

Recent and Current Archaeological Research on Moen Island, Truk

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INTRODUCTION

TRUK LAGOON AND THE outer atolls of Truk State have seen a good deal of anthropological research since World War II, but the archaeology of the area was virtually unknown until the last decade. Mahony and Gosda (Gosda 1958) inspected and briefly reported several prehistoric sites on Moen Island in 1954-1955, but the first fairly systematic surveys to be reported, at least in the western literature, were those of Clune in the 1970s on Moen and several other islands (Clune 1974, 1977). Takayama and Seki (1973) undertook the first excavations, at Winipwéet (Ulibot) and Féwúpé (Fauba) on Toon (Tol). Takayama returned to excavate at Chukuyénú (Chukienú) on Toon (Takayama 1978). In 1976, Takayama, Sinoto, and Shutler carried out an emergency excavation at several sites on Feefen (Fefan) which were being affected by dredging. This excavation, the first to investigate shoreline middens in Truk, revealed pottery and surprisingly early (c. 2000 B.P.) occupation deposits (Shutler, Sinoto, and Takayama 1977).

In 1977, Parker began ethnographic and ethnohistorical research in Iras Village on Moen Island; her studies, conducted as dissertation research under the supervision of Professor Ward Goodenough at the University of Pennsylvania, are directed toward understanding traditional land law in the village and the effects of the postwar imposition of American legal systems. At the same time, King began a two-year term as consultant in archaeology and historic preservation to the High Commissioner of the

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Trust Territory of the Pacific Islands. One of his early actions was to establish the Micronesian Archaeological Survey as a branch of the Trust Territory Historic Preservation Office. Since 1977, the Survey has sponsored a number of projects throughout Micronesia.

Section 106 of the U.S. National Historic Preservation Act requires that historic properties be considered in the planning of projects assisted by the federal government. In 1977, when it was ascertained that enlargement of Truk International Airport in Iras Village would damage properties of both archaeological and contemporary cultural significance, the Trust Territory Government undertook a program to reduce the severity of these impacts (see King and Parker 1981; Parker and King n.d.). One aspect of this program was archaeological salvage excavations at the airport and its associated quarry. This initial fieldwork was expanded during airport construction in 1979, when excavations were also conducted in advance of sewer construction in Iras, test excavations were conducted in the adjacent village of Mechchitiw, and a survey was undertaken on the upper slopes of Mt. Tonaachaw, on whose flanks both villages lie. Parker returned in 1981 to conduct salvage excavations in advance of sewer construction in Iras and Mechchitiw, and in advance of waterline construction in Sapwúuk, at the opposite (east) end of Moen.

Edwards and Edwards (Edwards 1978; Edwards and Edwards 1978) surveyed on Toon in 1978, and Takayama worked there and in the Mortlocks in 1979 (Takayama and Intoh 1980). The Truk Historic Preservation Team, under the direction of Francis Buekea, conducted surveys in advance of minor construction projects through 1981, while we analyzed the data from the excavations around Tonaachaw. The final report of this study is now complete, and will be published by Southern Illinois University, Carbondale, in the fall of 1984 (King and Parker n.d.). The present paper is a summary outlining conclusions on topics of possible interest to other researchers in Oceania.

BACKGROUND

Truk is a collection of basaltic high islands, remnants of a submerged volcano, surrounded by a barrier reef 30 to 40 miles in diameter, lying in the center of the Caroline Islands (Fig. 1). It is the center of Truk State, one of the four states of the Federated States of Micronesia. The state also includes the Mortlock Islands to the south, Nómwun Paafeng (Hall Islands) and Nómwun Wiitée (Namonuito) to the north, and the atolls of Pwonnep (Pulap), Pwonowót (Puluwat), and Suuk (Pulusuk) to the west. Moen Island is the northernmost major island within Truk Lagoon itself, and is the state capital. It is a roughly triangular high island, with an area of 7.2 square miles (Fig. 2).

Mt. Tonaachaw is a volcanic plug that comprises the far western tip of Moen; it is virtually separated from the main island body, connected only by a narrow ridge on which the state government offices lie in the village of Nantaku. The village of Neepwukos is situated south of Nantaku in a low, swampy area that was partly filled by the Japanese and later by the Americans to form the island's major port facility. North of Nantaku is Pwoow Bay, dividing the villages of Mechchitiw and Tunnuuk. Not counting Nantaku, which is a recent creation, Mt. Tonaachaw is divided between two villages: Iras to the southwest, and Mechchitiw to the northeast.

The people of Iras and Mechchitiw were allies in a number of wars during the nine-



Fig. 1 Truk Lagoon

teenth century, when warfare was apparently endemic in Truk. They were badly defeated late in the century, and Iras lost the land that is now Neepwukos. The Germans more or less pacified the villages at the turn of the century, and the Japanese built a road, playing fields, stores, and other amenities there during the two decades following their takeover in 1914. World War II brought vast changes: the people of Iras were forced to relocate, and an airstrip was built over their village. Major military and commercial facilities were constructed in Mechchitiw, and an observation post was built on top of the mountain. The area was heavily bombed by the Americans, and Mechchitiw became the first headquarters for the U.S. occupation forces in 1946. The people of Iras returned in 1947, but had to settle in the swamps along the foot of the mountain, their beachfront village lands being still under the Japanese airfield, which became Truk International Airport.

Once divisions of a single political district, Iras and Mechchitiw have remained closely knit for at least 150 years. Genealogical data collected by Parker show high rates of intermarriage, reinforced by land exchanges and inheritance patterns, extending back to the mid-nineteenth century. Marriage and concomitant property transactions continue to tie the two villages together, along with more "modern" forms of intervillage cooperation.

Mt. Tonaachaw itself is said to have been the seat of government for the legendary con-

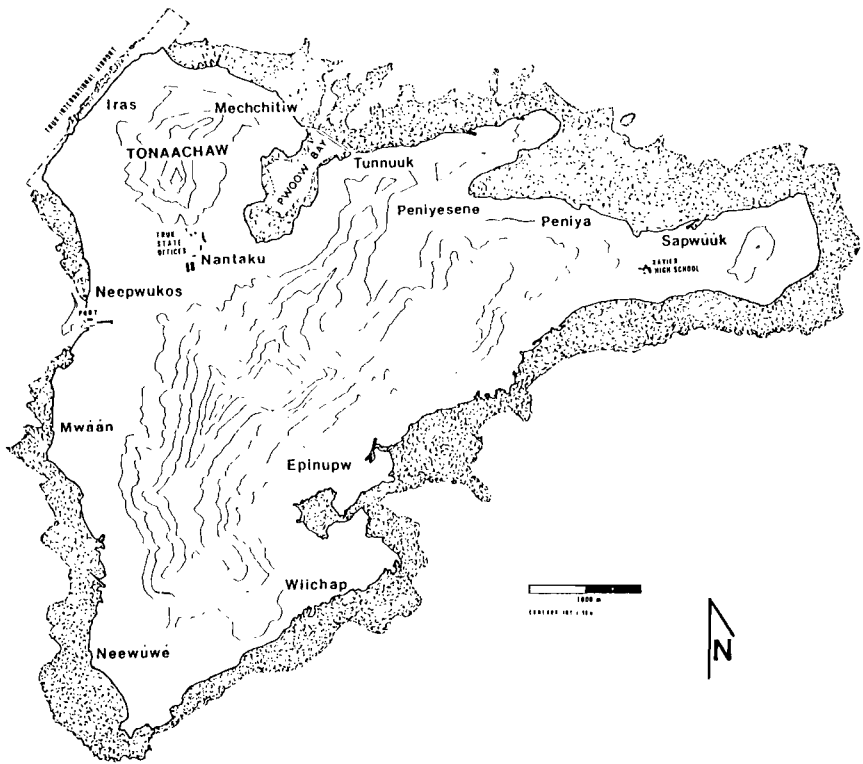


Fig. 2 Moen Island. Mt. Tonaachaw and Truk International Airport in northwest corner.

querors and administrators Sowukachaw and Sowóóniiras. Sowukachaw in Trukese tradition came from a place called Kachaw, often associated with Kosrae. He is said to have established himself in Mechchitiw and to have built a meetinghouse on the crest of Tonaachaw. From this base, Sowukachaw, Sowóóniiras, and others variously referred to as their brothers and children are said to have ruled Truk lagoon and the outer atolls. Mt. Tonaachaw is referred to metaphorically as an octopus, whose head, mind, and spirit are embedded in the mountain's peak, and whose tentacles stretch out through a series of named loci to touch every island and reef in the state.

The Sowukachaw/Sowóóniiras tradition has been variously interpreted. Nakayama and Ramp (1974), for example, posit an empire ruled by Sowukachaw from Kosrae with administrative centers at Nan Madol on Ponape and Tonaachaw in Truk. Goodenough (n.d.; personal communication, 1983) argues that the tradition represents the establishment of a religious cult in Truk, with links to Ponape that are at least as strong as those to Kosrae. The tradition is of pivotal importance in traditional Trukese culture history, symbolizing the establishment of both the clan system that comprises the basis for the modern social order and the schools of *itang*, the practice of spiritual and moral authority embodied in metaphorical speech.

Given the importance of the Sowukachaw/Sowóóniiras tradition, and the central role played in it by the mountain Tonaachaw, our archaeological studies were naturally oriented, in part, toward defining how this tradition might be represented, if at all, in the archaeological record. At the same time, our work was necessarily exploratory, given the

scant basis we had initially for reconstructing the basics of Trukese culture history and our even less firm understanding of the meanings embedded in Trukese oral historical lore, the *itang* chants.

RESEARCH METHODS

With the aid of older residents, Parker prepared a series of land-use maps of Iras ranging back to the last quarter of the nineteenth century, and collected genealogical and land history data going back approximately 150 years. Oral historical data on land use in Mechchitiw and Sapwúúk are much more limited, since these villages were not the foci of her dissertation research, but an effort was made to obtain comparable data.

Excavations were directed toward testing and expanding upon the oral historical data. At the airport runway, the first stage of testing involved cutting backhoe and bulldozer trenches through the clay bed of the Japanese airfield within each old land plot identified by informants. Despite extensive bomb damage, intact midden deposits were found and tested. Subsequently the old runway bed was stripped for the new airport, and all grading was monitored. A number of features, burials, and concentrations of artifacts were recorded and recovered. Excavations in advance of sewer construction were conducted similarly, by stripping away the overlying clay by machine, then carrying out controlled test excavations. In Mechchitiw and Sapwúúk there was no overburden, so stripping was not necessary. The slopes of Mt. Tonaachaw above the heavily occupied areas were inspected, and minor test excavations were carried out at identified sites. Major excavations were carried out on sites to be destroyed by quarry expansion on the northwest flank of the mountain. All fieldwork was carried out by residents of the villages and the Truk Historic Preservation Team, under the supervision of Parker, King, Truk Historic Preservation Officer Francis Buekea, and Peace Corps volunteer James Carucci (now of Southern Illinois University, Carbondale).

SUMMARY OF EXCAVATED SITES

Figure 3 shows the locations where intensive investigations were undertaken in Iras and on the upper slopes of Mt. Tonaachaw; the other foci of work were in Mechchitiw at the mouth of Pwoow Bay and in Sapwúúk along the north shore. Sites excavated are the following:

1. *Tonaachaw Summit* (TKMO-1). This is a small remnant midden with two loci: one on the very tip of the mountain, one on a small terrace 3 to 4 m below the summit to the north. The midden is rich in shellfish debris and fishbone, and a minor test excavation revealed part of a fire pit at the base of the northern (lower) locus.

2. *Neemóón* (TKMO-2) is a small, single-component shell midden on the ridge of Tonaachaw, north of the summit and some 50 m lower in elevation.

3. *Nekkêetes* (TKMO-9) is a small, single-component shell midden, identified by informants as an occupation site in the late nineteenth century, on a terrace some 65 m above the shore on the north face of the mountain.

4. *Pwpwúnúkkamw* (TKMO-8) was a dark earth midden with little shell and many earth ovens for cooking breadfruit (*wuumw*). It was 100 to 120 cm deep and contained three major stratigraphic components. The deepest was a dark orange midden with abundant charcoal, few artifacts, and very little shell, lying on and behind a buried basalt retaining wall. Above this was a dark gray, friable stratum with many earth ovens and a

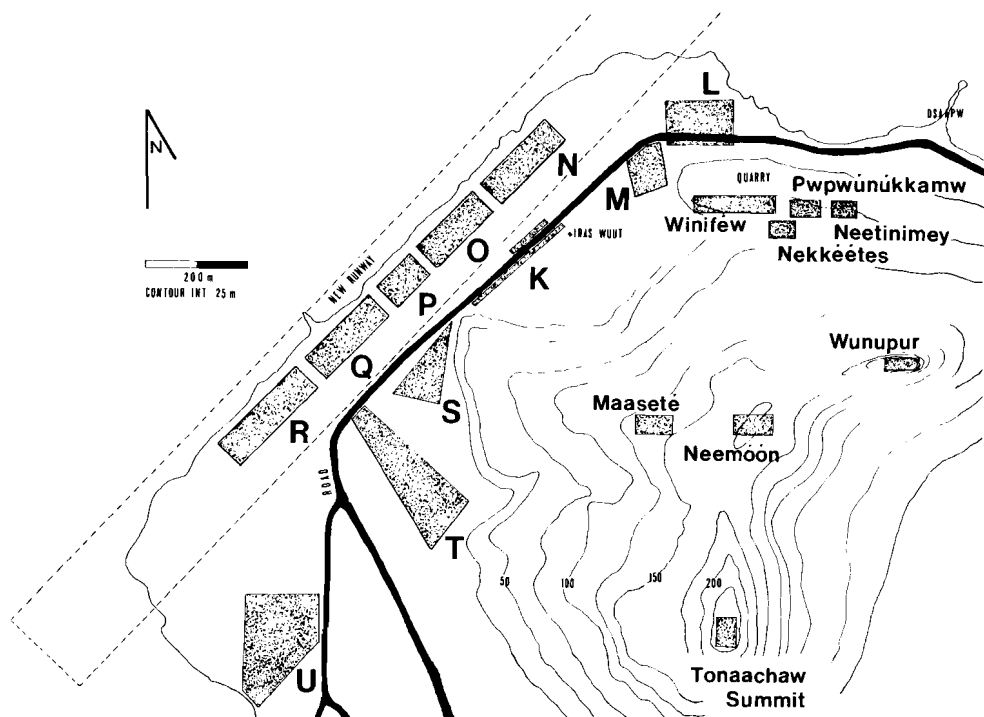


Fig. 3 Excavated locations on Mt. Tonaachaw (exclusive of coastal Mechchitiw).

fairly large amount of shell. The uppermost stratum contained the largest amount of shell, many earth ovens, and two inhumations, each identified by informants as a known individual who died around the turn of the century. Pwpwúnúkkamw lay within the quarry expansion area on the north flank of the mountain, and was identified by informants as a cookhouse (fanang).

5. *Neetinimey* (TKMO-7) is a shallow, single-component shell midden, known to have been occupied through the 1920s, which lies just outside the quarry east of Pwpwúnúkkamw. It contains the apparent remnants of a house foundation, abundant shellfish debris and fishbone, many artifacts, and inhumations.

6. *Coastal Iras* (TKMO-11) is the collective term for the lowlands fronting the lagoon on the west side of Tonaachaw, including the present site of Truk International Airport. Excavations were conducted in 11 locations. Figure 4 shows a typical excavated area under the runway itself; in each such location, the controlled stripping and test excavations of 1978 were supplemented by monitored full-area grading in 1979. The occupation deposits revealed included shallow, undifferentiated dark gray shell middens with hearths and shell lenses, light gray shell middens, sometimes associated with twentieth-century materials, structural remains, earth ovens, and primary and secondary inhumations. Toward the shore the middens tend to be shallow, 10 to 30 cm deep, while inland (e.g., location M in Fig. 3) the midden might be 90 to 120 cm deep, extending below the present water table but terminating roughly at the contemporary sea level. In locations T and U on Figure 3, the midden was very light gray with small amounts of shell, widely scattered human bone fragments, and artifacts. This deposit lay under taro patches which informants recalled being used early in the twentieth century. In most areas the midden

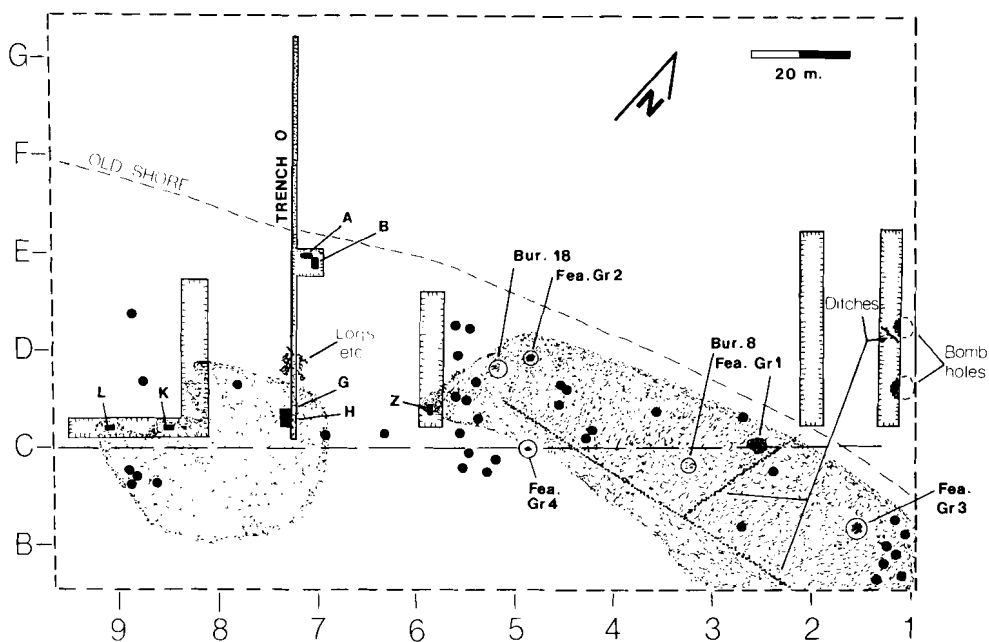


Fig. 4 Study Unit N: a typical study unit in coastal Iras (TKMO-11). Entire study unit graded during 1979 construction. Rectangles are 1978 excavation units and backhoe/bulldozer trenches; shaded areas are middens; black circles are isolated artifacts.

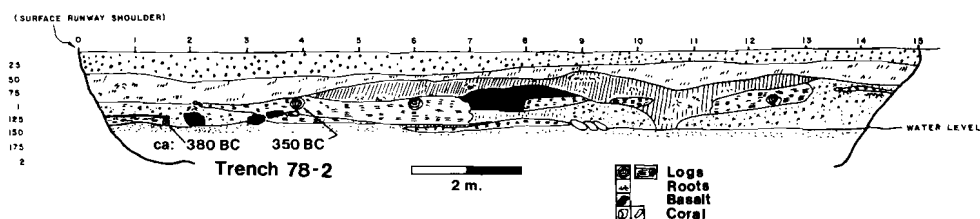


Fig. 5 Stratigraphy of Neepwootong Deep, Study Unit N, coastal Iras.

terminated on a coarse beach sand composed of fragments of the segmented calcareous green alga *Halimeda*. Location K in Figure 3 is stratified in a complicated way, probably as the result of slope wash from the mountain and the presence of a stream in the vicinity before airport construction. A trench on the northwest side of the road at Location K revealed a complex interstratification of shell middens, sand lenses, and clays with organic debris (Fig. 5), which we call *Neepwootong Deep* after the land unit in which it occurs. Most of the coastal Iras middens remain more or less intact, many now buried under the new airport.

7. *Coastal Mechchitiw* (TKMO-5) is a sandy shell midden at the mouth of Pwoow Bay. This is the traditional landing place of Sowukachaw. Much of the site was badly disturbed during World War II and thereafter. The midden appears to become deeper, less disturbed, and generally richer in debris as one progresses from west to east; near the mouth

of the bay Trukese architectural remains were encountered, and the midden was found to be at least 150 cm deep.

8. *Western Nemwâân* (TKMO-15) is a badly disturbed coastal sandy shell midden in the northwestern part of Sapwúúk; the midden is about 60 cm deep and merges with mangrove swamp to the north, inland taro swamp to the south.

9. *Eastern Nemwâân* (TKMO-16) is a complex of small midden sites and structural remains in the northeastern part of Sapwúúk. The midden areas excavated within the waterline right-of-way appear to have been redeposited during twentieth-century road construction.

RESULTS

Age Determination

Eleven radiocarbon dates were obtained from excavated sites in Iras and Mechchitiw. Table 1 presents these dates and all other radiocarbon dates known to us from Truk, calibrated following Klein and coauthors (1982). Figure 6 presents the calibrated age-ranges represented by all these dates in graphic form. The age-ranges clearly fall into two clusters. The older is represented by the middens at the south end of Feeffen (Shutler, Sinoto, and Takayama 1977) and the Neepwootong Deep deposit under the airport, and ranges between about 500 B.C. and 400 A.D. The later is represented by the great bulk of sites excavated on and around Mt. Tonaachaw, as well as by all sites excavated so far on Toon and in the Mortlocks. The Mortlocks dates range earlier than do those in Truk Lagoon, but must be regarded as somewhat suspect, as they all date samples of marine shell. In the lagoon, the later cluster of age ranges suggests the rather rapid establishment of occupation sites after 1300 A.D. The single date in the lagoon that falls in the "long gap" between c. 400 and c. 1300 A.D. is from TKFE-2, a site subjected to minor testing by Shutler, Sinoto, and Takayama (1977), which produced distinctive redware sherds.

CULTURE HISTORY

On the basis of present data, we define two culture-historical patterns in Truk Lagoon. The *Winas Pattern*, named after the Winas Lagoon area on Feeffen where the first pottery discoveries were made, appears to represent a period sometime between 500 B.C. and 500 A.D. It is reflected in the southern Feeffen sites and, probably, in the Neepwootong Deep midden on Moen. Only very minor testing was done at Neepwootong Deep; no pottery was found, but the single artifact recovered was a shell ornament fragment closely resembling specimens from the Feeffen sites. The most notable characteristic of the *Winas Pattern* sites, on Feeffen at least, is their pottery, which is not found in later sites. All known *Winas Pattern* sites are found on the shore, and contain abundant shellfish debris suggesting gathering on the reef. The artifact assemblages thus far known contain few if any of the tools associated with breadfruit processing, which are ubiquitous in the later sites.

The *Tonaachaw Pattern* represents the late sites throughout Truk Lagoon. It lacks pottery, and is characterized by the full range of artifacts associated with ethnographic Truk, notably by the complex of tools and facilities associated with breadfruit processing. The earliest dated component that probably represents the *Tonaachaw Pattern* is the remnant midden at Tonaachaw Summit (TKMO-1) (1305-1420 A.D.). The *Tonaachaw Pattern* is represented in a variety of site-types, including coastal middens, interior occupation sites

and cookhouse sites, ridge and summit middens like Tonaachaw Summit and Neemóón, and fortresses like Féwúpé. Most site-types both on the shore and in the interior show regular and predictable relationships to specific soil and slope combinations as mapped recently by the U.S. Soil Conservation Service (Laird 1983). Settlement patterns, subsistence practices, architecture, and mortuary patterns apparent in the archaeological record are all consistent with those of ethnographic Truk. The Tonaachaw Pattern is also represented in the sites tested by Takayama and Intoh (1980) in the Mortlocks; if their dates are accurate, the pattern was present there by about 1000–1100 A.D.

Traditional History and Archaeology

Truk Lagoon has clearly been occupied since at least the time of Christ, but the evidence of human settlement is quite limited until about the fourteenth century A.D. The relative dearth of Winas Pattern sites, and sites filling the “long gap” between the times of the Winas and Tonaachaw patterns, may reflect nothing more remarkable than sampling error, but we suspect that it reflects settlement and subsistence systems substantially different from those that characterize the Tonaachaw Pattern and ethnographic Truk. The lack of breadfruit-processing equipment in Winas Pattern sites suggests that this crop, the mainstay of ethnographic Truk, was of limited importance during Winas times. The great value of breadfruit in the Trukese economy is that it can be stored in fermented form (épwét), and that some varieties can produce during months other than April through August, the major breadfruit season. The major breadfruit season coincides with relatively low tides and gentle winds, when the reef is most productive, while during the months of breadfruit scarcity, high tides and strong northeast trade winds make the reef relatively unproductive. If for some reason the people responsible for the Winas Pattern had limited access to breadfruit, especially to those varieties that produce late or early, or that are best for fermentation, the lean period between November and April of each year would have limited the carrying capacity of the local environment. Adaptation might have involved swidden horticulture and/or seasonal dispersal to make best use of reef resources during the lean months, either of which would result in less sedentary, concentrated settlement systems than would have been possible with breadfruit as a staple crop.

The people responsible for the Tonaachaw Pattern clearly did make heavy use of breadfruit, and presumably stored it in its fermented form, thus buffering the effects of the lean period each year and allowing relatively large communities to remain in place throughout the year. This could account for the apparent rapid spread of the Tonaachaw Pattern, represented in the apparent establishment of settlements on islands throughout Truk Lagoon during and shortly after the fourteenth century. The evidence thus far suggests that Mt. Tonaachaw, including the site on the summit, the traditional location of the meetinghouse of Sowukachaw, was occupied at least as early as any other site at which the Tonaachaw Pattern is represented.

Studies by Cordy and Ueki (Cordy 1982; Cordy and Ueki 1983) at Leluh on Kosrae indicate that artificial expansion of the islet on which Kosrae's capital city was built began during the thirteenth century, with major megalithic construction beginning around 1400. Megalithic construction apparently began at Nan Madol on Ponape around 1200 A.D. (Athens 1980, 1983, n.d.), and secondary political centers were established elsewhere on Ponape by the fifteenth century (Streck 1983). This evidence suggests a period of rapid culture change in the central Carolines during the thirteenth and fourteenth centuries. The coincidence of the apparent inception of the Tonaachaw Pattern in Truk Lagoon with

TABLE I. RADIOCARBON DATES ON TRUKESE ARCHAEOLOGICAL MATERIAL

ISLAND	SITE	ASSOCIATIONS	MATERIAL	LAB. NO.
Moen	Coastal Iras TKMO-11	<i>Neepwootong Deep</i> , Study Unit K, log 1 m N of SW end Tr. 78-2, 120 cm deep	unburned wood	N-3374
Moen	Coastal Iras TKMO-11	<i>Neepwootong Deep</i> , Study Unit K, log 4 m N of SW end Tr. 78-2, 90 cm deep	unburned wood	N-3373
Feefen	TKFE-1	Pottery-bearing midden	charcoal	N-2887
Feefen	TKFE-1	Pottery-bearing midden	marine shell*	N-2888
Feefen	TKFE-1	Pottery-bearing midden	charcoal	N-2845
Feefen	TKFE-1	Pottery-bearing midden	marine shell	N-2866
Feefen	TKFE-1	Pottery-bearing midden. Shutler says date suspect	bone	UCR-598
Feefen	TKFE-3	Red-slipped pottery-bearing midden	charcoal	UCR-599
Mwooch	Eor Village	TP-2, Layer II, coarse black sand c. 22-26 cm deep	marine shell	N-3678
Satawan	Kuta Village	TP-3, black midden on surface	marine shell	N-3681
Mwooch	Eor Village	TP-2, Layer III, light yellow coarse sand c. 26-40 cm deep	marine shell	N-3679
Mwooch	Eor Village	TP-1, Layer II, coarse grayish black sand with intrusive pit, c. 20-60 cm deep	marine shell	N-3676
Moen	Tonaachaw Summit TKMO-1	Locus B. Strata D-E interface, in firepit at base of midden	charcoal	N-3532
Moen	Coastal Iras TKMO-11	<i>Neeroraawu</i> , Study Unit T, scattered human bones in midden underlying taro patch deposits	bone collagen	UCR-985
Moen	Coastal Iras TKMO-11	<i>Fään Achapar</i> , Study Unit N, Feature 78-H-1, hearth in unit 78-H and Trench O	charcoal	N-3420
Toon	<i>Chukuyénú</i> Shell Midden	Upper (NE) terrace, Level II, black midden c. 13-45 cm deep, with <i>wuumw</i>	charcoal	N-2364
Feefen	TKFE-2	Pottery-bearing midden. Shutler says date suspect	bone	N-2867
Moen	<i>Pwupwínúkkamw</i> TKMO-8	Firepit at base of Level III, behind retaining wall, at base of cookhouse site with many <i>wuumws</i>	charcoal	N-3534
Toon	<i>Chukuyénú</i> Shell Midden	Upper (NE) terrace, Level III, black- ish brown clay midden 45-70 cm deep	marine shell	N-2365
Moen	Coastal Mechchitiw TKMO-5	Log identified as cornerpost of <i>wuut</i> under basalt concentration in midden at 130 cm depth	unburned wood	Beta- 4135
Toon	<i>Chukuyénú</i> Shell Midden	Slope SW of upper terrace, in black shell midden c. 5-25 cm deep	charcoal	N-2366
Toon	<i>Chukuyénú</i> Shell Midden	Upper (NE) terrace, Level II, black midden c. 13-45 cm deep	charcoal	N-2363

CONVENTIONAL OR APPARENT RADIOCARBON AGE (BP)		CALIBRATED RADIOCARBON AGE (BC/AD)	SOURCE
5730	5568		
2330±65	2270±60	525–175 B.C.	This project
2300±80	2240±80	565–30 B.C.	This project
2080±90	2020±85	375 B.C.–215 A.D.	Shutler, Sinoto, & Takayama 1977
2060±80	2010±80	370 B.C.–220 A.D.	Shutler, Sinoto, & Takayama 1977
1980±80	1930±75	165 B.C.–240 A.D.	Shutler, Sinoto, & Takayama 1977
1860±85	1810±85	01 B.C./A.D.–420 A.D.	Shutler, Sinoto, & Takayama 1977
—	1305±130	455–1005 A.D.	Shutler, Sinoto, & Takayama 1977
—	1255±130	575–1035 A.D.	Shutler, Sinoto, & Takayama 1977
985±85	955±80	890–1250 A.D.	Takayama & Intoh 1980
900±60	875±60	1035–1235 A.D.	Takayama & Intoh 1980
900±75	870±70	1035–1255 A.D.	Takayama & Intoh 1980
805±75	780±70	1190–1315 A.D.	Takayama & Intoh 1980
590±75	570±70	1305–1420 A.D.	This project
—	500±100	1310–1515 A.D.	This project
495±60	480±55	1345–1490 A.D.	This project
450±90	480±90	1320–1605 A.D.	Takayama 1978
480±80	465±80	1330–1630 A.D.	Shutler, Sinoto, & Takayama 1977
470±80	455±80	1330–1635 A.D.	This project
450±65	435±60	1400–1515 A.D.	Takayama 1978
—	420±60	1400–1525 A.D.	This project
430±75	415±70	1405–1540 A.D. <i>or</i> 1560–1605 A.D.	Takayama 1978
410±75	400±75	1350–1655 A.D.	Takayama 1978

Continued

TABLE 1.—Continued

ISLAND	SITE	ASSOCIATIONS	MATERIAL	LAB. NO.
Moen	Tonaachaw Summit TKMO-1	Locus B, Strata D-E interface, in firepit at base of midden	marine shell	N-3533
Mwooch	Eor Village	TP-2, Layer I, black midden on surface	marine shell	N-3677
Toon	<i>Chukuyênú</i> Shell Midden	Lower (SW) terrace, shell midden 10–35 cm deep, with rock clusters and pits	charcoal	N-2372
Toon	<i>Chukuyênú</i> Shell Midden	Slope SW of upper terrace, black shell midden c. 5–25 cm deep	charcoal	N-2368
Toon	<i>Chukuyênú</i> Shell Midden	Surface humus, with rock clusters and pits	charcoal	N-2369
Toon	<i>Fëwûpê</i>	Shell midden within walls; 10–30 cm deep	marine shell (?)	Unreported
Toon	<i>Seminow</i> TKTO-4	Firepit; depth and stratigraphic context not specified. Site is a fortified interior site	charcoal	UGA-1425
Toon	<i>Chukuyênú</i> Shell Midden	Slope SW of upper terrace, black shell midden c. 5–25 cm deep	charcoal	N-2367
Satawan	Eor Village	TP-2, Black midden on surface	marine shell	N-3680
Toon	<i>Chukuyênú</i> Shell Midden	Lower (SW) terrace, under stone pavement underlying midden, at c. 50 cm + deep	marine shell	N-2373
Moen	Coastal Iras TKMO-11	<i>Násâp</i> , Study Unit O, Feature 78-O-1, hearth in unit 78-O with dog bone in association	charcoal	N-3372
Moen	Coastal Iras TKMO-11	<i>Násâp</i> , Study Unit O, Feature 78-N-1, hearth in unit 78-N	charcoal	N-3371
Toon	<i>Fëwûpê</i>	Shell midden within walls; 10–30 cm deep	marine shell (?)	unreported
Toon	<i>Chukuyênú</i> Shell Midden	Lower (SW) terrace, shell midden c. 10–35 cm deep, with rock clusters and pits	charcoal	N-2371
Toon	<i>Chukuyênú</i> Shell Midden	Upper (NE) terrace, Level I, black surface humus	charcoal	N-2362
Toon	<i>Chukuyênú</i> Shell Midden	Lower (SW) terrace, shell midden c. 10–35 cm deep with rock clusters and pits	charcoal	N-2370
Moen	Coastal Iras TKMO-11	<i>Násâp</i> , Study Unit O, Burial 1 in unit 78-N; date is on carbonized fabric (burial shroud?)	charcoal	N-3375

CONVENTIONAL OR APPARENT RADIOCARBON AGE (BP)		CALIBRATED RADIOCARBON AGE (BC/AD)	SOURCE
5730	5568		
410±75	395±70	1410-1630 A.D.	This project
390±75	380±70	1410-1635 A.D.	Takayama & Intoh 1980
370±75	360±70	1415-1645 A.D.	Takayama 1978
345±75	335±70	1420-1655 A.D.	Takayama 1978
345±75	335±70	1420-1655 A.D.	Takayama 1978
	330±70†	1420-1655 A.D.	Takayama & Seki 1973
	320±70†	1425-1655 A.D.	Clune 1977
315±75	305±70	1430-1660 A.D.	Takayama 1978
280±75	275±70	1485-1665 A.D. <i>or</i> 1760-1795 A.D.	Takayama & Intoh 1980
280±85	275±80	1420-1815 A.D. <i>or</i> 1840-1885 A.D. <i>or</i> 1915-1950 A.D.	Takayama 1978
245±60	235±60	1505-1675 A.D. <i>or</i> 1710-1805 A.D. <i>or</i> 1925-1950 A.D.	This project
145-	145-	1655-1950 A.D.	This project
	140±80†	1520-1950 A.D.	Takayama & Seki 1973
135±80	135±80	1530-1565 A.D. <i>or</i> 1610-1950 A.D.	Takayama 1978
	“modern”‡	1660-1945 A.D.	Takayama 1978
	“modern”‡	1660-1945 A.D.	Takayama 1978
	“modern”‡	1660-1945 A.D.	This project

*All dates on marine shell are “apparent”, following Stuiver and Polach (1977:356-7); that is, they have not been environmentally corrected. The 95% confidence assigned by Klein et al. (1982) to calibrated radiocarbon dates cannot be assumed with reference to shell dates presented here.

†Half-life used not reported. Difference between Cambridge and Libby half-lives is insignificant for purposes of calibration of date this recent. Libby half-life (5568) assumed.

‡For purposes of calibration, a conventional date of 100±50 is assumed for samples assigned “modern” dates by laboratories.

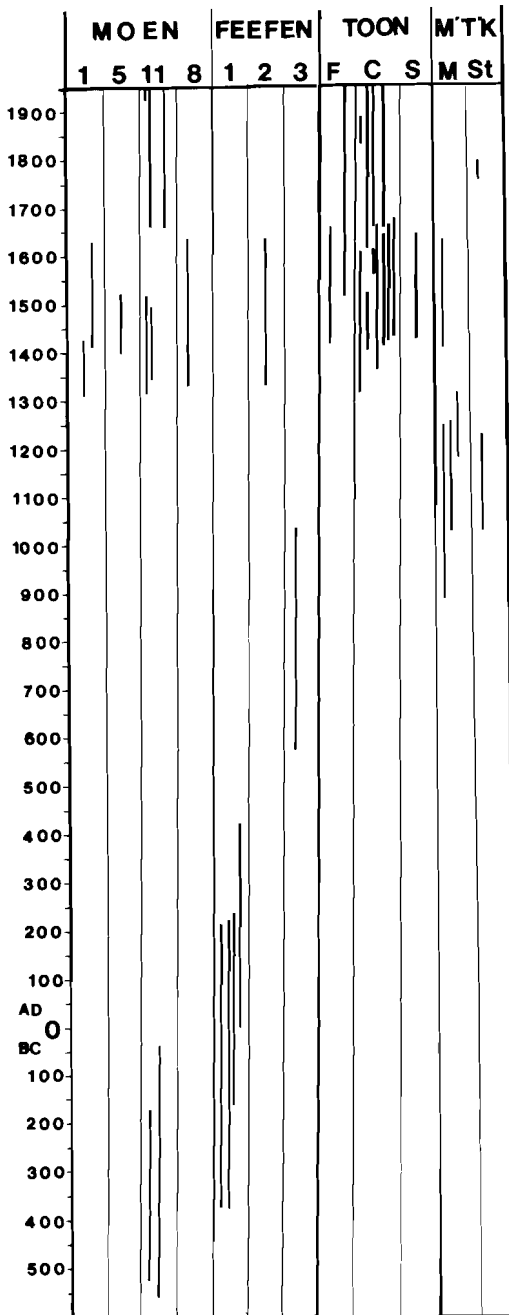


Fig. 6 Calibrated age ranges of Trukese archaeological sites.

Moen: 1 = Tonaachaw Summit (TKMO-1); 5 = coastal Mechchitiw (TKMO-5); 11 = coastal Iras (TKMO-11); 8 = Pwpwúnúkkamw (TKMO-8).

Feefen: 1 = TKFE-1; 2 = TKFE-2; 3 = TKFE-3.

Toon: F = Féwúpé; C = Chukuyénú; S = Seminow.

Mortlocks: M = Mwooch; S = Satawan.

this period suggests that it too is reflective of changes that went on throughout the area. The association of the Tonaachaw Summit midden and the other sites on and around the mountain with the early part of the period represented by the Tonaachaw Pattern suggest that the Sowukachaw/Sowóóniiras tradition may also refer to this time of apparent cultural ferment. At this point we would not hazard a guess as to exactly what complex of events, institutions, and processes may be reflected in the Sowukachaw/Sowóóniiras tradition. We do think it likely, however, that it somehow reflects the inception of the Tonaachaw Pattern in Truk Lagoon, probably during the fourteenth century A.D., and that the inception of the Tonaachaw Pattern somehow involves changes in the use of breadfruit. The evidence produced by Takayama and Intoh (1980) suggests that the Tonaachaw Pattern may have developed in the Mortlocks (though it should be cautioned that none of the other outer islands of Truk State has yet been investigated) sometime after 1000 A.D. It seems likely that the cultural developments on Kosrae and/or Ponape during the thirteenth and fourteenth centuries are related to the inception of the Tonaachaw Pattern, but this putative relationship does not necessarily mean that there was a major incursion of populations from either island into Truk.

In summary, we think the evidence suggests that the Tonaachaw Pattern developed somewhere in the outer Trukese atolls and was brought to the lagoon around the fourteenth century in connection with a reshuffling of population, intensification in the use of breadfruit, and the spread of a cult of Sowukachaw, all somehow related to the cultural changes going on during the same period on Kosrae and Ponape.

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