) fitted the 9.2.0.0.0 Oxkintok lintel (Pollock, 1940) to this reconstruction. In his "The Ancient Maya" (1946), Morley amplified this reconstruction, suggesting that the Chenes ruins represent a second wave of migration northward from the Petén (pp. 80-81) and that the sites of the Puuc region, of Maya Chichén Itzá, and of Mayapan were all settled at about 10.9.0.0.0, 1000 A.D. (see his Table V) by people of Mexican extraction. This period, which is made to correspond to the archaeological Puuc Period (period 1 above), is followed

at about 1200 A.D. by a period of the Ascendancy of Mayapan (archaeologically the Mexican period, period 3 above) which ends with the fall of Mayapan ca. 1441 A.D.⁷

Morley's scheme depends upon Initial Series Maya dates and documentary sources for its chronological framework, and upon dirt archaeology only for detail. The chronological placements of his Puuc and Mexican periods do not fit the archaeological framework, and his cultural dynamics, notably the relationships between the Petén, Chenes, and Puuc areas, and among Uxmal, Chichén Itzá, and Mayapan, also do not fit the ceramic evidence.⁸ Thompson (1945), using many of the same data, has produced a scheme archaeologically more acceptable. As may be seen later in this report, the three sequent ceramic periods first hypothesized by Vaillant have fitted into the longer time scale unearthed during the ceramic survey.

SUMMARY OF CHRONOLOGY USED IN THIS REPORT

To aid in the reading of the subsequent sections, the chronological outline which has emerged from the ceramic survey will be summarized here. A chronological chart is given as chart 22; the detailed evidence for its formulation constitutes the bulk of this report.

Because of the large area covered and the considerable time depth reconstructed, I have decided to use generalized names for major sequent culture divisions in Yucatán, and have fitted the collections from various horizons and sites into this more general scheme. These divisions are meant only for Yucatán, and fit certain peculiarities in Yucatecan cultural history. They differ somewhat both in name and duration from others used elsewhere in the Maya area. The major divisions have been called stages in accord with Dr. Kidder's usage (Kidder, Jennings, and Shook, 1946, pp. 1-9). Their names have been chosen in an effort to designate general characteristics of each, and at the same time to avoid confusion with the increasing number of such terms now in use in Mesoamerican archaeology.

The sequence chosen runs as follows:

Yucatán Formative stage.—This stage is divided thus far into three substages, Early, Middle, and Late, on the basis of evidence for distinctively separate ceramic assemblages running sequentially in that order. The Early Formative substage was found only in the Maní Cenote; the Middle Formative substage has been sampled only in the Chenes area, and thus is not described in this report. The placement of my Late Formative substage was first made by the establishment of close correspondences with the Uaxactún Chicanel phase which dates pre-Initial Series (or pre-Classic) at that site, and was later confirmed stratigraphically for Yucatán. Some ceramic diagnostics are the almost exclusive use of monochrome in slipped wares; the prominence of flat-bottomed, allover-slipped bowls with flaring sides and heavy, out-turned rims; the presence of tubular-spouted small jars. The dates of this stage are estimated roughly as 1500 B.C. to perhaps 100 A.D.

Yucatán Regional stage.—Several distinctive ceramic assemblages of this stage are known. It shows such a variety that sharp regional as well as chronological differences are evident. The Regional Flaky Redware assemblage, with its included Incised Dichrome and Polychrome, is the earliest of these; the Oxfintok Monochromes seem to be a distinctive western mani-

festation and must overlap at least the latter part of the Flaky Redwares in time. The Regional Monochromes of Acanceh and Yaxuna seem to date later, in major part with Tepeu 1 at Uaxactún (9.9.10.0.0-9.12.10.0 Maya calendar, 623-682 A.D.). Following them stratigraphically at Acanceh, and also found at Dzibilchaltún, is Red on Thin Grayware, which occurs in association with slatewares. Some of the general ceramic characteristics of the stage are the use of red, orange, and cinnamon-colored monochromes, and of polychromes in some regions. Distinctive vessel forms include curved-bottomed bowls, many with lower face unslipped, and some with a ridge or flange low on the curved side. Small teat-shaped tripod legs are the commonest support, but there is wide variety. Slipped jars commonly have a short, sharply outsloping rim, and often a low-placed angular shoulder. There is considerable regional variation in both wares and forms during this stage, as well as evidence of chronological overlapping in some regions between this stage and the next in sequence. With reasonable certainty, this stage lasted later than 9.16.0.0.0 (751 A.D.) in northwest Yucatán. Its duration, even its presence, is unknown from the sites of the Puuc, Chenes, and Río Bec areas. Its beginnings in northern Yucatán must have distinctly preceded the advent of Tzakol-style polychrome, estimated in the central Maya area at A.D. 278.

Yucatán Fluorescent stage.—Ceramic assemblages of this stage are dominated by the slatewares. Thin and Medium Slatewares, accompanied by Medium Redware, seem to have predominated in the assemblages all over the northern part of the Peninsula during the later part of this stage. To the southwest another distinctive ware, Holactún Slateware, is common. Certain slateware vessel forms believed to belong to the early part of the stage were used contemporaneously with Regional stage Red on Thin Grayware at Dzibilchaltún and Acanceh, thus suggesting an origin at least as far south as the Puuc area for the slatewares, with a later diffusion into northwest Yucatán. In the sites sampled thus far, this stage can be dated as beginning earlier than 9.16.0.0.0, but there is as yet no clear evidence of a beginning date earlier than 9.12.10.0.0 (the beginning of Tepeu 2 at Uaxactún; no Tepeu 1 pottery has been found in demonstrably pure Fluorescent deposits). This stage is distinguished from Regional by its slatewares; its late end is delimited primarily by changes in forms caused by Mexican innovations, and by changes in the types and origins of its tradewares, although gradual ware changes also occurred. Its end is estimated as between 10.3.0.0.0 and 10.8.0.0.0 (889-987 A.D.), and was probably nearly contemporaneous all over Yucatán, although there may have been a slight chronological lag in the Puuc region in comparison with Chichén Itzá.

Yucatán Mexican stage.—This stage is divided into three substages, each recognizable by a widespread and distinctive ceramic assemblage, and is followed by a century which, although historically documented, is not thus far recognizable ceramically.

The stage was initiated by the Early Mexican substage. Medium Slateware rather similar to that of the Fluorescent stage, but inclined toward a white, opaque slip, dominates the slipped wares, accompanied by Medium Redware but with no thinwares. The smaller vessel forms and the decoration show striking changes from Fluorescent styles; most innovations are unquestionably copied from X Fine Orange, a pottery imported from central Veracruz, which sometimes runs as high as 10 per cent of samples. Plumbate

pottery occurs as a rare trade item. This substage is represented in our collections by materials almost exclusively from Chichén Itzá, where all the "Toltec" period architecture is contemporaneous to it.

The Middle Mexican substage is distinguished by the advent of Coarse Slateware as the major slipped pottery. This ware differs from Early Mexican Medium Slateware in the employment of a coarse-textured, calcite-tempered paste. The opaque, white slip continued to be used, and sloppy, rather exuberant, black painted decoration, X Fine Orange was still imported during this substage; plumbate importation had probably ceased. The subphase saw the building of a few minor architectural additions to the Toltec period buildings at Chichén Itzá, the beginnings of the main Mayapan occupation, and occupations at Dzibilchaltún and Acanceh.

The Late Mexican substage is characterized by the presence in quantity of Coarse Redware, the paste of which is similar to that of the earlier Coarse Slateware. The vessel form changes through the Mexican stage are gradual, but several of the Late substage forms are quite distinctive from those of the Early Mexican substage. Mayapan Fine Orangeware, probably traded from the Tabasco-Campeche coastal area, has influenced local form and decoration. During this period a new type of unslipped jar appeared, distinguished in both form and finish from the preceding form which had lasted with but minor changes from the Florescent stage. A new unslipped cooking pot, the calderón, also began to be used during this period and has lasted until now. Late in the substage the manufacture of figurine incensarios was introduced, almost certainly from the west, suggesting evangelization to a new set of religious concepts.

At this point there is an uncertainly documented gap of about a century in the ceramic sequence, following the historically documented fall of Mayapan and preceding the Spanish conquest. This period has been termed the Interregnum by Morley.

Post-Conquest stage.—This stage is characterized by an impoverishment of the pre-Columbian repertory, and by a few innovations. Coarse Redware is still the prevailing manufacture. The unslipped jar does not seem to have survived the Conquest; the calderón must have replaced it. Two new types of decoration, painting of conventionalized floral motifs in brown on an unslipped exterior, and embossed inscriptions in European script on an unslipped band, began at some time in this stage. The pre-Conquest practice of painting in tempera colors on previously fired unslipped pottery persists on modern Lacandone incensarios, and upon whistles used in Yucatecan fiestas. Animal figures are made each in several molds and luted, perhaps in an old technique. Neither slip casting, glazing, nor any wheel techniques have become a part of the Yucatán ceramic folk craft. Our chief archaeological samples of this period come from the Maní monastery, dating back for an unknown span from about 1830 A.D. Small-

er samples come from the Maní and Telchaquillo cemeteries, and a small but certainly early sample from Dzibilchaltún.

ACKNOWLEDGMENTS

This study was started in December, 1939, and began my acquaintance with Maya archaeology; my background at that time was in the archaeological ceramics of other areas. My debts have been great, first to Dr. A. V. Kidder who started me and has since sustained me with constant understanding and encouragement. Maya archaeology, I have found, is an unusually complex field. I owe much to characteristically candid and generous discussions with those members of the Carnegie Institution staff with longer experience in the Maya field, particularly to Anna Shepard, who introduced me to Yucatán ceramics.

In Yucatán Don Rafael Regil graciously allowed me to photograph and record his collection. Sr. José A. Erosa Peniche, resident inspector of the Instituto Nacional de Antropología e Historia, Dirección de Monumentos Prehispánicos, was helpful in arranging permissions. Sr. Alfredo Barrera Vásquez as director of the Yucatán State Museum, and as my guide on two field trips, gave valued time and advice. Sr. Raúl Pavón Abreu extended the courtesy of the Campeche Museum and allowed me to study collections from Jaina. Many people in Yucatán, both property owners and laborers, gave the constant courtesy and interest so characteristic among residents of the state. Timoteo Canul and Eugenio Mai increased my efficiency by devoted labor as field foremen, and in handling of ceramics. Sr. Juan Germón did valued work in 1942 in the sorting and tabulating of ceramics.

Of the several draftsmen who prepared the drawings for reproduction, Sr. Isaac Esquillano, Mr. Elmer Reising, Mr. Leo Prince, and Mr. Robert Quinn were particularly helpful. Miss Tatiana Proskouriakoff also prepared several pages of the more difficult drawings with unusual skill. Mrs. Betty Bell improved the manuscript by an editorial reading, and Mrs. Margaret Harrison checked the bibliography.

I am indebted to the Southwest Museum for the use of library facilities, and for a month's time which was allowed me toward the completion of this manuscript. I owe thanks to the Mérida State and Federal Museums, the Peabody Museum at Harvard University, the University Museum at Philadelphia, and several owners of private collections for permission to illustrate specimens in their possession. The Committee on Research, University of California, Los Angeles, allowed me grants that permitted statistical studies which, although they are not published here, have clarified my understanding of Yucatán ceramics. To my wife I owe not only the considerable effort she has spent on various tasks connected with the field work and report, but her forebearance during the fourteen years it has taken me to complete it.

I. TECHNIQUES AND MATERIALS USED

The unusually varied nature and sources of the ceramics discussed in this report make a careful listing advisable.

MATERIALS

- I. Pottery from archaeological excavation (almost exclusively sherd material). See map 2 for locations.
 - a. Collections resulting from the clearing and repair of the various buildings at Chichén Itzá by staff members of the Carnegie Institution. Both whole vessels and fragments resulted.
 - b. Potsherds from trenches at Chichén Itzá dug by H. B. Roberts. This material was meant to aid in the stratigraphic placement of the above-floor samples which form the bulk of pottery obtained from building excavation and restoration. The Roberts collections are relatively small.
 - c. Sherd collections and whole specimens from widely scattered localities, obtained by workers in the course of the Institution's studies in Yucatán since 1924.
 - d. Collections from trenches dug in ruins investigated by the Architectural-Ceramic Survey during the years 1932-1936. Collections were dug by Roberts from the Puuc sites of Uxmal, Sayil, Labna, Kabah, Sabacche, and from Yaxuna, Cobá, and Holactún. Several collections came from sites in the region between the Puuc hill range and the city of Campeche, but their smallness and heterogeneity has made their study impracticable at this time.
 - e. Material dug by the author from trenches in various Yucatán ruins and from neighboring water sources. These excavations were conducted after the study of all previously excavated material, to the end of determining stratigraphy thus far lacking, and of covering regions and time periods only hinted at in the previously mentioned collections which were almost all from ruins bearing impressive standing architecture. Pottery from Oxkintok was obtained in 1940, and from Yaxuna, Dzibilchaltún, Acanceh, Mayapan, Ticul, Dzan, and Maní and environs in 1942. Nearly all of the ruins sampled in this work produced evidence of long occupation. An effort was made in each case to assure as representative a sample as possible for each site.
- Most of the whole vessels excavated by the Carnegie Institution are divided between the National Museum in Mexico City and the Federal Museum in Mérida. A large sample of the sherd material is stored in Mérida; small sherd study collections have been furnished interested institutions in and outside of Mexico.
- II. Whole vessels from museums and private collections were used to supplement the excavated material in the determination of vessel shapes and designs often left doubtful because of the badly broken condition of the documented excavated sherds. A few well-documented museum collections furnished additional information of regional and chronological value. The principal sources were as follows:
Collections at Mérida, Yucatán, including those of the State Museum, the collection of the late Don Rafael Regil, and other smaller privately owned collections. The majority of the specimens in these collections are undocumented as to provenience, the remainder are documented only to a general geographic location. About 1,000 specimens were studied and photographed by the author, and a number of these have been illustrated in the text. The State Museum collection of whole specimens from graves at Dzibtún gives a valuable picture of pottery of its period, and samples of all types have been illustrated.
- Peabody Museum of Harvard University. A majority of the specimens here came from excavations at Chichén Itzá and in the Puuc region, made by E. H. Thompson about 1900. Collections from Labna, Mound 6, and the locally made pottery from the Sacred Cenote at Chichén Itzá, have been illustrated as groups characterizing their respective periods. Considerable pottery from Peabody Museum has been illustrated as supplementary to sherd material, as have a few previously unpublished specimens from private collections in the United States and Mexico. Specimens already illustrated and described in the literature have been discussed and reillustrated wherever direct comparison seemed advisable.
- III. Notes made by G. C. Vaillant and by H. B. Roberts and held by the Carnegie Institution have been used for the description of certain important collections since mixed or lost. These citations are individually attributed in the text.
- IV. Maps locating all pottery excavations as nearly as possible are included to indicate the exact source of the material. The majority of these have been redrawn from more detailed maps by Carnegie Institution workers, some of which are thus far unpublished. It should be emphasized that the maps as here published make no pretense of adequacy in architectural or other specialized details, and were drawn primarily to locate the pottery trenches in relation to the other features of the sites. The source is shown in the caption of each map. It is hoped that these maps will eventually allow the ceramic data to be linked with their accompanying architectural and other cultural manifestations, without which the descriptive archaeology of Yucatán is now sadly one-sided. Only after such use will the chronological scale, which has been the primary purpose of this study, achieve its full application.

As may be seen from the sources enumerated above, the report is to some extent a patchwork constructed from objects obtained at various times in the course of work aimed toward various purposes. Despite Roberts' considerable labors to integrate the materials available to him, a complete reworking of all material by the present author was necessary due to two causes. A large proportion of the excavated pottery in storage at Chichén Itzá had become mixed or lost its labeling during the years 1936-1940. The collections from Chichén Itzá, totaling perhaps 100,000 sherds selected from collections of several times that number, were in storage at the site in

1940 when this study was begun. The climate of Chichén Itzá is poorly adapted to the dead storage of perishable materials. Although the pottery had remained in good condition, the wooden boxes containing it had been riddled by termites, and the whole collection had been appropriated as dwelling quarters by the abundant rodent, reptile, and insect life which characterizes the region. More serious was the destruction of labels. The boxes had been labeled with filing cards thumbtacked to their fronts. All paper sizing, save that under the tack heads, had been eaten from these cards, presumably by silverfish and cockroaches. With the paper sizing went the penciled labeling, except where the pencil point had dug very deeply. Before my arrival, an effort to save the labels had been made by substitution of a series of brass number tags, and thus a considerable amount of information still remained stored on paper labels in a safe. The labeling on brown manila bags had escaped damage, although rodents had in many cases cut up the bags. Even worse than the loss of the labels was the mixing of collections through the disintegration of their containers. Sherds from bags and boxes had often dropped through into the collections below them.

Despite these ravages, a considerable number of collections were still identifiable. However, at least in some cases, certain fine wares and noteworthy specimens had been extracted from their collections and sorted by categories, and few of these sherds had been separately labeled. This fact introduced disquieting doubt as to the validity of presence-absence criteria in the samples. To this were added questions as to whether a part of any sample, previously sorted, was among the unlabeled collections, thus leaving a selected sample from which I would extract a false conclusion.

With a keen sense of the irreplaceability of these collections, I spent several months in analyzing the traces of inscriptions on labels, correlating Roberts' tabulations with the original material available, and checking his field notes, which for the earlier part of his study were excellent, to determine what collections were unaccounted for. Many collections were reassembled by matching fragments between them.

Parts of Roberts' notes had been misplaced, including the illustrated keys to most of his tabulations, and Roberts was unavailable for consultation to clarify his incomplete notes. After several months spent largely in tracing and relabeling collections with the aid of what notes were available, I retabulated all the pottery of traceable provenience.

Upon taking stock of information available from the pottery samples, it became evident that large collections belonging to two major architectural periods constituted the great bulk of the sample (see periods (1) and (2) above), but that tantalizingly small collections obviously belonging to several quite separate horizons were also present. This situation seemed to cry for additional excavation aimed toward a general sampling of the northern part of the peninsula, with emphasis on sites which seemed different from those already represented.

The first attempt to round out the samples was made in 1940 when, taking advantage of the presence of the Yucatán Architectural Survey at Oxfintok, I dug test trenches there (Brainerd, 1940). The season of 1942 was spent covering scattered sites, with particular emphasis on obtaining materials from little-known ceramic horizons.⁹ During the three months spent at these excavations, we were fortunate in documenting several new ceramic periods, thus completing in skeleton outline a chronologic sequence extending from

times well antedating the earliest Maya stelae until the Conquest.

In June, 1943, work on the Yucatán ceramics was halted by the war and has been continued only at various intervals since the autumn of 1946, when I began teaching and museum work in Los Angeles.

COLLECTING TECHNIQUES

The methods used in gathering pottery for this survey were governed by factors which it may be well to discuss.

The terrain of Yucatán is flat to gently rolling in most parts, and has but a thin coating of soil which is burned over every few years in the course of agricultural procedures. Yucatán is a Karst area with underground drainage; there are no surface streams. The country, when not cleared for agriculture, is covered by a mass of thick, thorny, low-lying growth, difficult to see through and necessitating the constant use of a machete to penetrate. Pottery can rarely be found on the surface of the ground; burning and weathering of the pottery in the tropical climate, as well as the difficulty in seeing it through vegetation, makes surface collecting impracticable. The scarcity and consequent value of soil has made the deposition of deep, well-stratified refuse deposits a rare occurrence.

The characteristics of the Yucatán Maya civilization further limit and determine archaeological procedures. The relative simplicity of the pottery in comparison to its accompanying elaborate architectural remains should be emphasized. Finer chronological subdivisions would be easier to determine from more elaborate pottery. It is very clear that the pottery we are studying is the common ware of the population, and that during most of our time span pottery-making was not a major art. Although finely made wares are present in varying quantity, they always constitute but a small percentage in collections.

The masonry buildings, which are the most striking feature of Maya archaeological sites, were commonly placed on massive raised masonry terraces, which were usually plaster-floored and were kept clean. The population may be assumed to have lived simply, as they do now, in flimsy pole and thatch huts. Some were probably near the temples but the majority, during most time periods, seem to have lived at a distance, convenient to their fields. Owing to the Maya agricultural system, the fields were necessarily scattered more or less evenly over the whole countryside. House sites are difficult to locate, and their short occupation, the extremely shallow earth, level land, and luxuriant vegetation seem to have prevented the accumulation of localized domestic dumps, and the climate and shallow soil cause rapid disintegration even of pottery.¹⁰

In Yucatán, doubtless owing to the scarcity and consequent value of earth and to the enormous quantity of limestone easily available from the raised marine reef which composes the peninsula, the fills of the Maya temples and terraces of most periods were made of clean chunks of limestone unmixed with dirt or debris, thus eliminating another possible source of pottery of particular chronological value. The long-continued use of ceremonial centers has aided the obtaining of stratified sequences, but has made more difficult the obtaining of short-period deposits. It has caused a mixture of earlier pottery to appear in nearly every collection, and has weighted our samples toward the later part of the time scale.

The main sources of archaeological pottery were as follows:

In ruin debris and on floors of rooms.—Although much material of this sort resulted from the extensive Carnegie Institution program of building restoration at Chichén Itzá, the quantity of pottery relative to debris moved was small, and very few short-period collections resulted. This was due presumably to the long period of occupation permitted by the durable construction of masonry buildings, to the undesirability of excavation in deposits sealed by later construction when the preservation of the later structures was a primary goal, and to the fact that many buildings stood long after their major period of use. A constant, long-continued secondary use which often culminated in conversion to simple shrines or temporary shelters seems to have been the rule. It is likely that rooms were kept clean during their primary period of occupation, and there is almost no evidence that masonry buildings were ever constructed for domestic use.

Stratigraphic trenches dug in inside corners at the base of terraces (for example, see map 7).—Such trenches provided the largest and most heavily concentrated collections found at ruins. They represent the only true refuse dumps found. Pottery broken on terraces and in buildings seems to have been thrown off the terrace sides into these relatively inconspicuous corners. Stratigraphy is not found in the majority of these collections, probably due to salvage of earth for agriculture as well as to the Maya practice of constantly enlarging buildings and terraces, using previous structures as cores. Frequent additions to terraces would cause the covering of old dumps and the beginning of new in more peripheral positions, and thus the deposits obtained in the superficial excavations undertaken in this survey usually represent only the latest occupational phase of the site. Evidence along several lines points to long earlier occupations being but poorly represented in the ceramic samples.

Shafts sunk through bases of early building platforms.—The largely demolished early "acropolis" in Acanceh (see map 8b) was trenched along its present periphery. The previous removal of a large part of the pyramid for use as building stone made its core of early deposits easily accessible to us. These were rich and well stratified. Here, as elsewhere in Regional stage ruins, we noted the use of cultural debris as fill in the construction of subsequent buildings. This practice seems not to have been followed in Florescent or later stages.

Chultun deposits.—Chultunes are jug-shaped cisterns dug into the limestone to collect water from surrounding paved floors. They often contain a mixture of water jars broken or lost in use, and of general rubbish; stratigraphy was seldom apparent in those dug. In the chultunes we found only debris dating from the Florescent stage and occasional fragments from later periods. We have records of chultunes in numbers only from the Puuc area and from the north edge of the Puuc range at Ticul, Dzan, and Maní; they are very common in these regions. It seems likely that in Yucatán they are characteristic of, and limited to, the Florescent stage; in sites of this period they are most common when no natural water sources are nearby.

Deposits in cenotes and in caves containing springs.—In the absence of streams and lakes, cenotes and caves were the principal source of water in areas where they are found. The open, large-mouthed cenote is less common in some areas investigated than are extensively ramified caves. In the branches of these caves, often at considerable distance and depth from the mouth, are found springs which seem to lie at the

ground water level (see map 12). Along paths leading to the water, there are deposits sometimes as much as two meters deep, containing a large proportion of broken pottery. Stratigraphy is sometimes mixed, sometimes excellent; pottery horizons occurring seldom or not at all in our neighboring ruin collections are represented by collections found in stratigraphic sequence. A drawback to the study of cenote collections, particularly evident in certain periods, is a prevalence of water vessels over other shapes. This makes cenote collections somewhat difficult to compare with ruin samples of the same date. However, the size of collections and length of occupation represented by the stratigraphy of cenote excavations make them our best source of stratified deposits, and they are likely to represent the complete ceramic history of the sites in which they are found.

Burial and cache pottery.—This pottery, including nearly all of the whole museum specimens so useful in studies of pottery shapes, seems to have come from two main sources, buildings and cenotes, as parts of caches or of secondary burials. A number of such specimens were found in Carnegie Institution excavations at Chichén Itzá and are documented. The majority of those from elsewhere are in museums or private collections. They have been discovered during the destruction of ruins for stone and lime by the inhabitants of the country. It is impossible to learn the exact provenience of most of such specimens, or the exact associations in which they were found. Many of those which are documented were found with disarticulated human bones in or near them, and sometimes associated with flaked stone artifacts, shell ornaments, and jade. Thus secondary burial must have occurred in Yucatán. Although the vessels in these tombs and caches are usually of better than average quality and sometimes include elaborate pieces, they do not constitute an entirely separate repertory of vessels made only for funerary or ceremonial use. Many of these vessels therefore can be used in direct comparison with documented sherd material. They provide valuable information on decoration and vessel form otherwise difficult to obtain.

No pretense can be made that our ceramic collections are exhaustive either as to period or as to type of locality, and certainly not every period is represented in several areas. However, because of recognizable continuity of techniques and styles through our sequences, we are confident that no major horizons within them have been missed. One type of locale completely slighted in the survey has been the coastal shell heap. Such heaps occur on the north Yucatán coast and should certainly be investigated in the future. Also, it is certain that early horizons have been slighted. Many ceremonial sites were in continuous occupation for 2,000 years or more. The scarcity of soil prompted later people to reuse early rubbish. The relatively heavy recent occupation of Yucatán has destroyed much evidence, particularly at major population centers. Early material is harder to obtain than late.

It should be reported here that I do not believe the Yucatán ceramic sample is biased to any considerable degree by containing artifacts used only by members of the upper class of Maya society.¹¹ The bulk of the pottery was dug from where it could be found—near the ceremonial centers. But pottery from water sources tallies well in general complexity of form and craftsmanship with that at the masonry ruins. I am convinced that the refuse dug was left by run-of-the-mill Maya pottery users. There will be some discussion later in the text on such inferences of

Maya social structure as have been attempted. Fortunately for the purposes of this monograph, which are in major part frankly descriptive and chronological, enough elaborate pottery, both local and trade, was found to allow several of the close stylistic anchorages so necessary to the fixing of the time-space framework which is a prerequisite to all proper culture reconstruction.

EXCAVATION AND HANDLING OF SHERDS

The criteria for the placing of pottery trenches on sites have been described. Trenches were excavated in cuts of 25 cm. to 50 cm. depth, generally following whatever evidence of depositional plane was available, including the top earth level, the angle of rest of sherds and flat stones, and earth strata showing in trench side profiles. Unfortunately, few trench walls showed more detail than a humus line, possibly due to the shallowness of trenches and to root disturbance by the rank vegetation. Evidence of floors was noted carefully when present, and new collections were always started below floor level.

Sherds were sacked in the field, labeled as to trench and cut, and then washed and stamped individually with provenience, either at the site or later in Mérida. Stamping was done with movable rubber letters in a small holder, with stamp-pad ink. This marking is rapid, does not require skilled or even literate labor, and shows satisfactorily on most Yucatán pottery. After seven years' storage in the light, fading was observed on some labeling. Carbon ink is recommended in future work to prevent this difficulty.

No screening was done at the trenches; the character of the local soil makes this operation difficult, and the kinds of remains characteristic of the area are easily located in earth without screening. The workmen saved all sherds they could see. In later sorting, all sherds under one inch in longest dimension were discarded, except for sherds of rare or foreign wares. It is believed the samples remaining are but little biased by selection.

Various procedures to avoid sorting errors previously described by the author (Beals, Brainerd, and Smith, 1945, pp. 164-166) were used, the most important of which was the sorting of types from the combined lots obtained from each site. This procedure, permitted only by the individual labeling of each sherd, is in my judgment the only way to obtain the objective, unbiased sorting necessary to close chronological work.

The initial stage of ceramic analysis in a new area is necessarily taxonomic. The procedure followed was that of isolating, and objectively sorting, the material into successively smaller categories, usually mutually exclusive. The final result is a large series of sorting categories, each of which in theory depends upon a sufficient number of characteristics to assure against the likelihood of its duplication by chance in any cultural context not its own.

After an initial sorting into wares, based upon the surface appearance of the pottery, the categories were based when possible—and it was seldom found impossible—on whole vessel forms, so that the classification would allow direct comparison with whole vessels. This procedure, perhaps not necessary to the original chronologic study, later allows much better comparison with pottery of adjoining areas, the study of change through time in pottery shapes, and estimates of the place of ceramics in the culture. Unusually complete and numerous records of pottery forms were made as illustrations, including details such as sherd orientation,

vessel radius, and extent of slip when present. Some 6,000 specimens are illustrated in the plates. Whenever possible, whole vessels or reconstructed vessels have been introduced on plates with their sherds to aid in visualization of whole specimens from the documented sherd material, and a series of summarized pages of whole vessel shapes has been included (see figs. 104-109).

During the classification, description, and tabulation, every effort was made to attain objectivity. The frequent intergrading found was described, is noted both in the illustrations and in the text of the typology, and is further analyzed in sections on various attributes used in the sorting. Most of the types represent concurrent variations in more than one recognizable sorting criterion; variations in a single criterion normally were handled by a series of drawings showing form, slip, or diameter variation, or descriptively, as by a series of color readings. The theory underlying this sorting system is that while variations in all sorting criteria are normal in all groups of artifacts, concurrent variations of several technologically unrelated criteria are evidence of a conscious effort to make recognizably different kinds of artifacts, or of a cultural difference between the makers of the artifacts so distinguishable. Interrupted variations, attributes which showed bimodal distribution curves in the material, were also considered valid reasons for separate pigeon-holing, since they suggested distinct differences in procedure of manufacture, and thus mirrored either conscious choice differences in the cultural conditioning of the makers, or differences in materials used.

The text of the section on ware descriptions is not aimed at exhaustive description of each category but at concentration upon characteristics showing variability in the samples, and upon those chosen as diagnostic in the classification. On the other hand, a constant guard was kept against basing the classification upon any preconceived notion of what was important or unimportant to the craftsmen. Aid toward this attempted objectivity was given by the elimination as sorting criteria of certain types of variation known to be inherent in the process of manufacture of pottery of this general class—variations known to be dependent upon a poorly controlled technique, rather than upon difference in technique.

The sherd tabulations, as may be guessed from the above description, are unusually voluminous. Eighty separate sorting groups were not unusual for the pottery of one site; over 200 were used for Chichén Itzá. Even then, certain gaps in description were keenly felt in the later analysis. One reason for such fine typological subdivision was the fact that the sherds, having been left in Yucatán after tabulation, were not available for rechecking during the remainder of the analysis. Another reason for numerous categories was the attempt to keep rim sherds isolated from body sherds in order to allow comparison with results of other workers, some of whom use only rims for counts. Since the typology was formed, as are all typologies, before an understanding of the culture could be reached, an exhaustive record of all possibly significant factors was desired. Such a record was obviously not attained, and can never be attained. It was felt that no loss due to too much subdivision was possible, since the categories could be later combined at will, as they invariably were, during the process of analysis.

The above-described procedures and principles are not novel, and most of them are used with varying emphasis by all workers on archaeological ceramics.

The general classificational hierarchy used was similar to that used on most American archaeological ceramics.

1. Subdivision into slipped and unslipped pottery.
2. These two groups each divided into wares on the basis of paste characteristics, surface treatment, and surface color, all based on megascopic examination. The wares defined here are broadly drawn in comparison to those of most workers. This was felt to be advisable in a study with such a broad regional and temporal coverage as is this.
3. Each ware subdivided into vessel forms, jars being those of markedly restricted orifice (slip, if present, not being found on interior); basins, bowls of various types, plates, cups, all having a relatively large orifice (slip, if present, always found on the interior and sometimes on exterior). Other rarer forms were separated when recognized.

4. Shards belonging to each vessel form then classified according to variation in rim form, design, if present, distribution of slip, base form, etc. The ware descriptions and plate captions give the details of this classification.

The author does not hold with the extremist view that all classifications must of necessity be arbitrary, but is firmly convinced that there is a natural hierarchy of combinations of attributes in single specimens which the pottery classification should mirror,¹² and that the above-described kind of pottery classification does so in this, as in all the other varied collections he has worked upon. He does not wish this statement to commit him to a closely genetic theory of the origin of his types, nor to a denial that many factors, such as decorative style, may cross borderlines of a hierarchic classification. Random assortment of traits in artifacts will not allow the definition of types. Were there not clear tendencies toward combination on individual pots of such traits as paste character, texture of slip, and surface color, the definition of a ware would be meaningless, as would the defining of a vessel shape, were not certain shapes of rim, body, and base found together in a preponderant number of vessels in the products of a given culture. These patterns or combinations of

traits on single specimens and groups of specimens allow us to describe a cultural repertory or, conversely, to establish the cultural provenience of a specimen. Such placement would also be impossible were these patterns not complicated enough to guarantee that they were unique to a given time and place. It is the complicated nature of these trait combinations which makes pottery such a sure and sensitive tool for culture placement. The description of wares and types as markers in the complex variation encountered in ceramics is an organizational step without which the first technical stage of cultural analysis would be impossible.

It should be emphasized that this stage, the chronologic and regional placement of material, is but a preliminary to the cultural study which should follow. Once the culture material has been classified and dated, it is available for study; at this point the cultural mechanics must be worked out afresh, using either individual specimens or copious records for the finer definition needed.¹³ It is but fair to say here that I have not been able, for want of time as well as for want of access to the pottery during later stages of the work, to carry cultural reconstruction into the finest possible detail. The voluminous tabulations, and samples of the pottery, are still available and merit future work. A further apology as to method of presentation should be made. Since information was gradually accumulated from a starting point in 1940 in a new field, and back-checking of early recording was often impossible, the level of workmanship in this report is more uneven than could be wished. Technological analysis of material, which could have solved several of our most perplexing problems, was abandoned after a preliminary trial, due to the press of time and the wide variety of ceramics handled. The detailed analysis of the many ceramic assemblages described here has not been attempted for want of time, although such analysis by statistical techniques has been started on several of them (see Robinson, 1951; Brainerd, 1951). In the interests of economy, the detailed tabulations are not presented. They will be kept on deposit, available to the small number of students who may wish to use them.

II. THE SITES

COBA

Cobá is unique as the most northerly well-preserved site of a clear-cut Central Maya type. The Petén similarities in architecture, site planning, sculpture, and inscriptions are strikingly close, and the large size and excellent preservation of the site have allowed detailed study (Thompson, Pollock, and Charlton, 1932). The nineteen stelae found at Cobá give a dating range in the Maya calendar from 9.9.0.0.0 to 9.12.10.5.12, with some stylistic evidence of earlier dates among those not directly decipherable. There is also architectural evidence of a Late Mexican substage occupation similar to the main occupation at Tulum (*ibid.*, pp. 129-130). Surprisingly, because of its peripheral position, the architecture and inscriptions have been judged equal to if not a shade more advanced than those of the Petén of the same period (*ibid.*, p. 196).

Henry B. Roberts excavated pottery samples from Group B at Cobá during April, 1932 (see map 3). Six trenches were dug, yielding 10,099 sherds, of which the rims and vessel legs were brought in. As far as I know, I tabulated this complete collection. It totaled 2,238 sherds.

Pottery of three time horizons appears in the collections; two of these are represented only by traces. The main period is a close equivalent of the Late Regional assemblage from Yaxuna (Yaxuna III). The overwhelming majority of the Cobá collections seem to be pure or nearly pure deposits clearly of this period, although the assemblages are not identical with those from Yaxuna.

Twenty-nine fragments were classifiable as slateware, although 19 of these were atypical. There is some suggestion among them of color intergrading into mottled Medium Redware like that from Yaxuna III. This suggests that they may well antedate our better-known slatewares. The remaining fragments fit well into the Yaxuna and Maya Chichén Itzá (Late Classic stage) slateware collections (compare fig. 49, m, 1-6, with figs. 15, 67); one fragment (fig. 49, m, 5) in both rim form and color is suggestive of Holactún slateware. All of these, except for two dubious sherds, come from strata which, judging from Roberts' notes, probably consist of postconstructional wall slump. Thus, although a small but rather consistent number of slateware sherds comes from upper levels of these trenches, there is no positive evidence that slateware comes from under the plaza floors which were pierced by nearly every trench. Two of the typical Yaxuna-Chichén type slateware fragments show lichen staining, an evidence of their having come from the surface. The most tenable explanation is that slateware-using people were on Cobá Group B in small numbers before the plaza retaining walls collapsed, but after the construction of the group. The position of slateware in the stratified deposits at Yaxuna reinforces this sequence.

Figurine incensarios (for examples of the general type, see figs. 98-101), occurred on or near the soil surface in several trenches, and constitute a major part of a sample taken from inside the standing vault of structure 9. This structure is classified by Pollock as an East Coast style shrine of a type known from Tulum (Thompson, Pollock, and Charlton, 1932, p. 41), and thus shortly antedates the Conquest. Cobá is known to be held sacred by the present-day Maya, and the ruins have very likely been the scene of many pilgrim-

ages to leave small offerings in the past. A group of incensarios, probably of relatively recent date, was collected by Thompson. One of these (fig. 100, d) is shown. Figure 100, f, is a modern Lacandón incensario. Stylistically, the Cobá vessel is closer to this than to the Figurine Incensarios, and therefore may be suspected to be post-Conquest. The absence of Late Mexican Coarse Redware in the Cobá collections suggests that Group B at least was not inhabited during this late period and that the shrine of this period was perhaps only used by pilgrims as a place of worship.

The ceramic collections from Group B (the largest group at Cobá) thus point to intensive occupation during a relatively short period which the stela dates place as 9.9.0.0.0 to 9.12.10.5.12 (613-682 A.D.). This dating is strongly supported by Robert E. Smith's report on the Cobá pottery, made at Chichén Itzá in 1940. Smith dates 119 of the 240 polychrome sherds tabulated (see figs. 2, b, 31, a) as definitely Tepeu 1 of Uaxactún type, and sees no sign of another period in the remainder of the polychrome, much of which was too finely fragmented or badly worn for positive identification (see charts 2-4 for these period datings). Smith notes that twenty-six rounded bowls, mainly monochrome but some possibly worn polychrome (see fig. 2, a, 5, 7, 21), appear more like Tepeu 3 but may well be Tepeu 1. Twenty-six conoid-footed tripod plates with low basal molding (Yaxuna type mottled Medium Redware, fig. 2, f and g) fit Tepeu 1 in form. Eight red-slipped jar rims, he states, look more like Tzakol than Tepeu. Thus 145 sherds, most of them elaborate polychrome and thus closely diagnostic, fit Tepeu 1, which conforms to the Cobá stela dates, while only 34 sherds of more generalized type may equate with other Petén horizons.¹⁴ This is a strikingly close agreement, considering the distance between Cobá and the Petén, and is equaled only at Yaxuna. The ceramics therefore support the other Petén similarities and suggest that the common people as well as the rulers had southern affiliations.

There is stratigraphic evidence of ceramic change in the collections but it is of a very gradual nature. The unmixed collections of the major period show increase with time in the percentage of coarse paste ware. Regional Coarse Redware in lower levels of trenches 1, 2a, 2b, and 5 runs 32.8 per cent of a total of 256 sherds; in the high levels of these trenches it runs 53.1 per cent of a total of 1,335 sherds. The close similarities with the Petén noted by Smith are all among the fine wares, but such wares are so numerous as to make local manufacture likely. The coarse pottery, however, also shows certain similarities to southern forms. Similar redware dishes (see fig. 2, a, b) were found at San José and Benque Viejo (Thompson, 1939, pp. 100-101, fig. 47; Thompson, 1940, figs. 11 and 13), where the corresponding types are dated in periods III a and b, which in turn are synchronous with Tepeu 1 at Uaxactún. Another suggestive parallel with the central Maya sites is the use of thumbbed, sub-rim encircling fillets (see fig. 2, e) on Tepeu basins at Uaxactún (Smith, 1936a, Tepeu 5, 6, 8). Plates from Panama (Lothrop, 1942, part 2, figs. 8, 9) are roughly comparable to those from Cobá (fig. 2, b) and to unslipped forms from Yaxuna (fig. 1, b, 2, 10), though the distance makes this

correspondence uncertain and cross-dating hazardous.

None of the above similarities are identities. Although the coarse wares were certainly locally made and therefore likely to be less cosmopolitan in type than the more elaborate wares, it seems probable that even the latter were locally made, although they may have been made by more traveled craftsmen.

Qualified by the above observations and analyses, we can confirm the Cobá Group B collections as representative of a short, heavy occupation ranging in time from the Maya dates 9.9.0.0.0, or somewhat earlier, to 9.12.0.0.0. A further sample taken from this ruin, preferably including material from the other architectural groups, should considerably clarify the ceramic repertory of the above period, in addition to proving with greater certainty the stratigraphic position of slateware on the site. Late Mexican substage pottery should also be present at least in the vicinity, judging from architectural indications.

The markedly close relationship of the ceramics of this site to those of the central Maya area is shared to some degree by Yaxuna III, and to a lesser extent by the Late Regional ceramics of Acanceh. Cobá Polychrome, however (fig. 3, a), is a ware not shared by the other two sites.

YAXUNA

Pottery collections from Yaxuna were studied in 1940; these collections were excavated by H. B. Roberts in 1932. Roberts' ten trenches have been plotted from his notes on map 4, revised from the survey made by O'Neill and Stromsvik (O'Neill, 1933). Roberts notes that "the most important information obtained from these two sites [Sayil and Kabah] was the discovery in the lowest strata of two trenches at Kabah of polychrome sherds of the same general type as those from Holmul V and Uaxactun III [Tepeu]. Polychrome sherds of wares assignable to the above two periods have been found under stratigraphic conditions at two other sites in the Yucatán Peninsula; namely Cobá and Yaxuna. The Cobá and Yaxuna sherds were found in strata which did not contain any of the standard Yucatán-Maya [slate] wares" (Roberts, 1935, p. 127).

Roberts' Yaxuna pottery was examined by Robert E. Smith at Chichén Itzá in 1940; he reported sherds of Chicanel, Tzakol, and Tepeu types in the collections. The collection in storage at Chichén Itzá at this time consisted of 272 sherds, separated by trench but not by level. An additional sample collection from these excavations was found at the Peabody Museum; it consists of 89 sherds. The fact that the original collections had evidently been combined made the checking of stratigraphic locations impossible.

The relatively large proportion of Petén-like monochromes and some polychromes, and the presence of Puuc-style architecture and slateware sherds, suggested that excavations at Yaxuna might allow an equation of the Yucatán and Petén chronologies (see Thompson, Pollock, and Charlton, 1932, pp. 197-205). The causeway connecting Yaxuna and Cobá, together with the proximity of Yaxuna to Chichén Itzá, suggested the likelihood of ceramic connections among these three sites, and the stelae at Cobá promised a chronological anchor of sorts (see *ibid.*, pp. 205-206).

About two weeks were spent in excavation at Yaxuna in February, 1942. Fourteen trenches were excavated (numbered 21-34, see maps 4 and 5). Several trenches were located in an attempt to augment and clarify Roberts' ceramic sample from the environs of the north building group; another series from the cenote

to the northwest of the ruins gave a less complex deposit, representing in nearly pure form the period least well known from the other site collections. Structure 8 was sampled and the trenches found to contain little but Formative pottery. Of these trenches, 29 and 30 gave large, pure Formative collections. This mound, consisting of a high platform bearing evidence of several probable structures, measures approximately 60 m. by 130 m. at the base, altitude over 20 m., and volume about 50,000 cu. m. It would certainly repay further investigation, as would the whole site.

The Yaxuna chronologic sequence.—There is ceramic evidence of four distinct periods at Yaxuna, each characterized by a change in the predominant slipped ware. Although large unmixed collections were not obtained for each of these periods, there is reason to believe that such deposits exist on the site. The earliest of the periods, Yaxuna I, belongs in the Yucatán Late Formative substage and compares quite closely with the Chicanel phase at Uaxactún, showing a few resemblances to Mamom ceramics. Following this period is one characterized by Flaky Redware associated with the less frequent but more diagnostic Incised Dichrome and with Black Trickle on Redware: Yaxuna II, Yucatán Early Regional stage. Next in order, a phase markedly similar to that of Cobá Group B is well represented: Yaxuna III, Yucatán Late Regional stage. Finally, the ceramics show the slateware period, also represented by the only standing architecture: Yaxuna IV, placed in the Yucatán Florescent stage.

The order of this sequence is amply supported by stratigraphic changes in the proportions of wares, although the last two periods are not represented by unmixed collections. The slipped wares of four excavated trenches have been graphed to demonstrate this sequence (charts 2-4). Trenches 24 and 25 show transitions from predominantly Late Formative deposits (Yaxuna I) into the Dichrome-Flaky Redware period (Yaxuna II), nearly missing the Cobá Group B period (Yaxuna III), and ending with slateware predominant (Yaxuna IV). Trenches 21 and 26, which adjoin and have therefore been combined (chart 4), begin their history with a stratum (cut C) showing predominant Yaxuna I pottery. Cut B shows the Yaxuna III wares predominant. The deposit from bottom to top shows a gradual increase in Medium Slateware. Although Yaxuna II is but slightly represented, this deposit thus shows Yaxuna III wares following Yaxuna I and II wares in strong percentage. This sequence is weakest between the Yaxuna III and IV, but support for the III-IV sequence has also been found at Cobá and at Acanceh. These placements gain further support from their equivalents in the Petén sequence, which are discussed later in this section.

The cenote collection, as stated above, showed a relatively pure, short-period occupation called Yaxuna II. Of the 3,905 sherds tabulated from the cenote trenches, 180 (4.6 per cent) were of Thin or Medium Slateware, mostly atypical from those of the Puuc sites in form and finish. Percentage of this slateware decreased, although indecisively because of the smallness of the sample, from top to bottom of trenches through the four cuts taken. Although some intergrading between the cenote monochrome wares and monochromes of the later ruin deposit were noted, no cenote monochrome fragments were distinctive enough to be attributed definitely to Yaxuna III.

Chronologic equivalence with Petén phases.—Robert Smith examined the greater part of the Yaxuna collection made in 1942, and selected 236 sherds out of the collection of 8,909 as identical with or very similar to Uaxactún sherds.

Cenote	Ruin
Similar to or Identical with Uaxactun Pottery	Identical with Uaxactun Pottery
No sherds identified as later than Tepeu 1	
Tepeu 1 5	33 18
Tzakol 35	48
Chicanel 26	30 37
Mamon	4

The overwhelmingly Yaxuna II deposit from the cenote, it will be noticed, contains Uaxactun Chicanel and Tzakol correspondences in nearly equal numbers, suggesting at first glance that Yaxuna II should be placed chronologically between the Chicanel and Tzakol phases at that site. It should be borne in mind, however, that the Chicanel-like specimens are all undecorated monochrome and were probably locally made, while the Tzakol-like specimens are polychromes, the rarity of which in all Yaxuna collections suggests that they were traded in from a distance. Since it has long been suspected (see, for example, Thompson, 1939, p. 224 and table 17) that there is a partial or complete disjunction in the occupation of Uaxactun between the Chicanel and Tzakol phases, and since there is stylistic evidence that the decorated type of this period, Incised Dichrome, is stylistically linked and probably antecedent to Tzakol-style polychrome (see fig. 63 caption), Yaxuna II can most likely be placed in this gap.

The distribution of the Petén-like sherds in the cuts of trenches 24, 21, and 26 (included in the "ruin" column of the above table) have been shown for direct comparison to the distribution of the native wares (chart 4). The right-hand columns show the percentages of sherds attributed by Smith to each of the Uaxactun phases. Total slipped sherds in each cut are shown by the figures to the right of the graphs. The trench 25 sherds were not seen by Smith; the Petén-like sherds in this trench are at any rate too few for significant percentage comparison.

Late Formative monochrome is predominant in the bottoms of these trenches, and Smith has classified most of it (62.5 per cent) as of Uaxactun type, Chicanel phase. The next local period in order is that of the cenote sample. Flaky Redware shows as major percentages in the middle levels of trenches 24 and 25, but is nearly absent in trenches 21 and 26. The graph of Petén equivalents for trench 24 (chart 3) shows a predominance of Tzakol pottery corresponding with reasonable closeness in distribution with Flaky Redware, considering the smallness of the Petén-style sample. This occurrence supports the evidence of the cenote trenches. The third period, characterized by Medium and Coarse Redwares closely similar to those from the Cobá excavations, is predominant in levels a and b of trenches 21 and 26, but nearly or entirely absent in the other two trenches. The Petén graph for trenches 21 and 26 shows a predominance of Tepeu 1 in these two upper levels.

Thus the first three sequent periods at Yaxuna can with reasonable certainty be equated approximately with the Uaxactun periods Chicanel, a period between Chicanel and Tzakol which Robert Smith recommends calling Matzanel, and Tepeu 1. Above them lies the slateware. Only one or two sherds of Petén-like pottery dating later than Tepeu 1 (believed to have ended about 9.12.5.0.0) were identified at Yaxuna. The simplest hypothesis to explain these facts is to date the slateware (equating with the building of the Puuc-style ruins) as having begun with Tepeu 2 times, and to assume a dropping off of cultural relationships between the Petén and the Yucatán areas at this time to explain

the absence of later Petén-style wares. An overlap between the Petén occupation and the Northern Yucatán sites has long been suspected (Thompson, 1939, pp. 231-232, 240); the sequence from Yaxuna suggests that the overlap is more marked, and dates earlier, than formerly suspected.

An alternative explanation may be presented with some degree of plausibility. The absence of Petén influence in the slateware period at Yaxuna may be due to a disjunction in the stratigraphic column. The site may have been deserted and remained uninhabited until after 10.2.0.0.0, the estimated end of the pottery chronology in the Petén, and then reoccupied by slateware-making peoples. This reconstruction is decidedly less likely than that of a continuous occupation. First, there is no evidence in the several trench profiles of abandonment of the site, and all the deposits sampled which show this time interval evidence the admixture of pottery to be expected in a site under continuous occupation. Stylistic evidences for continuous occupation are also convincing; the slateware, which is the predominant and diagnostic ware of the Puuc period, occurs in considerable proportion even in low levels of the trenches. This suggests early beginnings of the technical characteristics used to define slateware. This theory is strikingly supported by the paint technique and shapes of the Trickle on Flaky Red pottery of early Regional times, which show close similarity to later slatewares (see fig. 7). The majority of the Yaxuna slateware sherds are from jars and basins, and in most cases show intergradation into earlier wares in paste and slip as well as in form. The same is true of such bowl sherds as occurred. Thus a continuous stylistic tradition is indicated throughout the Yaxuna deposits. Also, there are certain similarities in form between ceramics of the Florescent stage and Uaxactun ceramics of Tepeu 2 and 3 times, the demonstration of the exact nature of which must await publication of Smith's report.

It seems likely from the Yaxuna pottery collections that the Florescent stage there coincides in its beginnings with Tepeu 2 at Uaxactun. This placement has since been supported by my excavation at Chenes sites during 1949. This placement is an important link in the synchronization of Northern and Central Maya chronologies. The chronological position of the Flaky Redware assemblage, and its developmental implications in the history of Maya pottery, is further discussed elsewhere.

Notes on architecture and sculpture.—A carved stela was found (fig. A) in the south end of trench 28, facing 3 degrees east of north; its dimensions were: height 1.18 m., width .72 m., thickness .39 m. It seems to have been reset in the position in which it was found, judging from the broken edges at the base and at the lower, eastern corner. It was set flush with the face of a step having a .42 m. riser and a .40 m. tread, which may have been the bottom member of a staircase ascending the north face of structure 4. The top of the stela had been broken off at ground level. The front of the stela, as well as the step, bore several coats of plaster, each painted red. The plaster was applied heavily to the front of the stela to form a smooth surface, obliterating the carving. The sides and back of the stela were carefully shaped, but bore no plaster. The red paint appeared to have been applied in at least two coats, the first dull and orange tinged, the final coat a strong purplish-red in color and showing specular reflections (imported specular hematite?). Fragments of carved plaster bearing the same paint coatings were found in the trench, probably fallen from a building atop the substructure to the south.

On the south side of the North Group, just west of trench 1, an uncarved stela lay on the fallen terrace slope, and near the southeast corner of the smallest of the five ruined buildings to the southwest of it, a jamblike sculptured stone (fig. B) was still in place in the wall face. At the foot of the south face of substructure 7 were noted badly fractured fragments of what appeared to have been one or more stelae. Approximately 150 meters northwest of the northwest corner of the North Group, there was a ruin containing round column drums. A single column drum was found at the west side of the small square buildings southwest of trench 1. On the west slope of substructure 4 were strewn small cylindrical stones about 35 cm. in diameter, each with one side flattened as though they had been engaged to a wall surface (colonnettes). Several elements of a carved stone mosaic wall decoration were found just west of the standing building, structure 5.

The synchronism of these architectural features with the pottery periods can be assigned with some degree of probability. The subfloor deposits under the carved stela contained slateware pottery (Yaxuna IV) mixed with earlier wares. The stela seems to have been reset; it is thus likely that it may date earlier than these deposits.

The standing building, 5, at the North Group has the distinctive veneer masonry characteristic of the Puuc ruins, and therefore must date in period IV. The group of small buildings below it to the west, containing the sculptured jamb and column drum, must also date to the same period on the basis of masonry style. The group to the northwest of the North Group is Puuc in style, identified by the cylindrical column drums which characteristically occur centered in door openings in Puuc buildings. The small engaged columns are of a type which, although found in the Puuc, are perhaps more characteristic of the Chenes area. All of these architectural features are usually found in slateware horizons and therefore probably date Yaxuna IV.

It should again be emphasized that the most striking architectural feature found at Yaxuna is structure 8, a large pyramid which yielded ceramic samples of Late Formative date. This mound is of roughly the same size as one of Miraflores phase recently excavated at Kaminaljuyu (Shook and Kidder, 1952). This structure, which would seem to have been approximately contemporaneous to structure 8 at Yaxuna, was built almost entirely of adobe and contained richly furnished tombs. The Yaxuna mound is composed mainly of rough limestone; the absence of any Late Formative pottery among some 1,000 complete specimens examined from Yucatán collections suggests that rich tombs of the Late Formative substage are not characteristic of Yucatán archaeology, and that mound 8 was thus built solely as a building substructure. It should be remarked that recent opinion is inclined to date the Pyramids of the Sun and Moon at Teotihuacan to late in the Formative stage (Kidder, Jennings, and Shook, 1946, p. 252). The evidence in Yucatán is for a continuity of culture between the Formative and Regional stages, with no change in the location of ceremonial sites (see Brainerd, 1951).

OXKINTOK

About a week in March, 1940, was spent in excavation at Oxkintok in company with Pollock and Shook, who were at that time working on the architecture and stelae of that site (Shook, 1940).

Four ceramic trenches were dug (see map 6), two of them (1 and 3) in a lower court upon which backs the

building with the Initial Series lintel which dates 9.2.0.0.0, the earliest Initial Series date yet found in Yucatán. Both trenches penetrated shallow deposits, but both yielded sherd collections from under the mortar floor of the court. The above-floor pottery from these trenches is judged contemporaneous with deposits from the Puuc sites, and is discussed in that connection. The locations of the trenches were chosen in hopes of anchoring the ceramic sequence accurately to the Initial Series date. Trench 1 showed only Puuc occupation. The trench 3 subfloor pottery contains considerable early material. Trench 4, dug off the west end of the terrace bearing the Initial Series buildings, shows only a superficial layer of Puuc period pottery. The lower refuse shows increasing mixture of early pottery, with only one slateware sherd below the floor.

The following tabulation shows the percentages of slateware (the characteristic slipped pottery of the Puuc sites) in relation to the total sample of rim and significant body sherds. Slateware constitutes about 75 per cent of the sample in typical Puuc collections. Variations below this percentage evidence early pottery as a constituent of the collection.

	Slateware percentages	Total rims
Trench 1 a	78.4	102
Floor		
Trench 1 b	76.6	60
Trench 2 a-c	14.2	409
Trench 2 d-g	0.0	760
Trench 3 a	75.7	185
Floor		
Trench 3 b	44.5	247
Trench 3 c	4.5	197
Trench 4 a	73.9	394
Trench 4 b (east end)	50.4	236
Trench 4 b (west end)	49.0	114
Trench 4 c (east end)	66.0	91
Floor		
Trench 4 c and d (west end)	0.8	2,875

Trench 2, dug about 200 meters to the west of the Initial Series lintel group off the slope of a major platform which bears a large pyramid, yielded 2.50 meters of rich deposit, with some 1,200 rim and significant body sherds. The platform retaining wall proved to be in good condition, preserved by the sterile earth of a postoccupational slump. Remains of a thin mortar floor adjoined it but extended only a few centimeters from the platform base. Just under this floor lay a border of wall stones at right angles to the superimposed platform, probably the facing of a low terrace. These structures extended only through the southeastern 4.5 meters of the trench. They were not disturbed, in accord with our policy of obtaining samples with a minimum disturbance of architectural structure on the ruins. In this case, the lower terrace border stones proved to have been laid on the native sascab (soft limestone) which sloped sharply downward to the maximum depth of the trench. This deep deposit of cultural debris, by far the deepest we located outside of a cenote, is markedly at variance with the normal soil depth in Yucatán, which ranges from zero to six or nine inches. This area seems to have been a basin, bounded to the northwest by a limestone ridge. It may have been formed by quarrying for limestone and sascab for building purposes.

Although the deposit was not sealed in by a floor, there is every evidence that at least its lower levels accumulated during a relatively short period and re-

mained undisturbed by later activity. Levels b and c contained some slateware mixed with previously unencountered wares, while levels d, e, f, g, running from 1.40 m. to 2.50 m. in depth from surface, contain no slateware but a homogeneous assemblage of pottery which includes a relatively small number of fragments suggesting the Uaxactun Tzakol phase. Robert E. Smith's report on these lots of pottery follows. It has been slightly paraphrased, and references to my illustrations of the types he discusses have been added in brackets.

In general the monochrome wares are Petenish but fail to be exactly like Uaxactun, except for a very few sherds too fragmentary to be absolutely certain; one of these is a small, pedestal-base blackware vase, unslipped on exterior except just below the lip, interior slipped, eggshell thin, and Tzakol 3 [fig. 12, i; j, 15]. Several rim sherds may belong to brown-blackware tripod cylindrical bowls [fig. 12, j, k] with hollow slab feet, one present [fig. 13, g]. Some are vertically fluted, and some plain or with one or two horizontal incised lines below lip on exterior. Orangeware bowls have rounded sides, horizontal grooves below lip, vertical fluting, and modeled human faces. One blackware bowl with rounded sides has incised geometric design done before slipping [fig. 12, j, 18]. All of these are Uaxactun types, providing the bases are Uaxactun in style, and they are not present.

The near-Peten types are: (1) Basal flange bowls with flaring sides, beveled lip and ring base. Many of these have red and black on orange decoration on interior [fig. 9, g]. Some of these may be Tepeu 1 basal molding types. (2) There is also a smaller group of basal flange bowls; one flange is triangular in section with rounded lip. (3) Bowls with rounded sides, probably with ring bases; these run more to black than to red, whereas the basal flanges are nearly all red in monochrome ware [fig. 13, i, l, m; fig. 12, d-h].

As can be seen from the above, the only close synchronism with the Peten seems to be with Tzakol 3, the last subphase of Tzakol, and there is a suggestion of Tepeu 1, though Smith emphasizes the lack of completely reliable correspondences.

If late Tzakol is accepted as the correct placing of the collection, it should date between 9.2.0.0.0 and 9.8.0.0.0 according to present estimates of Uaxactun dating. The Oxkintok lintel dates 9.2.0.0.0.

The material examined by Smith probably covers only a short time-span sample. The collections lumped together here from trench 2, levels c to g, showed no stratigraphy. The relatively small number of wares and shapes further argue the homogeneity of the sample. Illustrations shown of Oxkintok Regional pottery are all from this collection.

The placing of this sample in the local ceramic sequence is a complex problem. None of the major wares of this deposit have been located in any other collection from Yucatán in quantity, and under conditions allowing stratigraphic placement. Hence any placing must depend on stylistic criteria, similarities in shapes and decorative features with other collections, rather than on positive ware identifications.

The collection contains no marked Chicanel-like features in form, decoration, or slip type; this is in contrast to the early collections from most other Yucatán sites. It also contains no Incised Dichrome nor marked similarities to its accompanying Flaky Redware, which in some samples shows Chicanel similarities and closely follows Chicanel in time. It must therefore

postdate both these periods. On the other hand, the early Oxkintok collection shows considerable similarity in ware and shape with the main Dzibilchaltun ceramic assemblage, which in turn can be documented as preceding the Floresent stage deposits from the Puuc sites. The Acanceh excavations show a stratigraphic sequence of vessel forms from an assemblage resembling Yaxuna III into Dzibilchaltun-like pottery. The Oxkintok pottery fits best stylistically at the beginning of this sequence. No stylistic transition from early Oxkintok strata into the later Puuc period is documented from these trenches, in spite of the gradual increase of slateware at trench tops shown in the table, and thus these trenches show mixed rather than transitional deposits. The placement of the Oxkintok ceramic assemblage earlier than Dzibilchaltun is also supported by: (1) the absence at Oxkintok of fine grayware found at Dzibilchaltun, which shows close stylistic similarities with Piedras Negras wares which likely date about 9.18.0.0.0 (see fig. 28, g); (2) by absence at Oxkintok and presence at Dzibilchaltun of fine orangeware, distinct though similar to that from the Puuc sites (fig. 59, g); and (3) by the absence of Peten tradewares at Dzibilchaltun, considered in relation to our findings elsewhere that Peten trade ceased after Tepeu 1 times. Since Dzibilchaltun predates the Puuc sites and shows close stylistic similarities with them, Oxkintok must predate Dzibilchaltun.

The evidence for placing the Cobá collections at about 9.10.0.0.0, the date of the stelae there, is clear and straightforward; the Peten tradeware in this collection is preponderantly Tepeu 1. The Cobá and early Oxkintok collections have in common redware basins with subrim flange (fig. 2, c, 11-19, 23-26; e; fig. 11, d-f) which are markedly similar, though the Cobá flanges are usually thumbed while the early Oxkintok specimens are not. Regional Coarse Redware jars from Yaxuna (fig. 8, a-d) are suggestive in form of the early Oxkintok Cinnamon Buffware jars (fig. 11, a-d), though here the form is more generalized and the resemblance thus less certainly significant. Closer similarities with Acanceh jars have been mentioned above. Bowl forms at Oxkintok are not as closely similar to those of Yaxuna and Cobá as are the forms of the jars. The Oxkintok bowls are also markedly closer to Puuc slateware bowl forms than are the eastern specimens. These facts would alternatively suggest that the early Oxkintok collection is later than the Cobá collection, or that the distinctive shape range of the Puuc bowls developed in the western part of the peninsula and spread east at a later date. The latter hypothesis is made nearly certain by chronological evidence given above and by the predominantly western distribution of the Puuc architectural style, as well as by the evidence of sculptured dates and Peten tradeware. Thus the Oxkintok ceramic assemblage dates perhaps later than the lintel date of 9.2.0.0.0 and certainly earlier than the Cobá collections; somewhere earlier than 9.8.0.0.0.

The bottom cuts of trenches 3 and 4, dug in the court adjoining the initial series building (see map 6), contained collections predominantly of early wares but with a little slateware intermixture. These cuts underlie the floor of the courtyard. The architecture of the adjoining building which bears the Initial Series lintel is of the so-called early type (Pollock, 1940; Shook, 1940) which disappeared before the building of the classic Puuc sites. There is evidence at Dzibilchaltun and elsewhere in northern Yucatán that the first appearance of slatewares antedates the full development there of Puuc style veneer masonry, although there is also evidence at Dzibilchaltun that

slatewares either superseded the earlier slipped wares gradually, or overlapped them in time but were restricted regionally.

The occurrence of slateware sherds under the courtyard floor at Oxkintok indicates that this floor considerably postdates the Initial Series lintel. The building containing the lintel may also antedate the courtyard floor, though this is not certain at present on the basis of the evidence given above.¹⁵ The possibility that this floor is later than the building is strengthened by the fact that it lies to the rear, abutting the building platform on which the Initial Series building rests. Thus it may be seen that although the presence of late pottery in the bottoms of trenches near the Initial Series building at Oxkintok does not agree with the early date of the lintel, it also does not present valid evidence against the dating of either the building containing the lintel or of Early Oxkintok pottery at about 9.2.0.0.0. With present evidence it seems justifiable to assume this dating, or one not far from it, for the early pottery assemblage.

Mercer (1896) recovered a collection of ceramics from the labyrinth, or Sat un Sat, at Oxkintok (structure 3, b, 1 on map 6). I have examined this collection, which consists almost exclusively of figurine incensario fragments dating from shortly before the Conquest, another evidence of Maya religious pilgrimage to ancient sites (Brainerd, 1953). In the course of architectural exploration, Pollock discovered a single sherd of plumbate pottery in Puuc-style fallen building debris at Oxkintok. This fragment, of Early Mexican substage, need indicate no more than a casual visitor during this period.

The architecture, like the ceramics, indicates two phases of occupation at the site. Whether they were continuous is not certain from the pottery but it is likely, since Pollock and Shook note evidence of areal expansion in the architectural remains. The dating of the earlier phase has been discussed; the ceramics and architecture place the later as contemporaneous with the Puuc sites. The documented time range thus runs from 9.2.0.0.0 probably to at least 10.2.0.0.0, or possibly as late as 10.8.0.0.0 (about 500-1000 A.D., by the 11.16.0.0.0 correlation). The ceramics, as noted elsewhere, are Puuc period closest to those of Uxmal, which is the nearest large Puuc site to Oxkintok. Shook notes the possibility that a Maya causeway may have connected the two sites.

The sculptures found at Oxkintok are varied and important. Shook (1940) notes their association with the earlier, central plazas of the site. Proskouriakoff, who has recently tackled the intricate problem of classifying the strikingly varied Yucatán Maya sculpture, assumes (1950, p. 160) that the Oxkintok sculptures date "much later than 9.11.0.0.0." If Proskouriakoff is correct, a continued occupation is indicated for Oxkintok, with the stelae far postdating the dated lintel as well as the early ceramic assemblage, but perhaps somewhat antedating the Puuc-style architecture and ceramics. On architectural-ceramic grounds, the most economical hypothesis at present favors an earlier date than does Proskouriakoff for these monuments, but the data are far from complete.

DZIBILCHALTUN

A pressing problem in the formulation of a Yucatán ceramic chronology was the connecting of the sequence into historic times. Prof. Alfredo Barrera Vásquez, who gave generously of his time and knowledge in this as in other matters, showed me a site situated about

1 kilometer south of the hacienda of Dzibilchaltun, which lies about 5 kilometers east of the 15 kilometer marker on the road from Mérida to Progreso. This site, known locally as Xlaca (see map 7), consists of several ruin groups connected by two causeways. Near the center of the site is a deep, clear cenote or aguada, surrounded on three sides by a flat bedrock ledge only slightly higher than the water level. This is an ideal water source and has probably been so for a long time.

East of the aguada stands a ruined church of the capilla abierta type with arched stone apse and sacristy standing, as well as a detached single-room building nearby to the north, possibly used as the curate's residence (R1, R2, R3, on map 7). The nave of the church must have been of perishable material, since excavations for its corners yielded no results. These Spanish buildings were constructed largely of stone from the ruins, including several fragments with carved decorations. The stones are large and squared; there are few of the tapered edged "veeeneer stones" used during Florentine and Early Mexican times. The carved stones seen at the site were concentrated about the Maya plaza in which the church was found, save for one in the bottom of the aguada (see Andrews, 1942, for architectural discussion). On the altar wall of the church, fragments of an elaborate fresco were still in place. Drawings were made and will be published elsewhere. There is some stylistic evidence in these frescoes for a 16th century dating. A test excavation at the altar end of the church showed several superimposed altar platforms and the presence of numerous burials under the floor, those seen being poorly preserved. Excavation of the environs of the detached building showed a courtyard with low surrounding wall, and a loose stone found near the north door bearing a badly eroded but probable date of 1593. The figures are in rounded relief against a flat background. The last figure in the date is more uncertain than the first three.

Several of our workmen came from the village of Chablekal about 1 kilometer to the east of the ruin. Local legends that the "virgin" in the Chablekal church came from the aguada, and a general tendency among the inhabitants to accept the ruined church as a forerunner of their own, prompted a visit to the Chablekal church. To the right of the church doorway an unusually large stone showed faint traces of an inscription. This stone, as well as the surrounding wall, had been whitewashed many times. Upon removal of a quarter inch of paint, an inscription became visible in the Maya language in Roman script, dating 1612 or 1617. This clear inscription (fig. C) as well as another, a re-worked corner stone set in the wall on the west side of the corral at the hacienda of Dzibilchaltun and bearing an incised date of 1662 or 1663, bolster the reading of the early inscription date at the doorway of the detached building.

In an effort to confirm this dating from historical sources, Mr. France Scholes was consulted and very kindly contributed the following references and comments:

Chablekal was probably the Pech town of Chable for which we have sixteenth and seventeenth century references. The story of Chable, insofar as I can patch it together from the data at present in my files, is as follows:

The pueblo of Conkal was granted in encomienda to Don Francisco de Montejo, the son. This town had various sujetos, i.e., other villages which formed part of the jurisdiction of the cabecera of

Conkal. Among these sujetos were Chulul, Sitpach, and probably Chicxulub. Montejo also held other towns in encomienda, such as Dzilam, Itzimna, and Dzibical. These towns were inherited by his son, and during the last third of the sixteenth century various changes took place. In 1605 there was litigation concerning the encomienda holdings (A. G. I., Mexico 242) from which we learn that at some time prior to this date the town of Chable, undoubtedly the Chablekal of later times, was separated from Chulul, one of the sujetos of Conkal. The Spanish reads: "Cable que es cierta parcialidad de indios que se aparto de Chulul." What does this mean? It may mean that Chable was founded as a separate settlement made up of Indians from Chulul; or it may mean that there were small settlements at Chable and nearby, such as Xlaca, regarded as sujetos of Chulul, which were brought together and concentrated at Chable, resulting in the setting up of a separate pueblo. Personally, I lean to this interpretation. In any case, where we first find reference only to Chulul, we now find separate pueblos mentioned in 1605. When did the separation take place? On this point all that is possible is to set a period during which Chable was set up as a separate pueblo. Obviously it took place some time prior to 1605, when the litigation was in progress. The 1582 list, published in Documentos para la historia de Yucatán, p. 56, mentions Chulul but not Chable as one of the pueblos served by the convento at Conkal. Consequently, it may be inferred that the establishment of Chable as a separate village took place after that time. Thus you can fix the period 1582-1605 as the time when the change occurred. Throughout the seventeenth century the encomienda of Conkal included both Chulul and Chable. Moreover, it appears that both Chulul and Chable remained attached to Conkal for religious purposes because as late as 1688 these two towns occur in a kind of census list prepared by the priest of Conkal.

Now, what about Xlaca? Here all I can do is to speculate. Possibly this settlement was one of the outlying sujetos of Chulul and if your 1593 date is correct, it may indicate that the friars began to set up some kind of mission establishment there about that time. It is unlikely, however, that the friars would have maintained two churches a mile and a half apart at both Xlaca and Chable. Lack of references to Xlaca in a subsequent period may mean therefore that this village was administered as part of the Chable mission. Indeed, it may be that the people there were congregated or concentrated at Chable as part of the movement which resulted in Chable's becoming a separate pueblo. If this speculation has any validity, and taking into account the dates, it is possible that the setting up of the Chable mission occurred between 1593 and 1605 when the litigation shows Chable as a separate place. I would not try to be very definite about these dates and I don't imagine that you have to be. The development in the Chable area, which included Xlaca, apparently took place after 1582 due to the fact that there is no mention of either Xlaca or Chable in the list of that year or prior to 1605. If your mention of the church at Xlaca as a capilla abierta means that it was never roofed over in a permanent manner, this may be evidence that it was not permanent and that with the setting up of Chable as a separate pueblo the friars decided to move their church to the latter pueblo. This again would explain the later date on the Chable church. In short, it seems to me you have a period of some twenty-five to thirty-five years when these

developments were taking place in the Xlaca-Chable area, which ought to be good enough for your purposes.

Incidentally, the name Chablekal appears in a census of about 1794 recently published by Rubio Mane in the first volume of his *Archivo de la Historia de Yucatán, Campeche y Tabasco*. This list does not include Xlaca or Dzibilchaltun. This reference appears in the census data for the coastal area north and northeast of Mérida. In this area there were 256 estancias, among which may have been Xlaca and Dzibilchaltun.

Thus it appears clear that Chablekal (earlier Chable) became a part of the Yucatán religious organization not much earlier than the date on the church front there. The Xlaca church was larger than the church at Chablekal, although it was never completed in permanent materials. It seems likely that it was abandoned after a few years' use, possibly because of its inconvenient distance from the settlement at Chablekal, and the church at Chabekal built to replace it. (For plans and description of the Chablekal church, see Vega Bolanos *et al.*, 1945, vol. 1, pp. 419-420.)

The only pottery of the early Colonial period found at Dzibilchaltun consisted of a few redware jar body fragments, a small fragment of a cream paste, white glazed plate, and fragments of a deep redware caldron restored in fig. 220, a. This pottery all came from the immediate environs of the dwelling. The lack of fragments of Coarse Redware pottery, which characterizes the period from well before the Conquest to the present day, argues that the Maya site surrounding the church did not support a village during the period of the church, or at most was settled for a very short time. No surface fragments of this ware were found on the site, although a considerable number of earlier fragments were collected during the exploration and mapping of the area.

The site was surveyed using an oil suspension prismatic compass. Most distances were measured by tape, others were paced. The map is believed to be free from any major inaccuracies of orientation and placement. The western sacbe measures 1.32 kilometers between platforms. It consists of a slightly raised masonry pavement edged by a roughly faced line of stone. Bordering the causeway, at an average distance of 3 meters on each side, are rows of massive, rough limestone slabs set on edge. The eastern sacbe is shorter, being only 402 meters. This causeway is locally known as the Izamal Road, and the villagers assured me that it continues to Izamal. The direction of the section of the causeway which was mapped is some 5° north of the bearing of Izamal. Group 7 at its eastern end lies on the outskirts of Chablekal. The area of the village was unsuccessfully checked for a continuation of the "Izamal Road," though the possibility of such an extension farther east remains and was not checked. The connecting stretch may have been destroyed in construction of the village.

We discovered twenty-two stelae on the site, which is the northernmost on which a similar concentration of monuments has been observed. Only two carved stelae are known from farther north, from Dzilam on the coast northeast of Dzibilchaltun. Of these twenty-two stelae, six were carved, all badly eroded, and the other sixteen were plain. Of the six carved stelae, two, in fragmentary condition, were built into the Spanish buildings. Andrews, who was shown the carved stelae, states that none bear Initial Series inscriptions and he was unable to read any dates from them (Andrews, 1942, p. 259). Two standing vaulted Maya build-

ings were discovered (in groups 2 and 5, map 7). In an effort to utilize the developing ceramic sequences for the chronological placement of Yucatán architecture, Andrews visited the site and drew plans of group 2 from which, during his stay, small subfloor ceramic samples were taken. He also discovered a nearly buried range of vaulted rooms in group 4 (see *ibid.*, p. 259 for summary description).

The pottery from Dzibilchaltun, aside from the Colonial wares mentioned above, may be divided into three discrete periods, all separated in our chronology by intervening time intervals. The earliest period is the Late Formative substage. Only 33 sherds of this horizon were found, and most of these occurred as single sherds in large collections. In trench 2, however, they occur concentrated in the lowest level, C, and account for 16 out of a collection of 36 sherds. This trench, strangely enough, lies beside the Spanish church; thus the settlement seems to have ended for the time in the location where it began. In trench 2 there is a trace of the Yaxuna Cenote period (early Regional) overlying the prestela wares, 4 sherds which seem to be Cobá Group B period, and above this lies the main period of the site. These trench 2 collections are so small that their stratigraphy, proved correct by other excavations, could certainly not be proved from this trench alone.

The major period of the site is one undoubtedly close to or overlapping with that of the Puuc ruins. Medium Slateware is a major constituent of the collections and its form and decorative repertory is generally similar to that of the Puuc sites, save for various of the more elaborately decorated forms which are missing here. Of the rest of the Puuc ceramic repertory, Thin Slateware is prominent, Thin Redware nearly lacking; unslipped wares including incensarios are present, though not very similar to the corresponding Puuc types. A fine orangeware is present, similar but by no means identical to Z Fine Orange; Fine Grayware and Thin Blackware, rare in the Puuc, are much more abundant here. In addition a ware virtually absent in Puuc collections is very prominent at Dzibilchaltun. This is Red on Thin Gray. Several of the forms of this ware are identical to those of the accompanying Slateware, although there is no intergrading of the two in ware, paste, or slip.

The proportions of the major wares encountered on the site are given in the following tabulation of the total collection of sherds excavated.

Total number of sherds from Dzibilchaltun:	10,010.	
Unslipped	5,082	50.4 per cent
Fine Slate	115	1.1
Medium Black	41	.4
Fine Orange	43	.4
Medium Slate	2,097	20.87
Fine Gray	271	2.7
Red on Thin Gray	1,619	16.0
Coarse Slate	1,160	11.3

It will be noted that Red on Thin Gray nearly equals Slateware in frequency, and that unslipped ware occurs with higher frequency than in most collections.

The presence of Medium Slateware in quantity in these samples places the period as being near the Fluorescent stage or Early Mexican substage, in both of which Medium Slateware is the major slipped pottery. The style of nearly all the slatewares, as well as that of the accompanying wares, further restricts the collections as closer to Fluorescent. Does the period then precede or follow the Fluorescent stage? Early Mexican ceramics seem immediately to follow Fluorescent at Chichén Itzá, thus leaving no room for this period and

thereby leaving it earlier than Fluorescent. Much more positive evidence is in the form as well as other characteristics of the Slate and Red on Thin Gray wares, which place them stylistically between Early Oxkintok and the Puuc period, and also between the Cobá Group B and the Slateware period at Yaxuna. The fine wares, Fine Gray, Fine Orange, and Thin Blackware, also place this material stylistically as an early or proto-Puuc occupation. This occupation seems to have covered a relatively short time span. The large collections from trench 14 show (graph 6) Fine Grayware and Thin Blackware being replaced by Dzibilchaltun Fine Orangeware, which is a close relative of Puuc or Z Fine Orangeware.

Robert Smith, in checking this collection in 1942, found no Petén-like wares at all. When considered in connection with the fact that at Yaxuna and elsewhere in Yucatán, as will be seen, Petén pottery resemblances decline markedly after Tepeu 1, this lack of Petén ceramic resemblances suggests a date of after 9.13.0.0.0 for this deposit, although there is a possibility, less likely to my mind, that the northern position of the site would account for lack of Petén contact. Similarities with Usumacinta ceramics are noted, although there is but little published comparative material from that area. The most marked of these similarities is between the Fine Grayware beakers and certain coarser gray-brown ware beakers bearing incised monkeys, found in some of the latest deposits (9.16.0.0.0 or later) at Piedras Negras (specimens at University Museum, Philadelphia). A vessel found at Guaytan in the Motagua Valley also shows resemblances (cf. fig. 28, e-g; 36, b-g, i with Smith and Kidder, 1943, fig. 27, a).

Evidences of a third later period occur near the surface of some of the Dzibilchaltun deposits as collections strong in Coarse Slateware. This ware is the diagnostic of the Middle Mexican substage. One fragment of Medium Slateware (fig. 15, d, 8) is definitely of the Early Mexican substage. The Coarse Slate (fig. 20, a, b) is very close to its counterpart at Chichén Itzá in all details noted. It is found only in the upper levels of trenches 3, 7, 11, 14, and 16, all of which, it will be noted, lie along the north range of group 3. Sculptured stones of this period are mentioned by Andrews (1942, p. 259). I am not certain which fragments he attributes to this period, but two fragments of large limestone slabs were noted bearing relief decorations somewhat similar to those on Mexican Chichén buildings. One was visible on the bottom of the aguada, which the natives claim is part of a subterranean temple; the other (plate IIIb) was found in front of the detached building north of the west side of Group 5.

Although Dzibilchaltun failed to produce any quantity of the Spanish contact ceramics hoped for, its main phase sheds much-needed light on the development of the Puuc ceramic complex. The Coarse Slateware gave small but nearly pure samples of a period (Middle Mexican substage) found at Chichén Itzá only in mixed collections. The few early sherds discovered demonstrated that here, as in nearly every site sampled, a Formative stage settlement existed, the evidence for which would indubitably be much stronger if the later heavy occupation had not nearly destroyed it. In this case, the aguada may have been the reason for the long occupation of the site, but here as elsewhere, at Yaxuna for example, there is evidence of even closer localization; the Maya used the same building platforms over long, though often discontinuous, periods. And here, as in so many other sites, the Spaniards chose ruin areas for their churches, utilizing the stone blocks in their buildings and to burn for lime.

The site is worthy of further study. The stelae, although badly eroded, merit description, which Andrews will perhaps supply from his notes. Proskouriakoff has commented that their composition is similar to that of central area Maya monuments (Proskouriakoff, 1950, p. 164), a similarity paralleling such features as the closely spaced plan of the site, the Peten-like masonry, and architectural details. The stucco façade discovered and reported by Andrews (1942) may be of major importance. Its excavation should not be undertaken without governmental arrangements for its care.

The exact dating of the major Dzibilchaltun occupation cannot be fixed certainly without more excavations in its region. In general terms its position seems clear. It must date from a period slightly prior to the fluorit of most of the sites of the Puuc area, but almost certainly after the beginnings of some of them. During the occupation of Dzibilchaltun, it seems likely that slate-wares were being manufactured in some parts of Yucatán, and Regional monochromes in other parts; this situation can only be checked by careful analysis of ceramics from a series of sites spaced over the area concerned. The time period of this occupation can roughly be estimated as within the range 9.13.0.0.0 to 9.18.0.0.0.

ACANCEH

A series of tests was made at Acanceh. The site was chosen in the hope of dating the famous stucco façade as well as a pyramid on the north side of the town plaza (see map 8, b) which bears large stucco faces suggestive of those on the Chicanel-phase temple E-VII sub at Uaxactún (Marquina, 1951, pl. 242). Andrews spent several days during the ceramic excavations in the determination of architectural sequence on the acropolis (Andrews, 1942, pp. 257-259). During this time we excavated trenches 17, 18, and 19 (see map 8, a) in areas calculated to aid him in dating the architectural sequences.

The ruin groups in the town have been robbed extensively for local construction; irregular, rounded areas shown in the town plan consist of masonry fill so badly destroyed as to afford little indication of form. Architectural stone elements of Florescent-stage form in place on the acropolis surface attest an occupation later than that evidenced by the standing buildings (*ibid.*, p. 258).

Nineteen trenches were dug, spread over the recognizable ruin areas, yielding a total of 9,441 sherds. The trenches north of the plaza near the early style pyramid yielded altogether only 36 sherds; all trenches encountered rock fill with no recognizable floors. This area is at present nearly formless in contour, making choice of trench location difficult. Trench 20 (depth 1.50-2.50 meters) yielded a deposit containing one Incised Di-chrome sherd with 14 other Flaky Redware sherds also assignable to the Yaxuna Cenote horizon. Higher levels show later wares. Relationships of this collection to the stucco-faced pyramid are not clear; there is only a suggestion that it may be Early Regional in date.

The trenches around the edges of the acropolis showed considerable depth of deposit, and several produced large stratified collections. These trenches were mapped by plane table, using permanent benchmarks, and levels of all cuts, floors, and other structural elements encountered are on record; these were taken with a tripod telescopic level and all measurements are within 5 cm. accuracy. This survey is on file, and if consulted should assure freedom from errors due

to disturbance by our trenches if this group is later excavated. It should also allow a correlation of any architectural features discovered with our ceramic scale.

With the pottery of Yaxuna, Oxkintok, and Dzibilchaltun as a guide, wares were relatively easy of definition at Acanceh. This was fortunate, as nearly every trench showed a stratigraphic sequence running through several periods. As in most of the material heretofore described, the deposits show considerable mixing between successive periods, which are recognizable only by predominance of characteristic wares in successive cuts.

Quantities of Flaky Redware appear in the earliest cuts. This ware is very similar in appearance to Yaxuna Cenote redware, but forms are of Late Formative as well as of the later Yaxuna Cenote (Early Regional) period (fig. 17, e-h; fig. 18, a, 1-7). A few sherds of Flaky Dichrome occur (fig. 17, g, 1-2), but none with incising. Formative Monochrome cream ware bowls (fig. 17, f, 33-34), preslip striated redware jar fragments, and negative painted monochrome (fig. 17, e, 1, 2, 18-20; h, 31, 32), all of Late Formative dating, occur in smaller quantities. The Late Formative Dzibilchaltun sherds have a flaky slip and also show close form resemblances to the Acanceh specimens (fig. 5, f and 17, h).

The variation among the Acanceh and Dzibilchaltun wares shows the ceramic situation in the Late Formative substage in Yucatán to be complex. Although some of this variation in slip character and minor wares may in part be regional, chronological change is also likely to be involved. More material is required before these wares can be plotted through space and time.

Above the Flaky Redware in sequence come deposits containing Coarse and Medium Redwares, many with mottled slip similar to those of the Cobá-Yaxuna III wares. These collections may be classed as of mid-Regional stage. Shapes and decoration in this period resemble similar wares from both Early Oxkintok and Cobá Group B and probably periods intermediate between them in time, as well as earlier and possibly slightly later wares. The pottery of the Oxkintok-Cobá time span (138 years between the Oxkintok lintel and the earliest Cobá date, and 69 additional years for the Cobá span of dated stelae, plus or minus whatever discrepancies exist between the date of our samples and of the inscriptions) has been difficult to differentiate into periods in the Acanceh deposits, which contain rather small, heterogeneous collections of the wares of this time range. Thus our proof that the Cobá Group B period dates later than Early Oxkintok must be primarily based on the Peten pottery correlations, supported by the stela dates of the two sites. Stylistically, Oxkintok Early wares, slipped bowls for example, are closer in form to slateware than are the Cobá Group B-Yaxuna wares; the latter, although they must date later and thus closer to the Puuc horizon, were made far to the east of the Puuc area in which nearly all of our Florescent sites are concentrated. There thus seems to be evidence for development of Yucatán Florescent-style pottery in the west, while the eastern peoples clung closely to the Peten ceramic traditions. This same regional dichotomy is documented in the concentration of Initial Series stelae and Peten style architecture at Cobá, contrasted with a near absence of carved monuments and the distinctive Puuc style architecture in western Yucatán.

A ware of the Regional stage at Acanceh which was not demonstrated to occur in either the Cobá or Yaxuna collections is Red on Thin Gray, which has the same

or closely similar ware characteristics to that of Dzibilchaltun. This ware occurs in stratified sequence above Coarse and Medium Redwares, and intergrades somewhat with them in paste, slip, and color. It also shows form similarities in jars and basins (cf. figs. 18, c, 2, 4-11 with fig. 2, c, e; fig. 8, e-g). The jar shapes of both wares are suggestive of Early Oxkintok Monochromes. Many pieces of Coarse Redware vary toward cinnamon-buff in slip color; a few fragments are definitely classifiable as of Early Oxkintok wares. Acanceh Red on Thin Gray is indistinguishable to the eye from Dzibilchaltun Red on Thin Gray, and occurs characteristically with slatewares. Thus there is stratigraphic evidence at Acanceh for placing the Dzibilchaltun collections as following the Cobá Group B-Yaxuna collections and the Early Oxkintok collections in time, and preceding the Fluorescent collection.

Supporting our establishment at Dzibilchaltun of a time period characterized by the use of Red on Thin Gray in nearly equal quantities with Puuc-style slatewares, the same association is apparent in several collections from Acanceh. However, the later Acanceh collections show a greater proportion of slateware and of Puuc Thin Slate and Redwares and a smaller proportion of Fine Gray and Thin Blackwares than at Dzibilchaltun, coupled with certain Puuc-like shapes in the Red on Thin Grayware. This places them later in a local sequence which probably culminated in the dominantly slateware collections which characterize the Puuc sites. The stylistic connections between Early Red on Thin Gray and the cinnamon-buff and red wares of early Oxkintok, coupled with the evidence of a gradual supplanting of Red on Thin Grayware by slatewares, documents a general trend for northwest Yucatán.

There are no sizeable Acanceh collections containing typical Puuc pottery assemblages free of Red on Thin Gray. Trench 4-A (see map 8a) is the nearest approach to one. A few Medium Slateware sherds of Early Mexican substage shape and slip range (fig. 21, a, 8, 9, for example) attest a very minor occupation of this period.

The lack of typical Puuc ceramic assemblages in the sites we explored in northwest Yucatán is possibly not significant; the area was very lightly sampled, and few of the sites tested showed the short occupational sequences most likely to yield pure samples if an occupation did exist. An easily sustainable argument can be presented that Puuc-style buildings once existed in numbers in northwest Yucatán, but have been robbed of masonry so extensively for churches and other buildings later built upon and near them in Mexican and post-Conquest times as to leave little trace of either Puuc architecture or ceramics. The ceramics in the Mérida collections are predominantly Puuc in period, and their proveniences, in the rare cases in which they are known, are widely distributed over the country. Surface ruins are certainly not a reliable indication of culture distributions in Yucatán, as witness the belief held until recently that Yucatán supported only a primitive agricultural population until after the dissolution of the Old Empire and the moving north of its survivors. In this case, the temples of the earlier peoples have proved in many instances to lie under the architecture of the later. Perhaps the Spaniards did a more thorough job of demolishing earlier structures than did the Maya before them.

Conversely, present evidence suggests a marked concentration of religious centers in the Puuc area during the Fluorescent stage. Furthermore, the ceramics from the Puuc sites suggest that these were religious centers on new locations, a break in the nearly universal Maya custom of utilizing time-honored sites.

The possibility exists that the Medium Slateware collections from Dzibilchaltun and Acanceh, which show closer similarities to early collections than do those of the Puuc, must be examined to determine if their variation from the Fluorescent Puuc collections may not be due to regional rather than temporal differences. It must first be said that the Puuc collections have unfortunately yielded stratigraphic evidence of only slight stylistic change, despite careful analysis directed toward that end. Thus, unless samples are large, we do not have the criteria from the Puuc that should clearly attach the other sites either to the beginning or the end of the Puuc chronology. Puuc pottery shows more stylistic elaboration and technical virtuosity than the slateware-containing collections from the sites to the north and east of it, but such differences may be explained, at least to some extent, by the indubitably peripheral position of any other sites contemporaneous with the Puuc concentration. The Red on Thin Graywares of Dzibilchaltun and Acanceh, which form a considerable part of each sample containing Medium Slateware, give definite chronological clues because of their stylistic similarities to Early Oxkintok and Cobá Group B wares, the dates of which are fixed in the Petén chronology and the positions of which are fixed in the Yucatán sequence.

Unfortunately for the solution of this problem, we do not at present have sufficient ceramic samples to assure us that the total ceramic sequence through the Regional and Fluorescent phases is represented for both the Puuc and northern areas. If we had, it should be easy to determine a series of synchronisms which would allow the sequences from the two areas to be compared for regional variation. Was there a time when a ceramic assemblage containing slatewares as the only slipped ceramics existed in north Yucatán? And conversely, was there a period of occupation in the Puuc during which Regional monochromes were the only slipped wares (as at Oxkintok and Acanceh), or were used simultaneously with slatewares (as at Dzibilchaltun and Acanceh)? And what are the chrono-logic relations of these assemblages?

At Acanceh we can document with some certainty the chronological change from Regional monochrome assemblages to an even mixture of monochrome and slatewares. In the Puuc, despite more thorough sampling, we find only slateware assemblages, and this situation has been further supported by similar results in the Chenes and Río Bec areas in 1949.

The disparity between the ceramic sequences excavated in the Puuc and northern Yucatán sites can best be explained as a function of a combination of regional and chronological variation. In the analysis, the problem is the evaluation of the relative effects of these two factors; and of these, only the chronological factor can be isolated since its effects, by definition, should be observable in collections from all the sites sampled. Regional variation can be recognized only after the chronological variation has been allowed for, and should appear as the variations between any two occupations identifiable as contemporaneous.

In the determination of chronological markers, which must precede any determination of regional differences, there are various measures which may be applied. The slatewares from the northern sites show various similarities to the slatewares from Maní, the Puuc, and the Chenes sites, as well as to those from "Maya" or Fluorescent Chichén Itzá, and all of these show certain traits rare or absent in Puuc site collections and lack certain others common in Puuc site collections. Also, there are certain indications that these differentiating criteria place the other

collections at the early end of the Puuc ceramic sequence. This evidence is given a degree of confirmation by the 1949 Chenes collections, as yet incompletely analyzed.

A further chronological yardstick may be found in the finely made, obviously imported ceramics in the collections of the northern and Puuc sites. At Dzibilchaltun, Thin Blackware, Fine Grayware, and Dzibilchaltun Fine Orangeware are all found in some quantity (see figs. 53, i, 28, g, and 59, g, h, respectively, for these wares). Thin Black and Fine Graywares occur only as traces in the large Puuc collections. Z Fine Orange, which occurs in the Puuc (fig. 59, b-f), is stylistically distinct from the Dzibilchaltun variety, and quite likely represents a later development of the same region which was earlier the source of Dzibilchaltun Fine Orange. It should be added that certain stylistic similarities between the ceramics of the Puuc and northern sites and those of the central Maya area bear out the evidence given above for the placing of these northern sites as somewhat earlier than the Puuc fluorit, but probably contemporaneous with the earlier part of the occupation of some or all of the Puuc sites.

If it be hypothesized that there were marked regional differences in the kinds of utilitarian ceramics manufactured in Yucatán during certain periods, it should pay to attempt a reconstruction of the conditions of ceramic manufacture and trade which might produce the mixtures found in the excavated collections. To begin such a reconstruction, some cultural interpretations of ceramic typology are prerequisite. The ware is our most important ceramic category in the determination of locale of manufacture. A ware is defined as a mass of pottery which in general has similar characteristics of paste, slip, and finish. These characteristics depend upon the sorts of materials selected from those geographically available, and upon the techniques of manufacture. Even when as broadly drawn as they are in this report, they mirror categories of pottery which must have been apparent to their original users, and they must also reflect cultural traditions of manufacture, limited by local accessibility of suitable raw materials.

Pottery manufacture in Yucatán today, and indeed generally in Mesoamerica, wherever wares of indigenous tradition are made, is carried on only in certain towns. Although the industry is in large part a family affair, the families who make pottery tend to cluster by town or even in one quarter of a town. The same situation exists in the less elaborately organized modern pueblos of the Southwest. Coupled with craft specialization by community in Mesoamerica is the custom of trade between communities, at present carried on in town markets which are held in a succession of towns according to a weekly cycle. There seems to be every reason to assume that this pattern is an aboriginal survival. If so, the collections from Dzibilchaltun and Acanceh containing Red on Thin Grayware and Medium Slateware can be explained by the assumption of a southern (Puuc) origin for slatewares and general trade over northern Yucatán. Various other ceramic assemblages, such as those in Late Formative and Puuc deposits, are also easily susceptible to such explanation; it seems quite possible that such a custom may stretch back in time to the Formative stage—and, from the Old World distribution of similar trading patterns, it may even be suggested as a general phenomenon in folk culture.

The distribution of fine and elaborately decorated wares is harder to explain by historic archaeology; the religious hierarchy for which such wares were probably produced is gone and the historical continuity

thus interrupted. The Kaminaljuyu Esperanza tombs (Kidder, Jennings, and Shook, 1946), as well as numerous other less spectacular finds, attest the great extent and volume of such luxury trade in Classic-stage Mesoamerica. There is some suggestion in the large quantity of fine orange pottery from Veracruz found at Chichén Itzá that luxury trade was further extended in post-Classic times, perhaps coincident with an increase in coastal sea traffic.

If the analysis proposed above is acceptable, our archaeological data show a marked regional variation in the ceramic industry of northern Yucatán at a horizon which can be placed at sometime near 9.16.0.0 (about 750 A.D.). At this time the peoples of northern Yucatán were using monochrome pottery in the tradition of the earlier Regional stage pottery of that area, but they were also using slatewares, which seem to have been the local ware of the Puuc area during the Regional stage and probably were developed within the Puuc-Chenes-Río Bec area. We know that at some time before the Mexican stage, slatewares were the sole native slipped pottery of the area of Chichén Itzá, and we suspect from reconnaissance that this same situation existed over all of northern Yucatán. Thus the evidence points to the gradual replacement of local monochromes in northern Yucatán by slatewares which are known to be the native wares of the area to the south.

Further and broader reconstructions which depend on these findings are discussed in the conclusions.

A more fully represented Middle Mexican substage occupation is next in stratigraphic sequence (cf. trench 3, a-d, chart 10), topped by a slight deposit of Late Mexican Coarse Redware. There are cuts showing about 80 per cent Coarse Slateware period wares, with 20 per cent of wares characterizing other periods. The Coarse Redware occurs only as minor percentages in collections consisting mainly of wares of earlier periods.

Advantage was taken of Andrews' discovery that the building facing the stucco façade was a later construction, on a northward extension of the pyramid. Portions of the fill within this extension and between the two buildings were removed (see map 8, b, trenches 17, 18, 19) and a small but workable collection resulted. From Andrews' stratigraphic architectural evidence (Andrews, 1942, p. 258), materials in this fill must all predate the northern building and postdate the stucco façade building. Both these buildings predate a Fluorescent occupation, posited on the presence of Puuc architectural members scattered on the surface of the acropolis, and fragmentary architectural remains in place above the level of the stucco façade building. The pottery deposits of this horizon must have largely disappeared as the masonry of the top of the mound was robbed.

The ceramic collection from the trenches which postdate the stucco façade building (fig. 19, d-g) consists of a mixture, the earliest identifiable sherds probably being of Formative date; the latest, which constitute the majority of the samples, show clear similarities to Early Oxkintok specimens. A basal flange polychrome fragment of Tzakol style is included (fig. 19, g, 3). The Formative pottery must be contained by chance in earth used much later.

If the Early Oxkintok collections are contemporaneous with the lintel there, the stucco façade temple dates not later than about 9.2.0.0.0. Although these collections may date as late as 9.8.0.0.0, it must also be remembered that the deposit under discussion postdates the stucco façade temple by an unknown time span. It thus seems safe to date the façade as early ninth cycle.

An excavation of the acropolis, with its evidences of long occupation, should yield much superimposed architectural evidence. The trenches showed a use of occupation earth fills rather than the loose stone fills characteristic of the Florentine and Mexican periods. The pottery contained in these fills should allow a dating of the architecture, thus making this site a highly informative one in an area where architectural remains of this age are scarcely known.

MAYAPAN¹⁶

Mayapan is a most important link in the joining of the Chichén Itzá ceramic chronology to the Christian calendar, since Mayapan is known through early Spanish documentation to have been abandoned only shortly before the Conquest. Vaillant found some ceramic substantiation of this late dating in a small sample from the site (Vaillant, 1927, pp. 353-354, 366).

Approximately two weeks were spent at Mayapan in the collection of 32,413 sherds from 13 trenches. Toward the close of these excavations, Andrews began architectural studies at the site (Andrews, 1942).

During this trip two trenches, numbers 11 and 12, were sunk in the cenote of the nearby town of Telchaquillo (map 9). The large collection (2,644 sherds) obtained all seemed post-Conquest, but lack of European tradeware makes its dating difficult. It seems no different, however, from the better-dated Maní Colonial collection, save that unslipped wares were completely lacking at Telchaquillo; all the fragments belonged to water jars, which seem always to have been slipped during this period. This difference is likely to be due to the circumstances of deposition; the Maní deposits were kitchen refuse, the Telchaquillo sherds came from a water source.

Fortunately, a survey of Mayapan had been made by R. T. Patton in 1938 (Carnegie Institution Yearbook no. 37, pp. 5-6), resulting in the map of the central group which we have here used (map 10). The trenches were concentrated in this group, with only three trenches, 4, 8, and 10, being dug in outlying areas. Trench 8 yielded a small stratified collection, all of which, except for one sherd, is Middle or Late Mexican in date. For a description of the masonry of the group in which trench 8 was dug, see Lawrence Roys, 1941. 19,016 sherds of the collection, including nearly all sherds of the earlier horizons, came from trenching in Cenote Chun Mul (see map 11), which shows ceramic evidence of almost continuous use from Formative to Conquest times. This cenote collection, then, may be taken as a fair indicator of the span of human occupation of its immediate area, which is the Mayapan main ceremonial group.

The slipped wares of the cenote collections may be summarized as follows:

Coarse Redware (Late Mexican Period)	84.3 per cent
Coarse Slateware (Middle Mexican Period)	7.2
Medium Slateware (Classic and Early Mexican)	2.2
Tzakol-style polychrome (may include some late Mexican polychrome)	.3
Flaky Redware (made only during Formative and Early Regional Periods)	.4
Formative monochromes	<u>.3</u>
	94.7 per cent

Other miscellaneous pottery made up the remainder.

Despite the wide chronological range defined stratigraphically here (chart 17), this is one of the most homogeneous collections recovered from excavations in Yucatán. Late Mexican Coarse Redware is heavily preponderant. Next, but a very poor second, is the Coarse Slate characteristic of the preceding Middle Mexican period. This points to a short intensive occupation of a hitherto lightly inhabited location. This occupation follows with little or no overlap, and perhaps even with a disjunctive interval, the last Chichén Itzá building period.

Trenches 1 and 2 in Cenote Chun Mul (map 10) show the earliest occupational evidence, consisting of 67 sherds of Formative monochrome in mixed collections from their lowest levels; in trench 1 this depth is 1.50 meters, in trench 2, much less. In generally ascending order in these trenches occur a small number of sherds of most of the major chronological periods known from the Peninsula, thus checking the stratigraphic order arrived at elsewhere, and adding evidence that no major ceramic groups have been missed in the survey. The proportions of Tzakol-style polychrome sherds to other sorts of contemporaneous pottery are far larger than in deposits from other sites. In fact, very few undecorated sherds attributable to the same horizon were found in these polychrome-containing collections. In addition, a polychrome bowl (fig. 9, f, 8) with badly eroded surface has been found in this cenote, containing human bones. Polychrome bowls may have been preferred to the less spectacular wares for secondary burials, and it is thus conceivable that this concentration of polychrome sherds may have resulted from the use of the cenote as a burial place. R. E. Smith did not see these polychrome fragments (fig. 9, f); they all seem to come from basal flange bowls and are doubtless classifiable as Tzakol style. The situation in the cenote is therefore what one finds in most water sources of long standing in Yucatán, save that the late Regional stage seems to be nearly or completely absent, and that the intensive late occupation in this vicinity has markedly enlarged the deposits attributable to that time span.

All trenches at the site yielded small percentages of Medium Slateware, usually most strongly represented in their lower levels. Only 3 sherds out of the 219 of this ware found (including fig. 15, p. 6, 7) show form characteristics of the "Mexican" part of the chronological span of the ware. These three characteristic sherds must represent a larger frequency than their number indicates, since more indeterminate sherds probably come from this period. However, they are still scarce enough to indicate that the Medium Slateware occupation must have been restricted to a minor occupation belonging to the Florentine stage, after which the site was abandoned, or very nearly abandoned, until Middle Mexican times.

The Coarse Slateware at Mayapan occurs in every trench and in nearly every cut, tending to show more prominently at the bottom of the trenches. Its proportion in regard to the later redware is, however, small in every collection, although larger than that of Medium Slateware. No collection shows a predominance of Coarse Slateware over Coarse Redware; its largest frequencies occur in trench 7 which adjoins but does not pierce the pyramid slope of the serpent column temple, which was cleared and drawn by Andrews subsequent to the excavation of the ceramic trench. A floor covered deeply by ashes was found at a depth of 1.20 m. from the lowest surface point at the trench, under level e (chart 14). The trench continued to bear pottery including Coarse Redware until it reached

bedrock .70 m. below the floor. Two building periods are thus suggested for this temple, during the earlier of which Coarse Redware had already come into use. There are no data to tell us whether the first builders of Mayapan had begun to make Coarse Redware in addition to Coarse Slateware at the time of their arrival, or whether more excavation on the site would show a pure Coarse Slateware horizon such as was found at Dzibilchaltun.

The samples are enlightening with regard to the chronologic placing of the attached figurine incensarios found over so much of Yucatán and adjacent areas. These have long been known as late in the archaeological record because they characteristically occur on or near the surface, often overlying collapsed Maya structures. There is thus considerable evidence of their placement on ruins by postoccupational visitors. This custom is still followed by the Lacondone Indians, who make pilgrimages and place incensarios in ruins.

The Mayapan collections show clear evidence from several trenches (see charts 17, 16, 15, trenches 2, 5, 6) of increasing proportions of figurine incensarios toward the surface of deposits, beginning in the lower strata with predominantly Coarse Redware collections containing few fragments of figurine incensarios; in trenches 1, 6, and 8 there are no fragments of them. The manufacture of figurine incensarios therefore began later than that of Coarse Redware. Mayapan is revered as an ancestral capital by the Maya even now, and this type of incensario may well date until after the Conquest, since there are many sixteenth century records of the difficulty experienced by the Spanish friars in stopping the manufacture of idols.

The determination of the dates of occupation of Mayapan is of particular importance in the placing of all earlier periods in Yucatán. As we have stated above, the Mayapan ceramic sequence gives evidence that the site was settled at the time the period of architectural activity ended at Chichén Itzá. The earliest phase of architectural activity recognized thus far at Chichén Itzá is contemporaneous with the Puuc ruins, and there is reason to believe that the Puuc fluorit began about 9.18.0.0. This sequence of occupation is the most fully documented one which covers the time that intervened between the end of the Initial Series period and the Spanish Conquest in the Maya area.

A major handicap inherent in ceramic dating, and for that matter in all direct archaeological dating, is the lack of criteria for estimating the amount of elapsed time. The only two methods normally useable are depth of deposit and amount of stylistic change, both highly variable in rate through time and therefore unreliable.

The short-form dates used in the post-Conquest Maya chronicles and in certain inscriptions, although based on a definite day count which is inherently capable of furnishing accurate information on elapsed time, are of a cyclical nature which does not allow their certain placing in sequence. In pottery studies the sequence is accurately portrayed, though time duration is uncertain. With these two crutches we may walk with greater steadiness. Mayapan is known to have been a late site. Its abandonment in 1441 or 1446 is possibly the best substantiated of the pre-Conquest dates; Landa states that it was occupied for 500 years before that time (see Tozzer, 1941, pp. 33, 37, 38, for discussions). Three inscriptions bearing Ahau glyphs with coefficients have been found at Mayapan. Pollock (1936) accepted these as katun-ending dates written during the main occupation; Thompson (1945, p. 19) dates them as probably of the Puuc period; E. W. Andrews (verbal information given in 1947) professes an open mind on the subject but believes the style of the inscriptions

close to those of Cobá (9.6.0.0-9.12.0.0); Proskouriakoff (1950, p. 164) assumes that they are katun endings, but does not commit herself on their dating. The ceramic evidence leaves little likelihood of an earlier occupation and is notably free of ceramics of Cobá Group B date. If these inscriptions are accepted as coming from the main occupation of the site, they should probably be read as katun endings, the type of dating still in use at the Spanish Conquest. If so assumed, the following Christian dates may be read at the 256 year cycle intervals.

Possible Christian datings				
Stela 1	10 Ahau	1441 A.D.	1185 A.D.	928 A.D.
Stela 5	4 Ahau	1244 A.D.	988 A.D.	
Stela 6	13 Ahau	1283 A.D.	977 A.D.	

Examination of the above table shows that, if the dates were contemporaneously written and actually belong to the period documented by an overwhelming majority of the pottery, Mayapan must have been occupied from at least 1244 on, the latest date which may logically be read for Stela 5, since the next 4 Ahau came at 1500 A.D., at which time the site had been abandoned. This evidence points to an occupation of at least 200 years for Mayapan.

Andrews (1942, pp. 261-262) discusses certain finely cut stones, reused in the roughly built Mayapan structures, which he suggests may be assigned to the earlier ceramic period there. He also mentions evidence of a temple underlying the temple atop the large pyramid at Mayapan which may possibly also belong to my earlier period, although its masonry type is still unknown. This earlier ceramic period is the Middle Mexican substage of which the characteristic slipped potteries are Coarse Slateware. I know of no evidence unearthed till now that Coarse Slateware and finely cut stone masonry are contemporaneous at Chichén Itzá, where this ceramic period is best represented. From the Casa Redonda at Chichén Itzá, H. B. Roberts (Pollock, 1936a, pp. 151-152) tabulates but 4.5 per cent of red pottery in a collection of 488 sherds from general postconstructional debris and no red ware in a collection of 186 sherds from a pit, the contents of which must certainly date from before the collapse of the building (*ibid.*, p. 141). The masonry of the Casa Redonda is composed of rough stone blocks, either unworked or but slightly worked and set in mud mortar, and this type of construction is believed in general to have followed the fine-cut masonry of the Mexican architectural period at Chichén Itzá (the Early Mexican substage). Thus the Casa Redonda, a rough-block masonry building, dates from either the Medium Slateware period or the Coarse Slateware period; Roberts did not distinguish in his tabulations between the two characteristic wares. This does not, of course, prove that no finely cut masonry was used in the Coarse Slateware period, but there is as yet no evidence of its use in that period. Another reasonable assumption is that these worked stones date from the Florentine stage, which is so strongly represented in Yucatán. Unfortunately, the ceramic representation of this stage is very light at Mayapan.

The presence of an underlying temple in the Mayapan Castillo pyramid and the presence of a heavy pottery concentration under a floor in ceramic trench 7 suggest at least some rebuilding during the occupation of Mayapan. However, the relative scarcity of high pyramids and the crudeness of the buildings on the site may be taken to suggest a relatively short occupation. As has been stated above, lack of stylistic change in the Mayapan redware deposits also suggests

a relatively short occupation—the shortest of any site we have sampled on the Peninsula. Therefore, the choice of a 200- or 250-year duration of occupation seems indicated decidedly over the next choice of a 500-year occupation. Although this goes contrary to Landa's statement, the archaeological evidence of the lack of a long overlap between the Chichén Itzá and Mayapan occupations also controverts the historical sources. Political histories have notably failed in other instances to agree with the archaeological evidence of occupation of sites.

Following back our chronological sequence, this means that the end of the intensive building period at Chichén Itzá dates from not later than 1200 to 1250 A.D. Working back from that date, we must place the Coarse Slateware period, or a major part of it, then the Medium Slateware (Early Mexican substage) period which bears plumbate and X Fine Orange pottery, and finally the Fluorescent period, to reach the Maya date of about 9.16.0.0.0. The time period to be covered is roughly 500 years if the 11.16.0.0.0 correlation is accepted, 750 years for the 12.9.0.0.0 correlation, 250 years for the 11.3.0.0.0 correlation. The Early Mexican and Fluorescent (Puuc) periods are each characterized by the development of highly integrated and elaborate architectural styles, and by the erection of tremendous masses of carefully executed carved stonework. Compared with the building of Mayapan, these achievements loom tremendously. 250 years seems too short a time for this four period sequence. As to the choice between 500 and 750 years, this research considered alone yields little evidence (see chart 21 for a more extensive discussion).

TICUL

The long prehistoric sequence already attained in Yucatán ceramics had been markedly strengthened, checked, and filled in by the excavations at Yaxuna, Dzibilchaltún, Acanceh, and Mayapan. The lack of knowledge of early Colonial ceramics made still further work on that period advisable in order that the historical anchor of the sequence might be more firmly attached. In addition, regional differences between northern Yucatán and the Puuc region were suspected, and I was anxious to determine the regional boundaries along the north face of the Puuc hills. A trip to Ticul was first made, on which Dr. Alfredo Barrera Vásquez was kind enough to accompany and guide us. Methods of modern pottery making were studied there, and the environs of the Ticul monastery explored for possibilities of excavation. Such work proved unfeasible because of lack of coöperation in the inhabitants of the church and monastery.

We explored the small site of Chanpuuc about 3 km. south of the Ticul church, on top of the first low range of the Puuc hills. There is a group of minor ruins with a chultun. A trench was sunk in the bottom of the chultun. A collection of pottery (641 sherds, fig. 15, f-n) was unearthed, consisting in the main of typical Fluorescent stage wares but also containing two probable Late Mexican substage unslipped jar fragments (fig. 15, f, 5, 6), and two atypical incensario fragments which seem closer to Puuc forms than to any other (fig. 15, n, 1, 2). These collections were of some interest since they represented our first Fluorescent collection on the north side of the hill range.

DZAN

Following the excavation of the Chanpuuc chultun,

the town of Dzan was visited and considerable evidence of pre-Conquest occupation noted in the form of reused cut stones. Nine collections of pottery from Dzan and environs were excavated, all small and all dating from the Puuc period and later. No map of the town was made. Excavations will be described relative to street intersections.

Just north of the northwest corner of the main plaza lies the center and north side of a considerable mound showing part of a standing structure with veneer type walls, a medial molding, and a cornice and vault, with plaster roof in place, upon which stands a wall seemingly of Spanish construction. The vault facing was missing in the area observed. This building must have been encased in a later structure now largely gone. Two trenches were dug; trench 1 was 25 meters north of the north side of the standing building, and trench 2 was 10 meters north of it. Both passed through large stone fill to a thin layer of sherd-containing earth resting on bedrock. This bottom layer contained Puuc-style Medium Slateware and no earlier wares.

At the northeast corner of the intersection of Calles 19 and 14 is a large sunken area approximately 50 by 50 meters and about 3 meters deep, partially lined by a battered rough-masonry wall. Each side of the area bears a staircase about 2 meters wide. All masonry seems of Spanish style. This sunken area is called a rejoyada (seed bed) by the townspeople, and is used for a banana plantation. No information as to its original purpose could be obtained. At least part of this rejoyada is plaster floored. In the center seems to have been a masonry-lined depression, probably a pool. The whole depression is reported to hold water in the rainy season. I have no evidence as to whether this area was originally a shallow cenote into which embankments have been built for the streets, or whether it was originally excavated. In either case it represents much human labor. Trench 3 was sunk against the north side of the west staircase in hopes of obtaining a pottery collection. The trench revealed a retaining wall of heavily spalled post-Conquest masonry containing occasional reused Maya cut stone, and a plaster floor resting on bedrock. No pottery was encountered.

In grounds at the southeast corner of Calles 19 and 16, a chultun was located and a trench excavated on its floor (trench 4). Thirty meters south of the chultun is a ruin mound showing vestiges of worked stone. About 10 meters west of this mound is another chultun, now filled with modern refuse, which we did not dig.

Thirty meters northeast of the corner of Calles 26 and 25 is a building ruin bearing three columns 40 centimeters in diameter centered in the building front and spaced 1.5 meters apart. Vestiges of a sculptured molding belonging to this building were found. Larger column drums were observed nearby. Thirty meters north of the building, a cache of three copper celts and three copper rings was found by the owner in a mortar pit, unassociated with other artifacts. Five meters north of this building we excavated a chultun (trench 5) containing a Medium Slateware deposit. The presence of the three columns and the metal suggest that this area bore a Mexican stage occupation but this and the other chultunes are probably of Fluorescent date. Trench 6, which produced a shallow but rich Medium Slateware deposit, was dug from a chultun in Calle 26, 25 meters north of Calle 23.

Trench 7 was dug in a chultun 15 meters south of the Dzan-Maní road, about one-half kilometer east of Dzan. The pottery contained a Late Mexican-style animal-head bowl leg, and Late Mexican Coarse Redware.

Two pottery collections from the northeast of Dzan and a Puuc-style Medium Slateware molded monkey head were brought in by interested land owners. On the whole, the individual collections from Dzan were relatively small and mixed, although together they constitute a sizeable sample. The general impression is that of the usual concentration of ruins within the town, further documenting the establishment of Spanish towns on ruin sites. Confirmation is given by the large proportion of Maya cut stone incorporated in the walls of the large church and of the masonry houses about the plaza. As far as could be told by the pottery, the ruins had all been Florescent of Puuc type, and Mexican.

After the sampling of the Dzan deposits, which aided more in the chronologic placement of the town than in adding to our information on Yucatán ceramic sequences, we established ourselves in Maní, where excavations proved more enlightening.

MANÍ

At Maní, eight trenches were dug in the town cenote to the southwest of the main plaza. This cenote (map 12), still an importance source of water, has been made more accessible by the construction, in post-Conquest times, of a masonry ramp with flights of stairs at top and bottom. This ramp, described by Stephens (1843, vol. 2, p. 259), is now little used in favor of a vertical shaft which was later cut directly over the pool.

The deposit to the sides of the ramp bears mainly post-Conquest ceramics, but underlying them is a deposit showing traces of wares of the Mayapan period in one trench; then, in sequence, evidence of the earlier Mexican, the Florescent horizon, a little Regional, and Late Formative, of which a large quantity occurs (see table below).

Below the Late Formative stratum occurred a sizeable deposit of a ceramic horizon hitherto undiscovered in Yucatán (see fig. 30, c), and which I have called Early Formative on the basis of results from my 1949 excavations (Brainerd, 1951). One fragment similar to this ware has since been recognized in the sample from a Formative deposit at Holactún. A whole vessel, which from its shape may possibly be of a related ware, has been photographed and published by Andrews (Andrews, 1943, pl. 28e) but cannot be attributed without examination and study at present unfeasible.¹⁷ This specimen was photographed at Tiradero, north of Río San José Martír, Campeche. Andrews notes the presence of large deposits near there, and I have examined his samples from these. The deposits are referable to the Formative stage on stylistic grounds; the wares show the orange paste characteristic of that region, and appear very similar to Formative wares illustrated by Ruiz (n.d.) from excavations along the Campeche coast.

Totals of diagnostic wares in the cenote trench collections are here arranged in their stratigraphic order:

Wares	Sherds	Per Cent
Colonial Coarse Redware	12,068	58.9
Late Mexican Coarse Redware	812	4.0
Middle Mexican Coarse Slateware	272	1.3
Early Mexican Medium Slateware	252	1.2
Florescent Medium and Thin Slatewares	1,755	8.7
Red on Thin Grayware	2	.0
Tzakol-style Regional Polychrome	287	1.4
Late Formative monochromes	776	3.9
Early Formative Burnished Design Ware	4,203	20.6
Total of Diagnostic Wares	20,427	100.0
Grand Sherd Total	21,310	

Notable in the tabulation is the strength of the first and last phases and the virtual absence of the Late Regional wares and Red on Thin Grayware, of which we have found large samples elsewhere. The Florescent Medium Slateware shapes are distinct enough from those of the Puuc sites to suggest either a regional or time difference, and there is enough stylistic evidence in their similarity to the Dzebtun collection (fig. 35) in both color and form to believe them earlier than that of the Puuc sites.

The lack of Regional wares of the Early Oxkintok period and the presence of Tzakol-style polychrome has been remarked at Mayapan. The same situation exists here, more clearly apparent because of the larger collections obtained. Trenches 4, 6, and 12 (map 12) are the richest in this polychrome. In trenches 6 and 13, Mexican-period pottery extends to the lowest levels, thus evidencing some late mixing. In trench 4, however, cuts f and g show samples of the ware with little slateware, and in 4, e, no slateware is intermixed (see charts 18-20).

The stylistic ties linking Tzakol-style polychrome to Incised and Punctate Dichrome, and the early stratigraphic placement of the Maní Orangeware, suggest that this horizon falls early in the Regional stage. If the Early Oxkintok wares actually date about 9.2.0.0.0, the Maní orangeware may with some reason be assigned somewhat earlier because of the relative proximity of the two sites and the marked lack of similarities between their pottery. An alternative explanation of perhaps equal likelihood is that of a marked regional boundary between the two sites.

Excavations were also carried on in the grounds about the Colonial church and monastery (map 13). Plans of these buildings and a valuable discussion of their dating and use are given by Vega Bolanos *et al.*, 1945, vol. 1, pp. 299-306. Trenches 13, 15, 16, and 17 were dug to the north of the northwest corner of the monastery, where a well and a room formerly used as a kitchen gave promise of refuse beds. Trench 15 immediately penetrated large stone fill. It was continued to a depth of 2.25 meters in hopes of earlier deposits, and then discontinued for lack of space and because of mounting danger from the loose fill of the walls. The remaining three trenches yielded exclusively Colonial ceramics and trade objects; trench 16 contained only scanty collections, the others much fuller. The trade material has not been intensively studied but there is no evidence that any of it dates later than early in the 19th century; also, Stephens describes the monastery as already in ruins in 1842. In the upper levels European china is plentiful, but it is absent from the lower levels. In nearly the lowest levels are found fragments of majolica, which persist through the chinaware period but always in small quantity. The majolica bears close resemblance to Puebla wares, but we have no proof as to its origin. Glass fragments in small quantity appear contemporaneously with the china. A brown pottery bearing underglaze manganese paint also appears with china, and lasts through the remainder of the occupation. Pottery of this description is made in various parts of Mexico now; Mercer (1896, pp. 161-166) describes the making of glazed pottery in Mérida; the clay was imported, generally from Orizaba, according to his description. Scattered fragments of metal also occur, the lowest of them in prechina strata. The chinaware stratum must begin in the latter years of the 18th century. The Puebla majolica industry was started in the middle of the 16th century, but did not attain much importance or size until the middle of the 17th century (Cervantes, 1939, vol. 1, pp. 17-20). Thus we may divide

these deposits into two periods, or possibly three: (1) Upper levels dating from late 18th through early 19th centuries, with chinaware as the diagnostic; (2) Lower levels, lacking china but showing majolica, mid-17th to late 18th centuries; (3) A possibly earlier level in trench 13, i, j, and 17, i, which lacks majolica but in which the collections are too small to prove this lack significant. It is also possible, of course, that the majolica in part or all of the collections of group 2 is earlier than mid 17th century in date. It may be added that the single plain white glazed fragment of majolica from the Dzibilchaltun deposit, which has a probable end date of 1593, is thinner and finer than the Maní specimens; it may be of European importation.

A clue to the dating of the local ceramics is given by Roys (1943, p. 48) who quotes, presumably from the Vienna dictionary which he dates from the late 16th or early 17th century, a reference to a bowl "painted with small white pebbles." The calderón sherds shown in fig. 34, b, 1, 2, meet this description. Painting has been done with an opaque white pigment on the red slip. The pigment has been fired and is moderately permanent, though with a tendency to scale off.

The slip of most of the Colonial Coarse Redware is indistinguishable from that of the Mayapan ware. The jar form is also similar but somewhat slimmer, and new base and rim forms have been introduced. The other vessel forms are quite distinct and new. Also, two ware changes are notable; a considerable part of the collection bears slip showing a sparkle like that of specular hematite, and there is another group of vessels with finer paste and a smooth slip showing a more purplish red than the common ware. In some modern pottery, imported slip pigment is mixed with local red clay (see Mercer, 1896, p. 164), and this practice doubtless started early; in fact, specular hematite paint was used during the Florentine and Early Mexican stages in Yucatán. Modern Yucatán pottery making is described elsewhere. It can be said that the 600 years beginning with the making of Mayapan pottery and including the present has been the most conservative span we know in Yucatán ceramic history.

The central part of Maní was searched for evidence of pre-Conquest occupation. A considerable number of carved stones from ruins were observed and photographed in house walls on and near the central plaza. The inhabitants were cooperative in reporting aboriginal material, including several chultunes; the latter were explored.

A chultun was trenched (trench 7) at Calle 27, no. 228. On the rear of these grounds is a Colonial masonry ruin, said by the natives to have been the hospital. Another chultun on the same grounds had recently been excavated by the owner. The earth was screened and a pottery collection made (trench 9). Another chultun at the extreme west end of the town was dug, but a very small sample resulted. These chultun collections consisted mainly of early Florentine pottery with later admixture.

Trench 8 was dug at the northeast corner of the monastery just south of the large corner buttress (for plan, see Vega Bolanos, 1945, p. 299). A small deposit was found, all Colonial of uncertain date, and remains of a Colonial wall running north and south. Trench 10 was dug at the southeast corner of the present church, outside the northwest corner of a cement dance platform reputed to have been constructed about 1900 A.D. A few redware sherds resulted.

The rancho of San José, also called X'cabenchen, about 2 kilometers south on the street adjoining the Maní cenote, was visited. An actún or cave there is said to lead downward to a pool, but was not explored.

Just inside the cave mouth a trench was dug, yielding a small sample. A number of sculptured stones were photographed, including a jaguar head. To the north of the present ranch headquarters, which is a thatch house, there is a large sunken area like that described at Dzan. This area is said to flood during heavy rains, and to drain in three or four days.

The pottery from these deposits, none deep or stratified, consists of mixed collections dating from periods varying from Florentine to modern. This again suggests, as at Dzan, an intensive, relatively late occupation, outlasting the abandonment of the Puuc area to the south and perhaps accounting for the large population which may have drifted or have been moved northward at the end of the Florentine stage. Unfortunately, the ruins which must have stood at these towns are nearly all gone into lime-kilns, churches, and masonry houses, and with them must have gone most or all of the stratified ceramic deposits adjoining the pyramids.

Post-Mayapan-pre-Conquest deposits are to be expected of Maní from the post-Conquest sources which relate that the Xius ruled in Maní after the fall of Mayapan. This period has not been recognized ceramically. If ceramics of this period exist at Maní, they must be among the "Colonial" collections, which show certain distinctive shape differences from the Mayapan period ceramics.

"MOUND NEAR MERIDA" CERAMICS

A collection of twelve potsherds (collection C-20, 77) in the Peabody Museum, Harvard, is catalogued as coming from a "Mound near Mérida." The collector was E. H. Thompson. They are illustrated and discussed here because of their interest as evidence of the evolution of polychrome pottery painting in Yucatán.

An unsuccessful attempt was made to locate this mound through a check of Thompson's notes and papers at the Peabody Museum, and through questioning the late Mr. Thompson's acquaintances in Mérida.

There is no external evidence that these twelve specimens (fig. 63, a, 1-12) come from the same time period. However, the appearance of paste and slip on all of them is so similar that they would normally be classed as the same ware. There is also overlapping among them in decorative techniques and form which link them in such a manner that it seems justifiable to consider them as a group made during a relatively short time span in the same area.

Allowing this assumption, we have clear evidence that Incised and Punctate Dichrome (see figs. 1, g, i, k; 6; 64; 66, a) was made at about the same time as were Tzakol-style polychrome bowls bearing geometric designs (fig. 63, a, 6, 8, 9, and 12), which conform with reasonable closeness to certain specimens from Holmul I (cf. Merwin and Vaillant, 1932, plates 18d, 19c) and with San José II (cf. Thompson, 1939, fig. 44).¹⁸ The designs on a, 1 and 2, on the other hand, correspond to those on other Flaky Dichrome bowls from Yucatán sites (cf. figs. 1, i, k; 6, d, 1, 2; g, 2), and the designs and forms of the jar rims (fig. 63, a, 7, 10) are also close to those on Yucatán Flaky Dichrome (cf. fig. 64). The forms of all the bowls also show Petén similarities, and it is of some interest that the "basal angle" as described by Smith (1936, plates 2, 16, 17; 4, 13, 16), which begins in Chicanel times at Uaxactún and lasts into Tzakol, is used in these specimens rather than the "basal flange" which is limited to the later Tzakol phase. Smith also tells me that the use of rows of black dots as design fillers

(see fig. 63, a, 5, 6, 9) is a characteristic of his earliest Tzakol polychromes.

The design repertory of Flaky Dichrome shows similarities to that of Tzakol-style polychrome¹⁹ close enough, in my estimate, to make cultural connections between the two extremely likely. These similarities include use of heavy stepped elements, rectangular volutes, and combinations of the two (step-fret elements) as major constituents of the two masses of design. Rows of punctations, used like the painted dots mentioned above as an early Tzakol characteristic, occur on Flaky Dichrome (see fig. 6, a, 3, 18, 20; e; f), adding a minor but close correspondence. There is also marked similarity between the slips of the two wares in Yucatán, and between the interior striations characteristic of jars of both wares (cf. fig. 63, b, with fig. 64).

In summary, evidence from the collection under discussion, supported by evidence from other Yucatán ceramics, makes it very likely that Flaky Dichrome and Yucatecan Tzakol-style polychrome were made by peoples closely related culturally, and may even have been made for a while by a single people contemporaneously. Since most of the Yucatán Regional Polychrome is so similar to Uaxactún Polychrome that it is distinguishable from it only with difficulty, it seems safe to assume synchronism between these two groups. There is evidence from similarities, associations, and overlappings in ware characteristics and in form, that Flaky Dichrome closely followed the Late Formative subphase in Yucatán, which was synchronous with the Chicanel phase in the central Maya area. It is also likely that the polychrome bowls of the Thompson collection are synchronous with early Tzakol for reasons given above.

The hypothesis which best fits this series of probabilities is that Incised Dichrome, with its associated Flaky Redwares, fits between the Late Formative ceramics and the Regional polychromes in the Yucatán chronologic sequence. Since both the latter Yucatecan wares can be placed in the central Maya sequence, the position of Flaky Dichrome, if located between them, is secure. These sequences will then run:

<u>Yucatan</u>	<u>Uaxactún (Peten)</u>
Regional Polychrome	Tzakol I phase
Regional Flaky Dichrome	Disjunction
Formative Flaky Redware	Chicanel phase
Late Formative Monochrome	

Since the Tzakol phase at Uaxactún has been estimated as having begun at about 8.12.0.0.0 (A. L. Smith, 1950, p. 86), somewhat earlier than the earliest Maya stela date, it follows that the Yucatán Flaky Dichrome antedates in its entirety the central Maya Classic stage which is conventionally considered to have begun with the earliest dates. I have begun the Yucatán Regional stage early enough to include Flaky Dichrome and its associated wares (Yaxuna II) because I feel that there is a sharper stylistic break before than after this phase, and major time divisions are easier to use if sharp typological distinctions are available for their recognition.

The implications of the reconstruction attempted here are wide. I have summarized elsewhere (Brainard, 1948a) the evidence that Incised Dichrome decorated potteries are widespread in nuclear America, and seem characteristically to constitute a transition between earlier monochromes and later polychromes, which in several regions consist of broad line designs outlined by narrow black or white painted lines which seem to have been substituted for the earlier incised

outlinings. Realizing that evidence for the development of the first polychromes is lacking in the central Maya area, Thompson, with his usual clear sense of problem, surveyed the evidence for their place of origin and, on the basis of information then available, eliminated Yucatán, an area striking in its lack of polychrome pottery (Thompson, 1939, pp. 239-243). The new evidence discussed above demonstrates that our sampling of Yucatán ceramics, as well as of Petén ceramics of these time spans, is still so light as to give little grounds even for intelligent speculation on polychrome origins, save to suggest that they were not limited to a single area.

THE PUUC SITES

In the years 1932-1936 Henry B. Roberts and H. E. D. Pollock collaborated in a series of field trips, a combined architectural and ceramic survey of Yucatán.²⁰ During these field trips, ceramic collections were excavated in the Puuc region sites of Sabacché, Muluch Seca, Labna, Huntichmul, Sayil, Kabah, and Uxmal.

Of these seven sites, four produced sizeable collections of vessel rims; Roberts did not save body sherds from his excavations. The following data from these sites have been drawn from Roberts' notes and checked against the author's later tabulations when possible. All are believed essentially correct; an asterisk following the number indicates that it was obtained by approximation from incomplete notes.

Site	Trenches	Total Sherds	Rims	Rim Frequency
Kabah	21	48,466	2,670	.0551
Labna	34	29,060	2,680*	.0922
Sayil	29	55,000*	4,179	.0721
Uxmal	24	53,500*	7,518	.1405
Total Puuc		186,026	17,047	

Three of these four collections of rim sherds were found virtually complete in storage; of the Labna collection, only 349 certainly labeled sherds were found. Although the Uxmal rim collection was found to be apparently complete in bags as collected, only about two-thirds of the bags were labeled. The unlabeled lots of sherds have been treated as separate collections, exact provenience unknown, and analyzed with the rest. The locations of pottery trenches in the four sites have been plotted from Roberts' notes, with reasonable accuracy I believe, on maps redrawn from published sources (see maps 14-17), and from the thus far unpublished Carnegie Institution Yucatán architectural survey.

The Puuc site collections, in comparison with Yucatán sites of other regions, are characterized by a remarkable homogeneity. No more than a few dozen sherds from the total of several thousand rims belong to wares not of the Fluorescent assemblage.²¹ No other site of the nine from other regions which are sampled and reported upon in this volume presents a situation approaching this; all the other sites show at least two well-represented phases marked by separate categories of wares. It may be remarked here that although the architecture of the Puuc sites has not yet been published, it is believed to show a picture of comparable homogeneity.

Two possible causes for this situation present themselves: either the occupation of the Puuc sites covers only a relatively short time span, or the occupation has been characterized by a very conserva-

tive ceramic industry (and probably also by an equally conservative architectural style) during its occupation. Until 1949, when sites in the Chenes and Río Bec areas were sampled, I had suspected that the total occupation of the Puuc sites postdated the major occupation of such sites as Yaxuna, Dzibilchaltún, and Acanché, where wares of the Regional assemblages occurred in quantity with admixture of Florentine assemblage slatewares. Although a close statistical analysis of the Puuc area pottery assemblages will not be presented here,²² it should be stated that it seems likely that the slatewares which characterize the Florentine stage, as characterized from the pottery assemblage of the Puuc sites, originated at a time during which Regional monochromes were still the preponderant wares in other parts of Yucatán. The Regional and Florentine ceramic assemblages probably represent chronologically overlapping, localized developments, rather than a purely chronological sequence. In fact, it is not certain from the analysis to date that Florentine wares did not directly follow Formative wares in the Chenes and Río Bec areas, although it seems certain that the slatewares of the Florentine stage displaced Regional wares throughout all of Yucatán well before the beginning of the Mexican stage.

The estimated dating of the Puuc pottery collections treated here is discussed elsewhere in the report; there is no good evidence so far for beginnings earlier than 9.14.0.0.0 for the major occupation of any of them, nor for occupation as late as the Mexican stage in any. These four sites then seem to document a period ranging from a time within the range 700 A.D. to 1000 A.D. according to the 11.16.0.0.0 Maya-Christian calendar correlation. Data on other sites of the Puuc area do not lengthen this time range.²³ The tremendous size, concentration, and architectural elaboration of the sites, coupled with a relatively short time span, attest a large human population and a remarkable degree of social organization, as well as high levels of craftsmanship. The documented development of such a cultural peak in a short time in an area which was but lightly inhabited both earlier and later presents an archaeological problem of unusual interest.

The ceramics.—The unusual uniformity of Puuc ceramics through time has been remarked upon. Statistical studies, as yet incomplete, have suggested that minor chronological subdivision of the collections is feasible. Its elements are described and illustrated in various sections of the report; I shall here characterize it as a whole.

The crudest pottery is unslipped ware, consisting in the main of large, nearly spherical, round-bottomed jars of a capacity averaging about 6 gallons. Exterior surface of these jars is combed or striated, rims are usually thickened and elaborated, and of exceedingly even circular conformation. Minor unslipped shapes include hourglass incensarios, incense ladles, and rare bowls. The tradition for pottery of this general kind seems to extend to modern times from Formative stage beginnings.

Slateware is the predominant type of pottery. This ware is characteristically slipped with a tightly adherent clay of faintly glossy, soapy, translucent appearance. The paste ranges from an off-white to a medium brown in color, occasionally ranging to dark gray; the slip corresponds closely with paste color, presumably because of translucence. This slip is commonly decorated by paint which seems to have been applied as a somewhat viscous liquid by a crude, broad implement. This paint never shows relief and usually does not change the surface luster of the slip. Its color varies widely, usually on single vessels, and

notably between edges and centers of lines. Color sometimes fades to invisibility from the center of the line; sometimes a sharp, strongly colored outline surrounds a pale center; occasionally "clotted" or reticulated areas of color appear as though the slip had been stained during firing by a paint which had previously crazed from shrinkage during drying or heating. The color range of the paint is that of the slip itself, ranging from black to a pale gray or tan. Contrasts between slip and paint color, although most commonly between a lighter slip and darker paint, are occasionally reversed to lighter painted areas on a darker slip. This color reversal is sometimes apparent on parts of a single vessel and sometimes appears even in a single paint stroke, which as a result may appear dark, fading to a light edge on slip of medium tone.

Variability within this range in paint color seems characteristic of many ceramics in North and Middle America, and may be suspected to be a characteristic of organic paints—paints made of organic extracts—which, when painted on clays of certain characteristics, are carbonized in firing.²⁴ Depending on the atmospheric conditions during the heating periods, these paints may show carbon black against a light clay color, may fade to invisibility, or may act as a resist to leave a lighter slip color in the painted area to contrast with a carbon-darkened background of unpainted slip. This last condition, not uncommon in the Southwest,²⁵ has been called *resist smudged* by Mera (1945).

No evidence was discovered suggesting regional and time differences in the paint of Puuc slatewares. However, the paste, and perhaps the slip, do show such differences, while form and design also vary widely. These variations among the attributes of Puuc slateware seem to have no simply ordered interrelationship, and thus have hampered its division into consistent subtypes.

Thin Slateware, the only slateware of the Puuc area which has been separately designated, has been sorted using vessel shape as the primary criterion. Two shapes, the beaker and the hemispheroid bowl with taper or bead lip, are diagnostics (see fig. 50). Pottery of these shapes in the Puuc area characteristically can be distinguished from Medium Slateware by the following additional attributes. It is thin-walled (under 5 mm. thickness); the slip is light gray in color; the paste, which corresponds in color, is usually tempered with fine crystalline calcite. Variants show darker slip and paste colors, often with other temper types; hemispheroid, taper-lip bowls may be heavily walled. In Medium Slateware, light gray paste and slip color and fine crystalline calcite temper (Thin Slateware characteristics) appear in some collections on basal break bowls. These variants are definitely localized to certain sites. Basal break bowl variants of Thin Slateware, for example, are particularly common at Uxmal, taper-lip hemispheroid bowl variants are commonest in the Chenes sites. Thus Medium and Thin Slatewares, here defined primarily by form, intergrade to a variable degree in slip and paste at the sites.

The redware of the Puuc sites occurs in lower frequencies than does slateware. The slate and redwares have in common the closeness of color between slip and underlying paste, and the soapy, tightly adherent, translucent appearance of the slip. The redware is seldom painted, and the paint is nearly invisible on the few sherds showing it. Jar forms are completely missing in redware, and basins are extremely rare. Other forms are identical to those in slateware, and show the same correlations between wall thickness and vessel shape as those mentioned above for slate-

ware. It seems reasonable to consider the redware of the Puuc sites as a color variant of the concurrent slateware, used most commonly for the smaller, finer vessels, less well suited to painted decoration and owing its color to a difference in the composition of the paste, possibly enhanced by a difference in firing procedure. Supporting this theory is the fact that the thin-walled redware vessels do not show the nearly exclusive use of calcite temper characteristic of their light-gray-colored slateware counterparts. Much of the Thin Redware is tempered with volcanic ash.

The remaining pottery of the Puuc collection can with reasonable certainty be called tradeware. Z Fine Orange (Brainerd, 1941) predominates in this group. Pottery from the Petén (central Maya) area is very rare, but suggestions of trade from the Motagua valley and from the Campeche-Chiapas area to the west are present (see figs. 9, 60). The rarity of tradeware and of recognizable foreign traits may reflect the leading cultural position of the Puuc during its time period, at least in the Maya area; the distribution of trade-wares may reflect the distribution of important Maya centers during the time horizon of the Puuc sites.²⁶

The place of pottery in this, the final flowering of indigenous Maya civilization, is important in the assessment of the culture. The pottery is of excellent technical quality, hard, smooth, serviceable, and nearly free of flaws. It is markedly uniform and unvaried by odd shapes and designs. Such ornamentation as does occur is limited to surface treatments other than polychrome painting; the pottery is starkly simple in comparison with the notable architectural elaboration of the ruins in which it is found. Evidence that time-saving mechanical devices were used in the production of this pottery is discussed elsewhere. The conservatism in the pottery craft of the Puuc area, as well as the lack of regional variation in the pottery of Yucatán during this period, have increased the difficulties in ceramic documentation. They argue for a stable, long-continuing social niche for the potter, as well as for his minor status in the society; only thus can we explain such conservative competence in a period of architectural brilliance. Pottery making in the Florentine stage in Yucatán was indeed a minor art in contrast to its position in the polychrome-making phases of the Maya culture of the central area. But the technical competence of the Puuc potters in general exceeded those of the central area, whose wares are soft, with a tendency toward spalling and weathering off of the slip. The position of pottery among the arts and crafts of the Maya may be compared to that which it held among the early cultures of Egypt, Mesopotamia, and the Indus, where the elaborate decoration characteristic of the pottery of the Neolithic and Chalcolithic periods was superseded in favor of utility and speed of production as men became organized into theocratically governed larger aggregates. The potter's craft, here as there, is characterized by well-made but somewhat uninspired products.²⁷

There can be but little question that the Puuc potters were at least parttime specialists. This situation is generally true in modern Mesoamerican groups. The men may well have made the vessels; in modern Yucatán only men work at the craft in some towns, both sexes in others. The variability in ware and temper in each of the Puuc sites suggests that there were various manufacturing centers and considerable trade. This situation exists now in Yucatán and includes trade in materials, as for example between Maxcanú and Ticul. If materials are, as seems reasonable, the best clue to manufacturing centers, the widely varying proportions of various tempering materials at dif-

ferent Puuc sites suggests considerable trade. The general distribution of the varieties of shape and decoration among all temper types suggests that forms and decorations were extensively copied by craftsmen in the various centers.

The uses to which the various types of vessels were put can in some cases be intelligently guessed. The striated jars disappeared before the Colonial period and direct knowledge of their use disappeared with them, although their use for cooking is made quite certain by comparisons of their shape and finish with other American pottery used for this purpose. Modern unslipped ware is used for cooking, and has been since Colonial times, but it does not bear exterior striations and is never in the form of jars. Striated jars do not characteristically have sooty bottoms when found, but neither do other vessel forms; carbon must have largely disappeared from the deposits through time, or charcoal fires may have been used then as now. The uses of unslipped incensarios and incense dippers are well understood from Maya representational art, Colonial descriptions, and modern Lacandon survivals.

Slateware jars in the main form two types, a large vessel probably slung on the back, and a much smaller type (see fig. 32). The large jar must have been used for carrying water on the back for a distance; the smaller type, from the high proportion of sherds found in chultunes as well as from size and form, must have been used for drawing water from these cisterns. Although the lack of jar body sherds from Puuc ruins makes the exact proportions of the two types hard to determine, the Puuc collections definitely have higher proportions of the small jar than do the Chenes sites or sites of this general horizon in northern Yucatán. The finding of occasional pottery lids for the small jars, as well as of jar rims with interior ledges and tie holes (see fig. 40, d, 22, 23, 64; e, 19, 30), suggests the additional use of this vessel form for transporting goods, for example, the honey and wax for which this area is still famous as it was at the Conquest (see Tozzer, 1941, index under exports).

The basins would seem well suited for receiving and carrying maadz, the wet-ground corn meal which is the modern Maya staple. The vessel most commonly used at present is an enameled washbasin. Absence of clay griddles (comales) in this and all other horizons in Yucatán argues against the baking of tortillas, as does the fact that Landa does not mention them (see Tozzer, 1941, pp. 89-91 for preparation of corn in Yucatán). Basins may also have been used for the storage of maize and other foods in the house.

Two types of bowls, basal break and hemispheroid, are distinct through the period. The hemispheroid bowl would make a satisfactory drinking cup, and may have been thus used. The hemispheroid gourd cup now used dates at least from Landa's time (Tozzer, 1941, pp. 196-197), and evidence of such vessels has come from the Sacred Cenote at Chichén Itzá (see Ekholm, 1942, p. 91 for similar vessels from Guasave, Sinaloa). Both gourds and hemispheroid pottery bowls are now used in Yucatán for drinking. Basal break bowls of varying proportion and decoration have a long history and wide distribution in the Maya area (figs. 107, 108). They are the commonest type of vessel shown in Maya art for sacrifices as well as for utilitarian purposes. They have also been found holding human bones in subfloor deposits of Maya ruins in Yucatán, and were sometimes used as covers for cached jars. They most probably were used as service plates for solid foods, and perhaps for offerings as well.

Thin Slateware, Thin Redware, and Fine Orange

vessels occur as small hemispheroid bowls and beaters, some of which reach vase height. The marked fluctuations in frequency of these wares in the deposits suggests a specialized use, or at least that they were used predominantly only by certain members of the population. They may have been used as cups; their finish and delicacy suggests a luxury or ceremonial ware. The very occasional manufacture of redware basal break bowls and small basins, as well as the fact that these forms also occur with the paste finish and color of Thin Slateware, suggests that no hard and fast line was drawn in the employment of the finer clays and slips.

Statistical work as yet incomplete shows a gradual increase of smaller, finer vessel forms, as well as of finer wares, during the occupation of Kabah, and similar indications are given by other sites (see Brainerd, 1951, fig. 92). There is an increase in basal break slateware bowls, and in Thin Redware and Thin Slateware, at the expense of unslipped ware, slateware jars, and slateware basins. The meaning of this trend can be sought most fruitfully in a gradual social specialization in the sites, which may mirror an increasing wealth and number of priestly occupants of the religious centers. It seems dubious that these ceramics mirror a gradual change in the economy or food-preparing habits of the people. It would seem certain, however, that this pottery sequence cannot be interpreted as showing a decline in the wealth of the culture; the Puuc sites seem to have been abandoned at the height of their development.

Settlement pattern.—The intensive short-term development of the Puuc region, and the marked contrast between its former intensive occupation and its present nearly unpopulated condition, prompt an attempt to determine the causes of such a striking phenomenon.

The Puuc region is sharply marked off physiographically from the areas to the north and to the west of it. The hills which characterize the area rise abruptly from the level northern Yucatán plain.²⁸ The water table is far enough below surface to preclude the success of aboriginal well digging, cenotes are absent, and water-bearing caves are rare and difficult of use because of their depth. The scarcity of water during the six-month dry season is mirrored in the modern population pattern of Yucatán. The Puuc is lightly settled and contains no large villages; although considerable milpa farming and bee raising is carried on in the Puuc, most of this work is seasonal in character and performed by people who live to the north.

The agricultural possibilities of the area are good. Soil is generally deeper than on the northern plain, and rainfall during the growing season is considerably greater than that of the more heavily populated area to the north. The present light population of the Puuc area thus may be laid to the inability of the present inhabitants to obtain during the dry season even the relatively small amount of drinking water to sustain Maya farmers; domestic animals are neither numerous nor essential to the Maya milpero.²⁹

The Puuc sites could not have been built without large groups of laborers. These laborers must have been conscripted by a group or groups of men in authority, who, from the nature of the buildings and from our knowledge of Mesoamerican religion, are likely to have been priests who gained their power through the assumed control of agriculture by the round of Maya religious ritual. There is archaeological evidence at the Puuc sites and elsewhere during the pre-Mexican stages in Yucatán to support Thompson's thesis that Maya sites were not urban centers (Thompson, 1945, p. 15). Although a certain number of small

building groups which were probably of a residential nature are found at and near the sites, it seems likely that the bulk of the Maya population lived scattered and near their milpas, gathering at the ceremonial centers for labor and for religious and political observances.

The only known source of water in the Puuc area during the dry season is from the cisterns or chultunes which profusely dot the sites.³⁰ Nearly all the buildings of the Puuc ruins face upon leveled plazas which were paved with carefully laid lime-mortar floors, and seldom if ever does such a plaza floor in a Puuc ruin not drain into the mouth of one or several cisterns. The cisterns, many of large size, are bottle-shaped excavations into the soft native limestone or into the plaza fills, lined with mortar and often capped at the mouth with a cut stone slab. If building in the Puuc sites, with its requirements for plentiful water, was at least partially restricted to the rainy season, it seems easily possible that the chultunes would provide sufficient water for the priestly residents as well as for the constant pilgrims to the ruins.

In addition to the chultunes which occur so extensively below the ceremonial plazas, there are evidences of smaller, probably domestic, architectural assemblages throughout the Puuc area, each consisting of building foundations bordering a plaster-floored terrace which drains into one or more chultunes. The description and data on distribution of these chultun platforms must await Pollock's full account of Puuc architecture. It may be said, however, from Roberts' notes, as well as from reconnaissance by the writer in the area immediately north of the Puuc range, that chultunes and platforms are by no means confined to the near vicinity of the ceremonial groups; the settlement pattern does not seem to be one of urban, or even village, concentration. In regard to water storage in the Puuc area, Pollock should be quoted (1935, p. 125):

Reviewing the results of the survey up to the present time, it is felt that certain facts dealing with the environment of the Puuc region, or more precisely the effect of the environment upon the ancient culture, are beginning to be understood. It is, for example, interesting to note that a region which probably harbors more known remains than any other area in Yucatán appears to be the most fertile agricultural region in the peninsula; also that due to the almost complete absence of natural water supply, the inhabitants resorted to the artificial storage of rain water in underground cisterns, known as chultunes, and that great numbers of specialized, platform-like structures were built for this purpose.

If our data are correct in general outline, it may be said that the exploitation of the rich agricultural area of the Puuc by the Maya farmer is limited only by the necessity of obtaining water for human (not agricultural) use. During the wet season this problem is solved by the presence of frequent rain which fills local pools or aguadas. The Maya who lived at the Puuc ruins solved the problem of water for the dry season by digging chultunes, and this custom seems to have been limited quite closely in the northern Yucatán peninsula to peoples of the Puuc area and to those of the related and contiguous Chenes culture to the south. A group of computations and estimates have been made in an effort to determine the limitations on size and structuring of population imposed by the chultun system of water storage. Several factors are known, or may be estimated.

Roberts' observation of 2 gallons per day for a Maya family may perhaps be taken as minimal. During the 1949 field season at Xtampak, we hauled water for cooking, drinking, and bathing 6 men at hard labor in hot weather. A 50-gallon drum lasted about 5 days; this averages 1.7 gallons per man-day.

I compute the capacity of chultunes at Labna in the Puuc area at an average of 7,500 gallons each. E. H. Thompson (1897) gives plans and elevations of 30 chultunes. These chultunes are quite regularly hemispherical with flat bottoms. Thompson's drawings were scaled and volumes estimated by the following formula: (average radius in feet)² x height x 3.1416 x 2/3 = volume in cubic feet x 7.47 gallons = capacity in gallons. Judged by what chultunes I have seen, the Labna examples are typical. The chultunes show a surprising regularity in size and shape. Although this regularity may be the result of such physical factors as ease of excavation, repair, and cleaning, it is also possible that it may furnish a clue to the size of the household group.

The collecting surface necessary to fill the average chultun during a year of average rainfall is estimated at approximately 40 square yards. Annual rainfall at Tekax, Yucatán, is 1001 millimeters and at Halacho, 988 millimeters; both of these figures are a 7-year average (*Encyclopedia Yucatánense*, vol. 1). These weather stations are respectively on the east and west borders of the Puuc. One cubic meter holds 264 gallons; assuming 1000 millimeters of rain per year, 28 square meters of drainage will fill an average chultun. Forty square yards allows a generous percentage for losses including evaporation, which at times must be high on a warm paved surface after a short tropical shower. The rainfall divides sharply into a 6-month season, May through October, with high monthly averages, and a 6-month season with rain for every month less than half of monthly average for the year. If the collecting surface for the chultun were enlarged 50 per cent to 60 square yards (540 square feet), it should be full at the end of the rainy season despite constant use through that period, and thus would be available in entirety for the dry season of about 190 days.

The area included within the plazas and building roofs of the three largest complexes at Uxmal, the Governor's, the Monjas, and the Palomas group, totals about 580,000 square feet, or enough collecting surface to fill more than a thousand average chultunes. It is quite certain that not all of the collecting surface was utilized; to do so would have necessitated a subterranean chultun floor area of more than one-quarter the area of the overlying collecting surface, and there is no evidence that chultunes were this closely spaced.³¹

A single 7,500 gallon chultun, if full at the end of the rainy season (beginning of November), would provide 39.50 gallons per day during a 190-day dry season, assuming no increment of water from rains. To this quantity would be added an average of 2,400 gallons from the dry season rains off a 60 square yard drainage area, adding an average of 12.6 gallons per day. Thus 50 gallons per day per chultun is a reasonable yield figure. This means that a maximum of 25 families might be kept in minimal drinking and cooking water from a single average chultun. Since requirements of 2 gallons a day per family are minimal, and average rather than minimal rainfall figures have been used in computing water supply, an estimate of ten families, or 50 people, per chultun would seem more realistic. The chultunes are thus of a size which would make them sufficient for an "extended family" when found in isolated habitation ruins.³²

E. H. Thompson describes 30 chultunes from Lab-

na, several of which were found with stone covers cemented in place. It seems probable that at least 30 more chultunes remained undiscovered at Labna; chultun mouths are not normally noticeable in the bush unless approached to within 10 or 15 feet, and if covered are found only by meticulous clearing. Sixty chultunes would give water for 3,000 permanent inhabitants if the above estimate for a single chultun is acceptable. It is our theory that full habitation of the Puuc religious centers was only occasional. It seems obvious that a religious center of the Puuc area with functioning chultunes would not need to fear water shortage. It is quite possible that even such water-using occupations as the laying of mortar masonry and the making of pottery might be engaged in with moderation during the dry season. The drinking water supply of isolated family groups of farmers should provide even less difficulty. A single chultun per group would be adequate. The building of cisterns in modern times in this and other areas might again redistribute and allow a great increase in the population of the Yucatán Peninsula. There have been few changes in the farmers' mode of life; archaeological evidence may still be serviceable here.

The whole problem of agriculture in the Puuc area is worth investigation. Unlike conditions farther to the south, the sites are not uniformly restricted to raised land surfaces. The landscape, in turn, does not show the vegetation division into hill and bajo characteristic of the Petén and as far north as parts of the Chenes. A careful study of modern agriculture in the area might provide clues to ancient land utilization.

Chultunes were not found at the ruins sampled in the northern Yucatán plain with the exception of those along the northern base of the Puuc range, at Ticul, Dzán, and Maní. The Maní chultunes were not necessary because of the plentiful local water sources available within a few hundred yards of them. They seem to have been all of Florentine date on evidence of their ceramic contents. The presence of chultunes at Maní thus may be with some reason considered an indication of cultural rather than physical requirements. Chultunes were found to be very numerous at Santa Rosa Xtampak in the Chenes region, whereas at nearby Dzibilnocac, where the water table is accessible save in very dry years, they are replaced by wells which were excavated in a manner very similar to the procedure for chultunes.

This marshalling of data suggests that the concentrated population demonstrated by the Puuc ceremonial centers was made possible by the digging of chultunes. In Yucatán, this custom seems to have been restricted to the Florentine stage and, although a bit less closely, to the Puuc area.

The two large known Mexican-stage sites of Chichén Itzá and Mayapan are located in areas conspicuous for their concentrations of water-bearing cenotes, and do not contain chultunes associated with their Mexican-stage assemblages. This suggests that the custom of chultun digging had been dropped at the beginning of the Mexican stage. If Thompson's hypothesis (1943) of the Mexican Toltec introduction of the urban pattern is sound, it is possible that this innovation of the Early Mexican substage was coupled with the moving of populations into concentrated settlements near cenotes on the northern Yucatán plain, quite possibly in order to make political control easier. Whatever the causes, the art of chultun digging, so valuable to survival in the Puuc region, was lost and has never been regained.

Dating of the occupations.—The homogeneity of the

collections from the Puuc sites has already been emphasized. There is no evidence in these sites for qualitative changes in the predominant wares; Medium Slateware, Thin Slateware, and Medium and Thin Redwares form the bulk of all collections. Z Fine Orange ware forms a small but constant constituent of the samples, while the Fine Grayware and distinctive fine orangewares of the earlier horizon at Dzibilchaltun, as well as the X Fine Orange and plumbate of the Early Mexican substage at Chichén Itzá, are all either completely absent or very scarce and sporadic in Puuc collections. The early Oxkintok assemblage is also absent from these sites, as is all evidence of trade-wares from the Island of Jaina. Petén tradewares, as well as close similarities to Petén shapes and decoration, are also rare.

These evidences, although negative, seem well-enough documented to provide dating limits for the beginning of the major Puuc occupation as certainly following that of Early Oxkintok (date 9.2.0.0.0), and in the main following that of Jaina (date 9.11.0.0.0). It possibly overlapped, but at its height followed that of Dzibilchaltun, which in turn shows, through the intermediate link of Acanceh, a stylistic sequence stemming from Early Oxkintok. In turn Acanceh, as well as Early Oxkintok, shows links with Yaxuna and Cobá Group B, which bear tradewares and close form and decorative similarities to the Uaxactún and San José sequences. This mass of interrelated finds, impossible to assess at present with any show of objective judgment but nevertheless impressive to the author, argues that the bulk of the Puuc site occupation follows 9.14.0.0.0, as stated earlier in this chapter. The end date of the period of major occupation of the Puuc sites is fixed at Chichén Itzá by Toltec ceramic and architectural innovations, which are discussed later in detail.

The ceramics characteristic of the postconstructional deposits in the so-called Mexican period buildings at Chichén Itzá uniformly show marked admixtures of, and stylistic influence from, X Fine Orange pottery, which is indubitably associated with plumbate ware; neither of these wares, nor influence from them, shows in the Puuc collections. Also, the presence of cache vessels exclusively of Florentine age in the Caracol substructures, and concentration of Florentine pottery in excavated collections from "Maya style" buildings definitely link these two strikingly different ceramic assemblages to the two equally distinctive architectural styles. Although no certain stratigraphic evidence for the sequence from Florentine to early Mexican ceramics is yet available, architectural stratigraphy is definite between the two styles in the Caracol and Monjas complexes at Chichén Itzá, and is accompanied by documenting ceramics. In addition, the stylistic and stratigraphic sequences both in architecture and ceramics between the Early Mexican and later Mexican substages are certain, and thus fix Early Mexican as a connected part of a chronological sequence.

The evidence for the dating in Maya calendrics of the beginning of the Puuc occupation, and the evidence for its preceding the Early Mexican substage, are summarized above and detailed at other points in the text. The dating of the start of the Early Mexican substage in the Christian calendar is estimated as during the tenth century A.D. If the period lengths here detailed at the latter end of the chronological sequence be held, the estimation of the length of the major Puuc occupation is dependent on the Maya-Christian correlation. The 11.16.0.0.0 correlation has been chosen as the most likely; it leaves a time span of somewhat less than three centuries for the Florentine-stage developments of the Puuc area. This may seem a

short time for the building and use of one of the most spectacular regions in New World archaeology. Since there seems to be evidence from material collected in the Chenes-Río Bec region in 1949 for considerable antecedents to the cultural developments shown by the Puuc sites, perhaps this time period is not too short. If accepted, the 12.9.0.0.0 correlation would add 256 years to this span (see chart 21).

Regional and chronological relationships.—The regional variations among the ceramics of the Puuc sites are potentially of considerable interest. On detailed analysis, the collections from the four sites reveal definite quantitative distinctions in ware frequencies, and more marked quantitative distinctions in such details as vessel forms, rim details, and such ware distinctions as slip and temper. They also show that variation among the sites in kinds of temper and slip are correlated with minor variations in vessel form. Statistical seriations as yet not completely studied suggest that much of this variation among collections is chronological, but that there is a considerable residuum which is likely to be regional. My impression, as yet unverified objectively, is that the Puuc pottery collections consist of the ceramic products of several communities, each with its own sources of materials and with its own specialties in wares and shapes. If this assumption is correct, the utilitarian ceramics of these sites must have been freely traded, the users of each ritual center relying upon the other groups for specific items in their normal household repertory of pottery vessels. This sort of interrelation is normal in the folk culture of various Mesoamerican and other areas at present, and it seems reasonable to assume it for the Puuc area in the past.

The study of ceramic trade relationships within the Puuc and with the neighboring areas would require technological studies, correlated with precise studies on the minor form variations in the local pottery. More extensive excavated collections than are now available would be needed. An unusually detailed reconstruction could emerge from the correlation of such ceramic studies with the rich mass of architectural data from this region. There is perhaps nowhere else in the Americas where the archaeological data on such an advanced and integrated region is as well preserved as in the Puuc.

The archaeological chronology within the time period of the Puuc sites is as yet unknown, save for certain clues in architectural superposition and others gained in my still incompletely studied statistical seriations. At Uxmal, two buildings which Pollock believes show Chenes area architectural features were partly incorporated within the west side of the platform of the Palace of the Governors and thus antedate it (Pollock, 1936, pp. 123-124). In 1947 Alberto Ruz excavated at one of those buildings, and has very kindly sent me photographs and drawings of a barrel-shaped fine orange vessel recovered with a slateware drum in a context which he believes represents a secondary burial excavated into the building platform (and thus presumably dates from the period of use of the building). Although it does not exactly match my sherd materials, this vessel seems closer to Dzibilchaltun Fine Orange than to Puuc Fine Orange in style of engraving and in vessel shape. If this attribution is correct, the evidence of placement of Chenes architectural style as earlier than Puuc is thereby strengthened. Further ceramic support for the placement of Puuc remains later than Chenes was given by the ceramic survey of Chenes sites in 1949. In general, the scanty and somewhat dubiously read Maya dates in the two areas also support this

ordering, but both the ceramic and epigraphic evidence are sufficiently complex to be to some degree suspect of circular reasoning. However, the evidence is strong for at least the partial contemporaneity of Puuc and Chenes styles of architecture at the several sites in each of the two areas where both styles occur.

The chronological relationships of the Puuc sites with neighboring areas are important in the reconstruction of Yucatán culture history. It is unfortunate that the evidence at hand is so equivocal. There is evidence, resting mainly on the vessel forms of the slateware repertory of Dzibilchaltún, Maní, Dzibtún, and of the Chenes sites, for a widespread slateware horizon antedating at least the major part of the occupation of the Puuc sites. This ceramic horizon is dated at least as early as 9.16.0.0.0 at Santa Rosa Xtampak (Brainerd, 1949). Among the tradewares of this horizon is Fine Grayware which comes in quantity from Dzibilchaltún and is represented by a whole vessel at Dzibtún; it occurs sparingly at Holactún and at Jaina but, surprisingly enough, does not occur at all in the large Santa Rosa Xtampak collections, and it is almost absent from the Puuc. Holactún Slateware, present in quantity at Uxmal and at Etzna, Campeche, and in smaller frequencies at the other Puuc sites, is also absent at Santa Rosa Xtampak, a situation even more puzzling than the sporadic distribution of Fine Grayware.

My present inclination is to place major occupations of Dzibilchaltún, Holactún, Santa Rosa Xtampak, probably Etzna, Acanceh, Maní, and the Dzibtún collections earlier than the Puuc fluorit, but contemporaneous with occupational beginnings of certain of the Puuc sites, and to support this hypothesis with the evidence of Chenes architectural influence on certain buildings in the Puuc. This chronological horizon, according to the stage nomenclature used here, is early Florescent in the Chenes, Puuc, Holactún, and Maní regions, and possibly at Chichén Itzá, where there are suggestions that it occurs. At Dzibilchaltún and Acanceh, the same horizon must be called Regional-Florescent. This placement is given further support by the lack of Z Fine Orange in the earlier horizon, and the dating of the horizon at 9.16.0.0.0 by Initial Series inscriptions at Santa Rosa Xtampak and at Holactún. To fit this hypothesis to various blanks in ware distributions mentioned in the last paragraph, it must further be assumed that trade in ceramics was sharply limited by political or ethnic boundaries, or that some wares and sites covered very short time spans. The most striking discrepancy to be explained is the lack of both Fine Grayware and Holactún Slateware in the large samples from Santa Rosa Xtampak. Since contemporaneous carved Maya dates come from the two sites and they are only about 70 kilometers apart, a trade barrier seems the easiest explanation. It should again be cautioned, however, that our information is incomplete, and reconstructions are consequently shaky.

HOLACTUN (XCALUMKIN)

The ruins of Holactún lie on the savannah of Xcalumkin in the State of Campeche, about midway on an east-west line between the main Puuc sites and the Island of Jaina off the Campeche west coast. The site has been characterized by Pollock (1935, p. 126; 1936, pp. 122-124) as showing architecture suggestive of a single period directly related to that of the Puuc area, and also to the site of Etzna on evidence of the single building then visible there. Built into a well-preserved building at Holactún is a Maya date of about 9.16.0.0.0.

Pollock was inclined at the time of his field work to group the Puuc area, Xcalumkin, and Etzna as belonging to an architectural complex distinct from either the Chenes or the Petén areas, and probably not derived from them.

Ruz (1945) has since added evidence of an earlier occupation at Etzna showing ceramic similarities to late Tzakol and early Tepeu at Uaxactún, and stucco-faced block-masonry buildings in general similar to buildings of corresponding date in the Petén and of the Regional stage in Yucatán. Inscriptions from Etzna range 9.12.0.0.0, 9.13.0.0.0, 9.15.0.0.0, 9.18.0.0.0, 9.19.0.0.0. Ruz suggests an additional date of 9.10.0.0.0 from the collapsed hieroglyphic stairway; under the stelae dating 9.11.0.0.0 and 9.12.0.0.0 were found polychrome ceramics corresponding to late Tzakol and early Tepeu. According to Ruz, the ceramics on the floors of plazas and rooms are typically Puuc, with many thickened, T-shaped basin rims of Holactún Slateware type. A few fragments of X Fine Orange were found superficially.

The Holactún ceramic collection here discussed was made by Roberts in 1935 during the Architectural-Ceramic Survey. He records (1935 Diary) that the flora of this area is quite distinct from that of the remainder of Yucatán, and is characterized by a sharp division into savannah areas which are covered heavily with grass and hill tops which are inclined to be wooded. All ruins are on the tops or slopes of eminences above the savannah. All modern milpas are likewise on the high areas, presumably because of difficulty in clearing grass, since the natives claim the savannah soil is richer. This settlement pattern shows suggestive similarities with that of the Petén, where the ceremonial centers and house mounds are found on hills, while the "bajos," which are not far different from the Holactún savannahs, were bare of occupation.³³ Small paved terraces occur on the hill-locks. According to Roberts, all these were drained into chultunes, or more commonly into caves or crevasses which thus seem to have been used as cisterns, as were the chultunes of the Puuc area. There are also two cenotes near the ruins; the larger of these, described by Maler (1902), does not show in map 18. Roberts reports that this cenote holds much water during and after the rainy season, and that the bottom was moist when he visited the cenote on April 20, 1935. The other cenote, although dry, showed thousands of potsherds about its brink, suggesting aboriginal use. It is not certain but seems likely that this cenote is the depression shown at trench 5, map 18. The trench 5 collections are rich in Formative pottery and a surface collection labeled simply Holactún, which may come partially or entirely from the bank of this cenote, contains 60 per cent of Formative pottery. A surprisingly large number of Formative sherds, about one-eighth of the total sample from the site, came from the clearing of the Initial Series Temple. This demonstrates that this plaza location was established in Formative times, as were so many others tested in Yucatán. The general distribution of Formative monochrome in all collections of any size, as well as its high frequency, suggests that Holactún must have seen a very large Formative occupation. A single chultun was excavated and yielded sherds of the later Puuc-like occupation.

The total pottery excavated at Holactún recorded by Roberts (record incomplete) was 22,152 sherds; rims were saved. The rims tabulated by the writer total 2,282. Several collections were lost before tabulation; the ratio of rims to total sherds on collections with both figures available is 0.1307.

The position of the Holactun collections in relation to those of surrounding areas is at present unclear, since it was the only site sampled in that area. The absence of a deep, stratified series of collections and also the fact that body sherds were discarded, have added to difficulties of analysis. Another series of excavations at Holactun or at another site of the area should be rewarding.

The Formative collections are unusually rich in variety of decoration and form, and do not match exactly any other Late Formative collections from the Peninsula. Unfortunately, the Formative collections from Yucatán have never been examined side by side. However, some comparisons can be made from notes. Closest resemblances are with the Yaxuna collections which, like these, are nearly free of trickle paint. Collections from Yaxuna trenches 29 and 30 on the sides of Group 8 are completely free of trickle paint. On the other hand, the Maní Formative Monochrome pottery characteristically shows this paint. Since the Middle Formative collections found in the Chenes in 1949 do not show trickle paint, and since this type of paint seems to have continued as a tradition to as late as the Middle Mexican substage, it may be logically hypothesized that trickle paint began to be used in the later part of the Late Formative substage. The Usulutan type of decoration (Lothrop, 1933, pp. 47-51) as represented by a fragment at Maní (fig. 31, c, 6) has elsewhere been placed late in the Formative or pre-Classic stage (Kidder, Jennings, and Shook, 1946, pp. 182, 242-245), and the more generally distributed trait of "negative painting" is placed in an equivalent phase by Wauchope (1950, pp. 233-234 and fig. 3). The "negative" character of trickle paint is evident in the Yucatán samples, adds support to its placement in Yucatán Late Formative, and suggests that the Holactun and Yaxuna collections may somewhat antedate other Late Formative collections.

A single fragment of a narrow jar mouth, quite similar to those of Early Formative Pattern Burnished Ware and identical with Middle Formative fragments found in the Chenes in 1949, came from the Holactun collections, and suggests again that the occupation there may have been earlier than that shown by the Maní Late Formative deposits. A further argument for dating the Holactun deposits earlier than the Maní Late Formative is the similarity of certain Maní Formative Monochrome bowl rims to Late Formative Flaky Redware rims (see caption, fig. 17). Although all of these comparisons seem promising for a Late Formative chronological subdivision, there must be reservations because of the wide geographic distribution of sites and the sparse sampling.

The Holactun Florescent stage deposits contain large quantities of Holactun Slateware. This ware constitutes between 30 and 65 per cent of all slipped wares in the sherd lots which are large enough to be reliable samples. This large percentage is not closely approached in any Puuc site. Uxmal contains 5 to 25 per cent, Kabah 0 to 7 per cent with definite evidence that it is early in the sequence there (see Brainerd, 1951, fig. 92), and Sayil 0 to 3 per cent, all counted with total slipped ware rims as the base. Further occurrences of this ware add little light. None was recognized at Dzibilchaltun, and two fragments come from thus far undateable strata in the Hacienda Cenote, Chichén Itzá. To my surprise, the 1949 Chenes excavations produced almost none. No Holactun Slateware was found in the Oxkintok collections, although certain of the Medium Slateware basin rim forms are quite close to those of Holactun Slateware (see caption, fig. 43). The exclusive or nearly exclusive use of sherd temper

in Holactun Slateware demonstrated by Miss Shephard's examination of these sherds, linked to its presence in Holactun Formative Monochromes and its concentration in pre-Classic horizons at San José (Thompson, 1939, fig. 99) and Uaxactún (R. E. Smith, 1940), adds more weight to the likelihood that Holactun Slateware may range somewhat earlier than do the Medium Slatewares of the Puuc. The absence of this ware at Dzibilchaltun and the Chenes sites, however, is not easy to fit to this hypothesis, particularly since we have collections from near inscriptions of nearly identical date at Holactun and Santa Rosa Xtampak. The Fine Grayware found at Holactun is paralleled quite closely by Fine Grayware at Dzibilchaltun, suggesting contemporaneity. This ware was certainly widely traded and has stylistic ties with the Usumacinta and with the Southeastern Maya area. The near absence of Fine Grayware in the Puuc suggests that Holactun and Dzibilchaltun are earlier.

The Jaina stratigraphic collections of several thousand sherds from the trenches excavated by Pavón Abreu in 1942 do not clarify this picture. Sr. Pavón was kind enough to allow me to examine these in the Campeche Museum in 1942. I did not record and tabulate the individual collections, but noted no marked stratigraphic changes in them. The Yucatán wares recognized were scarce, well under one per cent on rough estimate. They included one rim of Holactun Slateware and a half-dozen sherds of Florescent Medium Slateware, two of which, coming from a jar like that shown on fig. 32, a, were found at a bottom level (1 meter depth, trench III). In the same lot was noted a polychrome fragment showing near identity with a bowl from the Mérida Museum illustrated as fig. 30, b; polychrome fragments were rare in the collections. One shard of a Fine Grayware beaker was noted, and two sherds of X Type Fine Orange. Much of the local pottery was of a medium-textured, orange-colored paste; a few fragments of seemingly untempered orangeware were noted. I found no figurine fragments in these collections. Ruz, in analyzing these collections with comparative material from Campeche and elsewhere (1945, pp. 71-72), finds two main periods, the first similar to a period found by him at the city of Campeche, at Etzna, and at Oxkintok,³⁴ and characterized by painted pottery which he believes contemporaneous with late Tzakol and early Tepeu at Uaxactún. Ruz places the hand-modeled Jaina figurines in this period. His second period shows the disappearance of painted pottery, the presence of vases decorated with bands of hieroglyphics, slateware, and a type of fine orange ware not corresponding either to the Puuc or Chichén Itzá types. The mold-made Jaina figurines are placed by Ruz in this period. Following this, Ruz describes a poorly represented Mexican phase marked by fine orangeware similar to the Chichén Itzá type and by the common wares of Yucatán at this period.

Ruz' information on periods adds light to the picture and also poses problems. It looks as though slateware may occur in the horizon which Ruz equates with late Tzakol and early Tepeu as well as in the later deposits, although the deposits from Jaina are likely somewhat mixed and therefore unreliable for close chronology. The placement of the Jaina mold-made figurines in the Puuc period invites the question of why not a single fragment possibly attributable to such a figurine has come from documented Puuc collections. The Puuc figurine heads are of slateware paste and in a distinctive style which has similarities to figurines as far west as Cerro de Las Mesas. Figurines generally similar to the Jaina molded figurines,

both in style and in their fine-grained orange-colored paste, are also found as far west as Veracruz. The absence of Jaina pottery and figurines in our Chenes collections as well as in those from the Puuc suggests that surprisingly little trade, rather than a chronological difference, may cause this lack of ceramics common to Jaina and the Puuc area. The relative scarcity of ruins on the coastal plain inland from Jaina, as noted by Pollock (1940, p. 267), suggests that this lack of culture contact may be due directly to sparse population in the intervening area. The political situation during the Yucatán Regional stage must have been of a peculiar sort; the presence of monuments with the same elaborate calendrics at Jaina, Holactun, the Chenes, and to a lesser degree in the Puuc area argues for a common priesthood, but the peoples using pottery in these areas (the common folk) seem to have traded with each other in a peculiarly selective manner. We have evidence of considerable ceramic trade and influence between the Puuc and Chenes; among Holactun, the Puuc (particularly Uxmal), and Etzna; and between Jaina and the City of Campeche area. The distribution of Fine Grayware, which links Holactun, Dzibilchaltun, and Santa Rosa Xtampak, is a further factor to be considered in what is at present far from a clear situation.

It seems obvious that any reconstruction of the origins of the culture of northern Yucatán will not be on certain ground until the archaeology of the western coast and adjacent regions of Campeche and Tabasco is known. From the sporadic finds thus far recorded, it seems safe to assume that this was an important area from Formative times on. The early Oxkintok finds suggest influences of this area on the Puuc, and the Holactun-Etzna similarities suggest a later, isolated province which brought western influences to the Puuc region. The area is definitely in need of further work. The publication of Ruz' coastal reconnaissance (Ruz, n.d.) would add considerable detail to general knowledge of this area.

CHICHEN ITZA

The Carnegie Institution pottery collections of Chichén Itzá were accumulated over a long period and by many persons during excavations made under the direction of Dr. S. G. Morley. This report is in large part the result of their labor; I have made no excavations at Chichén Itzá. Beyond a brief report by Roberts on the pottery from the Casa Redonda (in Pollock, 1937, pp. 151-152), Roberts' brief progress reports in Carnegie Institution Yearbooks (Roberts, 1931, 1932; 1933, 1934, 1935), Vaillant's preliminary discussion in his doctoral thesis (Vaillant, 1927, pp. 335-367), and two short discussions of his excavations in the Initial Series group, no formal reports on the ceramics of Chichén Itzá are available. A few illustrations of whole pieces of pottery have been published in Carnegie Institution reports on the excavation of the various buildings, but no attempts at ceramic analysis were made in any of these.

Vaillant (1927), later confirmed by Roberts, noted the occurrence of three sequent ceramic periods: First is a Maya, or pre-Mexican, or Puuc period in which the ceramics show similarities to those from the Puuc area. Following this is a horizon which has variously been called a period of Mexican, Nahua, or Toltec influence, during which Isla de Sacrificios Fine Orange pottery and plumbate pottery were imported to Chichén Itzá and numerous other evidences of Mexican mainland influence are apparent in architecture,

sculpture, painting, and chronicled history. Finally, a period of Maya Resurgence was described during which Mexican influence was less strong, and the ceramics resemble the earlier Maya wares (Vaillant, 1927, 1933; Roberts, 1934).

The major slipped ware of the first two periods was called slateware by Vaillant, and that of the last period named red lacquer ware. Two of these periods, the Maya and the Mexican, agree in general with the stratigraphic and architectural periods defined for the site by Morley (Morley, 1931, pp. 106-107). The later Maya Resurgence period has not been recognized architecturally save perhaps in the Casa Redonda (Pollock, 1937, p. 152), which, however, from its ceramics should definitely be classified into Vaillant's Mexican period, and perhaps toward the close of the period.³⁵ Vaillant's ceramic evidence for a Maya resurgence seems to have rested on his belief that red lacquer ware is Maya in inspiration, but the hypothesis of a Maya resurgence probably rests more on documentary than upon archaeological evidence. Present ceramic evidence indicates little if any drop off in foreign influence during the later part of the Mexican stage.

As the result of a Carnegie Institution conference at Chichén Itzá in 1931, Morley (1931, p. 106) described four periods of occupation, supported by a combination of architectural, epigraphic, and documentary evidence. Period I was based upon the date of the Initial Series lintel with a long-count date of 10.2.10.0.0 which Morley believed to antedate the period of the Puuc ruins. According to the dating scheme used in this report, this lintel belongs in Morley's period II along with the architecture of the pre-Mexican period. Morley's periods II, III, and IV correspond with those used by Vaillant and Roberts.

Morley's period II belongs in my Florescent stage. My reanalysis of the Chichén Itzá ceramics has established an additional period characterized by a change in the major slipped ware, which allows a subdivision of the Toltec or Mexican period (Morley's III) into my Early and Middle Mexican substages, and Morley's IV (Vaillant's Maya Resurgence) chronologically fits my Late Mexican substage. Although there is a considerable amount of Vaillant's red lacquer ware in the Chichén Itzá collections and it predominates in the slipped ware of E. H. Thompson's cenote collection, there is at present no evidence that any of the buildings at Chichén Itzá were built during the red lacquer-ware horizon, and evidence of but little construction during my newly established Middle Mexican substage which preceded it. Thus we have a sequence of four major ceramic periods at Chichén Itzá, which I classify as (1) Florescent stage, (2) Early, (3) Middle, and (4) Late Mexican substages. Of these, architecture is known certainly only for the first two. This sequence places the close of the architectural period at Chichén Itzá early in the 13th century, if the Mayapan occupation (almost completely Late Mexican) can be assumed to have lasted 200 years. The Mexican-influenced occupation at Chichén Itzá saw the erection of a large number of massive buildings and a distinct change in the major slipped-pottery ware of the site. If the estimated length of the Mayapan occupation is taken as a yardstick, an admittedly dangerous procedure, the Mexican occupation may be estimated on archaeological grounds as beginning sometime during the 10th century.³⁶

The ceramic and architectural periods at Chichén Itzá are equated in the table on the following page for purposes of clarity in reading the account which follows.

<u>Architectural</u>	<u>Ceramic</u>
none	Late Mexican
none?	Middle Mexican
Mexican or Toltec (sometimes subdivided)	Early Mexican
Puuc or Maya	Florescent

It would seem that the abundant ceramic material from Chichén Itzá should furnish a legible, detailed, and accurate account of the culture history of the city. However, the widely varying methods of collecting samples and the secondary position to which ceramics were relegated during much of the excavation have complicated the task of their study. More serious has been the deterioration of labeling during the long period of time between my study and their excavation, and the fact that their initial study was interrupted in mid-career; Henry Roberts' ceramic analyses made from 1932 through 1935 were terminated by ill health. It was unfortunately necessary to begin them afresh rather than to continue where they were left off. In an effort to date certain of the buildings at Chichén Itzá, Roberts' tabulations have been used in cases where the collections have since disappeared.

The extensive and detailed architectural studies of the Carnegie Institution at Chichén Itzá are now nearly all published.³⁷ The following account relies to a major degree upon information contained in these reports. I have compiled maps from material which was unpublished, or published in less usable form, at the time of writing to aid in the understanding of the ceramics.

A close inspection and analysis of the collections, which included complete tabulation into some 200 ceramic types, and the graphing and sorting of the frequencies of wares and many vessel forms has thus far failed to produce a detailed sequence of ceramic development through the architectural construction periods of the site, although the major periods, as named above, are clearly shown by evidence from Chichén Itzá and elsewhere. A close sequence would unquestionably be of value if only to allow the checking of historical reconstructions based upon such criteria as stylistic variations in sculpture and painting. The history of Chichén Itzá through these times represents one of the most radical and best-documented archaeological examples of acculturation available. Its detailed study would be of great interest. A statistical seriational analysis of the ceramic tabulations, begun in 1949 under a University of California grant but postponed to allow the completion of this report, shows signs of giving at least parts of the desirable close ceramic sequence (see Brainerd, 1951). Time and funds permitting, it will be completed later. Further ceramic excavations would unquestionably yield important results. Some of the major lacks in ceramic sampling to date include the absence of the following: (a) demonstrably pure Florescent samples, (b) pure Middle Mexican substage samples, (c) subfloor (construction period) samples from certain structures, the dating of which is important.

In the descriptive section which follows, ceramic dating by period is discussed for various of the architectural groups. The architecture from which we have samples dates almost exclusively from Florescent and Early Mexican times. As may be seen from the ware descriptions, the primary determinants between the native ceramics of these two periods are shape and decoration. The distinctions in paste, slip, and temper are of only limited and secondary value. It has not been possible in sherd collections to separate completely the ceramics of the two periods, since the known stylistic determinants are recognizable only

on certain of the sherds. The stylistic criteria for the Early Mexican substage Chichén Itzá Medium Slateswares and Medium Redwares were selected from those not found on the same wares in the Puuc collections.

The validity of this procedure, the best available at the time of sorting in 1940 and 1942, depends upon the assumption that the traits selected as period determinants are actually such, rather than regional variants. This assumption has since been given support by the results of later excavation, but the Florescent collections from Chichén Itzá or immediate vicinity which would allow the final chronological proof are not yet available. Since 1942, two vessel types which were used as chronological determinants, the pedestal (see fig. 71, e-i), and the grater bowl (see fig. 74, h-j), have been found in pre-Mexican associations in the Chenes and Río Bec areas and are thereby disqualified as exclusively Mexican determinants. The major changes in local ceramics which we consider to be diagnostic and the changes in imported ceramics for these two periods are listed below to aid in the reading of the following text. They are detailed in the following section on ceramic description and summarized in the section on results.

<u>Florescent</u> (Puuc sites)	Early Mexican (Toltec Chichén Itzá)
<u>Medium Slateware:</u>	
Jars:	"Chultun jar" forms; perforated lug handles.
Basins:	Thick angled bolster rims.
Basal break bowls:	Sharp, thickened basal break; slab legs.
Rounded bowls:	Hemispheroid form, exterior faceted rim; ring base.
<u>Thin Slateware:</u>	
	Present in distinctive form repertory.
<u>Medium Redware:</u>	
	Forms like Florescent Medium Slateware.
<u>Fine Redware:</u>	
	Present in distinctive form repertory.
<u>Plumbate Ware</u> <u>(import):</u>	Absent.
<u>Fine Orangeware</u> <u>(import):</u>	Effigy (Tohil) Plumbate. Z (Puuc) Fine Orangeware. X (Chichén) Fine Orangeware.

Akab'dzib Cenote.—Five trenches were sunk by Henry Roberts in 1932 in the depression east of and about 50 meters behind the Akab'dzib (see map 19, 4D1). The Akab'dzib is classified architecturally as of Florescent date, and bears a lintel dated by Thompson (1937) at 10.2.1.0.0. I know of no Mexican-period architectural evidence from its vicinity. The trenches ranged in depth from 1 to 2 meters. Sherd yields were small (332 sherds total) and no stratigraphy was noted, with the possible exception of trench 1 which suggests Florescent-Mexican change, but samples are too small for certainty. Medium Slateware was prepon-

derant in the collections, and no Coarse Slateware or Coarse Redware occurred below the top levels. Two sherds of Z Fine Orange come from trench 2, b (fig. 89, e, i), but no X Fine Orange was found. Three sherds of plumbate occurred, all thin, weathered, and of dull brownish color. Thus the deposit is limited to Florentine and Early Mexican date by its local wares, with indications of both periods in its tradewares.

Analysis of the forms of the native wares places them as largely Florentine in date. One Puuc-style slateware thickened jar rim appeared; this is an exceedingly rare type at Chichén Itzá, as not more than a dozen came from the large Monjas collections. Of 64 slateware bowl rims, 57 were of typical Puuc form, with only 7 of Early Mexican style. Of 48 slateware basin rims, 32 were Puuc and 16 of Early Mexican form. 31 grater bowl fragments (Early Mexican) are included. Medium Redware vessel forms differ from the Puuc style as shown by the presence of 7 jar sherds; jars of this ware are very rare in the Puuc but common in the Early Mexican substage, where also appear rattle tripod and pedestal base vases which are absent in the Akab'dzib Cenote collections. Several sherds of the distinctively Florentine Thin Slateware are included.

These collections show less Early Mexican pottery than most other groups from Chichén Itzá, and thus have an interest out of proportion to their small size. The following hypotheses are suggested by their study, but unfortunately, due to the small size of the samples, are not proved. (1) Plumbate may have preceded the first importation of X Fine Orange at Chichén Itzá, and been contemporaneous with the later end of the Z Fine Orange period.³⁸ (2) Medium Slateware Basin forms may have changed earlier than did bowl forms (which hypothesis is borne out by the Monjas collections), and the grater bowl, one of the original sorting criteria for the Mexican stage, appeared at Chichén Itzá during Florentine times (also borne out to some degree in the Monjas collections, and by the presence of rare grater bowl fragments at Uxmal and in the Chenes and Río Bec collections).

Southwest Group (5B12-21).—A series of trenches was dug by Henry Roberts during 1933 in the Southwest Group, off the outer walls of terraces (see map 19, area 5B). Although some of these collections were misplaced before my study, and the labeling does not correspond with Roberts' field notes, the collections remaining seem intact and total 406 sherds. The discrepancies between labeling and field notes cast some doubt on the location from which the separate collections come, but I believe that they are all from the Southwest Group.

The collections are approximately uniform in ware percentages; the faulty labeling does not allow the investigation of stratigraphy. The preponderant slipped ware is Medium Slate. Accompanying the collection are seven sherds of X Fine Orange, three sherds of Z Fine Orange, and four sherds of plumbate. As in the Akab'dzib trenches, evidence points either toward the Florentine-Early Mexican transition or toward mixed deposits of the two horizons. No Coarse Slateware, and only two sherds of Coarse Redware occurred. Medium Redware sherds in Early Mexican forms occur, which forms are absent from the Akab'dzib Cenote collections. The proportions between Puuc and Mexican shapes in Medium Slateware also point to a later dating than that of the Akab'dzib Cenote trenches. There are 37 Mexican-stage basin rims to 17 Puuc, but 34 Mexican-stage bowl rims to only two Puuc. The body of the collection certainly dates later than those from the Akab'dzib, and the three Z Fine Orange

sherds should not be regarded too seriously in the face of the evidence of lateness in other criteria.

Small group just east of the Sculptured Jambs (5B4, 5?).—Two collections of 175 and 240 sherds labeled with this location were found, representing two levels of a single trench. Roberts' field notes further specify that the trench was dug on the north side of the platform near the northwest corner. The map of Chichén Itzá shows two groups meeting these specifications, one bearing buildings 4B 2 and 3 and 5B 3, the other bearing buildings 5B 4 and 5. The latter seems the more likely location as it is near the Temple of the Sculptured Jambs. These collections are very similar to those of the Southwest Group. One Z Fine Orange sherd was present. Medium Slateware and Redware are largely Early Mexican in form; there were 56 Mexican basin forms to 6 Puuc and 23 Mexican bowl forms to 5 Puuc. Middle and Late Mexican period pottery are completely lacking in these collections.

Caracol (3C15).—The Caracol at Chichén Itzá (map 20) was investigated and restored by the Carnegie Institution during the years 1925-1931 (Ruppert, 1935). From architectural criteria it is generally believed to date from the transitional period ushering in the so-called Mexican occupation of Chichén Itzá (Morley, 1931, p. 107; Pollock, 1936a, pp. 103-104).

The sherd collections from the Caracol total 6,523 sherds in 34 lots. Since the work at the Caracol was done with the investigation and reconstruction of its architecture as the prime aim, the deposits were excavated only where this aim would be served. The ceramics thus obtained consist almost entirely of fragments accumulated during occupation of the building and in debris left by later visitors. The great majority of the collections contain material characteristic of at least three of the periods which we have defined elsewhere from less mixed deposits.

No collections completely lack Coarse Redware, but none contain much Coarse Slateware. A group of collections of nearly unmixed Early Mexican material come from the area east of the Bench House, including its South Annex. The intentional razing of these buildings (Ruppert, 1935, p. 270) is thus dated as in the Early Mexican period.

Medium Slateware constitutes over half of the slipped ware in all collections analyzed, save for two general surface collections and two other collections coming from the south side of the West Annex. This fact limits the major occupation to Florentine and Early Mexican times.

Evidences of an earlier occupation include a few Formative and more early Regional Flaky Redware sherds. These come from the base of the Lower Platform Stairway and from the West Annex. Similar material comes from some of the Monjas excavations. Ruppert found occupational levels well below the ground surface in an exploratory trench at the base of the Lower Platform Stairway (Ruppert, 1935, fig. 60) and it is possible, though unproved, that the early sherds were deposited originally at those levels.

Fortunately for ceramic dating of the main structure of the Caracol, several vessels were found cached during its construction (see map 20 for locations). In the absence of sherds which definitely antedate parts of the construction, these pieces are of prime dating value. The vessels were as follows: Field catalogue numbers are given; page and illustration references in parentheses are to Ruppert, 1935.

25 cm. below the lower platform floor on north side of upper platform, a striated unslipped jar

and a Medium Slateware bowl (cat. nos. 1048, 1144; pp. 38, 42, figs. 46, 47), see fig. 67, a.

In cyst in lower platform at center of first circular upper platform, sealed in place by construction of this platform, an unslipped, striated jar (cat. no. 1035; p. 86, fig. 102, a), see fig. 68, e.

In upper rectangular platform 20 cm. below floor unslipped striated jar (cat. no. 1049; p. 119, fig. 144, a, b).

In upper rectangular platform, base 48 cm. under floor, unslipped striated jar (cat. no. 1103), Medium Slateware rounded bowl (cat. no. 1137; pp. 119, 120, figs. 145, 146), see fig. 74, f.

Between outer circular platform and masonry block dividing upper portion of stairway, associated with burials, "sherds of a plain incense burner of Porous Gray Ware" (cat. no. 1073; p. 123).

In a cyst within upper rectangular platform, unslipped striated jar (cat. no. 1194; pp. 124-126) containing a cremation burial.

Under the upper rectangular platform on floor of stylobate in occupational deposit "sherds of sub-Plumbate Ware, Porous Gray Ware and a Gray Ware with raised knob decoration." This deposit "definitely antedates the rectangular platform, as the stairway and niche of the latter rest upon it" (p. 150).

Under the floor of the outer chamber of the Caracol Tower, an unslipped turtle effigy of Coarse Grayware decorated in unfired bluish-green, yellow, and black paint (cat. 1093; p. 219, fig. 278, d), see fig. 93, e; an unslipped miniature Coarse Grayware conical jar painted red on white and black (cat. no. 1100; p. 220, fig. 279, a); a Coarse Redware jar (cat. no. 599, p. 220, fig. 128, b), see fig. 94, c; two small unslipped jars (cat. nos. 658, 739; fig. 279, b, c); and an unslipped figurine of a jaguar painted white (p. 221, fig. 128, c), see fig. 93, d.

The above ceramics from the Caracol divide into three chronological groups. The slab-legged, Medium Slateware basal break bowl is very close to the material from Yaxuna, Dzibtun, and Maní, and dates either Early Florescent or is a regional variant contemporaneous with, though typologically earlier, than the Puuc pottery. The rounded Medium Slateware bowl found in the upper rectangular platform is probably an Early Mexican form. The Coarse Redware jar found under the floor inside the west doorway of the Caracol superstructure is of Late Mexican period, as are probably the turtle and the miniature jars. The other specimens listed are less surely diagnostic, but in general they substantiate the above chronology. There is no positive proof that the three slipped-ware specimens described above did not considerably postdate the structures in which they were found, although, since they are described from under floors, the supposition is that they date from either the period of construction or at least a period during which floors were still being replaced: a period of occupation rather than one of visitation by transients. A building as spectacular as the Caracol has certainly seen a constant stream of visitors ever since its construction.

A number of other whole or restorable vessels have been found at the Caracol, the majority of them dating from the Late Mexican period and being chiefly small Coarse Redware bowls such as were found containing copal in the Sacred Cenote. The surface of the site was strewn with such ware and with fragments of figurine incensarios. The people bearing these were probably pilgrims to Chichén Itzá shortly before the Conquest (see Tozzer, 1941, pp. 109-110).

A puzzling find is that of an unbroken plumbate jar, fig. 91, f, in the talus slope of the tower just under the five-member cornice on the west side. We have no evidence of plumbate ware in Yucatán in deposits later than Early Mexican. It does not seem likely that the tower collapsed as early as this period, particularly since we have evidence of floors being laid in the outer rooms of the tower in Late Mexican times. Either the jar was an heirloom of long standing at the time it was left in the talus, or it had been deposited in the upper part of the tower and slumped with the talus, remaining unbroken in the fall. The latter explanation, although extremely unlikely at first thought, is supported by the finding of a large section of the tower slumped unbroken to the platform on the east side. Perhaps the jar was protected by such a mass, which has since disintegrated through time.

If the above explanation is accepted, the construction of the tower as well as the upper platform dates from the Early Mexican substage, and reflooring of the interior for the last time probably occurred in the Late Mexican substage. The lower platform dates from the Florescent stage. The Middle Mexican substage is barely represented in the ceramic samples, while the relatively abundant ceramics of the late period come from pilgrimages to the site.

Although this outline is not documented very fully by the small number of whole specimens found associated with the structural sequence, it is supported to some extent by the gross counts of sherds of the various periods in the collections. It should be considered as confirmatory to architectural dating, and establishes several new facts and closer datings. The significance of the whole pottery in the position in which it was found should be understood. The Florescent basal break bowl must date with or after the lower platform, and the rounded, probably Early Mexican bowl with or after the upper platform. In both cases, the pottery is probably contemporaneous rather than postconstructional. The plumbate jar, if our preferred hypothesis is accepted, is contemporaneous with the construction of the tower, while the Late Mexican jar and figurine precede or are contemporaneous with the latest floor in the outer range of tower rooms.

Mercado (3D11).—The Mercado was excavated and restored during 1932 under the direction of Karl Ruppert, and the results have been published (Ruppert, 1943). The building was seemingly erected as a single unit upon the southern edge of the Court of a Thousand Columns, and has been dated in the Toltec period, as have all buildings in its vicinity. It is similar in plan to the Temple of the Hieroglyphic Jambs (see Ruppert, 1943, p. 233 for discussion), from which a ceramic collection is described. The accompanying map (map 21) shows both the Mercado and the contiguous Southeast Colonnade, also excavated by Ruppert, ceramics from which will be discussed in the following section of this report.

Thirteen sherd collections from the Mercado have been tabulated totaling 622 sherds; one collection, containing only six sherds, is from within the dais. The remaining collections, as far as can be judged, come from debris overlying the structure and resulted from the process of clearing it.

The collections all contain Medium Slateware varying from 25 to 40 per cent of the total slipped ware, and most contain X Fine Orange which ranges from about 10 per cent to zero. The predominant slipped ware in all but two collections is Coarse Slateware, the Middle Mexican diagnostic. Coarse Redware is absent in several collections and in no case runs over 10 per cent of slipped wares. The two collections

bearing small percentages of Coarse Slateware range 66 and 63 per cent of Medium Slateware in samples of 76 and 74 sherds respectively, and are thus predominantly Early Mexican. Both are labeled "Mercado general." The exact provenience of these two "general" collections is not known, and it seems quite possible that they came from the Southeast Colonnade, dug at about the same time as the Mercado proper. Their early dating as compared with the bulk of the samples is disturbing, since collections resulting from the general clearing of a ruin normally date later than collections from the more specific and later work of clearing the component parts of a structure.

Of the six sherds from within the dais, one is of Coarse Slateware, and all the others are unslipped. Thus, subject to some uncertainty since Coarse Slateware had not been defined at time of excavation and the collection may possibly have been mixed during or subsequent to excavation, the dais is datable as of the Middle Mexican substage. The dais was a secondary construction, contemporaneous with the contiguous bench (Ruppert, 1943, pp. 245-250). As Ruppert shows, the form and certain of the elaborate decorative features of bench and dais link them to structures in the Temple of the Warriors, to certain Mexican elements known from codices, and to the frescoes of Santa Rita. On the whole, these similarities seem rather generalized (also see discussion of design placement in Andrews, 1943, pp. 74-76).

The most likely placement of the construction of the Mercado would then seem to be near the end of the Early Mexican substage or at the beginning of the Early-Middle Mexican transition period, with renovation consisting of the building of the bench and dais of the gallery during the Middle Mexican substage. It would be interesting to know when the amazingly light, broad vault of the northern gallery fell. The collections coming from the area of this vault all show Coarse Slateware, but nothing later. The collections are small (only 63 sherds in all), but Coarse Redware should be present in these collections if it was in use while the vault stood; the vault must have fallen before the end of the Middle Mexican substage.

Southeast Colonnade (3D10).—The Southeast Colonnade was excavated by Ruppert in connection with the excavation of the Mercado. Although the results of the excavation have not yet been published, Ruppert has kindly supplied the map (map 21) to aid in locating the pottery finds. He informs me that he believes that the Mercado was built later than this colonnade. With the exception of the walls enclosing Room D of the Southeast Colonnade, all the interior walls of the complex as well as several or all of the benches seem to be secondary to the original column arrangement. Thus a large colonnade has been remodeled into small compartments by means of rather crude masonry construction during a secondary occupation.

Six pottery collections, totaling 829 sherds, were tabulated from the Southeast Colonnade, 648 of which came from Room B. 448 of the Room B collection were of unslipped ware; nearly all of these were of hour-glass form incensarios, suggesting the use of this room as a shrine. Two recognizable fragments of figurine incensarios were tabulated in this collection. Fourteen rims of Late Mexican style unslipped jars are present, as compared with thirty-three jar rims of earlier type. In the slipped ware of this collection, Medium Slateware runs about 16 per cent, Medium Redware another seven per cent, X Fine Orange 4.5 per cent; Coarse Slateware composes 40.5 per cent of the sample, Coarse Redware 30 per cent. Thus the Room B collection points to a Middle Mexican and

early Late Mexican occupation, with a minor admixture of Early Mexican and scarcely a trace of Late or post-Mayapan admixture. The Room B collection is demonstrably later than the general run of Mercado collections, as well as later than that of the Sweat Bath to the northeast of it.

The three collections from the Colonnade to the east of columns 1-10 total 128 sherds; since the collections show similar wares and percentages they will be discussed as one. Sixty-one sherds of these collections are unslipped. Of this group, the jar rims are twelve Late Mexican substage form to two earlier. Incensarios include 32 pedestal bowl type to 10 figurine type. The predominating unslipped forms thus point to the Middle and Late Mexican substages. The slipped wares suggest a slightly earlier dating. Medium Slateware and Medium Redware together equal 47 per cent of total slipped ware, Coarse Slateware 32 per cent and Coarse Redware 17 per cent. A small collection of 41 sherds from Room C fits easily into this picture.

A plausible reconstruction of the history of this area is as follows: Initial construction of the Southeast Colonnade began in the fully developed Early Mexican substage. Occupation during that substage was followed by compartmentation of the large hall in Middle Mexican times. The occupation declined during the Late Mexican substage. During the latter part of this lengthy time period (the whole Mayapan occupation span), characterized here by very light ceramic deposition, there was probably no erection of new stone architecture. This area of Chichén Itzá had descended from a cultural center to a sort of campsite. Only widespread ceramic sampling will show whether the rest of Chichén Itzá was also unoccupied during the Late Mexican substage. The evidence at hand suggests that none of the large, well-made buildings thus far sampled was erected later than the Early Mexican substage.

Temple of the Three Lintels (7B3).—This temple was cleared and restored by Paul Martin during 1927 and 1928 (Carnegie Institution of Washington Year Book 26, pp. 233-236; Year Book 27, pp. 289 and 302-305). It has been described as the only known example at Chichén Itzá of a pure Maya structure in the construction style of the Puuc ruins using the monolithic-cored veneer masonry characteristic of that area. The building showed no evidence of extensive remodeling; some stone had been robbed for small, crudely built habitations in the immediate vicinity. The indications thus seem to point toward an intensive occupation of rather short duration contemporaneous with the temple, followed by a later occupation. Chichén Itzá is rare in early short-period occupation collections, and this area should thus be particularly worthy of study.

Two catalogued specimens are known by photographs only. One (fig. 70, b) is an unslipped Early Mexican incensario, the other the lower half of what appears to be a Medium Slateware jar. The dark color suggests a Florescent stage date but this, and even the ware classification, is not certain.

A sherd collection of 20 fragments was labeled as from this temple and has been tabulated by me. It is probable, though uncertain, that this is a part of the collection excavated and tabulated by Roberts in 1933. Roberts dug two trenches, and obtained 578 rim sherds, from beside a well in the depressed area to the north of the temple. Martin (1927, p. 305) believed this well to be contemporaneous with the temple. The masonry well casing was flush with the ground; Roberts' excavations yielded what he believed to be an occupational deposit, built up from 1.27 meters below the rim of the well to the present level. The well originally had a high curb or else the casing was built higher during

time of use, to judge from Roberts' notes and drawings.

Roberts' pottery tabulations show definite stratigraphy of a very interesting sort. His "lacquer wares," which we can generally equate with our Coarse Redware at Chichén Itzá, occur concentrated at the bottom of the trenches, and this apparent discrepancy is markedly contradicted by other internal evidences of a definite direct stratigraphy in the trenches. A check of Roberts' shape analyses of these lacquer ware sherds shows that they fit into the Yaxuna III and other Regional stage series rather than into the Late Mexican substage.

It seems safe to assume, even without opportunity to examine these sherds, that they must date from the earlier periods. This ware constitutes 7 per cent of stratum C in the combined collection of the two trenches (185 sherds), 2 per cent of stratum B (201 sherds), and is absent in stratum A (215 sherds). Slateware percentages run constantly near 80 per cent but show significant variation in vessel form frequencies. Fine orangeware occurs in cuts A and B. No certain evidence of types later than Early Mexican occur in the tabulations, and certainly nothing later than Middle Mexican was found (Roberts' tabulations do not distinguish the wares of these two subphases) nor the types of fine orange.

The changes in percentages of slateware vessel forms and in rim types in this deposit is of particular interest for documenting the Florestant and Early Mexican periods, since the majority of such material from Chichén Itzá occurs in deposits so heterogeneous as to make chronological analysis difficult.

The percentages of Medium Slateware vessel forms change in the strata as follows:

	Basins	Bowls	Jars
A	14.4	3.3	82.4
B	22.5	8.3	69.3
C	<u>28.3</u>	<u>15.2</u>	<u>56.6</u>
Total slate	181	169	145

Jars thus increase in frequency at the expense of both bowls and basins. The rim forms were tabulated by Roberts in reference to a standard set of drawings which he constructed. A check of these shapes shows that in the basins, the group in which the demarkation is most evident, cut A (the highest) contains no Puuc forms; cut B, 68.4 per cent definitive Puuc; and cut C, 87.7 per cent definitive Puuc. Cut B contains three sherds, 7.9 per cent, of a rim which is not found in the Puuc range of material but is common in Mexican Chichén deposits.

The slateware bowls tell a similar story. A Thin Slate bowl rim constitutes 4 sherds of 14 in cut B and 14 out of 22 sherds in cut C, but is absent in A. A single sherd which probably came from a grater bowl occurs in B. The slateware jar rims show little resemblance to Puuc forms, but there is evidence at Yaxuna of regional variation from Puuc forms in the Florestant period (fig. 10, a, b). Thirteen slateware jar rims out of 82 in cut C are of a type very close to fig. 10, b, 29, and this type is not found in cuts A and B.

The redware listed by Roberts corresponds to our Medium Redware and is distinguished by him from his "lacquer ware," a term coined by Vaillant who defines it as follows:

The basal paste of Red Lacquer Ware is gray, coarsely kneaded, flaky, and porous. Over this paste is laid a slip of clay more finely treated with the grains adhering closely. The slip is thin, carefully smoothed, and burnished. So great a con-

trast exists between the basal clay and the slip in finish and texture, that the appearance of a lacquer is given" (Vaillant, 1927, p. 28).

Vaillant's description fits Yaxuna II Dichrome and the Flaky Redwares very neatly, probably covers Yaxuna III mottled Red on Coarse Paste ware, Red on Thin Gray particularly of the Dzibilchaltun type, and Vaillant used the term to cover Late Mexican Coarse Redware with which he was familiar. "Lacquer ware" seems an unfortunate term, implying as it does the postfiring application of a vegetal product, and it has not been retained in this report.

Two of the three shapes listed by Roberts in lacquer wares are included in the Yaxuna III Mottled Redware samples; his "Orange Lacquer" dish rim approximates fig. 8, g, 10, his Brown Lacquer jar form is near fig. 10, d, 11, 12. The third shape of "Red Lacquer" jar is not found at Yaxuna but is a major form in Dzibilchaltun Red on Thin Gray, and in the corresponding ware at Acanceh, fig. 20, d, 6-12; e, 16-18, 25-28. The color ranges of the wares described above, as well as the rim forms, intermesh in such a way as to confirm these assignments.

Of Roberts' three listed redware rim shapes, two are of jars which are an extremely rare form in Medium Redware of the Puuc (Florestant stage) sites (see fig. 52, a, b), and Roberts' listed jar rim forms are of kinds which do not occur in the Puuc collections. However, they are not markedly different either from Yaxuna IV (Florestant stage) Medium Slateware forms such as those in fig. 10, b, 14-16, 18, 25, nor from Yaxuna III (late Regional stage) Mottled Redware forms such as fig. 8, d, 11, 12, and may with reasonable certainty be assigned to one of these two periods. Roberts' third shape, a redware bowl, can likewise be fitted either to the Yaxuna III Mottled Redware series (fig. 8, j, 16, 17; k, 4, 8, 10) or to the Florestant Medium Redware series (fig. 52, m, 2-4, 8, 11, 30, 32, 33). Since there are strong indications on the basis of both ware and form characteristics that Florestant Medium Redware and Slateware are later developments fitting the same general ware series as Yaxuna III and Mottled Redware, it is not surprising that these few fragments cannot be placed more closely.

Four fine orange sherds occur in cut A, 5 in cut B. Since cut B seems to consist almost wholly of Florestant material, the 5 fragments would be expected to be of Z type. This is not the case; three of them are jars, a vessel form nearly absent in the Puuc Fine Orange samples (fig. 59, e, 1-10), and the rim form listed by Roberts does not appear in this series but is nearly identical to a common X Fine Orange form (fig. 79, g; fig. 77, gg, jj; fig. 76, b). The bowl rim form also seems distinctly of X Fine Orange type, with strong curve and blunt lip like fig. 73, a, c, l. All the fine orange from this collection must thus be considered of X type.

The classification of the deposit runs as follows: Cuts B and C nearly pure Florestant with traces, especially in C, of early Florestant and late Regional. Cut A consists of Early and possibly Middle Mexican ceramics, with very little mixture of earlier material and no Late Mexican ceramics. The five X Fine Orange sherds in cut B suggest that this type appeared somewhat earlier than the "Mexican Style" Medium Slateware basin rims. However, these later-style basin rims seem to appear somewhat later than the new bowl forms characterizing the Early Mexican period. The listed presence of four cascabel bowl legs in cut C and of five in cut B suggests that these Medium Slateware bowls may date later than do the Yaxuna and

most other Chichén Florescent collections which uniformly show slab legs. Pottery from the large Puuc sites shows presence of cascabel legs, and the similarity in masonry construction between the Temple of the Three Lintels and the Puuc buildings might be taken to support the ceramic evidence for placing the occupation of this group later than most of the Chichén Itzá Florescent occupation. On the other hand, the presence of X Fine Orange in these lower strata allows the placing of these slateware bowls in the Early Mexican substage. These assignments are a problem of definition. The virtual absence of X Fine Orange in the Puuc collections which are taken as the type for the Florescent stage would suggest the placing of cut B perhaps in "Florescent-Mexican transition," a convenient term for a complex situation.

If cuts C and B date in major part from the occupation of the Temple of the Three Lintels, as seems likely, then cut A may date with the small secondary structure on the temple terrace described by Martin (1927, p. 305), for the masonry of which the Temple of the Three Lintels was robbed. The robbing of stone suggests a time lapse between the construction of the two buildings. Roberts suggests in his field notes that the interface between cuts B and C looks like a living surface and may be contemporaneous with the temple. It is unfortunate that we do not have data to allow the definition of Early from Middle Mexican deposits in Roberts' notes, as it is quite possible that cut A, and Martin's secondary structure, may be of Middle Mexican date. An important lead is suggested from the uncertain but provocative evidence that the Florescent-Early Mexican transition at Chichén Itzá was not a sudden one.

Northeast Colonnade (3E1).—A sherd collection, two restorable pottery vessels, and a pottery pestle resulted from the clearing of the Northeast Colonnade (see Ruppert, 1952, fig. 40 for map). The sherd collection, totaling 257 pieces, was tabulated by me.

The Medium Redware jar, cat. no. 618, resembles fig. 85, d, 19, save that the neck-shoulder junction is more angular. The Coarse Redware bowl approximates fig. 26, a, 2, but bears no grater pattern and no visible slip.

The sherd collection is rich (55.2 per cent) in pedestal-bowl incensario fragments. The remainder of the sample consists of Medium Slateware (73.1 per cent of slipped wares), Coarse Slateware (15.4 per cent), and Coarse Redware (11.5 per cent). Analysis of the Medium Slateware shows that out of 50 diagnostic sherds, only four basin sherds are of Puuc form. Two Coarse Redware bowl sherds bear incised designs through white slip band (cf. fig. 95, a). This style, stemming directly or indirectly through local wares from X Fine Orange, does not appear in the Mayapan samples. It probably dates very early in the Late Mexican period, or may be contemporaneous with the late part of Middle Mexican. Only three fragments of figurine incensarios were found; they probably postdate the remainder of the collection.

Thus the major occupation of the Northeast Colonnade was in Early Mexican times, and probably in the latter part of that substage. Occupational remains then dwindle to abandonment in Late Mexican times, probably in the early part of the substage.

Temple adjoining the Northeast Colonnade to the south (3D6).—A small sherd collection from this area (18 sherds) was tabulated by Roberts. All fragments seem to have been of Early or Middle Mexican type, with three fragments definitely limited to Early Mexican. One fragment of X Fine Orange is included in the collection.

Temple on the northeast bank of the Xtoloc Cenote (3D13).—This temple, excavated by Ann Morris in 1925, yielded a collection of 13 rim sherds, known only from Roberts' tabulations, and a sherd of plumbate ware which was found on the floor of the middle room. No Florescent or Late Mexican wares are represented. An unmixed Early Mexican deposit is most likely, though the sample is so small as to provide only very shaky grounds for placement.

Zumpulche (3E3).—This sweat bath (see Ruppert, 1952, pp. 82-83, figs. 50, 51) was excavated under the direction of Karl Ruppert during 1936. In ground plan it is very similar to the T house, south of the Caracol (see map 20), which has been placed in the Toltec period by architectural studies, and in the Early Mexican substage by ceramic studies.

No whole or restorable ceramics were catalogued. I have tabulated three sherd collections, totaling 290 fragments; one collection of 231 sherds is general from the excavations; one of 25 sherds is from the inner room; and one of 34 sherds is from the water drain. No significant difference in ware percentages shows in the three collections, so they will all be treated as one.

The ware counts and percentages on a basis of total slipped wares run as follows:

Substage	Percentage	
Early Mexican	Medium Slateware	32.1
Early Mexican	Medium Redware	11.4
Middle Mexican	Coarse Slateware	32.6
Late Mexican	Coarse Redware	10.3
	X Fine Orange	12.0
	Plumbate	1.1
	Rare types	.5
		100.0

Unslipped ware, including three Late Mexican type jars and no figurine incensarios, totals 17.5 per cent of the total collection.

Thus it will be seen that the Early Mexican occupation including X Fine Orange and plumbate, accounts for over 50 per cent of the sample. Another third of the sample comes from a Middle Mexican occupation; the remainder is Late Mexican but probably does not include the latest part of that subphase, which is characterized at Mayapan by increasing quantities of figurine incensarios.

Analysis of the Medium Slateware vessel forms shows only five Puuc-style rims, all basins, out of 49 significant sherds. No grater bowl fragments were tabulated, but this is possibly a clerical error. The suggestion is that the occupational debris of this building began during the well-developed Early Mexican substage.

Temple of the Hieroglyphic Jambs (6E3).—This temple, located in the southeast part of Chichén Itzá, is discussed and a plan given by Ruppert (1943, p. 233). It is one of eleven at Chichén Itzá having a ground plan similar to that of the Mercado.

Roberts dug a pottery trench in 1933, abutting the east side of the terrace bearing this temple at the jog in the east terrace well. The collection was lost and thus not tabulated by me. Roberts notes two strata but sees no difference in the collections from the two. He tabulates 51 rims, 25 of them slateware (Coarse not distinguished from Medium), 7 sherds of X Fine Orange, one plumbate, and the remainder unslipped jars. Three slateware basin sherds out of thirteen are of Puuc form. This, plus the presence of plumbate and the large percentage of X Fine Orange, sug-

gests an Early Mexican dating, although the evidence is incomplete because of the lack of paste classification in slateware.

Temple of the Interior Atlantean Columns (3C6) and House of the Grinding Stones (3C5).—This small group stands on the south edge of the platform which bears as its largest structure the Osario or High Priest's Grave. It was cleared in 1927 by Paul H. Martin. A manuscript report of this work is in the Carnegie Institution files. In this report Martin states his opinion that these buildings are probably contemporaneous with the High Priest's Grave. Plans and a description of the two buildings are given by Ruppert (1953, pp. 38-39, fig. 27).

To judge from the fallen stonework, the Temple of the Interior Atlantean Columns bore a vaulted roof, and the masonry contains many re-used stones. The pottery from this building was found in the above-floor debris and bore at least two of the whole vessels which we shall discuss, although the catalogue does not specify exact locations for individual pieces. The House of the Grinding Stones seems to have borne a flat timber-beamed roof, and sherds were numerous at the floor level.

Neither whole pieces of pottery nor sherd collections remained available at the beginning of this study. Catalogue information and photos, and Roberts' tabulations are the only sources of information. Two vessels of X Fine Orange (fig. 77, gg and jj) and two design bearing sherds (fig. 79, m and 80, cc) were found. A pottery pestle (fig. 72, g, 4) and a small, hollow, unslipped animal head, seemingly from the end of an incense blower handle, were found. A Medium Redware flat-bottomed, sharp basal angle bowl with outturned rim and three spherical cascabel feet came from this group. This bowl has a dotted semicircle design in black paint on the rim top, and a scroll in the center of its floor (cf. fig. 87, a-t). Roberts' tabulation of the 30 sherds suggests a typical Early Mexican sample with no mixture of either Floreulent or of the later substages. This placing is borne out by the whole vessels listed above.

Casa Redonda.—The published report on this structure (Pollock, 1937) contains a description by H. B. Roberts of the ceramics from the building (*ibid.*, pp. 151-152). In the light of additional knowledge now available, I shall discuss the placement of this building.

Roberts' tabulations and drawings of the Casa Redonda pottery are available for the rims of what seems to be a combined collection from the general clearing of the building and from the pit at floor level in the center of the building. 107 rims and other diagnostic sherds are included. Seventy-three incensario fragments are of the pedestal bowl type, some studded (see fig. 69); three are of the late figurine type. Nine unslipped jar rims are of the general Puuc-Early Mexican form (see fig. 68, a, b, l-10). The slateware includes eight basin rims of Early-Middle Mexican form and two of Puuc form (Medium and Coarse Slateware not distinguished). Bowls are all spheroid of Early to Middle Mexican form; two of them are Red on Slateware, and thus can only be Early Mexican (see fig. 75). One of these sherds has been lost; the other seems to be the ladle bowl sherd illustrated in fig. 75, e or one very similar. Five redware bowl fragments must be Early Mexican Medium Redware (late Mexican Coarse Redware was called red lacquer by Roberts). A blackened, slipped, coarse-paste animal head leg (see fig. 95, b) was also found, and this must be Coarse Redware.

This collection evidences a strong Early Mexican occupation, probably late in the period to judge from

the placement of Red on Slateware at Chichén Itzá. The lack of plumbate, X Fine Orange, and Medium Slate grater bowls is not significant in such a small collection (only 24 slipped ware rims). There is a small scattering of Late Mexican material, three incensario sherds, and the slipped, coarse-paste animal head leg; this is not enough to constitute evidence of an occupation.

Because of its architectural style and mud-mortared block masonry, it has been suggested that this building is one of the latest at Chichén Itzá. If this stylistic architectural dating is sound, it supports the findings given elsewhere in this report that architectural activity ended not much later than the end of the Early Mexican substage.

Temple of the Wall Panels (3C16).—This temple, lying to the south of the Caracol, was excavated in 1927 and has been reported upon by Karl Ruppert (1931). The resulting pottery is a collection which consisted of 172 sherds when tabulated, and of seven whole or restorable pottery vessels.

The architecture of this temple is of the Toltec period, quite similar to that of the Temple of the Warriors, and to other structures of that period. Several stages of reconstruction and addition are noted by Ruppert, including considerable re-used stone; among these are drums of Atlantean columns, a form believed to date late in the period. The ceramics come from the clearing and reconstruction of the building, and probably contain little if any material predating the original structure.

The ceramic sample contains the following percentages of slipped wares: Medium Slateware 19 per cent, Medium Redware 7 per cent, Coarse Slateware 43 per cent, Coarse Redware 23 per cent, X Fine Orange and plumbate 8 per cent. Thus the ceramic sample dates Middle Mexican in major part, with smaller representations of Early and Late Mexican wares.

Of the whole specimens recovered, only one is certainly of Early Mexican times, the Medium Redware tripod cascabel vase shown as fig. 86, d, which was found in a cyst on the lower terrace north of the late stairway (Ruppert, 1931, p. 137, plates 16, b, 17, c). This is also the only ceramic specimen which may be associated with the construction of the building. The lower terrace was the first element constructed, but the cyst may have been added later, at any time up to abandonment. This vessel thus dates the structure not later than the Early Mexican substage. The other six whole specimens are an incense ladle or "blower" of unslipped coarse gray found in debris within the colonnade, shown as fig. 68, f, 8 (Ruppert, 1931, plate 17, c); two Coarse Red pedestal vases (see fig. 95, h for one of these), found unbroken in debris in the south passageway of the temple between the bench and west wall of the inner room of the temple; and three broken, thin, coarse unslipped ware direct rim jars (see fig. 93, a, b, for two of these), found in the talus of the temple pyramid.

Five of these six specimens may be identified with reasonable safety as Late Mexican from counterparts found in the Late Mexican deposits at Mayapan; the incense ladle probably dates earlier. The two pedestal vases are similar to specimens found cached beside a column in the North Colonnade, Temple of the Warriors (fig. 90, s, t). These pedestal vessels, as well as those from the Warriors, seem most likely to have been cached after the collapse of the buildings in which they were found, which thus must have occurred during or before the Late Mexican period. The unbroken incense blower may well have been left under the same conditions; if so, the fall of the building would be dated

as Middle Mexican. The unslipped jars are also likely to be postoccupational.

The combination of the heavy proportion of Coarse Slateware, nearly absent in the collections of the Caracol and from all but the East Building of the Monjas, and a Medium Redware jar in the subfloor cyst of the terrace, place at least the early part of the construction during the Early Mexican period, the major occupation in Middle Mexican, and the collapse of Temple and Colonnade before the end of the Late Mexican period. The latter part of the Early Mexican period seems indicated as the period of construction, explaining the small proportion of Medium Slateware sherds and tallying with the re-use of Atlantean column drums in the colonnade. It would be of interest to know if any of the well-made veneer masonry which distinguishes this building dates from the Middle Mexican period, but data on this is not obtainable from the pottery sample.

Initial Series Group (5C).—The Initial Series Group was investigated in 1926 by Vaillant (Vaillant, 1933; Ruppert, 1952, p. 157), who established the fact that the standing structures of the group (map 22) were begun with the construction of the main range of the Phalli, which he believed to be early Mexican showing Maya construction methods but Mexican style ornament. Vaillant (1933) distinguished three periods of architectural construction following this, the first of which, consisting of the colonnade south of the Phalli, he equates on stylistic architectural grounds with the Castillo, the Chacmool Temple, and the Great Ball Court. The next period showed less ornamentation. It included the south patio of the Phalli and its bordering structures to the south and east, which include Atlantean columns. Vaillant detects signs of plundering at the close of this period in reconstructable ceramic fragments, which include two X Fine Orange bowls (fig. 81, *a* and *j*), widely scattered over the South Court. Plumbate sherds were also found in this debris. He suggests that this evidence may document the resurgence of the Maya after the earlier Toltec conquest. Vaillant posits a fourth and final Maya Resurgence period, including the crude Temple of the Initial Series (into which the certainly earlier Initial Series lintel has been incorporated in modern times). Vaillant also includes in this period the figurine incensario fragments which were found scattered at or shortly under surface level.

I observed no significant ceramic differences in the 18 small collections which, in addition to Vaillant's collections, included the material from a trench dug by Roberts in 1933. The collections bear Medium Slateware as the preponderant ware. This ware characterizes the Florescent and Early Mexican periods. A form analysis done to separate Puuc-style vessels from later ware shows a high proportion of Florescent pottery. At the same time, collections made by Vaillant between successive floors of rooms of the earliest period in the group (north range of the Phalli) show sherds of the Coarse Slateware of the Middle Mexican subphase. Probably these buildings continued to be used during a long period, but the collections have possibly become mixed since excavation. The ceramic evidence places the group in the Florescent and Early Mexican periods, perhaps bridging the transition as Vaillant believed. The Initial Series lintel may not have been carried far to its present secondary position since it dates in the Florescent stage by our scheme, as does Puuc-style Medium Slateware. The absence of pure Florescent collections beneath architectural constructions leaves unproved the possibility that some of the earliest construction dates from the Florescent stage.

Faint traces of the Coarse Slateware of the Middle Mexican period show in the collections, and slightly

larger amounts of the Coarse Redware of the Late Mexican substage. Ten fragments of figurine incensarios are listed from the 1,676 sherds examined from the building group; some of these seemingly lay under fallen walls. Thus the late Mexican ceramics are not sufficient to argue an occupation of any size, but do suggest that parts of the group were standing during that period. This is to be expected; some of the walls still stand.

Monjas (4C1, 3, 4).—The Monjas group at Chichén Itzá shows more stratigraphic complexity than any other building group excavated, and should produce correspondingly more information. The excavations were conducted during the field seasons of 1932, 1933, 1934, under the direction of J. S. Bolles.

A total of 158 collections was taken during the excavation, and these contained, at the time of my tabulation, about 10,000 rims. The labeling of the collections was done descriptively, the terms used referring to the parts of the building. Unfortunately, since the report of these excavations has not yet been published, the architectural stratigraphy of the building is not entirely clear to me, although I have had access to Bolles' manuscript and many of his maps. The included plans (map 23) have been compiled from photostats of a series of partial plane table maps drawn during the excavation, and must certainly contain inaccuracies for which I am responsible. It seemed better to compile plans for locating the collections as far as possible than to treat them blindly. I have not been able to locate the field catalogue listing the provenience of the whole pieces of pottery recovered, and most of the whole vessels thus cannot be placed in the architectural sequence.

The Monjas building proper as well as the Southeast Annex and the Iglesia have been generally classified as pre-Toltec (Morley, 1931, p. 107). The type of construction and decoration shows general similarities to Puuc and Chenes buildings. Architectural placements given here are provisional, pending the publication of Bolles' report. From map 23 it will be evident that the east wing antedates platforms 3 and 4. Rooms 14 and 15 are in Florescent architectural style and of course postdate platform 4. The Ball Court is considered Toltec on the basis of the style of its bas-relief. The northeast annex, the east building, and the rooms facing the southeast court on its south and east sides are in Toltec-period architectural style and must be additions made to the group during that time. There is ceramic evidence, described below, of occupation of the east building and of the complex of rooms to the north of it in the Middle Mexican substage. In general, there is little pottery from the Monjas excavations dating later than the Early Mexican substage, and little earlier than that of the Florescent stage. Medium Slateware is the major slipped ware of all deposits, and there is considerably less evidence of the later Coarse Slateware and Coarse Redware than in the Caracol collections. Coarse Slate and Redwares are largely confined to surface collections in this series and, as remarked above, constitute only minor parts of all samples. Since this area of Chichén Itzá shows evidence of much visitation of late peoples, it seems certain that the late wares are to be thus accounted for. As further support for this interpretation, several sizeable collections composed almost entirely of figurine incensario fragments were found on the top of the pyramid and on its slopes.

On the basis of the ceramic changes from Florescent to Mexican, all Monjas pottery collections large enough to be statistically significant as samples contain some pottery definitely belonging to the Early

Mexican substage. The most surprising of these collections includes a six-sherd sample (M28) from under the floor of the Ball Court which, according to Bolles' field notes, definitely antedates the erection of platform 4. This in turn antedates rooms 14 and 15, classified as Florescent. Of this collection, four sherds are Florescent, two definitely Early Mexican. Collection MHR 51 is listed as coming from "in front of Northeast corner platform from beneath Iglesia." It contained 81 sherds, preponderantly Florescent but with several Early Mexican sherds, and one figurine incensario fragment.

A large collection (2,012 sherds) from the north end of the Ball Court, adjacent to and below the seat level of the bench along the south side of platform 4, is overwhelmingly Early Mexican. It shows an unusually large percentage of X Fine Orange, and is one of our best type collections for the substage. Bolles' opinion, as given in his field notes, is that this pottery was refuse from the buildings to the east of the Ball Court. It most certainly postdates the use of the Ball Court as well as its construction, which in turn must have followed the building of platform 4 of the Main Pyramid.

A collection of five sherds which may antedate platform 1 and certainly is not later than platform 2, shows sherds of waxy orange slipped ware similar to certain sherds of the Cobá Group B period (late Regional). This is faint evidence, but suggests that construction at the Monjas group may have been started at this period, which is strongly represented at Yaxuna (Yaxuna III), not far from Chichén Itzá to the south. It is significant, however, that few signs of this period occur in the large collections from elsewhere at Chichén Itzá, which obviously was not a site of importance at that time. The whole pieces from the Monjas which we have seen came mainly from caches and burials. They are not treated here since information on their characteristics and prominence is lacking. As far as we can judge, they are all of the Early Mexican substage, save for the large Coarse Slateware jar (fig. 92, a) which was found in the East building, and which must date Middle Mexican.

The lack of pure Florescent-stage collections may seem strange in the excavation of buildings which have been placed in that period on architectural grounds, and it brings up the question as to the validity of (a) the architectural criteria, (b) the ceramic criteria, and (c) the method of collecting the ceramics.

The most definitive architectural criteria consist of judgment as to style of masonry and design on the elaborately ornamented east wing. H. E. D. Pollock tells me that in his opinion this wing seems to copy the style of Chenes buildings. The Chenes sites, on architectural and ceramic evidence as yet unpublished in detail, probably either approximate the Puuc sites in dating, or slightly precede them with a decided overlap in time (Pollock, 1936, pp. 123-124). The Chenes ruins are associated exclusively with Florescent-stage ceramics (Brainerd, 1949). The Toltec-style buildings stratigraphically follow those of the Florescent stage in this group. The architectural criteria of these periods, as shown in the buildings of the Monjas group, seem well marked and consistent, and are agreed upon by the specialists in the field, although the final definitive architectural description awaits publication of Bolles' monograph.

The ceramic criteria are distinct and well established for the Early Mexican substage, one of the two most fully documented periods on the Peninsula; the Puuc area occupation of the Florescent stage is the other well documented period. The Florescent stage of the site of Chichén Itzá is much less well known ce-

ramically since few unmixed deposits of that period were recovered, doubtless due to the later disturbances of strata and the deposition caused by the heavy Early Mexican occupation there. However, there are other Florescent collections from sites near Chichén Itzá.

Our sample of the Florescent stage at Yaxuna is quite small but is probably classifiable as early Florescent, as are the collection of whole vessels from Dzibtun to the north (fig. 35), and the Mani Florescent pottery to the west. The Florescent occupation of Cobá is represented so poorly in our collections as to offer little clue. However, these collections are sufficient to establish the fact that the Florescent stage, as defined in western Yucatán, also existed in the area of Chichén Itzá. The dating of the probable later horizon of the Florescent stage shown by the major part of the Puuc site collections in relationship to the Early Mexican substage at Chichén Itzá is discussed later in this section. I believe that they constitute a chronological sequence with little if any overlap between them.

If the assumption of the validity and contemporaneity of the architectural and ceramic periods are accepted, the apparent disparity in the finding of only mixed Early Mexican-Florescent collections in the excavation of a building complex containing Florescent buildings must be due to the collection of the ceramic data (point c above).

Several factors combine to make ceramic sampling difficult at Chichén Itzá. Shallowness of soil and the use of clean stone fills make rubbish deposits rare, and the reuse of midden earth is inevitable in such a heavily occupied site as this. The primary purpose of the archaeological work, as contracted for with the Mexican government, was the restoration of ruins, and this aim was followed conscientiously to the detriment of exploratory ceramic trenching within building groups. Thus the ceramics come largely from the occupation of, or after the abandonment of, the latest constructions in the architectural group. The Early Mexican collections contain strikingly varying frequencies of Florescent pottery, but this variation is usually independent of the chronological position of each collection in the Early Mexican substage. It seems rather to be a function of the amount of Florescent occupation which underlies the spot where the collection was found. There are some suggestions of transitional forms and decorations between Florescent and Early Mexican ceramics at Chichén Itzá, but most of the collections seem to be mixed rather than transitional. Middle Mexican and Late Mexican sherds are often limited to deposits which overlay fallen roofs, and thus are demonstrably late. The Monjas collections mentioned above (M28 and MHR51), which would be expected to be Florescent, are hard to account for, but they may be contaminated either by downward movement of late materials through the loose stone fill or by faulty handling of ceramics at or after excavation.

The chronological placing of the Florescent-stage pottery of the Monjas relative to the occupation of the Puuc sites is a matter of considerable interest, and bears directly on the correlation of the Maya and Christian calendars. The similarity of the Monjas Florescent ceramics to early Florescent pottery rather than to the later material from the Puuc sites has been mentioned. Since Z Fine Orange pottery occurs in Florescent and not in Early Mexican deposits, and the reverse is true of X Fine Orange, the Florescent and Early Mexican deposits must be sequent rather than chronologically concurrent (Brainerd, 1941). Lack of evidence of trade from Early Mexican Chichén Itzá in the late Florescent Puuc deposits also points strongly toward a sequent placing of late Florescent and Early

Mexican, as does the occurrence of deposits at Chichén Itzá which are completely free of Floresent pottery in areas where no Floresent architectural evidence has been found. The hiatus between Thompson's Chichén Itzá dates and the traditional date for the arrival of the Toltecs (Thompson, 1937, p. 190) may be used quite neatly to cover the hiatus between early Floresent and Early Mexican stages in the Monjas materials. This hiatus in dates (10.3.0.0.0 to 10.8.0.0.0) occurs at about the right time if we place the span of our early Floresent ceramics from 9.14.0.0.0 to perhaps 10.3.0.0.0. Using Thompson's 10.3.0.0.0 as an intermediate point, we may consider 10.8.0.0.0 as the end of the Floresent stage and the beginning of Early Mexican, as Thompson has suggested (1941, Scheme B). This allows about 180 years for the early Classic ceramics and 100 years for the fully evolved Puuc ceramic assemblage, during which span the Monjas and probably the rest of Chichén Itzá showed only a light occupation, demonstrated ceramically by a few scattered sherds of the more elaborate, later Puuc types. An alternative hypothesis, favored by Proskouriakoff (1950, pp. 169-172) on the basis of Chichén Itzá dates and the style of stone sculpture, and by Lothrop (1952, pp. 111-113) on the basis of metal-work style, is to overlap Toltec Chichén with the Puuc occupation. This reconstruction has support from certain documentary interpretations. Although the ceramic evidence can be interpreted to allow some overlapping for these occupations, I believe that the evidence seems to favor a minimum of such overlap.

None of our collections, save those from the Puuc sites, shows sizeable deposits of the late and more elaborate Puuc wares. This may indicate, as we have suggested elsewhere, that there was a major occupational shift to the Puuc region during this period, or our sampling may simply by chance have missed this period in other parts of the country. A less likely possibility, to our mind, but one that should in fairness be mentioned, is that the rather elaborate pottery of the late Floresent stage in the Puuc area was an extremely localized phenomenon, and that the early Floresent ceramics from the Monjas and elsewhere, which we have assumed to date early, are actually chronologically late forms showing peripheral lag or regional variation. This hypothesis seems to me somewhat farfetched in view of the nearness of sites, the extensive population indicated, and the similarity of pottery types at various other time horizons over the whole north end of the Peninsula.

Evidences of Middle and Late Mexican occupation are slight relative to Early Mexican at the Monjas; their strongest representation is in the East Building, where collections from the building itself show 22.4 per cent Coarse Slateware and 6.9 per cent Coarse Redware, compared with 60.7 per cent Medium Slateware and 10 per cent Medium Redware out of 290 sherds of these four slipped wares. The Coarse Slateware jar found only slightly broken in this building suggests that the last occupation was during the Middle Mexican period and that the Coarse Redware, which consisted mainly of small bowl fragments, should be assigned to the late pilgrimages which have left a surface ceramic layer over most of Chichén Itzá.

Sacred Cenote.—The dating of the ceramics from the Sacred Cenote at Chichén Itzá is of particular interest because of the richness and variety of objects found in the deposit there, and because of the documentary evidence concerning it. The ceramics alone will be treated here and this study is far from exhaustive for that material, since I shall not attempt to discuss or identify the imported ceramics found. The other

artifacts from this deposit have been studied elsewhere, and are in process of publication by the Peabody Museum, Harvard University (see Lothrop, 1952).

The cenote was dredged by E. H. Thompson between 1904 and 1907. A winch and boom from which was suspended a steel clam-shell bucket were used in the operation; the material from the deposit thus was not recovered or recorded in any stratigraphic order. The ceramic data available to me come from two sources, tabulations made by G. C. Vaillant during 1926 of sherd collections which remained at Chichén Itzá from Thompson's dredging operations, and examination of ceramics coming from the same operation kindly made available by the Peabody Museum. These two sets of data will be described in turn, and their significance discussed.

The collections studied by Vaillant have since been either lost or separated, and the labels lost. However, his ware distinctions are quite closely equatable with those used in this report, save that, although Vaillant is known to have recorded Coarse Slateware for individual specimens, we cannot be sure he separated it from Medium Slateware in his tabulation. This uncertainty is minimized by the near certainty that Coarse Slateware did not occur in any quantity in the collections Vaillant worked upon.³⁹ Two collections were recorded by Vaillant, number 1 only by presence and absence, number 2 quantitatively by number of sherds per category. The tabulation which follows allows a comparison between Vaillant's quantitative cenote tabulation and one of our least mixed Early Mexican deposits.

Comparison between Chichén Itzá Cenote collection and a collection typical of the Early Mexican period. My equivalents are in parentheses.

	Cenote No. 2	Trench South of Southeast Colonnade
<u>Jars</u>	9.5	1.3
Plain	4.3	
Striated	5.2	
<u>Ceremonial</u>		
(blue-painted bowls)	12.1	0.0
Sub-lacquer, transitional (no equivalent)	1.5	
<u>Late incensario</u>		
(figurine incensario)	2.4	0.0
<u>Early incensario</u>		
(pedestal incensario)	0.0	34.2
<u>Lacquer (Coarse Redware)</u>	13.6	0.0
<u>Slateware</u>		
(Medium Slateware)	53.8	34.6
Jars	40.0	8.6
Cajetes (basins)	11.1	6.6
Bowls	2.2	13.2
Graters (grater bowls)	0.6	5.2
Polished red		
(Medium Redware)	3.7	24.2
Polished orange		
(early variety of Medium Redware?)	1.2	
Fine slateware		
(Floresent Thin Slateware)	1.5	0.0
Fine orange (X Fine Orange)	0.0	2.26
Total sherds in collection	322.	1,254.

Several clear-cut facts emerge.

1. The cenote sherd deposit consists largely of pottery dating from the Early Mexican and Floresent stages. These two horizons are those of the major occupation of Chichén Itzá. Both are characterized by

Medium Slateware. Vaillant's Fine Slate and Polished Orange (if our identification of Vaillant's description is correct) occur only in Florescent stage deposits, and thus the presence of these wares in the collection suggests a distinct Florescent intermixture.

2. The Early Mexican and Florescent deposit described above is composed of utilitarian pottery, not ceremonial. The preponderance of jars and basins in comparison to bowls and grater bowls suggests that the deposit was formed by the use of the cenote as a water source rather than as a ceremonial center. Strongly reinforcing this conclusion is the absence in the cenote deposit of the so-called pedestal incensarios which characterize both Early Mexican and Florescent times, and which were used ceremonially.

3. Ceramics of the Late Mexican substage occur in the cenote deposit mixed with the Early Mexican Florescent deposit. The number of sherds definitely identifiable as of this substage is slightly less than half the number identifiable of the early periods (28.1 per cent compared to 60.3 per cent). Of the identifiable Late Mexican ceramics, a considerable proportion (all the blue-painted bowls and an indeterminate proportion of the lacquer ware) is believed to have been ceremonial in use.

4. Coarse Slateware, the preponderant pottery of the Middle Mexican substage, of which the most definitive collections come from Dzibilchaltun, is sparsely represented at both Chichén Itzá and Mayapan, and if I correctly interpret Vaillant's tabulations, is completely unrepresented in the Cenote sample. The chief concentrations of ceramics of this period at Chichén Itzá are in above-floor refuse in the Mercado and the adjacent Southeast Colonnade, where architectural evidence of decadent reuse of buildings abounds, and above floors in the Temple of the Wall Panels and the East Building of the Monjas. It therefore seems evident that the Sacred Cenote at Chichén Itzá was little used as a water source by Middle Mexican times, concurrent with a general depopulation of Chichén Itzá, and that the practice of throwing pottery ceremonial vessels into the cenote was not common until the Late Mexican substage. During this and later times, as detailed elsewhere, there is no evidence for the use of the site of Chichén Itzá save as a goal for pilgrimages.

The Sacred Cenote collection of whole and reconstructible vessels at the Peabody Museum, Harvard University, adds additional evidence and detail to the story. Figure 96 illustrates 16 coarse paste vessels of this collection, and an additional vessel (fig. 95, n) is aberrant in slip color but probably of this category. Vessels fig. 96, b and j contained balls of copal. Seven of these vessels bear red slip (Coarse Redware) and the remainder do not, but the paste of all seems the same. Several are painted in blue, some with the addition of other colors. These vessels correspond in ware and shape to other Late Mexican Coarse Redware from the Chichén Itzá and Mayapan collections (cf. figs. 94, h; 26; 22, d; 27, d). A plaster-coated incensario (fig. 97, a) corresponds to the fragments from Chichén Itzá illustrated with it. This type of incensario can probably be attributed to the Late Mexican substage on basis of its occurrence in quantity at Mayapan (fig. 23, d) and its absence from all collections containing Middle, but not Late Mexican material.

Other Cenote vessels from the Peabody Museum collection, some of them ceremonial in type, belong to other periods, mainly Early Mexican. Perforated body incense braziers without attached figurines (fig. 97, h and j) do not appear in the Mayapan collections but do appear in Early Mexican Chichén (fig. 97, g, i). The complete brazier from the Cenote collection (fig. 97, h) bears what appears to be a specular hematite slip on a foreign paste (quite possibly from the Mexican mainland), while fig. 97, i, must be a crude, local, unslipped copy. Two small Medium Slateware basins (fig. 73, b and f) fit as to ware with the Early Mexican basins illustrated in the same figure; b is probably a miniature and likely Florescent in date (cf. fig. 44, b, 41, 43, from Uxmal). An incised Medium Redware jar (fig. 85, a) is certainly Early Mexican (cf. pottery on same plate); the scratched Medium Redware jar sherd (fig. 88, h, l) is closely similar to the accompanying sherds from other Early Mexican Chichén Itzá collections. The medium paste unslipped fabric stamp from the Cenote (fig. 91, i) is placed in time by its close correspondence to fig. 91, g, which comes from trench 1 south of the Southeast Colonnade, an Early Mexican deposit.

Three other objects in the Peabody Museum collection from the Sacred Cenote seem late. The miniature cup-shaped object (fig. 93, w) shows features like those on fig. 93, x, and several specimens in the Regil Collection (fig. 100, g-i). These show enough similarity to modern Lacandon god pots (cf. fig. 100, f) to suggest lateness, and we have encountered no such vessels in excavated material. Another miniature incensario probably from the Cenote (fig. 93, y) likely belongs to the same group; a vessel found on the ground surface in a shrine near Cobá (fig. 100, d) closely resembles this piece. The Cenote bird whistle (fig. 93, aa) resembles the others shown with it; bb and cc were made in 1940 at Maxcanu.

These objects reinforce the conclusion drawn from the sherd collection that the Sacred Cenote at Chichén Itzá was used as a depository for ceramic offerings, as opposed to its use for dumping and as a water supply, chiefly during the Late Mexican period, which is provisionally dated as from about 1200 to 1440 A.D.

A considerable body of literature is available at present on the Sacred Cenote at Chichén Itzá, and will soon be augmented by further Peabody Museum reports. The best beginning reference is Tozzer, 1941, which summarizes and gives references to much of the information available. Bishop Landa describes the persistence of the ceremonial use of the Cenote in the mid-sixteenth century and the numbers of idols still there at that time. Some of these idols very likely were figurine incensarios of the type illustrated in this report (for complete specimens, see figs. 99-102). The tradition of making pilgrimages to abandoned temple sites is documented for various Maya groups from Conquest times until the present. As with the modern Lacandones, these pilgrimages often included the depositing of incensarios.⁴⁰ Chichén Itzá must have remained such a site from its decline at about 1200 A.D. until after Conquest times—abandoned, ruinous, but revered by the Maya as a former glory of their people and as an abode of their gods.

III. CERAMIC DESCRIPTIONS

This section contains the descriptive data upon which the conclusions of the work are ultimately based. An outline of the procedure used in obtaining these data is included in the introduction. The descriptive material is contained in two main sections, a description of the wares and a set of figures with captions illustrating the ceramic form and decorative repertoires. The figure captions are full; into them have been written discussions of relationships between shapes and decoration, and references to similarities with other pottery from this and other areas. The ware descriptions include short, generalized, comparative sections which summarize detailed and referenced material from the captions. A third level of generalization will be found in the sections on historical reconstruction which follow this.

The quantitative tabulations which were made as the pottery was recorded are not included in this monograph because of their bulk. They are available for study at U.C.L.A. It is expected that their chief usefulness will be realized when more detailed analyses of substages are made. They have proved useful already in analyses of the history of shapes and in other detailed work. Their compilation, which required a major segment of all working time, was made in an effort to preserve detailed data which would otherwise have been lost with the necessary discarding of the collections. Forms and rim shapes have been recorded on the individual lots to a total of from 30 to 200 categories. This degree of detail has not been utilized for the establishment of the relatively loose chronology used here. The full tabulations have proved too voluminous for inspectional study. Statistical work now under way on parts of the tabulations should allow the refinement of intraphase chronology and closer interregional time and distributional studies as work proceeds (see Brainerd, 1951). A general picture of the relative frequencies of the major wares can be obtained by examination of charts 2 to 20 and by reading the chapters on stratigraphy and chronology.

The ware descriptions used here are brief and generalized to facilitate their usefulness as a key to the main sorting groups employed during the study. Minor variants from the main range of material and rare intrusive wares are not discussed in detail in this section, nor are detailed comparisons made to pottery from other areas. Data of this sort are included in the captions. It was found that paste texture was a useful sorting criterion; it is defined here simply as the degree of irregularity of the fractured surfaces of the pottery as viewed without magnification. Four divisions were defined and used in the naming of wares; wares were called "Coarse," "Medium," "Thin," and "Fine." There is reason to believe that this variability is due principally to the size of temper particles; fine wares are untempered. In general, wall thickness of vessels varied directly with texture; coarse textures were thicker, fine were thinner. See plate I for illustration. While the ranges of color,⁴¹ slip, and paste textures are believed to be distinct and were found to allow ready sorting, it should be remembered that the collections were sorted separately over a long time period and not referred to for comparison before final editing. I believe that a proper study of the regional and temporal variations certainly present within the categories here set forth can be carried out intelligent-

ly only in close conjunction with technical studies. Such studies were foregone because of bulk of material and scarcity of time; sample sherd collections have been saved in hope of later detailed work. This is a survey, and I can hope to do no more than formulate a framework for later, more detailed study. Miss Anna Shepard very kindly examined several thousand fragments with a binocular microscope, and has sectioned sample sherds for more careful study. Her temper determinations are attributed when used; other temper determinations are mine.

In the sections on comparisons which accompany each ware description, an effort is made to describe such intergradings and distinctions as were noted between wares. The wares chosen in sorting have varying degrees of definition from their accompanying and related materials. Each ware was sorted as a group defined by the presence of several describable attributes characteristically found in combination on single specimens. The characteristics chosen as definitive of wares were those in which tendencies toward occurrence together were noted. The classification is thus believed not to be an artifact of the sorter; each ware represents a product determined by cultural conditioning in the choice of materials, in the techniques used for forming and decorating, and in the stylistic conventions of form and design. The fact that each of the definitive characteristics chosen has an independent distribution of its own makes the drawing of lines between wares depend to some degree upon the judgment of the typologist, even though their tendencies to occur in combination were a prime criterion in the typology. In the judgments made as to ware dividing lines, an attempt was made to use as the definitive characteristics those which (a) showed definite binodality rather than simple intergrading between the two wares in question, and (b) characteristics which might be judged to have been intentionally varied by the potter rather than the result of imperfect control of craft techniques. An effort has been made to describe more closely the occurrence of these characteristics in the several sections on temper, slip, paint, and forms.

Since ware descriptions are at best simply a device for the easier handling of an unwieldy and highly variable mass of material, no inherent dignity should be assumed for those defined here, and no value other than the fact that they represent, in the author's best judgment, the trait clusterings which structure the material studied. They have been named for easier reference; use of these names and definitions should be subject to constant scrutiny as to usefulness in any new work.

The wares used in this report are more broadly drawn than in most archaeological reports on single sites or small regions. This is a result of the thinly spread nature of the sampling and is mirrored in the materials. For example, there is considerable consistent difference between the Regional Medium Redware of Cobá, Yaxuna, and Acanceh. These samples are here lumped under a single ware because the excavation of twenty more sites would doubtless produce several more "subwares" of this period, all having roughly equal variability. This situation must have been caused by many small groups of potters following the same general traditions and styles in their work, but each at the same time varying in materials available and

in minor cultural idiosyncrasies. Close ware descriptions such as those used in reports of single sites become cumbersome in a survey with as wide a regional coverage as this. Closer definition may advantageously be employed in the more detailed studies which should follow this one.

The scheme of classification used in pottery description in this report is hierarchic, with wares as its largest divisions, then vessel shapes, rim shapes, and other details of vessel form. The wares are distinguished by criteria of surface and paste, the vessels by general shape range, the finer classifications by further subdivisions of form. Decoration, although it generally conforms to these descending divisions in occurrence, sometimes crosscuts them, as the other steps of the classification also do on occasion.

In this generalized report, the wares have been used as the stage and substage diagnostics. The major slipped wares have proved particularly valuable as chronological period diagnostics, but in several cases a single ware occurs with no variation, or only slightly noticeable variation, in surface and paste in two successive periods. Examples are Flaky Redware between the Late Formative and Early Regional substages, Medium Slateware between the Florescent stage and the Early Mexican substage, and the Coarse Redware of the Late Mexican substage and post-Conquest times. It is likely that technical ceramic studies on paste and slip may eventually allow finer subdivisions on a basis of surface and paste but they are unavailable for this report, and are not so readily useable in pottery sorting as are macroscopic characteristics. In cases where wares cross major chronological boundaries, the wares have here been divided on the basis of distinctions in vessel shapes, and such less distinctive changes in surface and paste as are observable have been described for supplementary use in sorting. The descriptions of the wares and the section on the sequence of wares in Yucatán should serve to clarify the criteria on which these subdivisions were based.

VESSEL SHAPES, DETAILS OF FORM

Vessel shapes in the major ceramic periods of Yucatán are easily classifiable into certain major categories, which in most cases allow the sorting of body sherds as well as rims into several major subdivisions within wares. Every effort was made to determine the vessel shapes of all periods and to classify all sherds into vessel shape groups. This effort was successful on perhaps 98 per cent of the sherds, due in major degree to the information accumulated in notes and photographs taken of nearly 1,000 whole vessels found in various collections. A description of the nomenclature of the main shapes follows:

Jars all have a globular body with constricted mouth and a neck showing a marked change in curvature of profile from that of the upper part of the body (the shoulder). All jars noted, save in Pattern Burnished Monochrome and in unslipped ware of all periods, have a bottom bounded by an angular junction with the side wall. Slipped jars are always unslipped on the interior, thus allowing all concave⁴² sherds with exterior surface slipped and interior unslipped to be sorted as jar sherds.

Basins have a globular to hemispherical body, no neck, and a wide mouth. Slipped basins always have the interior surface slipped, and usually, although not in all kinds, have the outer surface slipped or partially slipped. In general they are large, heavy vessels, although this is not true in all periods. Constricted

mouthing vessels which conform to the above specifications are here described as basins, although these shapes range far from the accepted concept of the word in English. This was done because such vessels seem in some groups to form a continuous range with shallower wide-mouthing forms. Most basins known from Yucatán have a flat bottom bounded by an angular junction; a few types have a ring base, and one or more may have had three hollow legs. Concavate body sherds which have an interior slip can usually be sorted into basin or various types of bowl sherds by criteria of radius and kind of curvature, thickness, design, or finish of exterior surface.

Basal break bowls are distinguished by an angular to subangular junction between bottom and sides. Floor is usually faintly concave. Walls are flaring to outcurving and are well under the bowl radius in height. Slip covers vessel floor and the interior and usually the exterior sides of walls. Bottom is usually unslipped. Three legs (tripod) of any of several forms are nearly universal, ring bases and flattened bottoms are rare.

Shouldered bowls have strongly concave floors, an abrupt change of curvature at about one-half the vessel height, and rim nearly vertical, often insloping.

Hemispheroid or rounded bowls have no break in curvature of profile. The term hemispheroid is loosely used in this report to include bowls with oval or paraboloid curves, as well as those whose section includes more or less than a semicircle. Interior is always slipped, exterior is usually slipped or partially slipped. Annular bases are standard in some periods, flat bottoms with curving basal junction in others.

Beakers are cylindrical or with slightly flaring side walls and with height nearly equal to diameter. Bottom may be flat or convex with a flattened central area, or may have three small legs. They are usually slipped both interiorly and exteriorly, except for the bottom, and often decorated, usually by incision.

Pyriform vessels are pear-shaped with a bulbous body gradually constricting to a cylindrical neck. They are slipped exteriorly only, and have an expanding (trumpet) mouthed pedestal or tripod rattle legs. Shouldered pyriform vessels are a subtype and have an angular break in contour in the lower part of the body. These forms are often decorated.

Cylindrical vessels are similar in form but higher in proportion to diameter than are beakers. Sides may be straight, outcurving, or incurving. They are slipped exteriorly, the slip extending slightly over the rim. The bottom may be flat; there may be a trumpet base, or tripod rattle legs on a convex bottom. They are often decorated.

Hourglass incensarios have the form of a hemispheroid or paraboloid bowl supported on a large trumpet pedestal. They are unslipped, and often decorated with appliquéd bosses. They usually bear a postfiring coat of lime or white clay.

Grater bowls have an incised pattern enclosed in an incised circle on their floor. The bowl may be of several forms; one distinctive form has a shallow oval profile with incurving lip.

Figurine incensarios in Yucatán most commonly consist of large unslipped cylindrical vessels on trumpet pedestals, to one side of which has been appliquéd a human figurine, hand-modeled, unslipped, but usually painted, with mold-pressed face. They usually bear a postfiring white coat, often overpainted in colors.

Of the above forms the beakers, pyriform vessels, cylindrical vessels, and some of the rounded and basal break bowls are made with thinner walls (thin ware), are often decorated, and are more often traded than are the remaining forms. These are called finewares.

The naming of various of the less frequent forms may be obtained from the plate captions.

Several types of encircling moldings are found on vessels. They usually show such regularity as to suggest the use of a kabal. Descriptive terms are used as follows.

Ridges are small, with cross section approaching an equilateral triangle with heavily rounded apex (see figs. 2, h; 8, i, j).

Flanges are considerably higher than are ridges, their sides are less convergent, and the apex more blunt (see fig. 9, f).

Skirts have a form similar to flanges or ridges but project almost directly downward from the vessel (see figs. 28, a; 58, j).

Basal ridges, flanges, or skirts occur exteriorly at the juncture between the side-walls and bottom of a bowl.

Cutting and terracing is sometimes performed, particularly on skirts, ring bases, and slab legs. Cutting is done by taking series of notches out of the ridge, flange, or skirt, terracing by cutting out crenellations or stair-shaped areas.

Bolster rims are thickened on the exterior surface of the lip by the addition of a fillet of clay, more or less semicircular or loaf-shaped in profile (see figs. 27, j; 43, 44; 73). They occur on basins.

Bead rims are like bolster rims in form but much smaller, never exceeding 5 mm. in depth (see fig. 50, a). They occur on thinware bowls and beakers.

Hoop rims are slightly raised, smooth, wide bands on the vessel exterior adjoining the lip; hoop moldings are placed lower on the wall, or adjoining the basal angle.

To find the sites at which each ware was found, and the location of illustrations of each ware, see chart 1.

WARE DESCRIPTIONS

Pattern Burnished Ware

Surface.—Unslipped matte, smooth, lusterless. Pinkish Buff, Light Vinaceous Cinnamon, darkening to Grayish Olive.

Paste.—Medium-fine fracture, Light Vinaceous Cinnamon to deep gray, temper undetermined.

Decoration.—By burnishing in wide and narrow bands, stripes, and diagonal hachure. Polished areas faintly lustrous; noticeable only in strong light. In illustrations, commas on neck and bottom sherds indicate limits of burnished areas.

Shapes.—Bottles, with distinctive narrow, exteriorly thickened neck; one watch-glass shape.

Comparisons.—Unlike all other wares found in Yucatán in form and decoration. Ware color and texture similar to badly weathered fragments found at Santa Rosa Xtampak and Dzibilnocac in the Chenes area, Campeche. One similar bottle rim fragment was found at Holactun. This rim (unillustrated) is thinner both in wall and lip than the main fragments, but otherwise appears identical. The sherds of the Middle Formative deposits from the Campeche sites dug in 1949 bear no distinguishable burnished designs, but include bottle-neck shapes resembling those from Holactun. This constitutes a stylistic link between the Early and Middle Formative collections.

Chronological position.—Sole known Early Formative ware.

Formative Unslipped Pottery

The Pattern Burnished Monochrome of the Early

Formative substage seems to be unslipped. However, this pottery has a distinctively finer texture and smoother finish than have the characteristic Yucatán unslipped exteriorly striated jars which began to be made in this stage and continued almost until the Spanish Conquest.

Striated jars very nearly identical with the Regional stage unslipped ware jars occurred in several Late Formative stage deposits. In the pure collections of this period excavated at Santa Rosa Xtampak and Dzibilnocac in the Chenes region, the jars have a blunt outcurving lip, with neck meeting body in a gradual curve. No other unslipped vessel forms were noted.

Red Slip over Striated Ware

Surface.—Exterior slipped over a finely striated surface; medium lustre. Color Brick Red to Morocco Red to black.

Paste.—Similar to Formative Monochrome, surface striated externally.

Shape.—Jars only.

Comparisons.—Completely distinctive. Slip color deeper than Formative monochromes, surface finish unique. No comparable material from other areas known.

Chronological position.—Late Formative.

Formative Orangeware

Slip.—Lustrous slip; powdery abrasion common, baring paste. Color Vinaceous Tawny to Terra Cotta.

Paste.—Fine texture, no temper visible to eye, fracture verges on conchoidal, color Orange Cinnamon.

Shapes.—Bowls.

Comparisons.—Much like the Regional Medium Red ware from Yaxuna in slip color and paste texture, but shapes are different. Two fragments show trickle paint. R. E. Smith classes nearly all sherds similar to or identical with Uaxactun Chicanel.

Chronological position.—Late Formative, identified only at Yaxuna.

Formative Monochrome

Surface.—Slipped, smooth, sometimes showing polishing marks; opaque to waxy surface. Color and character of slip variable from site to site; see plate captions. Commonest slip color is a dull orange-red, often gray or yellow splotched. Slip may appear either opaque or waxy. Other slip colors found at some sites are a dull gray to black, a brilliant polished black, a waxy cream color, a clear chalky white.

Decoration.—The waxy orange-red and cream-colored slips at some sites show lighter-colored, or occasionally darker-colored, trickle paint. This paint shows the characteristics of slateware trickle paint. Combinations of the above colors on exteriors, interiors, and lips of single specimens are characteristic at some sites. This ware, with additional study, could probably be divided into at least two subwares, the one characterized by opaquely slipped surfaces not bearing trickle paint, the other by waxy slip and trickle paint. The latter variety may be related to Usulutan ware (Lothrop, 1933, pp. 47-51), the paint of which is similar to Yucatán trickle paint. One specimen was found which may well be Usulutan ware (fig. 31, d, 6). A few fragments among these monochromes bear either red or black paint in designs (see figs. 16, b, 19; 31, e, 25). These may be imports or conceivably may come from a later horizon. Underslip incision and grooving of varying character are common, crude painted areas are rarely found, a few sherds show incision or carving after slipping.

Paste.—Medium-coarse texture. Color Vinaceous Cinnamon to Cinnamon Buff to gray. Temper untested save at Holactun, where it is all sherd.

Shapes.—Flat-bottomed, basal break bowls with slip covering bottoms; spheroid shapes; rare jars; cuspids.

Comparisons.—Ware characteristics do not allow a ready distinction between this pottery and several of the Regional coarse and medium paste wares, and it is possible to confuse certain of the waxy slipped pieces with Florescent Slate and Redwares. The majority of the Formative shapes, however, are completely distinctive; Flaky Redware which also occurs in these shapes is distinguishable by surface characteristics. The great majority of the fragments of Formative Monochrome are classified by R. E. Smith as close or identical to Uaxactun Chicanel pottery, although certain characteristics in the group suggest the earlier Mamom phase (cf. Thompson, 1939, pp. 75-85 for similar wares). The fact that monochrome subtypes seem to show marked segregation among the various sites, and that Flaky Redware was also made in Formative shapes, suggests that complex relationships may appear in later study of the Yucatán Formative stage.

Chronological position.—Diagnostic for Middle and Late Formative phase.

Regional Unslipped Ware

Surface.—Little irregularity of contour, few projecting temper particles, texture of surface is rather coarse. No evidence of polishing.

Color.—Tilleul Buff, Light Ochraceous Buff, Pale Pinkish Buff, clay color to gray, sometimes smudged, never soot-blackened.

Paste.—Fracture coarse. All examined had calcite temper.

Decoration.—Striation on the exterior of vessel walls is very common but not universal on jars of this ware. The striation has been made by raking a tool with evenly spaced teeth over the surface. Patterning of striation varies by period and area, depending upon direction and arrangement of tool strokes. In some regions, a thin wash of black paint was applied at jar rims. Both of these techniques are also used on slipped pottery of Regional stage. In 1942 it was noted that two types of striation could be distinguished on unslipped jars, an early (Late Formative and Regional) type, in which the tool marks are shallow and some of the original surface of the vessel has been left between them, and a later (Florescent) type more deeply striated with little if any of the original surface unaltered. The scale of the later striation is a little larger than the earlier, but does not allow distinction as clearly as does depth of striation.

This typological distinction, although slight and difficult to describe, has proved a ready and reliable sorting criterion, particularly valuable because of the large samples (unslipped jar body sherds) available for its use. Since unslipped body sherds were not saved from Chichén Itzá, the Puuc sites, Holactun, Cobá, and Oxkintok, this information is not available for them. It seems likely that bivalve shells were used as the striating tools. If so, the use of a different species of shell might produce just such a slight but very constant difference in striation as that noted. The change in tool may have resulted from changes either in taste or in the availability of shell, due to varying marine conditions. Or it may reflect a change in Yucatán trade relations. Another hypothesis is that the striations were made in clays of different properties, or at a different stage of drying. In a collection from a chultun just

west of the Monjas, Chichén Itzá (see fig. 65), a unique style of unslipped striated jar occurs with other jars which bear striations on the exterior neck wall and Flaky Redware slip on the lip and neck interior. Associated Flaky Red bowl sherds of mixed Formative and Regional shapes place the striated jars very generally in time. They may slightly postdate the Yaxuna Flaky Redware horizon, but this is uncertain at best.

Shapes.—The jar with striated outer surface occurs in all sampled phases of the Regional stage, save the Flaky Redware phase at Yaxuna and the early phase at Oxkintok. In the Redware-containing Regional stage deposits where this kind of jar occurs, it always bears fine striation. At Oxkintok, the unslipped jar is a version of the concurrent slipped jar, and bears the same black-painted rim decoration; however, striation is occasionally used on jar exteriors at Oxkintok, and appears on interiors of the Flaky Redware jars at Yaxuna, and on Red over Striated Slip jars of the Maní Late Formative deposits. At Cobá, there are unslipped bowls and basins; at Oxkintok, unslipped basins of unique wide-flaring form. There are no incensarios of the Regional stage, save those at Acanceh which come from deposits which bear considerable slateware, and thus are not certainly a part of the Regional repertory, and from Dzibilchultún where the same condition holds. These incensarios bear appliqué décoration.

Chronological position.—Regional stage.

Flaky Redware

Surface.—Lustrous opaque slip, with a tendency to flake or spall in areas from a smooth, fine, powdery, cream-colored undersurface. No powdery abrasion of slip noted. Color a strong red, Ferruginous to Vinaceous Rufous, with slight if any lighter-colored splotching but sometimes grading to dark grays or Sayal Brown. The diagnostic trait of flakiness, which links this ware with Incised and Punctate Dichrome and with the Trickle on Flaky Redware, may be hypothesized as due to a preliminary smoothing or burnishing of the vessel surface before the addition of the red slip, a markedly differing coefficient of expansion between paste and slip, a soft or easily disintegrated underslip, or a combination of various of these factors. The powdery, light-colored character of the undersurface in badly spalled specimens suggests that it may have contained finely divided calcite, the leaching of which may be responsible for the loosening of the harder red slip. The advantage of such a light-colored undersurface might be in the added brilliancy of red slip color attainable thereby. No technologic test of this hypothesis has been made. Shepard (in Thompson, 1939, p. 268) describes a similar effect caused by an underslip on San José II polychromes, but the contemporaneous and earlier monochromes do not show it. Note, however (*ibid.*, p. 75), that San José I monochromes are described as having a tendency to flake. Similar slips are described by Shepard for polychrome of a later phase, Benque Viejo III (Thompson, 1940, p. 11).

Paste.—Coarse texture, color Capucine Buff to Tilleul Buff to gray, usually shows light-grayish temper particles.

Shapes.—Large jars, basins, shouldered bowls.

Comparisons.—Distinguishable from other wares of the same flaky slipped family by its over-all red slip and limitation of decoration to very rare and atypical sherds such as fig. 6, a, 17, 18, 21. San José Redware, the preponderant Formative ware of that site (Thompson, 1939, pp. 75-84), may be related to the Flaky Redware described here.

Chronological position.—Late Formative and Early

Regional. Specimens distinguished as to horizon by their shapes.

Flaky Dichrome

Slip.—Flaky character as that of Flaky Redware, but is Apricot Orange to Vinaceous Cinnamon in color.

Paste.—Similar to that of Flaky Redware. Unslipped interiors of jars are usually deeply striated. Temper of Balam Canche specimens is calcite; that of others is unknown.

Decorative techniques.—Painting in large designs, among which rectilinear step-fret predominates; color ranges Vinaceous Rufous, Terra Cotta, Vinaceous Russet, Ocher Red. Incising seems to have preceded slipping. It is used to outline painted areas, and occasionally used alone. A few fragments (fig. 6, a) show incised diagonal cross hatching. Punctuation is used to fill areas, randomly spaced or in lines. Painting, punctuation, and incision are usually complementary in designs, but occasionally each is used alone.

Shapes.—Large jars, shouldered and basal flanged bowls.

Comparisons.—The stylistic relationships of this ware to basal flange polychrome bowls are discussed elsewhere (see Brainerd, 1948a for a discussion of the distribution of this decorative technique). Flaky Polychrome differs in decorative technique, but seems to belong to the same ware family.

Chronological position.—Stylistically placed in Early Regional.

Regional Polychrome

Surface.—Lustrous red-orange slip. Tendency toward flaking noted in all save Mani and Chac Cave jars.

Paste.—Texture and color as in Flaky Dichrome; jars internally striated. Chac sample (fig. 3, b) with grayish, translucent to opaque calcite temper. Miss Shepard (1951, p. 243) states that almost all fragments are calcite tempered.

Decorative technique.—Painting in black and red on an orange slip.

Shapes.—Large jars, basal flange bowls.

Comparisons.—Slip and paste color and interior jar striations suggest Flaky Dichrome; association and intergrading of bowls (fig. 63, a) with Flaky Dichrome suggest nearly the same horizon for all three groups. Jar fragments are associated with basal break polychrome bowls at Mani, but in collections of long depositional span. Most of the basal break polychrome bowl sherds are accepted by R. E. Smith as Tzakol polychrome. The bowls of fig. 63, a may most logically be hypothesized as indigenous. Although there is not enough evidence here to assure the development of Tzakol-style polychrome from the local Yucatán incised dichrome in the face of the very sparse frequencies of these wares in our collections, it is difficult to explain the collection of fig. 63, a as neatly by any other hypothesis. More collections of this horizon are needed than this thinly spread survey has produced.

Chronological placement.—Middle Regional, on stylistic criteria.

Trickle on Flaky Redware

Surface.—Slip closely similar to that of Flaky Redware, showing same lustre and spalling. Color Vinaceous Rufous, Fawn Color, Sayal Brown to Deep Gull Gray.

Paste.—Closely similar to that of Flaky Redware. Texture rough and crumbly at fracture.

Decoration.—Trickle paint of rich, constant, deep-black color (see fig. 7). Although disposition of paint is closely similar to that of the slatewares, the color in constancy and depth of tone is completely unique.

Shapes.—Large jars, basins.

Comparisons.—This ware is found associated with other members of the Flaky Redware family in several instances. The decorative techniques of this and the dichrome group are never combined. Two successive groups are stratigraphically separated at Yaxuna (see fig. 7). This ware documents a continued tradition of the trickle method of paint application which lasted from Formative through Middle Mexican times.

Chronological placement.—Early and Middle (or Late) Regional.

Thin Red-Brown Ware

Surface.—Slip lustrous and waxy. Color Sayal Brown to Wood Brown to Cinnamon.

Paste.—Smooth, powdery surface where unslipped; medium fine texture. Color Cinnamon Buff and paler.

Decoration.—One sherd bears a red paint splotch.

Shapes.—Small jars and basins.

Comparisons.—Similar to Thin Slateware of Chichén Itzá variety (cf. fig. 4, p.). Its presence in the Flaky Redware deposits suggests that it may be an early prototype of Thin Slateware. Only 12 sherds found.

Chronological placement.—Early Regional.

Fibre-Tempered Ware

Surface and paste.—Unslipped, very smooth surface, silky to the touch. Color Tilleul Buff; honey-combed appearance due to many cavities left by the vegetal temper particles. These cavities under magnification show transparent, siliceous, unbranched filaments which may have come from a grass, agave, or other monocotyledonous plant. This pottery is immediately and easily identifiable in Yucatán collections by weight alone. It is much lighter than any other ware.

Shapes.—Basins.

Comparisons.—Fibre-tempered pottery is known from Florida, although in different shapes, but is unknown from the Antillean area (personal information from Irving Rouse, 1946). Pottery tempered with tree bark has been reported from various localities in the Amazon and Orinoco drainages. Fibre-tempered pottery belongs in the early pottery horizon of Southeastern United States. Association in the Yaxuna Cenote deposits place this ware with reasonable certainty as early Regional; its appearance at Cobá in identical vessel form suggests a middle or late Regional dating. Inclusive dates may thus be placed at 300-600 A.D. in Yucatán. These occurrences can in no sense be considered as valid evidences of cultural diffusion; vegetal tempering as a ceramic trait must have had a long life, and been independently invented often. It is known, for example, from Neolithic West Asiatic cultures.

Oxkintok Coarse Monochrome

Surface.—Slipped, lumpy with imperfectly smoothed temper particles on jars. Smooth on bowls. Slip durable, lustrous. Three color ranges. The first has Cinnamon Buff predominating, varying through Tawny Olive, Orange Cinnamon, Drab, and often splotched with black. This occurs on most jars and a few bowls. Second range is red, varying from Vinaceous Rufous through Mars Orange, English Red, Japan Rose, and occurs on nearly all bowls and some jars. Third is a high-gloss black. See plate captions.

Paste.—Coarse to medium textured, temper crystalline or powdery calcite.

Shapes.—Jars, basins, basal break bowls; large, very shallow, rounded bowls.

Decoration.—Thin, matte, brownish-black paint on jars and bowls.

Comparisons.—There is considerable similarity in shape between this ware and the late Regional Yaxuna and Cobá slipped wares, and Acanceh wares of the same period; there are also similarities to Dzibilchaltun Red on Thin Gray. Basal break bowls and bolster rim basins are closer to Fluorescent slateware forms and farther from Petén forms than are the shapes of these comparable Regional wares, suggesting that the Oxkintok Regional pottery assemblage is more closely akin to the slateware tradition which seems to have overwhelmed all other ceramic traditions before the end of Fluorescent times. Sorting between Coarse Monochrome and Thin Monochrome has been made primarily on vessel shapes, along the same general boundaries as in the slatewares of the Puuc sites. As among Puuc slatewares, there is considerable intergrading, although in general the rounded bowls have finer-textured paste and thinner walls than do the other forms. See figure captions for detailed analysis.

Chronological placement.—Middle Regional.

Oxkintok Thin Monochrome

Surface.—Slipped, lustrous to nearly glassy polish, showing tool marks. Colors Cinnamon Buff to greenish, deep red, high-gloss black, red with fine, evenly spaced gray flecking.

Paste.—Fine textured, hard, thin: 3-5, rarely to 6, mm. Temper undetermined.

Decoration.—By surface alteration, all underslip and including shallow incision, vertical and diagonal channeling, low relief appliquéd lozenges, appliquéd monkey faces. All decoration done with marked virtuosity and restraint. This ware, although not showy, ranks high among New World ceramics in the author's opinion. More material would justify its subdivision into several types. See figure captions for detail.

Shapes.—Shallow oblate spheroid bowls with flattened or ring base, low vertically sided bowls, small cup.

Comparisons.—The group shows intergrading in slip surface, paste texture, and wall thickness with Oxkintok Coarse Monochrome. One delicate cup, fig. 12, i, was classified by R. E. Smith as fitting Uaxactún Tzakol. One bowl of this ware in the Mérida Museum is said to come from Campeche (fig. 103, d). No other resemblances to ceramics from other areas were noted, although the quality of this ware is equal to that of most known tradewares. The accompanying Tzakol style polychrome consists of only 7 small fragments (fig. 9, c).

Regional Coarse Redware

Surface.—Medium lustre, adherent slip. Color Rufous to Testaceous to gray brown showing oyster gray mottlings and, rarely, dark smudging. Samples from Acanceh and Maní lack mottling; jars approach a black color.

Paste.—Coarse to medium texture. Color gray to buff. Temper is calcite and ash, frequencies unknown.

Shapes.—Jars, basins.

Comparisons.—Differs from Oxkintok Coarse Slipped ware in presence of mottling and absence of Cinnamon Buff color range. Slip somewhat darker and less orange than Formative monochromes; differen-

tiated from Flaky Redware by adherent slip and from Regional Medium Redware in coarse paste texture. There is intergrading in all these features at various of the sites. Shapes are a major diagnostic.

Chronological position.—Middle and Late Regional.

Regional Medium Redware

Surface.—Very similar to that of Regional Coarse Redware, but smoother, more lustrous finish; mottling commoner, smudging absent. Acanceh and Maní samples rarely have mottling. One fragment has a gesso coating.

Paste.—Medium to fine textured, ash tempered at Yaxuna and Cobá. Shepard (1951, p. 243) suggests that this ware may be foreign. Color Ochraceous Salmon to Ochraceous Orange. At Acanceh temper unknown, color darker to gray.

Shapes.—Medium size jars, bowls with basal ridge, hemispheroid bowls.

Comparisons.—Western variety of this ware seems the prototype of Red on Thin Gray, and probably grades into regionally, or immediately follows temporally the Oxkintok monochromes. There also seems to be an intergrading into a dark-colored slateware, and may be intergrading into the Fluorescent redware of the Puuc sites.

Chronological position.—Middle and Late Regional.

Cobá Dichromes and Polychromes

Surface.—Polychrome has a glossy, soapy, slipped surface, with underlying Ochraceous Salmon fine-textured paste with a tendency to a powdery, abraded surface when slip wears off. Pastes are tempered with calcite or tuff. Dichromes have a matte surface; paste similar to polychrome, presence of slip dubious.

Shapes.—Deep bowls with increased curvature at wall-bottom juncture; bottoms faintly flattened. Dichrome also made in a shallow bowl with sublabial flange and ring base.

Comparisons.—Some of these may be variants of the Regional Medium Redware of Cobá; their frequency suggests local manufacture. The polychromes were acceptable by R. E. Smith as Tepeu 1 wares, but Shepard (1951, p. 243) suggests a local origin on the basis of technological analysis. See captions to figs. 2 and 3 for details.

Chronological position.—Middle or Late Regional; Tepeu 1 cross-tie.

Fine Grayware

Surface.—Seemingly unslipped; powdery to smooth, with faint lustre. Color same as paste when powdery; one shade darker, Dark Dull Gray, when smooth.

Paste.—Very fine textured; probably untempered, but no microscopic test made. Color Pale Neutral Gray.

Decoration.—Incised, punched, grooved; see figure captions.

Shapes.—Lower beaker with flat or double bottom, flat-bottomed outcurved rim bowl.

Comparisons.—Very distinctive because of extreme fineness of paste and clear neutral color. Forms intergrade with wares of other areas (see captions) and with certain decorated slateware vessels.

Chronological position.—Regional-Fluorescent transition.

Thin Blackware

Surface.—Matte to slight gloss; slipped. Color dead,

brilliant black to Neutral Gray. One fragment with gesso coating.

Paste.—Fine textured; most fragments from Holactun are sherd tempered; some sherds bear fine, translucent, colorless, rounded grains. Some fragments show sulphur colored areas in the paste, as do certain lustrous blackware fragments from Xpuhil, Rio Bec area.

Shapes.—Similar to those better known in Fine Grayware.

Comparisons.—A scattering of blackware fragments from the Puuc sites may belong to this group, but direct comparisons were not made. Xpuhil fragments likely the same ware.

Chronological position.—Regional-Florescent transition. Perhaps continuing into early Florescent times.

Red on Thin Grayware

Surface.—Thin, sometimes abraded slip over a somewhat irregular surface. Slip matte or polished. Color red to Cinnamon Buff. Buff slip commonest on basal angle bowls.

Paste.—Coarse to medium texture. Deep Gull Gray to Light Gull Gray in color. Paste somewhat friable.

Shapes.—Medium size jars, basal angle bowls.

Comparisons.—Wall thinness is to some extent diagnostic, but approximates that of Coarse and Medium Regional Redware. Slip color range is similar to that of Oxkintok Monochromes. Gray, friable paste is best diagnostic from both these wares. Red on Thin Grayware is shown to be definitely contemporaneous with Medium Slateware at Dzibilchaltun, and to be gradually replaced by slateware during the time of deposition. This situation has been used to place the site sequentially.

Chronological placement.—Regional-Florescent transition.

Dzibilchaltun Fine Orange

Surface.—Unslipped, or may bear areas of Apricot Orange, clear white, or Quaker Drab slip. Unslipped surfaces either powdery or faintly glossy. White slip opaque with medium lustre; black slip thin, a stain.

Paste.—Very fine-textured; probably untempered, although untested microscopically. Clay color and texture distinctively like that of fine orange of other periods.

Shapes.—Outcurve-sided low beakers, barrel-shaped cylinders, flat-bottomed sharp basal angle bowls; hemispheroid bowls rare.

Decoration.—Incised through slip; removal of background areas rare. Black painted lines and designs present.

Comparisons.—Differs from its most similar ware, Puuc Fine Orange, in that incised lines are thicker, less variable in width, and clumsier in execution; rim shapes are mostly outcurved; designs, motifs differ.

Chronological position.—Regional-Florescent transition.

Florescent Unslipped Ware

Surface.—Like that of Regional Unslipped ware; smooth to porous, no polish. Color commonly Tilleul Buff to gray, sometimes smudged. Texture of surface porous.

Paste.—Fracture coarse. Temper predominantly or wholly calcite in jars. Some incensarios show sherd, others volcanic ash temper, suggesting that they may be made of Medium Slateware paste left unslipped.

Decoration.—All jars have externally striated bodies; this striation is deeper and coarser than that on Regional-stage unslipped jars. Incensarios bear several varieties of hand-modeled appliquéd decoration on their exterior walls, and often show traces of a thick, white, calcareous coat, applied after firing. The appliquéd decoration is varied: applied crude tetrahedrons in patterns, cut and sometimes reed-stamped encircling fillets, variously shaped lugs.

Shapes.—Large to medium size jars, incensarios, perhaps some bowls, although such fragments may also belong to incensarios; rare incense ladles with tubular handles.

Comparisons.—The unslipped, striated-surfaced jar is found in the Central Maya area in late Formative times⁴³ and continues through all periods. Its earliest certainly documented appearances in Yucatán are at Yaxuna in a phase strongly influenced from the Petén (Tzakol and Tepeu 1), later at Dzibilchaltun and Acanché in a phase showing a marked mixture of slatewares with monochromes which seem to derive from the early Oxkintok phase (where fully developed unslipped striated jars are absent). In the Chenes sites (1949 season), striated jars occur in slateware deposits which probably are equivalent to the Yucatán Regional stage. Thus the unslipped, striated jar would seem to have appeared from the south, accompanying both slatewares and Petén-like monochromes, but with forerunners in the Flaky Redware and Early Oxkintok horizons.

The unslipped incensario is earliest recognizable at Dzibilchaltun and Acanché with the Regional-Florescent horizon, and, like the unslipped striated jar, seems to run through the Florescent and into the succeeding Mexican stage as a continuous tradition which shows no striking changes in form or decoration. Unslipped incensarios begin in the Formative phase in the Guatemala highlands (De Borhegyi, 1950, 1951), but neither form nor decorative technique closely approaches those treated here. At Uaxactún in the Tzakol period (Smith, 1936a, fig. 4, 8-10) and in the corresponding San José II period (Thompson, 1939, p. 87), unslipped incensarios with appliquéd spikes not unlike those on the Yucatán specimens appear. This suggests that the spiked incensario may have diffused north from the Central Maya area into the Yucatán peninsula, a hypothesis made more likely because of the known high-ceremonial development of the Petén Maya during this time period.

Tubular-handled incense ladles are rare. They probably represent either stray sherds of the Early Mexican substage, or an evidence of Mexican influence antedating the Mexican substage. Some of the Puuc architectural detail also suggests such influence. Incense ladles, but with trough-shaped or solid cylindrical rather than tubular handles, are contemporaneous with the Florescent stage in Guatemala (see Kidder, Jennings, and Shook, 1946, fig. 201, a, b for examples).

Florescent Medium Slateware

Surface.—Slipped, slight to medium lustre; waxy, translucent appearance, varying occasionally to opaque; often shows faint encircling marks such as might result from applications of cloth to a turning vessel. Sometimes bears an inconspicuous, regular crackle; dendritic white opaque, or purple markings common, which seem to have been caused by contact of roots with the buried pottery. Depressed slipped areas often chalky and thus suggestive of a polishing technique, but lack of tool marks suggests a soft implement. Color corresponds quite closely to that of the body clay surface, and ranges through oyster gray to brownish

grays, brownish reds, purplish grays; Avellaneous, Light Pinkish Cinnamon, Cartridge Buff are common. Maertz and Paul colors seem a closer match: 14A5, 12B3, 13C4, splotches of 56L7, 11E4, 37A1, 12B2, 94H6. Color often shades to a dark brownish gray in large areas. Light-grayish slip tints usually are found on calcite tempered pastes.

Paste.—Texture medium, sometimes grading to fine. Colors Vinaceous Cinnamon in reddish areas to Avellaneous in yellowish areas; light gray also seen. Tempering materials include calcite of various types, powdery to crystalline and in various stages of subdivision, tuff in considerable frequency, reddish clay lumps which may have been a constituent of the clay, and crushed sherds; several of these types sometimes occur mixed in single sherds. Frequency of temper types varies markedly at the various sites tested; light paste color is definitely correlated with calcite temper. Temper classifications, if done on all collections, give promise of much aid in determining regional and chronologic differences in this ware, the present classification of which is far from satisfactory. The finer-textured pastes of this group are identical with that of Thin Slateware; sorting distinctions have been drawn in this classification on vessel shape and thickness of wall rather than upon coarseness of paste texture, which is only in general positively correlated with wall thickness.

Decoration.—In trickle paint; decoration ranges from a color lighter than slip to a deep black. Commonest range is a deep brown; cinnamon tints common. Outlines normally blurred and indistinct. Color often has a clotted appearance on lighter background, sometimes no color save for faint dark outline. Lines usually 1 cm. or wider. Jars and basins invariably bear irregular vertical trickles, exteriorly on jars, both exteriorly and interiorly on basins. Bowls bear rim blobs and floor decorations, some elaborate. Although unanalyzed, this paint behaves like an organic pigment; the vague outlines and occasional reversed or disappearing color are both characteristic of this type of paint. In addition to the trickle paint, this ware is occasionally decorated with preslip or postslip incising, specular red slip bands, or incising through red slip bands. Thumbed or design-stamped fillets and mold-pressed designs on hollow legs were also used as decoration.

Shapes.—Large, medium, small, and miniature jars. Jar lids. Basins, small basins, basal break bowls with variety of tripod leg shapes, some with basal ridges and skirts. Rounded bowls with exterior beveled or tapered lip, and ring or flattened base. Drums with heavy, exteriorly striated, unslipped rims.

Comparisons.—This ware is the distinctive and predominant ceramic product of the northern Yucatán Peninsula. Its distinguishing characteristics are the waxy slip and the trickle paint. Both go back to the Formative stage, where certain of the slipped monochromes bear waxy slip, though of an orange cast not typical of developed slateware, and also bear the characteristic vaguely bordered trickle paint. The earliest known ware approaching the form repertory of Fluorescent Slateware is Black Trickle on Flaky Redware which, however, lacks the slip and paint characteristics of slateware. With the coming of the Mexican stage, the waxy slip grades into opaque white. Coarse Slateware follows with white opaque slip and the last appearance of trickle paint decoration.

Chronological placement.—Fluorescent into Early Mexican. Earliest appearance is hard to date, and was likely localized. In Yucatán, on evidence of the early Oxkintok collections, it seems to follow 9.2.0.0.0. At Santa Rosa Xtampak it was almost the only slipped

ware before 9.16.0.0.0. At Yaxuna it seems definitely to have been present, but not dominant, at about 9.12.0.0.0. There seems good reason at present to hypothesize that it developed with mosaic masonry decoration of the Puuc-Chenes-Río Bec style, and originated in those areas contemporaneously with the Regional wares of the Yucatán area; gradually, with its accompanying architectural style, it supplanted the earlier wares of that area. It must be emphasized, however, that sampling has been scanty and sporadic; future work may alter the picture.

Thin Slateware

Surface.—Slip with medium lustre, less waxy and translucent in appearance than Medium Slateware; characterized by a fine crackle in which predominant direction of line is vertical. Dendritic purple markings common, vessels all over-slipped. Colors, Pallid Purplish Gray to Cartridge Buff to Pale Olive Buff, are lighter than those of Medium Slateware.

Paste.—Is fine-textured at fracture, but is tempered; light gray to buff in color; walls are thin, averaging 4 to 5 mm., rarely less than 3 mm. or more than 6 mm. thick. Tempered with fine calcite in lightest-colored specimens, others with tuff, clay lump.

Decoration.—Vertical preslip channeling and preslip incising are rare. Trickle paint, nearly universal on Medium Slateware, never occurs. Gesso coatings, white, rose, and green, occurred on a few sherds.

Shapes.—Tall and low beakers, hemispheroid bowls.

Comparisons.—Considerable intergrading with Medium Slateware in surface and paste characteristics. Vessel shape and wall thinness were valuable as sorting criteria, and were followed rather than paste in a few cases where fine-textured paste was used in shapes normal to Medium Slateware. Certain variants of this ware, found in early Florentine collections and at Chichén Itzá in collections of uncertain date, suggest that this group may have derived forms from such earlier finewares as Fine Grayware and Thin Blackware; the common hemispheroid bowl shape in this ware seems a newcomer. The Thin Red-Brown Ware found at Yaxuna (see fig. 6, 1) may represent an early stage in the development of Thin Slateware.

Chronological position.—Florescent.

Florescent Medium and Thin Redware

Surface.—Slipped, medium lustre. Slip adheres closely to paste; no tendency toward crackling or spalling. Rarely with dark blotches, sometimes bears purple dendritic markings. Slip appears translucent and waxy, varying with paste color. Color ranges: Ferruginous, Vinaceous Rufous, Japan Rose, Congo Pink.

Paste.—Medium to fine texture, but never untempered. Color always red, slightly lighter than that of slip. Temper about equally divided between tuff and calcite; sherd and clay lump temper rare.

Shapes.—Beakers, thin- and thick-walled hemispheroid bowls, small basins, basal break bowls.

Comparisons.—This ware may be considered as a color variant of Medium and Thin Slatewares since it occurs with the slatewares, and in the same shape repertoires. Redware in the Puuc sites is largely restricted to vessel shapes of the "Thin" category. Difference between slatewares and redwares on basis of color is complete, with no intergrading noted. The color difference is probably caused by choice of body clay. Color and slip qualities as well as form make this ware distinguishable from the Regional and later redwares.

Chronological position.—Fluorescent stage.Holactun Slateware

Surface.—Slip lacks the waxiness of Medium Slateware, appearing opaque; ranges lighter in color (Til-leul Buff to Light Gray to Neutral Gray to white); and does not match underlying paste color. In unpainted areas there is a tendency toward spalling.

Paste.—Medium-textured fracture. Color Cream Buff, Apricot Orange, or Deep Neutral Gray. Temper all or nearly all sherd.

Decoration.—Paint only. Lustrous black to Neutral Gray. More resistant to weathering than slip. Applied in regularly and closely spaced trickles, with heavy, bulbous thickenings merging into horizontal zones near the rim.

Shapes.—Small jars with either nearly vertical rim with T lip, or flare rim with outbent lip. Two opposed vertical loop handles at shoulder rim angle have a straplike cross section. Jar lids found. Basins have T lip, strap handles are horizontally placed. No bowls of this ware were identified at Holactun.

Comparisons.—Although this ware is closely similar in general form and decoration to the Medium Slateware of the Puuc sites, it can readily be sorted by slip and paint color range, reinforced by rim variations and the prevalent sherd temper. The prevalence of sherd temper in the Formative Monochrome from Holactun suggests a possible continuity of ceramic tradition there and, as a corollary, the placement of this ware earlier than Fluorescent. The presence of this ware in smaller quantity in Puuc sites argues for contemporaneity and trade with Holactun. Holactun slate is reported at Etzna by Ruz (1945, pp. 50, 61), who implies that it is abundant there in association with slateware of Puuc type and that it postdates steiae 18 and 19, which date 9.12.0.0.0 and 9.13.0.0.0 and are in turn associated with late Tzakol or early Tepeu ceramics. The almost complete absence of Holactun Slateware at Santa Rosa Xtampak and Dzibilnocac in the Chenes region is rather surprising, in view of the abundance of the ware at Holactun and Etzna, and of its presence in Puuc sites. Since these Chenes sites must be at least partially contemporaneous with the Puuc sites, a cultural barrier of some sort between them and Holactun and Etzna is suggested.

Chronological position.—Fluorescent stage.Puuc Fine Orangeware

(Z-type Fine Orangeware, see Brainerd, 1941, pp. 173-178, plate III, g, i-cc, for detailed descriptions.)

Surface.—Smooth, often bearing red or white glossy slip. Both paste and slips usually show chalky abrasion. Unslipped surface ranges from between Light Ochraceous Salmon and Light Ochraceous Buff through Light Ochraceous Salmon to Drab Gray.

Paste.—Untempered, with a fine, chinalike fracture. Color through paste matches surface color; see above.

Decoration.—Modeled gadrooning, incising through slip into leather-hard or dry clay, painting of areas with red or black slip. A gesso slip is found rarely; two colors, rose and green, were noted. The white slip is of glossy finish, clear color, fine texture, thinly applied, and quite opaque. Red slip bears medium gloss, ranges nearly to a black color, and when thinly applied often shows a streakiness which is used in designing (fig. 59, f, 3). Black slip appears like a stain, not altering the surface gloss of the paste and of no appreciable thickness. In some specimens, the streak-

iness caused by light application is used in designing (fig. 103, m). Incising always penetrates the slip and is drawn rapidly with a smooth calligraphic technique on a leather-hard to dry surface. Most designs include incised background areas. Drawing is more delicately done than on either Chichén Itzá (X type) Fine Orange or Dzibilchaltun Fine Orange, utilizing changes in pressure for variations from a thick to a thin line. Design arrangement seems to be limited almost exclusively to paneled bands, most panels showing two alternating designs. Common elements are rounded or squarish circles and scrolls, and delicately drawn curlicues which are used as space fillers.

Shapes.—Bowls of parabolic form with tapering lips, with or without ring or low pedestal bases. Barrel-shaped to wide-mouthed pyriform vessels with flat bottom, perhaps at times with pedestal base. Jars are rare, and of variable form; all vessels are small and thin walled.

Comparisons.—The pastes of the four kinds of fine orangeware are easily distinguishable from all local potteries, and are closely similar to the paste of figurines from the Island of Jaina. Since the Jaina figurines are presumably of local manufacture, they evidence a local use of an untempered, orange-colored paste. Ruz's report of abundant Z Fine Orange from excavations on the Island of Carmen (Ruz, 1945, p. 69), as well as the example from a Carmen collection illustrated as fig. 36, i suggest that this area may have been at or near the locality of manufacture. Two vessels reported from Jaina, our fig. 103, m and possibly that illustrated by Pifia Chan (1948, figs. 22, 23), although the paste of this latter piece may not be fine orange, lend support to the theory that the Fluorescent styles of fine orangeware may have Campeche coast origins. The chronological precedence of Dzibilchaltun Fine Orange over Puuc Fine Orange, as well as their placement in a single tradition, seems unquestionable; the form differences between the two wares are in accord with form sequences known in Thin Slateware, Fine Grayware, and the blackwares; their decoration intergrades, and their pastes seem nearly identical. Fragments of Puuc Fine Orange illustrated from other areas (see Brainerd, 1941, pp. 178-179) when identical are likely indicators for trade with the Campeche coast. Puuc Fine Orange is quite distinctive from the later Chichén and Mayapan Fine Orange wares both in form repertory and in design.

Chronological position.—Fluorescent stage.Mexican Unslipped Ware

Surface.—The same as Fluorescent Unslipped Ware. Color also the same. Texture of surface porous.

Paste.—As in Fluorescent Unslipped Ware. Temper believed to be exclusively calcite.

Decoration.—Striation on jar exteriors continues through this stage. Crudely modeled animal-head lugs are added to jars in the Late substages. Incensario decoration is augmented by the use of applied discs and perforations, and later by vertical flanges and appliquéd, elaborately modeled human figures with mold pressed faces. Hand-modeled decoration occurs on the forms and hand-modeled animal figurines are found. A thin, irregular red wash is found in Early Mexican times, on "Mixtec braziers" and on small tripod, basal break bowls. White calcareous paint and a pale blue paint, as well as occasional use of other colors, are characteristic of incensarios and also occur on unslipped vessels other than jars.

Shapes.—Striated jars continue through the stage, with change in rim shape during the Early substages.

In the Early substage, the following shapes also occur: comales are very rare; "Mixtec braziers" with perforated sided pot-shaped body, tubular handle, and two tall legs; small basal break bowls with tripod legs. Middle substage collections are small, and unslipped ware forms not clearly known. In the Late substage, the "Mixtec braziers" and comales have disappeared. Large flattish bowls, perhaps with pedestals, and basins with constricted rims appear. Also probably of this substage are hand-modeled hollow animal figurines, masks, and animal effigy bowls.

The incensario form shows changes during Mexican times. A new, taller, more constricted form on a pedestal appears and, in either the Late Mexican substage or during the succeeding interregnum, the figurine incensario, with cylindrical body on a pedestal, appears with vertical flanges and appliquéd human figurines with mold-pressed faces and hand-modeled body and details.

Comparisons.—Origin of the new jar rim shape is obscure. Comales are common in the Guatemala highlands and in the Motagua Valley. The new incensario shape has also been reported from the Motagua Valley. The animal figurines have parallels at Santa Rosa, British Honduras, and at Cerro de Las Mesas, Veracruz, as do the figurine incensarios, whose vertical flanges suggest Guatemala highland forms. Attached human figures on incensarios occur earlier in Oaxaca, and have a tremendous range along the east coast of the Mesoamerican area in immediate pre-Conquest times.

Chronological position.—Mexican stage.

Mexican Medium Slateware

Surface.—Slipped, smooth with faint lustre. Slip is adherent, with little tendency toward weathering or spalling. It is often grayish-white to gray in color, appearing opaque, and lacking the soapy, translucent appearance of Fluorescent Medium Slateware. Slip color is often independent of paste color. Considerable intergrading with the soapy, translucent slips of Fluorescent Medium Slateware was noted.

Paste.—Medium texture of fracture, color ranging from reddish-buff, the commonest color, to gray. Temper appears to be exclusively volcanic ash.

Decoration.—In trickle paint, with character seemingly identical to that on Fluorescent Medium Slateware. There is some difference in the designs of the two. S and U elements are used on the shoulders of medium sized jars (figs. 71, a; 72, e, k, l); series of spirals are pendant from the rim on bowl interiors (fig. 74, c).

Underslip incision is rarely used as on Fluorescent Medium Slateware, usually in designs of X Fine Orange style (fig. 72, a, b, c, h).

Note in fig. 72, a that black paint has been used as a slip band, also as in X Fine Orange, cf. fig. 80. The fine orange designs on this ware are always slipped after incising. Incising on drum rims (fig. 72, k) and on grater bowl interiors (fig. 74, i) is usually done on unslipped areas. Graffiti drawing (fig. 72, d) was probably an idle time pursuit on fired vessels or on sherds.

Shapes.—Large and medium-sized jars with either tall, concave, cylindrical necks or short to vestigial thickened necks bearing external banding grooves. Basins in general Puuc shape and size range, but with direct rims, or bearing bolsters differing from Puuc forms in that they lack an internal angular termination of the lip; low bowls which in profile range from having an unbroken curve from bottom to lip, through subangular bottom rim juncture. Most of these bowls have flattened bottoms and no base or legs; a few of the

subangular specimens bear thin, hollow, rattle legs. Oblate hemispheroid grater bowls, floor with circular incised area, bear hollow rattle legs. Rattle legs are normally tenoned into the bottom and then luted. Pedestal stands with flat top on an annular base. Tall cylindrical vessels with trumpet base. "Pestles" with punched bottoms, curved taper shank topped by crudely modeled animal head. Drums are probably indicated by large diameter, heavy outcurving rims with unslipped, vertically striated exteriors. A few effigy vessels were found.

Comparisons.—This ware shows close similarity to Fluorescent Medium Slateware. In the tabulation of the materials done in 1940, the defining limits between the two wares were drawn on the basis of shape and decoration; the somewhat variable difference in slip appearance was used only secondarily. Most of the collections at Chichén Itzá show some mixing of Early Mexican and Fluorescent forms. All sherds not fitting into the Puuc repertory and having a light slip color were assumed to be of Early Mexican substage, since the succeeding Coarse Slateware of the Middle Mexican substage is distinctively different. Thus, the primary sorting criteria between Fluorescent and Early Mexican Medium Slatewares were not those of ware (paste and slip), but of form and decoration.

A weak point in the sorting technique used above is the possibility that some pottery types not found in Puuc-region Fluorescent collections may have occurred in the Fluorescent stage of the Chichén Itzá area. We have no large, pure collections of this stage from the area of Chichén Itzá. That this error did in fact occur is evidenced by the finding in 1949 of certain forms formerly believed to be Early Mexican diagnostics at Chichén Itzá in the substructure of structure 1 at Xpuhil in the Río Bec area. This typical Río Bec structure (Ruppert and Dennison, 1943, frontispiece) is almost certainly of pre-Mexican date. There are two of these forms, the pedestal stand shown in fig. 71, e-i, and the "grater bowl" or bowl with scored floor (fig. 74, i-j). The Xpuhil pedestal stands are almost identical with those from Chichén Itzá; the bowls are of different form, but still bear the scored pattern on the floor. The amazingly close correspondence between pedestal stands and "stools" from Marajoa on the Amazon has been remarked (see fig. 71, caption). The grater bowl has a long history (see fig. 74, caption), but the most likely antecedents to the Chichén Itzá forms would seem to be those from Xpuhil, southeastern Campeche. The designs show similarity to one of the two styles of Mazapan pottery (Linné, 1934, figs. 70, 71, 73, 94, a) which may be significant. If so, the Mazapan bowls must owe their designs to contact with Yucatán, where these designs have a long history.

The tradition of Early Mexican Medium Slateware must stem from that of the Fluorescent Medium Slateware which seems to have been used throughout the Northern Yucatán Peninsula, although our only good repertory comes from the Puuc sites. The local (Chichén Itzá) variant of this ware may reasonably be hypothesized as influenced from the Río Bec area to the south on evidence of the pedestal stands and grater bowls. A more pervading stylistic influence in both form and decoration from imported X Fine Orange pottery from Veracruz is abundantly evident (see captions for figs. 71-74, 82, 83).

Chronological position.—Early Mexican substage.

Mexican Medium Redware

Surface.—Smooth, medium polish, varying from waxy, translucent surface with grayish "bloom" and

deep-red undertone often broken by purplish dendritic staining, to a strong, more opaque deep red, sometimes flecked with holes and cracks with black weathered edges. Surface often variable on same vessel. Color Etruscan Red to Testaceous. Mottled areas Wood Brown to a pewter or greenish-gray suggestive of plumbate, but with less reflection. Occasionally iridescent. Occasional pieces are blackened.

Paste.—Similar in texture to that of Medium Slateware, but always red in color (Vinaceous Cinnamon to Light Pinkish Cinnamon). Temper of this ware as sampled by Miss Shepard is almost exclusively volcanic ash.

Decoration.—Underslip incising, save on three bowl sherds which are incised through slip. Incised area sometimes covered by a white or black slip band. Never bears painted designs. Decoration follows the style of X Fine Orange incising (see figs. 82, 83 for comparisons), but may also show evidence of local tradition. As in the Medium Slateware of this period, the tradition of underslip incising has carried over from Florentine times.

Shapes.—Medium-sized jars, pyriform and cylindrical vessels with cascabel tripods and trumpet bases, bowls, drum-shaped vessels, basal break bowls, shallow spheroid bowls.

Comparisons.—This ware is certainly grounded in Florentine tradition, the Thin Redware of the Puuc sites. Slip and paste of the two wares show marked similarity. However, the style of shape and decoration of Mexican Medium Redware shows more influence from X Fine Orange ware than does the style of Mexican Medium Slate (see figs. 85-88 and captions). Forms seem to be X Fine Orange copies, save perhaps for fig. 86, a-c, as does the decoration, save perhaps for fig. 85, a, although there are various suggestions throughout of influence of the local tradition in shape and design. This strong influence of the Mexican mainland imported fine wares is not surprising; this ware, like its Florentine predecessor, was fabricated into medium-sized and small vessels, many of which are decorated and which must have had a restricted "upper class" use. The "upper class" people of this period were culturally oriented toward the Mexican mainland.

Chronological position.—Early Mexican substage.

Red on Medium Slateware

Surface and paste.—Variable; some pieces have a waxy Medium Slateware slip and characteristic paste, others have finer paste texture and slip of an atypically neutral gray color with darker streaks of Pallid Neutral Gray and irregular areas of Pinkish Buff. Others have a slip ranging toward buff in color, which tends to abrade from a medium-textured paste. It is likely that several wares are represented under this loose rubric.

Decoration.—All this pottery is decorated in roughly applied red paint, minimum width of line 4 mm., average 10 mm.; irregular rounded circles or rounded blobs of paint are common. This paint is a pigment rather than a stain, and often shows relief against the glossy slip. Some painting on typical slateware slip shows bad abrasion, in other cases it seems to have been burnished into the slip. The paint adheres well to the other slips. Pigment is of two types, a purplish red showing specular reflections, and an orange red not showing sparkle. The paint on the gray slipped specimens tends toward a purplish color with "bleached" gray or whitish areas. It shows brush marks as high ridges, must have been very viscous when applied, and is quite hard after firing.

Shapes.—Large to small jars, small basins, lids, incense ladles, hemispheroid bowls.

Comparisons.—This ware, like Mexican Medium Slate and Redwares, illustrates the strong effects of foreign stylistic influence on the local ceramic industry. The technological task of separating the local slate and redwares from fine or orange imports was easy, the untempered orange paste allowing macroscopic sorting. Red on Slateware has been inspired by mainland products, specimens of which probably lie in the collections, as yet unseparated from the local ware. The origins of Mexican inspiration—if not of Mexican trade—can be at least partly fixed. The Tula collections show decoration closely similar to certain of the Red on Slateware specimens; the Xochicalco collections contain specimens markedly similar to others (see fig. 75, caption). The Tula specimens are of Toltec to Mazapan date and, since Tula almost completely lacks Aztec I (Culhuacan) style pottery, were probably made before that period. At Chichén Itzá, it has been impossible to demonstrate any chronological separation between Red on Slateware and the X Fine Orange-ware which shows such close similarities to the Aztec I decorative style. Either the Early Mexican subphase at Chichén Itzá may cover successively the Tula-Toltec and Aztec I periods, or X Fine Orange painted design style may have been in existence in Veracruz before the Culhuacan Aztec I pottery was made. But both of these hypotheses depend upon the assumption of relatively rapid and uninhibited spread of design styles through the Valley of Mexico during this period. The presence of Red on Slateware style decoration at Xochicalco (where it seems to have been more used than at either Chichén Itzá or Tula) may aid in the dating of this puzzling and important site.

Chronological position.—Early Mexican substage.

Chichén (X type) Fine Orangeware

(For additional description, see Brainerd, 1941, pp. 163-172.)

Surface.—Very smooth to lustrous but never waxy in feel. Surfaces, particularly when unslipped, often show a powdery abrasion. Most sherds bear an opaque slip somewhat darker than the underlying paste (Vinaeuous Tawny to Terra Cotta to Smoke Gray). Slip has at times collected in thickened, lustrous-surfaced areas on unexposed surfaces. Rattle legs are luted in place and show no tenoning. Both legs and luting are so circular as to suggest kabal manufacture. Bands or panels of either white, black, or purplish-red slip showing sparkle are used in conjunction with incised designs. The black appears like a stain, uneven in density of color and not altering surface lustre. The white is glossy, clear in color, opaque, laid on heavily, subject to abrasion and occasional spalling. It may have been burnished. Encircling scratches of very even contour commonly occur on unslipped surfaces.

Paste.—Texture of fracture exceedingly fine, chinalike; no inclusions are visible to the naked eye, but fracture shows a faint, even graininess. Color is Vinaeuous Cinnamon or Orange Cinnamon, occasionally ranging to Neutral Gray.

Decoration.—Of two types, incised or plano-relief and painted. Incised lines range .5-1 mm. wide and of about the same depth. They seem to have been engraved into nearly dry clay; outline is crisp, with little or no burr. Drawing is precise, and curves are evenly rounded. Cut-away areas show the action of a chisel-shaped tool with faintly and unevenly serrated edge; a wooden tool would give this appearance. Where slip was present, the incising was always done after

slipping and always penetrates the slip so that the orange paste shows good contrast with the slip color. Incised design occurs alone or in combination with painted design, which may also occur alone. Painted design is done with the same black, stainlike paint that is used for secondary slipped areas under incised design. Drawing is done freely, often carelessly, in lines 2-4 mm. wide. Occasionally, black-filled areas are used. For discussion on the styles of incised and painted design, see Brainerd, 1941, Brainerd, 1953, and captions for figs. 76-84.

Shapes.—Medium jars, pyriform and cylindrical vessels with cascabel tripods and trumpet bases, flat and round-bottomed basal break bowls with cascabel tripods, hemispheroid bowls, effigies, vertical doughnut vessel, etc.

Comparisons.—The Chichén Itzá collection of this ware is the largest in existence (1,053 sherds and 11 whole vessels), unless the scattered collections from Isla de Sacrificios, Veracruz, be considered as one. The predominant types from Isla de Sacrificios are not found at Chichén Itzá, and the types of the Chichén Itzá collections are not found predominant among the decorated wares of any other site. On the other hand, there is no doubt that the Fine Orangeware of the Early Mexican subphase at Chichén Itzá was not made in Yucatán, and little doubt that it was made somewhere in coastal Veracruz or in Tabasco. The absence from Chichén Itzá of a wide variety of fine orangeware vessels known from Isla de Sacrificios, Cerro Montoso, and elsewhere, which have boldly drawn white designs with black and at times deep red outlining and secondary design, suggests that this type of design may not be contemporaneous with the Early Mexican substage deposits at Chichén Itzá. The proveniences of the few sherds decorated in this color combination found at Chichén Itzá suggest that these vessels may date later than X type Fine Orange.

The marked similarity between X Fine Orange painted design and Aztec I painted design has been discussed elsewhere, as have the distinctions between the painted and incised design styles and the possible origins of both styles. (See captions of figs. 82-84.) The cross-dating of the Yucatán and Mexican mainland chronologies is well served by this ware. The problems of the origins and interaction between the two styles must be sought on the Mexican mainland. The Chichén Fine Orange sample from Mayapan (see fig. 28 and caption) may represent a late variant of this ware, and may be dateable to the Middle Mexican substage.

Chronological position.—Early Mexican substage.

Plumbate

(See Shepard, 1948, pp. 130-131, for Yucatán Plumbate.)

Miss A. O. Shepard has described this ware so exhaustively that no further description need be given. No Yucatán Plumbate found is identified by Miss Shepard as of other than Tohil type, which is the type found elsewhere associated with X type Fine Orange. One hundred and seventy-eight fragments come from the Chichén Itzá deposits, most of which are clearly from Early Mexican substage deposits. Two fragments come from top levels at Uxmal, and one each comes from surface finds at Oxkintok and Maní.

Chronological position.—Early Mexican substage.

Coarse Slateware

Surface.—Slip with faint lustre, but with lumpy surface—a fine-grained slip over a paste bearing protrud-

ing temper particles. Color is grayish-white occasionally smudged to dark gray; a variant has a dull orange colored slip (Orange Cinnamon or Pale Cinnamon Pink). The white slip may well be identical with the opaque white slip which is found on much Mexican Medium Slateware.

Paste.—Coarse texture on fracture. Usually distinguishable from medium-textured paste of Florentine and Early Mexican wares by fracture as well as by rough surface. Temper determined by Miss Shepard on 36 specimens, all calcite. Paste color ranges gray to red-orange flecked with gray temper.

Decoration.—By black trickle paint. Paint occasionally disappears in spots, but never has the brownish range of Florentine slateware paint. Orange variant of this ware usually does not bear trickle paint.

Shapes.—Large to medium jars, basins, basal break bowls, hemispheroid bowls, grater bowls, cylindrical and pyriform vessels on pedestals, effigies.

Comparisons.—The distinguishing feature of this ware is the use of a coarse paste with a new undersurface finishing technique. Wall thickness is greater than that of its closest relative and predecessor, Mexican Medium Slateware, but form and design show only slight changes. The effigy legs from bowls of this ware (fig. 92, e, 1, 2) are hand-modeled and show no close similarity to any forms I know. Although our samples of this ware are small for careful study, the lack of observable similarities to other areas, as well as the close following of Early Mexican Slateware tradition in form and decoration, suggest a cultural continuum with a minimum of outside influence during the subphase. Similarities to Huastec Black on White are not judged close enough to imply contact when the distance is considered.

Chronological position.—Middle Mexican subphase diagnostic. This ware occurs only with heavy mixture of Early Mexican potteries in the Chichén Itzá collections, and seems limited to surface deposits, save possibly for the Mercado and Southeast Colonnade where it sometimes occurs in about equal quantity in single collections with Medium Slateware. Another concentration of Coarse Slateware is in the Temple of the Wall Panels and adjacent buildings, including the extreme east end of the Monjas complex. In all separate collections from this area, however, Coarse Slateware never equals Medium Slateware in frequency. Thus at Chichén Itzá we have as yet no certain evidence of building activity as late as the Middle Mexican subphase, save perhaps in the dais of the Mercado. At Dzibilchaltún, Coarse Slateware occurs in the higher levels of trenches mixed with Regional Florentine wares, but with very few wares of the Early and none of the Late Mexican substage. At this site there must therefore have been an occupation during which Coarse Slateware was the only slipped pottery—a "pure" Middle Mexican substage occupation.

At Mayapan, Coarse Slateware is low in all deposits and in no collection does it equal Coarse Redware in frequency. Thus we have evidence of either a Middle Mexican or more likely a transitional Middle-Late Mexican substage occupation at Mayapan; more excavation is needed to determine which.

Coarse Redware

Surface.—Ranges matte with irregularities through smooth to faintly lustrous. Slip fits well, little spalling or abrasion noted. Color a solid red with occasional darker smudged areas. (Ferruginaceous, Vinaceous Rufous to dark gray).

Paste.—Coarse fracture; gray to buff, with gray inclusions. Temper calcite.

Decoration.—Rare. Occasional underslip incised designs, sometimes also covered by a white slip band (see fig. 85, a). These designs derive from X Fine Orange. Other incised designs at Mayapan, some under slip and some over (figs. 26, c, d; 27, c, i; 96, c), are less certain in origin. The incised designs on bowl skirts may derive from, or have influenced, similar but less elaborate designs on Mayapan Fine Orange (cf. fig. 28, a). Effigy vessels show modeled decoration (figs. 25, g; 27, e, f, h). Effigy vessel legs are mold-pressed (figs. 27, g; 95, b; 96, g) and also show Mayapan Fine Orange similarities (cf. fig. 28, a, 37). Vestiges of blue paint are quite commonly found on bowls of this ware. This paint is not fired in, and is found on exteriors, interiors, slipped and unslipped surfaces.

Shapes.—Large to medium jars, basins, basal break bowls, hemispheroid bowls, grater bowls.

Comparisons.—Coarse Redware is the pottery which Vaillant called Red Lacquer ware. He argues that this ware shows evidence of a resurgence of Maya influence at Chichén Itzá (Vaillant, 1927, pp. 364-367). This hypothesis seems farfetched and not useful at this point; although slipped wares with the general characteristics of this ware are known in earlier Maya pottery, we know of no Maya group of this period or near it from which this ware is likely to have derived. The main direction of influence during the period seems to have been from the Campeche-Tabasco coastal region, which in turn was probably subject to strong Nahua-Aztec influence.⁴⁴

Evidence of foreign influence in Coarse Redware is not extensive. The Early Mexican form repertory with its Mexican innovations is continued with few changes. Vertical sublabial incision, interior encircling grooves, and recessed jar bottoms are new, grater bowls lose their rim incuse; skirts, some notched and engraved, are attached to basal break bowls. Zoömorphic and anthropomorphic legs are used on bowls. Small, truncated, conical bowl legs are in use; some are hollow with two exteriorly placed holes, one above the other. Skirts and legs probably come from Tabasco; the others cannot be traced. The terraced slab leg, rare in this ware (fig. 94, h, 32) and present at Cintla (fig. 103, 1, 7, 9), shows Valley of Mexico connections, where it is reported for Aztec III (Brenner, 1931, pl. A).

Chronological position.—Late Mexican diagnostic.

Mayapan Fine Orange Ware

Surface.—Smooth; appears to bear a very thin slip, of color and texture very close to that of the paste. Color Vinaceous Cinnamon or Orange Cinnamon.

One fragment is covered by a purplish-red slip with sparkle like that of specular hematite. Some bear white slip all over, or encircling bands, some white and some black. These white and black slips are very similar to those on Chichén Itzá Fine Orange. Evidence of forming shows in marked irregularity of contour (see fig. 28, a), and these irregular undulations of the surface go very evenly around the vessel in such a way as to resemble closely those made by use of the modern kabal. Skirts are also extremely circular, and appear to have been formed from the clay mass of the vessel rather than by appliqué. Rattle legs are luted without tenon.

Paste.—Fine texture; looks untempered through a 10-power glass, but has not been checked microscopically.

Decoration.—Incising in lines averaging .5 mm. in width and of about half that depth, with semicircular

cross section. Most designs show no cutout areas and are extremely simple and limited to vessel exteriors—save for one bowl with an incised grater pattern on the floor. Incising through black and white slip bands was noted. Painted decoration is in black with the same stainlike quality of that on Chichén Itzá Fine Orange. Designs again are very simple, with banding lines the commonest feature. The hemispheroid bowl rims with white slip, or slip band, and black, encircling lines painted over it may deserve classification as a separate type, but the sample is small. Effigy legs are the only type of basal support found. They bear mold-pressed fronts, with possibly hand-modeled back portions. Skirts are notched, as are those of the accompanying Coarse Redware.

Shapes.—Bowls with sharp basal break, skirted bowls with very rounded basal break, either or both with effigy legs; two shapes of spheroid bowls, grater bowl, pyriform vessels, constricted cylindrical-necked jars.

There is a strong suggestion that several types, each characterized by the almost exclusive presence of several traits of form and decorative style, are included in this group. Since there is no evidence at present that all these several types were made by the same potters, or even potters having close cultural interrelations, Mayapan Fine Orange cannot at present technically satisfy the implications of the classification of a ware, although it has, for convenience, been given that classification here. The above remarks apply equally to Puuc and Chichén Fine Orange, and to Dzibilchaltún Fine Grayware, none of which have been investigated in their original cultural context at sites near their center of manufacture.

The types which seem apparent in our sample are: (type A) Bowls with rounded basal break and undulating wall profiles, with bent and thickened lips. Many bear skirts and probably most bear effigy legs. Decoration on exterior wall of lightly incised vertical lines with a horizontal encircling incision at wall-skirt junction. Examples are figs. 28, a, 1, 5-21, 23-26, 30-37, 39-41. (type B) Hemispheroid bowls with out-bent lips; even wall profile and black-painted band designs on interior and exterior. Examples are fig. 28, c, 9-10. Other painted sherds with form of type A, figs. 28, a, 22, 27, 28, suggest culture connection between the two groups. (type C) Deep, hemispheroid bowls with black-painted, horizontal lines on a white slip band (fig. 28, b, 1-3). In the sample available, this type shows no definite traits in common with the other two. The remaining sherds are indeterminate; 28, c, 18 may be related to type B by reason of the painted design; several may belong to Chichén Fine Orange on basis of their plano-relief decoration.

Comparisons.—Mayapan Fine Orange stands in much the same relationship to the local wares as Chichén Fine Orange did during the Toltec period. It was imported, and was copied to some extent in local wares; the notched skirt and effigy legs, but not the designs or rim shapes, are followed on Coarse Redware. Mayapan Fine Orange, like Chichén Fine Orange, contains types which were not necessarily made by the same cultural group. The relationship of Mayapan Fine Orange to Chichén Fine Orange may be to a degree reconstructed. First, although the paste, and probably the paints, of the two groups of wares are macroscopically identical, forms and styles seem to be distinguishable enough so that complete vessels of the two groups would show no intergrading of either form or design. Thus a common tradition of techniques and materials seems to link the two groups (though this statement is subject to the results of technical analy-

sis), while the styles (form and design) of the two groups are quite distinct. Distribution of the two groups is, at least at our present level of knowledge, equally distinct. The center of occurrence of Chichén Fine Orange seems to be in central Veracruz, while Mayapan Fine Orange seems to center on the Campeche coast with related wares to the west on the Tabasco coast.⁴⁵

Chichén Fine Orange occurs in the minority, but mixed with Mayapan Fine Orangeware, in the Mayapan deposits. Although the present samples do not allow a stratigraphic separation of the two wares, it is probable that the Chichén-style ware ranges earlier in date and that it belongs with the Middle Mexican ware assemblage. A suggestion of time overlap between the wares is found in two of Seler's Uaxac Canal specimens (fig. 89, *s, t*), one each of Chichén and Mayapan Fine Orange, which, if they were found in a single grave (and this is likely though not certain), would

show contemporaneity between Chichén and Mayapan Fine Orangewares. There is also some evidence that these later samples, now included under Chichén Fine Orange, can be stylistically separated from those of the Early Mexican subphase (see fig. 28, caption).

A comparative estimate of direction and amount of ceramic trade at Chichén Itzá and Mayapan may be of interest. Fine orange is by all odds the major foreign tradeware at both sites. At Chichén Itzá the fine orange-ware from Veracruz runs about .5 per cent of total sherd count (body plus rims); at Mayapan the fine orangeware from the Campeche coast runs .43 per cent of total sherd count. These figures are of the same magnitude; the amount of ceramic trade was roughly the same. Chichén Fine Orange seems to document a long-distance coastal trade and Mayapan Fine Orange a shorter haul, a good part of it overland.⁴⁶

Chronological position.—Late Mexican substage.

IV. CHRONOLOGICAL ANALYSIS

Evidences of chronologic sequence have come to light at odd times and in irregular order during the course of this survey, and nearly every evidence of sequence after its first recognition was confirmed by additional evidence from other deposits. Aid in the placement of the earlier ceramic assemblages was given by interlinking through tradewares and similarities to the well-dated and documented Uaxactun sequence to the south. Although all sequence evidence will of necessity not be given here, an effort will be made to demonstrate convincingly the placement of the major pottery wares and the basis on which the generalized Yucatán stages have been set up.

THEORY

Time periods in ceramic studies are most commonly defined from characteristic assemblages of pottery described by ware and form repertory; the best studies give detail on variation and on relative frequency of wares, shapes, and decoration. These assemblages normally consist of pottery found in direct association, or of a series of collections which possess so many attributes in common that they are assumed to have been made at a single time and place. Such assemblages have generally been called phases in the Maya area, although there has been a tendency to extend the use of the original phase name to all assemblages within a considerable area if they are believed to be roughly contemporaneous with the type collections from which the phase was originally defined.

When time changes have been recognized at a site or in an area, the phases have been sequenced and fixed in absolute dating as far as possible from available evidence.

Time is a continuous variable; the phases described thus represent selected points or spans in time. The archaeologist most commonly chooses his points or spans on the basis of large collections which, for various reasons, he believes to be "pure"—that is, to have been deposited within a relatively short time span and to be unmixed with material of other age. Such collections are often supplemented by use of additional specimens placed with the dated lots on the basis of similarity. Phase descriptions thus may usually be most accurately described as cultural cross sections taken at points along the time axis, at a single geographic location.

The fact that period or phase descriptions are mere cross sections of a continuous body of material changing through time has often been ignored in analysis and even more commonly ignored in later exposition. The phases or periods described list blocks of wares and forms, and the assumption is sometimes at least tacitly made that changes take place simultaneously in all wares and forms at the same time, at a sort of interphase boundary line. A corollary of such an assumption is the sudden replacement of one culture by another. The acceptance of such culture replacement without sufficient documentation has allowed such errors as the incorrect reconstruction of a "Pueblo Invasion" in the Southwest United States⁴⁷ and, it may be suspected, many of the hypotheses of migration and displacement of human groups which have been made in American, European, and Near Eastern prehistory.⁴⁸

Ceramic horizon descriptions are certainly the best manner of obtaining an idea of the cultural repertory of a group, and can be used as basic materials for phase ethnography. In Mesoamerican archaeology their misinterpretation has been guarded against by some workers through emphasis on their discontinuous nature through time. Ceramic assemblages are commonly designated as phases and given names which do not commit them to a fixed, closed, chronologic succession, as do numbers as used to define horizons. If used intelligently, this system can allow the introduction of new phases intermediate in time, and even permits the transposition of the named phases in a chronology without dislocation of the nomenclature. Freedom is also given for the definition of regional variations by the naming of phases from new excavations, these phases being placed by chronologic equivalence to those already known.

In addition to the description of phases, there has been in the last few years a tendency toward the use of general inclusive names for the major time divisions in Mesoamerica. Kidder (Kidder, Jennings, and Shook, 1946) and Armillas (1948) have named such divisions for Mesoamerica. Such terms are of course of great value in generalized comparative work.

NOMENCLATURE IN THIS REPORT

Because of the relatively large area and long time period covered by this survey, a generalized nomenclature is essential. The following system has been chosen as conflicting least with those currently in use in neighboring areas.

<u>Yucatán Stages in this report</u>	<u>Yucatán Thompson, 1945</u>	<u>Central Maya Area (Uaxactun) equivalents</u>
Early Formative	)	Mamom
Middle Formative	)Formative	Chicanel, San José I
Late Formative	)	Tzakol, Tepeu 1, 2,)and early 3; San José II-V; Holmul I-V
Early Regional	Initial	
Middle Regional	)Series	
Late Regional	)early	
Florescent	)late	
Early Mexican	Mexican	Tepeu late 3; San José late V
Middle Mexican	)Mexican	
Late Mexican	)Absorption	
Interregnum	)Colonial	
Post-Conquest	)Modern	

The nomenclature given the Yucatán chronology is superficially quite different from the commonly used and at present quite adequate generalized Mesoamerican stage sequences of pre-Classic or Formative Classic or Initial Series, post-Classic or Militaristic or Expansionist. The stage nomenclature presented here is meant for Yucatán alone. It is based disproportionately upon ceramic history, but there is some evidence that architectural history in Yucatán also fits this outline at most points. The question of the final usefulness of this terminology in general descriptions of Yucatecan culture history must, however,

await future testing. The time span has been segmented to conform as far as possible with major ceramic and architectural changes; the stages have been renamed several times during the study in an effort to avoid confusion with the ever-increasing welter of terminology in Mesoamerican archaeology.

The Formative stage in Yucatán should cause no confusion; it roughly equates with the Formative or pre-Classic stage elsewhere. The Central Maya Classic or Initial Series stage has been subdivided in the Yucatán sequence because of the striking differences between the monochrome- and slateware-bearing sites of this stage. What descriptions are available suggest that the architecture of this stage in Yucatán presents a dichotomy which parallels the ceramic evidence. Monochrome-bearing deposits are always earlier than slateware in all parts of Yucatán, but there is considerable evidence that slateware began to be made earlier in the Puuc region than on the northern Yucatán plain. Thus the Yucatecan Regional (monochrome-bearing) and Fluorescent (slateware-bearing) deposits cannot be sequenced along chronological lines alone; there is evidence of chronological overlap and regional difference between them. The beginnings of the Regional stage in Yucatán can be set as considerably antedating the beginning of the Maya Initial Series period on evidence presented elsewhere in this report. Regional Incised and Punctate Dichromes, with their associated Flaky Redware, antedate the Tzakol-phase pottery of Uaxactún, the earliest use of which in turn is believed to antedate the first Initial Series dates.

The Mexican stage may have begun later in Yucatán than the end of the Initial Series dates, as has been suggested by Thompson (1945). The "Early" subdivision is based on the ceramics of the Toltec buildings at Chichén Itzá. The Late Mexican substage is based on the ceramics which preponderate in the Mayapan collections. The Middle Mexican substage is defined by a distinctive ceramic assemblage (Coarse Slateware is the diagnostic), which is early at Mayapan, late at Toltec Chichén Itzá, and found in nearly pure deposits at Dzibilchaltún. The architecture of this substage is unknown.

The time period between the historically recorded "fall" of Mayapan in 1441 A.D. and the Spanish Conquest a century later was one of internal disunion in Yucatán. Of the three major rulers of the Confederacy of Mayapan, one, the Xiu ruler, is reported to have settled in Maní. This town became a major Spanish ecclesiastical center in early Colonial times, doubtless favored by the Spanish because of the aid given them by the Xiu family. Much of the pottery found at Maní was dateable as Colonial by tradeware; some of it may come from the century of "interregnum" before the Conquest.

The problem of nomenclature of the various deposits from the individual sites is difficult to handle by the system of named phases described above. The method here chosen is not meant as a tacit criticism nor indeed as an improvement of that method. The use of the present method has been made advisable by the nature of the material handled. Our ceramics come from some 20 sites, several of which show evidence of occupation during a major part of the chronologic span. Some of these sites are at a considerable distance from others, and certainly show regional differences. In other instances, the collections of certain horizons in various sites are so small as to make it uncertain whether further excavation would indicate the naming of a new phase. In fact, the interpretation of phases in the description of regional culture is far from uniform in Mesoamerica. If the collections were

conscientiously named by phase, there would be such a number that the author, let alone the readers, could not carry them easily in mind.

The system used has been to name the assemblages by site name modified by either a stage name or, when that might be equivocal (as in cases where the position of the collections in the Yucatán chronology is not known exactly), by a number giving the early-late position of that phase in the chronological sequence defined at the site. Since, except in the case of Chichén Itzá, the excavations were merely exploratory trenches, there seems no reason why these phase names and numbers should be perpetuated if extensive excavations are later made at any of these sites.

The description and sequencing of pottery assemblages is of primary value to the service function of the survey; such definition allows the relatively easy dating of other archaeological materials by means of accompanying pottery. To this purpose the unusually large and voluminously annotated corpus of pottery illustrations is provided, in addition to the ware descriptions and notes as to their chronologic placing. The detailed tabulations, averaging sixty or more sherd categories per site, are not here published, but have been preserved and are available for later detailed analysis. Ware percentages for most assemblages can be read from the stratigraphic diagrams which accompany the next sections of the report.

The stratigraphic evidence for the Yucatán chronology has been supplemented by additional kinds of evidence. The cross-finds with Uaxactún have in many cases substantiated stratigraphic placing and in other cases have actually given clues to the sequence. The placing of two or three of the phases depends upon seriation evidence, as does the unraveling of much of the detail in the copiously represented Fluorescent and Early Mexican periods.⁴⁹

Seriations in the sense used here include all sequential placements made without stratigraphic evidence. All of these depend for their mechanism on the theory that the form of the varied products of cultural activity gradually changes as does the culture itself.

If we can correctly place a group of products of culture in order of change, and determine the directions of time in the sequence, we may attain the same result as if our series were found in stratigraphic deposition. The difference should be stressed between sequencing or seriation by the above procedure, and that produced by chronological placement on an *a priori* assumption that material culture increases in complexity, conventionalization, or virtuosity through time. We know that material culture does not always "improve" through time, but that it does change. Our seriations are based on change, not improvement, as a criterion.

In seriation analysis, the best criterion for the isolation of the results of factors other than time, lies in the fact that time is a unidimensional factor acting upon all the facets of culture. If two or more objectively defined criteria in pottery (A, B, and C) gradually change during a series of time increments (1 through 10), we will never find a pottery vessel characterized by the formula A1, B5, C8, but the variants of A B C will always be those of corresponding or nearly corresponding time periods (as A3, B3-4, C2-5). If the variations in the three criteria, A, B, and C, are linked to regional rather than to time differences, we may expect to find the coefficients of A, B, and C to vary more widely in their combinations.⁵⁰ The placement of the specimens on fig. 63 as intermediate between Incised Dichrome and Tzakol-style pottery was made by this method.

The statistical work which has been done on the Yucatán collections (Brainerd, 1951) has been directed toward the determination of chronology within the time divisions used in this report. This attempt at refinement has been dropped for a time in favor of the preparation of this outline of the total ceramic sequence.

STRATIGRAPHY

The chronological placing of the ceramic assemblages of the Yucatán survey is supported at most points by multiple lines of evidence. The first evidence gained for most stages was that of stratigraphy. This evidence will be outlined in the order in which excavations were made, and the general outlines of the chronology determined. Fuller discussion of much of this material is given in the sections devoted to the separate sites.

Before the beginning of the 1942 season's excavations, the validity of the previously determined sequence from Puuc sites to Toltec Chichén Itzá had been checked from Roberts' material. Strong similarity among the Labna, Sayil, Kabah, Sabacche, and Uxmal collections was apparent from their typological classifications, which I made independently from the rim collections gathered by Roberts. The Holactún collections seemed a regional variant of the same period, also containing Formative deposits dateable from those of Uaxactún. The collections from Chichén Itzá showed a marked preponderance of wares and shapes not present in the Puuc collections, and some rather uncertain suggestions of stratigraphy. The Coarse Redware and figurine incensarios in these collections were limited definitely to surface and postoccupational collections (as noted by Vaillant, 1927, pp. 363-364). I identified Coarse Slateware, unrecognized by Roberts in the Chichén collections, and tentatively placed it between the Toltec and Coarse Redware horizons mainly on stylistic grounds, but also on its presence in buildings judged to be late, and in superficial collections. The non-Puuc pottery in the majority of the Chichén Itzá collections was tentatively placed as of the Toltec period, anchored there by the associated distinctive tradewares. The Cobá collections and parts of the Yaxuna collection made by Roberts were recognized by Robert Smith in 1940 as of Tepeu 1 date, thus fitting the Cobá stela dates. Architectural evidence of veneer masonry, rare at Yaxuna, better preserved than the rest of the site, and stratigraphically on top, suggested that the slateware found there dates later than the predominant Tepeu 1-like wares. The early Oxkintok collections which I dug in 1940 were recognized by Robert Smith as having Tzakol similarities, thus matching in date the 9.2.0.0.0 lintel which had recently been found at that site; the stratigraphically later collections from Oxkintok were recognized as markedly similar to those from the Puuc sites, particularly to those from nearby Uxmal.

Thus by the end of 1940, seven horizons could be isolated and sequenced with some degree of certainty; three of these, the Puuc, Toltec Chichén, and Coarse Redware, corresponded to previous determinations by Vaillant, supported by Roberts. Various sequences and conclusions based on architecture also added weight to some of these placements. I had tentatively placed the Coarse Slateware in the sequence; the three earlier phases were anchored into the Petén sequence, but of these only Oxkintok was stratigraphically placed as yet in Yucatán. The Incised Dichrome collection from Balam Canche, the Guest House Cenote collection from Chichén Itzá, and certain other collections, re-

mained distinctive and consequently intriguing but with no real clues as to placement.

The choice of Yaxuna in 1942 as the initial site for excavation was made on the basis of Roberts' collections from there. Four sequent periods were recognized from the excavations, placed in reasonably certain stratigraphic order which was afforded further support by Petén cross-ties determined by Robert Smith, who examined the pottery that season. Charts 2, 3, and 4 demonstrate these sequences in three deposits. Formative Monochrome predominates in the bottoms of the three deposits, followed by Flaky Redware in charts 2 and 3, and by Regional Medium Redware in chart 4. Medium Slateware preponderates in charts 2 and 3 surface cuts, and is prominent in chart 4. This allows a sequencing from bottom up of Formative Monochrome, Regional Medium Redware, and slatewares, with Flaky Redware probably below Regional Medium Redware (note chart 4), possibly above it, but still below the slatewares. The cross-ties with sherds identified by R. E. Smith as Petén-like are shown to the right of charts 3 and 4. Chicanel seems roughly contemporaneous with Formative Monochrome, Tzakol with Flaky Redware, Tepeu 1 with Regional Medium Redware, and the slateware horizon shows a decline in Petén tradewares. These Petén equivalents of course increased the likelihood of our poorly documented stratigraphic placement of Flaky Redware, as did the Tzakol Petén tradewares found in a nearly pure Flaky Redware phase collection in the Yaxuna Cenote. The presence of Incised Dichrome in the Yaxuna Cenote Flaky Redware collections also fixed the Balam Canche Incised Dichrome collection in the sequence; marked similarities between the Regional Medium Redware assemblage and the Cobá collections, coupled with the Cobá-Peten placement and stelae dates, fitted the main Cobá collections to this sequence and gave check dates in the Maya calendar.

Dzibilchaltún was next dug, and instead of the late deposits expected because of the Colonial church, a phase transitional into the wares of the Puuc sites was discovered, with obviously disjunctive, and thus easily isolated, Coarse Slateware admixture. Charts 5, 6, and 7 summarize the stratigraphy. The Formative and Regional wares are very lightly represented here; charts 5 and 7 carry little authority due to small sample size, but are in agreement with the sequence. Chart 6 shows the trends of the main deposits, with the slatewares increasing toward the top. This evidence, coupled with the transition noted at Chichén Itzá between Florentine and Early Mexican, suggested that these Dzibilchaltún deposits probably somewhat antedated the Puuc assemblages, a hypothesis confirmed by work at Acanceh and elsewhere.

Acanceh gave hopes of more pre-Florentine material through the presence of the probably early stucco facade and the large stucco masks on the northern pyramid. The stratified Regional and Regional-Florentine deposits (charts 8, 9, 10, 11, 12, 13) gave more detailed information than any others encountered. The deposits, segregated by superimposed floors, support the Yaxuna Cenote evidence that Flaky Redware was not made concurrently with slatewares (see chart 8, cuts f and g), and soundly establish it as earlier than Coarse and Medium Regional Redwares. Regional Medium and Coarse Redware are invariably associated with Medium Slateware in all collections of significant size. That this mixing is due to later deposition seems unlikely in view of the large numbers of trenches, both here and at Yaxuna, where this condition holds constantly true. That slateware was made early in the Chenes area is suggested by the 1949 collections, as

yet incompletely analyzed. The Acanceh deposits therefore document an increasing use of slateware, displacing the Regional wares of this area, a situation also probably true at Yaxuna. The relative extent to which regional and chronological factors are at work through the various sites of this Regional-Florescent sequence is of major importance in placing the northwestern and eastern Yucatán sites chronologically in relationship to the Puuc sites, and needs further excavation to clarify. Cobá, where pure Regional Redware deposits were found, may lie beyond the geographic range of the earlier slatewares.

The chronologically sequent position of Regional Redware and Red on Thin Gray at Acanceh, and the close stylistic resemblance of their jar forms, places the main Dzibilchaltún occupation as quite clearly later than that of Yaxuna III, Cobá, and other occupations strong in Regional Coarse and Medium Redwares. The early Oxkintok collections are with considerable certainty placed earlier than the Regional Coarse and Medium Redware occupations by the absence of slateware in Regional Oxkintok deposits, by various stylistic criteria, by the Petén ceramic correspondences, and by the Oxkintok 9.2.0.0.0 Initial Series date.

A good representation of Coarse Slateware at Acanceh confirms again its stratigraphic position above Regional-Florescent deposits. Early Mexican pottery is too scarce, unfortunately, to allow a check by its placing here.

The presence of Flaky Redware in late Formative stage vessel shapes in the lowest strata at Acanceh with Regional stage forms of the same ware, coupled with the appearance of a Formative Monochrome horizon at nearby Maní, suggests that the two wares may characterize successive horizons of the late Formative subphase. This possibility is supported by certain differences in rim profiles between Formative Monochrome and Formative Flaky Redware. The Formative Flaky Redware vessel shapes grade into those of the Regional stage Flaky Redware.

Mayapan showed well-documented stratigraphy through two sequences: (1) Coarse Redware follows Coarse Slateware; and (2) Figurine Incensarios grow progressively more frequent toward the close of the Coarse Redware occupation. Charts 14, 15, 16, and 17 show both these trends. Maximum frequency of Coarse Slateware found at Mayapan is about 35 per cent in level g of trench 7 (chart 14), lying under a plaza floor. It is questionable whether Figurine Incensarios were in use during the earlier part of the Coarse Redware occupation; several large collections of that phase were entirely or nearly free of them.

The excavations at Maní yield evidence of long continued occupation. The trenches dug in the cenote near the center of town produced the earliest deposits yet to come from Yucatán. Charts 18 and 19 show its position better than the other sequences. As may be seen, the strata are mixed, probably due to construction activities during the building of the adjacent Colonial stage ramp. Burnished Design Ware preceded all other ceramic assemblages here. Following this Early Formative deposit come good Late Formative samples, then Regional, Florescent with a few Early Mexican forms, then Middle Mexican, very lightly represented Late Mexican, followed by an enormous concentration of post-Mayapan material. Since the Xius, one of the ruling groups of Mayapan, are said to have settled at Maní after 1440 A.D., the period following this date is of particular interest. The post-Mayapan pottery from the Maní Cenote is closely comparable with that of the Maní Monastery, the end date of which is early 19th century; none of the Mayapan specialized or trade

wares was found in the deposits. The placement of the late Maní pottery thus may well be post-Conquest. It is possible, however, that some of this pottery was made during the pre-Conquest interregnum.

The chronologic placements at Chichén Itzá are not shown in the graphs, and thus need explanation. Coarse Redware and Figurine Incensarios are in general found superficially in debris of fallen Florescent and Early Mexican buildings. Coarse Slateware is found in the Southeast Colonnade and Monjas East Court, which by architectural stratigraphy date later than adjacent Early Mexican buildings on evidence detailed in J. S. Bolle's unpublished report of the Monjas excavations. Several trenches dug by Roberts at Chichén Itzá show Florescent styles of Medium Slateware giving place to Early Mexican styles. Formative Monochromes give way to Florescent Slateware in a trench at the southwest corner of the Caracol. The Puuc collections all have Medium Slateware predominant. At Kabah, however, a small showing of Formative Monochromes tends to hold to low trench levels.

Figure 21 shows the more diagnostic wares arranged in a sequence, top to bottom. Wares which appeared through more than one subphase are bracketed. This early-late sequence is, through most of its length, supported by stratigraphy. Arrows indicate stratigraphic evidences of superpositions of wares. For accurate placement of a ware in sequence, the graph should show solid arrows connecting it with its two immediately preceding and sequent wares. The sequence pairs which do not show such stratigraphic documentation are: (a) Coarse Slateware above Medium Slateware; this placement is documented by architectural stratigraphy described above. (b) Coarse and Medium Redwares above Oxkintok Monochrome; this sequence has been assumed from Initial Series dates at Cobá and Oxkintok where these wares are found, as well as by Petén ceramic crossties with both wares, and by stylistic sequences in forms. (c) Oxkintok Monochrome above Flaky Redware; form repertory of Oxkintok Monochrome shows similarities to that of Coarse and Medium Redwares and to Medium Slateware, whereas Flaky Redware does not and therefore must be further removed in time—a stylistic placement. (d) Regional Flaky Redwares above Formative Flaky Redwares—on stylistic evidence again; the closeness of Regional Flaky Redware bowls to early Tzakol bowls, and evidences of transition in Incised Dichrome, are discussed elsewhere. Also, forms of Regional Flaky Redware are similar to those of other Regional wares, whereas Formative Flaky Redware forms are nearly identical with the Formative Monochrome repertory. (e) Formative Flaky Redwares above Formative Monochrome—a stylistic placement based on the fact that Flaky Redware forms bridge the Formative-Regional stage transition, whereas monochrome forms do not. This placement was further strengthened in 1949 (see Brainerd, 1949) by the discovery of a new substage lying between Burnished Design Ware and the Formative Monochromes shown here. The collections of this Middle Formative substage bear a preponderant amount of monochrome very similar in ware characteristics to the Formative Monochromes described in this report.

In the evaluation of the evidence for chronology here presented, the variable of regional difference should be held constantly in mind. Although the stratigraphically and stylistically determined trends presented seem valid, the 1949 excavations have borne out previous suspicions that slateware was made during most of the Regional phase in parts of the area. This finding suggests that other regional differences

may have complicated the chronological picture; our ceramic samples are thinly spread over both time and space. There is considerable evidence that form and decoration are more sensitive through time than are ware changes, and forms have given us our major chronological clues for the above placements. Trade pottery has also provided checks and new clues in the development of our chronology.

CERAMIC EVIDENCE BEARING ON THE MAYA-CHRISTIAN CALENDRIC CORRELATION

The following comments on the correlation problem can best be understood by reference to chart 22, of which this section is an explanation.

Columns I-V demonstrate the manner in which chronicles events in Yucatán and Maya Initial Series dates enmesh, using the three most widely accepted Maya-Christian correlations. Column I represents the 12.9.0.0.0 correlation, column II the 11.3.0.0.0 correlation, column III the 11.16.0.0.0 correlation. It will be noted that 1539 A.D. in each of these correlations falls on a Maya katun ending on the day 13 Ahau, the specification given by early post-Conquest sources, and that katuns 13 Ahau, as well as all other katun ending coefficients given on the righthand side of column V, fall 256 1/4 years apart. The assumption that the Maya and Christian calendars correlate in this cyclic manner depends upon coincidences singular enough to be convincing, and has remained almost unchallenged. The three positions shown, as will be seen, are those which most nearly fit several groups of separately derived evidence.

Points A, B, and C shown in each of the first three columns match katuns 8, 8, 4 respectively on the Maya calendar, column VI. Point A, the fall of Mayapan, which occurred within 100 years of the Conquest, is unquestioned in its placement. Points C and B indicate respectively the dates at which the Itzá arrived and abandoned Chichén Itzá, according to the Roys-Thompson scheme derived from the interpretation of the Chilam Balams and other chronicles and from certain carved dates at Chichén Itzá.⁵¹

A reexamination of the evidence for the length of the time spans A-B, B-C in Yucatán is in order. B-C, the span of the Chichén Itzá occupation, is quite uniformly fixed by the chronicles as about 200 years, and this span also checks well with the katun ending dates. Landa and Herrera give the Mayapan span (A-B) as 500 years, which is made improbable by several factors, perhaps the most obvious of which is the smallness and decadent construction of the site. Various other references suggest that the 500 years may apply to the duration of the League of Mayapan, out of which time span Chichén ruled alone for the first 200 years. The Chilam Balam of Tizimin gives 280 years for the joint rule of the lords of Uxmal, Mayapan, and Chichén Itzá.⁵² The ceramic evidence of a period (Middle Mexican substage) postdating the architecture of Chichén Itzá and found sparingly and only in the lower levels of Mayapan, suggests a possibility of a longer span for A-C. In the author's opinion, the consensus of evidence favors the time for A-B as shown, about 260 years.

Assuming that points 1539 A.D., A, B, and C, are in their correct order and span, the choice between the three Maya-Christian correlations depends upon the relationship between points C and D; C is computed from the Christian calendar and D is placed in the Maya Initial Series.

That D preceded C we know ceramically. Therefore the 11.3.0.0.0 correlation, column II, is ruled out if the range of our period A-C is allowed as correct. Remaining for consideration are the 11.6.0.0.0 and 12.9.0.0.0 correlations.

Column VII shows in summary form the Yucatán ceramic stages and some principal deposits, and their placement on the Maya calendar. These placements are accurate within quite close limits between 9.0.0.0.0 and 9.16.0.0.0 on the evidence both of Maya inscriptions on Yucatán sites and of correspondences through trade with the well-anchored Uaxactún ceramic sequence (lower part of column VII).⁵³ The placement of the Mexican ceramic stage has here been put in harmony with column III, the 11.16.0.0.0 correlation, but the essential criteria for its length have been drawn from the chronicled sources shown as points A, B, and C. The three Mexican ceramic substages shown are differentiated by major and easily recognizable differences in the preponderant slipped wares, coupled with many other less striking ceramic differences. Their time sequence is well documented as shown in the chart, and evidences of the time duration of the substages which show archaeologically do not dispute the charted placements. Thus the Mexican ceramic stage as here diagrammed is dated from the Christian calendar, and the solution of Maya-Christian calendric correlation, if all above assumptions are acceptable, may be reduced to a judgment of the length of the latter part of the Fluorescent ceramic stage (span C-D on the chart).

The qualification should be clearly stated that ceramics cannot yield an accurate estimate of absolute time duration. The ceramic criteria of stylistic change and quantity of material are subject to several unknown variables. The stylistic change during the period in question is very small relative to that of periods in the sequence of known duration, and the relatively slight stylistic changes in architecture noted by Pollack in the Puuc area bolster this determination. The quantity of ceramic and architectural material belonging in this period is very large, particularly in the Puuc region. The predominant slipped ware of the Fluorescent stage is nearly identical with that of the Toltec Chichén (Early) segment of the Mexican stage, the ceramic differences being mainly in shape and decoration of vessels, and in the trade wares. The architectural changes between the two corresponding periods at Chichén Itzá are to some degree analogous in that construction methods remain quite similar, but form and decoration change.

The addition of 260 years to the later end of the Fluorescent stage, or such an addition to the Mexican stage, would be necessary if the 12.9.0.0.0 correlation is to be accepted. Such an addition would make the Fluorescent stage double to quadruple the length of the dated ceramic stages of the sequence, and these successive stages, the author believes, are defined by very roughly equal degrees of ceramic changes. This criterion, however, is admittedly a dubious one, as witness the extreme conservatism of Yucatán ceramics over the last 500 years. The documentation of the time span of the Mexican stage, both in Yucatán and on the Mexican mainland, does not easily allow a 260-year addition. Therefore the author favors the 11.16.0.0.0 correlation over the 12.9.0.0.0 correlation on ceramic grounds, but favors the 12.9.0.0.0 correlation over the 11.3.0.0.0.

Other evidences also favor the 11.16.0.0.0 correlation. Thompson's (1937) readings of the Chichén Itzá short dates and of several dates in the Puuc area match this sequence nicely, except for two late date readings. Beyer's readings for several of these dis-

puted dates, however, favor the 12.9.0.0.0 correlation. A further argument for the 11.16.0.0.0 correlation is Dr. Kidder's placement (1946) of Teotihuacan III at about 9.5.0.0.0 (Tzakol phase), through trade pottery at Kaminaljuyu. Only one well-marked, distinctive ceramic horizon intervenes between Teotihuacan III and Mayapan-Tula in the Valley of Mexico (Coyotlatelco-Azcapotzalco-Teotihuacan IV-V). Since Mayapan-Tula crossties with Toltec Chichén Itzá so closely in both architecture and ceramics, the 400 years (roughly 500-900 A.D.) indicated by the 11.16.0.0.0 correlation seems a reasonable estimate of time for this period, while the 12.9.0.0.0 correlation would leave about 650 years to be covered by this relatively insignificant period. Although the 11.3.0.0.0 correlation, leaving about 150 years for Coyotlatelco, would seem to fit the present Valley of Mexico sequence best, it seems impossible, as can be seen from the diagram, to compress the Tzakol-Toltec Chichén Itzá interval in Yucatán to a mere 150 years, making Toltec Chichén begin at about 9.16.0.0.0 Maya.

Wauchope (1947, 1948), working with highland Maya chronicles, computes successions of rulers back to

the arrival of the Quichés and Cakchiquels in the Guatemala highlands. By assuming that the end of his Tohil Phase, linked to Tula-Toltec Chichén Itzá by presence of effigy plumbate pottery, coincided with the conquering of Zacualpa by the Quiche King Quicab, he places the end of the plumbate period in the early fifteenth century. Wauchope advances this as evidence for the 11.3.0.0.0 correlation. Objections to this scheme are clear in both the Yucatán and Valley of Mexico chronologies, which document successions of several plumbate-free ceramic periods following the plumbate horizon. An interpretation of Wauchope's Zacualpa material which fits our thesis may be made by accepting his fifteenth-century date for the end of the Tohil phase, but extending this phase to a time length of 450 years on the evidence of both mold-pressed effigy-head supports and effigy plumbate in the same phase. In Yucatán, mold-pressed effigy-head bowl supports closely resembling certain of his Tohil specimens⁵⁴ are entirely restricted to the Mayapan (latest) substage of the Mexican stage, and plumbate is limited just as definitely to the Toltec-Chichén (earliest) substage.

V. THE DEVELOPMENT OF YUCATAN CERAMICS: A TRIAL FORMULATION

The initial purpose of a ceramic survey such as this is the formulation of a chronology, a framework to which later archaeological reconstructions can be fitted. This is essentially a service function; other human products found associated with pottery are thereby made dateable, and can be fitted to an historical account. The classification and analysis used in producing a chronology can and should proceed without dependence on any attempt at the reconstruction of culture, which is properly an interpretive rather than an analytic technique. Since the reconstruction of culture history is dependent upon the chronological framework set up by typological analysis, it must logically follow that stage of the work.

The preceding sections of this report have been basically descriptive and analytic. In this section an effort will be made to reconstruct the historical development of the ceramic craft in Yucatán. In the final section a more general cultural reconstruction is attempted.

To aid in the understanding of ceramic techniques as practiced in Yucatán, a general description of modern pottery-making there will be given first. There is every reason to believe that this craft has not greatly changed during the past few centuries. Following this section the archaeological ceramics will be discussed.

POTTERY-MAKING IN MODERN YUCATAN

The descriptive summaries given here are meant merely to outline the problems of this branch of the study and to allow archaeological comparisons. The information and opinions given are mine (often corroborated by others), save where other sources are specifically cited; I should be held responsible for any inaccuracies and errors. The sources for information and theories follow: first, I owe much to discussion with, and information from, Miss Anna O. Shepard, who initiated me into the technology of Yucatán pottery before I began work in Yucatán, and who has generously given technical advice and theoretical clues during the course of this study. My work in Yucatán was preceded by work on Near Eastern and Southwestern pottery under Professors Arthur Watts and Arthur Baggs in ceramics and under Professor W. J. McCaughey in optical mineralogy at Ohio State University. The interest and kindness of these men in giving me many hours of their time I can never repay. Descriptions of modern Yucatán pottery-making may be found in Mercer, 1895, 1896, 1897; E. H. Thompson, n.d.; Rendon, 1947, 1948; Henry B. Roberts' diaries, 1932, II, pp. 72-75, and III, pp. 1-2, Ticul pottery-making; 1935, II, pp. 20-23, Tepekan pottery-making. I have observed pottery-making at Maxcanu, Becal, Ticul, and Uayma, and have taken a moving picture of the process at Becal. (See Brainerd, 1946, for a description of kabal forming.) Except in the particulars noted in the text, no changes in technique over the 50-year period covered by these reports has been noted. Regional variations are not so marked as to offer difficulties in making a single presentation of the ceramic craft in Yucatán. The disadvantages of a composite

account are believed to be outweighed by the greater simplicity and clarity possible in the single account attempted here. It should be warned, however, that not all stages of the process have been checked for each pottery center, and that more regional and chronological differences exist than appear in this account.

Materials

No striking differences among types of body clays are recognized by the potters in modern Yucatán, nor would such be expected from the geological uniformity of the area. The clays⁵⁵ come from sedimentary deposits, many or all marine, and produce buff to reddish colors in the firing. These deposits are localized, and form lenticular areas in the native limestone. Modern clay beds are famous among potters over the whole Peninsula and so must be of limited occurrence. Since the Peninsula is largely composed of limestone, the clay may be suspected of having a variable but often considerable calcium carbonate content. The modern Yucatán ceramics are unglazed. Modern potters claim that formation of gas (carbon dioxide) during firing precludes the use of glaze over native clay, but such gas formation may be due to the universal modern use of calcite as an aplastic. •

Aplastic materials at present are of two sorts, saskab and hi'. Saskab is a soft gray earth, composed of impure crypto-crystalline (or very minute crystal) limestone. Various qualities of saskab are recognized by the Yucatecans; the more impure may well be marls with a considerable clay content. The harder and perhaps more lime-rich varieties are used for pottery. Saskab is mined as an earth; it is employed for vessels not to be used for cooking. Hi' is a form of limestone, characterized by a sugary crystalline structure. It is of localized occurrence, and nowadays is often hauled considerable distances; for example, horse-drawn carts now haul clay (k'at) from Yokat, near Ticul, to Maxcanu, returning with hi' from near Maxcanu. Clay is also reported to be brought from Becal to Maxcanu. At Ticul, charges for hi' and clay were said to be for labor and cartage; no charge for mine ownership was involved. Rendon (1947, p. 116) was told that hi' is in some regions calcined before use. I was told at Ticul that a fire is built in front of the face of a hi' bed to soften it for quarrying. These reports are to be suspected of inaccuracy and should be checked, since calcining would release quicklime which would adversely effect the working of the clay. Hi' from the beds near Maxcanu is characterized by minute clayish red lumps among the crystals in some parts of the deposit (E. H. Thompson gives a Maya term for the red hi': Kanhi' or chac hi'). Hi' is used for refractory wares and is added to the wet clay in quantity equal to or greater than the wet clay up to a 2 to 1 proportion by volume.

The slip used by modern Yucatán potters is of the red, leached, surface clay (k'ankab) which fills the crevasses in the prevailing limestone. Imported red ochre is often used to mix with it or as a substitute, and is more attractive because of its brighter color. Uayma vessels show a lighter-colored mottled orange slip, probably caused by a regional variation in the k'ankab. As far as is known, k'ankab is never used as

a constituent of the body of the pottery. It is applied to the surface with a cloth or brush.

In the preparation of materials for use, the grinding of hi is of importance. It is mined in rocklike fragments which are crushed by placing them on a cleared area of bedrock and rocking over them a large, crudely rounded limestone chunk (kamush, according to Thompson) which must weigh 300 or 400 pounds. Screens are used for hi. Thompson reports a sieve of palm ribs (chachab) set at a slope, but sloping wire screens have now replaced this. No reports describe winnowing to sort for particle size. Thompson describes washing. The clay is sometimes picked over, and lumps containing orange streaks and areas are removed. It is then dried, crushed crudely, and left to soften in a vessel filled with water. The water is decanted, and tempering material added and worked in to produce a mix of good consistency for forming. The people of Ticul say that if the proper quantity of temper is not added, the vessels will crack. Thompson describes a marked swelling of the clay when water is added.⁵⁶ The clay is readied for forming into vessels by molding into plump rolls perhaps 1 1/2 inches in diameter and 10 inches long.

Forming

Forming tools are arranged before beginning. A low stool (kanche) of special form, with its seat a flat-bottomed low trough, is placed facing a smoothed board of zapote or other hard wood (limia). This board may be rubbed with soap or grease. On the board is placed the k'abal, a cylinder of wood commonly about 5 inches in diameter by 5 inches high, on which the vessel is to be made. Kabals are made in variant forms and sizes, according to the requirements of the worker and the size of vessel base; a square top is sometimes added to the kabal. The rolls of clay are placed on the board to the potter's right hand, and a bowl of water with tools such as a wooden or steel blade, an oval piece of gourd (box), and a cloth or leather strip by the potter's right side.⁵⁷

The potter sits with knees widespread and the toes of the right foot and ball of the left pressed against the opposite sides of the kabal. A flattened pat of clay is first pressed to the kabal and the fillets are pressed into place around it while the kabal is inched clockwise by the feet. The work is done on the side of the pot at the potter's left. Clay is squeezed from the right hand onto the interior surface of the pot. The motion of the kabal at this time seems to be directed chiefly toward keeping the vessel in a convenient position for work. The pressure for forming is given mainly by the hands. The technique at this stage of forming is similar to that used in Pueblo pottery-forming in the United States (see Guthe, 1925, pp. 37-42). A flarer-pot shaped vessel is thus formed, with inch-thick sides and uneven surface.

The next stage consists of spreading and thinning the pot. The rim of the half-formed vessel is trimmed to an even edge by a successive series of finger pinches. The gourd tool is then placed interiorly against the vessel wall, the left hand exteriorly, and the walls spread and thinned into their final form. During this stage, tools and hands are often dipped in water and the clay kept softer than is characteristic for hand-modeling. A variable amount of the force used in forming comes from the motion of the kabal, which forces the vessel wall between the stationary hand and tool. Clay is scraped off and added as needed to make the walls even in thickness, while an extremely even circular form is attained by the kabal motion.

The kabal is never spun through more than a fraction of a total revolution during this stage of the procedure, and it was noted that, whereas at Becal the force for forming came from this motion of the kabal, at Uayma nearly all the force applied came from the hands. This resulted, at Uayma, in uneven contour and surfaces and lack of circumferential forming marks on the finished pieces. It was also noted that during this stage the kabal was sometimes rotated counter-clockwise by one potter, seemingly to rest his legs.

Simple vessel forms such as open bowls and basins are formed at a single sitting. The potter proceeds directly to finishing them from the stage detailed above, first by very careful evening of the rim, done by pinching off clay and adding small dabs of clay with the fingers as the kabal is turned; then by a throwing or turning procedure performed as follows: the potter wets the rim of the vessel, using the strip of leather which has been hanging on the rim of the water bowl, and wets his hands. He then rearranges his feet, right heel and left toes now coming in contact with the kabal. The leather strip is held clamped over the rim to the potter's left side, the left hand steadies the outside of the pot, and the kabal is rapidly spun clockwise through its maximum possible rotation, which is about a revolution and a quarter. During this revolution the center of the kabal does not move more than one-half inch on the board as measured by moving pictures taken, and this movement is compensated by a shift of the hands. The resulting rim is extremely even and true, approximating that produced on a wheel (Plate I). The technique is in effect very close to that of wheel throwing. Only the axle is lacking, and this lack only slightly affects the hand technique and the qualities of the pottery shape attainable. By varying tools and hand position, raised moldings and grooved lines may be formed (Plate I). It should be noted, however, that the kabal technique is capable, through variations of usage in individual potters, of producing a complete range from handmade to apparently wheelmade forms. Forming noted at Uayma, for example, was much less exact than that seen at Becal.

In the making of more complex forms than that described above, additional steps are taken. To form a pitcher, the body up to the shoulder-neck junction is formed and allowed to become nearly leather-hard; then the upper part of the vessel is added by throwing, and finally the handle is luted to the partially dried surface. In forming vessels with large, flat bottoms, the bottom is first formed and allowed to dry partially; then the edge is scored and dampened, and sidewalls built upon it. To economize on time, several vessels, each on its kabal, are worked in rotation.

For the making of annular and trumpet bases, the vessel is first formed on the kabal, then allowed to dry leather-hard and cut loose with a knife. The vessel is inverted and placed on a special kabal which has a circularly cut board nailed to its top, with four equidistant holes bored around its projecting border. Into these holes have been inserted corncobs which project vertically. The vessel body (such as the one shown in fig. 34, g) is inverted and set among the corncobs so that their soft surfaces hold it in place. The flat bottom of the body is then scraped off until round; it is moistened, and a trumpet-shaped base built by coils onto it. The same technique is used for pitchers with annular bases.

In Becal and Lerma all potters are men; in Tepekan it is reported that only women work on the kabal (see Rendon, 1947, p. 115). Mercer had the impression that only women were potters in Yucatán; his observations were made near Mérida. Tozzer (1907) illustrates a

woman working at a kabal in Ticul. At Uayma both men and women work. At Ticul both sexes work, but the occupation is carried down patrilineally (Rendon, 1947, p. 115). At both Maxcanu and Becal there is at least a tendency for the women to make the figurines and whistles, but the men use the kabal. For over 50 years, at least, potters' wheels have been in use in Yucatán, as has been the making of glazed pottery from imported materials. These trends, as might be expected, have centered about Mérida, but seemingly have never assumed larger proportions than individual or very small group enterprises. There is no evidence thus far of any dropping off of the local techniques. The best potter I observed, an elderly man in Becal, told me he had learned wheel throwing in Ticul in his youth, and that he had found it a much more rapid technique but preferred the kabal. Some kabal workers use a pivot in the form of a nail projecting from the board into the kabal; other workers disdain this as slovenly practice.

Slipping

A slip is applied to most vessels, with the exception of cooking pots. The slip is a creamy mixture of *k'ankab* in water, in which the larger clay particles are allowed to settle. Commercial ochre is sometimes substituted or added to produce a brighter hue. It is applied with a cloth pad or brush over all or part of the surface of the dry vessel. The cloth pad is preferred by careful potters, perhaps because it permits a more even, impacted surface than does the use of the brush. The vessel is then dried again before firing.

Finishing

Thompson gives the name for a polishing stone (*yultunich*), indicating that this tool must have been in use within a half century. I have seen no modern pottery which shows evidence of stone or stick polishing, but the post-Conquest pottery of Maní contains sherds so polished. The wiping of the surface with wet fingers, cloth, or leather is done as a smoothing procedure, and particular care is taken to smooth out areas showing protruding temper particles by application of bits of clay and by rubbing with a damp finger. Oil and soap are said to be rubbed into the slip before firing to produce a greater gloss, and I have seen them used after firing for this purpose.

Decoration

The vessels are decorated in various manners. A technique used in Becal and Lerma is the mold pressing of low relief designs and inscriptions by means of pottery stamps (see fig. 34, g, for an example, pl. III for stamps). Occasionally, stamping is accompanied by simple incised work. These impressions are normally placed in a band bordered by raised moldings. The band is left unslipped, while the remainder of the vessel is usually slipped. The stamps are negative molds of floral patterns and letters in bas-relief. These are used by holding the stamp to the exterior of the freshly formed vessel and pressing the clay from the interior of the vessel wall into it. The technique can be called embossing or stamp (mold) pressing. The application of mold pressed low relief designs by luting them to the vessel wall was also described by informants. In the making of animal figurine banks at Ticul, a more elaborate use of the same basic technique was noted. A layer of clay was pressed into a series of fired clay molds (Rendon describes

plaster molds) of various parts of the animal's body, and the molded segments were then luted together while still damp. This technique is less efficient than the employment of slip casting in multipiece molds, which is widely used over the world for this purpose but has never been reported for aboriginal America. Hand-molding is used for some of the finer parts of animals made at Ticul, and for animal-shaped ocarinas made at Maxcanu in forms similar to those made before the Conquest (see fig. 93, r, u, v, z-cc).

At Tepekan, Campeche, painted water jars are made (plate I). The colors used are red and brownish black. The red is *k'ankab*, the black is described by Roberts as made from "a small stone which occurs in a type of earth called *hacalche*." Rendon describes this material as called *ta'kook*, meaning excrement of the turtle, and I found this name used at Becal. These descriptions, coupled with the color produced, make it nearly certain that a manganese oxide is used—probably psilomelane, with its botryoidal or reniform aspect. These paints are applied to the dry surface before firing and become permanent in the fire. The paints are applied in an aqueous suspension. I do not know if an organic vehicle is used in the water. Post-firing colors are also used, sometimes on vessels and commonly on figurines. The Maxcanu whistles and ocarinas are covered with a white coating. According to Rendon, this coating is of finely ground sascab, sorted by settling and decanting in water. The coating is much like that on Lacadone and pre-Conquest Maya incensarios. Additional decoration is painted on with store-bought, water-mixed pigments. The modern Ticul animals are decorated in oil paint.

One further method of decoration should be recorded. The unslipped, *hi'* tempered cooking vessels, upon being removed hot from the kiln after firing, are splashed on their exteriors with a vegetal paint. This paint is made by macerating and steeping for two days, or boiling, the bark of the *chucum*, *tzalam*, or *pixoy* tree. The dark, watery liquid so made is kept in a bowl and applied by slapping it on with a corn husk or palm frond. This splashing, as I observed it at Maxcanu and Becal (Rendon also describes it), consisted of two or three splotches with additional spattered drops, and produced no more than indistinct, faintly darker areas. The potters insisted that no other purpose than that of decoration underlies the use of this paint, and seemed embarrassed when I suggested its small value for this purpose. This technique may very likely be a cultural survival.

Firing

The use of a kiln for firing seems to be universal for vessels in Yucatán. Rendon describes the open firing of toys. Construction of the kiln is usually of rough limestone with mud (*k'ankob*) chinking in a simple beehive shape.⁵⁸ A small flue, which is often damped, is cut at top rear of the kiln in some cases; other kilns seen had no flue. The main kiln opening is at ground level, is usually irregular, and is closed by dry-laid rocks during firing. A covering of palm fronds is usually placed on top of the oven to stop rain or to retain heat, or both. No kiln furniture seems to have been noted, save for a ring of rocks used at Ticul to support the pottery against the kiln sides. The kiln is sometimes preheated, and thin green twigs are used for this "to make greater heat." Thin wood sticks are used for firing, and several loads of wood are inserted at intervals. Inspection and rearranging of the pottery during firing is performed with long poles of green wood. Some potters close the kiln open-

ing with unmortared stones; others leave it open. Firing lasts, by report, from 1 1/2 to 7 hours. In some cases, and certainly with the vegetal-painted cooking pots described above, the pottery is drawn from the kiln hot and allowed to cool on a bed of ashes. I have other reports of pottery allowed to cool in the kiln.

Rendon gives a detailed account of the organization and economics of the pottery industry and of marketing and distribution. In the villages I have observed, the industry is undertaken by the family and carried on in typical family quarters. The necessary equipment is simple and no specialized structures are used except the kiln. Pottery is usually marketed by merchants, some of whom are itinerants who carry vessels and figurines on their backs to the village markets. A lashed pole frame, which may be pre-Conquest in origin (fig. D) is used for carrying large jars and cooking pots. It is carried by a tumpline. Yucatán and Campeche, at least those parts within reach of the railroads, constitute a single trade province at the present time; in Mérida, regular stocks of glazed earthenware from the Mexican mainland reach the market but usually in badly chipped condition and at high prices.

The most serious omission in this account of modern pottery is the absence of data on its use. The Yucatán industry is still overwhelmingly Maya and centered in outlying areas of the state. Although metal vessels and china have partially displaced earthenware, I suspect that whenever the earthenware is used its place in the household has changed but little since the Conquest, and thus may present valuable clues to the archaeologist.

There is no doubt in my mind that the pottery-making practices now used in Yucatán are in overwhelming proportion pre-Hispanic. Vessel forms and materials are very close to those of the Late Mexican substage which shortly preceded the Conquest. They are so close that it may safely be said that the last 500 years' history has witnessed probably less, and certainly little more, change in the ceramic craft than the most conservative periods of similar length which preceded it. These facts should be clear from the sections which follow, in which the many similarities to modern ceramics will be drawn upon for inferences of ancient practices.

ARCHAEOLOGICAL MATERIALS

Clay

The clay used in Yucatán archaeological pottery has not been subjected to technological study. It gives the impression of relative uniformity, and probably came from sources similar to those used there at present.⁵⁹ There is good reason to believe that a great part of the color differences noticeable in pastes of the archaeological pottery result from two causes: (a) differences in firing atmosphere and possibly in temperature; oxidizing atmosphere causes buff color, reducing causes white, gray, to black; (b) type and amount of added aplastic (tempering) materials. Color of the paste is also suspected to vary not only due to the actual color of the aplastic particles, but to their chemical effect on the fired color of the clay. Sherd and volcanic ash probably add to the porosity during firing, thus facilitating complete oxidation of the paste and resulting in buff to reddish color. Calcite in finely divided form is known to bleach the red colors produced by iron oxides when fired in oxidizing conditions. In the Medium and Thin Slatewares of the

Florescent stage, calcite tempered pastes average a lighter, grayer color than the sherd or tuff tempered pastes, probably due to this bleaching effect in their firing.

Temper

"Temper" is here used in the incorrect but now time-honored archaeological sense of aplastic added to the pottery clay. Microscopic sections and chemical and optical tests were made on Yucatán pastes by Miss Shepard, and followed by microscopic examination of several thousand sherds. These determinations were made in 1940, and thus include only samples excavated before that date. The temper identifications used here are Miss Shepard's save for those of Yaxuna and Cobá, which I had made previous to her work. Miss Shepard, whose authority on these matters is unequaled, has made her notes available to me, as well as freely given information and discussion during the course of this study, but should not be considered responsible for any misuse I have made of her data. Many of my inferences are based on scant information, so this discussion can in no sense be considered as a definitive report on the technology of Yucatán ceramics; it comes closer to being a prospectus organized from clues and leads which have accumulated during the study. It is presented here, though unfinished, because I believe that only by a consideration of the underlying technology can cultural reconstruction (as opposed to archaeological analysis) be made. The value of future technological study would be enormous in establishing the craft history as well as interregional influences in Yucatán ceramics. (Shepard, 1951, includes additional information on this subject.)

Tempering materials, although poorly sampled as yet, show suggestive clues to craft traditions and pose certain problems as to origin of materials. Miss Shepard in October, 1940, summarized her determinations. She named five principal types of paste: calcite tempered, volcanic ash (tuff) tempered, sherd tempered, clay lump, and "untempered." The great majority of the sherds can be assigned to one of these groups. The untempered type is qualified, since the naming is inferential; the minute inclusions contained in the paste are such as would be expected to occur naturally in the clay.

Clay lump tempered pastes are also a qualified group; we do not know if the "lumps" are native to the clay or are added, and if so what is their source. The lumps are in the general size range of the temper materials, subangular to rounded in shape, brick red to brown in color, in shades darker than that of the surrounding paste. They occur in pastes which usually, but not always, contain a variable amount of calcite; they also occur with variable amounts of volcanic ash. Miss Shepard noted specimens showing volcanic ash and calcite in such proportions as would indicate intentional mixture. A logical assumption from the above data is that the clay lumps are a natural constituent of certain of the Yucatán pottery clays. An alternative assumption, depending upon the observation of small reddish inclusions in the beds of *hi'* near Maxcanu, is that the clay lumps were added in the temper, a variant of *hi'*. This question might be resolved by study of collections of modern Yucatán pottery materials.

Miss Shepard describes a considerable variety of volcanic ash, variable in texture and structure, as well as in the materials adherent to and intermixed with it in lumps. These intermixed materials are in some cases flaky and calcareous, in others are a compact buff-colored clay; they are probably included in

the volcanic ash as a result of secondary sedimentary deposition. No coarse pumiceous ash or ash with mineral inclusions was noted.

The sources for volcanic ash temper in Yucatán have not been located. In my opinion, the quantities of this material which must have been used in the large vessels of the Florestal and Early Mexican stages preclude the possibility of importation of volcanic ash from the nearest areas where vulcanism now occurs, a distance of some 500 kilometers. The only locally occurring material of volcanic nature known at present is pumice, which is sold in the Mérida market for scouring and is said to be found in lumps on the beaches. This pumice may have been carried by water from the volcanic areas of Guatemala and Mexico. But Miss Shepard's determinations rule out this origin for volcanic ash temper on the basis of its structure, which is never pumiceous. The nature of the material and the physiography of Yucatán suggest sedimentary deposits, where ash falls have been entombed in geologic time, as the probable source of this temper material. Collections of samples from the exposed strata of cenote banks might possibly produce volcanic ash of the kinds used for temper, but a search has not yet been made.

Sherd temper presents no problem of geographic source. Its use may well be more reliable as a culture trait than are other temper types, since it is a material universally available to potters and would not be confused with various types of minerals. Sherd temper particles often show inclusions of other tempers, thus establishing a sequence of temper use. The history of this type in Yucatán is of interest and will be discussed below.

Calcite temper shows some variety which can perhaps be explained by reference to modern Yucatecan practice. Crystalline and crypto-crystalline calcite are distinguished by Miss Shepard. Crypto-crystalline calcite ranges from opaque white through grays to black, presumably depending on impurities in the mineral and upon degree of smudging in the fire. Crystalline calcite is transparent and shows cleavage faces; occasional crystals of dog-tooth spar occur. Dolomite is believed to occur occasionally. Coarse and medium textured pastes are often tempered with coarse crystalline calcite; much smaller crystals are also used, notably in the Thin Slateware of Uxmal. These often occur in sugary-textured aggregates. In several known instances, crystalline calcite is found in distinctively different pottery types than is the crypto-crystalline.

It seems likely that the crystalline calcite of the archaeological specimens is the substance now called hi', and that the crypto-crystalline calcite is the modern saskab, but it is certain that the modern restricted use of crystalline calcite for cooking vessels was not universal in ancient times.

Vegetal temper, consisting of short bits of fibrous material which may come from a monocotyledonous plant, was found in sherds of a single ware and vessel form at Cobá and Yaxuna (fig. 1, e). This pottery is rare and aberrant in other regards than temper; no attempt will be made to fit it to the local craft history.

Slips

The description of the use of slips and paints in Yucatán is even more hampered by insufficient technological data than is the study of temper. No analytic work has heretofore been attempted on Yucatán pottery slips, although such studies would undoubtedly shed much light. This section, like that on temper, must present theories and a statement of some prob-

lems. The qualities of slips and paints were noted at the time of macroscopic sorting, and were described from groups of "typical pieces." Thus the general descriptions given here will not always be definitive in sorting of wares sherd by sherd. Nevertheless, I think there is little doubt that this descriptive material delineates the major technical peculiarities of the slips, and as such it is presented. The ware descriptions include further qualifications. The techniques used in sorting slips and paints are of particular importance, since the definitions of wares, the major pottery groups, are primarily dependent upon them.

In the sorting of slips on Yucatán pottery, several criteria were used: (1) color, although valuable, was not as effective a sorting criterion in Yucatán pottery as it usually is among archaeological wares; too little variation in color is found; (2) degree of waxiness (translucency) or its opposite, opacity. Translucency is initially dependent upon a compact, glossy surface, but many glossy surfaced slips are not waxy or translucent. Translucent slips are distinguishable by similarity of slip color to underlying color, and by the partial visibility of landmarks such as cracks and protrusions on the paste surface at the base of the slip. These slips are often sectile to the fingernail.⁶⁰ Translucent slips frequently consist of pale paint which reverses color on smudging (see below for description of this paint); (3) tendency to flake off. This tendency is presumably due to the presence of one or both of the following conditions: (a) poor fit of the slip—that is, a difference in shrinkage during drying, in coefficient of expansion during firing, and in final fired dimension, between the slip and the underlying body; and, more important, (b) lack of bond between slip and body. This may be due to a burnished or smoothed body surface under the slip, or to an underslip (underlying primary slip) which for some reason has partially disintegrated.⁶¹ These flaky slips are not to be confused with slips which, despite crazing (tendency 1 above), still adhere tightly to the body. The loose bond of the slip to the underlying surface would seem to be the most critical causative factor of flaky slips.

Waxy slips were always found to be closely adherent; although they often show crazing, there is no tendency toward flakiness. Their frequent decoration by means of pallid (probably organic) paint, which often reverses color with smudging, has been remarked above. Their colors are always to some degree grayish, ranging from rare instances of deep red with grayish to purplish surface bloom through orange red, dull buff, oyster gray and deeper grays to dull browns. They include much of the Formative Monochrome, all the Florestal slatewares and redwares, and are occasionally found among the Early Mexican slateware and redware.

Flaky slips are all opaque and strongly colored; colors are red and orange. They include Flaky Redware, its decorated variants which are Incised Dichrome and Trickle on Flaky Redware, and Regional Polychrome (see fig. 63 for example). The two latter wares are Early Regional in date; the unpainted Flaky Redware is both Late Formative and Early Regional.

All other wares noted in the Yucatán sequence bear opaque, adherent slips. The Late Formative Monochrome from several of the sites belongs to this group, as do most of the Early Oxkintok Monochromes, the Regional Redwares, and the Middle and Late Mexican slipped wares. Paints on these wares are strong and solid in color.

Paints

In Yucatán, from Late Formative through Middle

Mexican times, a tradition of pottery decoration by trickle paint seems to have persisted. And although Late Mexican pottery does not show evidence of this tradition, the process described for the decoration of modern unslipped pottery may still be an historical remnant of this same long-lasting technique. The paint may with reasonable certainty be called organic, although exhaustive tests have not yet been made on all wares here classed as having organic paint. But even without a complete testing, its peculiarities are so striking as to make its recognition through time reasonably certain. The manner of application of this paint, as well as its appearance, suggests the same lengthy tradition and adds weight to its identification.

The characteristics of the organic paint, if we correctly interpret it as such, are as follows: the paint reverses color when the area is smudged by reducing gases or smoke in firing. This reversal results in a light color in the painted area, while the slipped surface has been grayed. When found on a waxy slip, the paint is grayish, pale, variable in color and often vague in outline, and does not alter the lustre of the underlying surface. When found on an opaque slip, as on Trickle on Flaky Redware or on some specimens on Holactun Slateware and on Coarse Middle Mexican Slateware, it is strong black in color and sharp in outline, save in areas which show reversal of color through smudging. No reversal by smudging has been noted on Trickle on Flaky Redware. The manner of the application of this paint is even more characteristic than its surface appearance. It is always applied in broad, freely drawn lines, and shows a constant tendency to run over the surface. It is because of this quality that we call it "trickle paint." The paint appears in long vertical blobs which seem to have been caused by applying it at the rim of the upright vessel and allowing it to run down the side, sometimes with guidance. Figures are drawn on the floors of bowls, and these, as would be expected, do not show trickling but do show the characteristic vague outline. Some slateware designs show oval dark areas within the painted area, which suggest a variability in its thickness caused by considerable viscosity in the paint at time of application, or by its very rapid drying. I know of no evidence as to whether the paint was applied before firing or on pulling the vessels hot from the fire, as is modern practice.

It has been demonstrated by Shepard (Kidder and Shepard, 1936, pp. 411-422), and found independently by the author, that the type of organic substance used makes little difference, but that the type of slip clay used is of prime importance to this process. The suggestion given above that bentonitic clays are available in Yucatán is of interest, since Miss Shepard found that clays of this type are very susceptible to coloration by fired organic pigments.

The testing of samples of the various Yucatecan wares for organic paint is badly needed. Miss Shepard reports that the one sherd of Yucatecan slateware found at San José (Thompson, 1939, pp. 269-270) was decorated with organic paint, and that on slateware sherds from Chichén Itzá "the optical properties of the clay suggest that it is of the type which is highly absorptive and thus protects organic matter." In a recent brief report (Shepard, 1951, pp. 243-244), Shepard says of Yucatán slateware: "Tests of the paint have shown that it is organic, which makes the ware unique among analyzed Mesoamerican wares.... The only other example of carbon paint that has been sent to the laboratory is that on classic resist decorated sherds."

The writer has noticed on Pueblo III Black-on-White

organic-painted pottery in northern Arizona,⁶² as well as on experimental firing tests which he has made of organic paints on pottery, that tones of paint and background may reverse themselves, depending on firing atmosphere. In a fire which is kept smoky during its final stages, the organic paint may act as a resist to prevent the absorption of smoke, while the background becomes dark gray in color due to smudging. Yucatán slateware vessels occasionally show this color reversal, and the trickle-painted Formative monochrome, which on other grounds I suspect to be decorated with organic paint, shows it much more commonly. It is likely that the rare negative-designed fragments found in Yucatán collections (see for example figs. 12, f; 24, b) were so made. It thus seems likely that negative smudging, as it may be called, is a widespread characteristic of organic paint, and that most New World resist or negative pottery decoration is of this type.⁶³

Black mineral paints seem to be limited to polychrome pottery in Yucatán. The modern use of manganese ore for paints is nearly certain. They are presumably composed of manganese or of a manganese-iron mixture, but have not been tested. Red paints are of two types, easily distinguishable on the basis of hue. Hematite and ferruginous clay paints range toward orange in color, paints containing specular hematite are more rare; they range toward purple and show a characteristic sparkle.⁶⁴ It may be added that specular hematite was found used over a ferruginous paint on stucco building facings at Dzibilchaltún and Yaxuna.

HISTORICAL ACCOUNT

Chart 23 shows the characteristics of temper, slip, and paint of the major slipped wares recognized in Yucatán, ranged in rough chronological order from bottom to top. From the chart it may be possible to trace craft traditions through the sequent combinations of these traits in wares. It must be emphasized, however, that only three alternatives exist in this chart for each of the three mutually exclusive criteria of temper, slip, and paint. The presence of a single type of temper, slip, or paint over a long continuing time period does not of itself prove cultural continuity, since the number of possible choices is not great enough to preclude chance. Moreover, the interruption of any type, followed by a resumption in use, must be carefully examined to determine if chance rediscovery, a blank in the archaeological record, or reintroduction from an outside area is the most likely hypothesis.

Tempers

It is worth first commenting on the fact that all pottery believed to have been made in Yucatán is tempered.⁶⁵ This may possibly be due to a lack of naturally occurring aplastic minerals in Yucatán clays. Without such materials, shrinkage and consequent wastage in firing might be expected to be heavy. The coastal plain to the west, beginning at Champoton, seems to have produced untempered wares. This area is characterized by river drainages carrying water from volcanic mountains, and naturally formed, aplastic mineral-bearing transported clay would be expected from such an area. Although geological determinations are lacking, we suspect the Yucatán pottery clays to be relatively free of materials which act as aplastics under local pottery firing conditions.

Without question, calcite is the most generally available aplastic. Its use is shown as absent only from the Early Mexican substage in chart 23, a mis-

leading absence since it is characteristic in the unslipped ware of this as well as of all other horizons. A detailed study of the use of various types of calcite and of dolomite, the presence of which I suspect in some wares, would unquestionably yield more sharply drawn distinctions. A crystallized calcite of fine, uniform grain size and structure is characteristic of the Thin Slateware of some Puuc sites. In some Yaxuna deposits the unslipped ware divides neatly into two subgroups, each showing a combination of certain vessel forms with a definite type of calcite, one crystalline and the other crypto-crystalline. Modern Yucatán potters distinguish between crystalline and crypto-crystalline calcite.

Sherd temper is rare in the collections, was early in use, and has a distribution broken in time. The presence of Holactun Slateware irregularly distributed in Florescent deposits suggests the possibility of a craft tradition holding over from Formative times, although no documentation is available for sherd temper in the Regional stage. The likelihood that some of the slatewares of Yucatán are contemporaneous with the Regional monochrome wares and represent a continued craft tradition stretching on from Formative times is discussed below and at other points in the text. There is no documentation of Holactun Slateware or of any sherd tempered wares in Regional deposits, but much of our Regional pottery has not been tested for temper and some may contain sherd temper. Ruz' work in Campeche demonstrates that the geographic range of Holactun Slateware extends well down into Campeche (Ruz, 1945, p. 61), and his Etzna pottery, as yet unpublished in detail, might yield valuable evidence for the persistence of sherd temper in Regional times. In the central Maya area at Uaxactun and at San José, sherd temper declines sharply in use after the Formative stage; a reintroduction of the technique into Yucatán from the south in Florescent times is therefore unlikely. I can think of no reason why this technique should have been developed early and then apparently discarded, unless desired qualities of hardness, durability, color, or behavior in heating may have dictated changes in temper. There are suggestions in our material that all these qualities are to some extent influenced by tempering materials. The origins of sherd temper might theoretically be allocated to an area such as a broad flood plain, where no aplastics occur naturally, but I know of no evidence yet from the Maya area to support this hypothesis.

Volcanic ash temper is earliest known as a dominant type in our samples from the Regional stage at Cobá and Yaxuna.⁶⁶ It is very common in the Medium Slatewares of the Florescent stage in the Puuc sites, and was used almost exclusively in the Early Mexican Medium Slatewares and Redwares at Chichén Itzá. No ash was used in later wares; calcite was used exclusively. In the central Maya area volcanic ash (tuff) temper is listed as present in Mamom pottery but absent from Chicanel, reaching a peak of over 50 per cent in Tzakol times (Smith, 1940). San José shows the same trend, but material from the Mamom horizon is lacking at this site.

The historical relationships of temper types can be only generally and provisionally discussed because of lack of adequate archaeological sampling and of a sufficiently refined typology through most time periods and regions.

For the Late Formative stage we have sampled the Holactun collection and six sherds from Kabah. These sherds are all of Formative monochrome, nearly all without trickle paint. Sherd temper is predominant in the Holactun sample, but some crystalline calcite,

both coarse and fine, is present, as well as some volcanic ash.⁶⁷

The Flaky Redwares sampled, all of Regional stage, show crypto-crystalline calcite temper. The sample is small and restricted in provenience. The early Oxkintok wares are virtually all calcite tempered, almost equally divided between crystalline and crypto-crystalline with some fine crystalline calcite; volcanic ash tempers are present but very rare. According to my determinations, the Regional Medium Redwares of Cobá⁶⁸ and Yaxuna are tempered principally with volcanic ash, the Coarse Redwares from Coba with calcite. Unfortunately, we have no temper determinations as yet on Red on Thin Grayware, nor on its associated slatewares.

The sites of the Florescent stage show marked variability in the tempering materials used in the major slipped wares. Among these, Holactun Slateware, wherever found, is almost entirely sherd tempered. Various sherds sorted as Medium Slateware also show sherd temper, but they never constitute a large percentage of that ware. The Thin Blackware of Holactun (a very small sample) is also sherd tempered, for the most part. Without much question, Holactun Slateware dates as late as 9.16.0.0.0; it is found in abundance in superficial deposits around the temple bearing that date. At both Uaxactun and San José, sherd temper drops off markedly in popularity after the Formative stage. The use of sherd temper this late at Holactun suggests a continuing tradition of its use, the intermediate time horizons of which are thus far missing from our temper samples.

Calcite temper is concentrated at Oxkintok, where the Florescent slipped ware collection sampled (270 fragments) contains only 3 per cent of other tempers. Ash temper is concentrated in general in the slipped wares of Sayil and Kabah, but this is not of itself a particularly illuminating observation because there are unquestionable tendencies toward relationship between tempers and the various sorts of slipped wares, forms, and rim shapes, as well as between temper and paste and slip colors in the Puuc area; these can eventually be more revealing than uncorrelated observations. For example, Thin Slateware (sorted from Medium Slateware mainly on criteria of form) is almost exclusively tempered with fine crystalline calcite at Uxmal, Holactun, and Oxkintok, but is largely ash tempered at Sayil and Labna and about evenly divided between calcite and ash at Kabah. The differences in temper are paralleled by differences in wall thickness and slip color; thin walls and light slip color are characteristic of fine crystalline calcite tempered sherds. Medium Slateware hemispheroid bowls are largely ash tempered at all sites, in distinction to the rest of the ware which is highly variable in temper from site to site. Medium Slateware basal break bowls are mainly calcite tempered at all sites sampled, and such bowls are characteristically light in color. Clay lump temper occurs most often in Medium Slateware jars, frequently in basins, but almost never in Medium Slateware bowls of any sort.

The variations above have been described by ware and shape. Although sampling is meager, there is good reason to believe that type of temper may be quite closely correlated with minor variations of rim and vessel shape. These, in turn, are unevenly distributed among the sites, thus corresponding with the markedly different temper proportions in the sites as described above. For example, several of the better defined of the dozen or more Medium Slateware jar rim types tabulated show consistent predominance of a single temper type wherever found, but are markedly uneven

in frequency in the different sites. The inference may plausibly be made that a series of groups of potters in a certain area made vessels of consistent form style, using a characteristic temper, and that each of these types was widely traded over the area. This situation is what one might expect from the modern industry in Yucatán and throughout Mesoamerica, from certain results of Miss Shepard's Pecos study (Kidder and Shepard, 1936, pp. 581-583), and from the uneven distribution of the wares themselves among these sites.

The relative effects of regional and time differences in producing this maze of interrelated variations among the Fluorescent-stage sites of the Puuc area are as yet incompletely known and are still under investigation. The separation of time in the series can profitably be tackled first, and probably has the lesser effect on the temper types; at least this is true if it can be assumed that techniques and sources of material have changed through time more slowly than have shapes. The problem of the cultural interrelations among these tremendous and closely spaced sites should be an unusually interesting one, and the further study of their ceramics seems the easiest way to approach the problem.

The temper sampling of slateware from Yaxuna for the Fluorescent stage is small and shows marked variety in comparison with Chichén Itzá, a few miles to the north. At Yaxuna the determinations made on the slateware of the Roberts collection shows all calcite temper in jars, more ash than calcite in the basins, and almost exclusively ash in the basal break bowls. A collection sent by Roberts to Peabody Museum shows mainly ash. These samples contain 183 sherds in all; the temper determinations are mine. My findings on a very small slateware sample from Cobá are part ash, part calcite.

The slatewares from the mixed collections found in the Hacienda Cenote at Chichén Itzá are unique in ware characteristics, and I have provisionally placed them as Regional on the basis of style and association (see caption, fig. 66). From a good sample, Miss Shepard determined them to be largely ash tempered. Vessel fragments of Fluorescent Medium Slateware from Chichén Itzá were also determined to be preponderantly ash tempered. Thus a long, continuous tradition in temper is indicated at that site.

The tempering materials of the Mexican stage have been sampled only at Chichén Itzá. The Middle and Late substages show use only of calcite, and because of the widespread homogeneity of the wares of these horizons it is probable, though unproven as yet, that no other temper was used on the Peninsula and that this tempering material has continued in exclusive use until the present. The tempering material of slipped wares of the Early Mexican substage at Chichén Itzá is nearly all volcanic ash. At this site, Medium Slateware, both of Fluorescent and Early Mexican forms, and the accompanying Medium Redware, show the same overwhelming frequencies of ash temper. Thus there seems to have been no change in tempering material during the transition between the Fluorescent and Mexican stages, and the later shift from ash to calcite temper may be an underlying cause of the difference in appearance which allows a clean-cut sort to be made between Medium Slateware (Early Mexican substage diagnostic) and Coarse Slateware (Middle Mexican substage diagnostic). The constant small percentages of temper other than ash at Chichén Itzá during both Fluorescent and Early Mexican times suggests trade. There is good reason on architectural and other grounds to suspect such trade, at least in Fluorescent times, from both the Puuc area to the west

and the Río Bec area to the south. There are no Early Mexican substage remains yet identified from either of these areas in quantity sufficient for comparison. The presence of rare silica-sand tempered sherds at Chichén Itzá, as well as of the fine orange paste potteries of the Fluorescent and all subsequent substages, points to trade from the west and southwest, and trade from these directions seems to have continued through the Late Mexican substage.

The vegetal temper found very sparingly at Cobá and Yaxuna lies completely outside all known Mesoamerican traditions, and no plausible historical connections have been found in neighboring areas.

Slips

The criteria which have been used for macroscopic sorting of slips are of two kinds: first, translucency or "waxiness" and its opposite, opacity; second, flakiness and its opposite, adherence. Waxy slips are always adherent; this leaves three kinds of slips plotted in chart 23: waxy adherent, opaque adherent, and opaque flaky.

Waxy and opaque adherent slips were both used in Late Formative times. I suspect that the marked difference between various sites in this regard is due to regional rather than chronologic difference, although this is far from certain as yet. Waxy slips usually bear trickle paint. Flaky slips seem to be confined to the later part of the Late Formative substage, continuing into the early part of the Regional stage; the evidence for this placement is that of the pottery forms. These occurrences probably reflect the introduction of a new technique for the preparation of surfaces for slipping. Flaky slips do not persist beyond the early Regional stage in Yucatán. It is quite likely, as Miss Shepard implies (Thompson, 1939, p. 268), that their purpose may have been the heightening of slip color. If so, the Maya preoccupation in Late Regional and following times with monochromes of muted color may have accompanied the abandonment of this somewhat laborious double-finishing technique.

Waxy slips are absent from the Regional ceramic assemblages known so far, but characteristic of the Fluorescent-stage ceramics. If a cultural continuity be hypothesized for this sort of slip through the Regional stage, it must be assumed either that it was reintroduced from another region in Fluorescent times, or that the slatewares, which in this area are characteristic of the Fluorescent stage, had started to be made in certain regions by early Regional times.⁶⁹ There are reasons for suspecting that the latter hypothesis is correct. The Fluorescent stage is characterized by waxy slips throughout; I have seen but few slipped sherds of this stage which do not have a waxy, translucent surface. The superceding of waxy slips by opaque slips in the Early Mexican subphase is striking in our material from Chichén Itzá, although there is evidence that it was gradual. The Chichén Itzá Early Mexican slipped wares are tempered exclusively with ash, which probably causes or at least contributes to the strongly red paste color of these wares and may have prompted the use of an opaque slip if a white surface was desired. The trend to opaque slip is unmistakable, although technical studies would add important details. The white, opaque slip of Middle Mexican Coarse Slateware is indistinguishable from the Early Mexican white, opaque slip, but is often applied to a rough surface. The change from opaque white slip to the red k'ankab slip which is still in use today unquestionably represents a change in slip clay source. I have no information as to the source of the translucent and

opaque white clays; red clay is almost universal in occurrence.

Paints

The distribution of paint types in time is for the most part closely correlated with that of the slips. The somewhat equivocal names used in chart 23 are necessary at this stage because of the absence of technological determination on Yucatán paints. A minimum of technical work should allow a clearer and more certain set of determinations. As discussed above, the paint called "trickle" is strongly suspected of being organic in nature, as is the modern type described earlier. Opaque paints are mostly of mineral origin. The ones considered here are only those of wares found in major proportion in the collections, all of which are presumably of local manufacture. The paint of Flaky Dichrome is a mineral red. More reds and a black (probably also mineral) ornament Regional Polychrome, much of which is probably of local manufacture. Oxkintok Monochromes are often decorated in a black which is probably also mineral. Occasional use of red mineral paint occurs in the Fluorescent stage and in the Early and Late Mexican substages. The vivid black paints found on Trickle on Flaky Red, and on Middle Mexican Coarse Slateware almost certainly belong to the organic group. They do not alter the surface reflection of the slip; they are applied in the same trickle technique as the other paints of the series presumed organic. The Middle Mexican Coarse Slateware paint at times shows color reversal (resist smudging), as do organic paints. The strong black color of these paints can with some reason be laid to a quality of the slip. Both slips are opaque; the former red, the latter white. These are the only trickle paints found on opaque slips in Yucatán.

The preceding text and chart 23 have described the distributions of tempers, slips, and paints through time, and indicate in general a long persistence of each of the traits considered. Although the sporadic sampling of sites in Yucatán now available is not sufficient for a sound regional study, it may be said that the evidence to date suggests regional variation in these traits during several periods.⁷⁰

Wares

The marked differences among Late Formative Monochromes from various sites have been described earlier. Some of these differences are probably chronological, since certain vessel and rim forms also appear in Formative Flaky Redware which continued to be made during the Regional stage, while a different group of forms shows similarities to the Middle Formative collections dug in 1949. Regional form differences may also be present; no thorough study has yet been made of these stylistic variations, and samples are small and from widespread locations. The use of trickle paint on Late Formative Monochrome also shows a marked difference in frequency among collections from various sites, as do several other shapes and decorative techniques. At present we cannot separate temporal and regional variations from this mass of data with any degree of certainty. It seems likely, however, that this period was one of rapid technologic development, as the more or less contemporaneous Miraflores phase in highland Guatemala may also have been.⁷¹

The Regional stage has been so named because of the marked evidence of regional variation in its ceramics. Regional Flaky Redware, because of its Form-

ative stage vessel form similarities and its stylistic linkages to early Tzakol in design style, must be placed very early in the Regional stage; its period of use very likely preceded that of the earliest Maya calendric inscriptions. It is distinctive in form and finishing techniques as well as in ware characteristics. Its distribution is wider than that of any other Regional stage ware: Yaxuna, Chichén Itzá, Dzibilchaltún, Mérida, Acanceh, and (if the seemingly related Regional Polychrome be included) at Chac Cave in the Puuc region, at Maní, and at Mayapan. I am inclined to believe that this ware, at present known only from small collections save at Yaxuna, represents a widespread, well-developed horizon as yet only slightly known due to vagaries of sampling. The distribution of Trickle on Flaky Redware at Yaxuna (see fig. 7) makes it reasonably certain that the periods of manufacture of Flaky Redwares and Regional Medium and Fine Redwares overlapped at that site. Flaky Dichrome, a decorated variety of Flaky Redware, is of particular interest as a horizon marker in Mesoamerica (see Brainerd, 1948, and Wauchope, 1950, for distribution and discussion), as well as indicating possible parallel development in the sequence of ceramic decoration of the Mesoamerican and Andean regions. There is little question that this ware is a close relative of Yucatán Regional stage Polychrome, which in turn is a regional variant of the Tzakol Polychrome of the Petén region.⁷² There is, additionally, good evidence at Yaxuna that Flaky Dichrome precedes Tzakol-like polychrome pottery. This evidence is strengthened by the E. H. Thompson collection shown in fig. 63, a, which contains combinations of forms and decoration which consistently grade from Flaky Dichrome into Regional Polychrome with Tzakol features in both decoration and form (see fig. 63, caption).⁷³ Further confirmation of the close relationship between Flaky Dichrome and Regional Polychrome is the presence of interior striation of jars as a common characteristic found only in these two wares. The marked similarity of the slips and paints of the two wares, particularly the unique brilliant orange slip, also supports their interrelationship.

It is strange that our best documentation of the antecedents of Tzakol Polychrome, a pottery ware known as a Petén Maya early Classic diagnostic over Mesoamerica, should appear from Yucatán, an area noted for its absence of a polychrome style of decoration. No pottery with the decorative or shape repertory of Flaky Dichrome has been found at Uaxactún, San José, or Holmul. Thompson (1939, tables 17, 18) suggests a disjunction between Chicanel and Tzakol, and between San José I and II, in which he places Holmul I and Mountain Cow II. This period must be contemporaneous with Flaky Redware in Yucatán since we can crosstie both the preceding and following periods. Although the collections from Holmul and Mountain Cow do not contain material directly comparable to Flaky Dichrome, the collections are small and I find it easier to believe that the absence results from chance sampling rather than being an indication that Yucatán is the restricted region where Maya polychromes originated. The finding of incised dichromes in the Motagua Valley and the Guatemalan and Mexican highlands adds evidence for the view of a wide distribution of the repertory of decorative techniques which characterizes Flaky Dichrome.

Regional Polychrome has not thus far appeared as a major constituent in any excavated Yucatán collection. At Yaxuna it forms 1 to 2 per cent of the cenote collections, whereas Flaky Dichrome ranges about 10 per cent. In the collections of trenches 24b, c w, and c, and 21-26 a, b (see tables 3 and 4), which are be-

lieved to date later, the polychrome (here labeled Tzakol) far outnumbers the Flaky Dichrome. In Mayapan trench 2, d, e (see table 17), the polychrome outnumbers both Flaky Redware and the Regional Redwares, and no Flaky Dichrome was found. At Mani trench 12 (see table 20), almost no Flaky Redware or Flaky Dichrome was found, but polychrome bowls as well as jars occur in some quantity. The jars are orange adherent slipped and interior striated, much resembling the jar sherds from Chac Cave. All these collections, however, show mixtures of pottery from various other horizons. The Balam Canche collection (fig. 64 and caption) is limited to Flaky Dichrome large-jar necks and a few slateware jar sherds. It is a surface collection from a cenote cave and therefore limited in vessel repertory. Probably it has been additionally selected in its gathering. The E. H. Thompson collection has doubtless also been selected for decoration but, as pointed out above, seems to document a transition from incised dichrome to three-color Tzakol-style polychrome bowls.

The most likely reconstruction from these data is as follows: the early Regional substage is in general characterized by Flaky Redware, a ware which began to be produced during the Late Formative substage. Early Regional Flaky Redware evolved from this through evolution of a distinctive shape repertory, and began to be accompanied by Trickle on Flaky Redware and Flaky Dichrome at Yaxuna, and at least by Flaky Dichrome over much of Yucatán. The Flaky Dichrome seems to have evolved locally into Regional Polychrome, the bowls of which are nearly identical with Tzakol Polychrome in the Petén to the south, thus suggesting a cultural similarity over the whole area at this time. Accompanying these bowls in western Yucatán, best sampled at Mani, are orange-red jars which often bore painted decoration. In the east, at Yaxuna, Flaky Redware is displaced by Coarse and Medium Regional Redwares. Trickle on Flaky Redware lasts, with vessel shape changes, into this later horizon at Yaxuna.

The Oxkintok Regional ware assemblage is remarkably distinctive and shows almost no trade with other sites sampled. Oxkintok Coarse Monochrome probably influenced the later Red on Thin Graywares from Dzibilchaltun and Acanceh, but Oxkintok wares are known elsewhere only from scattered sherds at Acanceh and by one bowl reputed to come from Campeche (fig. 103, d). The high technical quality of the Oxkintok ware repertory argues for well-developed antecedents and correlatives over a considerable area. The Yucatán sites do not provide these but do show Tzakol-like polychromes which must be at least nearly contemporaneous. Since Oxkintok is peripherally located on the western outlyers of the Puuc range, coastal Campeche may well have been the home ground for the development of these wares, a group which may be important in influence on Puuc pottery. Unfortunately for the above hypothesis, Ruz' carefully done ceramic reconnaissance of the Campeche coast produced little if any Oxkintok-like pottery. But Ruz' material also seems lacking in Early and Middle Regional ceramics of any sort, which suggests this absence may represent a sampling gap rather than a true absence of Oxkintok-like pottery along the Campeche coast. Thus the distribution of Oxkintok-like ceramics still cannot be given.

A problem is raised by the presence of a Regional Flaky Redware horizon at Mayapan, Mani, and Chac Cave. The Oxkintok and Regional Flaky Redware ceramic assemblages show practically no evidence of trade, and this suggests that they are not contemporaneous.

Both show Tzakol-style polychrome bowl fragments, frequent in Flaky Redware deposits and very rare in the Oxkintok Regional-stage deposits. There are reasons, given above, to believe that Regional Flaky Redware immediately follows the Late Formative substage. Therefore, it is likely to precede the Oxkintok samples, whose later position is additionally suggested by stylistic similarities to Dzibilchaltun and Acanceh wares. The date of the Oxkintok lintel, which is 9.2.0.0.0, points to the occupation of the site at that early date; the pottery is not stratigraphically associated with the lintel, although it comes from a major occupational deposit found near the lintel building. If the hypothesis be used that 9.2.0.0.0 is the date of the deposit, the Regional Flaky Redware deposits must antedate this. Since 9.2.0.0.0 is only 160 years later than the date of the earliest inscription, the Regional Flaky Redware deposits likely antedate the beginning of inscriptions, thus falling within the Formative or pre-Classic stage, if this stage be thus defined.⁷⁴ The horizon has been called Early Regional in this report because in our present sequence in Yucatán, this horizon begins with major breaks in the style of vessel forms and of decorative techniques from the preceding Late Formative horizon. It is possible that the marked stylistic changes between Late Formative and Early Regional ceramics in our sequence may reflect a disjunction in deposits rather than a rapid cultural change. If this proves true, this departure from the central Maya area stages may be unjustified.⁷⁵

The Regional Redwares of Yaxuna and Cobá show many features in common and are accompanied by dichromes and polychromes, particularly at Cobá, which also show close correspondence with the central Maya ceramics as exemplified by the Uaxactún and San José deposits. The documentation of Cobá as an outpost of the Classic Maya hierarchic cult is strong from evidence of architecture and sculptured monuments, and it is not surprising that Yaxuna, at the other end of the great causeway, should show similar affinities. The central Maya cossies of the regional wares are to the Tzakol and Tepeu 1 phases of Uaxactún; San José cossies substantiate this assignment. The Acanceh Regional Redwares show only general similarities in paste and slip to those of Cobá and Yaxuna. Vessel form correspondences, however, are much more specific than those between the wares. There is a good sample of Petén-style polychromes from Acanceh (fig. 9, c-d). Those accompanying the Regional Redwares are Tzakol in date; no Tepeu polychromes were identified by R. E. Smith from the collection. This cossie places the Acanceh Regional Redwares somewhat earlier than those from Yaxuna and Cobá and approximately contemporaneous to the early Oxkintok assemblages, which Smith believes synchronous with his Tzakol 3. This synchronism is reinforced by the finding of occasional Oxkintok-like slipped fragments at Acanceh (see fig. 19, d) and the likelihood of a regional variation in ceramics between the two sites is reinforced thereby.

Red on Thin Grayware comes from two sites, Dzibilchaltun and Acanceh. It is accompanied by slatewares at both. There is good stylistic evidence from form that the Acanceh sample partially precedes the Dzibilchaltun sample in date of deposit, and trade evidence that the two Acanceh varieties synchronize with Tepeu 1 and Tepeu 2 respectively at Uaxactún. The forms of this ware give clues as to its stylistic antecedents from various Regional wares. There is more doubt as to its ware characteristics. The two alternative colors found on slip, Cinnamon Buff and red, suggest a relationship with the Oxkintok Monochromes.

where the same two interchangeable colors are found. This suggestion is strengthened by the lack of smoothing of the body and slip surfaces of Red on Thin Grayware which is paralleled in Oxkintok Coarse Monochrome, but in the absence of technologic study it cannot yet be proved to be due to similar technique and materials.

The slatewares have presented the most complex problem of analysis during this study. They have been found stratigraphically above Formative and Regional monochrome wares at almost all sites tested in Yucatán save in the Puuc area, and have been found as an unquestionable part of assemblages which also contain Regional monochromes at Dzibilchaltun and at Acanceh. At these sites and also at Maní, the slatewares have shown certain common characteristics of ware and form which distinguish them from the bulk of the Puuc slatewares, and which in some degree ally them with slatewares from Chichén Itzá, Yaxuna, Oxkintok, and Holactún.

The relative effects of regional variety and chronologic change have been hard to assess. If the differences can be assumed to be in the main part chronologically caused, the Puuc sites must follow a "Regional-Florescent transition" seen at Dzibilchaltun, Acanceh, and these other sites. But the absence of Red on Thin Grayware at Maní despite the presence of slatewares quite similar to those of Dzibilchaltun and Acanceh, and the near absence at Maní of Regional Redwares which at Acanceh and Yaxuna occur quite consistently in association with the slatewares, suggest that regional variation may also be playing a part.

The alternative to the assumption that chronologic change is responsible for the situation outlined above is to assume contemporaneity for all these slateware collections. This assumption, if pursued to its conclusion, requires that the Puuc sites be dated as contemporaneous with Dzibilchaltun and with the other sites enumerated above as producing similar slatewares. This solution is unlikely because the thin and fine wares are so markedly different between Dzibilchaltun and the Puuc, and these wares, because of their wide trade connections, are significant in their absence as well as presence, and thus allow crosstyling with foreign chronologies.

The 1949 Chenes-Río Bec ceramic survey, not yet completely analyzed, gives much additional information, but thus far not a complete solution to the problem. The two Chenes sites dug have produced slateware assemblages which resemble the Dzibilchaltun-Acanceh-Maní group more closely than the Puuc, with good evidence that typical Puuc slateware overlies them in the trenches. This adds strong evidence for a chronological subdivision for the slatewares, since the Puuc area has now been "surrounded" by evidence of earlier ceramic types, and stratigraphic evidence of the superposition of Puuc-style slatewares on the earlier slateware types has been produced. It should be held in mind, however, that definition between Puuc-style and earlier slatewares is not possible from small lots, and that the evidence for superposition rests only on changing percentages of pottery shapes, not on ware changes or total replacement of shapes. Also, there is not even near identity between the Chenes slatewares and those of northern Yucatán, although they resemble each other more than they do the Puuc ceramics. Some of this evidence has been considerably reinforced by statistical seriation studies of the Yucatán, Chenes, and Río Bec sites, the results of which will be published later. The two Chenes sites sampled, Santa Rosa Xtampak and Dzibilnocac, although producing slatewares known to be earlier

than those from the Puuc, have produced almost no Regional monochrome pottery of any sort, although Formative pottery is relatively common on both. They also have not produced any quantity of the Dzibilchaltun and Puuc thin and fine wares nor of Holactún Slateware. The absence of Holactún Slateware is peculiar if our chronological reconstruction is correct, and argues for strong cultural barriers; 9.16.0.0.0 dates come from both Holactún and Santa Rosa Xtampak, where they are presumably contemporaneous with sizable sherd collections obtained from their immediate vicinities. The following chart tabulates this situation.

	9.16.0.0.0	Fine	Holactún	Early Florescent
		Gray	Slateware	Slateware
Dzibilchaltun	-	+	-	+
Holactún	+	+	+	+
Santa Rosa	+	-	-	+
Xtampak				

I am inclined to believe all three sites were heavily occupied at about 9.16.0.0.0. For the two Chenes sites sampled we must either assume poor sherd sampling, occupations with Regional-stage chronological disjunctions, or that Medium Slateware began to be made in this region immediately after the use of Formative ceramics stopped.

In the Puuc area the collection from Chac Cave shows that there was a Flaky Redware-using occupation in the region. Slateware presumably followed that period. At Oxkintok there are large collections of Oxkintok monochromes which show not a sherd of slateware. In the Yucatán collections I do not find a single statistically significant lot of excavated pottery containing either Flaky Redware or Regional Redwares which do not also contain Medium Slateware sherds, although in some cases the Medium Slateware is recorded as one per cent or less and the slatewares are noted as atypical. Although these collections all come from sites which supported heavy slateware-using occupations, some of the collections, as at Acanceh for example, came from under unbroken floors and thus intrusives are unlikely. I do not believe that the above finds constitute absolute proof that Medium Slateware began to be made during early Regional times. It is conceivable that the few slateware sherds found may have fallen from trench edges, or been misidentified; some of the Late Formative monochromes, for example, have a surface much like slateware. It is more likely, however, that slateware was made from early Regional times onward in some areas on the Peninsula. This means that increasing attention must be given to vessel form and to technological work if close chronologies are to be built for Yucatán. As remarked elsewhere, there are variations which, with microscopic checking, may allow reliable subgroups to be sorted on a sound basis. With larger and less mixed early slateware collections a good sequence can be built. The present work is of necessity merely a survey.

In summary, the slatewares are divided into Thin Slateware and Medium Slatewares, with the main sorting criterion being that of vessel form; thinness of wall and fineness of paste are subsidiary. The lack of complete correlation among these criteria suggests that with temper and slip analyses and fuller archaeological sampling, more meaningful classification could be evolved, and the regional and chronological variations could be separated. In chronological analysis it has been possible both on ware and form criteria to separate out from the mass of Florescent Thin and Medium Slatewares groups of characteristics which

indicate an "early" horizon, during which slatewares were contemporaneous with Regional monochrome wares in various regions of northern Yucatán, from a "late" horizon best represented by the bulk of the ceramics from the sites of the Puuc region. These early characteristics are not at present of a sort which allow a definitive sorting of all slatewares into early and late, or Puuc, horizons. Because of this situation, I have retained the earlier nomenclature of classifying all these slatewares as *Florescent*, and classing sites which show slateware-monochrome collections as *Regional-Florescent* transition, although I believe that the bulk of the *Florescent* slatewares of Maní, for example, are contemporaneous with *Regional* and *Regional-Florescent* ceramics at Acanceh and Dzibilchaltún.

The Early Mexican subphase is also characterized by Medium Slateware as its major slipped pottery. Thin slateware does not last into this period. The main diagnostic between *Florescent* and Early Mexican Medium Slatewares is again that of form and decoration, although change to an opaque white slip is also valuable as a sorting criterion. The changes in style of Early Mexican Medium Slateware from the preceding *Florescent* ware were more far-reaching as well as more abrupt than those which took place during the *Florescent* stage. They were caused by an influx of pottery and general culture from the Mexican mainland. The main trade pottery, X or Chichén Itzá Fine Orange, comes from central Veracruz. Plumbate, a rarer import, comes from the Guatemala highlands. Either trade pottery or strong stylistic interinfluence with the Valley of Mexico is suggested by resemblances to Tula Toltec ceramics. Resemblances between both Puuc and Early Mexican slatewares and Xochicalco ceramics, although generalized, are pervasive enough to suggest strong cultural connections of some sort. Some Early Mexican slateware ceramic forms not present in Puuc slatewares seem to point to southern influence. Among these are grater bowls, pedestals, and pestles.

The Thin and Medium Redwares, as described elsewhere, seem to be a color variant of their accompanying slatewares, probably dependent upon paste color for their distinctive appearance. The forms of these wares are identical with those found among the slatewares, but are restricted to the smaller, more elaborately decorated vessels. Thin Redware, like Thin Slateware, is not found in the Early Mexican substage, and Medium Redware forms of this period are quite closely restricted to copies of X Fine Orange, presumably because similarity to X Fine Orange in the color of Medium Redware suggested such copying. Copying of X Fine Orange vase forms is almost completely restricted to Medium Redware; X Fine Orange jar and bowl forms are copied in both Medium Red and Medium Slatewares.

Coarse Slateware is the diagnostic ware of the Middle Mexican substage. Our collections of this ware are relatively small; all evidence is that it follows quite closely in the stylistic tradition of the Medium Slateware which precedes it. Vessel walls average thicker, a result of the coarser paste used. Black-painted decoration increased in exuberance, doubtless inspired by its visibility against the vivid white slip. The collections of this ware from Chichén Itzá show mixtures with both Medium Slateware and Coarse Redware (the diagnostic ware of the Late Mexican substage); Dzibilchaltún collections show very slight Medium Slateware mixture; Mayapan collections show Coarse Redware mixture; although we cannot be sure on present evidence, we suspect that Coarse Slateware was manu-

factured as the exclusive slipped ware during a period of time.

Coarse Redware succeeds Coarse Slateware and is the diagnostic ware of the Late Mexican substage. Possible forerunners of this ware, as small basal break, tripod-footed, unpolished bowls, occur in Early Mexican collections at Chichén Itzá. The forms in this ware, although showing no break in tradition from Coarse Slateware, are usually distinctive from Early Mexican wares through progressive style change, and perhaps through further foreign influence from Mayapan Fine Orange, a ware imported from Campeche or perhaps Tabasco. Mayapan Fine Orange shows culture interrelations with Aztec III ceramics in the Valley of Mexico, and we have historical accounts of Aztec colonies in its area of manufacture, as well as accounts of the importation of troops from this area to Mayapan. Thus the ceramics do not bear out earlier suppositions of a Maya resurgence in Yucatán during this period. Marked similarities between Yucatán ceramics of this substage and the scanty published collections from various sites on the east coast of the Peninsula suggest that the whole area possessed a common culture at this horizon, and that Mexican mainland influence was present over the whole area.

Colonial Redwares show a marked continuation of Yucatán ceramic traditions in water jars, and this tradition has remained stable until now. Other vessel forms have shown changes, mainly impoverishment in shape repertory, but macroscopic ware characteristics have remained relatively constant through the last 500 years.

Ceramics of fine-textured, apparently untempered paste are found in collections ranging from the *Regional-Florescent* transition until the Conquest. In the *Regional-Florescent* deposits at Dzibilchaltún are found Dzibilchaltún Fine Grayware and Dzibilchaltún Fine Orangeware. From the Puuc *Florescent* stage collections comes Puuc or Z Fine Orangeware, from Early Mexican substage Chichén Itzá comes Chichén or X Fine Orangeware, and from Mayapan Late Mexican deposits comes Mayapan Fine Orangeware. Occasional fragments of these wares have been found at other sites, in each case in deposits contemporaneous to the type locations. The names given these wares include the name of a type site, in each case the site yielding the largest collection, because of the greater usefulness of a specific name in discussion of these wares when found elsewhere than in Yucatán. Since the wares are demonstrably foreign and specifically recognizable sherd by sherd, the reasons given elsewhere for the use of generalized names such as have been used for the always variable and usually intergrading Yucatán wares do not apply here.

These wares, as well as certain of the thin wares described here—plumbate pottery, and certain other fragments illustrated and described but not classified for want of a sufficient sample—have in common a notable thinness of wall, uniformity and clearness of firing color, fineness of paste, delicacy of forming, and elaboration of decoration. They occur only in relatively small vessel forms, such as beakers of various forms, small bowls, cylindrical, pyriform, and other vase shapes. The uniformity and virtuosity of their workmanship, the frequent presence of well-integrated form and design styles, and in many cases the unusual nature of their composition suggest that each ware was made by a group of specialists within a relatively small area, for the specific purpose of trade.⁷⁶ They are unquestionably luxury wares, were widely traded, and are therefore of particular value for establishing synchronisms and interrelationships among cultures

of various areas, both through the study of the wares themselves and through the study of the local copying which frequently followed their spread.

Fine Grayware has remarkably close similarities in form and decoration to ceramics at Yoxiha, Chiapas, and Piedras Negras, but the ware itself does not seem to be documented from these or adjacent areas. I have noted sherds of Fine Grayware in the Campeche Museum collections from Jaina. The color of Fine Grayware and certain general characteristics of form suggest affiliations with the Oaxaca area, but there are no really definite resemblances. If the gray color of this and the Oaxaca wares can be assumed to be due to smoke clouding (and such an assumption is reasonable), this technique, uncommon in Mesoamerica, somewhat strengthens the dubious case for Oaxacan influence on this ware. The paste of this ware and of the fine orangewares looks very similar in texture to the naked eye. It is to be suspected that both are naturally sandy transported clays, probably from river flood plains. In X Fine Orange, one type of simple profile bowl is characteristically fired gray toward its bottom, suggesting that fine gray and fine orange pottery can be made from identical materials merely by changing the firing technique. As for the dating of Dzibilchaltun Fine Grayware, only general estimates are possible. Mine would be between 9.12.0.0.0 and 9.18.0.0.0.

Dzibilchaltun Fine Orangeware is found constantly associated with Dzibilchaltun Fine Grayware at the type site; the fine orange is much less frequent in the collections than fine grayware, averaging under 5 per cent as compared to a range of from 6 to 25 per cent for fine gray. There is no evidence for color gradation between the two wares nor for other similarities which might suggest cultural interrelationships between their makers. However, Dzibilchaltun Fine Orange is without question culturally related to Puuc Fine Orange in such manner that I suspect that Puuc Fine Orange was made by the direct cultural descendants of Dzibilchaltun Fine Orange. I have elsewhere detailed the evidence that the beaker is a stylistic horizon marker of the luxury wares of the time period of the Dzibilchaltun occupation. Both the fine grayware and fine orangeware occur principally in this vessel form at Dzibilchaltun.

Puuc, or Z type, Fine Orange is distinguished from Dzibilchaltun Fine Orange by several characteristics, the most definitive of which is that of vessel shape; the outcurved-sided beaker predominates in Dzibilchaltun, the hemispheroid bowl in Puuc. Other differences lie in the coarser technique of incision of Dzibilchaltun Fine Orange, and in the design repertory. Puuc Fine Orange includes a group of bowls decorated with crude scalloped designs in a dull gray or reddish paint which does not intergrade into the rest of the group (see fig. 59, f), and thus may conceivably have a different region of origin. Although the region of manufacture of this ware is far from certain, the Campeche and Tabasco coastal regions seem the most likely at present. Its dating may on rough estimate be put from 9.18.0.0.0 to 10.8.0.0.0.

Chichén, or X type, Fine Orange is found in the Early Mexican substage deposits at Chichén Itzá in surprisingly large quantity considering the distance from its source. In general, the paste seems similar to the paste of all the other fine orangewares, and there are several other similarities such as the use of white and black slipped areas and the decoration in plano-relief carving. A new technique is found in this ware, that of decoration by elaborate painted designs. The painted designs, although used on the vessels

with plano-relief carving, are in a quite different tradition from that of the plano-relief (see Brainerd, 1953), which in turn does not show close relationships to that of the earlier fine orangewares. Form, as well as decoration, shows only general similarity to the earlier fine orangewares. With little question, X Fine Orangeware comes from central Veracruz and can be assumed to have been introduced via coastal traffic by the Toltecs, the Mexican highlanders who are responsible for the surprisingly close resemblances between Chichén Itzá, Yucatán, and Tula architecture. The plano-relief design of X Fine Orange is related to the "entrelace" design of the yokes and palmas, and to the bas-relief sculpture of the Classic sites of the Totonac area. The Toltecs showed good taste in importing a ware much superior to the best made in their homeland. The effect of the copying of these wares by local Yucatecan potters is of particular interest as a phenomenon of culture contact; of even greater interest is the use of elaborate foreign motifs by the bas-relief sculptors of Chichén Itzá, and of foreign architectural plans and sculptured designs by Yucatecan builders of this period.

The chronological placement of X Fine Orange in the Yucatecan sequence can be made with reasonable certainty. Its import began after the end of occupation of the Puuc sites (two sherds from Uxmal deposits provide the only evidence contrary to this statement). However, sherds closely resembling the X Fine Orange Chichén Itzá specimens are found at Mayapan in such collections as to indicate that its importation continued into the Middle Mexican substage (see fig. 28, caption). A chronologically significant breakdown of the variation among these potteries should eventually be feasible, but the Mayapan specimens stylistically belong to X or Chichén Fine Orange as it has been defined (see Brainerd, 1941).

The four-color fine orange polychrome found at Chichén Itzá in Early Mexican stage deposits (Brainerd, 1941, pp. 172-173) should be mentioned here because of its abundance and dating importance in Veracruz archaeology. The five sherds found come from deposits which date from relatively late in the Early Mexican substage. The lack of this ware at Mayapan and elsewhere gives negative (and therefore uncertain) evidence for its later persistence. I have been unable to discover evidence for any sequential position for this ware in relation to X Fine Orange in Veracruz excavation reports; they seem to be considered contemporaneous. The reversal in relative frequencies between X Fine Orange and polychrome fine orange in the Veracruz sites published thus far in comparison with Chichén Itzá suggests that X Fine Orange comes from a region not well sampled as yet. The rarity of polychrome and frequency of X Fine Orange traits in pottery from the Las Flores site, Tampico, Tamaulipas (Ekholm, 1944, pp. 392-404), suggests that X Fine Orange may have an origin not far from this area, but individual designs and vessels there are not as close to Chichén Itzá specimens as are certain of those from Isla de Sacrificios. This seeming anomaly is resolved when one remembers that Isla de Sacrificios pottery is almost certainly a collection of wares made elsewhere—not the result of a single industry. The X Fine Orange must have been carried in from the north. It is conceivable that a meticulous analysis of the distributions of these wares might yield evidence as to the route and other details of the "Toltec invasion" of Chichén Itzá. There are several distinct types of fine orange which do not show the sort of interblending of designs, techniques, and forms which serve as sure evidence of their manufacture by contemporaneous

peoples in close contact; there may be several loci of origin for X Fine Orange.

Plumbate pottery, associated with X Fine Orange at Chichén Itzá but in markedly lower frequencies (178 sherds as compared to 1,053 sherds of X Fine Orange), has been so thoroughly discussed by Miss Shepard (1948) that no further discussion of the ware need be made here. Evidence for some perdurance of plumbate has elsewhere been cited: the unbroken jar found among fallen stones from the Caracol tower. The jar may have been placed after the collapse of the tower, and it is difficult to imagine that this unsightly debris could have been allowed to accumulate earlier than the end of the Early Mexican substage, since architectural construction was continuing into Middle Mexican times at the nearby Monjas, and the Temple of the Wall Panels seems still to have been in use. The jar was more likely deposited during Early Mexican times.

Mayapan Fine Orangeware comes only from the Late Mexican substage deposits of Mayapan. Paste is in general similar to the other types. It may average somewhat darker in color; microscopic tests for possible temper have not been made on it, and its naming as a "fine ware" is therefore tentative. In both form and decoration, its major vessel types are completely distinct from those of Chichén Fine Orange. There is good evidence that it comes from the Campeche-Tabasco coastal strip. Various of its characteristics were copied, and it exerted a noticeable influence upon the local wares. It occurs in approximately the same frequency as did Chichén Fine Orange in the Yucatán collections, and seems identical with pottery which occurs with major frequency in Campeche and Tabasco collections. It, as well as the local Yucatecan ceramics, shows probably significant similarities to Aztec III pottery. The presence in Mayapan collections of a number of fragments which closely fit the X Fine Orange description demonstrates that this ware (or rather that types of fine orange belonging to the Chichén group) continued to be imported into Yucatán at least as late as Middle Mexican times. There is certainly no evidence here of the "Maya resurgence" suggested by earlier workers.

Forms

The forms of Yucatán vessels are of primary value in chronological study of the pottery, in part because of the meagerness of decoration and the conservatism in use of slip color. As described elsewhere, form has served as a subsidiary but at times a more definitive criterion than surface and paste qualities in sorting fragments into wares. Wares almost always include several forms each, and forms seldom cross ware boundaries in the ceramic repertoires of single regions (an exception is in the Florentine Slatewares and Redwares); there is usually no question of their rank in hierarchic classifications. And forms are closer cultural diagnostics than wares; there is more variety in forms, and they are therefore less likely to be confused with similar but culturally unrelated groups. The disadvantage of the rarity of design in Yucatecan pottery has been somewhat offset by the complexity of Maya ceramic shapes, which makes their recognition from small fragments easier. Shapes have been further investigated by comparative study of whole vessels; every effort has been made here to reconstruct shapes when possible, and the classifications have been made with the whole vessel as the determining consideration.

The validity of the use of similar shapes as evi-

dence of cultural connection has been demonstrated at numerous stages of the work. Its value has been shown both as a finer-cutting diagnostic through time than are wares (as in the Medium Slatewares within the Florentine stage, and between Florentine and Early Mexican times), and in the demonstration of synchronism or near synchronism between potteries of similar form but of more or less widely differing ware characteristics (as among certain Formative and Regional collections). Although I believe that form, as well as decoration, is generally inclined to range through a short time span over a wide area, as opposed to wares, which, defined as they are by techniques and materials, are likely to hold a single, restricted regional position and last through longer time, it must be granted that this tendency is far from invariable in the Yucatán material. A prime exception is documented from the beginning of the Mexican stage; from this time on the vessel shapes show considerable similarity over the last 900 years, while wares shifted radically three times during the first 400 years but changed little during the succeeding 500 years.

The close study of form has paid dividends in the defining of synchronisms and interaction with areas outside Yucatán, as well as in allowing finer subdivision within that area. There are numerous illuminating similarities between Yucatán forms and those of other areas, some at a considerable distance.

The uses of form described above are all primarily technical and analytic—they contribute to the building of the archaeological time-space framework. These uses are all made possible by the fact that ceramic vessel shapes were concepts in the culture of the Maya. Vessels of varying form had uses, established by custom, which evolved through history like other facets of culture, modeled by changes in food preparation and usage, and by changes in those religious ceremonies in which ceramics were used. Some of these changing fashions had local origins, others were copies from a variety of outside sources. A great part of this report has been directed toward the analytic classification and documentation of these forms in time and space. Some interpretation of their usage, and certain broad generalizations as to their origins and development, will be attempted in the following sections.

Unslipped jars.—This vessel shape has the longest, least-changed tradition of any in Yucatán. Throughout its history the form is globular, with round and un-specialized bottom, thin and even wall, slightly constricted neck, and texturing of the exterior surface with smooth interior. Unslipped vessels of this general shape are very widespread among New World agriculturalists and may perhaps be safely assumed to have been used for boiling food wherever found. The pots are adapted to this purpose by their globular shape which allows a maximum efficiency in heating, and by the uniformly thin wall and absence of specialized base which prevents cracking due to thermal strain. The characteristically wide but slightly constricted mouth permits efficiency in heating with ready access to the contents for stirring and ladling. The texturing of the exterior surface, a widespread characteristic of cooking pots in many other areas as well as in Yucatán, takes the form of striation. This technique characterizes the unslipped jars at San José, Uaxactún, and Tres Zapotes during all their sequence, appears only from late Classic times on at Zacualpa and at Panuco, is sparsely represented in Motagua Valley collections, and is very scarce in Valley of Mexico ceramics. Thus it may be a Maya lowland area trait which spread somewhat in late times. It is possible that texturing aids in heat absorption, although I

know of no tests performed to check this hypothesis.

Unslipped jars are the only cooking vessels identified among the Yucatán pottery; the comal was never used there. This fact suggests that in this area maize was eaten as a gruel throughout prehistoric times. This custom still persists. Although the tortilla has become an essential part of the diet, maize is most often taken as gruel.

The unslipped jar was replaced shortly before the time of the Conquest by the cauldron, a more open-mouthed vessel with an untextured exterior, although most of the other local forms continued in use. The cauldron is now universal in Yucatán as a pottery cooking vessel. This change in the cooking vessel seems to have been one in form and likely in firing technique, but not in materials nor probably in forming practice. The cauldron of Late Mexican and Colonial times is buff in color as opposed to the gray of the earlier jars. This color change almost certainly marks a change in technique which allowed more oxygen in the firing. Modern Yucatán potters choose a special tempering material for cauldrons and mix it in a different proportion, and there is some evidence that this is an old custom.

Our earliest evidence for unslipped jars in Yucatán is in Late Formative collections. Information from the 1949 Campeche collections allow a few of the Yucatán sherds from mixed collections from Yaxuna and Chichén Itzá to be placed definitely in that horizon (fig. 16, 1; 65, a, 2-4, 8-10). These jars have a gradually curving rim-shoulder junction and a gently outward-curving, round-lipped rim. Exterior striation, which is of the "fine" variety, gradually fades out to the lip, and the rim interior bears fine diagonal to circumferential striation.

Regional stage jars are also decorated in the main by fine striation, and are globular. The most characteristic neck form has a sharp rim-shoulder angle, with short, flaring rim ending in a rounded, blunt, or slightly thickened lip (this is called "notch neck" in this report). Sometimes daubs or roughly drawn rim stripes of a pale gray (presumably organic) paint are seen, and the interior of the rim is sometimes striated horizontally. Exterior body striation ends definitely a centimeter or so below the neck-shoulder angle. Several major variations in forms of Regional stage jars are apparent. The Oxkintok unslipped jars (fig. 12, a) vary significantly in the presence of a steeply sloping zone bounding the notch neck as opposed to the globular body contour of the jars described above. Some of these jars are striated, some are smooth. This jar form is close to that of slipped jars in the same collections, and these slipped jars in turn are probably related to other Regional stage slipped forms in Yucatán. Quite similar unslipped jars come from the Motagua Valley (Smith and Kidder, 1943, fig. 18). It seems reasonable to suggest that unstriated jars such as fig. 12, a, 6-12, 31, should be considered variants of the slipped jars rather than members of the group under discussion. In the Dzibilchaltun and Acancheh collections (Regional-Florescent transition) another distinctive rim type is found (fig. 14, a). This type is scarcely represented at Acanceh (fig. 14, c, 5-7). It is characterized by the same neck-shoulder junction as on the notch neck rims, but the neck is gently outward-curving and much higher, with an elaborated, thickened lip. A quite similar form is represented in my 1949 collections from Xpuhil, Campeche, and there is some similarity to sherds from Early San José III (Thompson, 1939, fig. 46, a, b). The Dzibilchaltun form also comes in varying frequencies from Holactún, Uxmal, and Oxkintok (figs. 37, a, b; 38, f), sug-

gesting an early placement for the beginning of the Florescent deposits at these three sites.

The Florescent-stage rims (figs. 38, a-e; 68, e) are characterized by shorter, heavier necks than the last-described group, and by heavier, more rounded lip thickenings, generally exterior in placement. The neck-shoulder junctions are often rounded rather than angular, and the neck profiles more markedly curving and more nearly vertical in orientation. The striated body patterning is of the "coarse" type and usually ends at or shortly below the neck-shoulder junction in a pronounced ridge, produced by smoothing the neck after the body decoration had been completed. The body shape shows even curvature save for a faint angle bounding the convex bottom. This angle is followed by the striation patterning, which usually takes a single direction on the bottom and a chevron pattern on the sides.

Data are scanty on unslipped jars of the Early and Middle Mexican substages (fig. 68, a, b; 22, c, 10-16, 24-28), but are sufficient to suggest that the changes consist of refinement and rounding of rim contour. The thickened lip on these thinner, smaller rims is often in the form of an exterior bolster.

The jars of the Late Mexican substage (see fig. 93, a-c, for examples) show a more marked change from their predecessors than do those of any other part of the time sequence. There is some evidence that this type came into use shortly after the Coarse Redware which has been taken as the Late Mexican substage diagnostic. The walls are distinctively thinner than those of preceding jars, the striation patterning more irregular, the body shape probably more squat on the average. Rim-shoulder break is invariably sharp. The rim is short and straight, either flaring or rising vertically to a tapering, blunt or angular and slightly thickened lip. The mouth is somewhat wider in proportion to body diameter than in earlier jars. These jars occasionally bear simple zoömorphic lugs.

No unslipped jars are known for the Colonial period. As stated above, they were replaced by the cauldrons which are first seen in the Late Mexican collections.

Unslipped bowls, basins, comales, cauldrons.—Unslipped bowls, basins, and cauldrons do not show the long enduring tradition to be seen in the jars. They represent fashions belonging to separate periods, each of relatively short duration and each apparently representing an innovation without direct antecedents in Yucatán. A group of forms which are probably related to each other occurs in the early Oxkintok collections (fig. 12, b, c) and at Yaxuna (fig. 1, b, 8-10). These are large, heavy, flare-sided basins which seem to have had ring bases. Their form is close to that of associated slipped vessels. This shape is known from San José, British Honduras, and from the Motagua Valley, but seemingly not from Uaxactún. Smaller, thinner, unslipped bowls come from Yaxuna (fig. 11, b, 11, 25-27) and basins from Cobá (fig. 1, f). The vegetal tempered basins from Cobá and Yaxuna (fig. 1, e) are of an unslipped ware unique in Yucatán, and are thus far uncorrelated with any known craft tradition, although rim and body form is well within the local range. There is evidence that heavy, flare-sided basins continued to be made during the Regional-Florescent occupation of Dzibilchaltun (fig. 14, d, 42-46), and identical forms come from Uxmal (fig. 37, c) and Kabah (fig. 39, e, 1-14, g, 2-5), which occurrences document the form into the Florescent stage.

In Early Mexican times small unslipped bowls were made, supported in some cases on long, ball-ended legs of Mexican mainland "Mixtec" style (see fig. 70, j). With little doubt, this form was introduced from the

Mexican mainland for ceremonial use. These vessels bear postfiring paint, and were supplanted by the similarly formed Coarse Redware bowls of Late Mexican times which have been found, filled with balls of copal, in the Sacred Cenote (see figs. 95, 96).

Comales were exceedingly scarce in the Yucatán collections. The only two fragments found (figs. 66, g, 2; 97, k) were probably of Early Mexican substage manufacture. As stated elsewhere (fig. 97, caption), the custom of using pottery comales is documented from the south, from whence these vessels may have been carried.

In either the Middle Mexican or, more probably, the Late Mexican substage, large basinlike unslipped vessels seem to have been first produced in small quantity, and the same form, the cauldron, has persisted until now (figs. 22, c, 29-33; 33, f; 70, k). The introduction of this form may be considered evidence of a major break in the cooking-ware tradition of the Peninsula, which only took final effect after the Conquest, as evidenced by the complete absence of unslipped striated jars from the Colonial Mani deposits. The cauldron may have come in with the Nahua troops who by tradition were brought into Mayapan; other evidence of western influence during this period is evident. The influence of European iron cooking vessels of this form must also be considered as a possible influence in molding the shape of modern cauldrons.

Unslipped ceremonial wares.—The ware assumed to have been used for ceremonial purposes in Yucatán is characterized by several features: (1) it is all unslipped and unstriated; (2) it is frequently decorated by appliquéd elements; (3) it usually shows evidence of white postfiring paint (either lime or clay), which often bears additional overcolors. The form used during Regional and Florescent times was a flare-sided bowl, commonly supported by a trumpet base; Mexican times were characterized by variations centering about the earlier type and the introduction of the incense ladle or blower, and rare "Mixtec braziers." During Late Mexican times the bowl-shaped incensario was replaced by vessels bearing an attached human figurine with mold-pressed face and appliquéd, hand-modeled body and ornaments. All of these vessel forms, as well as the ware and decoration, are established as of ceremonial use by multiple evidences in pre-Hispanic art, modern Lacandon usage, and archaeological associations. I believe that this evidence is conclusive and generally accepted, and therefore it need not be reviewed here.

We have no record of Formative incensarios from Yucatán. Although our collections are not large enough to make the negative evidence conclusive, it seems certain that the incensario could not have been an important form. It seems to be a well-developed feature beginning with the earliest phase (Las Charcas) and continuing through all the pre-Classic phases of the Guatemala highlands (Kidder and Shook, 1946; Borhegyi, 1950, 1951a, 1951b). These tall, lidded, side-flanged incensarios are different from the traditional Yucatán product, as are the Formative Monte Alban incensarios (present from Monte Alban I on) forerunners of the figure type which continued this long tradition in Oaxaca and which must have inspired the form which swept into Yucatán in Late Mexican times. It seems likely that both the vertical flanges and cylindrical vessel forms of these late Yucatán products have been drawn from the Guatemala highlands, and the attached figurines from Oaxacan traditions through the intervening lowlands of Tabasco and Campeche.

The "hourglass" type of incensario used during the Regional-Florescent transition and the Florescent

stage (fig. 104, a, b) is close to those of the Motagua Valley (see Smith and Kidder, 1943, fig. 22, c, d, e; fig. 40, a-g), and shows similarity to specimens from Tres Zapotes (Drucker, 1943, fig. 41, h, i, j, m), but less similarity to the forms from San José and to the thus far published Uaxactún forms. This sort of distribution, covering most of the Maya area but missing the "Central Area," seems to apply to several of the Florescent stage traits of Yucatán.

The Early Mexican incensarios (fig. 104, c) seem to represent, for the major part, a continuation of the Florescent tradition. The hourglass incensarios of this substage are larger and usually lack appliquéd spikes; this form seems to have lasted into Late Mexican times. The ladle-formed incensario or censer is first definitely present in this period (see fig. 39 for possible Florescent examples) and has a tubular handle; local copies of the "Mixtec type" brazier also appear (fig. 104, d, 3; e, 5).

The ladle is known in the Huastec area from period II on (Ekholm, 1934, p. 346), from Monte Albán II on (Bernal, 1949, p. 18), from the Esperanza phase at Kaminaljuyu (Kidder, Jennings, and Shook, 1946, p. 208), and from the Motagua Valley (Smith and Kidder, 1943, fig. 41). The tubular handle begins in the late Classic horizon at Zacualpa, Guatemala (Wauchope, 1948, pp. 126, 150), and is found at the Toltec (plumbate) horizon at Tula (Acosta, 1945, p. 37). In Yucatán the ladle censer began in Early Mexican times and lasted through the Late Mexican substage.

"Mixtec type" braziers are characteristic of the plumbate horizon Toltec period in the Mexican and Guatemalan highlands (Dutton and Hobbs, 1943, pp. 101-102; Wauchope, 1948, pp. 148-150; Woodbury, 1948, p. 122; Acosta, 1945, p. 37). In Yucatán they seem to have appeared at the same time and to have disappeared before the Late Mexican substage, as evidenced by their absence in the Mayapan collections. I have found no reference to their appearance in Aztec-period deposits in Mexico. Thus both the ladle censer and the "Mixtec type" brazier must have come to Yucatán from the west, probably from the Mexican highlands.

The high, bucket-shaped, flat-bottomed incensario (fig. 104, c, 1) is harder to place. A suggestion of similar form is found in a fragment from Dzibilchaltún of the Regional-Florescent transition (fig. 19, b, 22), and in Río Bec region sherds which I have not yet published. There is a marked resemblance to published vessels from Tula (Acosta, 1945, fig. 20, n) and to a vessel as yet unpublished. A generally similar repertory of forms comes from plumbate horizon tombs at Nebaj (Smith and Kidder, 1951, figs. 79, a; 80, a-c) in the northern Guatemala highlands.

A smallish, globular to barrel-formed incensario with flare lip and low trumpet base, thumbed fillets and appliquéd disc ornaments (fig. 104, d, 1, 2), appears in the Late Mexican substage, during which time it was replaced by figurine incensarios. An incensario virtually identical with this Yucatán type is said to have come from the Motagua Valley (Smith and Kidder, 1943, fig. 23, b); others from Champoton, Campeche, are illustrated by Ruz (n.d., pl. 60, 51-56).

I have already pointed out that the figurine incensarios introduced into Yucatán toward the close of the Late Mexican substage seem to be of Mexican-Guatemalan highlands inspiration, as evidenced by their cylindric form, vertical side flanges, and applied, hand-modeled figurines. The documentation is poor on the eastward journey⁷⁷ of this type through the area south of the Gulf of Campeche. Specimens included under Drucker's Lirios-type figurines (Drucker, 1943a,

pp. 83-85) show close enough similarity in technique, as well as in scale, subject matter, and treatment of detail, to make me suspect that his type should date contemporaneously with my Late Mexican substage, rather than 500 years earlier in Upper Tres Zapotes where he has placed them.⁷⁸ Lirios-type figurines may then be acceptable as a needed link in this eastward sweep. There are many undocumented or only regionally documented museum specimens made in the characteristic orange clay of the Campeche coastal area, and Ruz (n.d., pp. 150-151, 370-373) reports figurine incensario fragments mixed with sherds of the globular to cylindrical type described above at Champoton. This situation is similar to that at Mayapan, except that in the Mayapan deposits the replacement of the cylindrical to globular type by the later figurine incensarios can be documented stratigraphically. A possible historical placement for the introduction of figurine incensarios to Yucatán may be given by Landa's descriptions of the introduction of Mexican troops into Mayapan from the Aztec garrison at Xicalango (Tozzer, 1941, pp. 32-38, with notes).

There seems but little question that the modern Lacandon incensarios (see fig. 100, f) belong to the continuing tradition which is documented above. The intervening stages in the Colonial sequence would not be expected in the Colonial church sites which we excavated, but may be represented by specimens in the Mérida collections (see caption, fig. 100). It is possible that the modern Maxcanu whistle-making industry may also qualify as a continuation of the incensario-making craft. Hand modeling with appliquéd and post-firing overpainting are still practiced there (see fig. 93, bb, cc).

Study of the distribution and dating of incensarios in the Maya area should be of particular interest in the tracing of Maya folk religion. This type of vessel is nearly universal in the Maya area, and shapes, techniques, and styles are unusually coherent, widespread, and easy to trace. This is the pottery ware which presents the best possibilities for correlating archaeology with Maya religion.

Unslipped bottles.—The unslipped, narrow-mouthed, bulging-lipped, pointed-base jars of the Early Formative deposit at the Mani Cenote (see fig. 30, c) are unique thus far in the Maya area, save for a few somewhat similar neck sherds found in Middle Formative deposits.⁷⁹ This vessel must unquestionably have been used as a portable water container; the small mouth, diameter about 255 mm., would make other use difficult. Capacity is estimated at about 13 liters (3 gallons) and weight full about 13 kilograms (30 pounds), a one day's allowance of water for a family. The only other narrow-necked bottles I know of in the Mesoamerican ceramic repertory come from the Upper Middle Period Valley of Mexico site at Tlatilco, and from Western Mexico. These bottles, however, are much smaller, slipped, and markedly different in form. The presence of the bottle shape in the Mani deposit suggests a marked cultural break between this subphase and all those which followed it. The tradition of jar forms is quite conservative for all later periods up to the Conquest. The paste and finish of this ware also suggests a disjunction or marked cultural change, at least between this horizon and the Late Formative substage. Pattern burnishing is unique to these vessels, and the paste texture is finer than in the succeeding unslipped wares of Yucatán.

Slipped jars.—This vessel is known from Formative times through the whole chronologic sequence, and is still manufactured in Yucatán. The Late Formative jar shape is not completely reconstructable

from our samples. The Holactun collection gives us our most certainly defined material (fig. 16, c; b, 3, 7-10), and the Yaxuna (fig. 5, c) and Mani collections (fig. 31, d, e) add detail. The forms are in general quite close to the Chicanel jars from Uaxactun (Ricketson, 1937, fig. 156, a, b; Smith, 1936, fig. 2, 5-7) and to those of San José I (Thompson, 1939, fig. 33). They are also quite similar to the Regional Redware jars (fig. 105, d). Differences (most clearly seen in the Mani collection—fig. 31, d) are in a more gradually curved rim-shoulder junction, less shouldering of the body, and undifferentiated or simply flattened base. The incised shoulder designs of the Mani jars (fig. 31, e) are very close to those from Uaxactun (Smith, 1936, fig. 4-6; Ricketson, 1937, fig. 150). Other variations in Formative Monochrome jars among the Yucatán sites should, with more material, almost certainly show subdivision of the period, and a closer chronological equation with the Chicanel phase.

Regional Flaky Redware jar forms (see fig. 105, a, 1, 2) show a striking, and seemingly rather ephemeral, break in the tradition of jar forms in Yucatán. The cylindrical neck form with small exterior bolster lip is distinctive, as is the jar base with its discursive exterior zone and dimpled bottom. A further distinctive feature is the presence of interior striation on these jars. Regional Polychrome (see fig. 63) suggests later changes in the jar form, those shown being the use of a flat bottom and the addition of three handles.

Early Oxkintok Monochrome jars (see fig. 105, b) are of uncertain derivation. The sharp rim-neck break, with short flaring rim, is not far from some Late Formative jars, but the rim is shorter and the break sharper. The greatest distinction of Oxkintok jars, however, is in the presence of the long conoid neck connected by an angular break to the low, strongly curved shoulder.

The Regional Redware jars (fig. 105, c) with their strongly carinated shoulders look like a refinement of the Oxkintok Monochrome jars. Walls are thinner, dimpled bottom is more pronounced, and the conoid neck is convex in profile. The dimple bottom may be derived from the Flaky Redware forms; the other features seem to reach back to the Late Formative tradition, perhaps via Early Oxkintok. Red on Thin Grayware of the Regional-Florescent transition (fig. 105, d) follows the earlier Regional forms, but with longer, sometimes outcurved lip.

Medium Slateware jars show a marked break in tradition from the various Regional jars in form as well as ware characteristics. In Dzibilchaltun, which produced our best Regional-Florescent sample, the jars are Red on Thin Grayware, suggesting that slateware jars were not used until later than other slateware forms in this area. The slateware jars were made in two size ranges, one larger, one smaller than the Regional and transitional jars. The larger jars (fig. 105, f) seem to have been made for carrying water on the back and, as discussed elsewhere, were more widespread regionally, and probably originated earlier, than the small jar form. Capacity of the large jar ranges from about 30 to 60 liters (8 to 16 gallons), weight full of water about 35-65 kilograms (75-145 pounds), a very heavy load. The small jars (fig. 105, g) hold about two quarts each. They have thickened lips and each has a pair of opposed vertical loop handles of such small size as not to admit a finger into the loop. These jars, by evidence of balance, construction, size, and association, seem to have been used to draw water from the wells and cisterns of the sites where they are found.

The Florescent Medium Slateware and Medium Red-

ware jar forms were superseded by a new repertory early in the Mexican stage (fig. 106, a, 1-9). Of the group illustrated, fig. 106, a, 5, alone may owe some of its form characteristics to the Florentine ceramic tradition. The most distinctive of the new characteristics is the tall, thin-walled, concave cylindrical neck, a form which has persisted until the present. The jar bodies are somewhat more squat than Florentine forms, strongly rounded, with an angular break to a flat or faintly concave bottom. Another common neck form is thicker-walled, wider and shorter, with exterior encircling grooves (fig. 106, a, 1). Jar size is wide in variation, without the marked division into size ranges which characterize the Florentine stage. Handles appear on the larger jars, and are horizontal loops, of good size for hand holds, placed just above the center of gravity of the vessel. Without question, these new forms are copies of the X Fine Orange (see fig. 106, a, 3) and, to a lesser degree, of plumbate trade pottery which is recovered from Chichén Itzá in association with the native forms. This marked taking over of foreign forms is particularly interesting since the ware characteristics, as well as certain techniques of forming and decoration, change but slightly from those of the Florentine stage.

Slipped platters.—This form is limited almost completely to the Regional stage in Yucatán; a few fragments come from Puuc sites. The vessels are large, ranging from 35 to 55 cm. in diameter, shallow, with rounded profile and outsloping rim. Most of them bore low ring bases, some may have had hollow tripod legs, some may have had flattened bottoms. The unslipped basins at Oxkintok (see fig. 12, b, c) may be related to these forms.

Chief collection is from Cobá (fig. 2, a, b, and caption); a few rims from Yaxuna may belong to the same group (see fig. 8) but may more logically belong with basins and bowls. There are occasional exterior sublabial flanges and interior encircling grooves. The only close similarities to these forms which I have located are to San José, where synchronisms are mainly with San José III, scarcer with San José II. This dating is supported by evidence from other sources. Smith and Kidder (1943, figs. 20, c; 21, a) illustrate vessels from the Motagua Valley which may also be related. Vessels of this size and shape in slateware were found at Xpuhil in the Río Bec area in 1949, but never occur among the Yucatán slatewares.

At San José the platter, or dish, as Thompson calls it, has a long developmental history (Thompson, 1939, fig. 93) ranging San José II-IV. The Yucatán occurrences must represent an evanescent fashion at Cobá, introduced, like its architecture and glyptics, from the south.

Slipped basins.—The basin form, in contrast to the platter, has a long history in Yucatán, and may have originated locally. The form is hemispherical to globular with erect or incurving rim, which usually bears an exterior bolster lip. Bottom is flattened in most types. The vessels are rather heavy-walled; diameter ranges 20 to 60 cm. and height from one-half to full measurement of diameter. Interior and lip are always slipped, exterior is slipped in some types.

Earliest basins are of Regional Flaky Redware (figs. 4, a, c; 6, c), and of early Trickle on Flaky Redware (fig. 7, b). These basins have rounded exterior bolsters and exterior as well as interior slip. They are globular in form, with markedly incurving rim. The early Oxkintok Coarse Monochrome basins (fig. 11, d-f; 13, a) are of two types, one globular with an external bolster thinner than hemispheroid in shape, with a highly diagnostic rim which consists of an ex-

terior thickening or bolster just above an external ridge. The exterior of the vessel is unslipped and striated below this flange, and usually bears a ring base. From Yaxuna come Regional Redware basins quite similar to the latter shape from Oxkintok (fig. 8, e-g), and from Cobá (fig. 2, c-e) comes an assortment, all of Regional Redware, including some of Oxkintok form but with the sublabial ridge thumbed, and others with bolsters but no sublabial ridge. The late Trickle on Flaky Red basins from Yaxuna (fig. 7, c) bear a bolster much like that on slateware basins. The Oxkintok basins are in collections which show resemblances to Tzakol Petén pottery, the Yaxuna forms associated with ceramics identified as similar to Tzakol and Tepeu 1. A few similar basin rims from San José, all thumbed, are dated later by Thompson, at San José III-IV and San José IV (1939, fig. 59, b, e), others from Uaxactún as Tepeu (Smith, 1936a, pl. X, 5, 6, 8). This type of rim shape also occurs sparingly in the Chenes and Río Bec collections. Of all these shapes, the closest to the slateware basins which follow are certain Regional Redware rims from Cobá (fig. 2, c, 4-10), Regional Flaky Redware and Trickle on Flaky Redware from Yaxuna (figs. 4, a, c; 6, c, 1-7), and Oxkintok Coarse Monochromes (fig. 13, a). Of these, the Oxkintok form, although in collections which are earlier than some of the others, is considerably the closest. This fact, like the basal break bowl shapes, supports the early Oxkintok ceramics as close relatives, more likely ancestral than collateral, of the slatewares.

The earliest Medium Slateware basin forms can most logically be sought at Dzibilchaltún. The collections from there, although small and mixed with Middle Mexican substage material (see fig. 15, e, and caption), show several sherds (fig. 15, e, 2, 4, 10) of a type rare in the Puuc collections but predominant in the Chenes-Río Bec collections of Medium Slateware and found in other Yucatán collections which show separate evidence of early date. These are Acanceh (fig. 21, b, 8-15), Maní (fig. 32, g, 2-7, 12), and Oxkintok (fig. 43, d, 1, 4-6, 14-21, 28, 32-35, 39-41, 45-50). These rims, which I have called Chenes style, are of exterior bolster form. The inner wall, just below the lip, is concave in profile, ending in an angular to subangular lip. There is sometimes a pronounced inward bend of profile just under the lip. Slip sometimes extends exteriorly no farther than the bottom of the bolster, and usually does not cover the whole exterior. The bolsters average higher and thinner than typical Puuc-style bolster rims; the greatest thickness is commonly near the top of the bolster.

The Puuc-style Medium Slateware basin forms differ from the above by having the inner vessel wall straight to convex below the lip. Lip is angular to subangular. Exterior is entirely slipped. Vertical loop handles, set just under the bolster, are common, whereas they are rare or nonexistent in the early form. The bases of both these and the early form are flat to slightly concave, thick-walled at the basal edge, with vessel floor a continuous curve into the sidewalls (see figs. 41, d-f; 43, 44). Although all rims are exteriorly thickened, some are of more elaborate form than the simple bolster. Of these, the wedge bolster is the commonest (see fig. 44, b, 33-40). Occasionally the rim is outbent (fig. 44, b, 43, d, 1, 3, 6). Other bolsters are grooved or faceted (fig. 44, d, 16-23, 29-32) and a smaller number are decorated by incision, appliquéd, and specular red paint (fig. 44, a). In general, the elaborate rims belong to small, relatively thin walled basins.

The Holactún slateware basins (fig. 53, c, d) which are often found associated with the type described at

the Puuc sites above, are in general similar to it in vessel form. Form is globular to hemispheroid; both exterior and interior are slipped. However, the rim form is distinctive, as are the ware characteristics, and strap handles are mounted horizontally rather than vertically. The rim, which I have called T form, has a more pronouncedly concave interior profile than have Chenes-style rims, and the exterior bolster projects horizontally and is shallow in depth. The top of the rim is flat, so that the rim, with its interior and exterior projections, takes on the form of the cross-bar of a T. The segregation of these basin rim forms to Holactun slateware is complete, in contrast to jars where the rim styles cross ware boundaries.

Early Mexican Medium Slateware basins are in general similar in form to those of the Florescent period. There seems to be a tendency toward a higher, globular rather than hemispherical, form, with rims markedly constricted (figs. 15, e, 9, 11, 12; 73). Bottoms are flat to slightly concave, slip covers both interior and exterior. The form of the rims is diagnostic from Florescent forms; the lip angle is missing. The external bolster is evenly rounded at the lip and of nearly uniform thickness, and joins the exterior vessel surface in an angle. It seems to have been formed by folding over the top section of the lip onto the exterior surface of the vessel. The two opposing strap handles are vertically placed. Some basins lack bolsters. This characteristic is commoner in small basins. The rim is direct, lip usually blunt. Both bolster and direct rims are often ornamented by a series of encircling incised lines on their exterior face. The even spacing of these suggests the use of the kabal.

Middle Mexican Coarse Slateware basins (figs. 19, i, 6-g; 20, b, 14-21; 24, e) follow quite closely the form of the Early Mexican basins, but are readily distinguishable from them on ware characteristics. Bolster rims are often squared at the upper edges. Our sample of this type is small; one sherd has a horizontal strap handle, a break from the Early Mexican style.

Late Mexican Coarse Redware basins (figs. 27, j, k; 94, g, 5-10) continue the earlier form tradition. The Mayapan sample shows no incised rims; the Chichén sample has one. One Mayapan sherd has a horizontal strap handle. The slipped basin, unlike the slipped jar, seems not to have been made during Colonial times. It is conceivable that the cauldron took over its uses.

The place of the vessel form described above in the domestic life of the Maya can, I think, be treated as a single problem; the form persisted with but minor variation for a thousand years or more. I suspect that basins were used for storing masa, the wet-ground corn still used as their main staple by the modern Maya,⁸⁰ as well as perhaps for the soaking of corn and lye which usually precedes the grinding. The shape, with its wide mouth, rounded bottom, smooth inner surface, and durable lip and walls, should make it very suitable to this purpose. Capacity of these basins ranges from about 2 liters to 50, with an average of about 10 liters (10.57 quarts). Chart 24, showing the diameter range of these basins, gives an idea of the wide variation.

A modern estimate⁸¹ allows about 21 kilos a day of corn per Maya family, and the corn is normally ground daily after overnight steeping. Although there are several uncertain factors here, such as the modern use of corn for domestic animals, and the degree of swelling of corn through absorption of water, it would seem that the average basin would hold masa for a family of five. The commonest modern receptacle for the day's masa in Yucatecan towns is an enameled wash basin.

Slipped composite profile bowls.⁸²—Relatively shallow, broad-mouthed bowls having an abrupt change of curvature between side and bottom seem to be characteristic of the high-culture area of Mesoamerica from the Formative stage on, with the exception of the Tarascan and neighboring areas in western Mexico. In other areas such as Central America, the northern Andes, the lower Amazon, and the Hohokam area, the form is only occasional.

In late Formative collections the bulk of the ceramics recovered belong to flat-bottomed bowls with angular to subangular base-wall junction and heavy walls, often with outbent (see fig. 107, a) or exteriorly thickened rim. One large hollow leg may have come from one of these bowls (fig. 5, b, 41). These vessels, with their massive walls and hand-burnished, often grooved or incised finish, are the most easily identifiable of their horizon. Size varies far more than in any other period. The finish is handsome, underside of base is usually slipped. Occasional rims bear plastic decoration. Contemporaneous with the above bowl form is evidence of one which may be the predecessor of the early Regional Flaky Redware bowls: a few sherds occur with sublabial flange or ridges overlying a break in wall contour (figs. 5, b, 5, b, 7; 31, c, 43, 44).

The Flaky Redware bowls (fig. 107, b) are shoudered. The shoulder in Flaky Redware is a slightly thickened angular break (see fig. 6, c; in incised dichrome it often seems to represent an overlapped joint between bottom, and the sides are built at a vertical or insloping angle upon it (figs. 6, g, 2; 63, a, 1, 2), or the perimeter of the bottom may curve sharply inward and the wall rise flaring or outcurving from it. The Regional Polychrome bowls have either breaks of the last type or "basal flanges" rising from a simple angular bottom-wall junction (figs. 9, f, 8; 30, a; 63, a). The sidewall is short relative to those of the other types of forms considered, straight or outcurved toward the rim, slightly insloping to markedly outcurving in orientation. Lips are rounded or, on Flaky Redware, exteriorly thickened (fig. 6, b). No certain information on bases is available for Flaky Red or Flaky Dichrome; they seem to have been slightly thickened and flattened on the bottom. All of the Regional Polychrome found shows low ring bases. The bottoms are far more deeply curved than those of any other of the bowls of the composite silhouette series.

Regional Redware composite silhouette bowls come from two widely separated regions: Cobá and Yaxuna in the east, and Acanceh in the west of Yucatán (see figs. 2, g; 8, j; 18, h). Although the eastern and western wares differ somewhat, the shapes are markedly similar in the form of the basal ridge, the rounded profile with faint S curve to wall, and the conoid legs (fig. 107, f). This east-west similarity is also markedly apparent in the jars of the same ware and sites, and both ware and forms are similar to Tepeu 1 pottery from Uaxactún. Miss Shepard remarks that some of the Regional Redware from Cobá contains ash temper probably of foreign origin. All evidence, including stelae and architecture at Cobá, points to interinfluence between Yucatán and the Petén in these times (roughly 9.8.0.0.0-9.13.0.0 Maya).

Oxkintok monochrome bowl forms (fig. 107, c, 1-5), although they presumably date earlier than the last mentioned group, are closer in form to Florescent slateware. Bottoms are nearly flat, basal breaks are angular; the basal projections, when present, are usually a projection of the base, side walls are straight to slightly outcurving; hollow as well as solid conoid tripod legs occur. As has been said elsewhere, the Oxkintok repertory is not closely related to other

known ceramic assemblages of its period. If we assume that Florescent slateware forms derive from it, we must assume that the close relationships shown among Acanceh, Cobá, Yaxuna, and the Petén were not characteristic of all of the area, that striking geographic variation, probably only to be explained by sharply separated political entities, also existed during regional times.⁸³

Red on Thin Grayware bowls (fig. 107, d, 1, 2) are indistinguishable from the associated Medium Slateware basal break bowls in shape, although jar forms in the two wares are different. This suggests that the bowls in the two wares may have been used interchangeably, the jars for different uses.

Medium Slateware basal break bowls are a form of major importance during the Florescent stage. They are found in burials and caches as well as being plentifully represented in refuse. They were presumably used to serve food, and probably for the offering of sacrifices as well.

The typology of these forms (figs. 107, e; 108, a) has been discussed elsewhere (see caption of fig. 45). Although in the Puuc collections two more ornate styles can be partially isolated from a more widespread, simpler style, the chronologic-regional affiliations of the ornate styles are not yet clear. A fourth style (for discussion, see caption of fig. 67) is confined to north and east Yucatán and is suspected of having earlier beginnings than the Puuc styles, but is likely synchronic with them through a considerable time span. The shape, with its nearly flat bottom supporting a rather heavy wall usually luted onto its upper face, is distinctively Yucatecan of this horizon. Tripod feet are nearly universal, and a wide variety is used, including solid slabs, solid and hollow conoids, spheroids, and cylinders, some mold pressed. Complicated rims and low basal ridges with thumb-pressed or stamped surfaces, and pendant skirts with cut terracing, are used. Bowl exteriors are sometimes incised. Organic paint is often used, red mineral paint is limited to elaborate forms. The only probable direct antecedent found in the Regional phase is the early Oxkintok style.

The basal break bowls of the Early Mexican substage show influencing from imported X Fine Orange bowls from Veracruz, although influence in form has been less than in decoration. These imported bowls are of two principal types. The one has a deeply curved bottom, often with an incised pattern on the floor, and three spherical rattle legs set on constricted necks. The walls of this type are uniformly thin, without pronounced thickening at either the basal angle or the lip (fig. 108, b, 1). The other type is flat-bottomed with flaring, often outcurving sidewalls (fig. 108, b, 2, 3). Basal angle is usually markedly thickened and rim outbent and thickened. Hollow tripod legs are cylindroid with some flaring to the closed bottom. They are hollow with a pellet inside; the wall of each leg is often pierced by a diagonal gash or slot. The influence of the X Fine Orange forms is of a generalized nature, whereas the decoration was frankly copied. Influence was concentrated on, though not restricted to, Medium Redware. An evidence of the generalized nature of the influence is the fact that the two above-described X Fine Orange shapes cannot be isolated in the native Yucatecan pottery, although vessels without thickening at basal angle and lip (a characteristic absent in Yucatán Florescent) are common (see fig. 108, c, 4, 5) and many flat-bottomed bowls show outbent rims and other suggestions of X Fine Orange influence (see fig. 108, c, 1-3). The cylindroid leg seems never to have been copied locally. The constricted neck of the X

Fine Orange spherical rattle legs is either absent or modified. It seems likely that the Yucatecan potters continued many of their old practices of forming; an example of this may be the method of attaching legs. X Fine Orange legs seem always to have been attached by simple luting. Early Mexican subphase legs on native wares were often, although not always, tenoned into a scored circle on the bowl bottom, as they were in Florescent times.

There is but little information on composite silhouette bowls of the Middle Mexican substage. The sample from Mayapan shows no leg fragments from this form (fig. 24, a, b), but we suspect that two unslipped, appliquéd modeled effigy-head legs from Chichén Itzá (fig. 92, e, 1, 2, and caption) may come from Coarse Slateware basal angle bowls of this period. In our restorations (fig. 108, d) we have shown no legs. Little comment can be made on this small number of sherds, save that they document the continuation of the vessel form through the Middle Mexican substage.

Late Mexican substage composite silhouette bowls are smaller in diameter and much taller in proportion than the bowls of earlier periods. Comparison with Aztec bowl sizes (Griffin y Espejo, 1950) indicates that size and proportion are very similar to those of Aztec II and IV bowls, although Aztec III bowls are listed as somewhat larger than bowls of succeeding and following periods. It is conceivable that if, as suspected, the composite silhouette bowls were used as "service" vessels, this decrease in size may indicate a change from the custom of a group eating out of a common bowl to individual service. Form is not in general characterized by delicacy, although some of the bowls have a high lustre and burnished finish. The leg forms are more diagnostic of period than is the body. Mold-pressed effigy-head legs are the most elaborate form (figs. 27, g; 96, b; see fig. 95 caption for a discussion of the distribution of this type). High terraced slab legs also occur rarely in Yucatán, and at Cintla, Tabasco, supplying a probable synchronism with Aztec III in the Valley of Mexico (see fig. 94 caption). A third type with wide distribution is hollow truncated conical, with two or more perforations, placed in a vertical line on the external face of the leg (see fig. 94, h, 19, 20). This type is also found at Tulum on the east coast of the Peninsula. Skirts are common, some of them notched, some in addition bearing geometric incised patterns (see fig. 26). The skirts, animal effigy legs, terraced slab legs, and incised patterns are found also on Mayapan Fine Orange and on other wares which, like it, seem to center on the Tabasco coast (see fig. 28, a, b, c, and caption, also fig. 103, k), and both typologically and from historical accounts have Aztec cultural affiliations. Their importation and copying support the thesis that in Late Mexican, as well as in Early Mexican times, Yucatán was influenced in major degree from the Mexican mainland.

No composite silhouette bowls seem to have been made in Yucatán since the Conquest, nor has any vessel of similar form or capacity replaced them. If it can be supposed that this form was used for serving food, the size of the vessels during various periods may be taken as clues to the number of people dining from a single vessel. Formative bowls range widely in size, but those of following periods do not. This was perhaps due to their manufacture for a specific family size as opposed to standardized production by community specialists in later times. Early Regional bowls have a capacity of about 3 liters. Late Regional and Florescent average about 1 1/2 liters capacity and Late Mexican bowls average well under a liter,

with Early Mexican transitional in size between Florentine and Late Mexican. If we assume the eating of some sort of corn gruel as a staple, and this seems likely in the absence of evidence for the tortilla, the Mexican stage may have seen the vanishing of group use of a single eating vessel, and the Regional stage a decrease in size of communal eating groups. It should be said that both modern custom and Conquest-period custom among the Yucatecan Maya is for men and women to eat separately, and that extended families of 50 people to a single group were common at the Conquest, but a single couple with children are the local unit today. As may be seen, there are several unknown and dubious factors to be considered in any reconstruction which might be attempted.

Slipped simple profile bowls.—This form is defined as a vessel with profile in form of a simple, uninterrupted curve to give a hemispheroid or lower shape, and of size which would permit use with one hand. The form is very simple and nearly universal among ceramics, and thus its presence cannot be taken to indicate cultural continuity. Such cultural connections and traditions as seem suggested will be discussed individually.

This form is present as a minor constituent in the Late Formative collections (figs. 5, a, 6-10; 16, b, 13; 31, c, 41, 42; 65, c, 15), and Middle Formative collections obtained in 1949 suggest that it was commoner in still earlier times. Shapes range hemispheroid to shallow. Bases to these vessels are not positively identifiable but, from the absence of specialized bases in the collections, must simply have been flattened. Interiors were always slipped, exteriors often slipped. Simple profile bowls were not certainly made in Flaky Redware; if made, they were rare.

The form is common in Oxkintok monochrome (figs. 12, d, e, h, j, k; 13, h, j-m; 103, d) where it seems to be divisible into two types, confined in major degree to separate wares. Shallow, ring base, rounded profile bowls, usually with blunt or rounded rim (figs. 12, d, e, h; 13, j, l, m) are of Oxkintok Coarse Monochrome; while flat-based, vertical-sided bowls, with a heavily curved base-wall junction giving a somewhat squarish profile, and with tapered rim (figs. 12, j, k; 13, k, but of Coarse Monochrome, and 103, d), are almost exclusively of Oxkintok Thin Monochrome. These two forms are so distinctive and so definitely restricted to their respective wares that it is suspected either that separate groups of people made them, or that their uses were quite different.

Regional Redware simple profile bowls are nearly as common as the more diagnostic basal-ridged bowls (figs. 2, g; 8, f-h, k; 18, e, g; 19, h). Their body shape is not far from that of the ridged bowls, but they lack feet, the ridge, and the wall outcurve commonly found just under the lip. For the most part they show the same tendency seen on the thin Oxkintok Monochrome bowls toward a strong curve at base-wall junction, and nearly vertical walls. The bottoms are of constant thickness, and often bulge upward slightly at the center (see figs. 2, g, 17; 8, h, j, 3). Rims usually taper toward the exterior. Slip normally covers the whole vessel, including the bottom. The forms of the polychrome bowls which accompany Regional Redware at Cobá should be here mentioned. They have considerably thinner walls and are higher and more narrow, approximating the Petén shapes which their decoration also copies (see figs. 2, h; 3, a; 4, m, and Smith, 1936a, pl. 13, 13, 14). No simple profile bowls of Red or Thin Gray are known.

The Florentine simple profile bowls can be subdivided, the shape differences correlating quite close-

ly with differences among wares. The Florentine wares in which this shape was made are: Thin Slateware, Thin Redware, Medium Slateware, and Z Fine Orangeware. The thinwares and Fine Orangeware may be related to foreign traditions, and their shapes are discussed in the section on Thin and Fine ware shapes. Medium Slateware shows, among the earliest collections, what seems to be an evolution from the Regional Redware simple profile bowl shape. This is best seen in the Chenes and Río Bec forms, but for illustration here the Dzibutun collection and other scattered finds may be used. The Dzibutun Medium Slateware rims (fig. 15, b) are valuable because of the lack of mixing of deposits. They show the profile and rim taper characteristics of the Regional Redware vessels. The two Dzibutun atypical Florentine Redware bowls (fig. 35, d, f, h) show the same features: f is as deep as the Cobá polychrome bowls, and the Medium Slateware bowl d is also of this general form. All show flattened bottoms. Sherds belonging to this horizon at Acanceh (fig. 18, k) and Maní (fig. 32, d) again show enough similarity to assume cultural relationship to Regional Redware forms. Also, certain sherds of Medium Slateware from the Puuc sites seem to belong to this form (fig. 49, c, 9-15). This evidence, as well as the thus far unpublished Chenes-Río Bec evidence, suggests that slatewares must have been made contemporaneously with or not long following the Regional Redwares. A somewhat dubious continuity between Regional forms and Thin Slateware is suggested by a few specimens. Fig. 63, b, c, and h, from Labna, classed as Thin Slateware, belong to the form group discussed above, as do figs. 73, e, and 87, w, from Chichén Itzá. All of these vessels lie in the range of Thin Slatewares which resemble the Medium Slatewares in slip and paste, a poorly defined group.

The hemispheroid Medium Slateware bowls from the Puuc sites (fig. 49, a-i) are the next group in this series. They seem to have gradually superseded the type described above; both shapes are found in the Chenes and Puuc sites. The form style preponderant in the Puuc sites is distinguished by ring base, sometimes terrace cut, and by the presence of a thickened lip with exterior sloping facet, which rises from a gradually thickening wall. The form is evenly curving, almost an exact hemisphere.

This form is highly distinctive and, to my mind, shows no close stylistic derivation from any which precede it in Yucatán, nor any descendants; the closest possible antecedent would be the hemispheroid bowls in Oxkintok Coarse Monochrome which show the ring base, but no closer similarity, and which date considerably earlier. The closest exterior relationships I know to the shape are the San José IV and V Redware incurving bowls (Thompson, 1939, fig. 71) which, although markedly close in form, lack the distinctive faceted rim of the Puuc specimens. This form seems to be approximately contemporaneous (*ibid.*, p. 240) to the time at which we would date the Puuc sites. The absence of the form from those of our 1949 Chenes samples which are tentatively dated at 9.16.0.0.0 also corresponds to Thompson's San José placement.

The form and size of this bowl are close to that of the gourd vessel used at Conquest times and still in use for mixing and serving pozole and other sorts of corn gruels. The gourd vessel is used by the individual as a drinking cup. The size of this vessel is about right for such use. Diameters range 12-20 cm., average volume is somewhat over a liter. It would seem that liquid foods could conveniently be drunk from a vessel of this depth, whereas shallower vessels would

be useful only for solid foods unless a spoon (unknown in this area) were used. If the identification of this vessel as a cup is correct, it seems dubious whether its restriction to the Florentine stage is a significant measure of a change in eating habits. Gourd bowls or cups were likely in use throughout Maya history.

The Early Mexican forms include vessels which are classifiable as simple profile bowls, but they do not form a single, well-defined group. There are simple profile bowls in Medium Slateware (fig. 74, a, 3-26, c) and in Medium Redware (fig. 87, u, x-cc; 88, a, c, 3). Most of these probably had flattened bottoms, some perhaps had hollow tripod legs; ring bases were absent or nearly so. In general, these vessels are shallow, without sloping rims, and with considerable range of shape and form. There is a noticeable intergrading between them and the associated basal break bowls both in shape and size, which suggests that the two forms were probably interchangeable in use. They are suspected to have been influenced by Mexican mainland forms, but are so generalized that search for antecedents is difficult.

A second group of the Early Mexican substage is much more tightly drawn and coherent. These are the so-called "chile graters" (fig. 74, h-j). The shape is low with increasingly abrupt curvature toward the rim. The rim is blunt to rounded, and incurved to slightly beyond the vertical. Tripod legs are spherical, with a pellet and slashed side. Covering the floor is a roughly geometric incised pattern, either done before slipping or on an unslipped area. The occurrence of this vessel type in the Huastec area during Formative and all subsequent periods, and its occurrence in the Chenes-Río Bec area during the Initial Series period (see caption of fig. 74 for data on distribution), suggest that this form came to Chichén Itzá from the south and probably to there from the Mexican mainland—a long and devious history. The chile grater continued in use through the Mexican stage, but is not documented in Yucatán after the Conquest, and thus its use remains unestablished.

Simple profile bowls continued to be made during Middle Mexican times (figs. 20, b; 24, b; 92, g, m), and during the Late Mexican substage (figs. 26; 94, h; 95, 96). They seem to have dropped in popularity in Late Mexican times in favor of composite profile bowls which, by a reduction in size since Florentine times, had become functionally interchangeable with them. Our Colonial samples (fig. 34, e) show a few fragments (fig. 34, e, 9-12) which may have belonged to small shallow bowls, and a modern hemispheroid, flattened-bottomed bowl is made over Yucatán today (fig. 34, h).

Beakers and cylinders.—These vessel forms were never important in the utilitarian ceramic repertory of Yucatán. They occur mainly in the fine and thin wares and are much commoner in collections of whole vessels, presumably from caches and tombs, than in refuse deposits.

There is some fragmentary evidence of beaker or cylindric vessels of Flaky Redware, but not sufficient to give vessel form proportions (fig. 109, a). Several of these pieces show more elaborate decoration than average, indicating a tendency evident through the history of this vessel shape. The Oxkintok Monochromes are singularly free of cylindrical or beaker forms. Only one sherd (fig. 12, j, 1) may have belonged to such a vessel.

Fine Grayware and Thin Blackware (fig. 109, b), which are associated at Dzibilchaltún and, in lower frequencies, at Holactún, occur characteristically in beaker form (figs. 28, e-g; 35, b; 36, b, d-g, i; 53,

e-k; 103, h, i). This shape, as it appears in Fine Grayware, has a height of somewhat more than half the diameter, an angular base-wall junction from which the wall rises vertically, gently outturning to a taper rim which occasionally is incised or hoop form on the exterior. Flat bottoms are commonest; another bottom form is convex exteriorly, with three spheroid rattle feet; a third is double-bottomed, with pellets between. Blackware also occurs in beaker-shaped vessels, and both wares occur in flat-bottomed basal angle bowls. These faintly outcurving walled bowls and beakers are somewhat similar to Teotihuacan II and III forms, but other vessel details are so unlike as to make the chances of cultural interinfluence highly conjectural. The relationships of this form quite likely stretch to Tabasco and lower Veracruz where the Yoxiha, Piedras Negras, and Tres Zapotes gray and blackware forms show similarities. Unfortunately, the existing reports from this area do not allow chronologic placement. Dzibilchaltún Fine Orangeware is also related by use of a very similar group of vessel shapes (fig. 59, g, h; cf. fig. 36, h), as well as by a barrel-shaped, flat-bottomed vase (see fig. 59, a; 60, d, z; 103, m).

Z Fine Orangeware (figs. 36, j; 59, b-f; 89, e, f), which seems to have succeeded Dzibilchaltún Fine Gray and Fine Orangewares as a luxury tradeware, shows a marked difference in shape repertory. The commonest shape is a simple profile bowl, hemispheroid to paraboloid in shape, with shallow ring base and thin taper lip. The barrel-shaped vase has disappeared. Thin Slateware and Thin Redware from the Puuc sites (figs. 50, 51) are also made principally in simple profile bowl forms, but a few specimens of Thin Slateware come from flare-sided, flat-bottomed beakers (fig. 50, c; 51, a, b, 9-15) which sometimes have a hoop rim. The atypical Thin Slateware sherds from Chichén Itzá (fig. 4, p) show a much higher incidence of flare-sided flat-bottomed beakers, and the Dzibutún collection, believed to antedate the Puuc collections, shows an orange-colored Thin Slateware faintly flaring sided beaker which, however, has a rounded bottom (fig. 35, e). This shape of vessel also occurs in the Chenes sites, notably at Santa Rosa Xtampak. This beaker shape never intergrades into the outcurved wall type characteristic of Fine Grayware, nor into the associated Thin Slateware simple profile bowl. Both on stylistic and distributional grounds, it seems likely that this shape was in use earlier than the simple profile bowl, and there is probably some chronological overlap between them.

The collections of elaborate Yucatán whole vessels seen in Mérida and elsewhere contain (see fig. 109, c, d) a considerable number of beakers and cylindrical vessels decorated with paint, incision, carving, mold pressing, etc., which Vaillant (1927, pp. 76-87) includes in his carved, modeled, and fine slateware categories. These vessels in great part belong to my Medium and Thin Slatewares, but, as might be expected, show surprisingly few correspondences in my sherd material; they were used for ceremonial and mortuary purposes, and do not commonly occur in occupational debris. Beaker forms are frequent in this group, the diameter ranging slightly greater than the height, as it does in the above-described groups. There is considerable form range. Flat-bottomed vessels with angular bottom-side junction may be barrel formed, or have cylindric or faintly flaring walls. Lip may be straight or outcurving tapered, and is often exteriorly thickened. "Collared beakers" occur, on which a wide, shallow neck section surmounts a globular body. Bell-shaped beakers are found. Some of these vessels have small, solid, tripod legs.

The forms of these vessels can in general be placed stylistically as early among the slatewares on the basis of the Thin Blackware and Fine Grayware placements given above, with additional suggestive evidence from the simple profile Medium Slateware bowls, and from the fact that certain of these shapes are also found on monochrome vessels in the Mérida collections which, although they cannot be classified closely from our excavated collections, are probably late Regional in date. A further bit of evidence for this placement lies in a vessel (fig. 103, 1) which belongs in this group on basis of form and decoration, and is reported to have come from Dzibilchaltun. In seeking foreign interrelations for these vessels, the Motagua Valley collections of Smith and Kidder are by far the most suggestive. A considerable proportion of their Magdalena phase tomb-offering ceramics are close to or identical with certain of the more elaborate Yucatán vessels of the Regional-Florescent and Florescent horizons (see Smith and Kidder, 1943, figs. 19, e-i; 21, c-e, g, h; 25, a-d, g, h; 27; 28, b, c; 34, h; 42; 44, d; 47, d; 48, a; 52; 55, b). The polychrome of the Motagua collections may be compared with certain Yucatán specimens in the Mérida collections, and with the Labna specimens, fig. 3, b, c. The clue to the placement of several of these shapes may be found in the Uaxactun ceramics illustrated by Smith (1936b, pl. 13, 1-9), which he tells me are Tepeu 2 in date. The San José IV blackwares also show the beaker form (Thompson, 1939, fig. 73).

The pedestal base appears on a few Florescent vessels in Thin Slateware (fig. 50, c, f, g) and in Z Fine Orangeware (fig. 59, d, 4). The tumbler vessel form, and perhaps a rather awkward pyriform body shape (fig. 79, o), are found in combination with this base. These may be forerunners of the Early Mexican trumpet-base cylinders and trumpet-base plain and shoulered pyriform vessels, which are prevalent in X Fine Orange and plumbate (figs. 77, 78, 79) and were local-

ly copied (fig. 86). The distribution in time and space of tall, vaselike vessels with pedestal bases has not been worked out; I suspect that they came to Yucatán from the southwest. This form of vessel may have lasted in much altered form until now, or, conversely, the Colonial and modern forms may have been reintroduced (see fig. 34, e, g for Colonial and modern pedestal vases). In modern Yucatán the wooden vessel used for mixing chocolate is in the form of a pedestal-base cylinder with small side handles.

The restriction of the vessel forms discussed above to the finer-textured wares, the small vessel size, the elaborate decoration, the evidence of trade, the constancy of use as tomb furniture, and rare presence in refuse, all suggest luxury and ceremonial usage. The extensive trade which must have been carried on in vessels of these forms should make them more than usually valuable in study of intercultural connections and discovery of synchronisms.

Unusual ceramic forms.—A considerable number of potsherds in the collections do not belong in any of the form categories discussed above. These specimens have in every case been illustrated, and in many cases are discussed individually in the figure captions.

It perhaps needs to be pointed out that the organization of this section on forms best fits the Florescent ceramic assemblage, which is the assemblage we know best, and that other stages have been fitted to it when feasible. It is this fact, as well as our lack of knowledge, that causes the paucity of description of Formative vessel shapes. These shapes are in several instances radically different from the remainder of the Yucatán sequence; the use of slip also contrasts in several respects, most striking among which is its use on only the exterior of wide-mouthed basinlike forms, and on the bottoms of flat-bottomed bowls. More excavated material is needed for its understanding.

VI. YUCATAN CULTURE HISTORY IN VIEW OF THE PRESENT STUDY

This short section is an effort to turn away from the mass of potsherds and take some bearings on the ultimate goal, the understanding of Maya history in Yucatán. Most of the statements to be made here have been discussed at length at scattered points in the text. I shall take advantage of this by minimizing qualifications in the hope of giving the account more continuity and coherence.

Yucatán was inhabited by pottery-making peoples long before the elaborate Classic Maya civilization had developed in the Petén lowlands. Although we have no direct evidence of the beginning date of settlement, a rough comparison with Valley of Mexico ceramic styles and radiocarbon dates suggests 1500 B.C. or even earlier as a likely date for the earliest deposits we have found. It must be pointed out first that our excavations have been limited to the vicinity of areas showing masonry structures of obvious Maya religious centers—a highly selective sampling technique—and that we have found no evidence of communities making only crude ceramics. We must suppose that such cultures as we have sampled have been preceded by pre-agriculturalists, followed by settlements characterized by the beginning of agriculture and by primitive ceramics. More adequate sampling techniques may in the future produce evidence of such peoples.

FORMATIVE STAGE

Our earliest evidence of man, the Early Formative substage collections from the Maní Cenote, tell us that these people hauled water in 3-gallon 30-pound loads, in pointed-bottomed, narrow-mouthed vessels decorated by pattern burnishing, a decorative technique also used by contemporaneous Highland Guatemalan peoples (Brainerd, 1951, pp. 77-78), but very uncommon later in the Maya area. This pottery is smoothly finished, in a difficult shape to form, with delicate, restrained decoration—not the sort of craftsmanship to be expected from beginners in pottery-making. Our sample consists entirely of water bottles, and thus we cannot be certain that slip and other decorative techniques found in the next substage, Middle Formative, were not also used earlier, but the very fact that water jars alone were found stands in marked distinction to the later deposits. The Maní Cenote Late Formative deposits include a wide variety of vessel shapes; radical changes in uses of vessels seem indicated through this time lapse.

The Middle Formative substage was found at the two Chenes sites of Dzibilnocac and Santa Rosa Xtampak in 1949. This work has not yet been reported in detail.⁸⁴ The two appearances of this horizon are in quite different contexts, and each gives information of interest. At Dzibilnocac, a deep refuse deposit was tested in a flat area at some distance from the nearest masonry ruins. The deposit contained leached ash in quantity, and randomly distributed and badly broken but unburned human bone. The impression given from the single sounding—excavation alone would confirm or deny this—is of a habitation site and suggests that villages, unknown during the Classic stage in the Maya area, may have existed earlier. At Santa Rosa

Xtampak, under the eight stelae found in a group, there was a plaster floor underlaid by an estimated three meters of rough stone fill containing only Middle Formative pottery. This fill must be part of a masonry platform. Its size is unknown but may be large, since it is situated in an artificially raised terrace about 100 meters square, flanked by the largest pyramid of the site. Thus the building of substructures is documented for this period. This activity implies co-operative labor for nonutilitarian—probably religious—ends by a considerable number of people. This sort of activity is a hallmark of the Classic Mesoamerican civilizations, but has not been assumed to have begun at such an early date. Throughout Mesoamerica, substructures were used as temple bases, and in the Guatemala Highlands as coverings for elaborate tombs which are rich in offerings of pottery. I have examined about a thousand whole pottery vessels from Yucatán, most of them from tombs or caches. Since not one Formative vessel occurs among them, it seems safe to assume that rich Formative tombs are rare or nonexistent in Yucatán, and that the Formative substructures there were used only for altars or temples.

The ceramic repertory of this period is extensive, including rare bottle forms related to Early Formative, and a host of slipped vessels including some forms and techniques in common with Late Formative pottery.

Late Formative pottery comes from nearly all sites sampled, from 14 in all. Exceptions among well-sampled sites are Labna and Uxmal, both in the Puuc area. Kabah and Sayil gave very light samples. Since few of these sites are so desirable geographically as to insure their occupation throughout all the time of human occupation in the area, it seems certain that single locations for religious centers continued in use over long periods, and that formal Maya religion, which has long been documented through the Classic stage, began as early as Middle Formative times. Many Formative structures must lie buried within the later structures of Yucatán, entombed by the Maya custom of renovating and enlarging religious buildings.

The only Formative substructure so far known from the central Maya area is E VII sub, Uaxactún, and this is believed by some to date early in the Initial Series period. The pyramid is small (volume under 200 cubic meters) and ornate, and if a temple was ever on its summit it was made of perishable material. At Yaxuna a large mound (map 4, mound 8) was tested by four trenches at the base of its slopes. These trenches produced almost exclusively Late Formative pottery. The shape of this mound suggests that several masonry buildings had been built on top of it. The volume of the mound is approximately 50,000 cubic meters, about as large as any Classic stage Maya substructure save for a few of the huge acropolis platforms. The size of this mound, if its dating may be assumed to be correct, attests an early peak of priestly control and religious devotion not unexpected if Dr. Kidder's theory as to the pre-Classic dating of the huge Pyramid of the Sun at Teotihuacan be accepted. The presence of large substructures at this approximate time period is further demonstrated by the large mound of the Verbena subphase, Miraflores phase, at Kaminaljuyú in the Guatemala Highlands (Shook, 1951, p. 98). This mound,

to which many structural additions were made, was presumably used to support a temple or temples made of perishable materials; large tomb chambers had been cut into it.

Further generalizations on Late Formative culture can be tried from the ceramics themselves. First, there is marked variation in wares, forms, and decoration among the various sites in Yucatán. This argues for either marked regional variation, or for a series of time horizons each with its own ceramic repertory. Of these two causes of variation I am inclined to choose time as the major factor, my reason being the surprising closeness of similarity between the majority of Formative Yucatán pottery and that from other areas.⁸⁵ Such homogeneity over the whole area is not consistent with regional isolation within Yucatán.

I believe that the workmanship of Late Formative pottery, and its range of style in shape and decoration, shows a greater inventiveness and attention in the craftsmen than do the ceramics of later periods. Many vessels are laboriously burnished to a high lustre. The range of form and of size in each form shows more variation; decoration is frequent and of sorts such as channeling, incising, and grooving, which required skill. The wall profiles suggest that the pottery was hand-modeled, often with great care. The vessel walls with thick horizontal lips necessitate a firm clay and much patience in their forming. Although it is hard to document this statement objectively, my present impression is that Late Formative pottery shows a major interest in the craft, probably by the population as a whole rather than by a group of specialists. Later pottery is more refined, some of it is more elaborate, there is more evidence of individual technical virtuosity; but this early pottery reaches an exceptionally even high standard, suggesting a wide appreciation of, and proficiency in, ceramic craftsmanship. Pottery-making must have been a major, not a minor, art to the Late Formative Maya. The presence of Middle Formative deposits in several, and Late Formative deposits in most of the Maya religious centers sampled in Yucatán, supports the architectural evidence given above that Maya religion dates from far earlier than the Classic stage.

REGIONAL STAGE

The Yucatán Regional stage is composed of pottery assemblages from several widely distributed sites. The major slipped wares of the stage are all monochromes, most of them redwares, but they show a striking variety in ware characteristics and thus in craft traditions; hence the name selected for the stage. At Acanceh, Flaky Redware is found in Late Formative vessel shapes underlying the same ware with early Regional vessel shapes. At both Acanceh and Yaxuna, Early Regional Flaky Redware lies stratigraphically below Regional Redwares which, although they show distinct ware differences, are closely comparable in form repertory. At Oxkintok, from under Florescent deposits, comes the Early Oxkintok Monochrome assemblage, with unproven but likely association with the Oxkintok lintel date of 9.2.0.0.0. This likelihood is strengthened by contributory evidence, some positive and some negative, from other sites such as Acanceh. Relatively unmixed collections of Flaky Redware and of seemingly related polychromes from Balam Canche, Yaxuna Cenote, Chac Cave, the Hacienda Cenote at Chichén Itzá, Cenote Ch'en Mul at Mayapan, Mani, and E. H. Thompson's "Mound near Mérida," add substance and suggest developmental

theories on the Early Regional substage. The Regional sequences are further confirmed and fixed to some degree in the Maya calendar by Robert Smith's identification of sherds from the above-mentioned sites which were either traded from the Petén area or show close stylistic and ware similarities to Uaxactún pottery. These determinations equate Regional Flaky Redware with Tzakol 1 and Regional Redwares with later Tzakol and Tepeu 1 at Yaxuna. Red on Thin Grayware and early slatewares equate with Tepeu 2 at Acanceh; the Early Oxkintok assemblage equates with Tzakol and thus with Tzakol-like collections from Mayapan and Mani.

The samples of the Regional stage are not large, and are from widely scattered areas. Three widespread horizons are in general recognizable, the first two showing developmental relations, the third seemingly removed from the local sequence and inspired from the south. Then there is the Early Oxkintok assemblage of thus far quite localized occurrence. The earliest of these Regional assemblages is almost certainly that from the Yaxuna Cenote, where Flaky Redware is found with Incised Dichrome and Trickle on Flaky Red as decorated variants. A number of stylistic traits and transitional specimens link the dichrome to Tzakol 1-like polychrome (our Regional Polychrome), into which it would seem to have evolved, and there is suggestive evidence that in various other parts of Mesoamerica, as well as perhaps in Peru, a similar sequence in pottery decoration occurred (see Brainerd, 1948). Thus the forms and ware variants of the group which we have called Flaky Redware picture a gradual cultural development from the Late Formative stage into a terminal horizon which, from the close similarity between the Yucatán and Petén polychrome bowl design and shapes, can be dated in the Maya calendar as Tzakol 2 or 3, Maya date *ca.* 8.16.0.0-9.8.0.0. At Uaxactún and San José, a cultural disjunction is thought to have taken place during the horizon of this sequence, which is marked by incised dichrome. Holmul 1 and Mountain Cow 2 have been suggested as examples of this horizon (Thompson, 1939, table 17), but both of these phases have produced very small samples. This horizon may be placed inferentially in the Maya calendar. The Tzakol phase is estimated to have ended somewhat before 9.8.0.0.0 and to have begun sometime before 8.16.0.0; A. L. Smith (1950, pp. 15, 87) estimates the beginning of the Tzakol phase at 8.12.0.0.0. Since the incised dichrome horizon in Yucatán is believed to precede the polychrome horizon, which in turn is so similar as to assure its contemporaneity with Tzakol at Uaxactún, then the Yucatán Regional stage, ushered in by the incised dichrome horizon, must have begun well before the first Maya stela was erected—perhaps as early as 8.8.0.0.0.⁸⁶

No descriptions of the architectural or other activities of the makers of Flaky Redware can be given with certainty at present. The north building group at Yaxuna was occupied during these periods, but would need a careful dissection since its occupation seems to have been continuous from Late Formative through Florescent times. It seems likely, though at present unproved, that the north Pyramid at Acanceh, with its huge stucco masks, may also belong to this period. The mounds near the mouth of Balam Canche cave (near Chichén Itzá) would also repay investigation, although here also there was probably a slateware overlay. Another possible source for information on this period is the plaza of Chuburná, a suburb of Mérida, where I have made a small surface collection of sherds almost exclusively of Flaky Redware of the Formative-Regional transition. Although this site has

been extensively robbed of materials for local construction, masonry wall bases were observed *in situ*, seemingly about at ground level. This may conceivably be E. H. Thompson's "Mound near Mérida" (see fig. 63, caption). The evidence of the beginnings of polychrome in Yucatán, not thus far found elsewhere in the lowland Maya area, makes this period in Yucatán of particular interest, since this would seem to be the precise time during which the Maya Classic culture pattern was becoming established.

The Regional pottery from Oxkintok, as mentioned earlier, shows but little connection with other Yucatán ceramic assemblages. At the same time, the craftsmanship is so refined in form, firing, finish, and decoration as to suggest the product of a long, widespread tradition. This tradition shows traits markedly distinct in nearly every respect from the sequence above described, although the two (Oxkintok Monochrome and Flaky Redware) must have been contemporaneous over at least part of their spans. The attention at Oxkintok to surface finish may well stem from the Formative monochromes, but transitional stages are lacking at present. There are a few similarities in form which point to Regional Redware jars and basins; more positive are the resemblances between Early Oxkintok basal break bowls and this form in early slateware. The Oxkintok forms may well be those from which the slateware forms derive; they are certainly more likely candidates for that position than are the Regional Redware composite profile bowls.

There is evidence that the Flaky Redwares were used at Mérida, Mayapan, Maní, and at Chac Cave in the Puuc area. West and south of these areas the Oxkintok Monochromes may have predominated. At Acanceh, although Late Formative Flaky Redware is prominent, Regional Flaky Redware and Tzakol-style polychrome are rare, and the trenches dug in front of the Stucco Façade Building gave collections which, although very small, seem to document the presence of the Oxkintok assemblages there, perhaps contemporaneously with Regional Flaky Redwares elsewhere. It is tempting to theorize that Oxkintok connections stretch to the southwest into Campeche and Tabasco, an area of little-known ceramics, although Ruz' reconnaissance (examined by his kind permission from his unpublished thesis, 1946) shows no Oxkintok-like pottery, but at the same time little evidence of ceramics from the proper time horizons. We know too little of the place of Oxkintok ceramics in relation to the others of Yucatán. The sites of Bakna and Acanmul along the Yucatán-Campeche western coastal strip (see Pollock, 1940, pp. 266-267) might yield archaeological results pertinent to these problems.

The architectural characteristics of the Regional Oxkintok horizon are somewhat uncertain. Buildings of heavily plastered block masonry with nonspecialized vault stones underlie Puuc-style masonry at the site (Shook, 1940, pp. 168-169). The Initial Series lintel, dating 9.2.0.0.0, was found *in situ* in a building of this style, although it may conceivably have been placed there secondarily since the inscription is a trifle too large for the exposed part of the lintel.⁸⁷ Trenches dug in the courtyard south of this building showed mixtures of slateware under the only courtyard floor found, indicating that this floor was placed later than the date of the Regional (slateware free) pottery samples. Thus it is quite possible that the Initial Series lintel building dates somewhat later than the early monochromes and the lintel but, according to the Uaxactún dated ceramic sequence, the pottery and lintel may well be contemporaneous and all three are definitely pre-Florescent. The famous stucco

façade at Acanceh is probably associated with Oxkintok Regional ceramics. The small collection excavated from an architectural fill of midden earth in front of the façade, and almost certainly postdating it, seems to belong to this assemblage. The technique of execution of the stucco façade—heavy plaster modeling—fits the technique of this period as found in the Petén.

The Regional Redwares, found at Yaxuna and Cobá in association with predominantly Tepeu I-style polychrome, and at Acanceh progressing into a Regional-Florescent assemblage, definitely belong to closely related cultural phases. Stylistic resemblances are numerous and close, although the wares of the two regions are distinct. This body of ceramics stands relatively distinct in its traits from either of the two traditions described above; indeed, it stands closer to the central Maya region than to anything else in Yucatán. The eastern manifestation of this horizon is with reasonable certainty associated with the major Classic-stage architecture and glyphs of the site (Thompson, Pollock, and Charlton, 1932), which has been described by Thompson as a remarkably advanced outpost of the central Maya culture. The high frequency of elaborately designed polychrome pottery from these deposits reinforces that judgment. Yaxuna has no standing architecture of this period, perhaps because of depredations caused by Florescent-stage occupation and by robbing of stone which is still going on, but the ceramics strengthen the case for communication documented by the 60-mile causeway between the two sites. The Acanceh Regional Redware sample is much smaller and lacks the high frequency of polychrome pottery of Yaxuna and Cobá. It may be that the spread of the Classic Maya culture⁸⁸ was confined to the high forest zone which bisects the Peninsula along a northeast to southwest boundary line, although the presence of the Chenes-Río Bec sites, which are definitely of a non-Classic pattern, within the fringes of the high forest zone show that the hypothesis in so simple a form does not fit.

The Cobá architecture adds substance to our knowledge of the eastern area for this horizon. A few observations could be made at Yaxuna. A stela was found (fig. A), and heavy stucco fragments with carving and paint were seen in trenches. Floor and platform surfaces were painted with what seemed to be a hematite undercoat with a specular hematite finishing coat. The Acanceh stucco façade probably dates earlier than this horizon (see above), thus leaving no architecture of the horizon documented in the western area.

The horizon for which the Dzibilchaltún collections serve as the most unmixed examples has here been called Regional-Florescent, because a monochrome slipped ware (Red on Thin Grayware) occurs in constant mixture with Medium Slateware, our best Florescent-stage diagnostic. There is no sure evidence at the site that a "transition" to slateware was taking place through time, although it is reasonably certain that slatewares succeeded Red on Thin Grayware generally in northern Yucatán. It is quite likely that during a considerable period of time in Yucatán, both Red on Thin Grayware and slateware were in use simultaneously; perhaps each made in different areas or sites, and each preferred for certain uses and in certain vessel shapes.

The deposits at Acanceh allow a crossdating of the Dzibilchaltún assemblage. There the Regional Redware assemblage (mentioned above) is gradually replaced by a mixed Medium Slateware-Red on Thin Grayware assemblage which stylistically dates later than the Dzibilchaltún assemblage. These assemblages show signs of increasing popularity of slateware toward the

tops of deposits, but no deposits were completely free of Red on Thin Gray. Robert Smith's identification of the polychrome sherds in these "transitional" deposits as mainly Tepeu 2 with occasional Tepeu 1 sherds adds a welcome, though rather loose, anchorage to the Maya calendar. (Tepeu 2 dates from 9.12.10.0.0 to 9.19.0.0.0 as outside dates; 9.12.10.0.0 is Tepeu 1, 9.19.0.0.0 is Tepeu 3). Perhaps somewhere between 9.12.0.0.0 and 9.16.0.0.0 is the most likely dating for the Dzibilchaltun deposits. These deposits, with their fine orangeware and fine grayware tradewares, should eventually be easy to crosstie over a considerable area. Fine grayware is also found at Holactun, where the 9.16.0.0 date gives a clue, but not in the Chenes, where stela dates suggest that the same horizon should be represented at Santa Rosa Xtampak. At Mani, where slatewares very similar to those from the Santa Rosa Xtampak stela platform (date 9.16.0.0.0) are found, there is no fine grayware nor Dzibilchaltun Fine Orangeware. Nor at these two latter sites is there found Holactun Slateware, although it is common at Uxmal. The dating and sequence given for this part of the chronology is thus still provisional because of uncertainty of definition between regional and chronological change in the ceramics.

Dzibilchaltun provides considerable information on the nonceramic characteristics of this horizon in Yucatán. The masonry is of block type, with undifferentiated vault stones. Numerous carved and painted plaster fragments in the pottery trenches attest elaborate surface treatment in stucco. A surprising number of stone monuments were located, 22 in all, of which six were carved but badly eroded and 16 were plain. According to E. W. Andrews, to whom I showed them, the carved monuments bear no Initial Series dates. Andrews also took notes on the standing buildings, and has made a brief statement (Andrews, 1942, p. 259). The architecture and glyphs merit further detailed description. The site plan (map 7) is notable for several quadrangular plazas with long ranges of buildings surrounding them (note group 3, group 7, and two quadrangles along the west side of group 5), and for the causeways which connect three separate building groups to the two central plaza clusters.

FLORESCENT STAGE

The Fluorescent-stage ceramics in this report are defined as those in which the pre-Mexican slatewares and closely related Fluorescent Redware constitute the whole of the locally made, slipped pottery. The assemblages can be divided into two major groups which with reasonable certainty represent separate time horizons, although further excavation is need to make positive that we have not underestimated regional variation—the other component in our analysis.

The criteria for recognition of early slatewares are discussed elsewhere. They have been recognized in collections satisfying one or more of the following criteria: (1) they show a number of types either absent or rare in collections from the Puuc sites; (2) the collections show other slipped wares believed earlier than Fluorescent ceramics; (3) they are dated by more or less likely association with early Initial Series Maya dates; (4) the vessel shapes of the slatewares show similarities to those of Regional monochrome pottery. To these four criteria we are at present endeavoring to add determinations made by analyzing the characteristics of ceramics which can be placed as early by means of statistical ordering techniques (see Robinson, 1951, and Brainerd, 1951). Al-

though there is evidence that the statistical ordering techniques will provide more finely graded as well as more objective placements for these early-late criteria in the Fluorescent stage, the work is not far enough advanced to be given in this report. There is much evidence that a collection which fits one of the four above criteria is likely to fit others, but also clear evidence that the four criteria do not constantly apply to the same collections. This situation suggests that (a) more than two time horizons showing sharp distinctions in the ceramic traits used as diagnostic are represented in our material, or (b) regional variation with two horizons, or possibly that (c) regional variation with only one horizon is the causative agent.

Hypothesis (c) seems unlikely because of the association of 9.16.0.0.0 dates with Early Fluorescent slateware at Santa Rosa Xtampak, and with considerably later dates read for the Puuc, by stratigraphic evidence in the Chenes (see Brainerd, 1949), and by Tepeu 2-style polychromes at Acanceh contrasted with a fair number of Tepeu 3 stylistic resemblances with Puuc ceramics. I believe hypothesis (a) unlikely since certain of the traits show regional distributions which I believe our samples are large enough to validate (high terraced slab legs are an example of such a trait). Therefore, my best hypothesis at present is (b), that we have two recognizable horizons with some regional variation.

The chronological placement of the beginnings of the replacement of Regional wares by slateware is earlier than 9.16.0.0.0 at Santa Rosa Xtampak, according to collections found under the flooring of the stela platform, and is well after 9.13.0.0.0 at Acanceh on the basis of the Tepeu 2-style polychromes found there in a Regional-Fluorescent assemblage. If the Fluorescent-stage ceramic assemblage be assumed to have arrived simultaneously in the Chenes and at Acanceh, this leaves a maximum of 60 years for the disappearance of Red on Thin Gray, too short a time period. The likelihood of a simultaneous appearance of Fluorescent-stage assemblages over the whole of Yucatán is further lessened by the absence of Red on Thin Grayware at Mani, at the Chenes sites, at Oxkintok, Holactun, and at the Puuc sites where early styles of slateware are recognizable. Also, the presence in Regional-Fluorescent deposits of slatewares which show marked resemblances to slatewares from Fluorescent stage deposits in nearby sites, for example at Acanceh and Mani, suggests that regional rather than chronological variations distinguish them.

If it be assumed that the Fluorescent pottery assemblage first arrived in the northern Yucatán plain through expansion from the Puuc area (a theory I believe highly probable but not unassailable on present evidence) and that Fluorescent ceramics became universal over Yucatán before the Mexican stage (again highly probable but not certain without more testing), the dates and geographic spread of these first slatewares become of peculiar interest, documenting, as they must, the spread of a whole craft process with specialized use of materials, techniques, and style repertory into new areas. The close correlations between Regional wares and block masonry and between slatewares and veneer masonry further suggest that the appearance of slateware documents a general cultural replacement rather than a simple change in craft technique.

The Fluorescent collections showing early slateware traits are, first, those from the two Chenes sites, Santa Rosa Xtampak and Dzibilnocac, excavated in 1949, which are not described in this report. The Mani collections show pottery strikingly similar in several

particulars to these Chenes sites, as do the Oxkintok Florescent collections, the Dzibilchaltun pottery, and some of the Uxmal collections. The Mérida State Museum collection from tombs at Dzebtun, near Cenotillo in northeast Yucatán, is early according to these criteria, as are various of the ceramics from pre-Mexican collections from Chichén Itzá and Yaxuna.

Any statement on the architecture of this horizon must of necessity be a poor makeshift until the results of Dr. H. E. D. Pollock's architectural survey, which has covered a major part of the northern Maya area, are available. The northern Maya area boasts what is unquestionably the most extensive as well as the most elaborate mass of pre-Columbian architecture in existence. The lion's share of it is Florescent in ceramic association and, because of its elaboration of structure and decoration, holds the same order of value for archaeological analysis as do the ceramics, and a stratigraphy in many cases more certain and easier to analyze.

Thus far in our study the architecture associated with Regional ceramic assemblages appears to be similar to that of the Petén area during the first part of the ninth cycle Maya calendar. Florescent pottery assemblages, on the other hand, have been found only in architectural contexts of the Río Bec, Chenes, Puuc, Maya-Chichén types, and in the thus far unnamed type differentiated by Pollock west of the Puuc and Chenes areas in southwest Yucatán and northwest Campeche.⁸⁹ Although each shows distinctive tendencies in such characteristics as masonry techniques, building form, decorative technique and style, and site planning, these types seem to show a general cohesiveness as documented by numerous traits common to two or more styles of the above five. The relationships of Petén architecture of the latter half of the ninth cycle to the above-mentioned northern styles which are contemporaneous to it are quite generalized. It would seem that Ledyard Smith's substructure, wall, and vault masonry types (Smith, 1950, pp. 70-71) from the beginning of his Late Classic period (9.8.0.0.0) correspond in general outline with the northern types, but that the northern sites progressed distinctively farther in the development of thin, finely fitted veneer surfaces and were unique in the development of beveled facing stones and tapered vault stones. Northern decorative techniques and styles, building form, and site arrangement are also distinctively different.⁹⁰ This difference is reinforced by Ruppert's finding, on the basis of architecture and glyphics, of what would seem to be at least a partial "cultural frontier" between Petén and Río Bec style sites (see Ruppert and Denison, 1943, pp. 5-10), and by the fact that although the Xpuhil (Río Bec) pottery collections contain much slateware, the Uaxactún and Calakmul (Petén) collections which are contemporaneous do not.

These findings lead me to the following hypothesis which is presented as a working tool, to be proved or refuted by future finds: sometime before the midpoint of the ninth Maya calendric cycle, within the central part of the Yucatán Peninsula, north of the Guatemala-Mexico boundary but south of the Puuc, a culture evolved which was characterized by slateware pottery, by a group of distinctive architectural traits, and by the absence of the custom of erecting Initial Series stelae. This culture gradually spread and evolved until it engulfed the northern Maya area and influenced the Petén as well as perhaps a larger area, becoming the dominant culture of the Maya area until overwhelmed by the incoming Toltecs in Yucatán. Such an hypothesis would explain the ceramic finds in Yucatán much better than can the hypothesis of which Dr. Mor-

ley was long a staunch defender, of the movement of cultures and peoples north from the Petén to develop a "renaissance" in Yucatán. The usefulness of this hypothesis will depend in large measure upon the analysis of the architecture within the northern Maya area; a "culture" cannot be reliably reconstructed from only one branch of human activity, such as ceramics. The culture I hypothesize might be called Yucatec Maya in contrast to Classic Maya in the particular sense used by Proskouriakoff (1950, p. 1). Toynbee's previous use of this coined word should not confuse the term as a descriptive label, and I know of no other use to which it has heretofore been put.

The evolved Florescent stage is best represented by collections from the sites of the Puuc area in Yucatán. The collections of the three sites of this area from which we have sizeable samples—Uxmal, Kabah, and Sayil, as well as the smaller collection from Labna—are almost exclusively Florescent, and preponderantly fully developed rather than Early Florescent. The Florescent slatewares of both Chichén Itzá and Yaxuna occur in some quantity but all in mixed collections, at Yaxuna mixed with ceramics of Regional stage and at Chichén with those of Mexican stage.

The general characteristics of the ceramics found in refuse of this period have been detailed elsewhere in this report. The impression given is one of excellent craftsmanship, but there is little sign of experiment. There is also a marked uniformity in the categories and forms of vessels produced, and a considerable economy in effort documented by an almost complete absence of small-scale decoration. The painted designs which do occur are cursive; sure but not meticulous. The graduation in wall thickness, particularly in basal break bowls but also in other forms, seems to be markedly functional, as though a fast-working, soft, wet clay had been used on a kabal and so formed that in every possible case one continuous operation, without drying periods, could be used without allowing the pot to sag. This means that areas where stress and strain would be caused from the weight of overlying clay must be made thick, while areas not subject to such forces can be made thinner without allowing slump while the clay is in the soft state necessary for kabal throwing.

These characteristics are those of an industrialized craft, performed by well-trained, full-time craftsmen apprenticed under standardized, well-established working methods. We have decorated pottery from Florescent-stage tombs, some of which shows individuality in shape and decoration, but there is some evidence that the best of this may range Early Florescent; other fine pieces were imported, and the small number of decorated fragments found in refuse are not notable for artistry. The artists and innovators of this culture must have worked in other media, architecture for example.⁹¹ On the other hand, the technical competence of these workmen was very high.

With little question the pottery industry was localized in various areas, each with its characteristic local materials and craft traditions, although the exact spotting of these manufacturing groups will need more excavation and technological work to determine. A thriving trade over this country seems indicated. Further study of the modern situation may aid the interpretation of the mechanisms of such trade.

There are indications of social stratigraphy in the markedly variable frequencies of the thinwares in the collections from various locations at Uxmal, and such social stratigraphy is certainly documented in Maya art of these times, as well as suggested by post-Conquest documents. Differential use of locations within

Maya centers is also indicated by the above finds, both on grounds of wealth and on grounds of religious observance. Frequency of incensario fragments in collections, for example, is variable. These findings are not new; they confirm characteristics long believed to have been true of the Maya of these periods.

Some new light has been shed by the general nature of the ceramics in these collections. Almost all of the excavations were made at temple precincts, or at least on the edges of plazas where people must have gathered for worship. The ceramics are utilitarian for the most part, and include a variable but considerable frequency of cooking-pot fragments. The Maya must have camped at or near their plazas and temples. The mild climate of Yucatán makes a simple life relatively comfortable, and it is not at all unlikely that these deposits were made by people who had journeyed to the sites for one or several days of religious festival, and who camped and ate near or on the ceremonial plazas. Although, as Pollock has recently pointed out (in Jones, 1951, p. 177), we cannot be positive that a townlike group of dwellings did not surround these sites, the ceramic finds are consistent with the theory of an open, widespread settlement pattern, with the Maya living near their milpas and making "pilgrimages" for worship during this period. My own examinations of sites of the Regional and Fluorescent stages revealed no evidence of architectural or ceramic remains near them in such quantity as would be expected if the majority of the worshippers had lived nearby.

A striking feature of the Fluorescent stage is the large number of major archaeological sites in the Puuc area during this time span. This area is very sparsely settled at present, probably due to the lack of natural water sources. The Puuc sites are notable for their strong development of water cisterns (*chultunes*), bottle-shaped excavations in bedrock which drain the paved plazas under which they have been dug. I have estimated that at Uxmal the runoff water from the main plazas alone could sustain a maximum continuous population of some 5,000 people through the six-month dry season. Certainly Maya water storage never approached perfect efficiency, but Maya cisterns with their accompanying collecting platforms are widespread through the country. They could doubtless have afforded drinking, cooking, and wash water for as many people as could have been supported by the non-irrigated farming which was presumably used then as now in the Maya area. The light population in this area at earlier and later periods can with reasonable certainty be laid to a cultural rather than a natural deficiency, the lack of either the knowledge or the desire to dig chultunes, and chultunes can reasonably be added to the traits of my provisionally named Yucatec culture.

MEXICAN STAGE

The Early Mexican substage in Yucatán is notable for the geographically restricted and yet rich nature of our evidence for it. With the exception of scattered sherds in mixed collections, all our Early Mexican ceramics come from Chichén Itzá. Here there are several seemingly pure deposits, many deposits showing varying degrees of Middle Mexican or Fluorescent mixture, but no pure Fluorescent deposits. This is in spite of the fact that the Monjas with its East Wing belongs architecturally there, that the substructure of the Caracol is Fluorescent on the basis of pottery caches found in it, and the fact that we have large collections of pottery from both.

The reason for the light sampling of the "Maya" or pre-Toltec deposits at Chichén Itzá seems to be attributable to two factors; first, the heavy Mexican occupation must have disturbed many earlier deposits; second, our samples come mainly from excavations done with the prime purpose of architectural reconstruction, which thus did not often pierce earlier deposits. The absence of pure Fluorescent ceramic assemblages from the area of Chichén Itzá with which the Early Mexican sample can be compared makes the determination of chronological diagnostics difficult. The Puuc collections, which are quite close in general characteristics to the Yaxuna and Maya Chichén slatewares, have been used to isolate the diagnostics for the Early Mexican substage.

The most important ceramic innovation of the Early Mexican substage was unquestionably X Fine Orange. This pottery, of fine texture and color and elaborately decorated, was imported from Veracruz in quantity and was enthusiastically copied by the local potters. The resulting Medium Slatewares and Redwares show a revealing blend of local and foreign features. Pre-slip incising continued in the old manner as did another technical procedure, the tenoning of hollow legs to bowl bodies, but new vessel shapes of several types were imitated often, producing intermediate forms, and the slipped and incised decorations were copied but rather crudely and imperfectly. There was an increase in the frequency of Medium Redware over the Fluorescent stage, doubtless because it more closely resembled the desirable X Fine Orange. There are a few unusual sherds from Chichén Itzá which are probably Mexican imports, a considerable quantity of imported plumbate and of local new forms which must be copies of imports. The architecture and sculpture of Chichén Itzá exhibit foreign influence to an even more striking degree.

In addition to the innovations in form and decoration of the Early Mexican stage, there is a technical change in the slateware pottery from the waxy, translucent slip of Fluorescent times to an opaque white slip. This change probably took place gradually during the substage rather than at its beginning, and it is quite possible that various of the other innovations described above did not arrive simultaneously since no certain chronological sequencing has been determined within the substage.

In general, it seems that the ceramic Early Mexican substage began contemporaneously with the erection of the "Mexican Style" architecture, although we have no sure ceramic evidence that the East Wing of the Monjas, for example, was as early as Fluorescent. The presence of Fluorescent pottery in caches in the lower platform of the Caracol dates at least this much of the structure earlier than our Early Mexican substage, and this suggests that Mexican mainland religious influence arrived earlier than ceramic changes. I believe from the ceramics that the Mercado and probably all of its adjacent colonnades are Early Mexican in date; they probably date late in the substage. All of the Monjas complex dates no later than Early Mexican, save for the East Building which was surely still in use and possibly constructed during the Middle Mexican substage.

It seems likely that the changes in social organization and settlement pattern caused by the Toltec conquest were as striking as those in the arts and crafts. There is little doubt that the Puuc religious centers went out of use due to this change. Thompson has pointed out that the Maya used words of Nahua origin for a defended town and for the administrative building of a town (Thompson, 1943, p. 23). The recent survey

of Mayapan has shown that it can definitely qualify as a town, a concentrated walled settlement 4.2 square kilometers in extent, with an estimated 3,500 structures (Jones, 1951, p. 180). I have stated above that, although proof is lacking, it is very unlikely that the Puuc religious centers were towns in the sense that Mayapan can be considered one. The likelihood thus stands at present that the Florescent Maya, living in a widespread fashion in the Puuc, were concentrated, after the Toltec incursion, into towns on the north Yucatán plain. The two well-known sites of this period, Mayapan and Chichén Itzá,⁹² as well as Dzibilchaltún where a Middle Mexican settlement existed, are placed beside cenotes, natural water sources. At Acanceh, where a sample from this period was obtained, no cenotes were found in use at present, but the water table is high and several of the wells now used may have been dug in pre-Conquest times. It is quite possible that the militaristic Toltecs concentrated the Maya in larger settlements for easier control, choosing cenote sites on the northern plain for the easy availability of a water supply sufficient for the large human groups they had assembled.

The Middle Mexican substage is a distinctive ceramic period firmly placed in time despite our relatively small ceramic samples. The diagnostic slipped ware, Coarse Slateware, is characterized by a coarse-textured, rough-surfaced paste, with a slip which has the same opaque white color as that of the Early Mexican substage. At Chichén Itzá the latest architectural remains by stratigraphic placement at four locations were at least occupied and possibly built during this period. These four locations are at the Southeast Colonnade, the Mercado, Temple of the Wall Panels, and the East Building of the Monjas group. There is also considerable pottery of this period in collections from fallen masonry at various buildings at Chichén Itzá, but none in pure collections.⁹³ At Dzibilchaltún, Coarse Slateware is distinctive of this period, but there are also a few Early Mexican Medium Slateware sherds in the collections. At Mayapan, Coarse Slateware increases toward the lower strata of trenches, but was found in minor frequencies, always mixed with Late Mexican Coarse Redware. The occurrence of a small amount of X Fine Orange at Mayapan shows that this ware continued to be imported to Yucatán during Middle Mexican times, and thus argues against the isolation of Yucatán from the Mexican Mainland.

Architecture of this period is unknown, an unfortunate situation because it is known that there was a deterioration in masonry between the Early and Late Mexican substages. There is a very uncertain hint that the deterioration of masonry techniques had begun before or during the Middle Mexican substage. The Casa Redonda Chichén Itzá collection was tabulated by Roberts. There was no Coarse Redware in the collection found within the structure, but it is uncertain whether Coarse Slateware was present; the collection has since been lost. The mud-mortared masonry found in the Casa Redonda may have been contemporaneous with superior Early Mexican masonry, and Tulum masonry with good lime mortar is contemporaneous with our Late Mexican substage which shows considerable use of mud mortar at Mayapan.

The estimation of the length of the Middle Mexican substage is based on two lines of evidence. The first is the fact that we do not have extensive evidence of an occupation of this period at any site yet sampled; the occupations of Chichén Itzá and Mayapan are predominantly earlier and later respectively. Another line of evidence is based on the amount of building at Chichén Itzá and Mayapan, reinforced by documentary

accounts of the lengths of their occupations. If the 11.16.0.0 correlation is correct, if the documentary date of 1441-1460 A.D. for the abandonment of Mayapan be allowed, if approximately one katun cycle is allowed for each site (Mayapan and Mexican Chichén) and the Early Mexican occupation is begun in accord with the documents at 10.8.0.0.0, only five katuns—less than 100 years—remain for this substage. If the Middle Mexican substage lasted longer than our estimate, it seems likely that the entire Mexican stage must be lengthened to accommodate it. This could be done by beginning the stage earlier, either by changing to the 12.9.0.0.0 correlation or by beginning the Early Mexican substage at some date such as 10.3.0.0.0. With present evidence no such course seems advisable; the Middle Mexican stage can be assumed at present to have lasted for approximately a century. Although the Early and Late Mexican substages have been fitted to documentary reconstructions and to architectural styles, this horizon is known only by its ceramics.

The Late Mexican substage is of particular interest because concentrated work on this horizon is under way by the Carnegie Institution of Washington. The diagnostic slipped ware of the substage is Coarse Redware, which bears a red slip, sometimes polished, on a paste very close to that of Coarse Slateware. The period is also distinguished by a clear-cut change in the surfacing and form of unslipped jars, and by the introduction of figurine incensarios during the period. The presence of imported Mayapan Fine Orangeware confirms the suggestion of western influence given by the figurine incensarios. The ceramic evidence thus would not seem to be for a period of "Mexican Absorption" or "Maya Resurgence" after the Toltec incursion, but for continued influence, part military, part by trade, stemming eventually from the Aztecs. The figurine incensarios, found in surprising quantity, suggest a western religious influence as well. These archaeological lines of evidence are well supported both by Maya and Spanish documentary evidence.⁹⁴ There is a likely, though slim, dating crosstie with the Valley of Mexico in the presence of terraced slab legs, an Aztec III determinant, at Mayapan. Of interest is the clean-cut, though sporadically documented, distribution of pottery related to the Mayapan-Chichén Itzá assemblage at Tulum on the east coast of the Peninsula and farther south at Santa Rita on Chetumal Bay, the presence of figurine incensarios over a much larger area, and the presence of orangewares very similar to if not identical with Mayapan Fine Orange at Cintla, Tabasco, and at Xicalango and Champotón, Campeche. These distributions conform neatly to the extensive coastal trade documented historically for the Spanish Conquest period and archaeologically for the Toltec period, and suggest that cultural isolation did not accompany the decadence of sculpture, architecture, and calendrics which have perhaps unduly influenced previous characterizations of this period. The ceramics of Late Mexican times are technically good. The degree of their ornamentation is approximately equal to that of most periods in Yucatán, save for the Early Mexican substage when design was copied from the ornate Vera-cruz ceramics then in vogue.

The excavations now under way in Mayapan will soon furnish details on Late Mexican substage architecture, since all the standing architecture of the main group seems to be of that date. Tulum adds further architectural detail; the few ceramics described from there, which are said to come mainly from wall mortar, show several Late Mexican characteristics (Angel Fernández, 1942). The Tulum and Santa Rita frescoes add more substance to the documentation of this hori-

zon on the eastern part of the Yucatán Peninsula.

POST-CONQUEST STAGE

The conservatism in the Yucatecan ceramic industry since the Spanish conquest is notable, despite the long period of European contact and replacement of pottery by metal vessels. The industry is organized on a family basis, and there is some evidence that the marketing and distribution methods likewise bear traces of pre-Conquest custom. Most craft techniques show every evidence of being of pre-Conquest origin. Materials and tools are largely of local materials. The use of imported ochre as slip has a prehistoric parallel in the occasional use of imported specular hematite.

Vessel form and design show only minor European influences. The displacement of the striated cooking jar by the smooth-surfaced cauldron is the most recent major vessel form change, but this change occurred in the Mayapan period, probably influenced from the Mexican mainland. Small, deep, cup-shaped

vessels on flaring pedestals first appear in the Mani Colonial deposits and are still made as a nonutilitarian form, but again this shape probably stems from the Mexican mainland. The influence of the Toltecs was, without question, far more pervading on Yucatán ceramics than has been European influence since the Conquest. This is not surprising in view of the nature of the two incursions. The Toltec way of life was much more similar to that of the Yucatecans than was the Spanish, and thus minor innovations could more easily be fitted to local customs. It also seems possible that the local ceramic techniques and materials, like those of Maya lowland corn farming, were peculiarly well adapted to local needs and limitations, and thus could not advantageously be displaced. Conservatism along many lines, such as language and population, are striking in Yucatán as compared to other areas in Mexico. Some of this conservatism is certainly due to the lack in Yucatán of natural resources coveted by peoples of higher technological advancement. Yucatán has been left in a backwater which provides the archaeologist with tantalizing glimpses of the past.

NOTES

¹John L. Stephens, an American explorer, published the first popular book on the Maya ruins in 1841. This book, entertainingly written and amazingly sound archaeologically for its times, went through numerous reprintings in the United States and abroad. Encouraged by its reception, Stephens chose Yucatán for a second voyage, publishing his "Incidents of Travel in Yucatán" in 1843.

²For this reconstruction, compare Spinden, 1923, pp. 145-151, with Morley, 1938; Morley, 1946, pp. 72-97 and table V, and Barrera Vásquez and Morley, 1949. Morley was the last active field worker to adhere to the above general outline.

³Vaillant's listings (1927 and 1935) of Yucatecan archaeological sites as representatives of various periods was based on the reported provenience of whole specimens, and has proved of little value since sites of several periods are found at or near almost every locality listed by him.

⁴I have not been able to check the early stratigraphic placement of Petén polychromes at Kabah, perhaps due to confusion in these collections since Roberts' determination, but have checked this sequence at other sites.

⁵For a more detailed account of these data, see Brainerd, 1941.

⁶See revisions in the dating of fine orangewares, and of the Holactún collection in this volume. I cannot recognize the bases for Roberts' chronological subdivisions within the Puuc and Mexican period ceramics in his notes or collections, and they can most logically be considered as casualties of the time between our studies.

⁷Another later version of this reconstruction is contained in Barrera Vásquez and Morley, 1949.

⁸I have elsewhere given an account of these discrepancies (Brainerd, 1948).

⁹Brainerd, 1942; also, see Andrews, 1942 and 1943, for descriptions of architecture dated by these excavations, Brainerd, 1948, for detail on the late periods, and Brainerd, 1951, for detail on early periods.

¹⁰The above reasoning, aimed at explaining the absence of pottery from house sites in our samples, may in some details be disputable. However, the fact remains that in spite of a systematic search of the environs of each site, no domestic dumps were found.

¹¹This statement would be unnecessary but for Taylor's inaccurate allegation (1948, pp. 46-68) that under the direction of A. V. Kidder the archaeological program of the Carnegie Institution in the Maya area has been one-sided. Taylor comments as follows: "Carnegie has sought and found the hierachal, the grandiose. It has neglected the common, the everyday. And even within its chosen segment of Maya culture, it has produced data for the most part in a narrowly descriptive range."

¹²Brew, 1946, p. 46, concepts 6 and 7, seems to be defining the use of classifications in a later stage of study than that discussed here, cf. Rouse, Modes (1939, pp. 26-27), or perhaps his house types do not allow advantageous use of the hierachic type of classification so well suited to both Southwest and Maya pottery. Krieger (1944, pp. 276-277) also discusses these problems of varied material. See further discussion of author's viewpoint in Brainerd, 1951 and 1951a.

¹³See Beals, Brainerd, and Smith, 1945, pp. 87-89 for an earlier statement of this plan of procedure.

¹⁴Descriptions defining Uaxactún Tepeu 1 pottery have not been published at this writing. Material illustrating Tepeu, but not subdivided, may be found in R. E. Smith, 1936 and 1936a, and in Ricketson and Ricketson, 1937, pp. 270-283.

¹⁵Although Shook (1940) believes that the lintel is in its original position, it should be recorded that the carved inscription on this lintel is slightly longer than the width of the doorway it spans, suggesting that it may have been refitted to the building into which it is set.

¹⁶This section was written before the intensive excavations of the Carnegie Institution at Mayapan, and has not been revised. It is thus subject to correction by later, fuller information.

¹⁷The shape of this specimen also equally resembles that of a Spanish olive oil jar.

¹⁸Unfortunately for the argument presented here, the bowl illustrated by Merwin and Vaillant as plate 28, h, and dated Holmul IV, is also similar in shape and design to those of the Thompson collection. This bowl seems atypical for its period. Can it have been reused in a tomb?

¹⁹By Tzakol-style polychrome I mean Tzakol polychrome of the central Maya area, and pottery from other areas, such as Yucatán, which is very similar to it in form, color, and design.

²⁰Prospectuses and progress reports of this survey were published as follows: Pollock, 1931; Roberts, 1931; Kidder, 1932; Roberts, 1933; Morley, Ruppert, and Bolles, 1934; Roberts, 1935; Pollock, 1935; Pollock, 1936.

²¹Of these, the largest assemblage from a single site is the Late Formative ware from Kabah. See fig. 60 with caption.

²²I hope that it will be possible to include close comparative figures on pottery types between Puuc and Chenes sites in a later report.

²³A summary of the evidence from ceramics found in the caves of the Puuc area by Mercer and Hatt is given in an article by Brainerd (1953). These caves, some of which are water-bearing, are not characteristically found near the large ruins. As might be expected, the cave time ranges exceed those of the sites, but ce-

ramic collections are small and mainly of Florescent stage. The cave of Chac, midway between Labna and Sayil, presents a somewhat different picture. This cave, although difficult of access (see Stephens, 1843, v. 2, pp. 31-35), is still a water source of considerable importance during the dry season. A ceramic collection made here by Edwin M. Shook in 1935 shows a high proportion of Regional Polychrome, suggesting Peten Tzakol wares in color and finish (see fig. 63, h). This collection documents an early Regional occupation, suggesting that slatewares did not become dominant in the Puuc area until a time considerably later than the end of the Formative stage.

²⁴See Kidder and Shepard, 1936, pp. 411-422, for a study of the reactions operative in the use of organic paints.

²⁵Beals, Brainerd, and Smith, 1945, contrast plate 23, c and d.

²⁶See Proskouriakoff, 1950, p. 4, figs. 1, 2, for the distribution of Maya-dated monuments of this horizon.

²⁷The potter's status in the Puuc must have been similar to that implied for Highland Guatemala in this passage from the Popul Vuh: "Not for you shall be the ball game. You shall spend your time making earthen pots and tubs and stones to grind corn" (Recinos, Goetz, and Morley, 1950, p. 161).

²⁸The following climatic and agricultural data is general and poorly documented. I have been able to gather little concise information for this area.

²⁹Roberts (diary, January 9, 1935) describes a man living at Sayil who was carrying water from Chac Cave (1 1/2 leagues plus 425 meters of tortuous underground passages each way) as the sole supply for his family. The man was carrying 2 gallons per day, probably in one trip. Stephens (1843, pp. 31-35) describes the carrying of water in gourds held in slings, so made as to allow the men to crawl through the passages of this cave.

³⁰Landa (see Tozzer, 1941, p. 289, under storage) seems to describe the use of chultunes for maize storage as well as for cisterns, but see Ricketson, 1937, p. 172, for the disintegrating effects of chultun storage on horn, wood, and steel. Although the characteristic chultunes at Uaxactun seem not to have been used as cisterns (*ibid.*, p. 123), their use for water storage in the Puuc seems indisputable from evidence of their placement and structure.

³¹Average diameter of the Labna chultunes is 14 feet, average floor area 150 square feet.

³²For evidence of groups of Maya families, including married sons, habitually living in a single group at the time of the Spanish conquest, see Roys, Scholes, and Adams, 1940, p. 14.

³³See Ricketson and Ricketson, 1937, pp. 8-31, for description and discussion of this situation.

³⁴Our early collections from Oxkintok, here published, contain little painted pottery, and their few Peten affiliations are all to the Tzakol phase. I am thus at a loss to explain Ruz' statement. I have seen many specimens from the region of the city of Campeche which resemble Jaina sherds and so can second Ruz' statement of similarity.

³⁵Roberts' statement (in Pollock, 1937, p. 152) seems puzzlingly at variance with his summary of wares given on p. 151.

³⁶These dates correspond quite closely to Thompson's reconstruction, scheme B (Thompson, 1941).

³⁷The most recent publication in this series (Ruppert, 1952), which has appeared since the writing of this section, gives much information of direct applicability to the ceramic studies and should be consulted in reference to this part of the report.

³⁸Two fragments of plumbate pottery come from the top levels of trenches at Uxmal, and another from the surface at Oxkintok. A few grater bowl rims also occur at Uxmal, and a single sherd of X Fine Orange.

³⁹This conclusion is the author's, supported by the fact that Vaillant's description of the one Coarse Slateware fragment which we can identify from his data (fig. 92, b) shows that he recognized the distinction between it and Medium Slateware. See Vaillant, 1927, p. 90, figs. 302, 371.

⁴⁰See Tozzer, 1941, index and syllabus; Tozzer, 1907, pp. 148-150; Thompson, Pollock, and Charlton, 1932, pp. 3-5.

⁴¹Color terms, when capitalized, are from Ridgway, 1912. These can be converted for use with the more generally available Munsell charts by consulting the conversion list published by Hamly (1949).

⁴²A concurvate surface is here defined as a surface of a vessel on which a vertical plane taken radially through the vessel, as well as a horizontal plane, both cut curves which are concave on their inner surface; on a discursive surface, in contrast, the vertical radial section shows a convex profile on its interior surface.

⁴³For San José I, see Thompson, 1939, pp. 72-74; and for Uaxactun, Ricketson and Ricketson, 1937, pp. 231, 243, which shows, interestingly, a drop-off in frequency of this form in the two Formative phases, from period IA to IB.

⁴⁴See, for example, Scholes and Roys, 1948, pp. 34-35, for a discussion of the Conquest period. See discussion on captions for figs. 28 and 29 for evidences of ceramic influence through Mayapan Fine Orange and Figurine Incensarios, and Tozzer, 1941, p. 32, for historical evidence.

⁴⁵Ruz (1945, pp. 68-70) describes what must be this ware from Xicalango, Tixchel, and Champoton in Campeche. See fig. 103 for a related type collected by Berendt at Cintla, Tabasco.

⁴⁶For historical information on the relations between Yucatán and the Campeche-Tabasco coast at and just prior to the Conquest, see Scholes and Roys, 1948.

⁴⁷See Brew, 1946, pp. 67-73, for evidence against this hypothesis.

⁴⁸See Brainerd, 1951 and 1951a, for more extended discussions of various problems and viewpoints mentioned above.

⁴⁹For my views on method and validity of seriational techniques, see Brainerd, 1951 and 1951a.

⁵⁰See Beals, Brainerd, and Smith, 1945, p. 115, for a design analysis of this type using variation in multiple factors. Direction of time changes was determined by other means.

⁵¹This scheme was brought forth by Thompson (1941) as the one fitting most closely the Mexican chronologies, which lean toward the placement of the plumbate horizon, linked to the Tula-Mazapan horizon in Mexico and to Toltec Chichén Itzá in Yucatán, as ending at least 150 years before the Spanish conquest. This scheme has been given strong support by the author's excavations at Mayapan in 1942, which sampled large deposits all postdating the constructional periods at Chichén Itzá, and thus established beyond doubt the sequent positions of time spans A-B and B-C.

⁵²See Tozzer, 1940, pp. 30-31, for discussion of this evidence.

⁵³The placement of the Uaxactun phases, as yet unpublished, is given through the kindness of R. E. Smith. Placements are therefore tentative, and the author is responsible for any errors which may have crept into the chart due to his lack of critical judgment as to the Uaxactun dating evidence.

⁵⁴Cf. Wauchope, 1948, fig. 57, k-s, with our fig. 95, b, l-6, 28, 37, and a comparative specimen from Uaxac Canal, fig. 89, t.

⁵⁵Maya names given are k'at or k'ut, with varieties given by E. H. Thompson as zahk'at (white clay) and zhank'at (yellow clay).

⁵⁶This suggests that the clay seen by Thompson may have been bentonitic. Bentonitic clays are well suited to the retention of organic pigments; hence such a clay would be valuable for slip. See Shepard in Kidder and Shepard, 1936, pp. 417-418, for descriptions of this quality.

⁵⁷See Rendon, 1947, pp. 119-120, for a fuller description of tools and their Maya names.

⁵⁸Mercer describes a kiln of brick with dry-laid brick arches separating a fire chamber from the pottery area above it. Rendon describes stone with lime-mortar construction, with a k'ankob lining.

⁵⁹There is a possible variation in certain clays, shown by the presence of small, dark-colored lumps, which is discussed below under tempering materials. No doubt there are also local variations in iron oxide content, since iron is often noted to be concentrated in veins through the clay, and these are sometimes removed by hand. Miss Shepard believes some clays bore calcite other than that added in temper, and there is adequate evidence of variety in the clays used for slipping.

⁶⁰Although Shepard (see Thompson, 1939, pp. 264-265, and Shepard, 1951, pp. 243-244) suggests that an organic coating may have been applied to slateware slips, to my mind her experiments have not ruled out the possibility that the organic substances she found originated after the pottery had become buried in the humus of the archaeological deposit. It is nevertheless quite possible that an organic coating was used.

⁶¹See Shepard in Thompson, 1939, p. 26, and 1940, p. 11, for mention of such an underslip, which was

found to be markedly calcareous in some instances, and thus may have been subject to solution by soil acids. This underslip served to heighten the brilliance of color of the final slip.

⁶²Cf. Beals, Brainerd, and Smith, 1945, plate 23, c, with plate 23, d, for example.

⁶³This view is at variance with that of several writers, who have assumed that in all cases a "resist" of wax or some similar pore-filling, water-resisting substance was first painted on to form a design, followed by a water-mixed paint which did not adhere to the resist-decorated areas.

⁶⁴See Shepard in Kidder, Jennings, and Shook, 1946, pp. 270-271, for a description and discussion of this paint.

⁶⁵In 1942, a man near Mérida was successfully making untempered pottery from local clay. The man had been educated abroad. Geographic determinism is not absolutely certain!

⁶⁶The ash temper determined in 26 sherds from Holactun classed as Late Formative is questionable since it may be due to sorting errors. It is very possible that volcanic ash temper was used in the Formative Orangeware found at Yaxuna. No temper determinations have been made on this ware.

⁶⁷Sherd temper 61 per cent, volcanic ash 14 per cent, calcite 24 per cent, clay lump 1 per cent; 186 sherds in sample which may have included a few Florentine-stage sherds through sorting errors, since all Late Formative sherds were found in mixed deposits. This is similar to the situation in the Chicanel phase at Uaxactun where 66 per cent of the temper is sherd, 33 per cent calcite. No volcanic ash is listed for Chicanel, but 10 per cent for the preceding Mamom phase (Smith, 1940). San José shows only 10-20 per cent sherd; the remainder is mostly crystalline calcite, and volcanic ash is rare (Thompson, 1939, p. 75).

⁶⁸Shepard, 1951, p. 243, notes that the ash in this pottery is not of Yucatán type.

⁶⁹The classification of slips of Oxkintok monochromes into the "opaque" class is not completely clear-cut. Some are smooth-surfaced, probably burnished, and some seem to have been unburnished and applied over a lumpy surface which makes their attribution between opaque and waxy difficult. Analytic work may provide a more discerning classification of these slips.

⁷⁰The main lack in the data is the uncertainty as to whether collections belonging to the same substage, from different areas and showing differing traits of temper, slip, and paint, really represent regional differences or whether a time difference is also involved.

⁷¹A suggestion of rapid development may be drawn from the fact that during the short time since Miraflores has been recognized, four subphases have already been defined (Shook, 1951, pp. 97-99).

⁷²See Shepard, 1951, p. 243, who points out that the Yucatán sherds are calcite tempered, but the Petén sherds are ash tempered.

⁷³The fact that the grading of vessel form and of decoration are consistent between the two wares sug-

gests a linear causative factor (see Brainerd, 1951, pp. 306-307) which is probably time, rather than a regional intergrading which would probably not be so consistent between two unrelated traits.

⁷⁴ Wauchope, 1950, would seem to place this general horizon there. Also see Brainerd, 1951. Robert Smith begins the Tzakol phase at Uaxactun at 8.12.0.0.0; thus Incised Dichrome, which I suspect precedes Tzakol 1 on stylistic grounds, would distinctly precede the earliest Initial Series date of 8.14.0.0.0.

⁷⁵ Wauchope's recent (1950) survey of pre-Classic Mesoamerican ceramics, published after this section was written, seems to support my choice of stage boundaries.

⁷⁶ I know of no New World archaeological evidence other than in Mesoamerica for the manufacture and wide trade of luxury ceramics. If the absence of this culture characteristic from other areas is real and not due to incomplete study, it documents an important organizational advance in the Mesoamerican area. However, it is quite possible that such specialization existed in Peru and perhaps even in the southeastern United States. In many areas where wares are simple in style, a technical study of pottery compositions is necessary to establish a common origin for widespread pottery types, and such studies have seldom been made.

⁷⁷ Which took it at least as far as the coastal area of British Honduras; see Gann, 1900, pl. 32.

⁷⁸ Drucker may have been misled by postoccupation-al mixing of deposits. Drucker's San Marcos type, found mixed with Lirios type in Upper Tres Zapotes deposits, shows definite stylistic similarity with the Yucatán Puuc figurines (see figs. 54-56 and captions). Since the Yucatan Florescent stage and Upper Tres Zapotes are dated as approximately contemporaneous, Drucker's placement of his San Marcos type is confirmed by the Yucatán evidence.

⁷⁹ Shook's report of sherds with similar decoration from Las Charcas and Sacatepequez phases in Guatemala (see Brainerd, 1951, pp. 77-78) does not include information on vessel shape.

⁸⁰ See Tozzer, 1941, pp. 89-90, and Villa, 1945, pp. 54-55, for accounts of the preparation of maize among the Maya.

⁸¹ Villa, 1945, p. 60. But pigs and chickens are raised by these people, and fed largely on corn.

⁸² This term is an adaptation of Vaillant's composite silhouette, altered because the term seems clearer. The contrasting term used here is simple profile. Composite profile is used here as a catchall for bowls which have in common a single angular change of direction in the wall profile of the bowl. In the detailed descriptions of forms, more specific terms such as shouldered bowls, basal break, basal angle, etc., have been used.

⁸³ Such geographic separation is also suggested by Ruppert's and Denison's survey in southeast Campeche (1943), where the Río Bec style sites (which bear slate-ware pottery) are separated geographically from those in Petén architectural style.

⁸⁴ See Brainerd, 1949 and 1951, for preliminary reports.

⁸⁵ See Wauchope, 1950, for a survey of Mesoamerican Formative pottery.

⁸⁶ A further suggestion of early dating is given by Vaillant's Valley of Mexico sequence, in which bowls of somewhat similar shape and incised dichrome decoration occur in Early Ticoman, being replaced by polychrome in Intermediate Ticoman, which is contemporaneous with or slightly precedes Teotihuacan 1. Since Tzakol 2-3 and Teotihuacan 3 (Xololpan) are contemporaneous, early Ticoman must be placed early enough to allow three well-differentiated ceramic phases before late Tzakol. A radiocarbon date from Cuicuilco, which dates somewhere in the Ticoman sequence, reads 471 B.C. ± 250, and other radiocarbon dates support this approximate placement.

⁸⁷ Shook does not suggest this possibility.

⁸⁸ Used in Proskouriakoff's sense (1950, p. 1).

⁸⁹ See Thompson, 1945, for summary descriptions and a bibliography on the first four types, Pollock, 1940, for a geographic determination of the fifth.

⁹⁰ I refrain from listing the features of difference. Thompson's descriptions of northern styles must serve as a basis for the present. See Brainerd, 1954, for a general statement.

⁹¹ A possibly fruitful analogy may be drawn with the Old World "early urban" cultures where Childe posits a difference in social status between the potters of the Mesopotamian cities and those under Minoan kingly patronage from marked differences in the characteristics of their wares: "In Crete the specialist potter was not one of the craftsmen already differentiated before the local urban revolution and degraded socially thereby. So, while in the Orient the aesthetic quality of pottery almost everywhere declined after the [urban] revolution, in Crete the new specialists in the palace workshops turned vessels, delicate and beautiful and worthy to adorn the tables of princes" (Childe, 1942, pp. 155-166). The Florescent Yucatecan potters may be compared here with the Mesopotamian early urban potters who made mainly undecorated, utilitarian wares as compared to the exquisitely formed, delicately decorated wares of their village-living predecessors and of their contemporaries in peripheral areas.

⁹² The lack of evidence at Chichén Itzá for an urban concentration of the type known at Mayapan seems likely to be significant (see Wauchope, 1938, pp. 163-170, and Ruppert, 1952), thus suggesting that concentrated settlements were not used until Middle Mexican times.

⁹³ A news item reported after this manuscript was completed further confirms this early cessation of architectural activity at Chichén Itzá (Thompson, 1954). A series of excavations made in 1954 by Edwin Shook and R. E. Smith at the supposedly latest buildings at Chichén Itzá produced almost no Coarse Redware.

⁹⁴ For a discussion of some of the evidence for western contacts with Yucatán at and before the Spanish conquest, see Scholes and Roys, 1948, pp. 317-322.

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