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MARIANAS PREHISTORY

Archaeological Survey and Excavations On Saipan, Tinian and Rota

ALEXANDER SPOEHR

FIELDIANA: ANTHROPOLOGY
VOLUME 48
Published by
CHICAGO NATURAL HISTORY MUSEUM
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FIELDIANA: ANTHROPOLOGY

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VOLUME 48

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Preface

This is the final report on anthropological field research conducted for Chicago Natural History Museum in the Mariana Islands of Micronesia during 1949–50. An earlier monograph published by the Museum covered the ethnological results of the field work, and was primarily a historical analysis of culture change in the Marianas from the time of first contact with Europeans in the sixteenth century up to contemporary times (Spoehr, 1954). The present report deals with the archaeology of the Marianas in an attempt at extending the historical record backward in time from the point of early European contact. The two reports therefore complement each other.

Financial support and sponsorship of the Marianas research was provided by Chicago Natural History Museum. I am deeply indebted to the Museum for the generous support it has always accorded me. In connection with the Marianas research, I particularly wish to record my appreciation to Mr. Stanley Field, President of the Museum, Dr. Clifford C. Gregg, Director, and Dr. Paul S. Martin, Chief Curator of the Department of Anthropology. Miss Agnes McNary, formerly Departmental Secretary, has assisted with many details, and Mr. Phillip Lewis has given assistance in the final drafting of ground plans. For identification of bone, shell, and stone specimens, I am indebted to Mrs. Dorothy B. Foss, formerly Assistant in Anatomy and Osteology, Dr. Fritz Haas, Curator, Lower Invertebrates, and Dr. Sharat K. Roy, Chief Curator of the Department of Geology. Miss Lillian Ross, Associate Editor of Scientific Publications, has extended her generous aid in seeing this report through the press.

The Museum's work in the Marianas received also the sponsorship of the Pacific Science Board, National Academy of Sciences–National Research Council. The Board rendered invaluable assistance in facilitating transportation and field work, and I am particularly grateful to Mr. Harold J. Coolidge, Executive Director of the Board, for his personal interest in the success of the work. Miss Ernestine Akers, of the Honolulu office of the Board, was very helpful in expediting numerous logistic details in co-operation with the Navy.

Without the generous co-operation of the Department of the Navy, the Museum's field project in the Marianas would not have been possible.

Special thanks are accorded to Admiral A. W. Radford, Rear Admiral L. S. Fiske, Rear Admiral E. C. Ewen, Captain W. C. Holt, Captain S. P. Sanford, Commander J. R. Grey, Commander W. R. Lowndes, Commander E. C. Powell, Lieutenant-Commander J. B. Johnson, Lieutenant C. J. Carey, Lieutenant J. S. Broadbent, Lieutenant M. S. Bowman, Lieutenant R. F. Roche, Lieutenant B. I. Rosser, Lieutenant J. W. Millar, Lieutenant D. D. Moore, Lieutenant (jg) E. H. Gummerson, Lieutenant (jg) S. Weinstein, Lieutenant (jg) W. E. Laskowski, Lieutenant (jg) R. K. Hoffman, Chief C. T. Smallwood, Chief J. T. McCrosson, and Staff Sergeant J. E. Hinkle, U.S.M.C. Among civilian specialists attached to the Saipan District, I am particularly indebted to Messrs. Frank L. Brown, Cyrus F. Quick, Kan Akatani, and Ernest G. Holt. Grateful acknowledgment is made for the assistance and hospitality freely offered by all these personnel and by their families. I particularly wish to express my thanks to Mrs. W. C. Holt for her aid in the archaeological work.

The work on Saipan was greatly aided by the friendly interest of many Chamorro friends to whom I wish to express my appreciation: Messrs. Ignacio V. Benavente, Vicente de L. Guerrero, Ricardo T. Borja, Elias P. Sablan, William S. Reyes, Juan M. Ada, Antonio Cabrera, Joaquin Cabrera, and Ramon Borja. On Tinian, I am particularly indebted to the survey team of the United States Geological Survey then operating on Tinian, and consisting of Messrs. Harold W. Burke, David B. Doan, and Harold G. May. The Geological Survey assisted tremendously in the location of sites, in the loan of surveying equipment, and in extending the always generous hospitality of their quarters. For friendly co-operation on Tinian I am also indebted to the Reverend Marchand Pellet, OFM, Cap., and to Messrs. Henry Fleming and Henry Hoffschneider.

Digging under a tropical sun is hard and tedious work. Yet I have never worked with a more effective and conscientious digging crew than during the Museum's work on Saipan and Tinian. My special thanks are accorded to Benedicto Taisacan, Vicente Selepeo, Joaquin Palacios, José Palacios, Henrico Lisama, Serafin Atalig, Pablo Piteg, and Ignacio Sablan.

To Dr. Paul Fejos and the Wenner-Gren Foundation for Anthropological Research, Inc., grateful acknowledgment is made for the loan of photographic equipment.

The results of the field work have been greatly facilitated through valuable assistance rendered by Dr. Preston E. Cloud, Jr., of the United States Geological Survey, on the geological history of the Chalan Piao area on Saipan; and by Dr. T. Dale Stewart, of the United States National Museum, on the paleopathology of prehistoric skeletal material.

Since assuming my duties at the Bernice P. Bishop Museum, I have been fortunate in being able to examine the manuscript field notes of Hans G.

Hornbostel on the Marianas. For assistance rendered at Bishop Museum, I am indebted to Miss Margaret Titcomb, Librarian, who made available the Hornbostel notes; and to Miss Mary Stacey, Secretary to the Director, who typed the manuscript of this report.

Lastly, my greatest debt is to my wife, Anne Harding Spoehr. She handled virtually all the logistics on Saipan, directed the work of cleaning the thousands of potsherds and artifacts found in the field work, and gave invaluable encouragement in the completion of this report, despite the many interruptions that have occurred since the termination of the field work. I am indeed grateful to her.

ALEXANDER SPOEHR

December 1, 1955

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I. Introduction

The reconstruction of Oceanic prehistory has been based primarily on the evidence of linguistics, ethnography, and physical anthropology, drawn from the study of modern island peoples. In these fields of anthropology, much work of major significance for Oceanic culture history has been accomplished and much remains to be done. Yet if we are ever to understand the migrations of man into Oceania and the course of events that lie in the Oceanic past, recourse must be had to archaeology. Archaeology can provide kinds of data that other disciplines cannot furnish. It is very largely on the data of archaeology that future knowledge of Oceanic culture history must be built.

Since World War II, there has been a freshening of interest in the archaeology of the Pacific islands. Duff in New Zealand, Emory in Hawaii, Gifford in Fiji, New Caledonia, and Yap, and Osborne in the Palaus have produced, through their excavations and reports, valuable new perspectives where none existed before. This post-war work is characterized by the application of stratigraphic techniques to archaeological deposits. Oceanic archaeology is finally getting down to the business of intensive digging in an effort to determine sequences of culture change. The emphasis on digging, rather than only on description of surface remains, is a healthy trend and is a forerunner of solid results in the study of Oceanic prehistory.

A second reason for the productivity of recent work and for an optimistic prognosis for the fruitfulness of future field research is the development of radiocarbon dating (Libby, 1951). Oceanic archaeology is handicapped by a paucity of time indicators among the artifacts with which it deals. The materials for constructing even a relative chronology of change are not elaborate. Granted the problems surrounding radiocarbon dating, it is a revolutionary development for which Oceanic archaeologists can give fervent thanks each time they thrust a shovel into a Pacific island midden.

Of the three major regions of island Oceania—Polynesia, Micronesia, and Melanesia—only Polynesia can boast of a series of professional reports covering archaeological exploration that provides a basis for intensive excavation and field research. The pre-World War II literature on the archaeology of Melanesia and Micronesia is, with a few exceptions, fragmentary and sketchy. The prehistory of Melanesia and Micronesia is a truly uncultivated field of inquiry.

In contrast with Polynesia, however, both Melanesia and Micronesia possess a most important aid to the archaeologist. This aid is the presence of pottery, a fundamental indicator of culture change. The distribution of pottery in Melanesia and Micronesia is an important element in planning the strategy of field research in both areas. It would seem that one of the best approaches to archaeological work in Melanesia and in Micronesia is made by beginning at the margins of the pottery area and proceeding westward, with the aim of cross-dating pottery sequences from individual island groups. This is the strategy that Gifford has followed south of the equator. Commencing with his important excavations on Fiji (Gifford, 1951), he and Shutler then pushed westward to New Caledonia, where they have recently completed a second series of field investigations. This same consideration of commencing at the margins of the pottery area, with the hope of extending future work to the more complex areas to the west, was the controlling factor in the selection of the Marianas for my own archaeological field work in Micronesia.

The known limit of pottery distribution in Micronesia is shown in figure 1. Only the western part of Micronesia falls within the pottery area. Most of Micronesia is excluded and together with Polynesia forms a great island expanse where the prehistorian must use indicators other than pottery to reconstruct sequences of culture change. The map shows that the Micronesian pottery area is comprised by a southwest to northeast line of high islands, with the Marianas at the outer end. In geographic terms, the Marianas are truly marginal and very much at the end of the line. The Palau Islands, on the other hand, lie directly in the path of presumed migrations from Malaysia and probably formed a funnel through which man passed into the Carolines, as well as into the Marianas. The Palaus obviously hold the key to much of Micronesian prehistory.

Another important consideration in the selection of the Marianas for field work was that it is the only major island group in Micronesia whose archaeology has received much attention. During the 1920's, H. G. Hornbostel, an observant collector, explored archaeological sites on Guam, Rota, Tinian, and Saipan, made careful notes, collected specimens, and conducted limited excavations. Although his work yielded no published stratigraphy and was primarily confined to surface observations, his materials have proved very useful. Hornbostel's collections and a major part of his notes have been written up by Thompson (1932), who, in addition, has provided an outline of Marianas ethno-history (1945). These reports, taken in conjunction with the notes of other investigators, such as Safford (1905) and Fritz (1904), provide a valuable starting point for more intensive archaeological investigations.

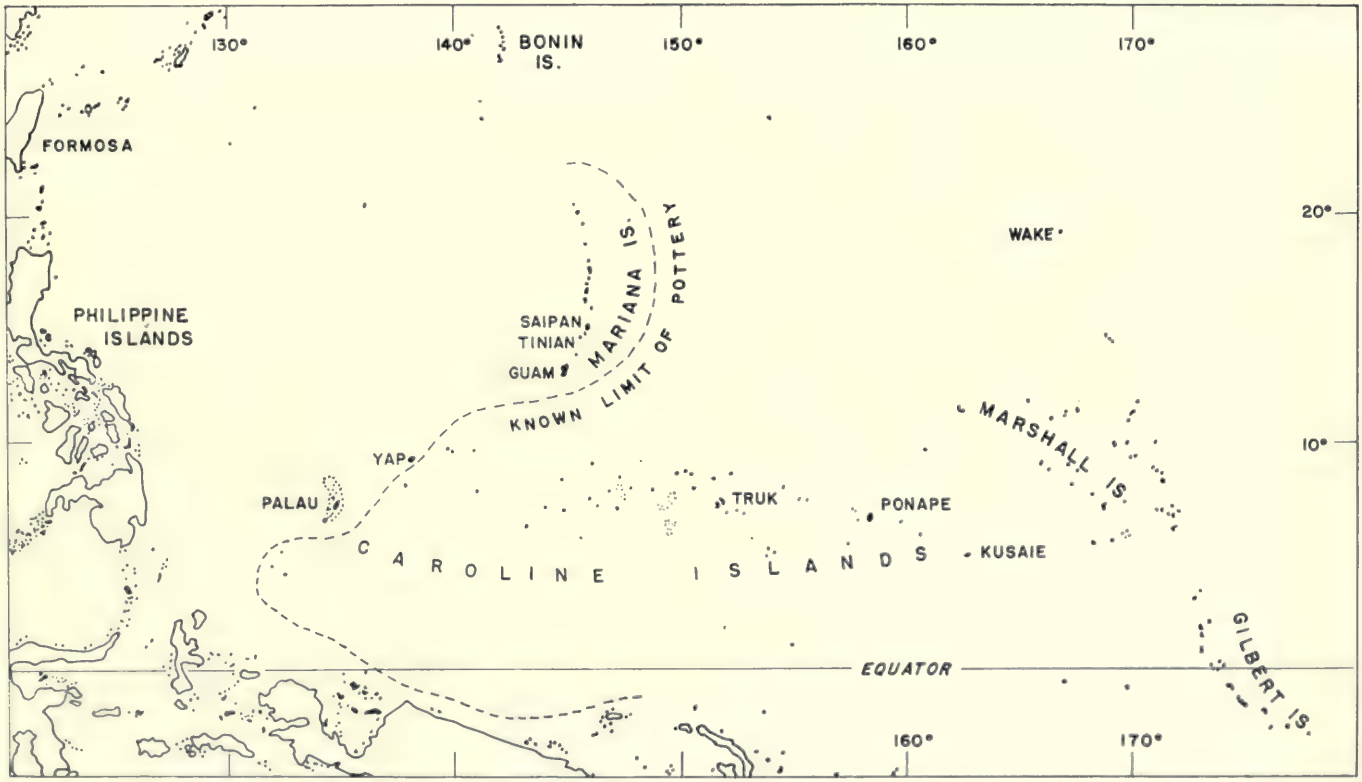


FIG. 1. Micronesia, showing known limits of pottery distribution.

PROBLEMS OF MARIANAS PREHISTORY

Unlike work done in areas of long-standing archaeological interest, such as the American Southwest, it was impossible at the onset of the Chicago Museum's Marianas work to define specific problems of space and time relationships as a guide to field operations. There were only the very broad problems of which all Oceanic students are aware, such as the question of prehistoric relationships of the Marianas with the Palaus and the Philippines. Without a satisfactory basis of knowledge derived from previous archaeological work, however, such problems are too general to be useful as controls for field work. The picture in the Marianas was that facing any archaeologist entering an area where the only knowledge available is description of surface finds, plus a sketchy outline of the indigenous culture at the time of contact.

Faced with this situation, I had two principal objectives in mind. The first was to obtain, through the application of stratigraphic techniques, as long a prehistoric culture sequence in the Marianas as was possible. Linked with this objective was that of obtaining suitable materials for radiocarbon dating, in order to tie to absolute dates any relative chronology that could be determined.

The second objective was the more complete delineation of what I have chosen to call the *Latte* Phase of Marianas culture. The most distinctive archaeological sites in the Marianas consist of double rows of stone columns, usually in sets of eight or ten, locally called *latte*. Early documentary sources and the observations of Fritz, Safford, Hornbostel and others made it certain that these columns were houseposts. The sets of stone columns had, in places, been found in end-to-end rows, indicating a village pattern, and around them were invariably discovered potsherds, artifacts, and the debris of daily living. When the earliest explorers discovered these *latte* type structures they were still in use. The antiquity of the earliest *latte* was merely a matter of conjecture. A principal objective of the Marianas expedition was to determine the time span of the *Latte* Phase, including both architectural features and associated artifacts, and through excavation and analysis of remains to clarify its diagnostic characteristics.

These were modest objectives. Yet in a new region of investigation, first things must come first. In Micronesia the immediate need is a framework of established spatial and temporal cultural relationships in prehistoric times within and among major island groups. Until such a framework has been established we shall advance but little in our understanding of the prehistoric flow of events in Micronesia. It is my hope that the present report will contribute toward satisfying this fundamental need.

Fig. 2. The Taga *latte* on Tinian, as seen by Lord Anson in 1742.

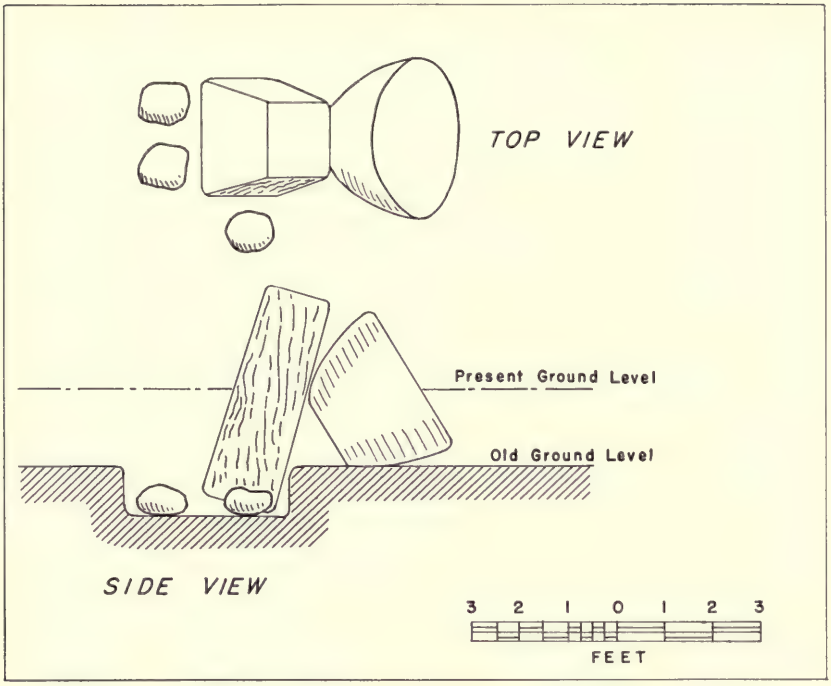


FIG. 3. Stone shaft and fallen capstone from a *latte* at Bapot, Saipan.

THE MARIANA ISLANDS

The Marianas consist of fifteen islands, lying in a long, flat arc from Farallon de Pajaros (Uracas) in the north to Guam in the south, a distance along the arc of nearly 500 miles (fig. 4). This chain can be divided into a northern and a southern group. The islands of the northern group are small, volcanic peaks rising abruptly from the sea. Those of the southern group, consisting of Guam, Rota, Aguijan, Tinian, and Saipan, are larger and are composed primarily of superimposed, coral limestone terraces resting on volcanic bases. The southern group of islands contains much greater areas of level or gently sloping land and is much more suitable for human occupation. The southern islands have probably always been the seat of most of the population of the Marianas.

The combined land area of the Marianas is approximately 400 square miles, but of this total, Guam accounts for more than 215 square miles. The land areas and peak elevations of the individual islands are given in the table on page 24.

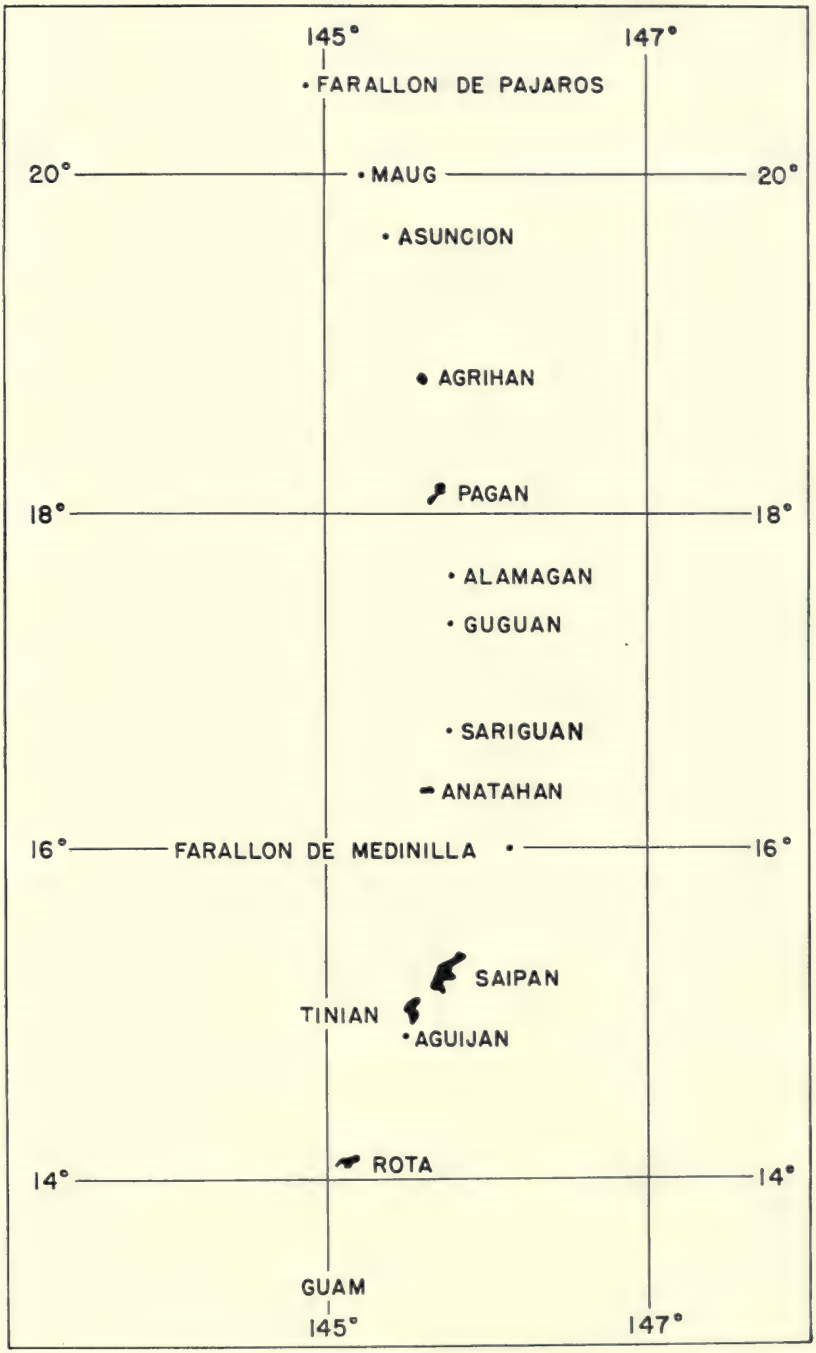


Fig. 4. Map of the Mariana Islands.

THE MARIANA ISLANDS[1]

Name	*Area* (sq. miles)	*Peak Elevation* (feet above sea level)
Farallon de Pajaros (Uracas)	0.79	1,047
Maug	0.81	748
Asuncion	2.82	2,923
Agrihan	18.29	3,166
Pagan	18.65	1,883
Alamagan	4.35	2,441
Guguan	1.61	988
Sariguan	1.93	1,801
Anatahan	12.48	2,585
Farallon de Medinilla	0.35	266
Saipan	46.58	1,554
Tinian	39.29	564
Aguijan	2.77	584
Rota	32.90	1,612
Guam	215.50	1,334
Total	399.12	

[1] Data taken from Bryan (1946).

The Marianas lie both in the trade wind latitudes and on the eastern fringe of the Asiatic monsoon area. The climatic conditions are thus largely the product of the interplay of trade winds and monsoons. The trade winds prevail through the first part of the year. In late spring or early summer the winds shift to the south and southwest, but by the end of the summer months the trade winds gradually begin to assume control once more. Temperatures range from 75° to 85° F. Rainfall is abundant, with an annual average on Saipan of approximately 82 inches. There are distinct wet and dry seasons, the latter extending from about June to December, although the onset of each season is not sharply marked. Also, periodic rains can be expected during the dry season. Typhoons may occur at any time but tend to fall in the period between August and November.

The vegetation of the islands, particularly the southern group, has been so altered by human occupation that its original character is preserved only in a few restricted areas, such as along cliffs and on steep slopes. This is especially true of Saipan and Tinian, where most of the arable land was brought under cultivation by the Japanese, to produce sugar cane. During World War II, both Saipan and Tinian were invaded by American forces and thereafter transformed into huge wartime bases. The military construction attendant upon this transformation further altered the landscape. By 1950 these installations had largely been abandoned, giving both Saipan and Tinian a pronounced feeling of desolation, relieved only by local areas that still retained their natural beauty.

CHAMORRO CULTURE AT THE TIME OF EARLY EUROPEAN CONTACT

At the time of first discovery and exploration by Europeans, the Marianas were inhabited by a people speaking a single language and possessing a homogeneous culture. The inhabitants of the islands came to be known as Chamorros, the name that is still applied to them. Their history, following their discovery and conquest by Spain, has been the subject of a considerable literature. Thompson (1947), Joseph and Murray (1951), and Spoehr (1954) give outlines of post-contact Chamorro history.

The first European to sight the Marianas was Magellan, in 1521. Thereafter there were sporadic visits by European, principally Spanish, ships, until 1668, at which time Spain formally entered upon an attempt to missionize and conquer the islands. By the close of the seventeenth century, the Spanish conquest had been completed and all Chamorros removed to Guam, except for a handful remaining on Rota.

The Chamorros of these early days were fishermen and farmers. They were expert outrigger-canoe builders and skilled as sailors. In fishing, they used nets, spears, and hooks and lines; they also gathered shellfish from the reefs. As farmers, they raised yams, taro, bananas, breadfruit, sugar cane, and coconut palms. In addition, they appear to have grown rice. Domesticated animals, however, seem to have been conspicuously absent; the early accounts contain no certain evidence of the dog or pig, and whether the Chamorros possessed domesticated fowl is open to question.

Chamorro tools were of stone, shell, bone, and wood, for metal was unknown. After the first contact with European ships, iron was eagerly sought after. Pottery was extensively manufactured.

The Chamorros lived in small hamlets and villages, usually located along the coast, although fertile interior areas were also occupied. The houses were constructed of wood and thatch and some of them were erected on stone houseposts. The bachelors' house, in which were kept the skulls of ancestors, was an established feature of the village plan.

The social organization is but sketchily known. A rigid stratification of nobility and commoners prevailed. Some sort of maternal descent grouping existed, though its exact nature is unknown. The relatively large size of many *latte* house sites suggests the former presence of extended families. In political organization, each island was divided into districts, but these were not consolidated into large, well-knit political units. Warfare between districts seems to have been the rule. In war, slings and spears were the offensive weapons used; defensive measures included camouflaged pits lined with sharpened bamboo stakes, a distinctively Malaysian feature.

Warfare was conducted primarily by stealth and ambush and was not subject to a high degree of organization.

Further notes on Chamorro ethno-history are given in Thompson (1945) and Spoehr (1954).

SELECTION OF ISLANDS FOR ARCHAEOLOGICAL FIELD WORK

The objectives of the Museum's 1949–50 expedition to the Marianas included an ethnological study of Saipan as well as archaeological work. For this reason, headquarters were maintained on Saipan. From an archaeological point of view, Guam had been better explored than either Saipan or Tinian, so that an understanding of Marianas prehistory demanded fuller coverage of the latter two islands. I decided, therefore, to concentrate attention on Saipan and Tinian. From the map (fig. 4), these two islands can be seen to fall together as a spatial unit, in contrast with the southerly pair of islands, Guam and Rota. There is consequently good reason to consider Saipan and Tinian together. After the completion of the work on Saipan and Tinian, I conducted a brief reconnaissance of Rota to determine in a preliminary way the extent and nature of the remains there.

PROCEDURES

An archaeological survey was commenced on Saipan on November 18, 1949, and continued for approximately one month. On the basis of the survey, six sites were selected for excavation. Excavations were commenced in January, 1950, and were concluded in the early part of March. During the following month, the pottery and artifacts were processed and then attention was directed to Tinian.

On Tinian, the necessary survey was greatly facilitated by the fact that the United States Geological Survey had a three-man team working on the island; these men had in the course of their own work discovered virtually all the major sites. Their co-operation and aid were invaluable and greatly expedited the work. Following the Tinian survey, two sites were selected for excavation. The Tinian work was completed in May, and the pottery and artifacts were shipped to Saipan for processing.

In June, through the co-operation of the United States Navy, transportation was arranged to Rota and a brief archaeological survey was made of that island.

Neither the expedition's budget nor the amount of time available allowed large scale excavations. On Saipan, a four-man digging crew was employed and on Tinian a two- to three-man crew. Every man proved to be excellent and set a pace of work that was remarkable in any climatic zone,

let alone the tropics. In no case, however, was a single site completely excavated. Instead, an attempt was made to obtain the principal structural characteristics of each site and to seize any opportunity that gave promise of stratigraphy.

A word should be said regarding excavation methods. Each site was first cleared of bush. It was then staked on a grid with a five-foot grid interval, except for Laulau Rock Shelter on Saipan, where a system described later was employed. Each site was excavated in 0.5 foot levels. Maps were constructed with plane table and alidade.

Pottery, artifacts, and burials were cleaned at the expedition quarters by a washing crew. Except for analysis and counting of Marianas Plain sherds, some 7,000 of which were counted and discarded, all material was packed and shipped to the Museum for final study.

II. Survey and Excavations on Saipan

PHYSICAL CHARACTERISTICS OF SAIPAN

Saipan is approximately 12.5 miles long and 5.5 miles across at its widest point; the land area is a little over 46 square miles. The island consists primarily of a series of raised coral limestone terraces on a volcanic base. Saipan can be divided into two major surface areas: a mountainous interior upland, which occupies nearly a quarter of the total land area; and a series of plateaus and coastal terraces, and a low coastal strip on the western side, which surround the rugged interior. The more level coastal areas provide the best farmland. It is in these areas that most of the archaeological sites lie. Particularly important is the western shore area with its adjacent lagoon, for the fish of the lagoon have in historic times—probably in prehistoric as well—been a principal food of the islanders. In historic times the main centers of population have been on the lagoon side of the island.

Destruction of Archaeological Sites

Several factors have contributed to a destruction of archaeological sites on Saipan. During the last decade of the Japanese regime, the agricultural resources of the island were developed to the utmost for the growing of sugar cane. Probably most of the arable land was cleared and planted. Although the Japanese did not introduce large amounts of power machinery in their farming operations, and though plowing was generally shallow, considerable disturbance of sites did result. In addition, the village of Garapan, located on the western shore, expanded to a sizeable town of some 13,000 people. A large sugar mill and an accompanying village were erected at nearby Chalan Kanoa, and the western shore area was generally utilized in the expanding economy of the island, so that such sites as from hearsay evidence existed were largely destroyed.

The pre-World War II disturbance of archaeological sites was of much less significance, however, than the destruction occasioned by the invasion of Saipan during World War II and the construction of base facilities following the American occupation. According to local informants, as well as the fragmentary literature, most of the principal archaeological sites were located on the western and southern coastal areas. The western area in particular was the scene of bitter fighting during the invasion. Even more im-

portant, however, was base construction. Great areas were bulldozed and then covered with crushed limestone to provide foundations for warehouses, troop quarters and airstrips. The entire coastal terrace from Agingan to Cape Obian was transformed into a giant ammunition dump, with virtually all the top soil bulldozed into revetments. As a result of the enormous amount of wartime construction, probably most of the archaeological sites on the island have been destroyed. The Museum's archaeological work was, therefore, considerably a salvage operation. However, enough sites were found to make excavations productive.

SURVEY

Archaeological survey was commenced at Agingan Point. From this location, the beach, cove, and coastal terrace areas were surveyed in company with local Chamorro residents. The survey proceeded in counterclockwise fashion around the island. All beach and cove areas were covered. Even with the destruction of sites, it soon became apparent that the major archaeological sites were located adjacent to beaches and coves in spots where ancient populations had had access both to the resources of the sea and to fertile farmland. Most of these locations were used as military areas during World War II and have been bulldozed, but numerous potsherds scattered on the surface, and *latte* stones removed to the sides of roads and former military areas remain as testimony of the previous existence of sites. No major *latte* site exists completely intact. The site at Agingan described by Hornbostel (Thompson, 1932, p. 19) has been destroyed.

Except along the shore line, in cultivated areas, and in those covered by groves of casuarina, survey proved to be very difficult. Dense secondary growth of bush, heavy grass, and abandoned sugar cane made inspection of the ground surface a formidable task.

Some twenty-five limestone caves were also investigated. Only one small one was found undisturbed. The others had been excavated by Japanese defense forces and converted into machine gun positions and military strong points for the defense of the island during the American invasion. Saipan, however, abounds in limestone caves and it is probable that a number still exist undisturbed.

Principal sites located during the survey are as follows (see fig. 5):

1. Objan: The coastal area between Agingan Point and the base of Naftan Point contains numerous sherd areas and bulldozed remains of *latte* house sites. Only one was found intact, fortunately spared destruction by its location between two large outcrops. This *latte* is at Objan and is part of a large site that has been bulldozed. The Objan *latte* was excavated and further details are given in the description of the excavations.

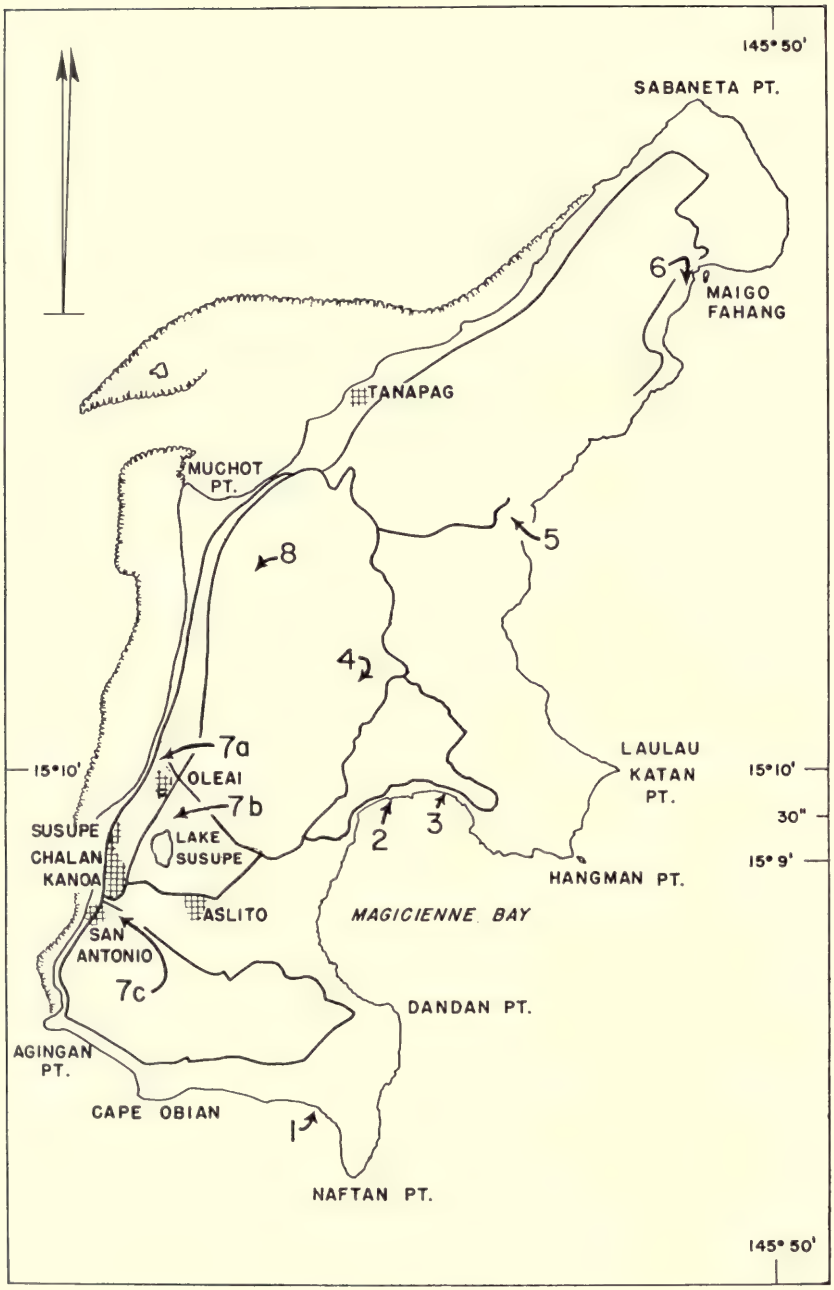


FIG. 5. Principal archaeological sites of Saipan. Numbers on map refer to following sites: 1, Objan; 2, Laulau; 3, Bapot; 4, As Teo; 5, Talofofo; 6, Fañunchulujan; 7a, Oleai; 7b, Chalan Kija; 7c, Chalan Piao; 8, Chalan Galeite.

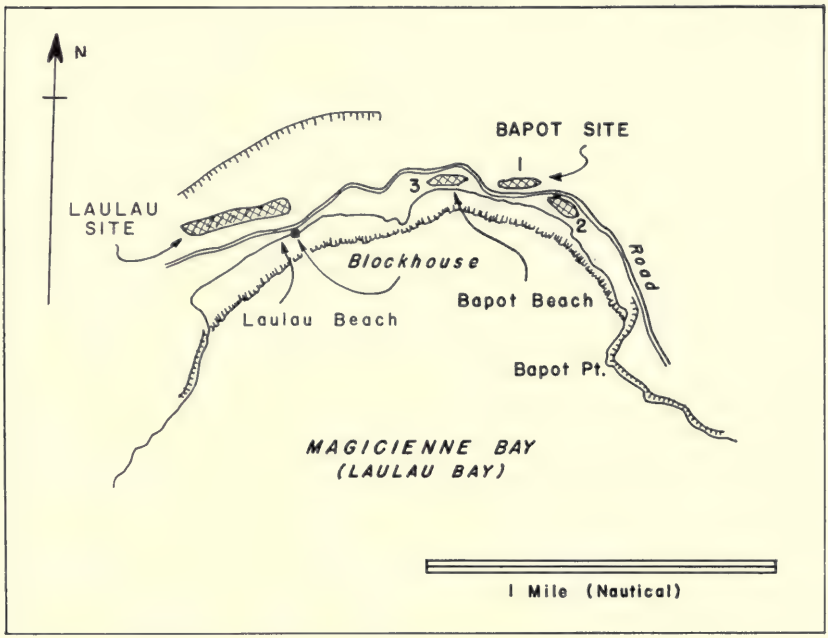


FIG. 6. Magicienne Bay, Saipan, showing location of Laulau and Bapot Sites.

2. Laulau (see fig. 6): There is an extensive village area back of the beach on Magicienne Bay. This site was undisturbed by military operations and was partially excavated. Further details are included in the section on excavations.

3. Bapot (see fig. 6): North and east along the shores of Magicienne Bay there is a coastal terrace about 100 yards wide. The soil is good and there is easy access to reef and offshore fishing. This area is the site of three clusters of *latte* houses: Bapot I consists of two, Bapot II of four, and Bapot III of five. All have been disturbed by defensive trenching by the Japanese military forces, while a road also cuts across the former occupation area. Sherds are distributed throughout the area. It is probable that the area once contained numerous house sites.

4. As Teo: An inland site, located at the base of a cliff, where two springs emerge and develop as very small streams. The site consists of a large sherd area about four acres in extent, but with no surface indications of refuse dumps or house sites. As Teo is typical of sherd area sites found near water supplies along inland parts of the eastern section of the island.

5. Talofofo: At Talofofo a small stream enters a coastal cove through a steep-sided canyon. On the north rim of the canyon there is a sherd area,

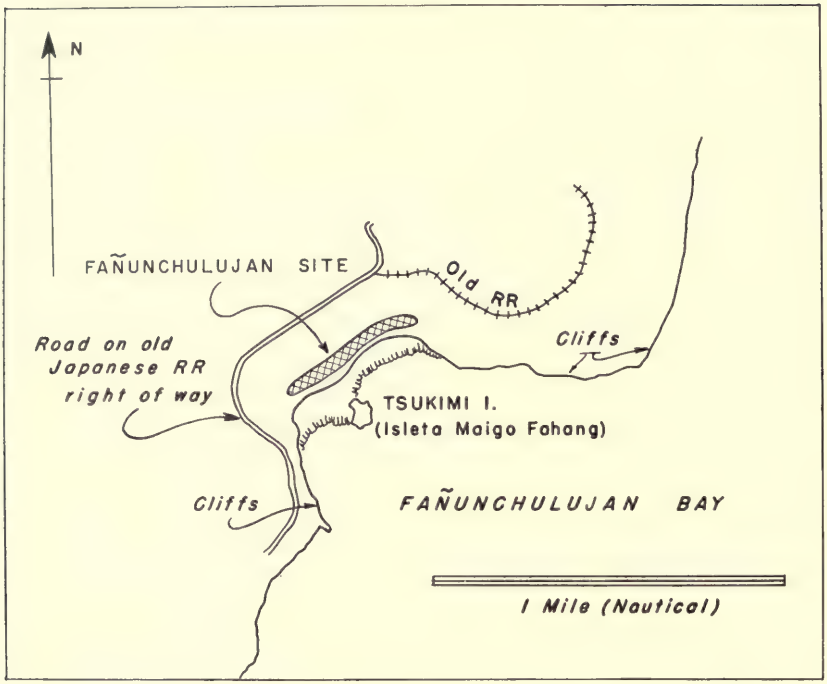


FIG. 7. Fañunchulujan Bay, Saipan, showing location of Fañunchulujan Site.

but most of the site has been destroyed by the construction on it of wartime troop quarters.

6. Fañunchulujan (see fig. 7): The site is located along the top edge of the cliff-like sides of Fañunchulujan Bay. The site consists of a string-like sherd area approximately 150 yards long, together with a single *latte* house. Fragments of broken *latte* stones are also found at the edge of the site, which had been plowed for sugar cane during Japanese times. Evidently a small village had been built along the edge of the cliffs.

7. Western coastal area along the lagoon shore: According to Chamorro testimony, this region once abounded in sites. However, its development as a major occupation area during Japanese times and as a wartime construction area has resulted in the destruction of most of these sites. Today, sherd areas are to be found intermittently along the entire western coastal strip in locations of lesser disturbance. Tanapag village itself was an old site, judging from the sherds to be found on the small plaza. Oleai, Chalan Kija, and Chalan Piao are other sites in this area, each of which was excavated and of which details may be found in the section on excavations.

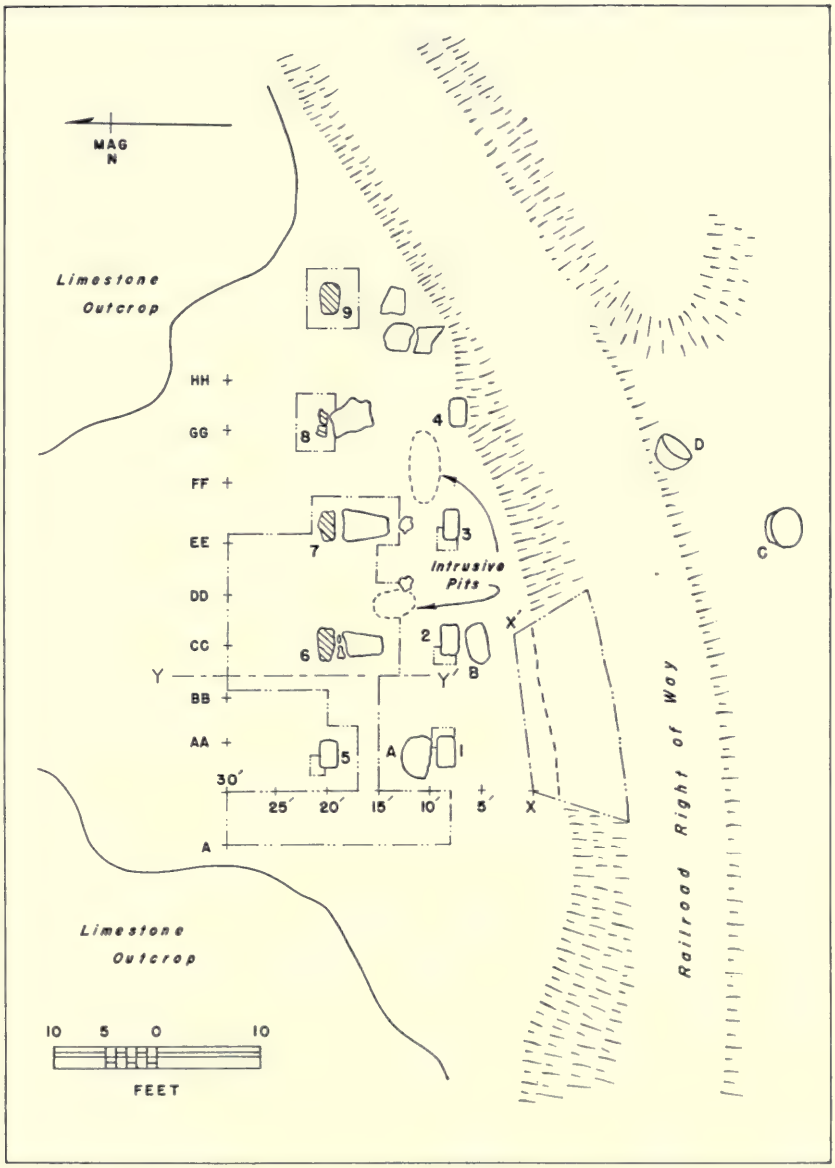


FIG. 8. Plan of *latte* and excavations at Objan, Saipan. Broken lines indicate limits of excavations; shafts are numbered; capstones are lettered.

8. Chalan Galeite: Although upland sites in the form of small sherd areas exist on the island, the number of people residing in interior settlements must have been small. Chalan Galeite is the only upland, interior *latte* site found. It consists of two small *latte* houses and a small sherd area.

As a result of the survey, only six, partially intact, *latte* sites were found: Objan, Laulau, Bapot, Fañunchulujan, Chalan Kija, and Chalan Galeite. Three of these were selected for excavation: Objan, Laulau, and Chalan Kija. Sherd areas are much more numerous than *latte* sites, but in no case in sherd areas was there surface evidence of undisturbed dump heaps and remains of houses made of perishable posts and materials.

EXCAVATIONS AT OBJAN

Location and Description of the Site

Objan, also known locally as Obian, is a large village site located about midway between Cape Obian and Naftan Point. The site lies directly behind a long beach (Unai Objan or Unai Obian). At this point there are no steep cliffs fronting the beach, and the low terrace on which the site is located slopes toward the beach. The beach in turn leads onto a fringing reef. Inland from the site, the soil is shallow but good. The location of the site provided, for its former inhabitants, easy access both to soil resources and to reef and offshore fishing.

The habitation area extends continuously for approximately 1,200 feet along the shore. The original width of this area is difficult to determine, for as a result of wartime bulldozing, the top levels of the site have been scraped off and dumped seaward. The site was probably not more than 300 feet wide. Today the surface is covered with sherds, shells, and, in places, fragments of *latte* stones.

At about the midpoint of the site, directly on the beach, the Japanese military built a concrete pill box. In addition, the Japanese constructed a narrow gauge railroad across the beach side of the site. The railroad right of way (ties and rails have been removed) cuts across part of the site at both east and west ends.

Objan has therefore been much disturbed. However, one section of the site was found intact. This consisted of a single *latte* house, located 225 feet east of the Japanese pill box, and situated on a low sandy terrace between two large limestone outcrops (figs. 8, 9). The railroad right of way cuts directly in front of the house and has destroyed its southeast corner. The beach extends to the right of way; it is approximately 150 feet from the site to the mean high water line.

At the time of excavation, the site was covered with heavy grass and a few small trees. North of the *latte*, the two limestone outcrops join and at

this point there is an abandoned Japanese machine-gun post, though the *latte* do not appear to have suffered wartime damage. The house site commands a fine view of the sea and of Tinian Island, some four miles distant. The limestone outcrops serve as partial protection from heavy winds, without completely cutting off the cooling trade breeze.

Objan is of particular interest because it is identified in seventeenth century Spanish accounts. In January, 1670, Medina, a Spanish Jesuit missionary, crossed over the passage between Tinian and Saipan, landed at Objan, and proceeded inland. While attempting to baptize a child at one of the interior villages, he was attacked and killed (Le Gobien, 1700).

In 1684, a Spanish expedition, led by José de Quiroga, landed on Saipan's west coast and after considerable fighting marched south to the village of Agingan, on the south shore. This village undoubtedly is the large site described by Hornbostel (Thompson, 1932, p. 19), though it has since been destroyed. The Spanish party then sent friendly Chamorros to Objan. It is noted in the Spanish account that the people of Objan had previously been cordial to the Spanish.

Shortly after, there was a general revolt of Chamorros in the Marianas and Quiroga found himself besieged on Saipan. He counterattacked with his small party, sacked Objan, and procured eight canoes from the village to take him to Guam (Le Gobien, 1700). In 1698, the Spanish sent another expedition to Saipan, were finally victorious, and forced the Chamorros to move from Saipan to Guam. It is highly probable that Objan was abandoned at this time.

Excavation Procedure

Although the construction of the railroad right of way along the south side of the house had destroyed a considerable area of cultural deposit, the right of way served as a convenient starting point for obtaining a profile of the soil structure underlying the house. The first step in excavating the site was the cutting of a profile along the bank formed by the right of way. This profile is indicated by the broken line XX′ shown on figure 8. The small area of deposit removed by the cutting of the profile was not excavated in levels, as most of the cultural material had been secondarily deposited down the slope of the bank.

Following the cutting of the profile XX′, an east-west trench, 5 feet wide and 22 feet long, was excavated at the west edge of the house, and a second trench, of the same width and 16 feet long, was excavated along the north side of the house. Both trenches were carried down either to bedrock or into undisturbed sand. Excavations were then carried forward into the house proper (figs. 8, 10). An important consideration was that an agreement was made with the Navy Civil Administration not to destroy the site

as a result of the excavations, for the Administration desired that the *latte* be preserved, in view of the fact that so few *latte* sites on Saipan remain intact.

Structure of the Site

General Description

The principal feature of the site was a series of nine stone shafts and associated capstones. So far as could be determined, there were originally ten shafts, the one at the southeast corner having been destroyed by the construction of the railroad right of way. Only five shafts were found erect and in place; the remaining four had weathered away at ground level, so that the bases remained in place but the exposed part of each shaft had fallen. All the capstones had long been displaced and most of them were broken.

As measured along the shafts, the house was 46 feet long and 12 feet wide, with the shafts placed from 7 to 9 feet apart. Sherds were found scattered on the surface around the *latte*.

The subsurface structure of the site proved to be relatively simple. The top stratum was composed of gray sand, varying within the *latte* area from 0.5 to 1.0 foot in thickness. This stratum was probably, to a large extent, wind-blown. On windy days, sand from the beach blew into our faces. In addition, sand has undoubtedly been washed down from the area above the site. Below the top stratum lay a thin layer, approximately 0.2 to 0.5 foot thick, of coral pebbles. This layer was present within the area enclosed by the stone shafts and extended toward the seaward side of the house. The coral pebble stratum was visible on the XX′ profile (see fig. 12). I would interpret this coral pebble layer as representing the ground surface at the time the house was occupied. Today in the Marshalls, as well as in many other parts of Micronesia, it is customary to spread coral pebbles under and around houses. The coral pebble surface prevents mud from forming in rainy weather and reduces dust during dry spells. In the case of Marshallese houses raised on posts above the ground, the area under the floor becomes a work area, particularly for the women. This area always has a coral pebble floor. The *latte* house at Objan apparently possessed this common Micronesian feature.

Below the layer of coral pebbles was a thick stratum of very dark gray sandy soil, filled with much organic material, including many minute bits of charcoal and containing numerous potsherds, artifacts, limestone and coral rocks, and burials. Between the northern line of shafts and the XX′ profile, this stratum was found to vary from 1.5 to 5.5 feet in thickness.

The very dark soil stratum was underlaid either with limestone bedrock, or with a stratum of gray sand, containing some sherds. This stratum in turn merged into underlying white beach sand, sterile of artifacts.

FIG. 9. Upper: Objan *latte* cleared of surface vegetation, prior to excavation. Lower: shaft 5; looking north; top of shaft has weathered away.

FIG. 10. View from above of excavations at Objan; looking southwest.

No evidence was found of any house structure under the *latte*. Yet the depth of deposit underneath the coral pebble layer indicates a considerable occupation period prior to that of the *latte* house. In addition, the base of shaft 9 was found resting on a deposit of ashes and sherds 1.1 feet thick, another bit of evidence indicating prior occupation.

During the course of excavation, eleven burials were exposed. These were found either within the shaft area, or directly to the west and south of the house. The burials lay between 1.1 and 4.0 feet below the present ground surface. Although only two burials showed evidence of the pit in which the bones had been deposited, it is probable that all burials are referable to the *latte* house occupation.

Details on the shafts and capstones, the soil structure of the site, and burials follow.

FIG. 11. Shaft 7, Objan, Saipan; looking west. Shaft has fallen and has broken off at base; base remains in place.

LATTE

Shafts

Weathering.—All *latte* shafts exhibited pronounced weathering—those that had fallen more so than those that remained erect. Shafts 1–5 were in place and erect, though no. 4 was leaning precariously. Shafts 6–9 had fallen. The bases of these shafts remained in place, but the shafts had eroded away at the ground surface and the upper sections had fallen to the ground (figs. 9, 11).

Material.—Coral limestone.

Form and Dimensions.—All shafts were clearly trapezoidal in shape. Shafts 2 and 3 exhibited the least amount of weathering and most clearly illustrated the original form of the shafts at the site. Shaft 2 was 3.0 feet wide and 1.7 feet thick at the present ground surface, and 2.1 feet wide and 1.6 feet thick at the top of the shaft. Shaft 3 was 2.9 feet wide and 1.7 feet thick at the ground surface, and 2.2 feet wide and 1.5 feet thick at the top. The overall length of shaft 2 was 6.7 feet, while that of shaft 3 was 7.0 feet. So far as could be determined, the shafts at the site originally averaged between 6.0 and 7.0 feet in length. The ground surface at the time of occupation of the house was approximately 1.0 foot below the present surface at the shaft locations. At this time, shaft 2 projected 4.7 feet above ground level and shaft 3 projected 5.2 feet. The tops of the shafts were approximately level with each other.

Constructional Features.—The depth of the shafts below the present ground surface varied from 2.0 to 3.0 feet. The coral floor that probably represented the original ground surface lay approximately one foot below the

present surface, so the shaft must have been set in holes from one to two feet deep. Shaft 6 was set in the shallowest hole, the base resting on limestone bedrock. The variation in depth of the shafts was compensated for by their variable length and by the variable thickness of the capstones. The base of each shaft was packed with large rocks, which helped to keep it erect. The base of shaft 9 was resting on an ash deposit 1.1 feet thick, below which was coral limestone bedrock.

Capstones

Weathering.—Only four capstones, recognizable as such, were discovered. Numerous rocks were found on and around the site and presumably some of these represented the disintegrated remains of the other capstones. The four capstones exhibited pronounced weathering. Capstone D, the best preserved, was found buried in the sand on the seaward side of the right of way.

Material.—All capstones of coral limestone.

Form and Dimensions.—All capstones conformed to the general Marianas shape. Capstone D, the least affected by weathering, was 2.5 feet thick and from 4.1 to 4.2 feet in diameter. The remaining three capstones varied from 2.3 to 2.7 feet in thickness, and from 3.8 to 4.2 feet in diameter.

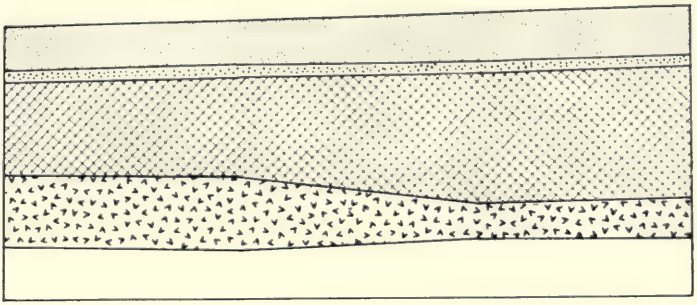
Soil Profiles

Five east-west and two north-south profiles were cut. The accompanying two profiles illustrate the soil structure of the site (fig. 12). The upper stratum probably represents wind-blown and washed-in sand that was deposited after the house was abandoned. The next lower stratum is a coral pebble layer, which, judging from its occurrence in other parts of Micronesia at the present day, was a surface laid down by the house's occupants as a gravelled work area. This coral pebble layer is confined to the space within the shafts and to the seaward side. Below the coral pebble layer is a stratum of dark gray sand, filled with much organic material, rocks, potsherds, artifacts, and burials. Below this stratum is either coral limestone bedrock or a gray sand stratum. The limestone bedrock has a very uneven surface, pitted with many natural holes and depressions. The gray sand stratum is sharply marked off from the very dark stratum overlying it by its color, lack of small rocks, and the relative absence of charcoal bits and finely ground organic matter. The gray sand stratum contains some sherds. This stratum merges into the underlying white coral beach sand, which contains no cultural material.

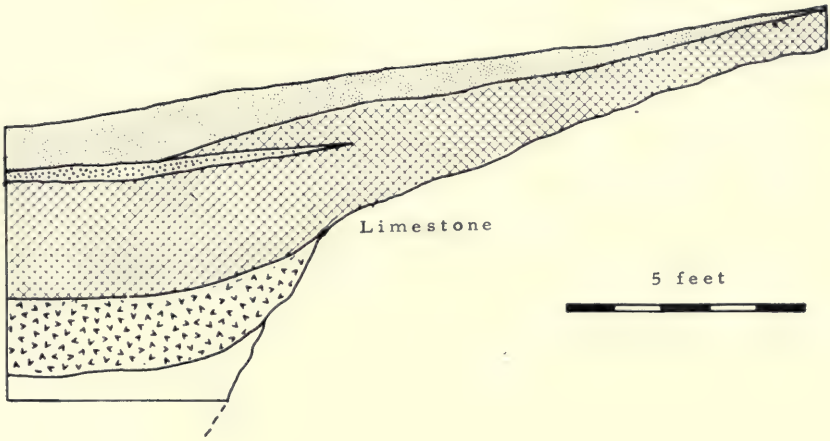
Burials

During the course of excavations, eleven burials were exposed. These were located either under the house, on the seaward side of the house, or

SECTION XX'



SECTION YY'



Light gray sand

Coral pebbles

Dark gray sand

Light gray sand

White beach sand, sterile of artifacts

FIG. 12. Soil sections, Objan, Saipan.

directly to the west of the house. The number of burials was large, considering the limited area actually excavated, and it was clear that the underground structure of the house site was literally filled with burials. Limitations of time did not permit the complete excavation of all burials exposed, but it was possible to determine that a variety of burial practices existed.

All skeletal material was in fragmentary and poor condition. In three cases the skulls were not present—evidence of the removal of the skull after death and before inhumation, a custom documented in the early accounts. In several instances, the teeth were stained dark red-brown, an indication of the antiquity of betel-nut chewing. No grave goods were found with any of the burials, with the single exception of the probably accidental association of one net-sinker with Burial 6. The coral pebble layer, which I have interpreted as the floor of a work area, was extended, unbroken, over the burials beneath it.

The eleven burials were of the following types: two secondary burials; one probably extended on back, shoulders to north; one extended on side, shoulders to north, facing east; one extended on side, shoulders to south, facing west; one on back, with legs drawn up, shoulders to east; five indeterminate.

Burial 1: Located seaward side XX′ profile. Secondary burial, with miscellaneous, fragmentary collection of bones lying in bottom of pit. Top of burial 3.2 feet below present surface.

Burial 2: Located seaward side XX′ profile. Child burial lying in pit. Sudden cave-in of bank prevented detailed determination of type of burial. Top of burial 2.1 feet below present surface.

Burial 3: Located seaward side XX′ profile. When the profile was cut, the skull of this burial was exposed on the face of the profile. Surface depth to top of skull 3.3 feet. No attempt was made to excavate this burial.

Burial 4: Located seaward side XX′ profile. When the profile was cut, two long bones were partially exposed on the face of the profile. Burial lay 2.9 feet below present ground surface. No attempt was made to excavate this burial.

Burial 5: Located in square 15-15AA. Skeleton on back with legs drawn up; femurs extended; feet at pelvis. No skull present. However, a mandible was found at the position of the clavicles. The mandible may represent a second individual and could have been interred as a fetish. Top of burial 4.0 feet below present ground surface.

Burial 6: Located in square 15DD. A shallow secondary burial consisting of a miscellaneous assortment of bones, including three fragmentary skulls. Burial lay just under coral pebble floor. Top of burial 1.1 feet below present ground surface.

Burial 7: Located in squares 10BB-15BB. Only a skull, lying on its right side, was exposed by the trench excavated along the 15-foot stakes. No attempt was made to excavate the entire burial. Top of burial 3.0 feet below present ground surface.

Burial 8: Located in squares 15BB-15CC. Only bones of two feet, extending into trench, were exposed. Remainder of burial was not excavated. Burial probably extended on back, with skull to south. Top of burial 3.3 feet below ground surface.

Burial 9: Located in squares 10DD-15DD. Only the upper part of the skeleton was exposed, projecting into the excavated area. The lower extremities were not excavated. Burial lay on back, with shoulders to north. Burial was probably extended on back. No skull present, but a mandible was found at the clavicles. This burial lies directly below Burial 6. Top of burial 2.2 feet below present ground surface.

Burial 10: Located in squares 5-10. Burial extended on left side, shoulders to north, facing east. No skull present. Top of burial 2.6 feet below present ground surface.

Burial 11: Located in squares 10DD-15DD. Burial extended on left side, shoulders to south, facing west. Lower extremities lay on limestone bedrock. Burial 2.6 feet below present ground surface.

EXCAVATIONS AT LAULAU

Location and Description of the Site

Like Objan, the Laulau Site is a coastal one, permitting the combination of good farmland with access to the fish resources of the sea (see fig. 13). The Laulau Site is located on the northwestern shore of Magicienne Bay, on the east coast of Saipan. The site lies about 150 feet inland from the beach, to the west of a narrow road that runs around Magicienne Bay. Laulau Site is approximately 600 feet long and 200 feet wide, with its long dimension paralleling the shore line. It is northwest of a massive, concrete Japanese blockhouse built on the beach and commanding the bay.

Northwest of the site there is a series of limestone cliffs. A large limestone segment has fallen away from the cliff edge and forms a rock shelter. This is Laulau Rock Shelter, whose excavation will be described shortly. The ground at the rock shelter is approximately 115 feet above sea level. From the rock shelter the terrain slopes gradually down to the beach, and the site is located on this sloping ground.

The surface features of the site consist of a large number of sherds scattered over the surface, plus the remains of four *latte* houses, all badly disintegrated. Two *latte* houses are located at each end of the site. The four houses are in rough alignment. It is quite possible that other *latte* houses

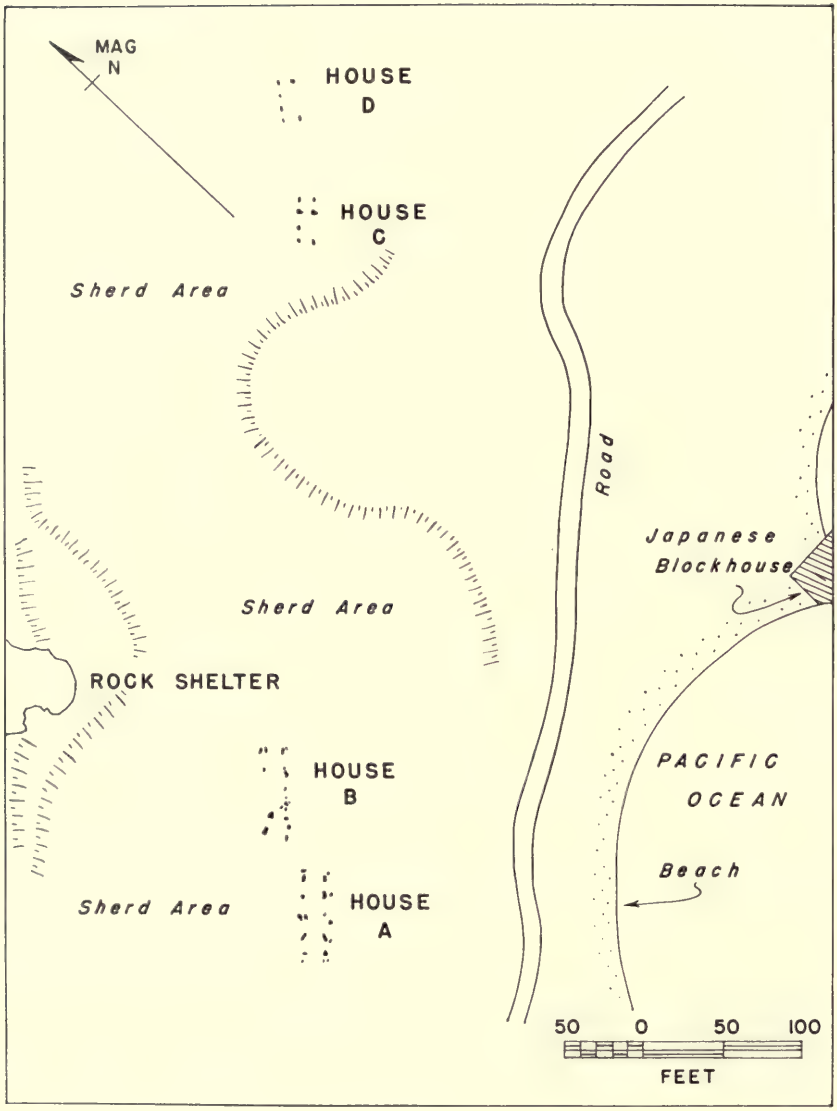


Fig. 13. Plan of Laulau Site, Saipan.

once existed, but have since disintegrated (see fig. 13). At the time of excavation some of the site was planted in maize, coconut palms, and bananas, and the rest was lying fallow in grass. According to Chamorro informants, the land has always been hand-tilled. In Japanese times it was used for tobacco. Today, it is used primarily for growing maize.

The beach at the point of the site is bordered by a wide, fringing reef. As the location is on the trade wind side of the island, the waters of Magicienne Bay are usually rough. In early times it would have been difficult to bring canoes of any size over the fringing reef; however, the reef fishing is excellent.

At the Laulau Site, two structures were excavated: House A, the southwesternmost *latte* house; and the rock shelter. Description of their excavation follows.

House A

Excavation Procedure

The area immediately surrounding the site had been cultivated but was lying fallow at the time of excavation. The site was cleared of grass and staked according to a 5-foot grid (see figs. 14, 15). A longitudinal trench, 2.0 feet wide, was then run through the long axis of the site. Transverse trenches were excavated at each end of the site and were widened to obtain necessary structural details. All excavations were carried down into undisturbed soil. The limits of excavation of the house proper are shown in figure 14.

A common contemporary Micronesian house pattern consists of a living house, with a separate cook house to the rear of the living house. In order to determine whether House A possessed this feature, an area to the northwest of the house proper was excavated. This latter area is not shown on figure 14. It comprised squares 15D, 15E, 15F, 15G, 20E, 20F, 20G, and 20H, whose location can be judged by an inspection of figure 14.

Structure of the Site

House A consisted of ten shafts arranged in two parallel rows of five shafts each. The shafts were very badly weathered, though the shaft bases remained in place. On the surface of the site was a high concentration of scattered sherds, mixed, along the seaward margin of the house, with large numbers of coral pebbles. At a depth of 0.3–0.5 foot below the surface, along the seaward side of the house, areas of a coral pebble stratum were discovered. This coral pebble stratum was approximately 0.2 foot thick. It extended into the house for 1.5 feet and outward for approximately 5.0 feet. This was no doubt the remains of a coral pebble working area, similar to the one at Objan. However, at House A the coral pebble stratum was

confined to the seaward margin of the house, while modern tilling of the site had brought many of the floor pebbles up to the present surface.

Another indication of the ground level at the time the house was occupied was the discovery of a large section of shaft 4 that had broken from the shaft and crushed most of a pot beneath it. The sherds were lying on a surface 0.5 foot below the present ground level. This lower surface probably was approximately the ground level at the time of house occupation, though this level was nowhere found well defined.

In the area excavated northwest of the house proper, remains of two earth ovens were found, though there was no evidence of a structure that would have served as a cook house. One oven was discovered in square 15F, the other in square 20E. The former consisted of a circular shallow depression 2.4 feet in diameter, filled with small, heavily burned rocks. The top of the deposit lay 0.7 foot below the present ground level. The second oven was similar—2.2 feet in diameter and 0.8 foot below present ground level. The Chamorro and Carolinean digging crew recognized these immediately as earth ovens, which are still used occasionally on Saipan today.

Also in this area was found a stone mortar (fig. 72). It was 1.4 feet thick and projected 0.5 foot above present ground level, but its base was also buried 0.5 foot below the probable former ground level. Another mortar was found at the south edge of the house, but it had obviously been secondarily deposited in the position in which it was found.

Another discovery of interest was two iron fragments, at the northeast corner of shaft 9, lying next to the shaft and directly under a large stone. This large stone was one of several that had been packed around the base of the shaft to help keep it erect. The iron fragments were found at a depth of 1.0 foot. None of the shaft bases had been disturbed by modern tilling and there was no evidence that the iron fragments were intrusive. One fragment was a section of an iron knife; the second was a projectile point (fig. 89).

Unlike Objan, no burials whatsoever were found associated with the house, a very unusual feature for *latte* houses in the Marianas. The shallow depth of the occupation level at the house indicates that it was inhabited for only a relatively short time.

The Latte

Shafts

Weathering.—All shafts exhibited extreme weathering. Most of them were leaning or had fallen, though shaft bases remained in place.

Material.—All shafts of coral limestone.

Form and Dimensions.—Weathering of shafts was so great that the only real indication of form was found in the buried shaft bases, which were clearly rectangular. Those shafts which were approximately whole varied

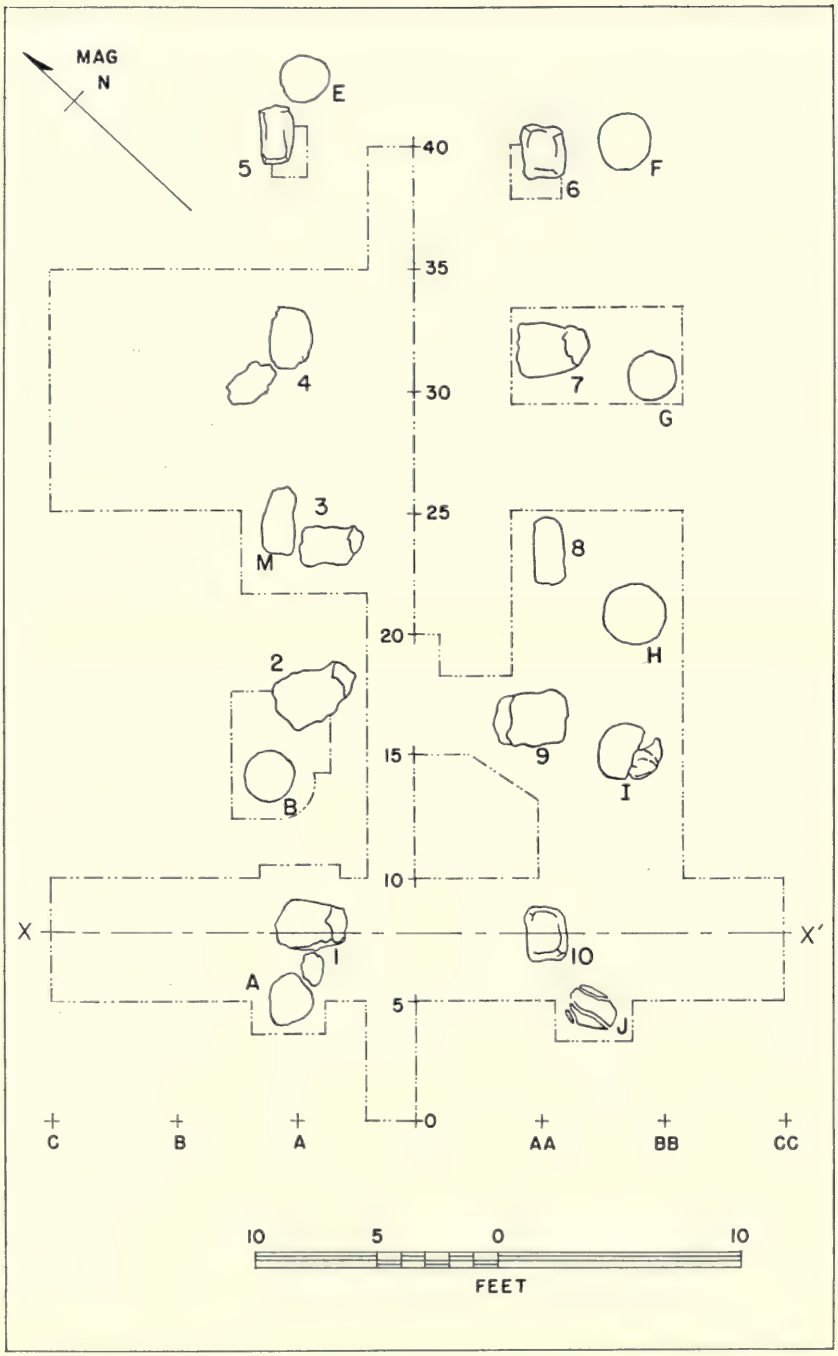


FIG. 14. Plan of *latte* and excavations, House A, Laulau Site, Saipan. Shafts are numbered; capstones are lettered. Limits of excavation indicated by broken lines.

FIG. 15. House A, Laulau, Saipan, looking northeast. Upper: site cleared and staked. Lower: site under excavation. Corn field and coconut palms in background.

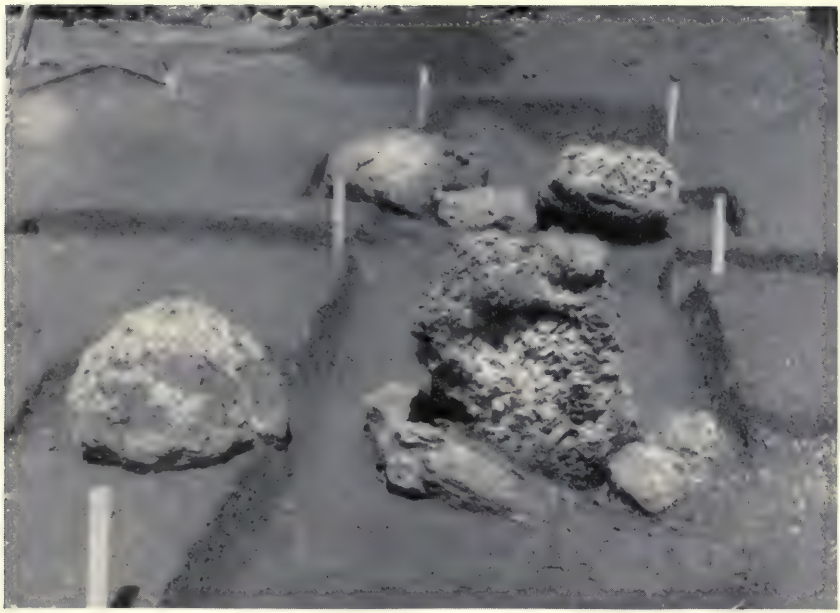


FIG. 16. House A, Laulau, Saipan. Upper: shaft 10 in foreground; shaft 1 in background; capstone fragment lies next to shaft 10. Lower: shaft 4. Rocks packed around bases of all shafts.

in dimensions as follows: overall length, 3.1–3.6 feet; width, 2.2–3.0 feet; thickness, 1.2–2.4 feet.

Constructional Features.—So far as could be determined, the ground surface at the time of the occupation of the house was from 0.3 to 0.5 foot below the present surface. The *latte* shafts were set in shallow holes from 0.3 to 0.6 foot below the old ground level, and the shaft bases were packed with rocks to assist in maintaining the shafts erect (see fig. 16).

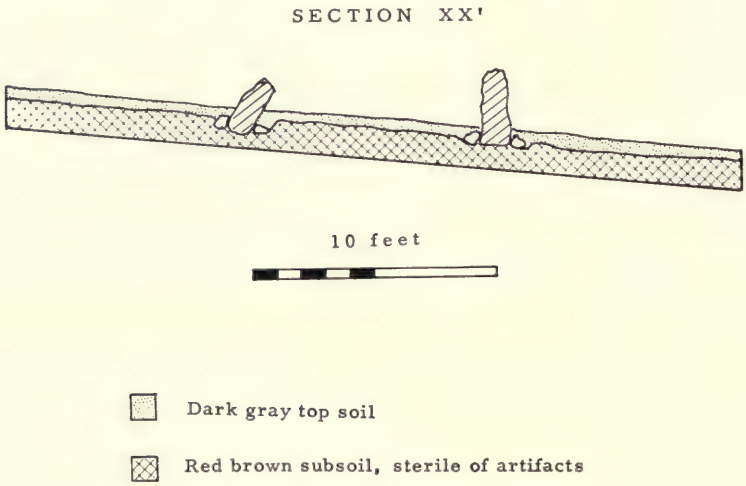


Fig. 17. Soil section, House A, Laulau Site, Saipan.

Capstones

Weathering.—Six capstones, or recognizable fragments thereof, were found near the shafts from which they had been displaced. No capstones were found with shafts 3 and 4. Apparently these capstones had disintegrated completely. All capstones exhibited pronounced weathering.

Material.—All capstones of coral limestone.

Form and Dimensions.—Capstones E–H were the best preserved and exhibited the usual Marianas cup-shaped form. These capstones varied in diameter from 2.4 to 2.8 feet, in thickness from 1.4 to 1.8 feet.

Soil Profiles

The soil profiles at House A, as exemplified by that shown in the illustration (fig. 17), are very simple. The top stratum, from 0.3 to 0.8 foot in depth, consists of dark gray, humus-filled soil, containing shell fragments, potsherds, and all other cultural material found at the site. The lower stratum, of undetermined depth, is a reddish-brown, clay-like subsoil,

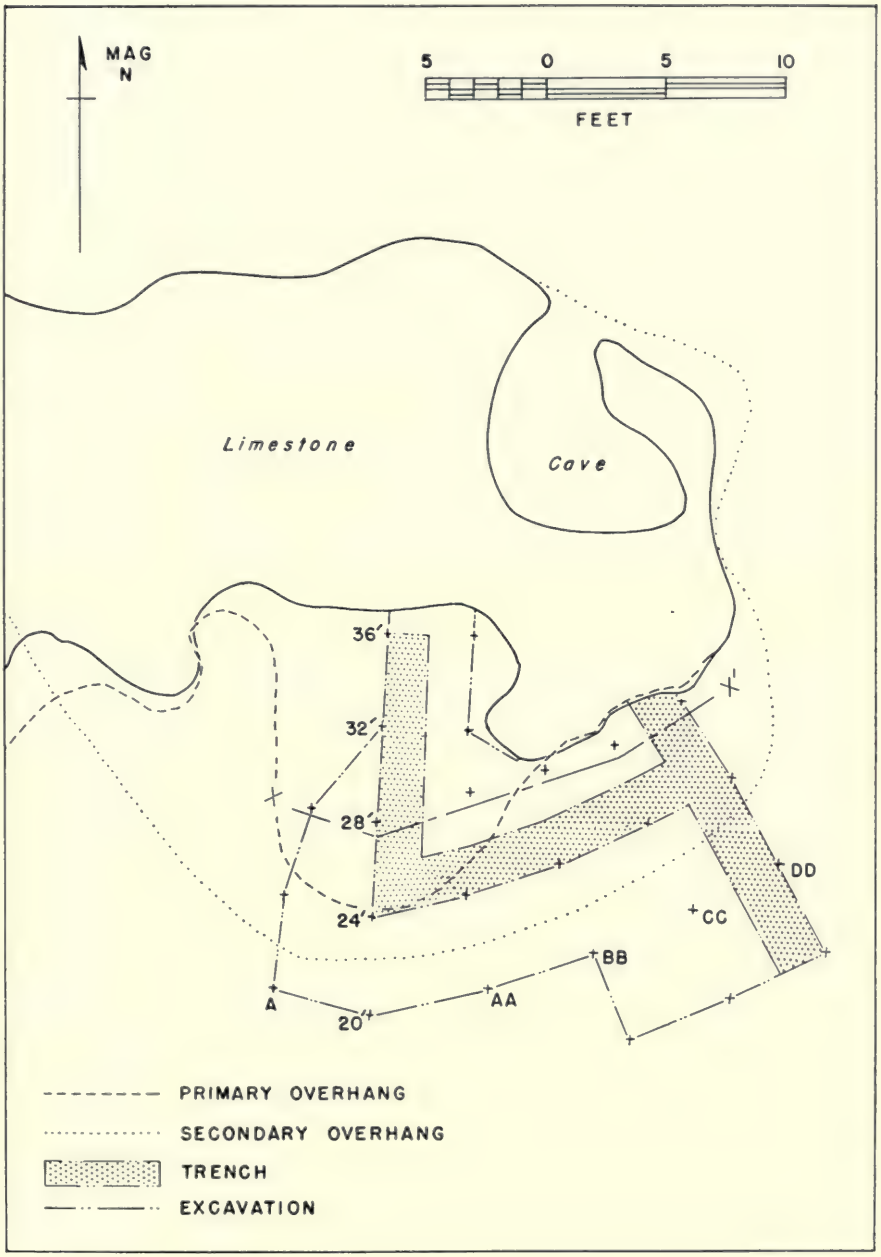


FIG. 18. Plan of excavations, Laulau Rock Shelter, Saipan.

completely sterile of artifacts. Along the seaward side of the house, the top stratum contained numerous coral pebbles, and fragments of a pebble floor were found in this area, at a depth of 0.3–0.5 foot below the present ground surface. This floor, lying at such a shallow depth, undoubtedly lost its well-defined character through modern tilling of the land.

Laulau Rock Shelter

Excavation Procedure

This rock shelter was formed by the overhang of a large limestone section projecting from the seaward bluff of a limestone terrace, now many feet above sea level. In the northern part of this limestone fragment was a cave which had been completely cleaned out by the Japanese military forces and used as a military strong point. The part of the site excavated by the Museum lay along the southern side of the limestone under the overhang of a cliff face (see fig. 18). This area had not been disturbed.

A somewhat unorthodox method was used in laying out the excavation grid. The main axis was run from a point outside the shelter into its deepest part. Lateral grid lines were then staked parallel to the rock face of the shelter, rather than at right angles to the main axis. This resulted in more or less trapezoidal horizontal sections. Excavations were commenced between the 20- and 24-foot stakes, and between the A and DD stakes. This trench, paralleling in long dimension the rock face, was then carried forward toward the face (fig. 18). The unorthodox grid made for convenience in excavation and corresponded to the occupation area, which was spread around the curving face of the cliff. The site was excavated in 0.5 foot levels, which paralleled the ground surface.

Structure of the Site

Laulau Rock Shelter was primarily a burial site, and the structure of the site revolved around the relative position and nature of the burials excavated. The principal features of the site were as follows:

(1) The surface was devoid of any indication of house construction, and except for a few sherds there was no evidence of human occupation. The top stratum consisted of a thin layer of humus-filled, dark gray topsoil, approximately 0.1–0.3 foot thick.

(2) Below the thin stratum of topsoil lay a stratum of densely packed ashes, approximately 1.5 feet thick. This ash stratum was filled with fragments of charred human bones. Three burials—one extended, one flexed, and one a secondary burial—lay in shallow pits in the ash level, but otherwise there were no discernible structures within the ash level itself. The ash bed extended from 10 to 18 feet out from the rock face of the shelter; the outer margin of the ash bed curved roughly parallel to the rock face.

FIG. 19. Laulau Rock Shelter, Saipan. Upper: excavations in progress; looking north. Lower: excavating along the rock face.

The ash bed contained so many small fragments of bones that the only conclusion that can be reached is that this stratum represented the remains of a large number of human cremations. A certain amount of pottery—all sherds—was found in the ash level. These sherds could have come from pottery placed with the dead at the time of cremation or otherwise associated with disposal of the dead.

(3) A light brown sandy surface lay directly beneath the ash bed. This surface had very obviously been spread with beach sand. At this level three scattered postholes were found, but no other evidence of a house structure; the three postholes were not in a regular pattern and a wall could not be delineated from their location.

The sandy surface merged into the brownish soil beneath, making a single stratum. This stratum was difficult to follow. At times it was only 0.3 foot thick; at other times it increased to several feet in depth.The reason for this vertical irregularity was that the stratum merged with the fill of a considerable number of large burial pits that had been sunk into the ground. Most of these burial pits contained extended burials, only one of which showed evidence of cremation.

(4) The large burial pits had been excavated into a heavy clay subsoil, sterile of all artifacts.

The structure of the site is shown graphically in the accompanying soil profile (fig. 20). It is clear that two levels of human use are involved. The upper level is represented by the ash bed, the remains of an unknown number of cremations. The lower level is represented by a sandy surface associated with underlying burial pits, exhibiting a different burial practice. Furthermore, below the sandy surface, Marianas Red and lime-filled, impressed sherds were found; none of these were present in the ash bed. Further consideration of the pottery differences found at this site are included in a later section. Details regarding the burials follow.

Burials

The upper stratum of ash contained such a profusion of small charcoal fragments of human bones, scattered in random fashion through the stratum, that it was not possible to separate these into well-defined cremations. Sections made through the ash failed to reveal any lenses within the stratum. Whether this means that the cremations responsible for this stratum all took place in a relatively short time, is difficult to say. Just how many individuals are represented could not be determined.

Three burials were found in the ash level. They were all intrusive into this level, though how much later they are than the cremations forming the ash stratum is unknown. No grave goods accompanied any of the three burials. Details on these burials are as follows:

Burial 1: Shallow, extended burial, lying along the face of the rock shelter, in squares 24CC–24DD. Shoulders of burial were to northeast. No skull present. All bones in extremely fragmentary condition. No evidence of cremation. Surface depth to top of burial 1.0 foot.

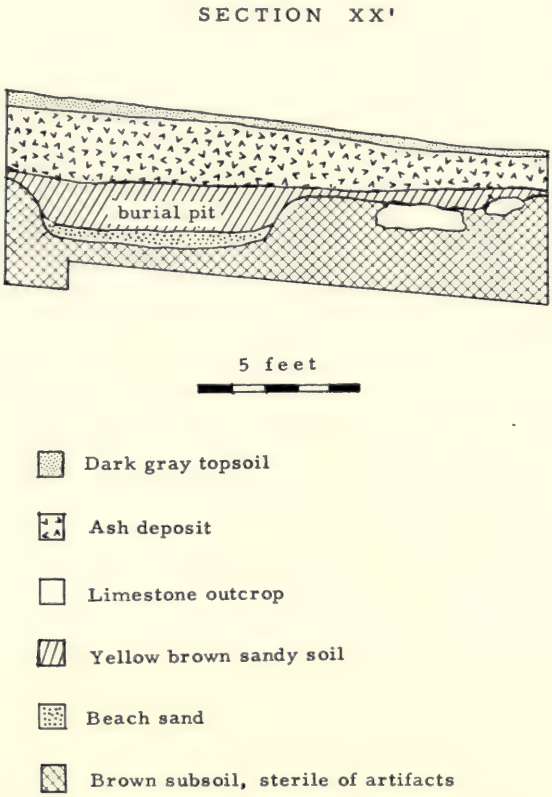


FIG. 20. Soil section, Laulau Rock Shelter, Saipan.

Burial 2: Secondary burial lying at the bottom of the ash level in square 24BB. Burial consisted of collection of long bones and phalanges lying over skull, with one extra mandible among the long bones. Bones in very poor condition. No evidence of cremation. Surface depth to top of burial 1.2 feet.

Burial 10: Child burial, fully flexed, lying on right side, with skull toward north. Located in square 20AA. Bones extremely fragile, with skull crushed flat. Surface depth to top of burial 0.7 foot.

FIG. 21. Burial no. 6, Laulau Rock Shelter, Saipan. Burial lies in pit, the bottom of which was covered with beach sand.

The remaining twelve burials were all associated with the occupation level lying under the ash stratum. These burials were all found in pits that were dug into sterile soil from the light brown stratum above. In no case were these burial pits intrusive from the ash level, and there was a clear demarcation between this set of burials and those lying above them. In some cases, the pits overlapped one another, with one burial superimposed over part of another.

Of these twelve burials, eight were found lying extended on the back in pits from 7.0–7.8 feet long and approximately 2.5 feet wide. One burial had been partially cremated, but the others showed no evidence of fire. All twelve burials had been placed on a layer of coral beach sand spread in the bottom of each pit. Bones were generally in fragile condition. No grave

goods were found. The burials were extended parallel to the rock face of the shelter; otherwise there was no set orientation. Depth from surface to top of burials ranged from 3.0–3.8 feet, except for one burial at a depth of 2.4 feet. A typical extended burial is illustrated (fig. 21).

In addition to these eight extended burials, three secondary burials were found. Each consisted of a miscellaneous collection of bones, in no case representing a complete skeleton. Burial 7 was located in a pit sunk directly over an extended burial (no. 8). It consisted of a skull and fragmentary long bones, all heavily burned, so the burial must have consisted of bones remaining from a cremation. Burials 11 and 12 were in pits, with Burial 12 also the remains of a cremation. Of the three, only Burial 12 exhibited a sand layer that had been spread in the bottom of the pit. No grave goods were found associated with any of these three burials. Depth of the burials below present ground surface varied from 2.6 to 2.9 feet.

The remaining burial (no. 5) was probably extended. Only the skull was uncovered, projecting into the excavated area, and the outline of the burial pit discerned. Time did not permit excavation of the complete burial.

Stratigraphy

The stratigraphy found at Laulau Rock Shelter may be recapitulated as follows:

1. An upper ash stratum of old cremations superimposed on an underlying occupation level. The lower occupation level exhibited a sandy surface, probably resulting from beach sand spread over the area. Below this surface were found twelve burials, lying in pits associated with the lower occupation level.

2. In the upper ash level, the prevailing mode of dispersal of the dead was obviously cremation, though one secondary burial, one extended burial, and one flexed burial were found in the cremation ashes.

3. In the lower stratum, the prevailing burial practice was to place the dead extended on the back in a long pit, the bottom of which was spread with beach sand.

4. Marianas Plain pottery was found in the ash level. Marianas Red and lime-filled, impressed sherds, together with some Marianas Plain, were found in the lower level. No Marianas Red or lime-filled, impressed sherds were found in the ash level. Further details on the pottery seriation from this site are given in the chapter on pottery.

5. It should be noted that no burials were found during the excavation of Laulau House A. It is possible that the occupants of the Laulau *latte* houses utilized the rock shelter for disposal of their dead, represented by the cremations in the upper level of the shelter. If this is so, we do not know

where the individuals represented by the lower level burials at the rock shelter lived and built their houses.

EXCAVATIONS AT OLEAI AND CHALAN KIJA

The most favorable geographic location on Saipan for human settlement is along the west coast, fronting the lagoon. In ancient days, here was fertile land combined with fine fishing, as well as a sheltered lagoon giving access to the open sea. The earliest voyagers to the island would naturally have chosen this location.

It has also been the area of the island's historic settlements: Garapan, Tanapag, and Chalan Kanoa. Likewise, along the west coast there was a great concentration of World War II base construction. Unfortunately for the archaeologist, these last chapters in the human occupation of the island have destroyed the earlier chapters and most of the archaeological sites have been obliterated. Careful search did reveal several sites along the west coast that had not been heavily disturbed, though they were south of what was once the most fertile agricultural area. Three of these—Oleai, Chalan Kija, and Chalan Piao—were selected as giving the greatest promise of finding occupations earlier than those represented by Objan and Laulau. The first two proved disappointing, but are reported on as a matter of record.

Oleai

Description of the Site

Oleai Site is located 300 feet west of the present Oleai village and approximately 570 feet inland from the lagoon shore (fig. 22). The terrain at this point is level. Before the war, the land was cultivated and most of it is still free of bush (fig. 23). The principal surface feature of the site is the great quantity of shells strewn over an area approximately 500 feet long and 250 feet wide. Evidently Oleai was at one time a large camp site. There was no evidence of *latte* stones.

The name "Oleai" is derived from a settlement of Caroline Islanders from Oleai who lived on Saipan for a time during the German regime, after a typhoon had devastated their home island. Careful inquiry among the owners of the land made it certain, however, that the archaeological site was not the result of this late settlement in historic times.

Excavation Procedure and Structure of the Site

Four test trenches, each 5.0 feet square, were excavated along the long axis of the site. Each trench was taken down in 0.5 foot levels to a depth of 5.0 feet below the present ground surface. At this depth, there was no indication of cultural material. In none of the trenches were there found any

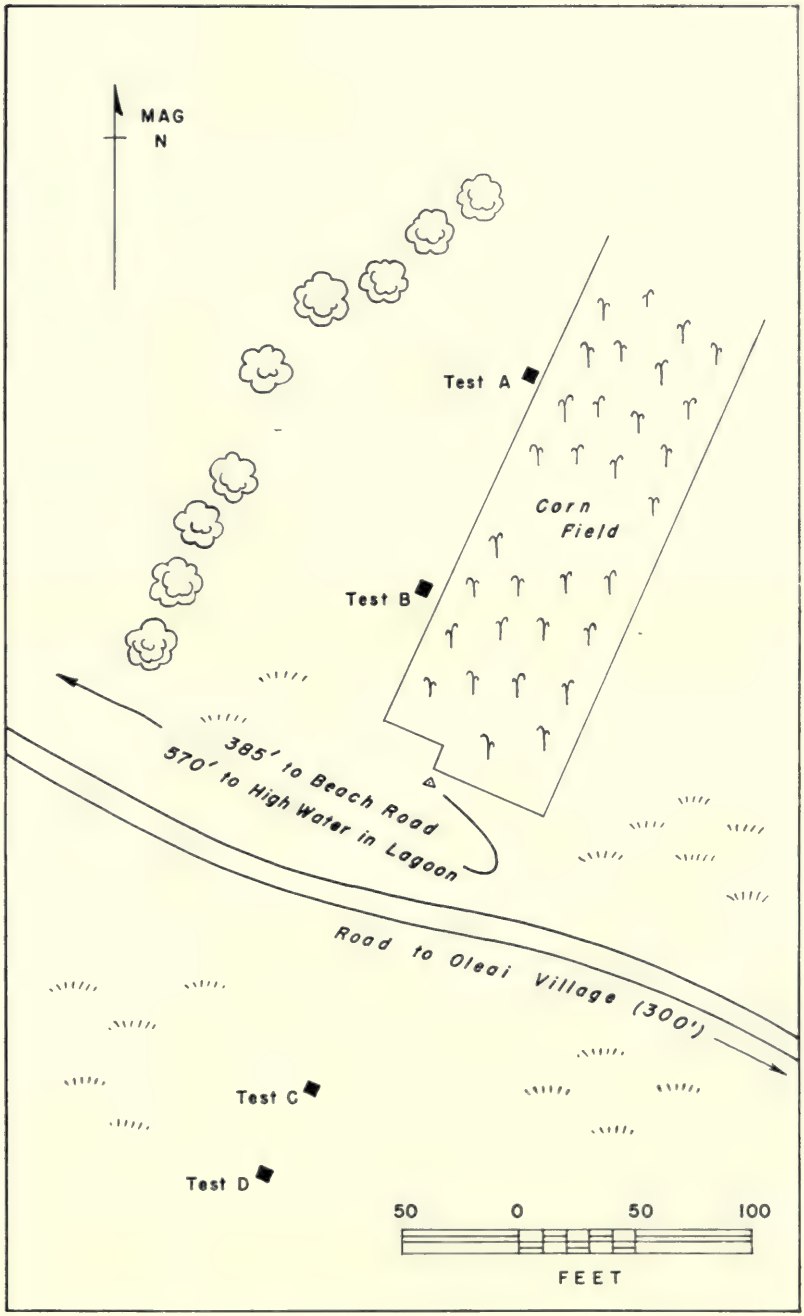


FIG. 22. Plan of excavations at Oleai Site, Saipan.

remains of house structures or other architectural features. The site showed evidence of modern tilling to a depth of 0.5 foot.

The soil structure of all the trenches was identical. The top stratum consisted of a dark gray, humus-filled, sandy soil, varying in thickness from 1.0–1.8 feet. This stratum contained a great many shells, a considerable number of sherds, and a few other artifacts. A soil profile of Trench D is shown in figure 23. Below the upper stratum lay light-colored, yellow beach sand, with a sharp separation in color between the two strata.

All artifacts were recovered from the topsoil stratum. In Trench C a round, fire-burned area, 1.6 feet in diameter, was found at the bottom of the upper soil stratum. It extended to a surface depth of 2.0 feet. Evidently this marked the remains of a cooking fire. It is doubtful that Oleai Site has any considerable antiquity or that it was long inhabited.

Chalan Kija

Description of the Site

The Chalan Kija Site is northwest of Lake Susupe, between two marshy arms of the lake. Here there is a ridge of higher ground about 4.0 feet above the water table (fig. 24). Surface features of the site consisted of a shell and sherd area approximately 200 feet in north-south dimension and 75 feet wide. A few broken *latte* stones have been pulled off the site to the edge of the marsh. In Japanese times, the area was leased to Okinawan farmers and is today used by Saipan Carolinian families for sweet potato (*camote*) fields.

Excavation Procedure and Structure of the Site

Four test trenches were excavated in the most promising sections of the site and were carried down 3.0 feet into undisturbed, light brown sand. Trench A was 4.0 × 8.0 feet; the remaining three were 4.0 × 6.0 feet.

The soil structure was the same in all trenches and was similar to that found at Oleai. The top stratum was a dark gray, sandy soil. Below this was undisturbed, light brown sand. All shells, sherds, and artifacts were found in the upper level. No evidence of any feature of house construction was found in the excavations. Trench C was sunk in a particularly heavy concentration of shells.

Chalan Kija Site represented a single and probably relatively brief occupation. The pottery was Marianas Plain, characteristic of *latte* sites.

EXCAVATIONS AT CHALAN PIAO

Description of the Site

The Chalan Piao Site lies south of Oleai and Chalan Kija, but on the same level, coastal formation of indurated sand beds. Chalan Piao is lo-

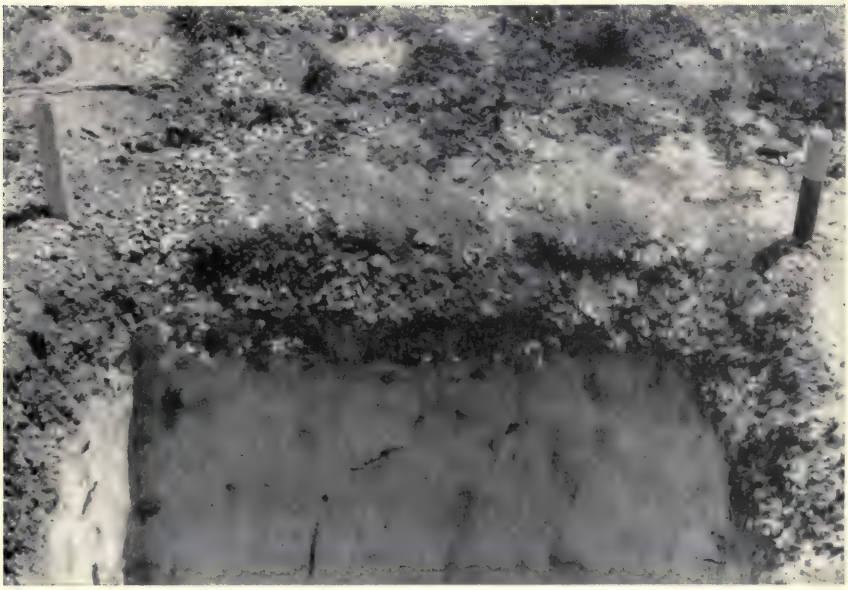


FIG. 23. Oleai Site, Saipan. Upper: view of site, looking south; road from beach to village in foreground, sand piles from excavations at Test Trenches C and D in center background. Lower: soil profile of Test Trench D, showing heavy concentration of shells and humus in top stratum, underlain with beach sand.

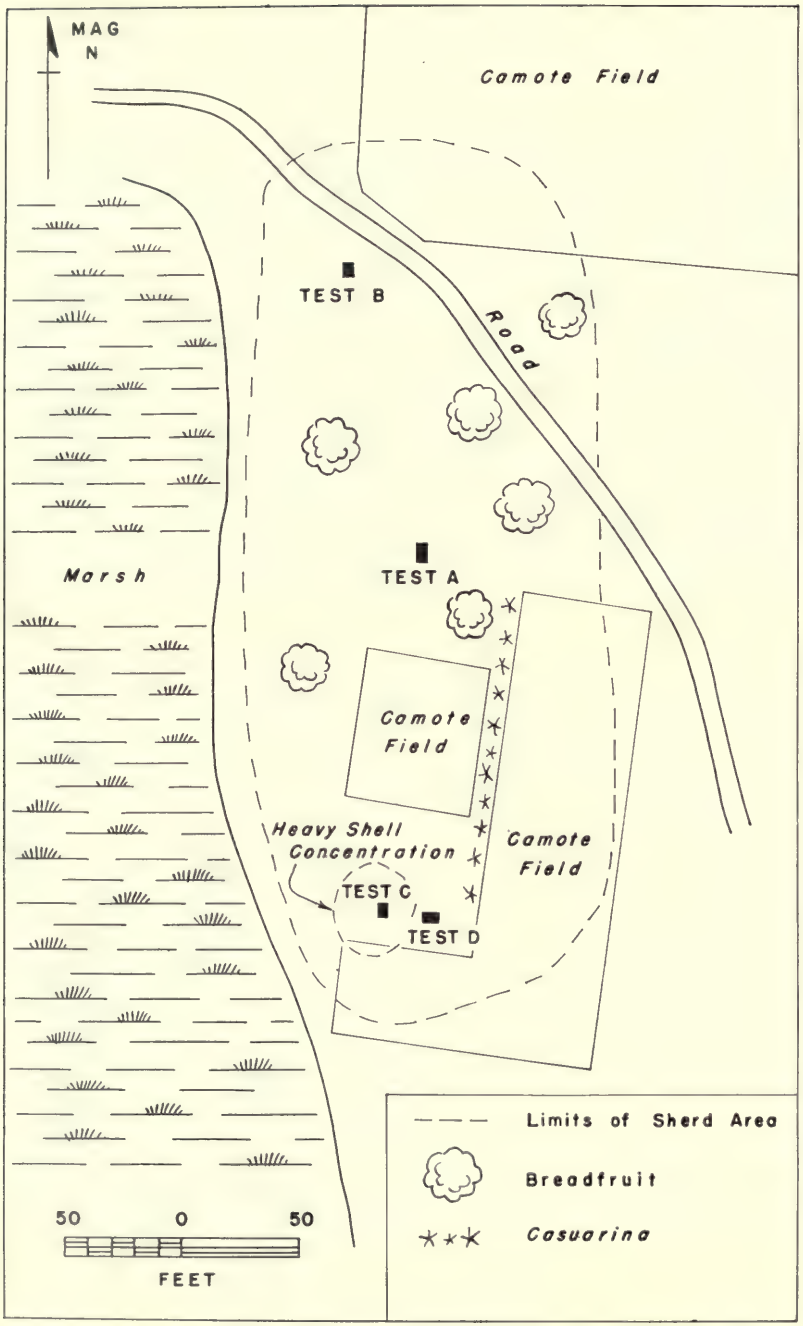


Fig. 24. Plan of excavations at Chalan Kija Site, Saipan.

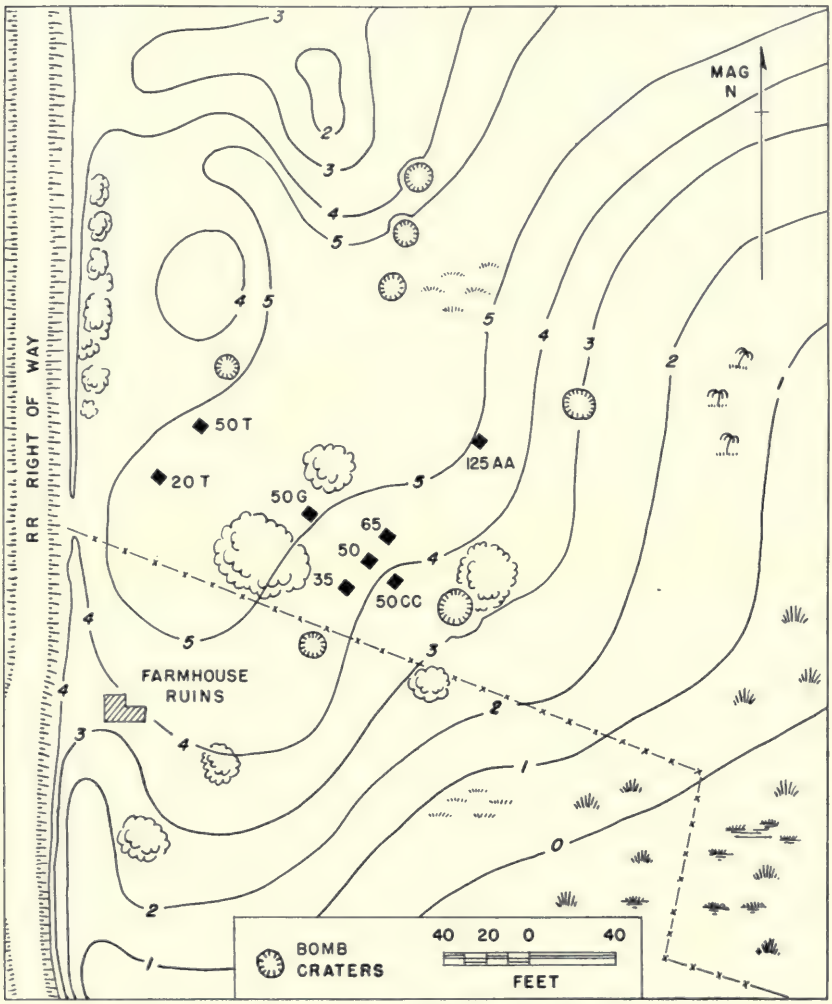


FIG. 25. Plan of excavations at Chalan Piao Site, Saipan. Test trenches are numbered, according to grid.

cated south of Lake Susupe, between a marshy southern extension from the lake and the lagoon shore (fig. 5). The site is approximately 2,000 feet east of the lagoon and extends along a low-lying area that slopes eastward to the marsh (fig. 25). Paralleling the site on the west is the right of way of the former Japanese narrow-gauge railroad. A few hundred yards northwest of the site is an abandoned area that contained American petroleum tanks during World War II. The site itself has been undisturbed, except for shal-

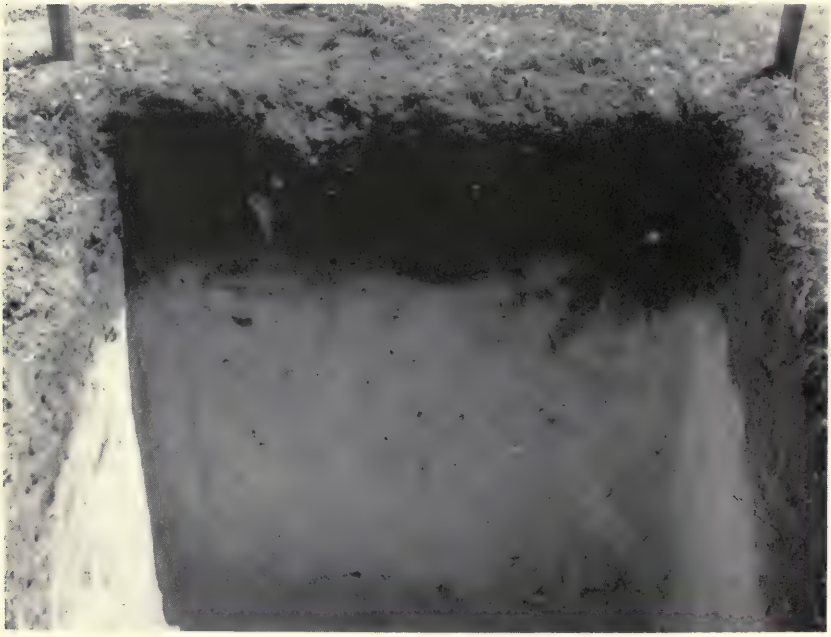


FIG. 26. Excavations at Chalan Piao Site, Saipan. Upper: view of Trenches 35, 50, and 65, looking southwest. Lower: soil profile of Trench 65. Upper stratum, one foot in depth, consists of dark gray, humus-filled, sandy soil, underlain with light yellow-brown sand.

FIG. 27. Oyster shell (*Ostrea cucullata* Lamarck) from Chalan Piao, Saipan. A carbon 14 date of 1527 B.C. ± 200 was obtained from this shell by W. F. Libby. Shell exhibits little or no evidence of rolling.

low tillage practiced in Japanese and present times and for bomb craters that pitted its surface during the World War II invasion of Saipan. The land is on the farm of Joaquin Cabrera.

The surface of the site was covered with scattered sherds and shells. This sherd and shell area extended in a northeast-southwest direction for some 350 feet, and was approximately 150 feet wide. West of the railroad right of way there was also a sherd and shell area. No *latte* stones were found at the site, though the surface sherds were predominantly Marianas Plain, which is characteristic of *latte* sites on the island.

Excavation Procedure and Structure of the Site

We excavated eight test trenches at the site, each trench 5.0 feet square (fig. 25). The soil profiles on these trenches were similar to those at Oleai, with an upper stratum from 0.08 to 1.0 foot thick, consisting of dark gray, humus-filled, sandy soil containing sherds and numerous shells. Below this stratum lay lime-sand, light yellow-brown in color (fig. 26). The first trenches to be excavated were nos. 35, 50, 65, and 50CC. Unlike Oleai and Chalan Kija, and to the joy of the digging crew, cultural material in these trenches was not confined to the upper level; sherds continued to appear as the excavations were carried down into the lower stratum. At a depth of 2.5–3.0 feet, this sand had become hard-packed, requiring the use of picks. By a depth of 4.0 feet, the soil was hard-pan, and crowbars had to be added to the picks. Sherds continued to be found, imbedded in the rock-like chunks of indurated sand removed from the trenches. The lowest sherd

(Marianas Red) was found in Trench 125AA at a surface depth of 5.6 feet. The water table was found at a depth of 5.9 feet, and excavations in Trenches 35, 50, 65, 50CC, and 125AA were carried to a depth of 6.1 feet below the surface. Excavations in the other three trenches were carried down 4.5–5.5 feet below the surface, at least a foot below the lowest sherd.

No evidence of house structures was found in any of the trenches. The principal interest of the cultural material was the pottery seriation determined, with Marianas Plain ware predominating in the upper levels of the site but giving way to Marianas Red sherds in the lower levels. This seriation is discussed at greater length in the chapter on pottery. Another point of great interest was the finding of a large oyster shell (*Ostrea cucullata* Lamarck) at a depth of 1.5 feet in Trench 125AA (fig. 27). The shell was subsequently determined by W. F. Libby to have a radiocarbon date of 1527 B.C. ± 200 years (Libby, 1952).

There is little doubt that the Chalan Piao Site has a respectable antiquity. From the point of view of age, it proved to be the most important site excavated during the season.

Antiquity of the Site

The principal problem concerning the antiquity of the Chalan Piao Site revolves around the question: How did the sherds, found to a depth of 5.6 feet, get there? This in turn raises the question—a strictly geological one—as to the manner of deposition of the limestone sands in which the sherds were imbedded.

Two possible methods of deposition have been suggested by Dr. Preston E. Cloud, of the United States Geological Survey, who is most familiar with the geology of Saipan. One is that the 2,000 feet of limestone sands that stretch between the site and the lagoon were built up and outward by storm action, the sherds having been deposited from camp sites along the shore. However, in this case one would expect that the sherds would exhibit pronounced evidence of rolling, and most of them exhibit very little. The oyster shell in particular exhibited none. There is also the matter of adjusting this explanation to the 6-foot fall in sea level related to the post-glacial optimum.

The second possibility is that the limestone sands represent a lagunal deposit, laid down during the post-glacial optimum, and that the sherds were deposited from a camp site off the toe of a sand spit, formed to the west of the site proper. The only difficulty with this hypothesis is that the sherds are not covered with encrusting marine organisms, a point raised by Dr. Cloud. However, this hypothesis seems more in accord with the evidence.

In any case, the geological evidence is not in opposition to the radiocarbon date determined from the oyster shell. This oyster was probably consumed by man, and the shell discarded, along with broken pottery. The geological evidence tends to support the antiquity of the site as given by the radiocarbon date.

III. Survey and Excavations on Tinian

PHYSICAL CHARACTERISTICS OF TINIAN

Tinian is approximately 12 miles long and 6.5 miles across at its widest point, and has an area of a little over 39 square miles. As in the case of Saipan, Tinian consists of a series of raised limestone terraces. Bowers (1954) notes that the island is composed of two major plateaus, separated by the Marpo Valley. Each plateau is in turn topographically composed of a set of terrace levels. Elevations on Tinian are lower than on Saipan and there is relatively more level land. Mount Lasso, the highest elevation on the island, is only 564 feet.

The coast of Tinian consists largely of limestone cliffs dropping abruptly into the sea, but this rocky shore line is broken by several beach areas and small coves. Particularly important is the Tinian harbor area on the west side of the island. This has always been the principal landing point on the island and has been a local center of settlement since prehistoric times.

Destruction of Archaeological Sites

Tinian was a major American military base during World War II, and as in the case of Saipan there has been much disturbance of sites, particularly around the harbor area. However, relatively more *latte* sites remain intact than on Saipan. A number of caves were investigated on Tinian, but all had been converted into military strong points by the Japanese and were so disturbed that whatever archaeological evidence they may once have contained has been destroyed.

SURVEY

As in the case of Saipan, the archaeological survey of Tinian was first concentrated along beaches and coastal terraces. Inland areas were then explored, and finally attention was paid to caves. In conducting the archaeological survey, I received invaluable aid from the members of the United States Geological Survey field team then working on Tinian. By the time of my arrival, Messrs. Doan, May, and Burke, who composed the team, had covered almost every square foot of Tinian and had already

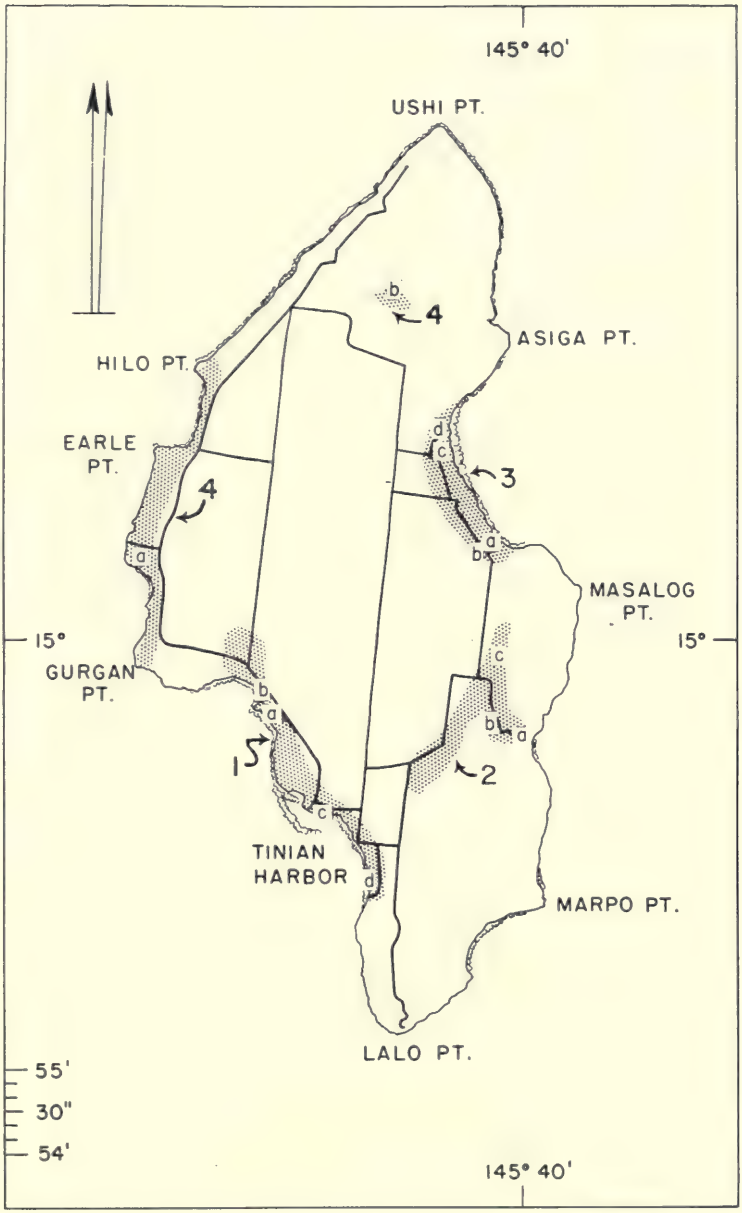


FIG. 28. Principal archaeological areas and sites of Tinian. 1, *Nuclear Tinian:* (a) Leprosarium I, (b) Leprosarium II, (c) House of Taga, (d) Blue Site. 2, *Marpo Valley:* (a) Marpo I, (b) Marpo II, (c) Marpo III. 3, *Unai Dangkulo:* (a) Unai Dangkulo I, (b) Unai Dangkulo II, (c) Unai Dangkulo III, (d) Unai Dangkulo IV. 4, *Secondary areas:* (a) *Latte* site in Gurgan-Hilo area, (b) Central bomb dump.

found all the major archaeological sites extant. The information that follows on the location of Tinian sites is almost entirely due to the co-operation of these geologists.

Since shortly after the close of World War II, Tinian has been inhabited by a small community of Chamorros, by the Trust Territory Leprosarium, and by a few American administrative personnel. These groups occupy only a small part of the island. The remainder has been overgrown with a dense cover of bush, which made survey work arduous and difficult. However, I feel reasonably certain that most of the sites still existing were discovered and located.

The archaeological sites discovered on Tinian can be grouped into three major areas, together with minor, less important sites (fig. 28). These major areas are:

1. NUCLEAR TINIAN

This area extends from a point slightly north of the present Tinian leprosarium to the Blue Site on the south. The area includes the harbor shore, the natural geographic location for settlement. Major sites discovered in this nuclear area are:

(a) Leprosarium I: The present (1950) leprosarium occupies an old archaeological site which extends along a terrace to a small point jutting into the sea northwest of the present leprosarium buildings. The area is at least 400 yards in length. The northwest section of the area, about five acres in extent, has been used for small farms by the leprosarium patients. Everywhere in this area there is a heavy concentration of surface sherds. One badly disintegrated 8-shaft *latte* house still survives and numerous shaft and capstone fragments are scattered over the area. There is one well-defined low mound, either a house site or a shallow refuse deposit. There is no doubt that this area was once a major site, but it has been much disturbed.

(b) Leprosarium II: North of Leprosarium I is a sherd area approximately 50 yards square and one 8-shaft *latte* house. The shafts and capstone fragments were greatly weathered. The long dimension of the house parallels the coast line.

(c) House of Taga: This is the center of nuclear Tinian. The House of Taga is an immense 12-shaft *latte* structure, preserved in a small park. It is all that remains of a prehistoric village, found by Hornbostel in 1924 to consist of 18 separate *latte* structures. The House of Taga is described in detail in a following section.

(d) Taga Quarry: Located on the shore approximately 4,000 feet south of the House of Taga. Details are given in a following section.

(e) Blue Site: An extensive series of *latte* houses at the south margin of the harbor area. Details are given in a following section.

2. MARPO VALLEY

The interior of Tinian is occupied by the Marpo Valley. This valley has two arms, one extending north-south and the other southwest-northeast. The two arms meet in a depressed area, the lowest part of which is occupied by a small swamp. The soil of the valley is fertile, and the small swamp supplies fresh surface water. Both the Japanese and the American military forces installed pumping stations at this site to provide other parts of the island with fresh water.

The Marpo Valley is a major archaeological area. In both arms of the valley surface sherd areas are common, though deposits of cultural material everywhere appear to be shallow. Marpo is known to have been occupied by Chamorros at the time of Spanish discovery. One of the early Spanish accounts mentions that Sanvitores, who established the Jesuit mission in the Marianas, in 1699 settled a local civil war on Tinian between the residents of Marpo and those of Sunharon, the latter name applying to the harbor area.

During the survey the following *latte* sites were located in the Valley:

(a) Marpo I: In the southeast corner of the valley, just east of the swampy area, a single 8-shaft *latte* was found. House dimensions were 12 × 38.5 feet. The site was located on a former Japanese farm and was considerably disturbed. Shafts were much weathered and tops were broken, except for one which had fallen and remained relatively intact. This shaft was 3.5 feet long, 1.4 × 2.6 feet at the base, and 0.9 × 1.3 feet at the top. No capstones were found intact. One well-preserved mortar was found associated with the house. The long dimension of the house was oriented north-south, at right angles to the slope of the ground. Approximately 50 feet north of the house several fragments of additional shafts were found, indicating the probable former presence of another *latte* house.

(b) Marpo II: Southwest of the American-built pumping station and close by the road is a single, large *latte* house. Only five shafts project above the surface, though the structure probably contained eight shafts. Existing shafts show considerable weathering. No capstones were found intact. Dimensions of the house were 12 × 44 feet. Orientation was north-south, at right angles to the slope of the ground. The best-preserved shaft projects 5.1 feet above the present ground surface. Dimensions of this shaft at ground surface were 1.9 × 3.0 feet; at top, 1.4 × 1.5 feet. The shafts at Marpo II, as at most other Tinian sites, are more trapezoidal in form than those of Saipan.

(c) Marpo III: Consists of two *latte* houses, located in the north arm of the valley on its east slope, and several hundred yards east of the road. The two structures were built end to end, separated by a distance of 40 feet. The northernmost house was a 10-shaft *latte*, 13.5 × 45 feet. Six shafts are erect and in place, but they are all much weathered. The best-preserved shaft projected 3.0 feet above the ground. Dimensions of this shaft at ground surface were 2.3 × 2.7 feet; at top, 1.1 × 1.2 feet. Stone mortar was found at the southwest corner of the house. The other house had only three broken shafts in place and its original dimensions could not be determined. Fragments of other shafts and of capstones are in the immediate vicinity. The two houses were oriented north-south, with long dimension at right angles to the slope of the ground.

Below Marpo III and somewhat to the south in a cultivated field, six circular dark-colored areas, approximately 30 feet in diameter, were also found, together with surface sherds. These may have been either house or burial sites, though the cultural deposit appeared very shallow.

3. UNAI DANGKULO

In the bay formed between Asiga and Masalog Points on the east coast of Tinian there extends a stretch of beach and fringing reef that is similar to Laulau beach on Saipan's Magicienne Bay. This beach area on Tinian is known as Unai Dangkulo ("big beach"). Around this beach is a concentration of *latte* sites. The location combines good reef fishing with adequate farmland, a combination that formed the basis for the location of almost all coastal *latte* sites in the Marianas.

At the time of the Tinian survey, the Unai Dangkulo area was so heavily overgrown with bush that I am not at all certain that all sites were discovered.

(a) Unai Dangkulo I: A small, very badly disturbed, 8-shaft *latte*. Two of the interior shafts were missing and the others were so badly weathered that no accurate dimensions were possible. No capstones were found intact. House dimensions were 12 × 31 feet. The structure was oriented parallel to the coast line. For approximately 100 feet on either side of the house was a moderate concentration of surface sherds.

(b) Unai Dangkulo II: A large 12-shaft *latte*, 15 × 60 feet. All shafts were standing, with fallen capstones. A few feet to the south of this *latte* was a badly disintegrated 8-shaft *latte*. This site was literally buried in bush containing dozens of wasps' nests. The occupants of the latter found the intruding archaeologist an easy target and survey operations at this site were brought to an untimely close. It is probable that additional *latte* exist at this site. The two that were discovered were oriented with the long dimension parallel to the coast line.

(c) Unai Dangkulo III: Consists of three *latte* structures, with possibly others whose shafts have disintegrated, found in an abandoned sugar cane field. The largest of the three was a 12-shaft *latte*, with dimensions approximately 14 × 58 feet. Only six badly weathered and broken shafts remained in place, but fragments of other shafts and of capstones were scattered about. Fifty feet north was found a 10-shaft *latte*. The shafts of this house were in place but also very much weathered and broken. Dimensions of this house were 14 × 44 feet. Approximately 50 feet north of this second *latte* was a third. The third was probably an 8-shaft structure, but only a few badly weathered and broken shafts remained in place. It is probable that other *latte* structures once existed south of the large 12-shaft *latte*. The entire area of this site was covered with sherds. The three *latte* were arranged end to end, roughly parallel to the coast line.

(d) Unai Dangkulo IV: North of Unai Dangkulo III the remains of a single *latte* house were found. Only two broken shafts were found in place, with the disintegrated fragments of others at the site. One stone mortar was found associated with the *latte*.

4. SITES OF SECONDARY IMPORTANCE

(a) Along the west coast of Tinian, particularly between Gurgan Point and Hilo Point, is a coastal terrace of relatively fertile though shallow soil. Along this terrace extensive, but intermittent, sherd areas are to be found. In his field notes, Hornbostel grouped this area with what I have called "nuclear Tinian" into a single major archaeological area. Primarily the Gurgan-Hilo region consists of surface sherd areas, but one *latte* site was found. The location of this site is shown in figure 28. It consists of two probable 10-shaft and two probable 8-shaft *latte*, but the shafts are so broken and weathered that accurate dimensions could not be obtained. These *latte* are aligned end to end from 35 to 100 feet apart and parallel to the coast. Two additional *latte* probably existed to the south, judging from the number of limestone fragments. Two stone mortars were found.

(b) In the north central part of the island, an extensive sherd area, together with fragments of *latte* shafts and capstones, was found. This area was the site of a large World War II bomb depot. At the end of the war, the bombs in the revetments were blown in place, leaving tremendous craters. Consequently only bits and patches of the archaeological site remain, where the original ground surface still exists.

EXCAVATIONS AT THE BLUE SITE

One of the objectives of the archaeological survey on Saipan and Tinian was to find an entire *latte* village relatively intact. Although it is very prob-

able that many prehistoric Chamorro villages consisted largely of wood structures, previous survey work by Hornbostel had revealed clusters of stone-pillared house sites at Agingan on Saipan and at the Taga Site on Tinian (Thompson, 1932, pp. 17–18). At the time of my own work, the Agingan Site and all except the central *latte* structure at the Taga Site had been destroyed. The Blue Site was important in that it was the only major site discovered where an aggregation of stone *latte* houses was found intact.

The Blue Site derived its name from the fact that it lies just back of what American invasion forces in 1944 designated as Blue Beach. There is no surviving Chamorro place name for this location, so the wartime designation has been used.

Location and General Description

The Blue Site (see fig. 29) lies along the western edge of an abandoned sugar cane field. The area between the site and the beach and over half of the site itself were heavily overgrown with a dense cover of trees and bush. During the 1944 battle for Tinian the area was bombarded, but there was little wartime destruction of the site. There was no landing by American forces at this point.

The Blue Site consists of 10 *latte* structures, strung roughly end to end in an uneven line that parallels the beach (see fig. 30). The site is well located, in that there is good inshore fishing along the beach and shallow but good soil for farming inland from the site. Around the *lattes* themselves there was a heavy surface concentration of shells and sherds. The sherd area extended west of the *latte* about 50 feet and inland across the road (fig. 30).

A number of small, low mounds were found along the seaward side of the *latte* structures. Here the ground commences to slope toward the beach, though the *latte* area itself is level. Test trenches were sunk into two of these mounds and both proved to be refuse dumps. It is possible that the other low mounds are also the result of refuse accumulations.

Of the 10 *latte* structures, the largest and most imposing was at the center. This arrangement also held true at the Taga Site (Thompson, 1932, pp. 17–18). Whether the large central *latte* served some special function, either as a chief's house or as a ceremonial structure of some sort, could not be determined. The central *latte* had all the remains of daily life—sherds, shells of edible mollusks, adze blades, etc.—on and in the ground about it, so that it must have been used as a living house and not reserved for special occasions. However, the village plan, with the largest house at the center, may well be a reflection of the social organization of the community.

In figure 30 the *latte* structures are numbered from I to X. They were all badly weathered, and in no case were the stone capstones found in place on the shafts. It is quite possible that there were wood houses also at this

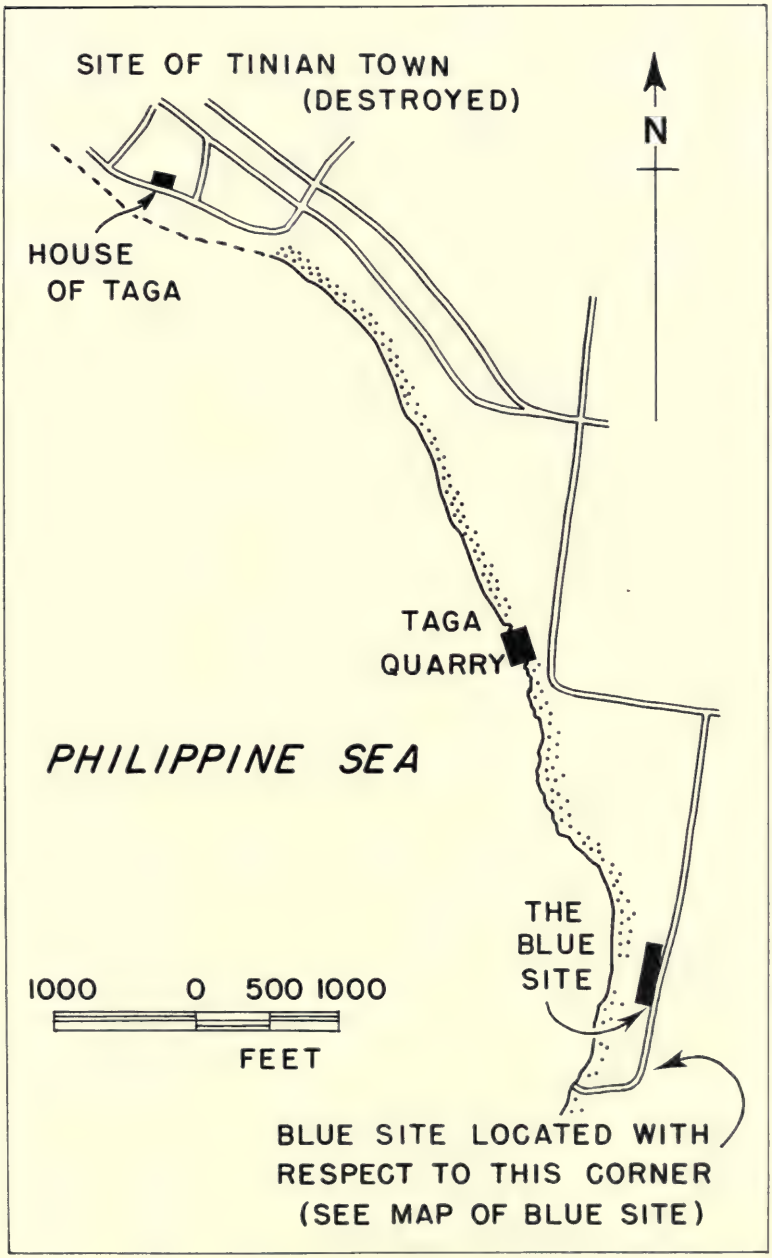


FIG. 29. Location of Blue Site, House of Taga, and Taga Quarry, Tinian.

site and that these have long ago disintegrated, and also there may have been a few additional stone *latte* houses that have disappeared, leaving no surface indication.

Blue I was the only house site excavated. Brief descriptions of the remaining *latte* follow. All shafts and capstones were cut from coral limestone.

Blue II, an 8-shaft *latte*. Only one shaft had not broken off, though all bases of other shafts were in place. The intact shaft projected 3.0 feet above the present ground surface and was trapezoidal in form. One intact capstone and two fragmentary capstones lay near the shaft bases, as well as one large stone mortar. Dimensions of structure: 36 × 12 feet.

Blue III. Probably an 8-shaft *latte*, though only the bases of five shafts projected above ground. All shafts were very much eroded. No capstones were found. Two stone mortars were found 25 feet west of the house. Probable dimensions of structure: 30 × 12 feet.

Blue IV, a 10-shaft *latte*, in fairly good condition. Five shafts were intact, all of trapezoidal form. These shafts projected above the present ground surface from 3.4 to 3.9 feet. Eight capstones were found, all of typical cup-shaped form. Dimensions of the best-preserved capstone were 3.5 feet (upper surface diameter) × 1.8 feet (lower surface diameter) × 2.0 feet (thickness). A fragment of stone mortar was found at the east side of the house. Dimensions of structure: 41 × 13 feet.

Blue V. Probably an 8-shaft *latte*, but two northernmost shafts had disintegrated. The remaining shafts were broken and greatly weathered. One shaft base projected 2.8 feet above the present ground surface, but originally it undoubtedly had a greater height. Only one weathered capstone fragment was found. Probable dimensions of structure: 36 × 12 feet.

Blue VI. Probably an 8-shaft *latte*. Though only three shafts were evident, two of these were at one end of the house and one at the other, with two fallen capstones regularly spaced between the ends. The two shafts at one end had fallen outward, but they were in fairly good condition. Both were trapezoidal in form, and from 3.6 to 3.7 feet in length. Of the third shaft only the base remained. Six capstones were found. Dimensions of the best-preserved one were 3.2 feet (upper surface diameter) × 1.7 feet (lower surface diameter) × 2.1 feet (thickness). Probable dimensions of structure: 35 × 14 feet.

Blue VII. Probably an 8-shaft *latte*, but only bases of three shafts were found in place, together with fragments of two capstones. The structure was located in a sugar cane field, and most of the capstone and shaft fragments apparently had been removed. Probable dimensions of structure: 34 × 11 feet.

Blue VIII, an 8-shaft *latte*. One interior shaft was missing; other shafts were broken or eroded, but the bases were found in place. The best-pre-

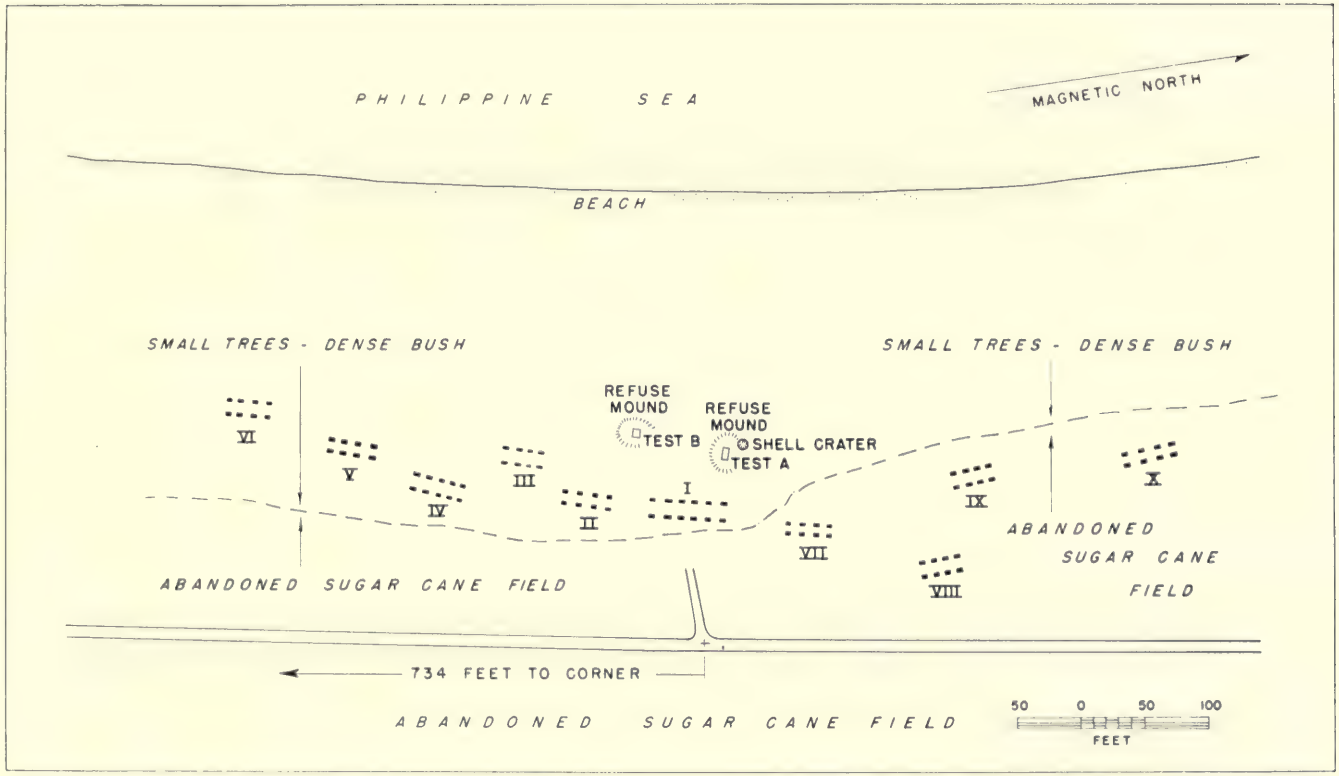


Fig. 30. Map of Blue Site, Tinian.

served shaft, though eroded, was trapezoidal in form and projected 3.1 feet above the present ground surface. One capstone fragment was found. Four feet from the southwest corner of the house was a well-made stone mortar. Dimensions of structure: 32 × 13 feet.

Blue IX, an 8-shaft *latte*. One interior and one corner shaft were missing, but fallen capstones marked their former location. Of the six remaining shafts, four were weathered but nearly intact; of the other two only the bases remained in place. The four nearly intact shafts were trapezoidal and projected from 2.6 to 3.0 feet above the present ground level. Seven fallen capstones were found. Their dimensions varied from 2.9 to 3.2 feet (upper surface diameter) × 1.4 to 1.6 feet (lower surface diameter) × 1.5 to 2.0 feet (thickness). Dimensions of structure: 33 × 12 feet.

Blue X, an 8-shaft *latte*. One interior shaft was missing; the other shafts were broken and weathered, but the shaft bases were found in place. Three capstones were found, only one of which was intact. Its dimensions were 3.0 feet (upper surface diameter) × 1.5 feet (lower surface diameter) × 1.8 feet (thickness). Dimensions of structure: 31 × 12 feet.

Excavations at Blue I

Excavation Procedure and Structure of the Site

Blue I, the largest of all Blue Site *latte*, was a 12-shaft *latte* structure, 58 feet long and 14 feet wide, located at the center of the line of *latte* that formed the site. A ground plan is shown in figure 31.

The surface of Blue I was heavily covered with potsherds, with both whole shells and fragments of *Tridacna*, as well as of other shells, and with some stone tools and flakes of volcanic rock. The *latte* was heavily overgrown with bush, though at one time the house area had been shallowly plowed. A stone mortar was found approximately 55 feet west of the house.

The excavations at Blue I consisted of a trench, 5.0 feet wide and 45.0 feet long, that was cut across the center of the *latte* at right angles to its long dimension. The soil proved to be shallow, and the trench was taken down to the underlying limestone bedrock. The surface of this bedrock was very uneven. The two deepest depressions were only 2.1 and 2.2 feet below the present ground surface. In some spots the limestone was found within 0.4 foot below the surface; its average depth was 1.2 feet (see figs. 32, 33).

Lying in the bottom of depressions and pits in the bedrock were found a few areas of undisturbed, red-brown soil, never more than 0.1 foot thick. For the rest, the entire soil stratum was loose and friable, dark gray in color, and filled with sherds, shells, stones, remains of burials, and charcoal.

No evidence was found of a coral pebble stratum, as was discovered at Objan and Laulau sites on Saipan. Nor were there found any remains of

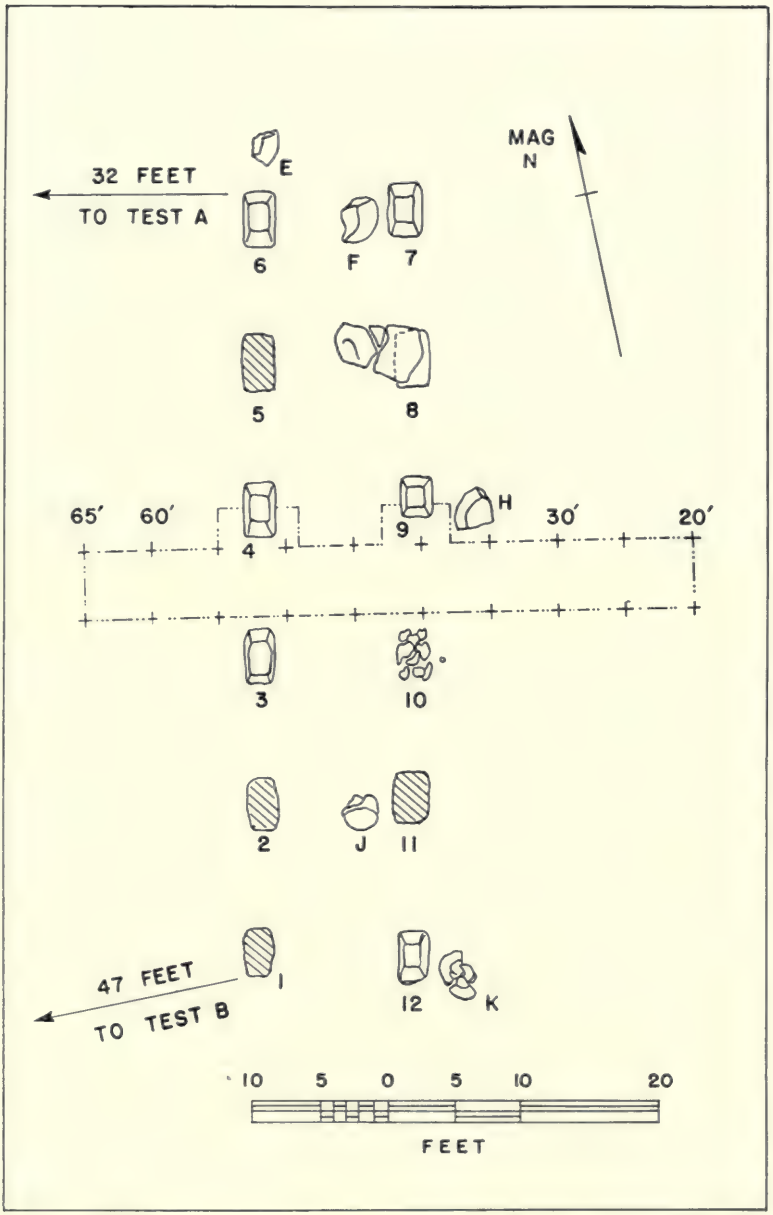


FIG. 31. Plan of Blue I, Blue Site, Tinian. *Latte* shafts numbered; capstones lettered; limits of excavation indicated by broken lines.

an earth oven or a cook house in the inland extension of the trench, though the soil was filled with minute charcoal fragments and considerable ash.

In addition to the lateral trench excavated across the house, test trenches were excavated in two small refuse dumps located to the seaward side of Blue I (see fig. 30).

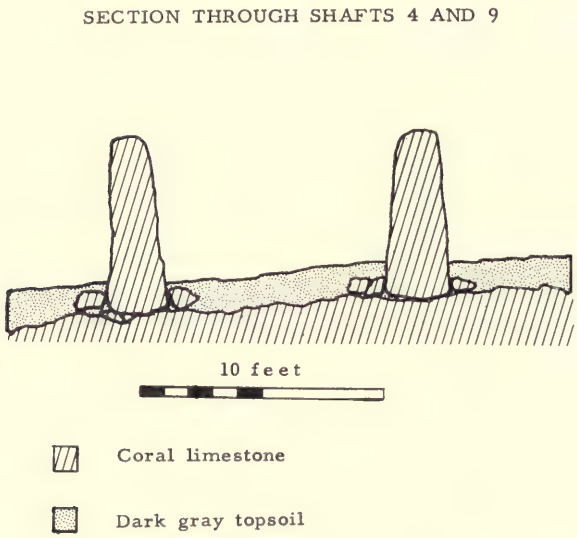


Fig. 32. Section through shafts 4 and 9, Blue I, Blue Site, Tinian.

Test Trench A.—Excavated in refuse mound to the northwest of Blue I. This mound was approximately 34 feet across in east-west dimension and 25 feet in north-south dimension. A World War II shell crater, approximately 8 feet in diameter, was located on the northern margin of the mound. The test trench, 5.0 feet wide and 10.0 feet long, was sunk into the center of the mound and excavated down to the limestone bedrock, which lay from 3.1 to 4.0 feet below the present ground surface. Except for a lower thin stratum of red-brown, sterile soil, from 0.1 to 0.4 foot thick, the entire deposit consisted of an accumulation of ashes, broken shells, sherds, and miscellaneous debris, capped with a thin recent deposit of topsoil. Lenses of lighter- and darker-colored ash appeared on the soil profiles along the sides of the trench, indicating successive dumpings of ashes probably removed from cooking hearths. At the bottom of the trench was found a large accumulation of fish scales.

Test Trench B.—Excavated in refuse mound to the southwest of Blue I. The trench was 5 feet square and was carried down to bedrock, which was found to lie from 3.5 to 3.7 feet below the present surface. The soil structure

FIG. 33. Blue I, Blue Site, Tinian. Upper: site cleared of bush and staked, showing *latte* shafts; looking north, with shafts 4 and 9 in foreground. Lower: trench, 5 feet wide, excavated across site, showing shallowness of soil overlying rough-surfaced, coral limestone bedrock; looking west.

FIG. 34. Shaft 7, Blue I, Blue Site, Tinian. Note markedly trapezoidal form of shaft, which projects 5.7 feet above present ground surface.

was the same as that found in Test Trench A—a thin lower stratum of red-brown soil, above which lay the refuse deposit, capped with a thin layer of topsoil. The refuse deposit consisted largely of ashes, with numerous sherds.

Latte

SHAFTS

Weathering.—*Latte* shafts exhibited great variation in amount of weathering and degree of disintegration. Shafts 3, 4, 6, 7, 9, and 12 were largely intact; other shafts had broken off, though bases remained in place (fig. 33).

Material.—All shafts were coral limestone.

Form and Dimensions.—Shaft 7 was the best preserved and is illustrated (fig. 34). Blue I shafts are more trapezoidal, with broader bases and narrower tops, than those found on Saipan. Eliminating shaft 3, whose top was badly weathered, the remaining standing shafts projected from 5.15 to 5.75 feet above the present ground surface. Shaft 7 measured 1.6 × 1.5 feet at the top and 4.1 × 2.5 feet at the point where the base entered the ground. The tops of the shafts were approximately level with one another.

Constructional Features.—Exploratory trenches were excavated around shafts 4 and 7. Both these shafts were found to rest on the limestone bedrock, with rocks packed around the base of each shaft to keep it upright.

Capstones

Weathering.—No whole capstones were found, though numerous fragments of disintegrated capstones lay near the shafts.

Material.—All capstone fragments were coral limestone.

Form and Dimensions.—All capstone fragments displayed the usual cup-shaped form. From the fragments, it was possible to estimate that the capstones were from 1.8 to 2.0 feet in thickness and that their greatest diameter was approximately 4.0 feet.

Burials

In the trench excavated across the *latte* structure, three burials were found, and in addition a miscellaneous assortment of human bones not associated with well-defined burials. These were all located west (seaward) of the center of the house. Probably the entire western half of the unexcavated house area was similarly used for burials.

Burial 1: Secondary adult burial, consisting primarily of skull and long bones. Bones present in good condition, but many bones of the skeleton missing. No grave goods. Depth to top of burial 1.1 feet (see fig. 35).

Burial 2: Multiple secondary bundle burial, consisting of two skulls and a miscellaneous assortment of long bones and a few phalanges. Bones in fair condition. No grave goods. Depth to top of burial 1.05 feet (see fig. 35).

Burial 3: The upper half of what was probably an extended burial. Bones present, all in poor condition, were those of skull, thorax, and arms. Burial was oriented on back in east-west direction, with skull at east. A few long bones were found where the lower half of the burial would normally have been, but these long bones probably represent a later secondary burial of a few human bones. No grave goods found. Depth to top of burial 1.8 feet.

All these burials were lying on the surface of the limestone bedrock at the bottom of the trench.

FIG. 35. Burials, Blue I, Blue Site, Tinian. Upper: Burial 2. Lower: Burial 1.

Pathology Indicative of Yaws

One skull and certain of the long bones of Burial 2 are of particular interest because they exhibit pathology characteristic of yaws and at the present time are the earliest evidence of yaws that exists in the records of paleopathology. These pathological bones have been examined by T. Dale Stewart and his observations and conclusions are recorded in a separate paper (Stewart and Spoehr, 1952).

Radiocarbon Dating of Blue I

Both test trenches at Blue I yielded liberal numbers of *Tridacna* shells among the refuse of which the mounds were composed. A *Tridacna* shell found at a depth of 1.9 feet in Trench A was dated by the radiocarbon method at A.D. 845 $\pm$ 145. Inasmuch as the refuse mound from which this *Tridacna* shell came was clearly associated with the Blue I *latte*, and as the deposit of cultural material at this site was so shallow and hence indicated only a relatively brief period of occupation, the radiocarbon date provides a carbon 14 date for the Blue I Site. The *Tridacna* is an edible mollusk and the shell supplying the radiocarbon date was undoubtedly deposited on the refuse dump shortly after the animal was consumed by man.

EXCAVATIONS AT THE TAGA SITE

Location and General Description

The House of Taga, consisting of twelve immense shafts and capstones, is located at the present harbor area (fig. 29). Originally, the site was approximately 360 feet east of the shore, but with the construction of World War II harbor improvements the beach area was filled in and the shore line moved farther west.

When Hornbostel visited the Taga Site in 1924, he found that it consisted of eighteen separate *latte* structures, extending roughly end to end and parallel to the beach (Thompson, 1932, p. 18). The House of Taga was the largest of these structures and was located near the center of the line. The site was composed, therefore, of an entire assemblage of *latte* houses, very similar to the present plan of the Blue Site, but more extensive. Also, as in the case of the Blue Site, the most impressive house was built near the center of the line.

After the time of Hornbostel's visit, the Japanese developed Tinian for the production of sugar cane. The town of Tinian grew up around the Taga Site, as the location at the harbor was the natural spot for a modern population to settle. All the *lattes* except the House of Taga were removed to make way for streets and buildings. The House of Taga and the ground immediately surrounding it, however, were made into a small park. Trees

were planted around the margins of the park and the interior area was planted to turf.

In 1944, Tinian was invaded by American forces during the Marianas campaign of World War II. Tinian town was completely destroyed, and the harbor area was bulldozed and rebuilt as a military area. The House of Taga was fortunately set aside and surrounded by barbed wire, and hence escaped the attention of American bulldozers. By 1950, a certain amount of vegetation had grown on and around the shafts and capstones, but they remained in good condition.

The Taga Site in History

I have found no references to the Taga Site in the early Spanish accounts but with the publication of Lord Anson's story of his voyage around the world in the years 1740–44, Tinian became known in detail to the European world. Anson arrived at Tinian in August, 1742, with his crew in deplorable condition from the ravages of scurvy. Except for a small foraging party of Chamorros and one Spaniard, the island was uninhabited, but it was well stocked with provisions in their natural state, and Anson and his men quickly recovered their health. Anson's account is one of the best concerning the island. He notes the large number of archaeological sites: "For there are, in all parts of the island, a great number of ruins of a very particular kind; they usually consist of two rows of square, pyramidal pillars, each pillar being about six feet from the next, and the distance between the rows being about twelve feet; the pillars themselves are about five feet square at the base, and about thirteen feet high; and on top of each of them there is a semi-globe, with the flat part upwards. . . ."

Anson does not specifically state that he is here describing the House of Taga, but the large dimensions of the *latte* given in this quotation could refer only to the Taga *latte*. He also includes a view of his landing and watering place at Tinian harbor (fig. 2). In this view the Taga *lattes* are prominently featured and he refers the reader of his archaeological description to this illustration. It is interesting to note that all twelve shafts of the House of Taga are pictured as still standing, with their capstones in place.

Anson also notes that the small party of Chamorros that he captured on Tinian assured him that the *latte* found in various parts of the island were the foundations of buildings. Anson's visit was less than fifty years after the inhabitants of Tinian had been conquered by the Spanish and removed to Guam.

After Anson's day, the House of Taga appears intermittently in the literature. Mortimer, in 1791, recorded the presence of the Taga Site, but gave no extended description. Arago, who was with Freycinet in the Marianas in

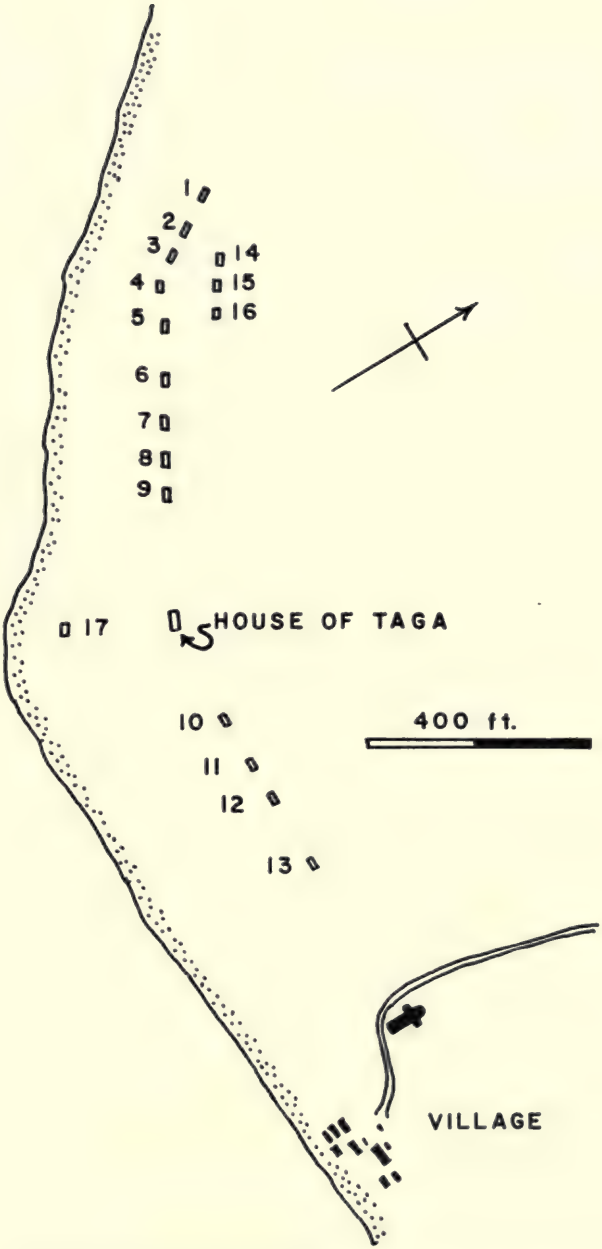


FIG. 36. Map of Taga Site as it was in 1924 (after sketch by Hornbostel). Site consisted of 18 *latte* structures, indicated by numbers on map.

1818, reports that seven shafts were standing erect. Sanchez y Zayas examined the site in 1865 and likewise reported seven standing shafts. Marche (1891) described the House of Taga briefly and included a photograph. Fritz (1904) stated that by 1900 all but five shafts had fallen. When Hornbostel visited the site in 1924, only two shafts remained erect with their capstones in place.

Figure 36 reproduces Hornbostel's sketch map of the Taga Site. On the map are plotted the locations of the eighteen *latte*. Each *latte* was examined by Hornbostel, and the following condensed description of the seventeen *latte* that have been destroyed is taken from his notes.

Latte 1: 12-shaft *latte* in good condition. Shafts in place, projecting approximately 5.0 feet above ground surface. Dimensions of *latte* 10.9 × 61.6 feet.

Latte 2: 12-shaft *latte*, badly weathered. Shafts out of place, so no measurements were taken.

Latte 3: 10-shaft *latte*, with four shafts in good condition; all but two capstones broken. Shafts projecting approximately 3.6 feet above ground surface. Base of capstones flat, with a slot cut into it to receive the top of the shaft. Dimensions of *latte* 11 × 40 feet.

Latte 4: 10-shaft *latte*, with five shafts intact; others broken but bases in place. Intact shafts projecting approximately 4.6 feet above ground surface. All capstones broken. Dimensions of *latte* 11 × 42.6 feet.

Latte 5: 12-shaft *latte*, with all shafts in place, but some broken. Shafts projecting approximately 3.8 feet above ground surface. Eight capstones present. Dimensions of *latte* 12.6 × 54.4 feet.

Latte 6: 8-shaft *latte*, with shafts and capstones badly broken. No measurements taken.

Latte 7: Probably 12-shaft *latte*. Seven shafts present, projecting approximately 2.0 feet above ground. All capstones missing. Probable dimensions of *latte* 9 × 35 feet.

Latte 8: Only one shaft and two capstones intact. Shaft projecting 4.0 feet above ground. Other shafts and capstones broken and some removed. No measurements of house taken.

Latte 9: Only shattered fragments of shafts and capstones found. Probably a 10-shaft *latte*.

Latte 10: Only one shaft found, with fragments of other shafts and capstones about. Shaft projecting 3.5 feet.

Latte 11: Only one shaft and capstone intact. Shaft projecting 5.3 feet above ground. Capstone 5.2 feet in diameter.

Latte 12: Only one capstone intact, with other capstones and shafts reduced to fragments.

Latte 13: One complete and two broken shafts found in place, with one intact capstone. Other shafts and capstones missing. Intact shaft projecting 3.6 feet above ground.

Latte 14, 15, 16: Hornbostel notes these ". . . are all in a ruined condition and measurements would be of no value. They appear to have been of 8 stones (shafts)." No. 14 had three shafts and nos. 15 and 16 each two shafts intact. Shafts projecting from 2 to 3 feet above ground.

Latte 17: 12-shaft *latte*, with six shafts standing, six fallen. Standing shafts projecting approximately 5.4 feet above ground. All capstones intact, but displaced from shafts. Diameter of capstones 5.3 feet. Dimensions of *latte* 12.7 × 54.5 feet.

The Taga Site in Chamorro Mythology

According to Chamorro legend, Taga was an ancient Chamorro giant, a man of great exploits, among them being the construction of the structure on Tinian that now bears his name. The Chamorros of today have been subject to influences from the West and from Japan for many years, so that Chamorro folklore only survives in a fragmentary state. The following account was obtained from Alberto Tobis, an elderly Chamorro who was born on Saipan. The account contains incidents also found in the texts of other stories, as recorded by Gertrude Hornbostel on Guam and published in Thompson (1932). The Taga account also ends on an obviously modern note.

Taga was originally a chief on Guam. He was a very big man, at least ten feet tall. He came from Guam to Rota, fought the Rota chief, and defeated him. Then Taga became the chief of Rota. He married a Rota woman and had a girl child by her. Taga commenced to build himself a house on Rota, and started to quarry the shafts and capstones at As Nieves. But he never finished the quarrying, as he decided to go to Tinian instead. So he left Rota and went to Tinian.

On Tinian, Taga met the Tinian chief for a contest of strength. First, the two chiefs both got in one canoe, sitting back-to-back. Taga faced Rota and the Tinian chief, Tinian. At a given word they both paddled as hard as they could. The canoe cracked apart between them. The two chiefs were even on this contest and returned to shore.

Next, the two chiefs took their throw nets. The Tinian chief cast his net along the shore. When he pulled the net up, it was full of fish. Taga was worried. He did not know Tinian and did not know where the good shore fishing spots were located. He finally gave his net a great heave and threw it far beyond the reef into the deep water. He dove into the open sea, pulled up his net, and found there were just as many fish in it as in the net of the Tinian chief. Because Taga had thrown his net so much farther, he won this contest.

After this, the two chiefs took their fish home to cook them. They needed some coconuts for coconut cream to put on the fish. The Tinian chief started to climb a coconut palm. "That is not the way," said Taga. Taga grasped the coconut palm and shook it so hard by the trunk that even the smallest coconuts fell off. The Tinian chief was shamed. Twice he had been defeated.

"We need now to husk and grate the coconuts," said the Tinian chief. He husked several coconuts, broke them open, and gave them to his wife to grate. "That is not the way," said Taga. Whereupon Taga took a nut, tore off the husk, and crushed the nut in

his two hands, squeezing out the cream. The Tinian chief had been defeated again. Three times he had been defeated. So Taga became the chief of Tinian.

Then Taga built himself a great house. The ruins of this house are still called the House of Taga.

After the house was finished, Taga's wife became pregnant. At this time, Taga decided to go to Saipan, to fight with anyone who wished to oppose him. So he went to Saipan with his wife and found a cave as shelter for her. But at night she gave birth to a son. The cave was contaminated with birth fluid. Taga was afraid to fight, as he might lose his vitality by being present at a childbirth, so he returned to Tinian.

When Taga's son was five years old, Taga caught a beach crab, tied a string to it, and gave it to his son to play with. The string broke and the crab ran into a hole under a coconut tree. The child called, "Father, come here and push over the tree so that I can get the crab."

Taga refused, because the coconut was one he had planted, and it had just commenced bearing nuts. The boy became very angry. He pushed the tree back and forth, and finally pushed it over. Then Taga became afraid. "The boy is so strong he may kill me when he gets older," Taga thought. So that night when the boy was sleeping, Taga killed him by strangling him.

Then Taga's daughter became very afraid of her father, and also sorrowed over her brother's death. She fled into the Carolines—the mountains of Tinian.

The mother, too, sorrowed so that she became ill and died. Taga was filled with remorse. One day Saint Joseph came to Tinian to convert the people to Christianity. Taga became a Christian and died on Tinian.

Archaeological Work at the House of Taga

The expedition's archaeological work consisted of bushing and cleaning the site as a public service, mapping and measuring the shafts and capstones, and excavating a series of strati-tests. A ground plan of the shafts and capstones is given in figure 37 and photographs of sections of the site are shown in figures 38 and 39. Description of the *latte* follows:

Latte

Weathering.—Both shafts and capstones show a certain amount of weathering. The sides and ends of the shafts, as well as the sides of the capstones, exhibit parallel striations caused by differential weathering. Also, both shafts and capstones have tended to develop pockets of softer stone.

Material.—All shafts and capstones are coral limestone.

Form.—Shafts are moderately trapezoidal. Capstones are cup-shaped.

Constructional Features.—The House of Taga was literally built on sand. Shafts were sunk 2 or 3 feet into the ground, but without adequate foundation. This has undoubtedly contributed to the collapse of the shafts.

NOTES ON INDIVIDUAL SHAFTS AND CAPSTONES

Shaft 1: Shaft fallen outward and cracked transversely about one-third of the distance from the top. Capstone rests on side, with lower margin buried in ground.

Shaft 2: Shaft fallen inward but it remains unbroken. Capstone rests on side.

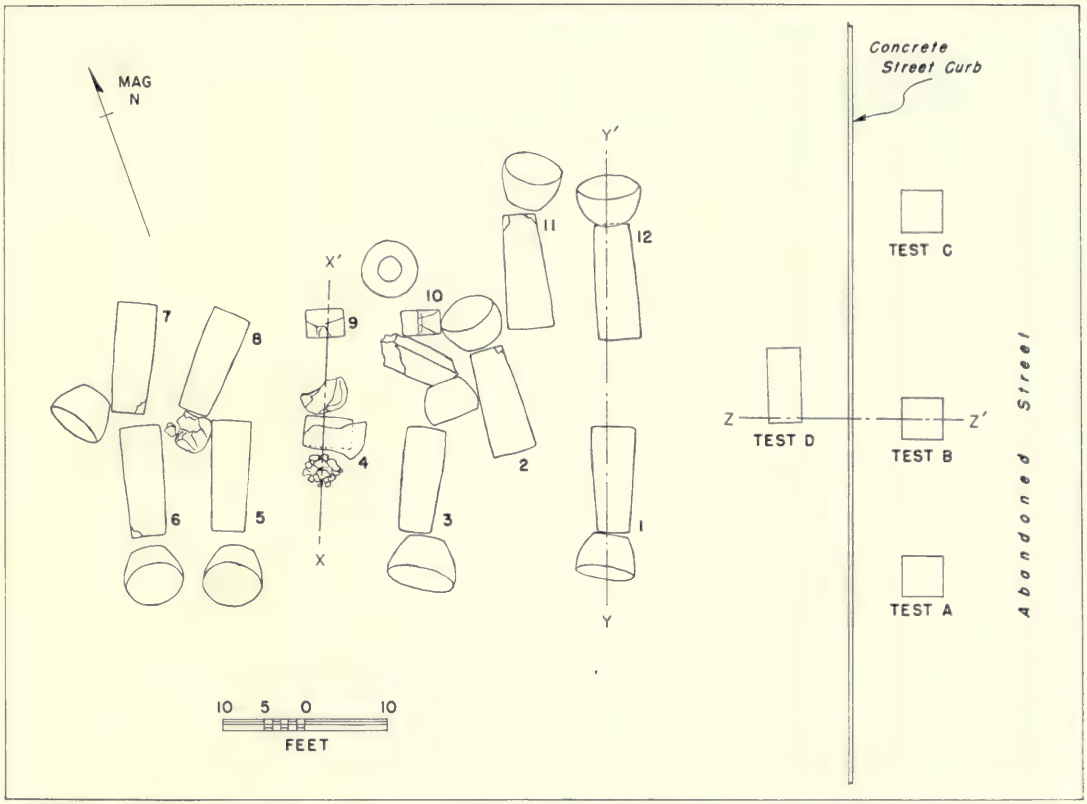


FIG. 37. Plan of House of Taga and of test trenches, Tinian. *Latte* shafts and capstones numbered.

FIG. 38. Shafts 4 and 9, House of Taga, Tinian; looking southwest. Fragment of capstone rests in place on top of shaft 9, shown at right.

Shaft 3: Shaft fallen outward. Capstone rests on side. Top of shaft buried only 0.1 foot below the present surface, while lower margin of shaft was found virtually on the surface; probably this shaft fell only recently.

Shaft 4: The only intact, standing shaft. Shaft is erect and capstone remains in position on the shaft. However, a large piece of the capstone has cracked off and has fallen inward, and another piece has fallen outward, breaking into many fragments.

Shaft 5: Shaft fallen outward. Base is almost buried up to the top surface, and this exposed upper surface shows much weathering. Capstone rests on side, with lower margin buried in earth. Upper face of capstone pockmarked by weathering. Relatively greater weathering of exposed upper

FIG. 39. Fallen shafts and capstones, House of Taga, Tinian; looking southwest. Capstone of shaft 3 in foreground, shaft 1 with capstone in background.

surfaces of both shaft and capstone suggests that this shaft was one of the first to fall.

Shaft 6: Shaft fallen outward, with base of shaft half buried. Capstone rests on side, with upper surface showing considerable weathering.

Shaft 7: Shaft fallen inward, with base partially buried. Capstone rests on side, with lower margin partially buried.

Shaft 8: Shaft fallen inward, with base partially buried. In falling, the capstone struck shaft 5, shattering the capstone, although its form is identifiable from the fragments.

Shaft 9: Shaft still standing but upper half has broken off, dropping the capstone to the ground. Capstone rests upside down, the only one in this position.

Shaft 10: Shaft base remains upright and in place, but upper section of shaft has broken off, falling inward. Capstone was dropped between shafts 2 and 3 and rests on side.

Shaft 11: Shaft fallen outward, with base partially buried. Capstone rests on side.

Shaft 12: Shaft fallen outward. Capstone rests on side.

Isolated Capstone: One peculiar capstone, not belonging to any of the shafts, lies half buried next to the fallen shaft and capstone of Shaft 3. This capstone is small (diameter 3.45 feet), and its cup-shaped surface has been reworked to form three concentric steps. It may have been placed as the base of a ladder into the house.

Dimensions: The intrinsic interest of the House of Taga makes it desirable to give the dimensions of the shafts and capstones. There is considerable variation among them. All dimensions are in feet.

Excavations

Inspection of the surface within the area of the *latte* itself revealed a sufficient number of depressions to indicate that the site had been very considerably subjected to previous excavation. Also, there were very few sherds on the surface. Hornbostel noted that at the time of his visit (1924) he collected in a 10 × 10-foot area on the surface 39 pounds of pottery fragments. Their scarcity today indicates the thoroughness with which visitors have picked up surface artifacts.

In view of the surface disturbance in the immediate area of the *latte*, a section on the east side of the site was selected for four test trenches. The site was bounded on the east by a concrete street curb and three trenches were located in the old Japanese street. The Taga shafts are on a low rise approximately two feet high. The Japanese street was cut through this mound but it was never surfaced. It was not used by American forces after the invasion and today leads nowhere. Except for the earth removed by the Japanese, the street was completely undisturbed, for no sewer or power lines had been laid below it. The fourth trench was located on the other side of the curb, just east of the *latte*, in an undisturbed location. These test trenches are shown in plan (fig. 37) and in section (fig. 40); excavation details are given below.

Test Trench A: In constructing the street, the Japanese removed approximately one foot of over-burden, but the subsurface area below was undisturbed. The trench was excavated to a depth of 4.0 feet. No pits, ash deposits, or occupation levels were found, but sherds occurred to a depth of 3.6 feet. The excavated material was all beach sand, and cave-ins of the trench prevented excavating to a greater depth.

SHAFTS

	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*
Length	12.9	13.2	13.4	11.2*	14.05	13.8	13.5	12.8	8.2*	4.5*	13.5	13.8
Width												
Top	3.7	3.9	3.9	....	3.9	3.8	3.85	3.5	....	3.5	4.0	3.9
Bottom	5.3	5.0	4.5	5.8	4.6	4.6	4.6	4.5	4.5	4.9	5.3	5.0
Thickness												
Top	3.4	3.15	3.3	....	3.0	3.0	3.4	3.25	....	3.2	3.0	3.0
Bottom	3.5	3.4	3.5	3.7	.....	....	.....	.....	3.3	3.0	3.9	3.25

CAPSTONES

	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*
Diameter												
Upper face	7.2	7.85	8.1	....	7.3	7.4	6.9	.....	7.0	6.55	7.15	7.8
Lower face	4.0	4.0	4.5	....	5.5	3.9	4.1	.....	3.5	3.6	4.45	4.5
Thickness	4.9	4.8	5.1	5.0	4.0	4.6	4.5	.....	4.35	4.6	4.6	4.7

* Projects above ground surface.

Test Trench B: In this trench, approximately two feet of over-burden had been removed during the construction of the street. The material removed was all beach sand. No pits, ash deposits, or occupation levels were found. Trench was excavated to a depth of 4.0 feet. Lowest sherd was found at depth of 2.3 feet.

Test Trench C: Approximately one foot of over-burden had been removed during street construction. Soil composition same as in Trenches A and B. At a depth of 2.5 feet a few small patches of dark gray sand were found, but there were no other signs of pits or occupation levels. Trench was excavated to depth of 4.0 feet. Lowest sherd was found at a depth of 3.5 feet.

Test Trench D: No over-burden removed previous to excavations. This allowed the obtaining of a soil profile of an undisturbed area (fig. 40) and made it possible to determine the pottery association of the Taga *latte*. Trench was excavated to a depth of 6.0 feet. Lowest sherd was found at a depth of 5.3 feet.

Burials

Just below the surface in Trench B, a few fragments of human pelvis and of the bones of the lower extremities were uncovered. Apparently, most of the burial was removed when the street was put in, during the period of Japanese administration. No other burials were found in the trenches.

General Discussion

Together with the As Nieves Site on Rota, where the shafts and capstones are even larger than those at Taga but are still located at the quarry and not at their ultimate destination, wherever it may have been, the house of Taga represents the climax of *latte* building in the Marianas. A question arises as to what sort of structure was placed on top of the stone *latte*. Was a roof placed directly on the capstones and shafts, or was a floor secured to the capstones with a wood structure above it? The top surface of the capstones was about sixteen feet above the ground, which would have resulted in a curious-looking structure, if a house were perched atop the *latte*. The answer to this question must remain one of speculation.

Another question is the manner of erecting the *latte*, as the weight of shafts and capstones is so great that some mechanical means must have been used. The simplest explanation is that the *latte* were set in place through the use of earth ramps. Here again any explanation is largely speculation.

The amount of surface pottery reported by Hornbostel, as well as that recovered from the upper level of Test Trench D, indicates that a good deal of ordinary daily living went on around the House of Taga. Whether

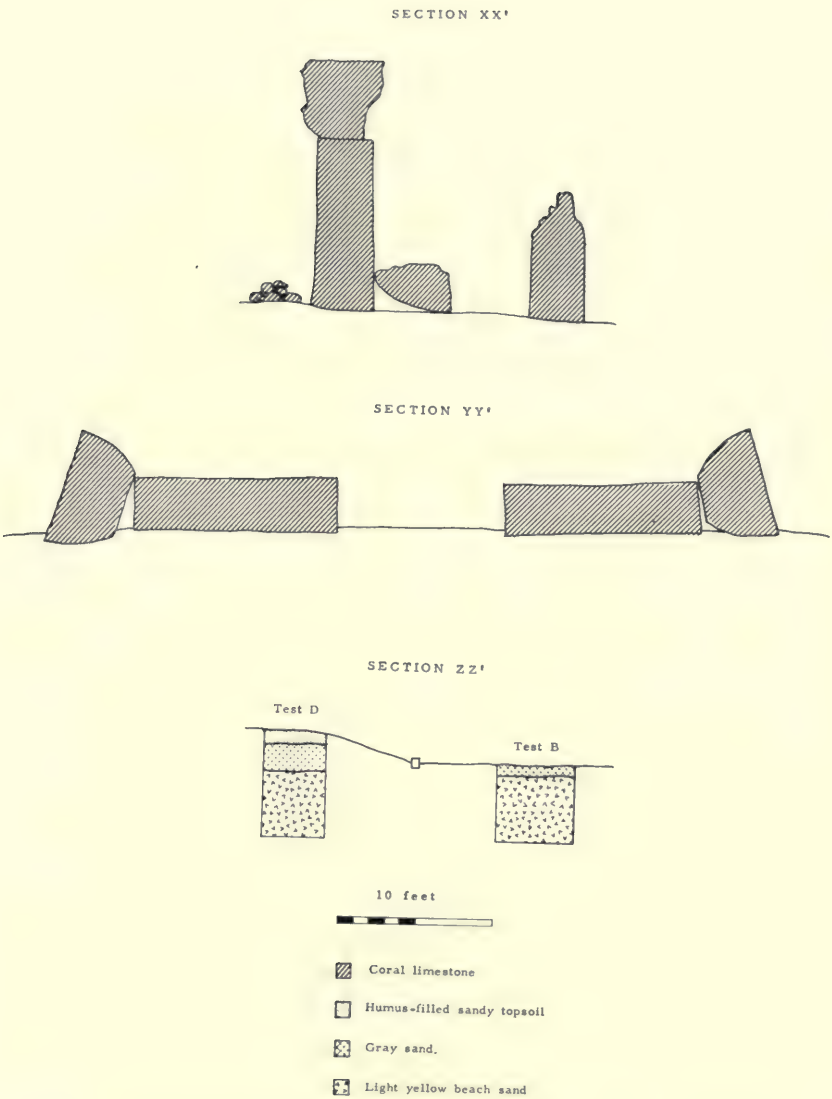


FIG. 40. Sections of shafts, capstones, and test trenches, House of Taga, Tinian.

it had a specialized use cannot be determined. The original form of the Taga Site consisted of a series of *latte* structures strung out along the beach, with the largest—the House of Taga—near the center. This arrangement paralleled that found at the Blue Site. It is known that the Chamorros at the time of contact had special men's houses, and the House of Taga may have been one. The Chamorros also maintained sharp class distinctions, and the House of Taga might have been the residence of a chief. In any case, I believe it most likely that the Taga *latte* reflected the social structure of the community just as do the men's houses of parts of western Micronesia.

The test trenches demonstrated that the House of Taga was only the last manifestation of a considerable period of occupation. With sherds found at a depth of over five feet below the surface, the site must have been occupied for a good many years. This matter is considered in greater detail in the conclusion of this report.

THE TAGA QUARRY

On the shore, approximately 4,000 feet south of the House of Taga, is situated the quarry from which Taga's giant shafts and capstones came. It is located on a low, limestone bench that terminates along its western side in a cliff that falls abruptly to the sea. A map of the quarry is shown (fig. 41). This is the only quarry found on either Tinian or Saipan.

The quarry forms a series of distinctive patterns of shaft and capstone holes. Along the east edge the pattern becomes confused and less well delineated. There are numerous overlaps of quarry holes, some of which are difficult to explain, unless a shaft or capstone broke in the process of quarrying.

The quarry is separated into two parts by a small cove that cuts into the limestone bench. At the cove, several great pieces of limestone have broken off the edge and fallen into the sea. In at least one case, a large section of limestone has fallen after shafts have been quarried from it, for the quarry holes are terminated by the cliff edge (see fig. 41).

The quarry holes themselves are not completely symmetrical. Apparently a small trench was cut around the capstone or shaft and this trench was deepened until the stone was undercut and freed from its matrix. In at least three cases, shallow trenches run into the quarry holes. Their use is unknown, unless it was to facilitate the collection of water in the trench cut around the shaft or capstone. Judging from the curvatures of the quarry holes, capstones were taken out right side up, in the same position as when placed on the shafts at the house site. In a few places, tool marks can be seen on the sides of the quarry holes. The marks appear as vertical, parallel

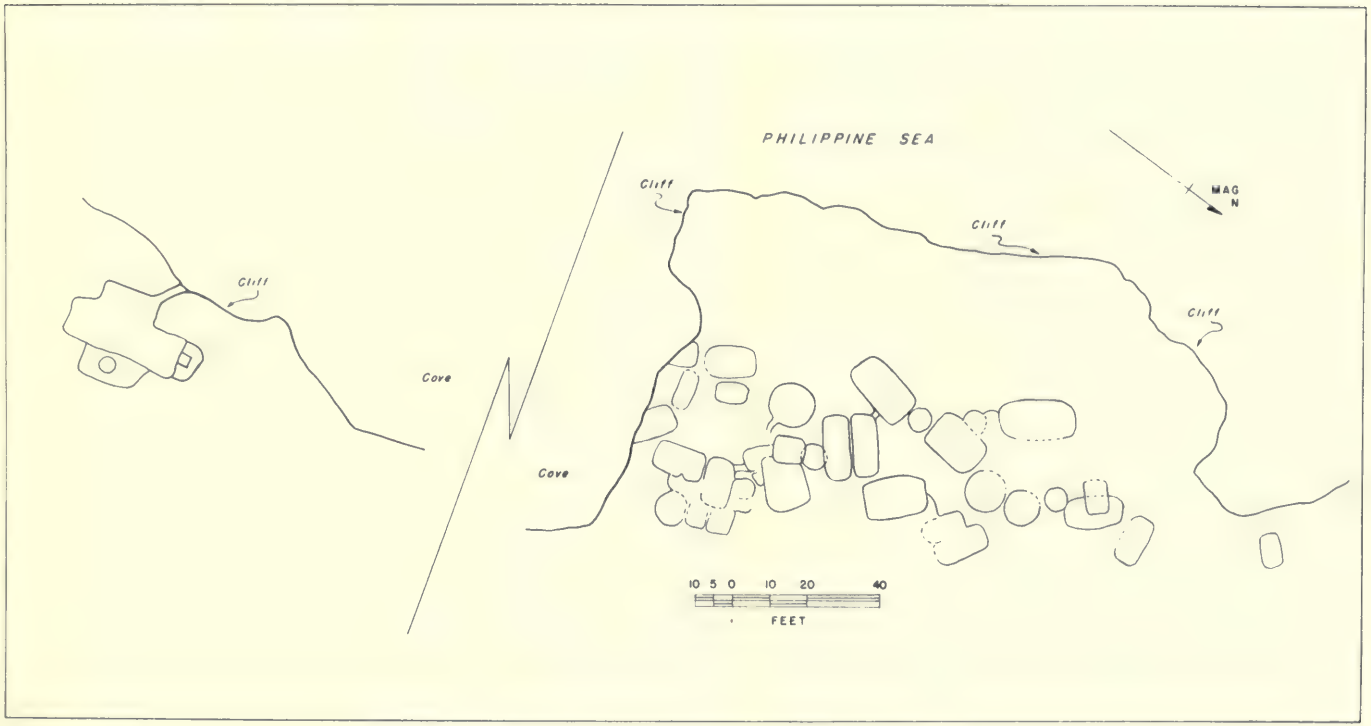


FIG. 41. Plan of Taga Quarry, Tinian.

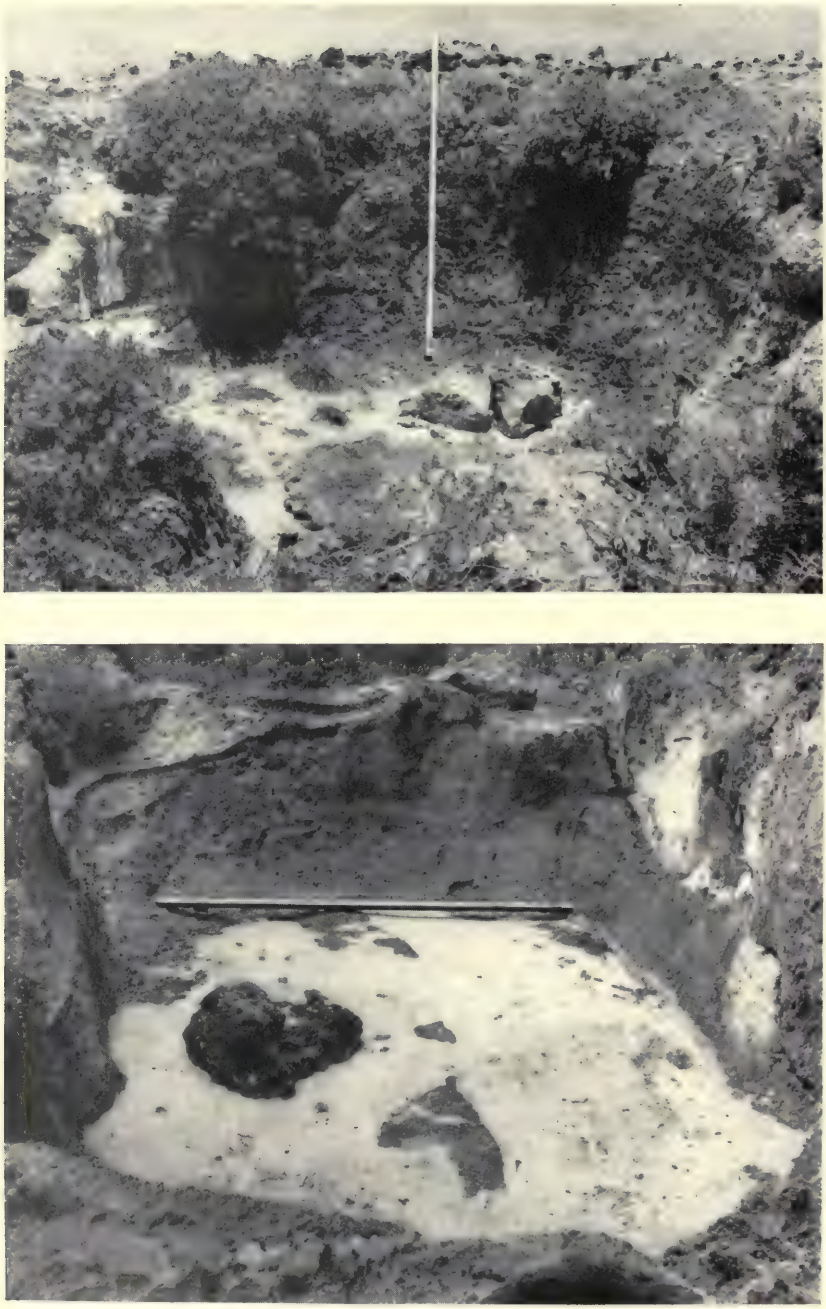


FIG. 42. Taga Quarry, Tinian. Upper: quarry hole of capstone. Lower: quarry hole of shaft. Level rod is 6.5 feet long.

grooves and were probably made by adzes or chisels. Also there are a few grooves to be found in the surface of the limestone, running into the edge of quarry holes. These grooves are from 1.5 to 4 feet long and from 0.05 to 0.15 feet wide and deep.

It is evident from the map that this quarry was used not only for the House of Taga shafts and capstones, but for smaller ones as well. How the largest shafts and capstones were transported is a matter of conjecture. There is no evidence that the ancient Chamorros knew and used the wheel.

IV. Archaeological Survey of Rota

Through the co-operation of the United States Navy, a brief archaeological survey was made of Rota in June 23–27, 1950. The coastal area was surveyed along the north coast from Sosanlagh Bay to beyond Muchon Point, and along the south coast from Sosanjaya Bay to Mariiru Point. In addition, an examination was made of the very interesting interior As Nieves Site.

Rota abounds in coastal *latte* sites, with the greatest concentration along the north coast, particularly in the Muchon Point area (fig. 43). At the latter location there are literally dozens of *latte*, including the only 14-shaft one (over 72 feet long) that I observed. Some are in clusters and others more widely spaced. There has been considerable destruction of Rota *latte* through the years, particularly as the Japanese during World War II constructed a coastal trench system, which disturbed numerous sites. Nevertheless, Rota retains more *latte* sites intact than either Guam, Tinian, or Saipan. The cultural deposits at these sites, however, do not seem to be deep and I was unable to locate sizeable refuse deposits.

The logical spot for the first migrants to have settled on Rota is at the site of the present settlement. This area has been much disturbed, as it was the seat of the Japanese sugar mill and the adjacent town. No *latte* were found here, though surface sherds are common. A considerable part of the area consists of limestone sands, and a series of test trenches might reveal an underlying pottery seriation, with Marianas Red sherds at the lower levels as at the Chalan Piao Site on Saipan.

The interior As Nieves site rivals the House of Taga on Tinian in impressiveness. At As Nieves, a series of nine giant shafts and seven capstones destined for a structure larger than the House of Taga remain at the spot where they were quarried. With one exception, the shafts and capstones are still in the quarry holes, with trenches cut around each shaft and capstone. The prehistoric Chamorros of Rota were bent on erecting a giant *latte* structure, but some unknown event caused them to abandon their work after it was well on the way to completion. Just where they proposed to erect the shafts and capstones is unknown.

The As Nieves site was first carefully mapped and described by Hornbostel in 1925. His plan and elevations, taken from his notes, are in-

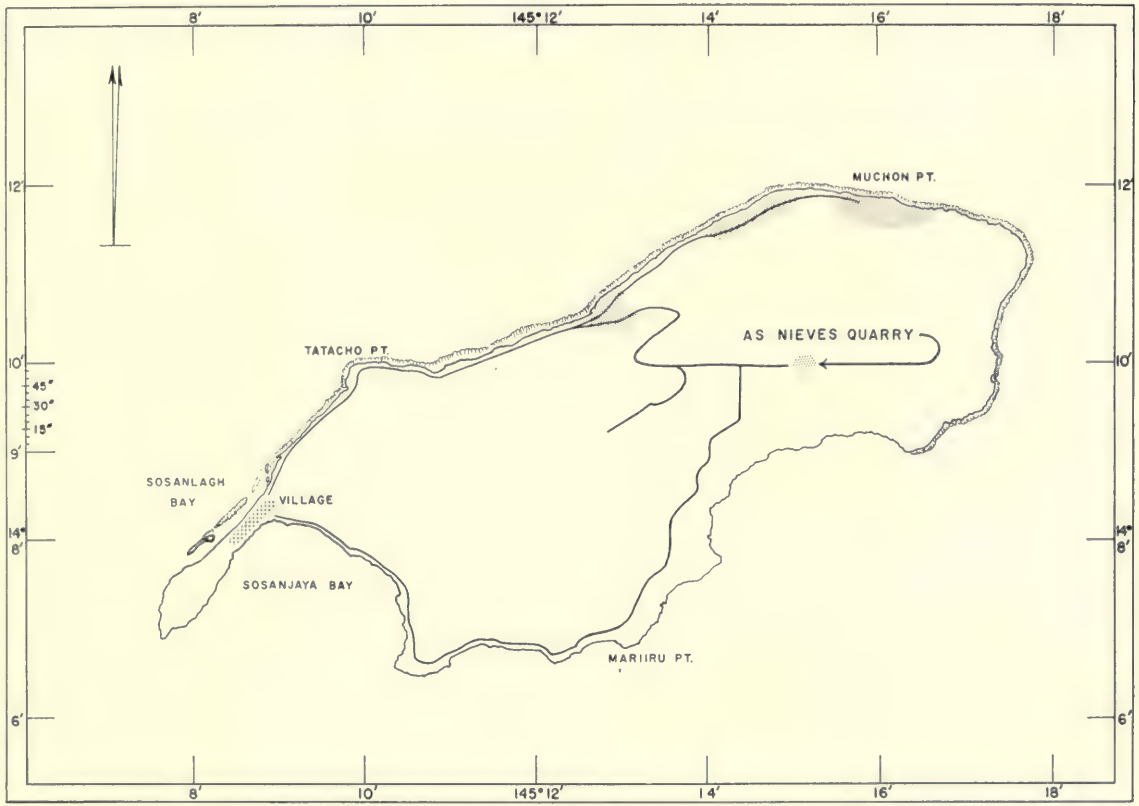


FIG. 43. Map of Rota, showing principal areas of *latte* sites and As Nieves Quarry.

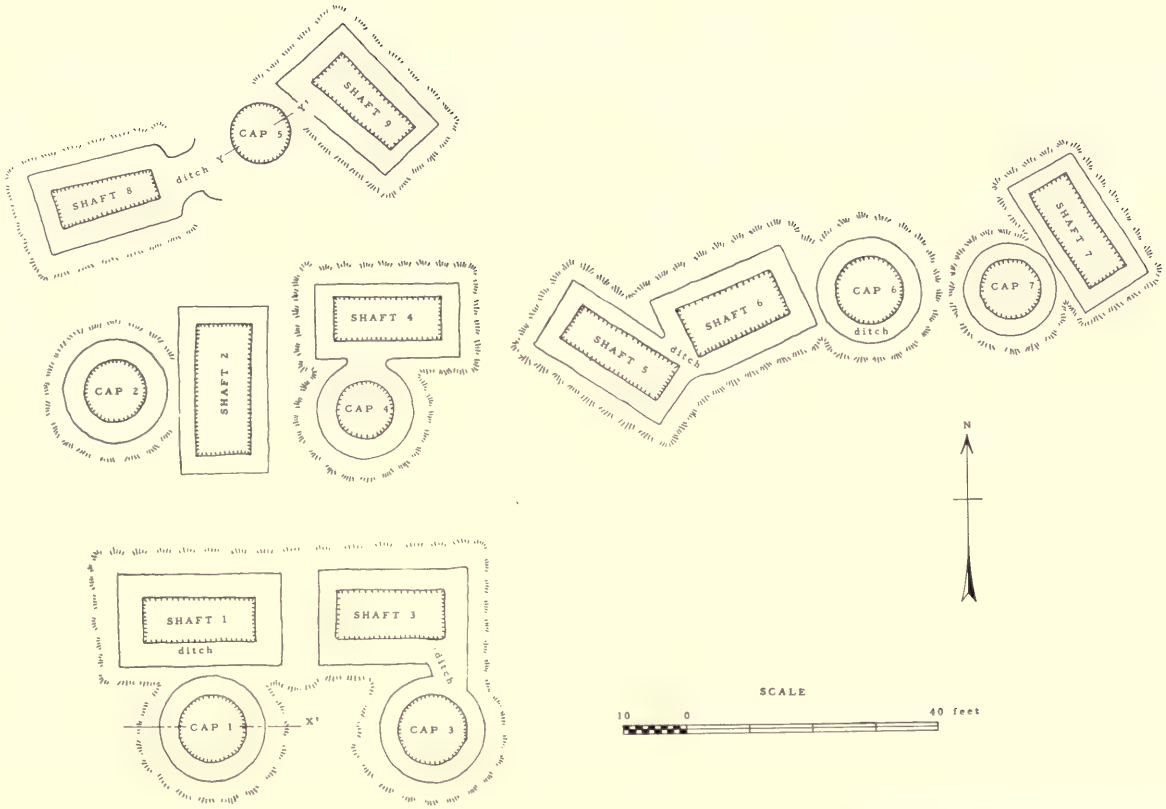


FIG. 44. Plan of quarry at As Nieves, Rota (after Hornbostel). Capstone 5 has been lifted out of its quarry hole. All other shafts and capstones remain in place, surrounded by ditches excavated into the limestone. Fill from ditches forms banks around them. Ditch around shaft 2 only 0.35 foot deep; other ditches from 2.0 to 4.2 feet in depth.

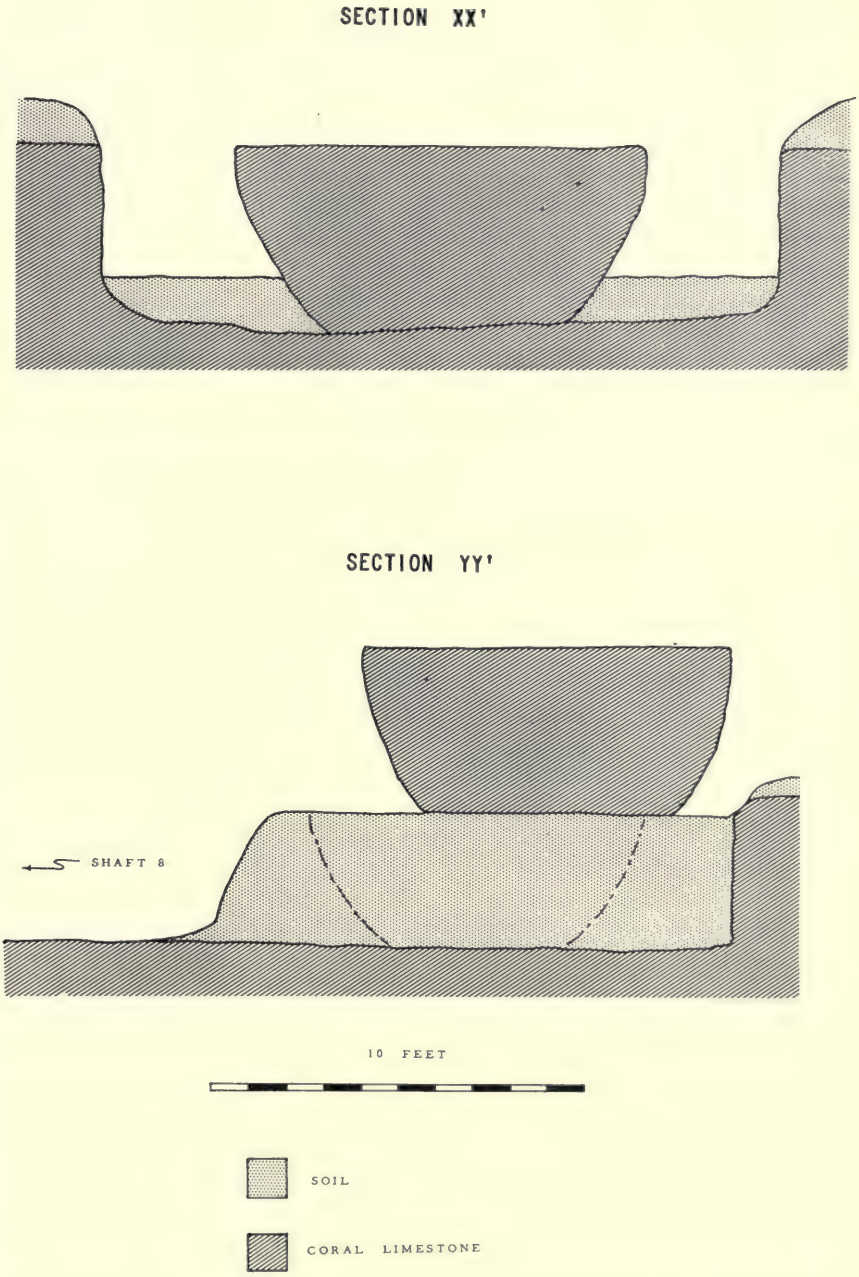


FIG. 45. Sections through Capstones 1 and 5, As Nieves Quarry, Rota (after Hornbostel). Section XX′, through Capstone 1, shows capstone still in place. Section YY′, through Capstone 5, shows how capstone was raised by levering it up and placing soil beneath it. Sections taken from drawings by Hornbostel.

cluded in figures 44 and 45. His observations of As Nieves provided Hornbostel with a clue to the method used in quarrying the giant shafts and capstones. In examining the banks of soil thrown out of the quarry holes, he noted that these banks contained considerable lime and fired rock particles. Hornbostel thereupon concluded that the prehistoric people at As Nieves built fires in the ditches around the shafts and capstones. These fires reduced the coral limestone to lime, or at least to friable material, which could then be removed with the basalt adzes of the ancient Chamorros. Hornbostel's explanation is entirely plausible, particularly when it is remembered that the prehistoric inhabitants of the Marianas were betelnut chewers, and hence probably familiar with this method of obtaining lime from coral limestone to combine with betel nut. If this is true, it is an interesting example of the transfer of a trait associated with chewing a narcotic to the quarrying of stone.

V. Pottery

A principal characteristic of archaeological sites in the Marianas is the abundance of pottery. Over 20,000 sherds were recovered during the course of archaeological work on Saipan and Tinian. Of all artifacts, pottery is the principal time-indicator of culture change in these islands.

The absence of whole vessels is remarkable. Despite the abundance of sherds, only one restorable vessel was found during the entire period of field work. As a result, pottery types have had to be established on the basis of sherds alone.

In 1698, Saipan and Tinian were conquered by the Spanish after many years of intermittent warfare. The Chamorro inhabitants of both islands were forced by their conquerors to move to Guam. Saipan was resettled in the nineteenth century by a colony of Carolinian islanders from the central Carolines and later by Chamorros from Guam. The Carolinians were from islands where pottery was not made, and the Chamorros who returned to Saipan had been under western influence so long that pottery-making had disappeared among them. During the eighteenth and nineteenth centuries, Tinian was stocked with cattle by the Spanish, who periodically sent parties to the island, where they hunted the cattle running wild on the island and returned to Guam with the meat, but no town was established on the island and no more than a very small handful of persons was ever on the island at one time. It is quite definite that the pottery found at archaeological sites on Saipan and Tinian predates the abandonment of these islands at the time of final Spanish conquest in 1698.

METHODS OF EXCAVATION AND ANALYSIS

In the excavation of archaeological sites on Saipan and Tinian, pottery and other artifacts were removed in 0.5 foot levels and by squares. Both distinctions were preserved in the analysis of the sherds. However, the lack of any statistically significant horizontal differences in pottery type distribution led to the grouping of squares in the presentation that follows. Levels proved to be significant; horizontal distribution did not.

All sherds were washed and given preliminary examination in the field. A considerable number of Marianas Plain body sherds were typed, counted

and discarded in the field. All rim sherds and all sherds of types other than Marianas Plain were shipped to the Museum for further analysis.

POTTERY TYPES

The pottery obtained during the course of excavations on Saipan and Tinian has been classified primarily from the point of view of usefulness in defining temporal and local differences. Another archaeologist might have imposed a classification of greater refinement on the sherd material if his objective was simply to describe and classify on the basis of small differences in paste quality and similar characteristics. This applies particularly to the largest category of sherd material, included in the type here given the designation Marianas Plain.

Marianas Plain is the most abundant type in the Marianas. Out of it probably grew Marianas Fine-Line Incised, Marianas Cord-Marked, and Marianas Trailed, which are differentiated from Marianas Plain on the basis of surface decoration. These decorated types are numerically insignificant on Saipan and Tinian, but I suspect they may be more significant on Guam. This supposition is based on only a casual acquaintance with Guam pottery, but there may be important local differences between Tinian and Saipan on one hand and Guam on the other (Thompson, 1932, p. 28).

The fullest previous description of prehistoric Marianas pottery is in the report by Thompson (1932) on the Hornbostel collection now in the Bishop Museum. Of the 1,559 sherds in this collection, Thompson assigned 1,546 to her Type 1; 6 sherds of a type not found in my own field work to her Type 2; 2 red-slipped sherds to her Type 3; and 1 burial urn to her Type 4. Four indeterminate sherds were not classified.

Of the pottery types described in this report, Marianas Plain, Marianas Fine-Line Incised, Marianas Cord-Marked, and Marianas Trailed all fall in Thompson's "Type 1." Also, in accordance with my own classification, I would assign Thompson's "Type 4" (burial urn) to Marianas Plain. Thompson's "Type 3" (red slipped ware) coincides with Marianas Red. One of Thompson's "Type 1" sherds I would assign to the lime-filled, impressed trade ware described hereafter.

The classification of pottery types that follows represents partly a refinement of Thompson's "Type 1"—a category in which she placed all but a few of the sherds from the Hornbostel collection. It should be noted that Thompson was forced to devise her sherd classification with only very minimal stratigraphic information.

MARIANAS PLAIN

General.—Of all the pottery types found, Marianas Plain is by far the most common. It is particularly associated with *latte* sites, where it occurs in great abundance. The following description is based on megascopic observation of over 19,000 sherds. Typical sherds are shown in figure 46.

FIG. 46. Marianas Plain sherds. Hole bored in upper left sherd for suspension of pot.

Provenience.—Objan (5,648 sherds); Laulau House A (1,976 sherds); Laulau Rock Shelter (1,103 sherds); Oleai (296 sherds); Chalan Kija (413 sherds); Chalan Piao (586 sherds); Taga (1,275 sherds); Blue I (6,887 sherds); Saipan Survey (68 sherds); Tinian Survey (862 sherds); Rota Survey (100 sherds). Total 19,214.

Paste.—There is great variation in the technical quality of this pottery type. Sherds vary from poorly fired and friable examples to well-fired, hard

sherds with a well-compacted paste. Color of core varies from brick-red through brown to dark gray. Sherds are grit-tempered, except for a few examples that also contain minute white inclusions (ground coral?). Vessels were probably modeled. One sherd shows interior finger-modeling impressions. No evidence of coiling. Hardness of core varies from 2.5–4.5 (Moh's scale).

Surface.—Undecorated except for two examples of small lugs and a number of examples of finger-impressed or incised decoration applied to the lips of rim sherds (see section on *Form* below). Predominant color of surface is reddish brown, though color may vary to a brownish gray. In the case of poorly fired sherds, surfaces tend to be eroded and crumbly. Exterior surfaces smoothed. Interior surfaces are sometimes smoothed for about 5 cm. below the lip. Sherds are unslipped, with the possible exception of some sherds that exhibit a very thin grayish film that may be merely a calcareous deposit. The one restorable vessel exhibited the marks of pandanus woven matting on the bottom surface. One other sherd also showed a mat impression. As these mat impressions may be merely the result of modeling the pot on a matting surface, I did not feel justified in establishing a separate pottery type to accommodate this form of surface treatment. Some sherds have a deposit of carbonized material adhering to the inner surface, indicating that these sherds came from cooking pots. Surface hardness 2.5–5.5 (Moh's scale).

Thickness.—A sample (which I believe to be representative) of 2,200 body sherds was measured for thickness. Measurements are given in the frequency graph below (fig. 47). The relatively large number of sherds measuring more than 12 mm. in thickness is one indication that this pottery type includes an appreciable number of large, heavy vessels.

Form.—Despite the large number of sherds found, only one restorable vessel, from the lower levels of the Taga Site and probably atypical in form, was recovered. This vessel is shown in figure 48. Marianas Plain vessels seem to have run to large sizes. Sherd curvatures indicate that pots up to 50 cm. in diameter were made. One Marianas Plain bowl from Guam was illustrated by Thompson (1932, pl. 5). This vessel is distinctive in that four small lizards are modeled in low relief on the exterior surface just below the rim. This type of relief decoration was not found on any Saipan or Tinian sherds. One large sherd from a flat plate (22 cm. in diameter) was found at Blue I site. Four rim sherds from Blue I showed holes for pot suspension.

All Marianas Plain rim sherds were carefully analyzed to determine differences in frequency among the various levels of a single site, as well as between sites. Rim types are as follows (see fig. 49):

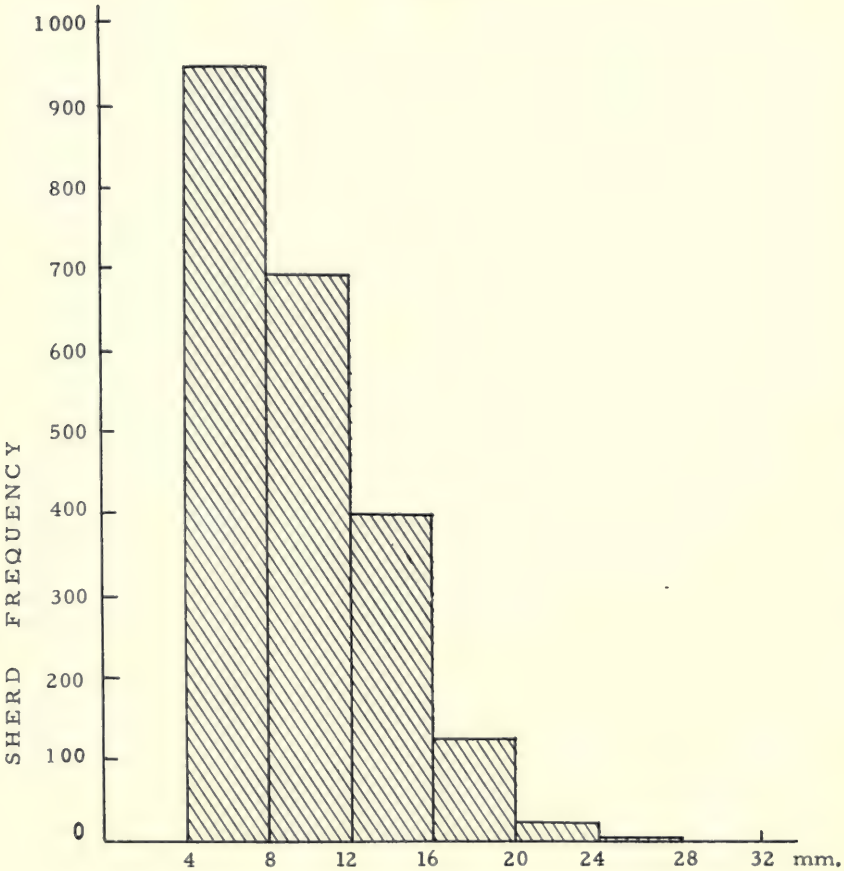


FIG. 47. Graph showing thickness of Marianas Plain body sherds, based on sample of 2,200 sherds.

Rim Type A.—In cross section, interior and exterior surfaces are either parallel or taper slightly toward the lip. The upper surface of the lip is usually rounded but occasionally is flattened. This type seems to be associated with straight-sided vessels, except for a very few sherds which exhibit a constricted neck and an everted lip.

Rim Type B.—In cross section, there is a pronounced enlargement at the lip. The upper surface is predominantly rounded but occasionally is flattened. Also, a very few sherds show a markedly everted lip.

Rim Type C.—Like Type A or B, except that the upper surface of the lip or the exterior upper surface of the rim exhibits a regular pattern of finger impressions. This type is low in frequency.

FIG. 48. Marianas Plain bowl, top view. This pottery vessel is similar in form to carved wood bowls from the Carolines and some other parts of Oceania; this similarity suggests that the vessel is derived from a carved wood prototype.

Rim Type D.—Like Type A or B, except that the upper surface of the lip exhibits a regular pattern of transverse incised lines. The upper surface of the lip is flat. Low in frequency.

Both Type A and Type B can be subdivided according to whether the upper surface of the lip is rounded or flattened. This subdivision was first made in the analysis of rims, but as the resulting division showed no statistical significance for purposes of seriation, the subdivision was not made in the final analysis. The results of the seriating of rim types are given in a following section.

A few rim sherds were so fragmentary they could not be classified. A few others, of exotic form, were also not classified.

MARIANAS FINE-LINE INCISED

Paste, thickness, color, and form are the same as those of Marianas Plain. Distinctiveness of pottery type is based on surface decoration. This

Fig. 49. Marianas Plain rim sections. Upper two rows: Rim Type A. Bottom two rows: Rim Type B. All sherd sections shown with sherd exterior to right. One half natural size.

consists of a pattern of narrow incisions on the exterior surface of rim and body. Incisions on Tinian and Rota specimens are in the form of a cross-hatch pattern (fig. 50), though Thompson reports other types of fine-line incising (Thompson, 1932, pp. 27–28), presumably from Guam. Though

FIG. 50. Upper row: Marianas Plain rim sherds (Type C) with finger impressions around lip. Lower row: Marianas Fine-Line Incised sherds.

the pottery type is numerically insignificant on the basis of the Museum's work at Tinian and Saipan, the type has been set up here because there may be marked differences in its frequency between Guam on one hand and Saipan and Tinian on the other.

Provenience.—Blue I (3 sherds); Rota Survey (4 sherds).

MARIANAS CORD-MARKED

This pottery type is the same in paste and thickness as Marianas Plain. The forms were probably also the same, except that the few sherds found of this type do not admit of a definite answer. The pottery type is distinguished by the manner of surface decoration (fig. 51). This decoration is either regular (a series of parallel lines) or random (sets of parallel lines, with different sets overlapping and running in different directions). The

difference is best seen in figure 51. On the few rim sherds found, parallel lines of the regular form of decoration run vertically downward from the lip. Impressions are from 1 to 2 mm. wide.

The decoration was probably impressed into the surface of the vessel by a cord-wrapped paddle. Solheim (1952) has recently reviewed the evidence

FIG. 51. Marianas Cord-Marked sherds. Middle sherd in left column random-marked; other sherds regular-marked. Note how impressed lines proceed vertically downward from lip of vessel, as shown in two upper sherds.

for paddle decoration of pottery in Oceania and Malaysia and in naming this type I have followed his conclusions. At the same time, I was unable to determine with certainty whether all sherds assigned to this type exhibited cord-impressions, or whether some may have been combed. Yet from the widespread nature of paddle-decorated pottery in Malaysia and its exten-

sion into the Marianas, I believe the assignment of these questionable sherds to the cord-marked category is valid.

Provenience.—Objan (7 sherds); Taga (4 sherds); Blue I (24 sherds); Tinian Survey (1 sherd); Rota Survey (18 sherds). Of this number, only 6 sherds, all from Blue I, exhibited the random form of cord-marking.

FIG. 52. Marianas Trailed sherds.

MARIANAS TRAILED

This pottery type is the same in paste, thickness, color, and probably in form as Marianas Plain. Distinctiveness of pottery type is based essentially on surface decoration. This is formed by trailed impressions, from 4–10 mm. in width, on the exterior surface of the vessel. In the case of the few rim sherds found, the trailing proceeds vertically downward from the lip (fig. 52). The trailed impressions are parallel. They were probably executed with the fingers, though an instrument may have been used.

Provenience.—Objan (1 sherd); Blue I (3 sherds); Tinian Survey (2 sherds).

MARIANAS RED

General.—The following description is based on megascopic observation of 485 sherds. No whole vessels of this type were found and inferences re-

FIG. 53. Marianas Red sherds. Rim of lower left sherd has broken off, leaving a fracture that suggests use of coiling technique; the sherd also exhibits erosion of red slip.

garding vessel forms are based on analysis of sherds alone (fig. 53). Technically, this is a well-made pottery type, superior to Marianas Plain.

Provenience.—Chalan Piao (397 sherds); Laulau Rock Shelter (81 sherds); Oleai (6 sherds); Blue I (1 sherd).

Paste.—Even-textured and well compacted, though some Chalan Piao sherds are slightly laminated and somewhat friable. In the range of sherds examined, the color of the core varies from dark gray to gray red. Paste contains numerous white inclusions (finely ground coral?) probably used as temper. From the sherds it is very difficult to tell whether coiling was used, though some rim sherds suggest this technique. Hardness of core 2.5–3.5 (Moh's scale).

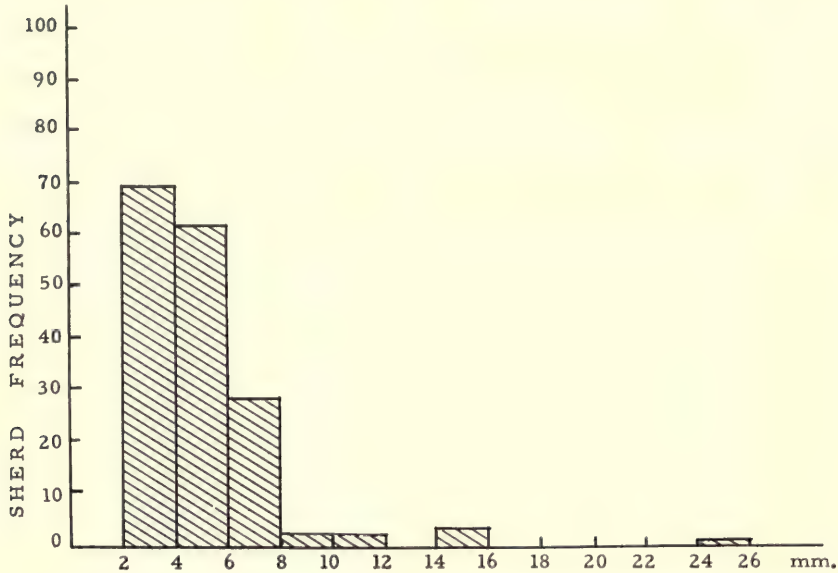


FIG. 54. Graph showing thickness of Marianas Red body sherds, based on sample of 165 sherds.

Surface.—Predominantly red, though some sherds vary to red-brown, or red-gray. Thin red slip applied to exterior surface and in a few cases to interior surface as well. Slipped surfaces smooth and often glossy. Some Chalan Piao sherds show considerable erosion of surfaces, and in many sherds only a part of the slip remains. Occasionally it is possible to flake off the red slip with the point of a knife. Except for two sherds with lip impressions, no decoration was applied to surfaces. Hardness of surface 3.5 (Moh's scale).

Thickness.—Predominantly a thin-walled ware, in contrast to Marianas Plain. Measurements of the thickness of 165 body sherds, given above (fig. 54), confirm this gross impression, which was most striking at the time of field excavation.

Form.—Analysis of rim, shoulder, and bottom sherds indicates that vessels were predominantly small. Both bowls and jars are represented in the collection. Range of rim sections is shown in the accompanying figure. The most common type has an everted lip. A few body sherds exhibit a well-defined shoulder. Bottoms of vessels seem to have been predominantly rounded, but four sherds gave definite evidence of a flat base.

Variant Sherds.—In addition to the 485 sherds on which the above description is based, we excavated an additional 164 sherds which varied from the Marianas Red sherds in surface color, though otherwise they were

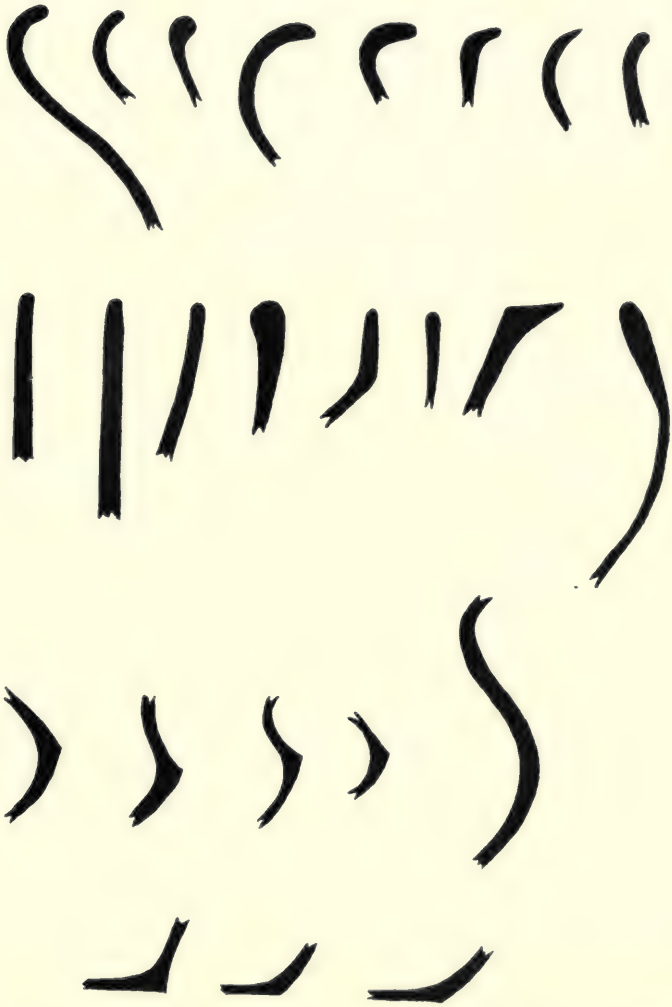


FIG. 55. Marianas Red sherd sections. Upper two rows: rim sherds. Third row: shoulder sherds. Bottom row: base sherds. One half natural size.

technically similar. Some of these sherds verged toward a buff, but the majority toward a dark gray. The provenience of these sherds is as follows: Oleai (1); Laulau Rock Shelter (11); Chalan Piao (152). The distribution in depth of these variant sherds showed a clear association with Marianas Red. Additional excavation may indicate the desirability of setting up a separate pottery type for the dark gray sherds, but I have purposely refrained from doing so in this report, as further extension of the formal clas-

sification did not seem warranted. Additional excavations in the Marianas may reveal that the dark gray sherds on one hand and the Marianas Red sherds on the other are associated with culturally established, consciously intentional differences in firing technique (oxidizing *vs.* reducing) rather than accidental differences. In this case, the dark gray sherds should be established as a separate type.

LIME-FILLED, IMPRESSED TRADE WARE

General.—This is a highly distinctive pottery type, set off from the others by the manner of decoration and the technique of manufacture. Only twelve sherds of this type were found, indicating a probable trade ware. For this reason, no locality designator has been used. However, the area of origin is unknown. The following description is based on megascopic observation of twelve sherds.

Provenience.—Laulau Rock Shelter (11 sherds, found in a small horizontal area, at a depth of 2.4 to 2.8 feet); Chalan Piao (1 sherd, found within top 0.5 foot).

Paste.—Somewhat friable, slightly laminated, and containing numerous minute white inclusions (ground coral?) as well as particles of grit. Color of core dark gray. Fractures indicate that this pottery was made by coiling technique, and that the sherds broke off at the coils, leaving smooth-edged horizontal breaks and rough-edged vertical breaks. These sherds provide a clear example of coiling in prehistoric times in the Marianas. Hardness of core 3.5 (Moh's scale).

Surface.—Color of surfaces dark gray. However, interior surface of one sherd has a thin red slip, and there are faint indications of a thin reddish-brown slip on the interiors of six other sherds. Exterior surfaces smoothed, but neither polished nor slipped. Hardness of surface 3.5 (Moh's scale).

Thickness.—Range of variation of thickness of body sherds 9–14 mm.

Decoration.—Eleven sherds were decorated on the exterior with impressed circles, circles with interior dots, and bands of impressed, opposed chevrons or of parallel vertical lines, or combinations of these. One rim sherd was undecorated on the exterior surface but possessed an incised, zigzag line 4 mm. below the rim on the interior surface. These impressions and incisions had been filled with lime, which made the decoration stand out strikingly from the dark gray of the surface. Figure 56 illustrates the distinctive nature of the decorative treatment.

Form.—Seven rim sherds were obtained, all having a similar cross section. In the absence of whole vessels of this type, it is possible to state only that the rim sherds suggest open mouth jars, or bowls. The question arises whether the lower parts of vessels of this type were undecorated and hence have possibly been assigned to Marianas Plain in the sherd analysis. Every

Fig. 56. Lime-filled, impressed sherds.

Fig. 57. Rim sections of lime-filled, impressed sherds. One half natural size.

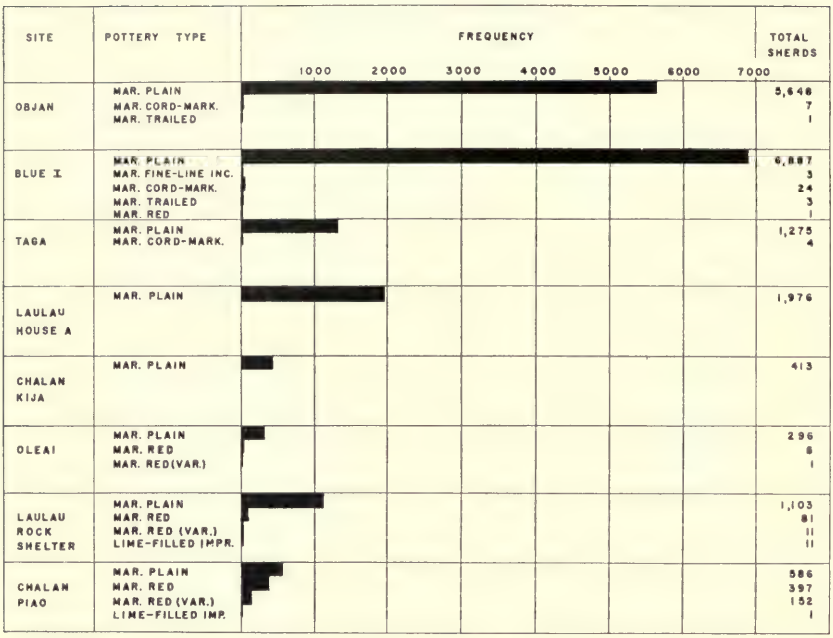


FIG. 58. Graph showing gross differences among excavated sites in relative frequency of pottery types.

effort was made to examine all undecorated sherds with this point in mind, but no undecorated sherds matching the technical characteristics of the decorated sherds were found.

LOCAL DIFFERENCES AND TEMPORAL RELATIONSHIPS REVEALED BY POTTERY

GROSS DIFFERENCES AMONG EXCAVATED SITES

The accompanying bar graph (fig. 58) illustrates the gross differences among excavated sites, when pottery types for each site are shown without regard to levels of excavation. For all sites, Marianas Plain is numerically the greatest. For *latte* sites, this numerical dominance is overwhelming, to the point that at Laulau House A and at Chalan Kija no other pottery type was found. It is clear that *latte* sites are characterized by a very high percentage of Marianas Plain.

Of non-*latte* sites, Laulau Rock Shelter and Chalan Piao are particularly interesting because they contained an appreciable number of sherds of a second major type, Marianas Red. The gross differences among sites suggest that the key to temporal relationships among pottery types is to be

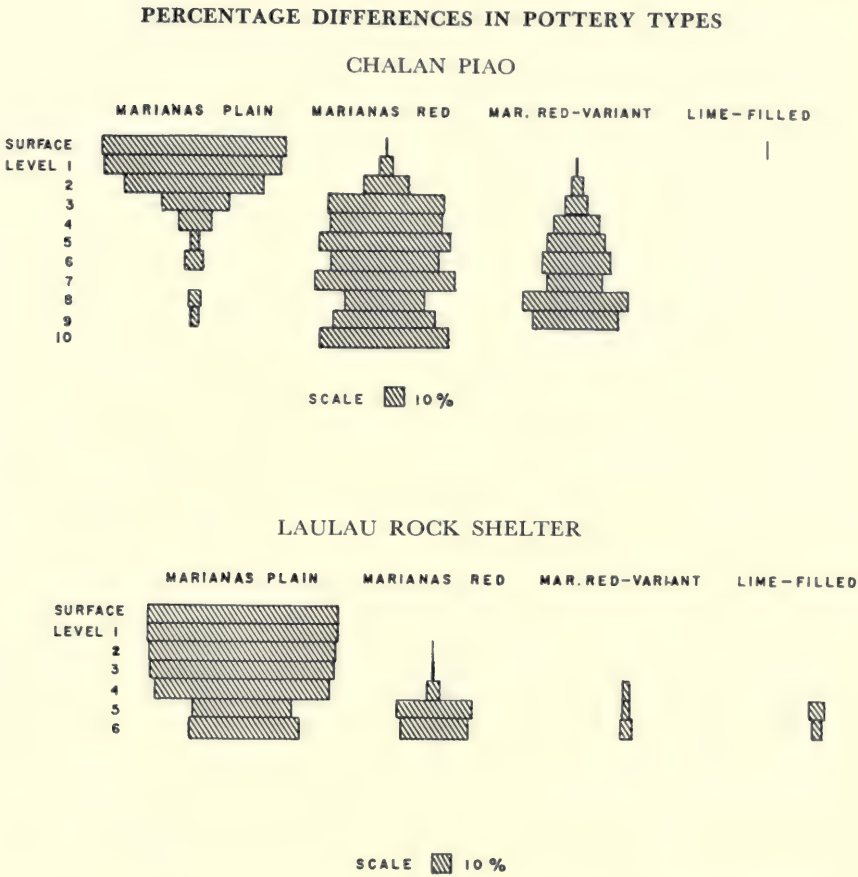


FIG. 59. Graph showing percentage differences in pottery types. Upper: Chalan Piao. Lower: Laulau Rock Shelter.

found in the relation of Marianas Plain to Marianas Red. This is precisely the case.

TEMPORAL RELATIONSHIPS AMONG POTTERY TYPES

At two sites—Laulau Rock Shelter and Chalan Piao—a clear temporal relationship was established between Marianas Red and Marianas Plain (see fig. 59). At Laulau Rock Shelter, although Marianas Red was not abundant, it occurred in the lower levels, phasing out toward the top levels. Marianas Plain, though present in all levels, showed a lower percentage of occurrence in the lower levels but was completely dominant in the upper levels.

The seriation data, therefore, lead to the following conclusion. Marianas Plain, though probably always present in the Marianas, did not become the dominant pottery type until late times. Marianas Red was either dominant in early times or at least as important as Marianas Plain, but it faded out with the passage of time. Marianas Plain is characteristically late (post A.D. 500?); Marianas Red is characteristically early. It was not present in historic times.

The occurrence of six sherds of Marianas Red in Levels 1 and 2 at Oleai suggests that the site is early but permits no definite conclusion. The finding of one Marianas Red sherd in Level 7 at Blue I is also inconclusive. Blue I is dated at A.D. 854 $\pm$ 145 and is a *latte* site. The single Marianas Red sherd was found near the bottom of a refuse deposit and may well have been originally a surface sherd deposited on the old ground level prior to the time Blue I was occupied by *latte*-builders.

Returning to Laulau Rock Shelter, the occurrence of lime-filled impressed ware in the lower levels only is also important. Presumably this is a trade ware that was introduced into the Marianas relatively early and never became established. The one sherd of this type found in Level 1 at Chalan Piao suggests that the site is early, but any conclusion based on the presence of a single sherd is necessarily open to serious question.

Marianas Fine-Line Incised, Marianas Cord-Marked, and Marianas Trailed seem to be types derived out of Marianas Plain. However, at Laulau House A and at Chalan Kija only Marianas Plain was found. The presence of iron artifacts at Laulau House A indicates that it was probably historic and suggests the possibility that these derived types had passed out of favor by historic times on Saipan. Yet Marianas Cord-Marked was found in the upper levels at Objan, also undoubtedly a late site, as it is described in Spanish seventeenth century accounts; so the evidence is not conclusive. However, Marianas Fine-Line Incised, Marianas Cord-Marked, and Marianas Trailed were nowhere found to be contemporaneous with Marianas Red.

Change through Time Expressed by Marianas Plain

With the temporal relationship between Marianas Plain and Marianas Red demonstrated, the next question is whether within the Marianas Plain category above, any change can be discerned. If such change were present, it would provide another means of determining the temporal relationships of the sites excavated, particularly those at which no Marianas Red was found.

The gross differences in relative frequency of Marianas Plain rim types among the sites excavated is shown in the bar graph (fig. 60). These data are then translated into percentage differences (fig. 61).

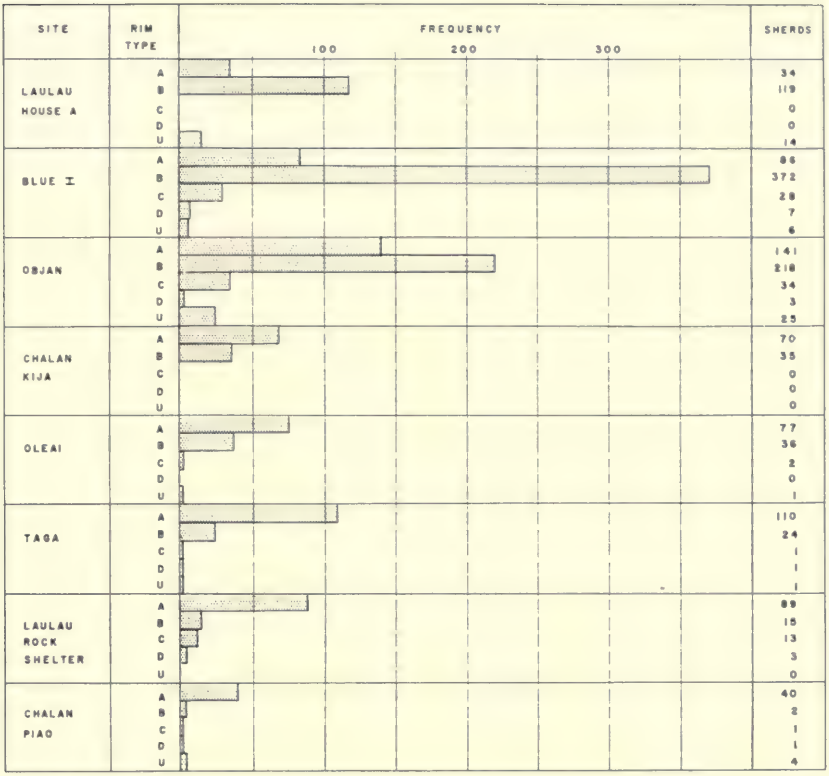


FIG. 60. Graph showing gross differences among excavated sites in relative frequency of Marianas Plain rim types.

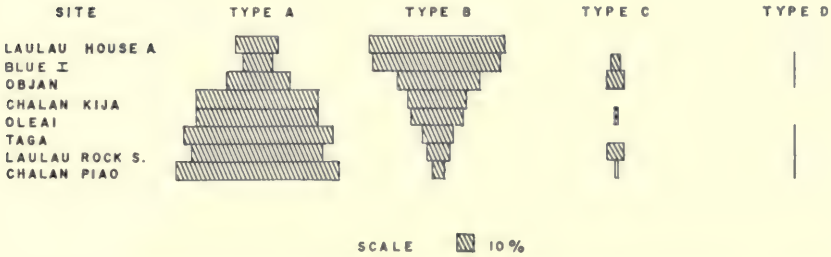


FIG. 61. Graph showing percentage differences among excavated sites in relative frequency of Marianas Plain rim types.

From the accompanying graphs it is clear that the principal point of interest centers on the difference in frequency between Type A rim sherds and those of Type B. On the basis of radiocarbon dates and pottery types—principally Marianas Plain and Marianas Red—Chalan Piao and Laulau

MARIANAS PLAIN POTTERY
(Frequency of Rim Types by Levels)
TAGA

Level	Rim Types			
	Type A	*Type B*	*Type C*	*Type D*
Surface	1	2	..	..
Level 1	6	5	1	1
Level 2	18	14	..	..
Level 3	30	2	..	..
Level 4	32	..	..	..
Level 5	10	1	..	..
Level 6	8	..	..	..
Level 7	2	..	..	..
Level 8	2	..	..	..
Level 9	1	..	..	..
Total	110	24	1	1

LAULAU ROCK SHELTER

Level	Rim Types			
	Type A	*Type B*	*Type C*	*Type D*
Surface	..	..	..	..
Level 1	22	8	..	2
Level 2	16	5	6	1
Level 3	24	2	3	..
Level 4	13	..	4	..
Level 5	8	..	..	..
Level 6	6	..	..	..
Level 7	..	..	..	..
Level 8	..	..	..	..
Total	89	15	13	3

Rock Shelter are early, Laulau House A and Blue I are late. In such case, a high frequency of Marianas Plain Type A rims is characteristic of early sites, and conversely a high frequency of Type B rims of late sites.

This leaves four sites between the extremes: Objan, Chalan Kija, Oleai, and Taga. Objan is a *latte* site and one would expect it to show a higher frequency of Type B. Nor at Objan was there a significant difference in the relative frequency of Type A and Type B sherds among the various levels.

This same lack of significance of relative frequency in depth was true of Chalan Kija and Oleai. At Taga, however, a difference did occur, with the Type B rims concentrated in the upper levels. As these upper levels are associated with the Taga *latte*, the *latte* period at Taga shows a higher proportion of Type B rims than figures 60 and 61 indicate and brings it closer to Objan. The data in depth for Taga and for Laulau Rock Shelter—the

only two sites with significant depth differences in rim types—are given in the following tables.

Therefore, within the Marianas Plain category, the difference in relative frequency of Type A and Type B rims provides supporting evidence in setting the sites excavated into a relative chronology, though primarily in regard to sites at the extreme ends of the chronology.

SHERD FREQUENCIES BY SITE

OBJAN

		Level					
	Surface	*1*	*2*	*3*	*4*	*5*	*6*
Marianas Plain	246	992	1,158	801	304	214	148
Marianas Cord-Marked	...	5	2	...	...	...	...
Marianas Trailed	...	...	.....	1	...	...	...
Total	246	997	1,160	802	304	214	148

	Level				*Seaward XX' profile*	*Trenches, shafts 1, 9*	*Total*
	7	*8*	*9*	*10*			
Marianas Plain	82	47	63	15	643	935	5,648
Marianas Cord-Marked	..	..	..	..	...	...	7
Marianas Trailed	..	..	..	..	...	...	1
Total	82	47	63	15	643	935	5,656

LAULAU ROCK SHELTER

		Level			
	Surface	*1*	*2*	*3*	*4*
Marianas Plain	12	324	266	262	129
Marianas Red	..	...	1	5	8
Marianas Red (variant)	..	...	...	...	4
Lime-filled Impressed (trade ware)	..	...	...	...	...
Total	12	324	267	267	141

	Level				
	5	*6*	*7*	*8*	*Total*
Marianas Plain	51	56	2	1	1,103
Marianas Red	36	31	..	..	81
Marianas Red (variant)	3	4	..	..	11
Lime-filled Impressed (trade ware)	7	4	..	..	11
Total	97	95	2	1	1,206

LAULAU HOUSE A

	Surface	Level 1	2	3	4[1]	Total
Marianas Plain	324	1,474	94	..	84	1,976

[1] Base of *lattes*.

OLEAI

	Surface	Level 1	2	3	4	Total
Marianas Plain	26	105	130	30	5	296
Marianas Red	..	3	3	..	..	6
Marianas Red (variant)	..	1	...	..	..	1
Total	26	109	133	30	5	303

CHALAN KIJA

	Surface	Level 1	2	3	4	Total
Marianas Plain	148	178	78	8	1	413

CHALAN PIAO

	Surface	Level 1	2	3	4	5	6
Marianas Plain	27	407	99	28	12	1	4
Marianas Red	1	34	31	48	42	26	24
Marianas Red (variant)	..	...	6	4	16	11	16
Lime-filled Impressed (trade ware)	..	1	...	..	..	..	..
Total	28	442	136	80	70	38	44

	Level 7	8	9	10	11	12	Total
Marianas Plain	...	6	1	1	..	..	586
Marianas Red	77	41	13	6	..	1	397
Marianas Red (variant)	30	55	11	2	1	..	152
Lime-filled Impressed (trade ware)	...	...	..	..	..	..	1
Total	107	102	25	9	1	1	1,136

TAGA

	Surface	Level 1	2	3	4	5	6
Marianas Plain	27	258	348	229	292	78	24
Marianas Cord-Marked	..	...	...	4	...	..	..
Total	27	258	348	233	292	78	24

	Level 7	8	9	10	11	Total
Marianas Plain	5	6	2	4	2	1,275
Marianas Cord-Marked	..	..	..	..	..	4
Total	5	6	2	4	2	1,279

BLUE I

	Surface	Level 1	2	3	4
Marianas Plain	1,077	2,402	1,742	777	305
Marianas Fine-Line Incised	2	.....	1	...	...
Marianas Cord-Marked	4	3	8	6	2
Marianas Trailed	2	.....	1	...	...
Marianas Red	.....	.....	.....	...	...
Total	1,085	2,405	1,752	783	307

	Level 5	6	7	8	9	Total
Marianas Plain	290	109	108	35	42	6,887
Marianas Fine-Line Incised	...	...	...	..	..	3
Marianas Cord-Marked	1	...	...	..	..	24
Marianas Trailed	...	...	...	..	..	3
Marianas Red	...	...	1	..	..	1
Total	291	109	109	35	42	6,918

ROTA SURVEY

	Surface
Marianas Plain	100
Marianas Fine-Line Incised	4
Marianas Cord-Marked	18
Total	122

TINIAN SURVEY

	Surface
Marianas Plain	862
Marianas Cord-Marked	1
Marianas Trailed	2
Total	865

SAIPAN SURVEY

	Surface
Marianas Plain	68

POTTERY AND BAKED CLAY ARTIFACTS

A few pottery and baked clay artifacts, other than sherds, were obtained in survey and excavations.

Sinker.—Small, ovate sinker with pointed ends and with groove around mid-section. Length 37 mm. Found at Laulau Rock Shelter, Level 5 (see fig. 62, upper left).

Pendant.—Large circular pendant of Marianas Plain pottery, probably a worked sherd, with perforation near edge of disc. Surface find at Chalan Galeite, Saipan. Diameter 67 mm., thickness 21 mm. (see fig. 62, bottom).

Pendants or Sinkers.—Two circular worked sherds of Marianas Plain pottery, with perforation in center. (1) Whole specimen found at Objan,

Level 6; diameter 35 mm. (see fig. 62, upper right). (2) Fragment found at Blue I, Level 2; diameter 31 mm.

Pottery Smoother(?).—Large, oval object with rounded ends and one flat longitudinal surface. Surface find at Muchon Point, Rota. Length, 87 mm.

FIG. 62. Pottery and baked clay artifacts. Upper left, sinker; upper right, worked sherd pendant; lower, pendant.

VI. Stone Artifacts

ADZES

Ten whole adzes and eleven fragments were recovered from Saipan, Tinian, and Rota. This collection is so small that few significant conclusions can be drawn from its examination. However, the very paucity of stone adzes in comparison with shell adzes, particularly on *latte* sites, is interesting. Although the prehistoric Chamorros were fully conversant with pecking, grinding, and polishing techniques as applied to stone, for material for their adzes they relied primarily on *Tridacna* shell. The latter was more easily worked and the material more readily at hand, for most of the igneous rock of which Saipan's and Tinian's stone tools were made was probably imported from Anatahan and other northern islands. In connection with the paucity of stone adzes, it is true that *latte* sites are generally shallow, that there has been much artifact-collecting in the Marianas, that probably most sites have been worked over by collectors, and that many stone adzes have been removed. Nevertheless, I believe that on *latte* sites shell adzes have always outnumbered stone ones.

The stone adzes have been classified according to three types. Types 1 and 2 correspond to Thompson's Types 1 and 2 (Thompson, 1932, pp. 33–36), except that some of the rectangular adzes included in her Type 2 I would classify separately and would place with my Type 3. Thompson also describes a Type 3, but the brevity of her description makes the identification of her Type 3 adzes very difficult when her classification is applied to a new collection.

The three adze types established on the basis of my small collection are described in the following pages. The conclusions given below have been drawn from examination of these types:

(1) One cylindrical adze of Type 1 was found in Level 9 (4.0–4.5 feet below ground surface) at Chalan Piao, Saipan, in association with Marianas Red sherds. If the carbon 14 date of 1527 B.C. $\pm$ 200 for Chalan Piao is correct, this is the oldest adze in the collection. Type 1 adzes were also found at Objan, a *latte* site, the upper level of which is probably historic. This evidence, therefore, indicates that Type 1 adzes persisted for a very long period of time.

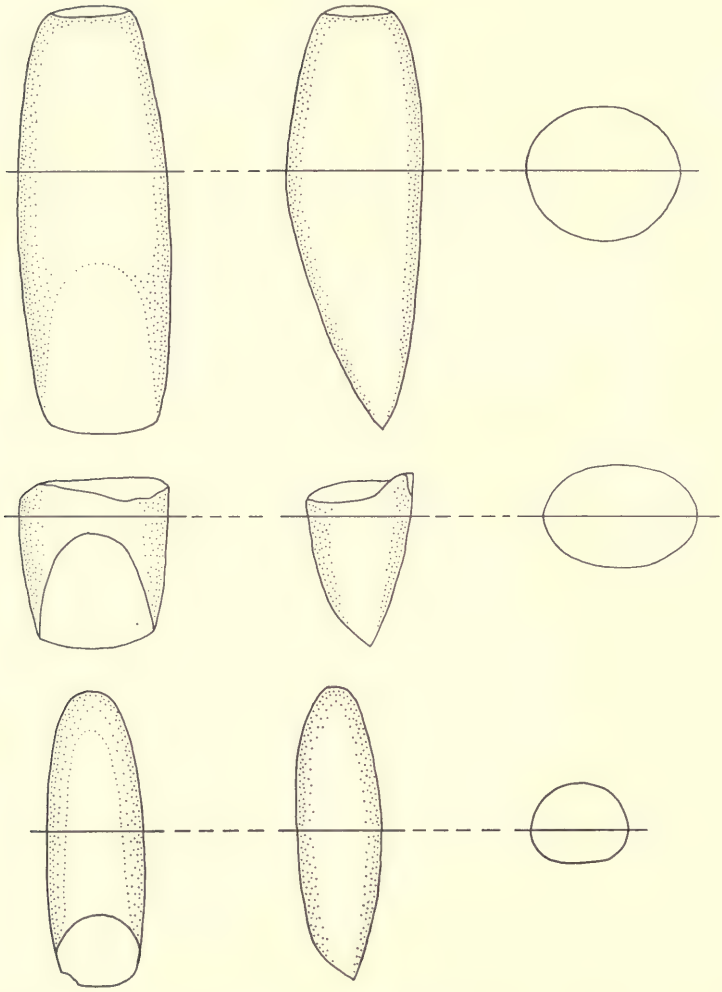


FIG. 63. Stone adzes, Type 1. Provenience of specimens as follows: upper, Marpo Valley (Tinian); center, Objan (Saipan); lower, Chalan Piao (Saipan). Length of top specimen, 133 mm.

(2) At *latte* sites, Type 1 and Type 2 adzes coexist, both as surface and as subsurface finds.

(3) Type 2 adzes are clearly similar to shell adzes of the same shape. The same form is therefore expressed in both shell and stone.

(4) The two Type 3 adzes represent surface finds and no conclusions are possible regarding their age.

Description of the adze types follows. The nomenclature used is taken from Buck, Emory, Skinner, and Stokes (1930). One adze fragment was so small it could not be classified.

Stone Adzes, Type 1

Shape.—Cylindrical in front-to-back silhouette, tapering toward both poll and cutting edge. Poll round or flattened. One longitudinal surface may be slightly flattened, presumably to facilitate hafting. Chin rounded. Adzes exhibiting the best workmanship belong to Type 1.

Cross Section.—Circular or slightly elliptical at mid-section. The best-made adzes are circular. Figure 63 (center) illustrates a broken fragment. The cross section of this fragment is elliptical, but it was taken from below the mid-section.

Surface.—The surface has been pecked. The blade has then been carefully ground, and the butt, particularly the poll, may exhibit light grinding over the pecked surface. In some specimens, the area of the surface adjacent to the cutting edge is polished.

Bevel and Cutting Edge.—Cutting edge may be straight or curved. In front-to-back silhouette, the cutting edge varies from a slight to a pronounced downward curve. The bevels are arched and confluent with the back. In figure 63 (upper specimen), the margins of the bevel have been ground to the point where they are virtually indistinguishable. The margin of the bevel is indicated by a dotted line.

Size.—Length of whole adzes varies from 9.1 to 13.3 cm.

Remarks.—Two specimens have cutting edges battered through use, and reground to form blunt, maul-like edges.

Provenience.—(a) Four whole adzes. Saipan: Chalan Piao (Level 9); Objan (Level 2, Level 5). Tinian: Upper Marpo Valley (surface). (b) Six fragmentary adzes. Saipan: Objan (surface, Level 4). Tinian: Blue I (surface); Blue VIII (surface). Rota: Muchon Point (surface).

Stone Adzes, Type 2

Shape.—Approximately rectangular to triangular in front-to-back silhouette. Surfaces rounded and angular margins absent. Poll rounded, occasionally slightly flattened. Front, plane or slightly concave; back, convex. There is no pronounced chin.

Cross Section.—Flattened ellipse at mid-section.

Surface.—Allover pecked surface. The amount of subsequent grinding varies. Most specimens exhibit some grinding over the whole adze surface, in addition to the bevel and edge.

Bevel and Cutting Edge.—In silhouette, cutting edge is convex. Bevel is sometimes slightly concave, forming a gouge-like tool. This latter feature is

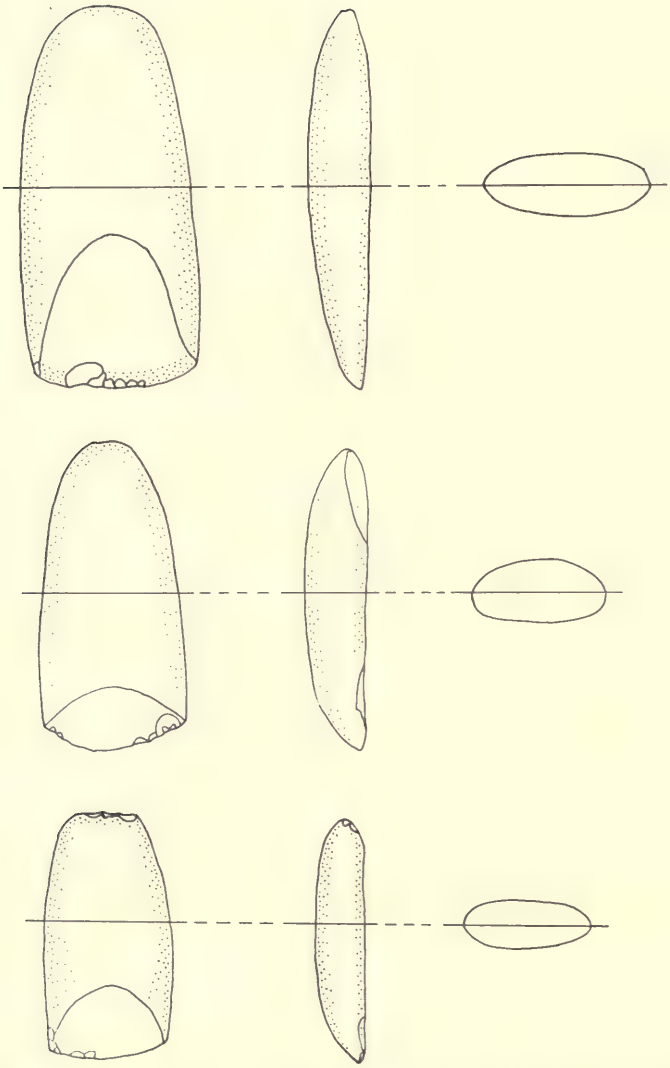


Fig. 64. Stone adzes, Type 2. Provenience of specimens as follows: upper, Muchon Point (Rota); center and lower, Objan (Saipan). Length of top specimen, 116 mm.

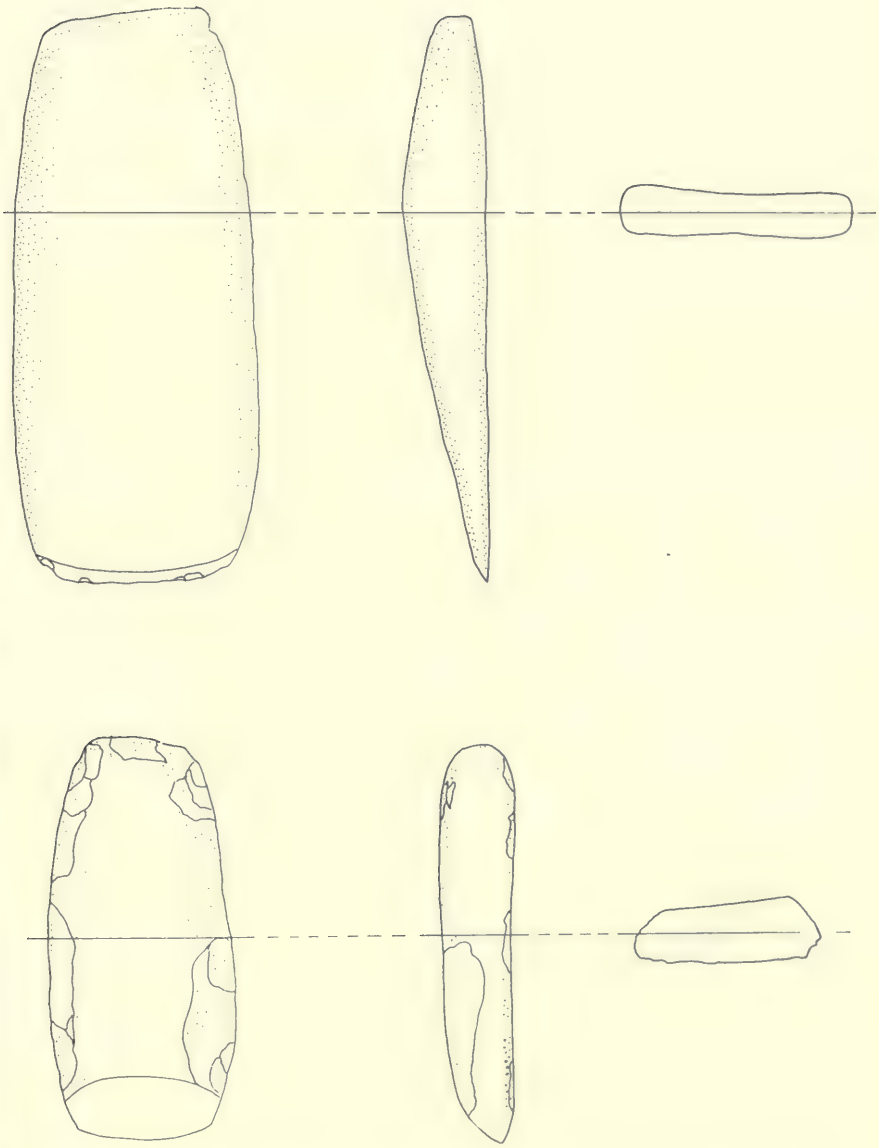


FIG. 65. Stone adzes, Type 3. Provenience of specimens as follows: Saipan, south section of island, no site. Length of top specimen, 178 mm.

pronounced in one specimen (fig. 64, upper) which also has a secondary bevel, indicated in the drawing by stippling. The variation in the amount of beveled area is illustrated (fig. 64).

Size.—Length of whole adzes varies from 7.6 to 11.6 cm.

Remarks.—Cutting edges of two specimens have been battered through use and then slightly reground. Polls also exhibit battering. These adze blades may have been re-used as wedges.

Provenience.—(a) Five whole adzes: Saipan: Objan (Level 3); Laulau House Site (Level 1). Tinian: Blue II (surface). Rota: Muchon Point (surface). (b) Four fragmentary adzes: Saipan: Objan (Level 3, 4); surface find (no site). Tinian: Marpo III (surface).

Stone Adzes, Type 3

Shape.—Roughly rectangular, in front-to-back silhouette. Flattened polls. Front and back surfaces plane. Sides rounded. The only two specimens of this type in the collection exhibit crude workmanship. One adze is triangular in profile (fig. 65, upper specimen).

Cross Section.—Rectangular, with curved sides.

Surface.—The two adzes of this type exhibit both chipped and pecked surfaces. Except at bevel and cutting edge, grinding has been used only very slightly over the adze surface.

Bevel and Cutting Edge.—Beveled surface narrow. Cutting edge straight. On one adze (fig. 65, upper specimen), only the bevel is ground. On the other specimen, both surfaces of the cutting edge are ground.

Size.—Length varies from 12.6 to 17.7 cm. These are the largest adzes in the collection.

Provenience.—Saipan: South section of island, no site (isolated surface finds).

CHISELS

One whole specimen and one fragment have been classed as chisels, primarily on the basis of their small size (fig. 66). They are cylindrical in shape, resemble stone adzes of Type 1, and conform to Thompson's description (1932, p. 37). Description of the single whole specimen follows.

Shape.—Cylindrical in silhouette, with sides tapering toward poll and cutting edge. Poll flattened. No pronounced chin.

Cross Section.—Circular at mid-section.

Surface.—Ground on all surfaces.

Bevel and Cutting Edge.—Bevel surface elliptical in outline and confluent with the back. In silhouette, cutting edge is convex.

Size.—Length 7.6 cm.

Provenience.—Muchon Point, Rota (surface find).

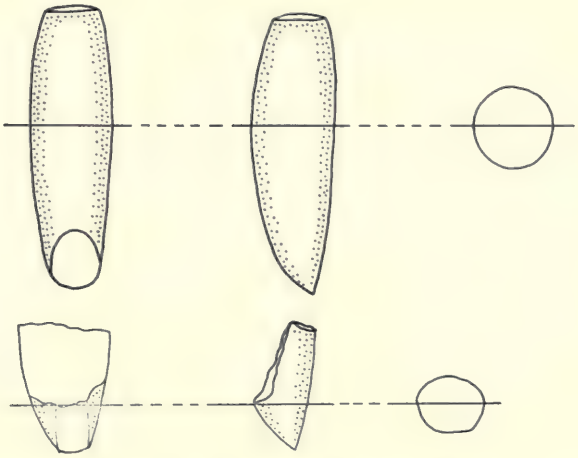


FIG. 66. Stone chisels. Provenience of specimens as follows: upper, Muchon Point (Rota); lower, Blue I (Tinian). Length of top specimen, 76 mm.

GOUGES AND AXES

Buck, Emory, Skinner, and Stokes (1930, p. 179) define a gouge as "a special form of chisel in which the edge is curved to such a degree that the bevel is hollow or grooved." No special forms of chisels conforming to this description were found. However, one adze of Type 2 (fig. 64, upper) does have a gouge-like bevel and edge.

No specimens that could be definitely classed as axes were found, either as surface finds or as excavated specimens. One artifact from the surface at Objan may represent an ax fragment, but the classification is uncertain.

SLINGSTONES

Thirty-five slingstones were found at sites excavated or surveyed. This is a small series compared to the 4,702 in the collection made by Hornbostel some thirty years ago. Slingstones are to the Marianas as projectile points are to the United States, and the surface of Guam, Tinian, and Saipan has been well scoured by collectors.

From documentary accounts, it is clear that the sling was a principal weapon of the Chamorros. The usefulness of slingstones as time-indicators, however, remains to be demonstrated. The potential variation in form is not great enough to provide a clear-cut medium of expression for stylistic change. Slingstones vary in quality of workmanship (which may be purely random), in shape (primarily whether the ends are pointed or rounded), and in size. In the following classification, three slingstones with rounded

ends have been set aside as a separate type; the remainder are grouped together. The three with rounded ends are all from Saipan, but this is not meant to imply that the type does not exist on the other islands.

Thompson (1932) classified the Hornbostel series into four types. She noted the presence on Guam of slingstones of baked clay and observed that local variation in slingstone materials correlates with the geology of Guam. No baked clay slingstones from Saipan or Rota are represented in the Hornbostel collection (Thompson, 1932, p. 100), and none were found in my own. Thompson's comment on local variation of slingstones on Guam is the only useful generalization to which discussion of slingstone types has contributed.

It should be noted that one slingstone from Saipan is 109 mm. long—nearly twice the usual size. The Hornbostel collection contains a number of oversize stones, the largest 260 mm. long. A ceremonial use for these oversize stones has been suggested (Thompson, 1932, p. 51).

Slingstones with Pointed Ends (Fig. 67)

Dimensions.—Length 44–109 mm.; average 58.6 mm. Diameter 15–51 mm.; average 29.9 mm.

Material.—Coral limestone.

Provenience

SAIPAN	
Objan:	
Surface	2
XX′ profile	1
Level 2	4
Level 3	1
Level 4	2
Laulau House A:	
Surface	3
Level 1	1
Level 2	1
Laulau Rock Shelter:	
Level 1	1
Oleai:	
Surface	2
Level 2	1
Chalan Kija:	
Surface	1
Saipan Survey	1
Total	21

TINIAN	
Blue I:	
Surface	1
Level 2	1
Level 3	1
Level 5	1
Tinian Survey:	
Blue III	1
Blue V	1
Puntan Laminbot	1
Total	7

ROTA	
Survey:	
Muchon Point	4
Total	32

Fig. 67. Slingstones with pointed ends. Length of lowest specimen, 109 mm.

Fig. 68. Slingstones with rounded ends. Length of top specimen, 55 mm.

Slingstones with Rounded Ends (Fig. 68)

Dimensions.—Length 55–64 mm.; average 58.7 mm. Diameter 2.9–3.9 mm.; average 34 mm.

Material.—Coral limestone.

Provenience

SAIPAN

Objan:		Laulau House A:	
Surface	1	Surface	1
Level 4	1		
		Total	3

PESTLES

The Chamorros at the time of the first Spanish contact were rice growers, and heavy stone mortars, presumably for grinding rice, are commonly found in association with *latte* sites. The stone pestles found at archaeological sites are of two general types: (1) relatively long cylindrical forms (fig. 69); and short, stubby pestles (fig. 70). The former could have been used with the larger, heavy mortars. The stubby forms were probably used for grinding medicinal plants in smaller stone mortars, a use to which they are still put today on Saipan. All pestles found were associated with *latte* sites.

Relatively Long Cylindrical Pestles (Fig. 69)

Dimensions.—Length 129–184 mm.; average 155.5 mm.

Material.—Igneous rock.

Provenience

SAIPAN

Objan:		Chalan Piao:	
Surface	1	Surface	1
Level 3	1		
Saipan Survey:		Afetna:	
Fañunchulujan	1	Surface	1
Oleai:		Location unknown:	
Surface	1	Surface	1

TINIAN

Blue I:		Tinian Survey:	
Surface	2	Blue III	1
		Leprosarium I	1
		Unai Dangkulo III	1
		Total	12

FIG. 69. Pestles. Length of upper left specimen, 141 mm.

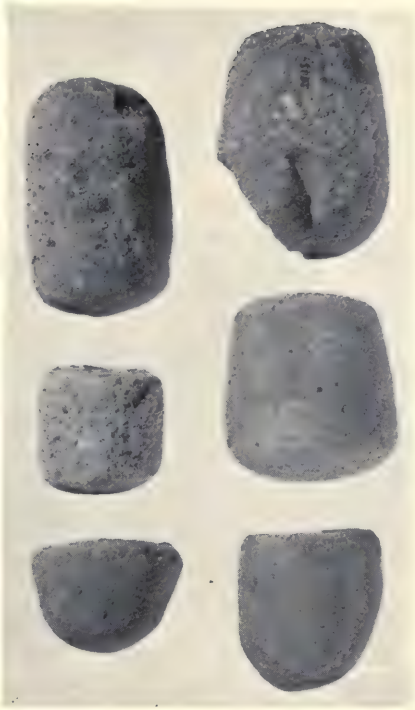


FIG. 70. Pestles. Length of upper right specimen, 111 mm.

SHORT, STUBBY PESTLES (Fig. 70)

Dimensions.—Length 56–111 mm.; average 80.3 mm.
Material.—Igneous rock.

Provenience

SAIPAN		TINIAN	
Objan:		Blue I:	
Surface	1	Surface	1
Level 6	1		
		Marpo III	1
Laulau House A:		ROTA	
Surface	1	Sijangigani	1
		Total	6

UNCLASSIFIED FRAGMENTS

Dimensions.—Length 53–110 mm.; average 77.6 mm.
Material.—Igneous rock.

Provenience

SAIPAN		ROTA	
Objan:		Muchon Point	1
Level 1	1		
Level 3	2		

TINIAN			
Blue I:		Tinian Survey:	
Surface	4	Blue VIII	1
		Total	9

MORTARS

Large, igneous boulders used as mortars were frequently found in association with *latte* sites. Others occurred as isolated finds, but it is obvious that many have been displaced and moved to new locations, often as recently as World War II. The non-*latte* sites excavated—Laulau Rock Shelter, Oleai, and Chalan Piao—possessed no mortars, but in view of the extent of displacement this has no significance. Mortars were, however, found apparently undisturbed at *latte* sites and I believe they are particularly associated with these sites. All mortars were discovered as surface finds. None were found buried beneath the surface.

The most logical sources for these mortars are the rocky beaches of the volcanic islands north of Saipan, as neither Saipan, Tinian, nor Rota provides basaltic boulders of this type. They apparently were moved to the southern islands by the ancient Chamorros.

The boulders, though sometimes circular in form, were apparently unworked; the rounding of edges probably was caused by water action. One possible exception—a mortar found at As Teo—was in the form of a nearly perfect disc.

Although Hornbostel reported mortars with as many as seven mortar holes, only one multi-holed mortar was found during my own work. It was discovered at Unai Bapot on Saipan and possessed three mortar holes. All others were single mortars, whose grinding depressions ranged in top diameter from 0.5 to 0.9 feet (average 0.72 feet), with depths ranging from 0.4 to 0.8 feet (average 0.52 feet) (figs. 71 and 72).

Small Stone Mortars and Stone Cups

The Hornbostel collection described by Thompson (1932) contains a number of small stone mortars, as well as stone cups. None of these were found during my own survey and excavations.

MAULS

One maul was found on the surface at Objan. It is of basalt, with pecked surfaces, and with both horizontal and vertical grooves for lashing and hafting (fig. 73). Length 124 mm.

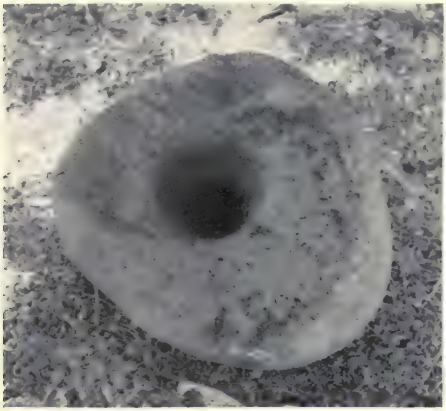


Fig. 71. Stone mortar found on Tinian near the House of Taga. This mortar has been displaced from its original position.

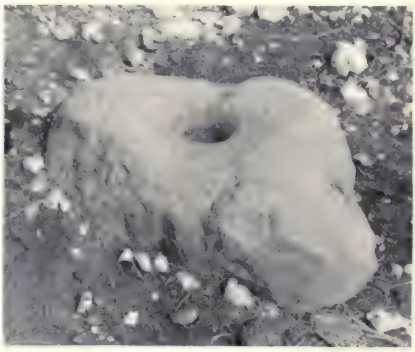


Fig. 72. Stone mortar *in situ*, Laulau House A, Saipan.

HAMMERSTONES

Two spherical hammerstones (fig. 73) and a fragment of a third were surface finds on Saipan and Tinian. One other hammerstone, with flattened sides and pecked depressions on both sides, presumably to facilitate grasping the stone, was found on Tinian (fig. 73). The surface of Objan also yielded three fragments which may be hammerstones but which could not be classified with certainty.

Spherical Hammerstones

Dimensions.—Diameters of whole hammerstones: 62 × 82 mm. and 121 × 142 mm.

Provenience

SAIPAN		TINIAN	
Objan:		Puntan Laminbot:	
Surface	1	Surface	1
Fañunchulujan:		Total	3
Surface	1		

FIG. 73. Upper left: pestle. Upper right: maul. Center and lowest specimens: hammerstones. Center right specimen has pecked depression on both sides. Length of upper right specimen, 124 mm.

NOTCHED HAMMERSTONE

Dimensions.—Length 114 mm.

Provenience.—Tinian, Blue I, surface, 1.

SINKERS

Fishing sinkers take a variety of forms. Some are merely reworked slingstones; others are more specialized. Materials used include both limestone and igneous rock.

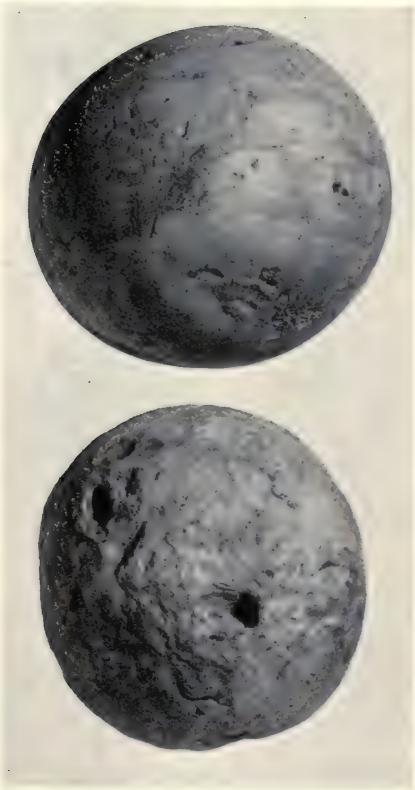


Fig. 74. Hemispherical sinkers, viewed from above. Diameter of upper specimen, 102 mm.

Fig. 75. Pyramidal sinkers with rounded surfaces. Groove for lashing shown on lower specimen. Length of upper specimen, 89 mm.

Hemispherical Sinkers

An account of the use of this type of sinker for fishing was collected by Hornbostel from Chamorros on Rota. The account is included in Thompson (1932, pp. 47–48). Two specimens were found (fig. 74).

Dimensions.—Diameter of base 92 mm. and 102 mm. Height 69 mm. and 82 mm.

Material.—Coral limestone.

Provenience.—Both specimens are surface finds from Muchon Point, Rota, in association with *latte* structures.

Pyramidal Sinkers with Rounded Surfaces

This sinker type is almost conical in form, except that two opposite sides are broader than the other two sides, forming a rectangular base. However, all edges have been pecked away to form rounded surfaces. Longitudinal grooves, approximately 5 mm. wide and from 1–3 mm. deep, have been pecked along the midline of the opposite sides. Out of four specimens, the grooves are on the broad sides in two specimens and on the narrow sides in the two other specimens (fig. 75).

Dimensions.—Length 81, 89, 105, 114 mm. Dimensions of base: width 64–95 mm.; thickness 54–73 mm.

Provenience

SAIPAN		TINIAN	
Objan:		Blue I:	
Surface	1	Surface	2
		Level 5	1
		Total	4

Miscellaneous Sinkers

These consist of five small sinkers (fig. 76). Three are apparently reworked slingstones, with grooves cut either longitudinally or transversely into the stone. One of these three has one point of the slingstone worked off. A fourth sinker (fig. 76, center) may also be a slingstone. At the top of the sinker, two small holes which meet within the matrix have been bored to allow suspension of the sinker from a fishing line. The fifth sinker is spherical, with a narrow groove cut around one circumference (fig. 76, lower left).

Dimensions.—Longest dimension varies from 41 to 55 mm.

Material.—Coral limestone, igneous rock.

Provenience

SAIPAN

Objan:		Afetna:	
Surface	1	Surface	1
Oleai:		Location unknown:	
Surface	1	Surface	1
		Total	5
Chalan Piao:			
Surface	1		

FIG. 76 (left). Sinkers. Upper left, upper right, and probably lower right, re-worked slingstones. Center specimen probably a re-used slingstone of the rounded point type. Length of upper left specimen, 54 mm.

FIG. 77. Pendants or sinkers. Top specimen shell, lower two specimens stone. Length of top specimen, 65 mm.

PENDANTS

Three pendants of a typical Marianas form, numerous in the Hornbostel collection, are illustrated (fig. 77). These may be sinkers; there is no ethnological or documentary evidence to determine the point. Two of the specimens are fragments. The one whole specimen is actually of shell, probably *Tridacna*, but the form is identical with the two fragmentary stone specimens. A hole for suspension has been bored at each end of the specimen.

Dimensions.—Length of whole specimen 65 mm.

Material.—Igneous rock and shell.

Provenience

SAIPAN		TINIAN	
Objan:		Blue I:	
Level 4 (shell specimen)	1	Surface	1
		Level 2	1
		Total	3

SCRAPERS

CIRCULAR SCRAPERS

Perhaps the most distinctive scraper form we found is roughly circular, in the shape of a disc, usually with some retouching around the edge. Left

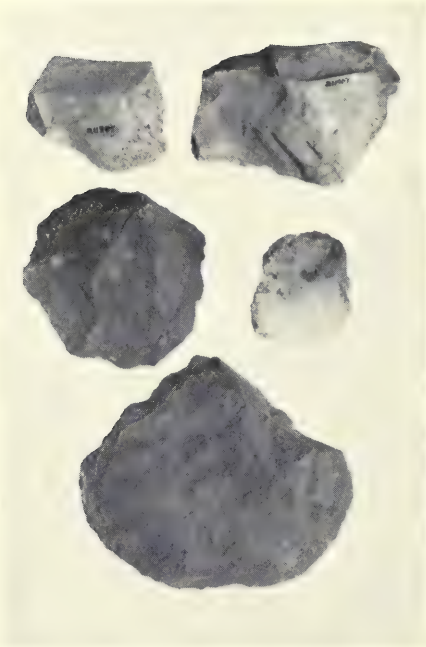


FIG. 78. Scrapers. Top specimens: side scrapers. Bottom three specimens: circular scrapers. Length of top left specimen, 34 mm.

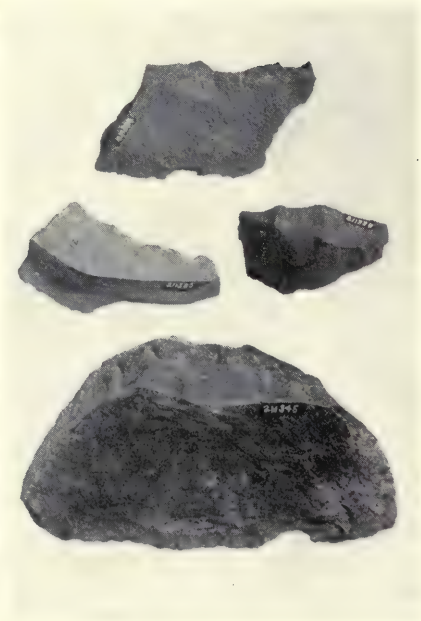


FIG. 79. Upper three specimens: probably knives. Lower specimen: large knife or possibly a scraper. Length of lower specimen, 140 mm.

middle and lowest specimens in figure 78 illustrate the type, which future excavations may show to be common in the Marianas.

Dimensions.—Diameter 67–105 mm.

Material.—Basalt.

Provenience

SAIPAN		TINIAN	
Objan:		Blue I:	
Level 2	1	Level 1	1
		Leprosarium I:	
		Surface	1
		Total	3

In addition, a much smaller circular scraper (diameter 35 mm.), made from quartz, was found on the surface at Objan. Edges have been retouched (right middle specimen, fig. 78).

FIG. 80. Unworked cores and flakes. Lower two specimens of volcanic tuff.

SIDE SCRAPERS

Two flakes, probably side scrapers, are shown as the upper specimens in figure 78.

The upper right specimen shown in the figure exhibits some secondary flaking along the working edge. In addition to these specimens, a number of unworked flakes were found that may have been used as scrapers (fig. 80).

Dimensions.—Length 42–85 mm.

Material.—Basalt.

Provenience

SAIPAN		TINIAN	
Objan:		Blue IV:	
Surface	1	Surface	1
XX′ profile	1		
		Total	3

End Scraper

One end scraper was found at Blue I, Level 3. It is 41 mm. long, of basalt, with a slight amount of secondary flaking along the working edge.

KNIVES

A few flakes found are probably knives (fig. 79). The lowest specimen is much larger and may have served as a scraper.

Dimensions.—Length 60–140 mm. Width 38–78 mm.

Material.—Igneous rock.

Provenience.—Objan (Saipan): Surface, 2; Level 1, 1; Level 3, 1. Total 4.

UNWORKED CORES, FLAKES, AND STONE FRAGMENTS

Every excavated site yielded a small collection of unworked basaltic flakes and small cores (fig. 80). As noted previously, unworked flakes may have been used as scrapers. A feature of almost every *latte* site was the finding of a few fragments of volcanic tuff. Their use is unknown, as they are unsuitable for cutting instruments. Waterworn basalt beach pebbles, possibly used as pot smoothers or as raw material for flakes, were also occasionally found at *latte* sites.

VII. Shell, Bone, and Metal Artifacts

SHELL ARTIFACTS

Adzes

As noted in the section on stone adzes, many more shell than stone adzes were found during the course of excavations and survey. The implication is that the prehistoric inhabitants of the Marianas relied primarily on shell rather than stone for cutting tools. However, the shell adzes are small and it is probable that stone adzes were used for heavy work, and shell tools for lighter work and for finishing. Also, the shell adzes were predominantly made from *Tridacna*, plentiful in the coastal waters of Saipan, Tinian, and Rota. On the other hand, the hard, igneous rocks needed for stone adzes had to be imported, presumably from the Mariana islands to the north.

In describing the shell artifacts from the Hornbostel collection, Thompson distinguishes between *Tridacna* shell adzes and *Tridacna* scrapers, despite the fact that the forms as she describes them are virtually the same. She notes that "scrapers of *Tridacna* differ from the prevalent shell adze type in that they are thinner and tend toward greater longitudinal and edge curvature." (1932, p. 54.) Additional definitive information for classifying these artifacts as scrapers is not given. In this report they are classed as adzes.

Thompson classifies the shell adzes of the Hornbostel collection into three types. Her "Type 1" includes all the *Tridacna* shell adzes described in this report. Her "Type 2" shell adzes are identical in form with the cylindrical stone adzes described as "Type 1" stone adzes in both Thompson's and my reports. No shell adzes of this type were found in my own field work. Thompson's "Type 3" shell adzes are large Caroline Island forms, probably imported in historic times. This type is not represented in my own collection.

Shell adzes found during the Museum's work on Saipan, Tinian, and Rota are of three types: triangular; quadrangular (those with opposite edges roughly parallel); and trapezoidal, according to front to back outline (fig. 81). With one possible exception (fig. 81, top center) all are made of *Tridacna*. The polls of triangular adzes are often rounded, so that the triangular shape is much modified. Edges of all adze types are often battered,

Provenience of Triangular Shell Adzes

	Surface	XX′ profile	Level 1	2	3	4	5	Total
Saipan:								
Objan	..	2	1	2	1	2	1	9
Laulau Rock Shelter	..	..	1	..	..	..	..	1
Chalan Piao	..	..	..	1	..	..	..	1
Oleai	1	..	..	..	..	..	..	1
As Teo	1	..	..	..	..	..	..	1
Location unknown	1	..	..	..	..	..	..	1
Tinian:								
Blue I	3	..	..	4	..	..	..	7
Taga	..	..	..	1	1	..	..	2
Blue III	1	..	..	..	..	..	..	1
Blue V	1	..	..	..	..	..	..	1
Blue IX	1	..	..	..	..	..	..	1
Leprosarium I	1	..	..	..	..	..	..	1
Leprosarium II	1	..	..	..	..	..	..	1
Rota:								
Muchon Point	1	..	..	..	..	..	..	1
Total	12	2	2	8	2	2	1	29

Provenience of Quadrangular Shell Adzes

	Surface	XX′ profile	Level 1	2	6	8	Total
Saipan:							
Objan	1	1	1	2	1	1	7
Chalan Piao	1	..	1	..	..	..	2
Oleai	1	..	..	..	..	..	1
As Teo	1	..	..	..	..	..	1
Tinian:							
Blue I	2	..	..	1	..	..	3
Leprosarium I	1	..	..	..	..	..	1
Total	7	1	2	3	1	1	15

Provenience of Trapezoidal Shell Adzes

	Surface	Level 2	4	Total
Saipan:				
Objan	..	..	1	1
Tinian:				
Blue I	..	1	..	1
Taga	..	..	1	1
Leprosarium I	1	..	..	1
Total	1	1	2	4

but as Thompson notes, grinding of the bevel is primarily on the back side. On the basis of present evidence no stratigraphic difference can be ascribed to the three types set forth here, and the typology proposed here is merely a matter of convenience in description.

FIG. 81. Shell adzes and gouges. Length of center specimen in top row, 107 mm.

Shell adzes in the Museum collection range in length from 62 to 120 mm. (average 82.7 mm.).

Unclassified Adze Fragments

Eleven fragments of *Tridacna* adze blades could not be classified. All these fragments include the cutting edge, plus from 4 to 7 mm. of the blade. Apparently, while in use shell adzes tended to break transversely above the edge.

Provenience of Shell Adze Fragments

			Level				
	Surface	*XX′ profile*	*1*	*2*	*5*	*6*	*Total*
Saipan:							
Objan	..	1	..	1	1	..	3
Laulau Rock Shelter	..	..	..	1	..	1	2
Chalan Piao	1	..	..	..	..	..	1
Tinian:							
Blue I	1	..	..	..	..	..	1
Taga	..	..	1	1	..	1	3
Rota:							
Muchon Point	1	..	..	..	..	..	1
Total	3	1	1	3	1	2	11

Adze Blanks

Two partially worked *Tridacna* adze blanks were found, one as a surface find at Objan and one in Level 3 at Blue I. Length of blanks 81 and 88 mm.

Gouges

Only one complete shell gouge was recovered (lowest center specimen, fig. 81). This is made from *Tridacna* and was a surface find at As Teo (Saipan). In addition, two other artifacts, probably gouges, of the same long, thin form were obtained. They are not complete specimens, as the cutting edges have been broken off, so it is not possible to classify them with certainty. Finally, one fragmentary gouge of *Terebra* was also found (lowest right specimen, fig. 81).

	Material	Length	Provenience
Gouge	*Tridacna*	90 mm.	As Teo (Saipan), surface
Gouge(?)	*Tridacna*	77 mm.	Objan (Saipan), Level 1
Gouge(?)	*Tridacna*	80 mm.	Sijangigani (Rota), surface
Gouge	*Terebra*	41 mm.	Objan (Saipan), XX′ profile

Pedalion Knives or Scrapers

A considerable number of thin flakes of *Pedalion* found in the excavations may have been used as knives, scrapers, or even spoons. Their use is uncertain. Four typical specimens are illustrated (fig. 82). Length of whole specimens ranges from 60 to 95 mm.; average 68.4 mm.

Fig. 82. *Pedalion* shell knives or scrapers(?). Length of upper left specimen, 95 mm.

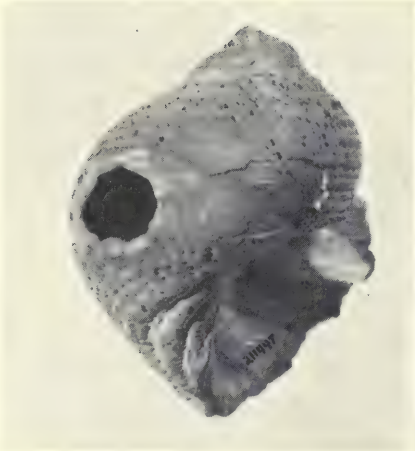


Fig. 83 (above). *Turbo* shell scrapers.

Fig. 84 (left). Shell container for lime chewed with betel nut; shell perforated for suspension.

Provenience of Whole and Fragmentary Specimens

		Level							
	Surface	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*Total*
Saipan:									
Objan	..	11	1	17	4	1	3	1	38
Oleai	1	..	..	..	..	..	..	..	1
Tinian:									
Blue I	..	2	6	..	..	..	..	..	8
Taga	..	..	..	1	..	..	..	..	1
Total	1	13	7	18	4	1	3	1	48

Turbo Scrapers

A series of *Turbo* shell scrapers, similar to those known ethnologically from different parts of Micronesia, was all, with one exception, found at the Objan site on Saipan. Two of these scrapers are shown (fig. 83).

Provenience

		Level					
	Surface	*1*	*2*	*3*	*6*	*8*	*Total*
Saipan:							
Objan	2	3	4	8	1	1	19
Fañunchulujan	1	..	..	..	..	..	1
Total	3	3	4	8	1	1	20

Lime Container

From ethnological evidence, and the fact that the teeth of ancient burials are often stained a dark brown, it is certain that the modern Chamorro custom of betel-nut chewing has a very respectable antiquity. Betel nut is commonly chewed with lime, which releases the narcotic in the nut. Figure 84 illustrates an ancient shell lime container, found on the surface at Objan Site on Saipan. A deposit of lime remains in the shell, and the deposit itself contains a well-delineated finger impression. The shell container is perforated, probably to accommodate a cord hung around the neck of the user.

Fish Hooks and Gorges

With the exception of one fragmentary specimen reported by Thompson (1932), all prehistoric Marianas fish hooks of which I am aware are of a single small type (upper row of hooks, fig. 85). The center specimen is the only complete hook found. It is 28 mm. long and has two small notches on the upper end of the shank for attachment to the line.

	Provenience			
		Level		
	XX′ profile	*3*	*4*	*Total*
Saipan:				
Objan	1	1	1	3

Fish gorges likewise conform to a single principal form (see Thompson, 1932, p. 46). Two gorges are shown (center row, fig. 85). In addition, three partially completed gorges were obtained, one of which is shown (lowest specimen, fig. 85).

Provenience

FINISHED SPECIMENS

	Surface	*Level 2*	*Total*
Saipan:			
Objan	1	..	1
Tinian:			
Blue I	..	1	1
Total	1	1	2

PARTIALLY FINISHED SPECIMENS

	Level 1	*Level 2*	*Level 3*	*Total*
Saipan:				
Objan	..	..	1	1
Laulau House A	1	..	..	1
Tinian:				
Blue I	..	1	..	1
Total	1	1	1	3

Shell Beads and Pendants

A number of circular beads and pendants, perforated in the center and no doubt used as ornaments, were found in the excavations. They are roughly of two sizes. The smaller series ranges in diameter from 6 to 25 mm. (average 14.5 mm.), the larger from 32 to 65 mm. (average 42.6 mm.). Four of the smaller specimens (top row, fig. 86) are probably beads. Two larger specimens (center row, fig. 86) are probably pendants. The holes in these specimens are characteristically bored from one side only.

Provenience

SMALL SPECIMENS

	Level 1	*Level 2*	*Level 3*	*Total*
Saipan:				
Objan	..	..	2	2
Laulau House A	1	..	..	1
Tinian:				
Blue I	1	4	2	7
Total	2	4	4	10

FIG. 85. Top row: shell fish hooks. Center row: shell fish gorges. Bottom: partially completed gorge. Length of center specimen in top row, 28 mm.

FIG. 86. Top row: shell beads(?). Center row: shell pendants(?). Bottom left: shell bracelet. Bottom right: fragment of *Babirussa* tusk, probably used as ornament. Diameter of shell bracelet, 65 mm.

Provenience

LARGE SPECIMENS

	Surface	*Level 1*	*Level 2*	*Total*
Saipan:				
Objan	1	..	2	3
Laulau House A	1	1	..	2
Tinian:				
Blue I	..	1	..	1
Total	2	2	2	6

Shell Bracelet

One *Conus* shell bracelet (diameter 65 mm.) was found on the surface at the Chalan Piao site on Saipan. Thompson (1932, p. 57) reports that a similar bracelet in the Hornbostel collection was found at a depth of twelve inches during Hornbostel's test digging at the Taga Site. Although bracelets of this type are known ethnologically from the Carolines, it is probable that these two bracelets are indigenous to the Marianas.

Pendant or Sinker

One shell pendant or sinker has been described in connection with stone artifacts of the same form (fig. 77, top specimen).

BONE ARTIFACTS

Awls or Thatching Needles(?)

Figure 87 illustrates a number of specimens which were probably used as awls or thatching needles. The four left specimens shown in the photograph have been worked. The fifth specimen, shown at the right, is the upper mandible of a tern; whether or not it was used as an artifact is not known. From left to right the specimens are:

Specimen	*Length*	*Provenience*
Awl(?)	123 mm.	Laulau House A, Level 1 (Saipan)
Awl(?)	118 mm.	Laulau House A, Level 1 (Saipan)
Awl	79 mm.	Objan, Level 3 (Saipan)
Awl	48 mm.	Blue I, Level 3 (Tinian)
Awl(?)	42 mm.	Laulau House A, Level 1 (Saipan)

Spear Points

At the time of first European contact, Chamorro spears are said to have been tipped with bone points, made from human long bones. Thompson (1932, p. 52) reports three such bone spear points from the Hornbostel collection. Two fragmentary specimens were found at Laulau House A, Level 1 (fig. 88).

FIG. 87. Bone awls or thatching needles(?). Length of left specimen, 123 mm.

UNWORKED SHELL FROM EXCAVATED SITES[1]

	Objan	Laulau House A	Laulau Rock Shelter	Oleai	Chalan Kija	Chalan Piao	Taga	Blue I
Arca (*Arca*) *antiquata scapha* Meuschen	..	..	..	..	x	x	x	..
Asaphis (*Asaphis*) *deflorata* Linne	x	..	..	..	..	..	..	..
Canarium (*Oostrombus*) *floridum* Lamarck	..	x	x	..	x	..	x	..
Canarium (*Oostrombus*) *gibberulum* Linne	x	..	..	x	..	x	x	..
Cerithium nodulosom Bruguiere	x	..	..	..	..	..	x	..
Clava aspera Linne	..	..	..	x	..	..	..	..
Clava gemmata Hinds	x	..	..	..	..	..	..	..
Conus (*Puncticulis*) *hebraeus hebraeus* Born	..	x	x	..	..	x	x	x
Corculum (*Fragum*) *fragum* Linne	x	..	x	..	..	..	x	..
Cyclotellina (*Scutarcopagia*) *scobinata* Linne	..	x	x	..	..	..	..	x
Cypraea (*Lyncina*) *lynx lynx* Linne	x	x	x	x	x	..	x	..
Diplomeriza duplicata lamarcki Kierner	..	..	..	..	x	x	..	..
Dolium (*Dolium*) *perdix* Linne	..	..	..	..	..	x	..	..
Drupa (*Drupa*) *ricinus elegans* Broderip	..	..	..	..	..	..	x	..
Erosaria (*Erosaria*) *erosa erosa* Linne	..	..	..	..	..	..	..	x
Erosaria (*Erosaria*) *helvola* Linne	..	..	..	..	..	..	..	x
Erosaria (*Ravitrona*) *caput serpentis* Linne	x	x	x	..	..	..	x	x
Gafrarium (*Gafrarium*) *pectinatum* Linne	..	x	..	..	x	..	..	..
Haliotis (*Sanhaliotis*) *varia* Linne	..	..	x	..	..	..	..	..
Heterocentrotus sp. (spines of sea urchin)	x	x	..	x	x	x	x	x
Lampusia chlorostoma Lamarck	..	..	..	..	..	..	x	..
Lithoconus lividus Bruguiere	..	x	x	..	..	x	x	x
Luria (*Basilitrona*) *isabella isabella* Linne	x	..	..	..	..	..	..	..
Mauritia (*Arabica*) *arabica arabica* Linne	..	..	..	..	..	..	..	x
Mauritia (*Arabica*) *histrio* Gmelin	x	..	..	..	..	..	x	..
Mauritia (*Mauritia*) *mauritiana* Linne	..	..	x	..	..	..	x	x

[1] Identified by Dr. Fritz Haas, Curator, Lower Invertebrates, Chicago Natural History Museum.

UNWORKED SHELL FROM EXCAVATED SITES—*Continued*

	Objan	Laulau House A	Laulau Rock Shelter	Oleai	Chalan Kija	Chalan Piao	Taga	Blue I
Monetaria moneta moneta Linne	..	x	x	..	..	..	x	x
Nerita (Amphinerita) polita Linne	..	..	..	..	..	..	x	..
Ostrea cucullata Lamarck	..	..	..	..	..	x	..	..
Pitar (Paradione) pellucidus Lamarck	..	..	..	..	..	..	..	x
Polinices (Mamilla) melanostoma Gmelin	..	..	..	..	..	..	x	..
Pterocera (Harpago) chiragra Linne	x	..	..	..	..	..	..	x
Pterocera (Harpago) scorpio Lamarck	x	..	..	..	..	..	..	..
Pterocera (Pterocera) bryonia Gmelin	..	..	..	..	..	..	x	x
Pterocera (Pterocera) lambis Lamarck	x	x	..	..	..	x	..	..
Quadrans (Quidnipagus) palatam Iredale	..	..	..	x	..	x	x	x
Rhizoconus (Rhizoconus) miles Linne	x	x	..	x	..	x	..	..
Rollus tulipa Linne	x	..	..	..	..	..	..	..
Spondylus ducalis Chemnitz	..	x	..	..	..	..	..	..
Tectum (Tectum) pyramis Born	x	..	..	..	..	x	x	x
Terebra (Myurellina) crenulata Lamarck	x	..	..	..	..	..	x	..
Terebra (Terebra) subulata Linne	..	..	..	..	..	x	..	..
Tridacna squamosa Linne	x	x	x	x	x	x	x	x
Trochus (Trochus) incrassatus Lamarck	x	..	..	..	..	..	..	..
Trochus (Trochus) maculatus maculatus Linne	..	..	x	..	..	..	..	..
Turbo (Marmorostoma) argyrostomus argyrostomus Linne (opercula)	x	x	..	x	..	x	x	x
Turbo (Marmorostoma) chrysostomus Linne	x	x	x	..	..	x	..	x
Turbo (Marmorostoma) sparverius Gmelin	x	x	x	..	x	x	..	x
Vasum (Vasum) turbinellum Linne	x	..	..	x	..	..	..	..
Venus (Periglypta) lacerata Linne	..	..	x	..	..	..	..	..
Venus (Periglypta) puerpera Linne	..	..	..	..	..	x	..	..
Venus (Periglypta) reticulata Linne	x	..	..	x	..	..	..	..

A third bone point, slender and long (134 mm.) was also found at Laulau House A, Level 1 (third specimen from top, fig. 88). This may be a fish spear point. It is interesting to observe that it has the same form as ancient Hawaiian arrow points; the ancient Hawaiians used bows and arrows for sport, in shooting rats, though the bow and arrow were unknown in the Marianas at the time of first contact.

A partially sawed section of human long bone was also obtained at Blue I (lowest specimen, fig. 88).

Ornaments

One fragment of *Babirussa* tusk is illustrated (fig. 86, lower right specimen). It is 82 mm. long, was a surface find at Chalan Piao, and may have been used as an ornament.

Unworked Animal Bones

Unworked animal bones, including remains of dogs and pigs, were found in the excavations. The Chamorros at the time of discovery were reported to be without either dogs or pigs, which is highly unusual for an Oceanic people. Unfortunately, all the dog and pig finds listed below occurred less than six inches below the surface, so the probability that these may represent modern intrusions cannot be excluded.

Specimens and Provenience.—Humerus, tibia, radius, fragment of scapula, astragalus, and tooth of young pig (Objan, Level 1, Saipan); fragment of pig tusk (Chalan Piao, surface, Saipan); femur of young carnivore, probably a dog (Objan, Level 1, Saipan); canine tooth of dog (Laulau Rock Shelter, Level 1, Saipan); vertebra of seal (Blue I, Level 1, Tinian); three fragments of turtle plastron (Objan, Level 4, Saipan). The bones were identified by Dorothy B. Foss, formerly osteologist at Chicago Natural History Museum.

Unworked Fish Bones

Most of the remains of fish found in the excavations were teeth, mandibles, and maxillas of parrot fish. According to Loren P. Woods, Curator of Fishes at Chicago Natural History Museum, at least three species of *Callydon* are represented, but they are so fragmentary that specific identification is not possible. Parrot fish teeth may well have been used as cutting and scratching tools. Provenience of parrot fish bones: Objan (XX′ profile, Levels 2, 4, 5); Blue I (Levels 1–5).

Vertebrae of marlin (*Makaira*) were found at Objan (Level 1) and one tip of the spear of what is probably *Makaira* was also found at Objan (Level 6). A fragment of the ramus of a sparid, probably *Monotaxis*, was found at Laulau House A (Level 1). The hypural vertebrae of a scombid, a tuna, or

FIG. 88. Upper two specimens: fragments of spear points cut from human bone. Third specimen from top: bone fish spear point(?). Bottom specimen: partially sawed section of human long bone. Length of top specimen, 133 mm.

possibly a young sailfish were found at Objan (XX′ profile). A tooth plate of the spiny puffer *Diodon*, probably *hispidus*, was recovered from Level 6 at Taga. In addition, a miscellaneous collection of fish vertebrae, too fragmentary to be identified, was found at virtually all the excavated sites. A large deposit of fish scales was found at the very bottom of Test A, Blue I.

METAL ARTIFACTS

Four metal artifacts (fig. 89) were found at the following sites:

Laulau House A (*Saipan*): Below the rocks packed around the base of shaft 9, at a depth of 1.0 foot below present ground level, was found what ap-

Fig. 89. Metal artifacts. Top row, from left to right: iron spear point, iron nail, fragment of iron or steel knife blade. Bottom: copper stud-like object. Length of upper left specimen, 101 mm.

pears to be an iron spear point (probably a fish spear) and the fragment of an iron or steel knife blade (upper left and upper right, fig. 89). There was no evidence to indicate that these specimens were intrusive and I believe they are contemporaneous with the original occupation of Laulau House A. If this is so, the site is historic and its date lies between the discovery of the Marianas by Magellan in 1521 and the final Spanish conquest and abandonment of Saipan in 1698.

Objan (*Saipan*): A heavily corroded fragment of a square, iron nail (top center specimen, fig. 89) was found in Level 2, at a depth of 0.8 foot below the present ground surface. The material above the nail was a dark gray sand, loose and friable, and the possibility cannot be excluded that the nail is intrusive and not contemporaneous with the site. On the other hand, documentary evidence indicates that Objan was inhabited at the time of Spanish conquest, and the iron nail may be of Spanish origin dating from the early historic period.

Muchon Point (*Rota*): A copper, stud-like object (lowest specimen, fig. 89) was found on the surface at the Muchon Point *latte*. Its use and date are unknown, though it is not recent. Local Chamorros had no idea what it was originally used for.

VIII. Conclusion

CULTURAL CHRONOLOGY IN THE MARIANAS

On the basis of the preceding description of excavations and artifacts, what kind of a cultural chronology for the Marianas can be constructed? The question demands a recapitulation of the evidence available on which such a chronology can be based. Briefly, the evidence is as follows:

1. Documentary Evidence

The early accounts of the first European explorers indicate that *latte* type houses were in use at the time of discovery. *Latte* sites therefore assuredly go into the historic period. More particularly, Objan is mentioned as a site on Saipan occupied at the time of Spanish conquest.

2. Trade Materials of the Historic Period

Two iron artifacts were found at Laulau House A, a *latte* site on Saipan. One iron nail was found at Objan, though, as indicated previously, this may be a modern intrusion.

There is no indigenous source of metal in the Marianas. It is an interesting question whether the prehistoric Chamorros knew of metal through pre-European contact with the Philippines, Japan or China, but there is no evidence that they did, except for their avidity to obtain iron from the early European ships. Certainly they did not secure iron in any quantity until the Spanish commenced sailing regularly from Mexico to the Philippines. For this reason, I believe that Laulau House A on Saipan dates from the early historic period.

3. Radiocarbon Dates

Through the generous co-operation of W. F. Libby and the University of Chicago, two carbon 14 dates were obtained: A.D. 845 $\pm$ 145 from Blue I on Tinian, and 1527 B.C. $\pm$ 200 from Chalan Piao on Saipan. Blue I was shallow and undoubtedly a single occupation site. Chalan Piao had a much greater depth of cultural deposit and spans a greater time period. The carbon 14 date was obtained from an upper level of the site. The four feet of cultural material lying below the oyster shell from which the date was obtained must be considerably older.

4. Stratigraphic Analysis

(a) *Depth of Deposits at Archaeological Sites and Duration of Occupancy.*—Of the excavated sites, Laulau House A, Chalan Kija, and Blue I were shallow and undoubtedly single occupation sites. Oleai also can be considered a single occupation site. Objan, Laulau Rock Shelter, Chalan Piao, and the House of Taga had a greater depth of cultural deposit and covered a greater period of occupancy. Both Objan and Taga were *latte* sites; yet the depth of deposit below the stone *latte* was great enough to conclude that they had had occupants prior to the *latte* builders. In the case of Objan, Laulau Rock Shelter, Chalan Piao, and Taga, there is no means for determining the total duration of occupancy of each site.

(b) *Site Structure.*—The only site yielding any clear stratigraphy of its structure was Laulau Rock Shelter, which gave evidence of two different periods, each showing a different predominant burial practice. The upper level of this site was given to cremations, the lower primarily to extended burials laid in sand-lined pits. In the case of *latte* sites, it is also interesting to note that the remains of older *latte* structures underlying more recent *latte* were not found. All *latte* so far found in the Marianas have been discovered only on the surface.

(c) *Pottery Seriation.*—A clear-cut pottery seriation, based on relative frequencies of Marianas Red and Marianas Plain, was obtained from Laulau Rock Shelter and Chalan Piao. There is no doubt that Marianas Plain, the predominant pottery type at *latte* sites, was preceded in time by Marianas Red. Artifacts other than pottery yielded no significant seriation data.

On the basis of the kinds of evidence listed above, what is the chronological relationship of the sites excavated? They are listed below, in their admittedly somewhat tentative chronological order.

Chalan Piao (Saipan): The levels contemporaneous with and below (1.5 feet and below) the oyster shell yielding the carbon 14 date of 1527 B.C. $\pm$ 200 are the oldest evidence of human occupation in the Marianas. These levels also showed a predominance of Marianas Red sherds. The surface of the site is undoubtedly much later, as the predominant pottery type on the surface is Marianas Plain, characteristically associated with *latte* sites.

Laulau Rock Shelter (Saipan): The presence of an appreciable number of Marianas Red sherds in the lower levels indicates that the lower section of this site is old. The upper level, consisting of the ashes from cremations, is certainly much younger. In this upper level, no Marianas Red sherds were found.

Taga (Tinian): Before the giant *latte* were constructed, the House of Taga was occupied by people who were probably not *latte* builders. We do not know how far back in time the lower levels go. Thompson (1932,

p. 30) notes that Hornbostel found sherds of Marianas Red at the House of Taga, indicating that part of the site may be contemporaneous with the lower part of Laulau Rock Shelter. We do not know when the great shafts and capstones were erected on the surface. They obviously, together with As Nieves on Rota, represent the climax of *latte* building, and a developmental period probably preceded them. My guess is that the Taga and As Nieves *latte* are roughly contemporaneous and that they date from A.D. 800 to 1400, but this is pure conjecture.

Oleai (Saipan): At this non-*latte* site a few sherds of Marianas Red were found, though the dominant pottery type was Marianas Plain. In the seriation of Marianas Plain rim types, Oleai falls later than Taga, though earlier than Blue I. Otherwise, there is no evidence on which to base a date.

Objan (Saipan): Like Taga, the lower levels of Objan may precede the *latte*-building period by a considerable margin. Though I have not noted the fact previously, Marianas Red sherds were found on the bulldozed part of the site, so at least they are present, even if the stratigraphic evidence has been destroyed. The Objan *latte*, however, no doubt go into the historic period, as the village is mentioned in seventeenth century Spanish accounts.

Blue I (Tinian): This shallow, single-occupation *latte* site yielded a carbon 14 date of A.D. 845 $\pm$ 145. The significance of this date is that it is the first evidence found of the duration of the *latte*-building period in the Marianas.

Chalan Kija (Saipan): This single-occupation *latte* site, yielding Marianas Plain but no Marianas Red, is certainly not particularly early. In the seriation of Marianas Plain rim types, it falls with Oleai. Otherwise there is no evidence on which to base a tentative date.

Laulau House A (Saipan): All the evidence—pottery, *latte*, and presence of two iron implements—points to a late date for this site. I believe it dates from the historic period, probably between 1600 and 1698.

The chronological results of the Museum's archaeological work in the Marianas can be summarized as follows: On the assumption of the reliability of the Chalan Piao carbon 14 date, the Marianas were settled by 1527 B.C. $\pm$ 200. These first settlers were probably fishermen and farmers, just as the Chamorros were at the time of European discovery of the islands. At a much later date, a new style of house construction—the building of *latte*—was introduced, either as an indigenous development or as the result of outside influence. At the same time, Marianas Plain pottery superseded Marianas Red. The earliest date from the *latte*-building period is the A.D. 845 $\pm$ 145 date from Blue I. *Latte*-building, and the characteristic artifacts

that went with it, continued up to the historic period and the abandonment of Saipan in 1698.

The framework of this chronology rests on only two radiocarbon dates. It would be a considerable comfort to have more. Until additional dates are obtained, either from the Marianas, or from the other two major Western Micronesian island groups—Yap and Palau—these dates must suffice for the construction of working hypotheses; they provide a valuable clue to the nature of the culture history of Micronesia.

LATTE PHASE OF MARIANAS CULTURE

A principal aim of the Museum's work in the Marianas was to clarify what I have termed the *Latte* Phase of Marianas prehistory. The results of the field research have furthered this aim in two ways: (1) Through the carbon 14 date of A.D. 845 $\pm$ 145 obtained from Blue I some insight has been obtained as to the time span of this phase. On the basis of this date, the *Latte* Phase endured for at least 850 years, up to the historic period. (2) Through the survey and excavations, a clearer picture has emerged of the culture content of this phase. With few exceptions, the artifacts described in the preceding pages refer to the *Latte* Phase and provide, when combined with the archaeological and ethno-historic data previously presented by Fritz (1904), Safford (1905), and Thompson (1932, 1945), a picture of prehistoric Chamorro culture, which apparently remained relatively stable up to the time of the Spanish conquest.

To itemize the artifact content of the *Latte* Phase would merely result in a listing of what has already been described. It may be useful, however, to outline certain of the characteristics of the *Latte* Phase, as revealed primarily by archaeological work.

The Village: The largest concentration of population was the village, which apparently varied considerably in size. The problem of size is one of determining the number of houses in a single village. Thompson has rightly noted that in the case of many villages all the houses were not of the stone *latte* type but were built on wood houseposts, which have long since disintegrated. We do have records of three villages, where apparently the majority of houses were of the stone *latte* type. Two were briefly described by Hornbostel and consist of Agingan on Saipan (completely destroyed in World War II) and Taga on Tinian (Thompson, 1932, pp. 18–19). The third—the Blue Site on Tinian—has been described in this report. Taga consisted of 18 stone *latte*, Agingan of 12 *latte*, and the Blue Site of 10 *latte*. I believe the houses were of sufficient size to accommodate an extended family group. If we assume an average of 15 people per house, and further assume that the houses were all occupied at the same time, this would give

a population of 270 people to Taga, 180 to Agingan, and 150 to Blue I. I believe these are minimal figures, as it is highly likely that additional houses of wood posts only were constructed at each village, judging from the sherd areas surrounding Blue I. At the same time, the village units were apparently never very large.

The size of villages must also be matched against population estimates for the Marianas as a whole. Sanvitores, the head of the Spanish mission when it was established in 1668, estimated the total Chamorro population at approximately 100,000. I have previously suggested 50,000 as a more realistic guess (Spoehr, 1954, p. 56).

An interesting feature of the Taga, Agingan, and Blue sites is the occurrence of the largest *latte* as the central structure of the site. Ethnological evidence indicates the presence of men's houses and a chiefly class among the Chamorros at the time of contact. The oversize central *latte* may represent men's houses or the residences of chiefs. I do not believe they were religious structures, reserved only for religious purposes, similar to the *heiau* of Hawaii or the *marae* of Tahiti, because the Chamorro central *latte* had all the debris of daily living around them, and because there is no ethnohistoric evidence of true temples reserved only for religious rites in the ethnological literature on the Marianas.

The location of *latte* type villages was evidently controlled by accessibility to available resources. Like other island peoples in Micronesia, the peoples of the Marianas relied on the sea as the principal source of protein. It is therefore not surprising that *latte* villages are primarily located along the shore, in places that combined adequate farming areas with easy access to the sea. Though some interior *latte* sites have been found on Tinian, Saipan, and Guam, they are still not so far removed from the sea as to eliminate it as a food resource.

Houses: All *latte* have around them the debris of daily life. In the Museum's excavations, certain features of living associated with household activities were discovered. At Objan and Laulau House A, the remains of work areas paved with coral pebbles were found around the stone shafts and on the seaward side, indicating the presence of work areas under the raised floor of the house. At the rear of Laulau House A, two earth ovens were uncovered, demonstrating that the ancient Chamorros made use of this widespread Oceanic manner of cooking. Though no evidence of separate cook houses was found, their presence on modern Saipan and their wide distribution in Micronesia today make it probable that each *latte* house had a frame cook house adjacent to it.

I have said elsewhere that the *latte* may well have housed extended family groups. The evidence for this is the size of the structures, relatively large

for Micronesian houses, and the rather wide occurrence of extended families as residence groups in Micronesia.

Technology: The *latte*-builders were prolific if not expert potters. Marianas Plain is the dominant pottery type, associated with much lower frequencies of Marianas Fine-Line Incised, Marianas Cord-Marked, and Marianas Trailed. Marianas Red, and the lime-impressed sherds occurring principally at Laulau Rock Shelter, pre-date the *Latte* Phase.

For cutting tools, the *latte*-builders relied on shell and stone, with the former predominating. Evidence of agriculture is limited to finds of mortars and pestles, together with frequent, if inadequate, references to Chamorro farming in the ethno-historic literature. The latter indicates the cultivation of rice, though it may have been millet. As the *Latte* Phase goes into the historic period, I believe it highly probable that the cultivation of rice was a characteristic of the *Latte* Phase as a whole. Although remains of both dogs and pigs were found, they occurred as shallow finds; they suggest, but do not prove, the association of these animals with the *latte* people.

Fish hooks and gorges are characterized by a paucity of forms, particularly compared to Polynesia. No archaeological evidence of canoes was found, though they must have been made and used. Remains of seal and turtle suggest that both these animals were used as food.

We have no archaeological evidence of clothing. Pandanus mat impressions on sherds are the only evidence of the textile art.

War: Barbed spear points of human bone and an abundance of slingstones testify to the use of these weapons in war. Ethno-historic data reveal the ancient Chamorros as a relatively war-like people.

Ornament and Art: Ornaments found were confined to a few simple beads, bracelets, and pendants. No carving was uncovered. It is probable that *Latte* Phase art was expressed in perishable materials that have long since disappeared.

Disposal of the Dead and the Evidence of Burials: Both extended and secondary burials (consisting of miscellaneous collections of bones) were found associated with *latte* sites. Also, it is possible that the cremations forming the upper level of Laulau Rock Shelter are associated with the Laulau *latte*. A variety of burial practices therefore was common. Grave goods were absent, except for what were probably trophy jaws. Some of the burials at Objan lacked the skulls, which must have been removed prior to burial. Brown-stained teeth of some burials are evidence for the antiquity of betelnut chewing. One skull and several long bones found at Blue I exhibited pathology suggestive of yaws (Stewart and Spoehr, 1952).

PRE-*LATTE* PHASE CULTURE

Evidence as to what came before the *Latte* Phase is confined primarily to a distinctive pottery type, Marianas Red. Other evidence expressed in artifacts consists merely of a few stone and shell adzes, not of substantial use, since they are insufficient statistically or not of distinctive form. The extended burials lying in sand-lined pits, found in the lowest levels of Laulau Rock Shelter, complete the list. On this scanty evidence, nothing as pretentious as a "culture" can be inferred and delineated. On the other hand, Marianas Red and the lime-filled, impressed pottery from Laulau Rock Shelter do provide distinctive pottery types that should in the future be of great aid in establishing culture relations with other islands and in providing material for cross-dating with other islands.

In this connection, it seems quite unlikely that truly major culture change will ever be delineated in the prehistory of either Micronesia or Polynesia. The first settlers of these islands undoubtedly brought with them the basic adaptations in fishing and agriculture that allowed them to survive and that persisted as the means of making a living up to historic times. The islands limited large-scale concentrations of population, acting as points of diffusion and cultural interaction over a major region, as contrasted with continental foci of culture growth. On the other hand, the probably narrow range of cultural variation through time in Micronesia and Polynesia, and the basic similarities so far uncovered in archaeological and historic cultures, make ethnographic facts essential in archaeological study. In Oceania, archaeology and historical ethnology are closely joined.

CULTURAL AFFILIATIONS OF THE MARIANAS

Until archaeology is further advanced in the western Pacific, it is too early to determine the prehistoric cultural affiliations of the Marianas. Logically, on the prehistoric time level, the Marianas should exhibit relations with the Palaus and with Yap, probably also with the central Carolines. But until a considerable amount of archaeological work has been done in these areas, no determination can be made.

Even more important is the nature of relations with the Philippines. The linguistic evidence indicates that both Chamorro and Palauan fall with the Philippine languages rather than with those of the rest of Micronesia (Grace, 1955). The presence of red pottery wares in the Philippines may link with Marianas Red, and I believe that through these red wares a relation will be established. Ethnologically reported similarities such as the cultivation of rice, as well as minor traits such as lining dug-out pits with sharpened stakes to catch unwary enemies, point to cultural connections. Here again, until stratigraphically established sequences and careful de-

scriptions of prehistoric pottery and artifact types are available in the literature on Philippine archaeology, the cultural affiliations of the Marianas with the Philippines must remain an open problem. I have little doubt that the Marianas are closely related to prehistoric Philippine cultures, but this is a personal impression and cannot be substantiated by published evidence.

REFLECTIONS ON OCEANIC PREHISTORY

The remainder of this report is speculative in nature and deals with the ways in which future archaeological work in Oceania can proceed in most productive fashion. In large part, the discussion that follows is a rephrasing of an earlier article (Spoehr, 1952) and deals with these questions: (a) What is the most useful spatial framework within which to view the problems of Oceanic prehistory? (b) On the basis of archaeological work, what actual chronology has been achieved? (c) What is the strategy that should govern archaeological field work in Oceania? (d) What lines of research allied to archaeology promise the most fruitful results for Oceanic culture history?

Spatial Framework of Oceanic Prehistory

It is characteristic of areas in which archaeological work has long been pursued that there is a constant revaluation of the spatial framework in which problems of culture history are set. As soon as a respectable chronology has been achieved and some insight gained into the specific characteristics of cultural development within a given area, the spatial framework for the interpretation of that area's cultural history comes under critical examination and is altered and refined. In New World archaeology, one need only point to the manner in which archaeologists working in the American Southwest have gradually reformulated their working concepts as to the principal areal subdivisions of the Southwest, as these shift through time. Other examples are the formulation of the concept of "Meso-America" as providing a principal division for the interpretation of Middle American culture history (Kirchhoff, 1943), and current interest in "Nuclear America" as a larger area accommodating a major continental culture growth (Kroeber, 1948; Willey, 1955).

In Oceania, a thorough evaluation of the spatial framework in which to set the problems of Oceanic culture history has not been made. Through long usage, the division of island Oceania into Polynesia, Micronesia, and Melanesia has become established as the most convenient classification of its peoples and cultures. For purposes of ethnographic description, this classification has been useful and will no doubt retain its essential validity.

When the tripartite division of the islands is imposed on what is known of their culture history, however, I have serious doubts as to the utility of the present classification. Because it is so universally accepted, the traditional areal division can easily obscure rather than clarify the nature of prehistoric events in Oceania. Its utility is in need of review and evaluation.

Although an adequate reconstruction of Oceanic prehistory cannot yet be made, at least two phases of its past are apparent. The first is the early settlement of Australia, Tasmania, at least parts of New Guinea, and possibly the Bismarck Archipelago. A conservative view places the peopling of the New Guinea-Australia region during the fourth glacial. The settlement of this area was affected by a series of paleogeographic factors, reviewed in interesting and competent fashion by Keesing (1950). On the basis of the cultures of Australia and what can be surmised of early Negrito culture, these first settlers possessed only the simplest form of water transport, and were food collectors rather than agriculturalists.

A second chapter in Oceanic prehistory occurred at a much later date. This was the settling of the islands of Micronesia and Polynesia, which have always been separated by great expanses of ocean. For human migration into these islands, two conditions had to be met. The first was the invention and development of a form of sea-going craft, and associated techniques of seamanship and navigation, which allowed man to traverse truly awe-inspiring distances across the open sea. The invention of the sailing, single outrigger canoe and the Polynesian double canoe fulfilled this requirement. The second condition was the domestication of those food plants particularly characteristic of the Indo-Pacific region, especially taro, yams, the banana, and breadfruit. With these conditions met, the stage was set for the movement of Malayo-Polynesian-speaking peoples across the Pacific in one of the greatest periods of exploration and settlement in human history. It is true, of course, that we do not know whether the first of these settlers spoke Malayo-Polynesian languages. Yet the fact that Micronesians and Polynesians all belong to this linguistic family makes it probable that the first settlers did also.

It is at this point that the problem of an adequate spatial framework for Oceanic prehistory becomes important. Some new areal concept is necessary to accommodate the events associated with the spread of canoe-voyaging, probably Malayo-Polynesian-speaking, peoples across the Pacific. The division of island Oceania into Polynesia, Micronesia, and Melanesia tends to obscure our perspective on this movement. It was a movement participated in by both Polynesians and Micronesians, who share significant sectors of their culture.

In a previous paper (Spoehr, 1952), I proposed the term *Micro-Polynesia* as an areal concept that would embrace the movement of Malayo-Polynesian-speaking peoples into the Pacific islands. The difficulty with this term is that it does not do justice to the spread of Malayo-Polynesian canoe voyagers into Melanesia. Current linguistic work (Grace, 1955) indicates an early Malayo-Polynesian influence of wide extent in Melanesia, and any areal term should take this into account. Some new spatial concept should be devised to accommodate what seems to me to be a distinctive chapter in Oceanic prehistory.

Chronology

Within the area encompassed by the spread of canoe-voyaging, Malayo-Polynesian-speaking peoples, what absolute chronology has archaeological work produced? Since World War II, the beginning of a framework of radiocarbon dates has been achieved. At the time of writing of this report, the following radiocarbon dates are available:

1. Oahu, Hawaii: A.D. 1004 ± 180. Excavations by Kenneth P. Emory. Radiocarbon date determined by W. F. Libby, University of Chicago (Libby, 1951).

2. Tinian, Marianas: A.D. 845 ± 145. Excavations by Alexander Spoehr. Radiocarbon date determined by W. F. Libby, University of Chicago (Libby, 1952).

3. Saipan, Marianas: 1527 B.C. ± 200. Excavations by Alexander Spoehr. Radiocarbon date determined by W. F. Libby, University of Chicago (Libby, 1952).

4. Viti Levu, Fiji: 46 B.C. ± 500; A.D. 654 ± 500; A.D. 754 ± 500; A.D. 1002 ± 300; A.D. 1255 ± 300; A.D. 1305 ± 300. Excavations by E. W. Gifford. Radiocarbon dates determined by H. R. Crane, University of Michigan (Gifford, 1955).

5. New Caledonia: 847 B.C. ± 350; 482 B.C. ± 400; A.D. 73 ± 350; A.D. 253 ± 300; A.D. 618 ± 300; A.D. 1048 ± 300; A.D. 1168 ± 300; A.D. 1338 ± 300; A.D. 1568 ± 300. Excavations by E. W. Gifford. Radiocarbon dates determined by H. R. Crane, University of Michigan (Gifford, personal communication).[1]

These dates will no doubt soon be supplemented by additional ones from Hawaii and New Zealand, where systematic archaeology is proceeding apace. Additional dates are also badly needed for western Micronesia. Although the dates presently available are hardly sufficient to establish a firm chronology for the spread of Malayo-Polynesian peoples into the Pacific, they do provide a basis for working hypotheses which may be altered or substantiated as new evidence accumulates. Two such hypotheses are recapitulated below from a previous paper (Spoehr, 1952).

The first hypothesis is that by approximately 1500–2000 B.C., man, equipped with sea-going canoes and the plants necessary for his survival in an Oceanic island environment, had commenced his eastward migration from the general Malaysian region.

[1] Since this was written, the Fiji and New Caledonia dates have been fully reviewed in Gifford and Shutler (1956).

The second hypothesis is that the eastward migration through Micronesia and Polynesia spanned approximately 2500 years. Terminal points of this period are set by the Saipan and Oahu dates, the Hawaiian Islands certainly being one of the last regions to be settled in Polynesia. However, current archaeological field work by Emory in Hawaii suggests that the first settlement of the Hawaiian Islands may be several hundred years earlier than the single radiocarbon date now available.

The dates obtained by Crane from Gifford's excavations in Fiji and New Caledonia are also an extremely important part of the picture. It is my considered guess that Fiji was settled by 500 B.C. If this is so, nearby Samoa and Tonga in western Polynesia were probably populated shortly thereafter. Emory agrees that the nuclear center of eastern Polynesia—the Society Islands—was settled about the beginning of the Christian era. New Zealand may be somewhat earlier than Hawaii, but a series of dates from each of these two areas must be determined before an answer can be forthcoming.

The 847 B.C. date from New Caledonia is of exceptional interest. The linguistic evidence suggests an early Malayo-Polynesian influence in Melanesia, and the radiocarbon date confirms this supposition. My guess is that one of the earliest movements of Malayo-Polynesian canoe voyagers was along the northern coast of New Guinea and into the Bismarck Archipelago, that they interbred with peoples already resident there, and that they pushed southward along the Solomons, the New Hebrides, and finally to New Caledonia, the southernmost major island in Melanesia.

Within the framework of the tentative chronology posed above there are many unanswered questions. What was the nature of these sea-voyagers' expansion eastward? Did it occur as a slow trickle or as a series of bursts or waves of exploration and settlement? What of the still unknown paths of migrations? In a previous paper (Spoehr, 1952), I committed the indiscretion of stating that the Polynesians probably came through Micronesia. This view is not sustained by convincing evidence and the question must remain open.

Most important of all is the nature of culture change encompassed by the chronology derived from our present carbon 14 dates. Here the answer can only come from careful excavations in key island areas. Since World War II, an excellent beginning has been made, yet much remains to be done.

Strategy of Archaeological Work

Except where anthropology is professionally established, as in New Zealand and Hawaii, islands deserving careful archaeological work are far removed from institutional centers of research, and access to such islands is

sometimes difficult and arduous. Archaeological field work is therefore expensive, and if for no other reason, the strategy of field work assumes great importance.

Two papers on the status and problems of archaeology in Micronesia and Polynesia should be noted. One (National Research Council, Sub-Committee on Pacific Archaeology, 1951) deals with Micronesia and points particularly to the critical importance of the Palaus and Yap in the pottery area of western Micronesia. Since the publication of this article, Osborne has conducted survey and excavations in the Palaus, and Gifford has worked on Yap. The results of their efforts should contribute greatly to archaeological knowledge of Micronesia.

In the Marianas, the gaps in this present report can best be filled by excavations on Rota. Of all the islands in the Marianas, the greatest number of sites remain on Rota, which has suffered less destruction of archaeological remains than Guam, Tinian, or Saipan. What is particularly needed is field research to determine the chronology and culture content of the pre-*latte* period.

Also of significance are Truk, Ponape, and Kusaie, strategically placed across the hundreds of miles of the Caroline chain. Thorough investigation of the impressive stonework sites of Ponape and Kusaie would in itself be an exciting task.

The second paper bearing on the strategy of archaeological work is Emory's excellent statement on the needs of Polynesian archaeology (Emory, 1953). Fortunately, there is a body of descriptive data on surface structures and artifacts in Polynesia. Added to this is the very promising current work, conducted with due regard for stratigraphy, now taking place in New Zealand and Hawaii, and of which Duff's report on the moa-hunter period in New Zealand is a most productive result (Duff, 1950). It should not be long before the outlines of prehistory in both Hawaii and New Zealand become part of the published record.

For other considerations affecting Polynesian archaeology, the reader is referred to Emory's paper, though I cannot let the opportunity pass without seconding Emory's stress on the need for careful excavations in the Society Islands, Samoa, and Tonga.

The Melanesian picture is much more complex. Gifford's work in Fiji (Gifford, 1951) and in New Caledonia is a real contribution. The next logical step is perhaps an extension of the line of attack through the Solomons and into the Bismarck Archipelago, with one goal the possibility of defining the area of Malayo-Polynesian influence in prehistoric times in Melanesia. Melanesia as a whole, however, encompasses such a great area, its prehistory is undoubtedly so complex, the relevant time scale covers so

many millennia, that any planned program of archaeological research in the area presents almost overwhelming difficulties. The prehistory of New Guinea alone would take decades of work to unravel.

Consideration of Malaysia is beyond the scope of this report, except to comment that determining the relationships of the Oceanic islands and Malaysia is an ultimate goal of prehistoric research in the Pacific. Heyerdahl's courageous voyage from Peru to Polynesia and his subsequent monograph have excited general interest in the question of trans-Pacific contact with the New World. That contact took place I have little doubt, but a balanced view of the evidence does not show that it had major effect on the course of culture history in the Pacific. The prehistory of Oceania is an offshoot of the Old World, and in time will be shown in its proper relation to the ancient culture growths of Malaysia and the Asiatic mainland.

Promising Lines of Research Allied to Archaeology

As archaeological research proceeds in the Pacific, there are within the general field of anthropology two allied lines of investigation which have already contributed substantially to Pacific prehistory and whose further pursuit promises most significant results. These allied lines of investigation are linguistics and physical anthropology.

Although I am not a specialist in the field of linguistics, and hence not perhaps in a position to offer a considered opinion, the development of structural linguistics in the last few decades appears as a major advance. From the point of view of Pacific culture history, an improved understanding of the historical relationships of Pacific languages, particularly those included in Malayo-Polynesian, is an absolute necessity. Through the application of the analytical techniques of structural linguistics to comparative studies of Pacific languages, the ultimate historical synthesis will have much greater validity, on both phonemic and morphological levels, than it ever could have had thirty years ago. At the same time, although glottochronology seems still to be the subject of considerable controversy, it promises to be a valuable technique, particularly when combined with radiocarbon dating, for determining chronology and historical relationships. In a recent paper, Elbert (1953) has applied the glotto-chronological method to the Polynesian languages. The present research of the Tri-Institutional Pacific Program, sponsored by Yale University, the University of Hawaii, and Bishop Museum, has as one of its first objectives the gaining of a clearer understanding of the historical relationships of the Malayo-Polynesian languages of Oceania, through the application of the newly developed linguistic techniques. To this end, Grace (1955) has recently published a tentative classification of the Malayo-Polynesian languages of Polynesia, Micronesia, and Melanesia. Under the Tri-Institutional Pacific

Program, he is now testing this classification through extensive field work, primarily in Melanesia, whose linguistic complexity makes it of critical importance.

In physical anthropology, the extension of research on human blood groups to the indigenous peoples of the Pacific certainly marks the most significant advance made in knowledge of the genetic make-up of Pacific populations. The spatial limits of the present distribution of Malayo-Polynesian-speaking peoples encompass genetically diverse groups. It is an interesting question whether the original movement of canoe voyagers eastward from Malaysia was undertaken by peoples of greater or lesser homogeneity, from either the point of view of morphology or of blood group frequencies, than modern Polynesians, Micronesians, and Malayo-Polynesian-speaking Melanesians. It is possible that Melanesia may be somewhat similar to Madagascar, where Malayo-Polynesian-speaking migrants have been merged into a largely African population and have lost their original identity, although the language brought by the migrants has remained dominant.

A final comment concerns another line of investigation that is only recently receiving the recognition it deserves. Particularly in Micronesia and Polynesia, man moved into the islands, bringing with him a distinctive biotic assemblage of economic plants, weeds, domestic animals, and organisms parasitic on man himself. The evolution and history, and the manifold ecological relationships of these man-transported forms of life with their human carriers, present challenging problems significant for an understanding of culture history (cf. Emory, 1953). Of prime importance are the economic plants. The time is ripe for their intensive study, utilizing the combined approaches of genetics, cytology, taxonomy, and plant physiology in a manner comparable to the studies of New World food plants, particularly maize. Sauer's intriguing hypothesis of an ancient center of domestication in Southeast Asia of the principal starch-yielding cultigens of the Pacific (Sauer, 1952), and Merrill's stimulating, if often vitriolic, discussion of the dispersal of Pacific food plants (Merrill, 1954) are recent publications from the pens of an eminent geographer and botanist, respectively, that emphasize the need for a new program of research. However, it is a program that demands the skills of the botanist, however valuable the collaboration of the geographer and the anthropologist may be.

Significant also are competent zoological studies of the domestic animals—the pig, fowl, and dog—and that perennial hanger-on, the rat. And lastly there are those organisms parasitic on man, of which the two most important are probably the treponemas of yaws and filaria. In the case of the former, some assistance may be rendered by paleopathology, granted

the difficulties in the diagnosis of pathological skeletal material (Stewart and Spoehr, 1952).

What is called for, therefore, is a well-defined approach stemming from what is not a well-defined field—human ecology. Yet because the principal objects of study are tangible life forms clearly related to man, an ecological point of view is essential to progress in the understanding of culture history in the Pacific.

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