Pots and pans in the intermediate Pre-Latte (2500-1600 bp) Mariana islands, Micronesia

Darlene R. Moore

Rosalind L. Hunter-Anderson
Archeologists

Introduction

Prehistoric ceramic variability in the Marianas (Fig. 1) was first seen as a progression from early calcareous-tempered "redware", a small proportion of it decorated with lime-filled incised designs, to later mixed or pure volcanic-tempered "plainware" lacking lime-filled designs. This process of technological change took place between initial settlement of the archipelago, about 3500 BP- the onset of the Pre-Latte Phase - and 1000 BP, the beginning of the Latte Phase (Spoehr 1957). The Latte Phase ended with Magellan's landing in 1521, although major effects of European contact were not felt until the galleon trade got underway in the second half of the 16th century (Levesque 1992a, 1992b; Schurz 1939).

Within the last fifteen years, stratigraphic excavations in Guam, Rota, Tinian and Saipan (Fig. 2) have forced a more complex characterization of the Pre-Latte sequence (Butler 1994; Hunter-Anderson and Butler 1995). In this paper we will discuss some of the intriguing patterning that has emerged within the early ceramic materials. First, to place this patterning in a chronological context, we will briefly review the entire Pre-Latte ceramic sequence, and then we will consider the possible functions and adaptive significance of the shallow bowl forms and decoration simplification which occurred between about 2500 and 1600 BP.

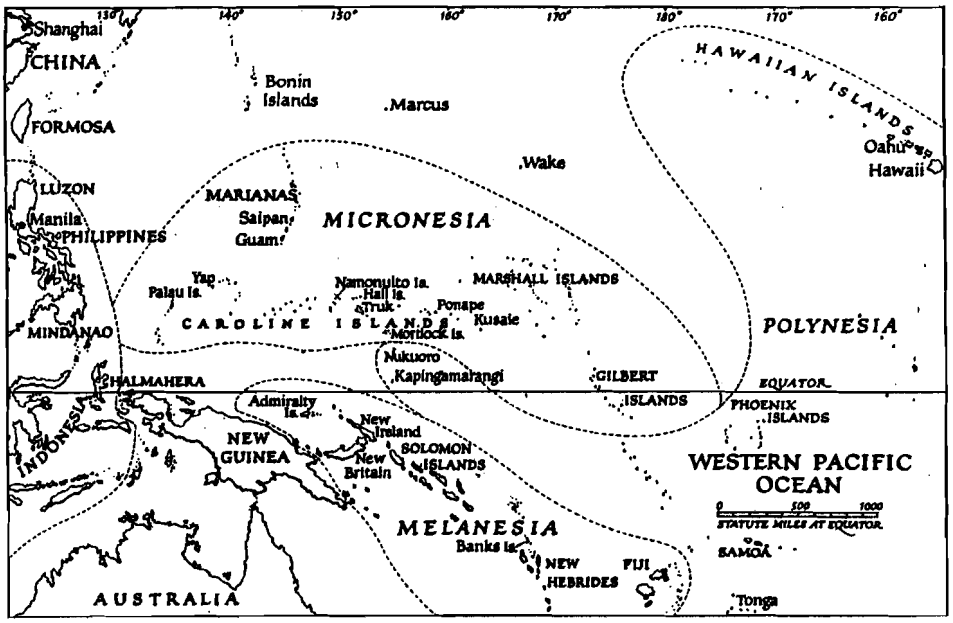

Figure 1
The Marianas in the Western Pacific. After Cladwin 51970).

Brief review of the Pre-Latte ceramic sequence

The 2,500-year-long Pre-Latte Phase conventionally has been divided into three intervals: the Early Pre-Latte (3500 to 2500 BP); the Intermediate Pre- Latte (2500 to 2000 BP); and the Transitional (2000 to 1000 BP) (Moore 1983; Butler 1988). For more than a decade after this tripartite division was proposed, the archaeological evidence indicated that the Early Pre-Latte deposits lacked the decorated sherds with lime-filled impressions. These were initially thought to make their first appearance during the Intermediate Pre- Latte (see Craib 1990). However, recent work in Saipan (Butler 1994; Butler 1995; Ray *et al.* 1996) and Tinian (Craib 1993; A. Haun pers. comm. 1995) has shown that decorated pottery occurs even in the earliest Pre-Latte levels. Furthermore, a series of radiocarbon dates, from various sites which have yielded the Intermediate Pre-Latte pottery, suggest that the vessel forms associated with this interval occurred from about 2500 to 1600 BP (Table 1). The new dates indicate that the beginning of the Transitional Pre-Latte interval should be 1600 BP instead of 2000 BP. The ceramics associated with the three Pre-Latte intervals and their revised dates are briefly reviewed below.

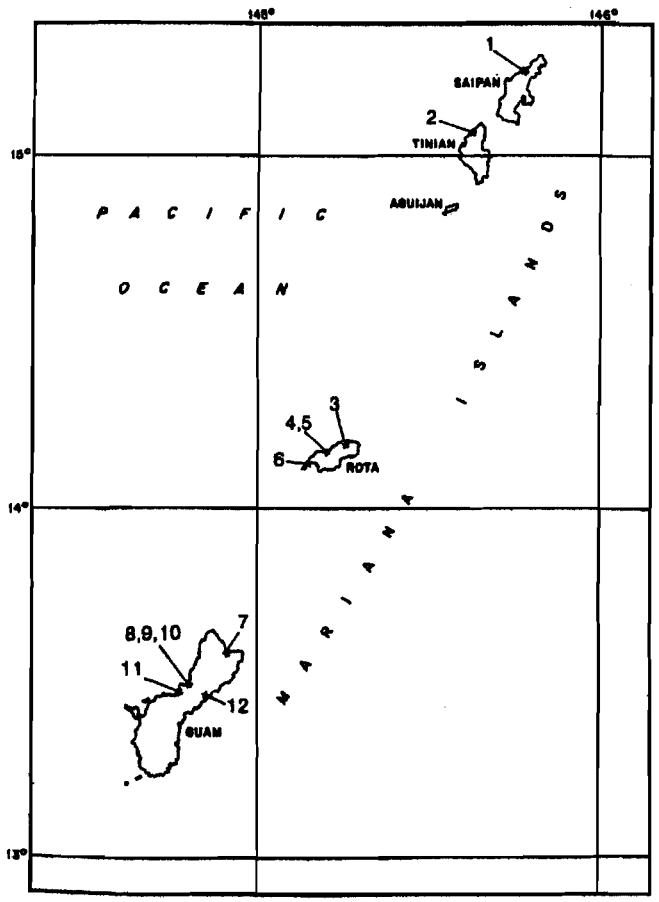

Figure 2
Southern Marianas sites with Intermediate Pre-Latte pottery:
1 Achugao, 2 Unai chulu, 3 Mochong, 4 Borja, 5 Maratita, 6 Songsong, 7 Taragüe, 8 Royal Palm, 9 AES, 10 Baba 11 Nansay, 12 Huchunao

Early Pre-Latte (3500-2500 BP)

The Early Pre-Latte pottery vessels are thin-walled (4-6 mm thick), are usually tempered with calcareous sands, and most often are finished with a red slip or wash. Several forms are represented, the most common being an undecorated globular jar with a restricted orifice and sharply everted, unthickened rim. This form occurs along with a small carinated bowl. The bowl has complex contours, including sharp shoulder angles, incurving upper shoulders, flaring rims, and rounded bases.

Due to the small, friable condition of many of the sherds from the globular pots, information about the overall size of these vessels is not readily available — although orifice diameters have been estimated to range from 14 to 24 cm (Moore *et al.* 1992; Butler

1994). Estimates of the orifice diameters of the carinated bowls range from about 16 to 38 cm and estimated heights range from about 6 to 15 cm (Ray 1981).

Lab. No.	Location	Material	C-14 Years	calendar Date#	Source
N-2127	Mochong, Rota	shell*	2460+/-85	510 B.C.	a
Beta 92489	Tarague, Guam	charcoal	2270+/-50	396 - 200 B.C.	b
RL-347	Tarague, Guam	charcoal	2140+/-100	190 B.C.	c
UCR 1474A	Tarague, Guam	fishbone	2100+/-270	150 B.C.	d
Beta 11866	Maratita, Rota	charcoal	2050+/-80	178 B.C. - A.D. 22	e
Beta 11865	Borja, Rota	charcoal	1920+/-100	170 B.C. - A.D. 270	e
Beta 92525	Tumon, Guam	charcoal	1820+/-50	A.D. 85 - 339	f
Beta 92524	Tumon, Guam	charcoal	1790+/-50	A.D. 128 - 383	f
Beta 93427	Tumon, Guam	charcoal	1770+/-120	A.D. 56 - 557	g
Beta 11363	Mochong, Rota	charcoal	1760+/-140	A.D. 580 - 91 B.C.	h
GX 61566	Tumon, Guam	charcoal	1700+/-60	A.D. 143 - 451	i
Beta 93429	Tumon, Guam	charcoal	1700+/-60	A.D. 223 - 435	g
Beta 93428	Tumon, Guam	charcoal	1510+/-70	A.D. 413 - 662	g
Beta 7154	Mochong, Rota	charcoal	1400+/-120	A.D. 410 - 890	h

- calibrated 2-sigma range, if given in source
* - no marine correction applied

Sources:
a - Takayama and Intoh 1976: 14,21
b - Liston *et al.* 1996
c - Ray 1981
d - Moore 1983
e - Butler 1988: 37, 71; Sant and Lebetski in Butler 1988: 202, 213
f - Olmo 1996
g - MARS work in progress, AES project
h - Craib 1990: 5-3, 5-8, 6-8
i - Dilli *et al.* 1993: B: 9

Table 1
Radiocarbon Dates associatod with Marianas Robust Ware.

It is the rims and sloping shoulders of the smaller carinated bowls which are sometimes decorated with encircling bands of fine, incised lines and dentate stamped designs. Apparently decorated bowls were uncommon; within pottery collections dating to this interval, generally less than two percent of the sherds are decorated.

Two major design styles (Fig. 3) have been identified, and they co-occur at Early Pre-Latte sites. Butler (1994; 1995) has dubbed the styles Achugao and San Roque Incised, after two nearby sites on Saipan. The Achugao style includes sherds with rectilinear

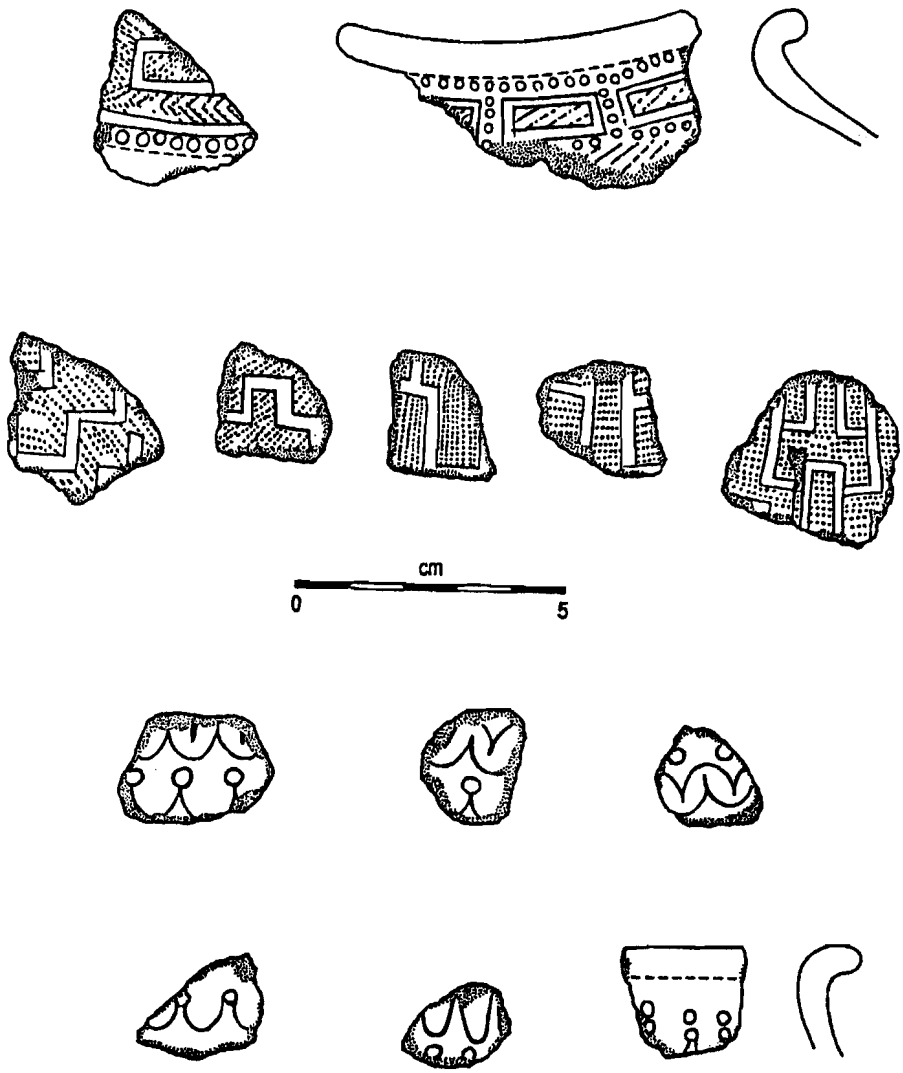

Figure 3
Examples of Auchugao (top) and San Roque (bottom) incised decoration from Saipan. After Butler (1995).

designs with infilled zones of dots or dashes. The San Roque style includes sherds with curvilinear designs and circles. In both styles, designs were in-filled with lime.

At present these two styles appear to be contemporaneous, but Butler (1995) proposes that work at other sites with intact deposits dating to this period could reveal that the Achugao style is older, or that it disappears from the sequence earlier than does the San Roque style.

Intermediate Pre-Latte (2500-1600 BP)

After 2500 BP, both the design styles and the vessel forms became less complex. A small number of bowls continued to be decorated with lime-filled impressions, but the design elements consisted of bold lines, circles, and chevrons (Fig. 4). By the end of this interval, the design elements had been reduced to simple impressions on the lips of vessel rims (Fig. 5). Most of the rim impressions do not appear to have been filled with lime.

The bold-line designs occur on small, carinated bowls while the rim-lip designs occur on vessels with flared or vertical rims and flat or slightly curving bases. The main point here is that as the vessel forms became simpler, so did the designs.

Vessel form changed to an open bowl with a flat, or nearly flat bottom, and vertical side walls with an unthickened rim (Fig. 6). This open bowl form eventually replaced the globular pots and carinated bowls. Various sizes of this open bowl have been recorded; some are very robust — with walls and bases measuring from 20 to 40 mm thick. Orifice diameters of the robust form, which some analysts refer to as a pan or griddle, are estimated to have been as much as 50 cm across; vessel wall height reached 15 cm. Smaller versions have thinner walls and orifice diameters ranging from about 30 to 42 cm and heights of 7 to 11 cm. The robust form is one of the chronological markers of this time period.

Another chronological marker of this interval is an oval-shaped bowl. This form is generally recognized by its spouts; little information is available regarding size. The round and oval bowls are finished with red slips or washes, or they have smoothed exterior surfaces. Woven mat impressions on base sherds are another temporal indicator of this interval. The impressions usually occur on the exterior surfaces, but some are found on the interior surface, and others occur within the clay matrix, parallel to the interior and exterior surfaces of the sherd.

Calcareous inclusions, or a mixture of calcareous and volcanic inclusions, tempered the clay in Intermediate Pre-Latte pots. The size of the inclusions varies from small (less than 1 mm) to quite large (>7 mm). The most coarse inclusions are found in the robust version of the open bowl.

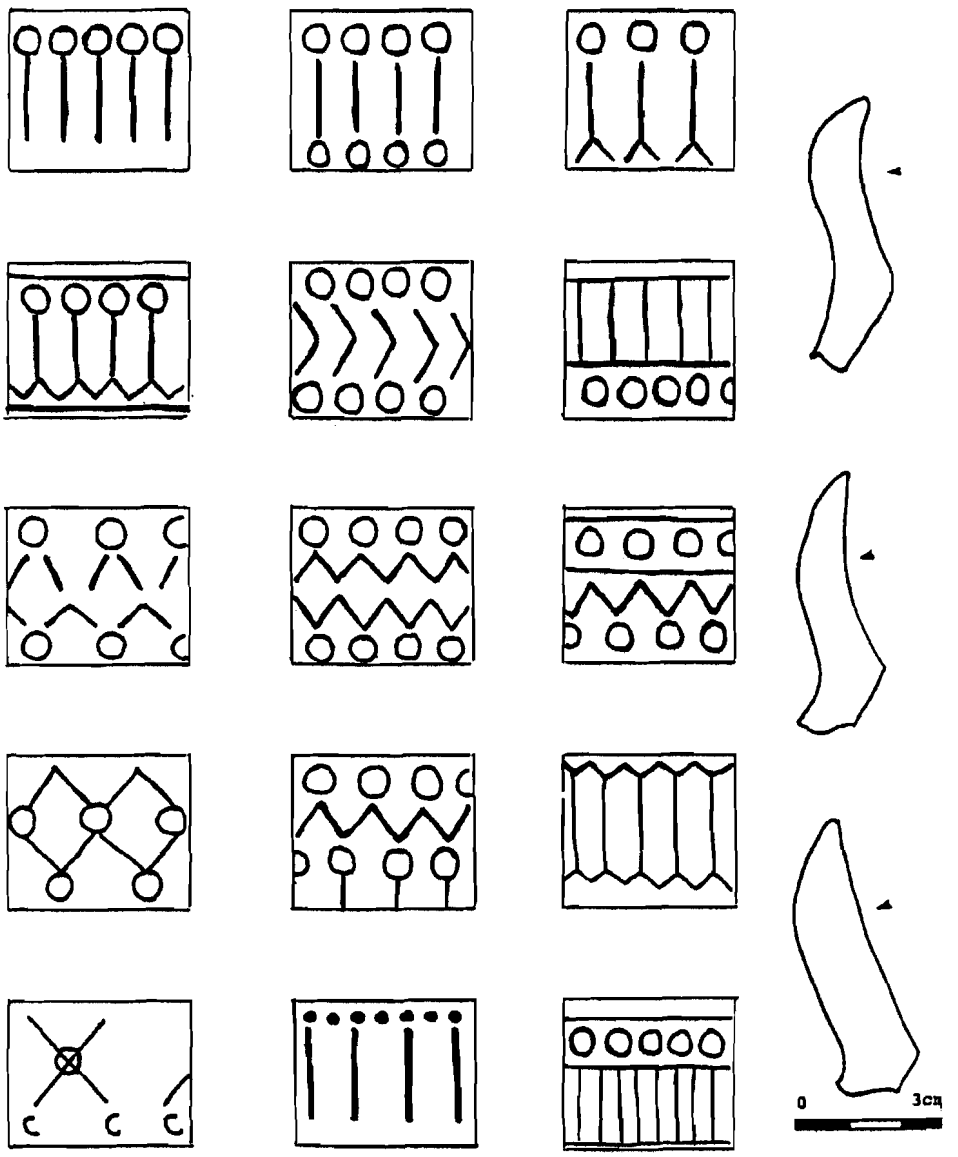

Figure 4
Examples of bold line designs on pottery from Guam, Rota, Tinian and Saipan.
After Leidemann (1980), Spoehr (1957), Ray (1981), Moore (1983), Moore (1989), Moore *et al.* (1992), Moore *et al.* in prep., Ray *et al.* (1996), Lizama and Montvel-Cohen (1978).

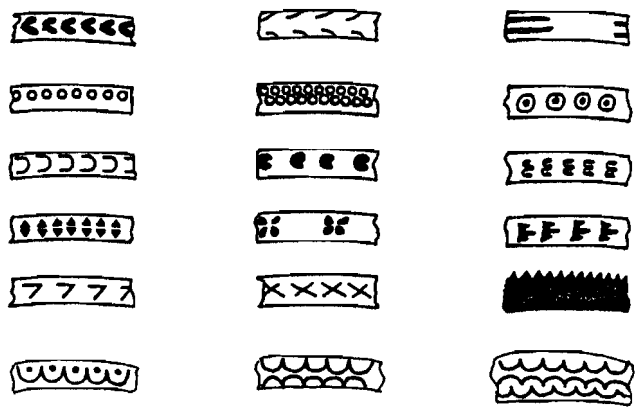

Figure 5
Examples of rim impressions on Intermediate Pre-Latte vessel fragments from Tarague, Guam. After Ray (1981), Liston (1996), Moore *et al.* in prep.

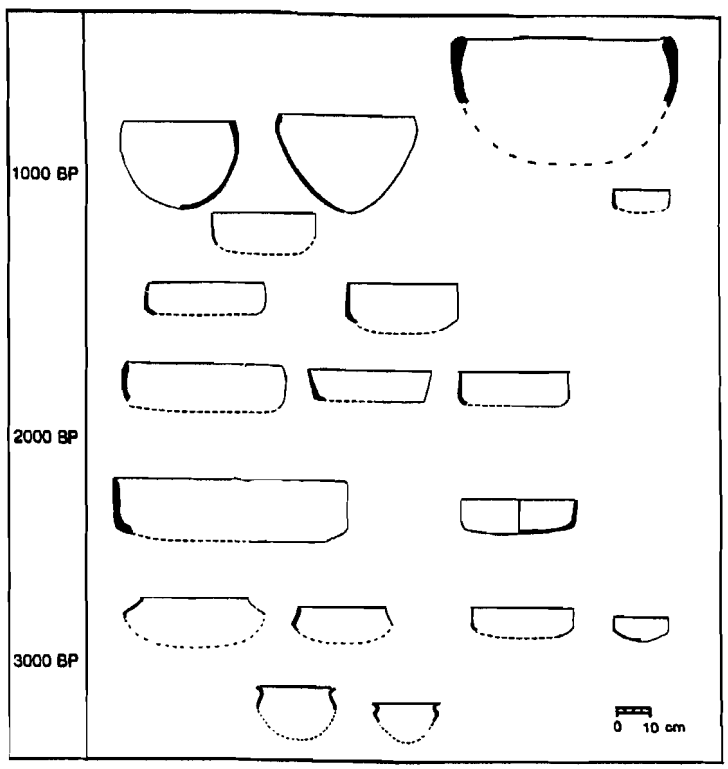

Figure 6
Simplified chart of the changes in vessel form through time in the Marianas pottery sequence. After Hunter-Anderson and Butler (1995).

Transitional (1600-1000 BP)

Around 1600 BP the ceramics changed again. The thick, flat-bottomed bowls were replaced by those with slightly thickened, incurving rims, thinner walls, and rounder bases. Surface treatment varied more during this time. Most vessels have a plain finish, but polished, burnished, and striated surfaces also occur. Estimates of orifice diameters range from 16 to 40 cm and vessel height varies from 7 to about 15 cm.

To conclude this brief review of the Pre-Latte ceramic sequence, it is important to note that two major transformations have been traced. One is in the types of decoration: over time, fine-lined gives way to bold-lined, which gives way to simple lip decorations. The other transformation is in vessel form: globular pots and small carinated bowls give way to slightly larger open bowls, some quite robust, with flat bottoms and vertical walls, which give way to thinner, more curved open bowls. Inter-assemblage comparison opportunities have been limited by the rarity of the decorated sherds and by the relatively few Pre-Latte assemblages excavated. Nonetheless, the early sequence appears consistent within the four islands where these materials have been found, namely, Guam, Rota, Tinian, and Saipan. The similarities in the decorations on the pottery found in these islands suggest frequent contact among the populations inhabiting them[1].

What prompted the ceramic changes during the intermediate pre-latte interval?

Some possible causes include immigration: immigrants introduced new forms and decorative styles; trade: the new ceramics were traded in; and in situ development: the new ceramic forms were a response to changes in food preparation and serving contexts. A wave of new settlers coming into the Marianas at about 2500 BP is possible, although a little early to have been part of the same radiation that resulted in the settlement of the high Carolines around 2000 BP (for a summary, see Rainbird 1994). Also, the ceramic changes of interest are not abrupt but rather gradual and directional, occur-

[1] There is evidence that by the Latte Phase, the pottery forms and surface treatments had diverged within the southern Marianas (Graves *et al.* 1990). It appears that the Latte pottery from Guam and Rota differs from that from Saipan and Tinian, although more data are needed to confirm this (see also Simons 1994).

ring over an 800-year time span. Even if the new ceramic forms were introduced by immigrant groups, their adoption still has to be explained in local terms since we have no evidence for drastic population replacement. Trade seems unlikely since the new forms replaced, rather than were added to, the existing ceramics. Also, compositional analyses have shown that Marianas pottery throughout prehistory has been made from local clays (Graves *et al.* 1990; Simons 1994).

The in situ development explanation implies that there were local cultural-adaptive reasons that a new vessel form, with variations, was integrated into the ceramic repertory. Such an explanation would be more compelling if it could also account for the simplification of decorations, and the cessation in use of globular jars and bowls. Thus while it is the most difficult, the in situ development explanation is also the most interesting one to consider because it forces us to think about local adaptive conditions and creative human responses to them, as these may be reflected in the archaeological record - not just in ceramics but in other areas of material culture as well.

It is generally accepted that pottery decoration may impart social information, such as clan affiliation of maker and/or user (Rice 1987). In the Early Pre-Latte, the small size of decorated pots suggest their use by individuals and their rarity indicates a non-utilitarian function, perhaps as heirlooms marking important historical social connections. Simplification in pot decoration could signal shifts in the social significance of all pottery by the Intermediate Pre-latte. Inter-island contacts and interactions seem to have continued; design simplification occurs throughout the southern islands. Since changes in vessel form generally imply changes in vessel usage, we asked, what were the new functions of open bowls/pans which previous ceramics did not perform or perform well? On the practical side, what are the advantages of the open bowl design within the size range we have observed? On the social side, what new practices and behaviors could have been associated with the use of open bowls and pans?

Bowls are generally used for cooking and serving, while jar forms are usually storage vessels. While the shape of the open bowl/pan does not seem appropriate for long-term storage, it may have played a role in preparing food for storage. A central Carolinian example of food cooked for storage in such a vessel form is apalong, a large flat cake of shredded breadfruit and coconut meat that can last for months, even years, under the right storage conditions. The protein- and carbohydrate-rich apalong dough is rendered storable by bake-drying it in metal or ceramic pans in the earth-oven (um). The baking vessels resemble the larger Intermediate Pre-Latte open bowls/pans in size. While the ceramic pans, which are rarely used because these items are considered heirlooms, are oval or circular, the metal pans are rectangular (L. Mwianur, interview with Hunter-Anderson 1996).

In thinking about hearths associated with ceramic use, there would have been no advantage to using the open bowl/pan over an above-ground hearth, due to the abrupt wall/base angle and large area of the base relative to the sides. If it were used to bake

food in an earth-oven, the shallow bowl/pan would be surrounded by the heat, and the low, flat shape of the food mass, protected by leaves, would ensure its maximal exposure to the heat and maximal moisture loss through steam. The same principle is exemplified in flat-bread cooking on griddles: the thinner the dough, the more heat can be absorbed by the food, and the more moisture can be released from the dough, per unit time.

In the case of our Intermediate Pre-Latte bowls/pans used in the earth-oven, the entire bottom of the vessel would rather evenly conduct heat through the food mass. In the shallow basin-hearth, the bowl could rest on top of the coals for a slow, even warming and drying effect. This is in contrast with an above-ground hearth, where heat is concentrated in a limited area under the pot, and the food mass inside is relatively thick. Pots used in this method of cooking usually have rounded bottoms and relatively high sides. Shallow open bowls/pans may also have been used to evaporate salt from sea water. If the demand for salt increased, say, to preserve fish, and open pan evaporation yielded more salt than previous methods, then a shift to pan evaporation, or the addition of this method to others already in use, may have occurred. This could have been the case if fish preservation during seasonally high catches became desirable. Frequent breakage during salt rendering could be a problem due to prolonged direct heating of the vessel base. Another possible use of the large open bowls/pans might have been to hold salted pelagic fish filets, which ooze a lot of liquid during this short-term storage method. In Namoluk Atoll, shallow metal pans serve this function, enabling the catch to be preserved for up to a week (field observation. Hunter-Anderson 1990). Finally, prepared foods may have been served from open bowls/pans - the smaller ones for family meals, the largest ones for very large gatherings -. Knowingly partaking of food cooked in or served from the same vessel is a tacit acknowledgement that one is part of a group with something in common. In the Pacific islands, people who consume food from the same source are close kin or occupy a similar social position. One sees this in Yap, where a mother and young children will eat from the same dish but older siblings and other adults will eat from separate dishes (field observation., Hunter-Anderson 1980-1982), and in Chuuk, where adult members of the same matrilineage will eat from the same mess of pounded breadfruit in the center of the table, although perhaps at different times (field observation. Hunter-Anderson 1995). Conversely, cooking and serving individual portions acknowledges some dimension(s) of separateness. The Yapese traditionally carried this to an extreme, with separate cooking pots for each adult in a family and with the finely partitioned ceremonial eating classes that marked social position. In the Marianas case, perhaps common eating from the large vessels signaled compliance with new norms associated with differently defined inter-personal relations during the Intermediate Pre-Latte. Chemical analysis of organic residues on the sherds may help to sort out some of these suggestions, while other material culture correlates, such as burial patterns, of the Intermediate Pre-Latte could be studied for clues about social organizational changes.

Whether they were used for cooking, serving, or in preparing food for storage, our larger-sized vessels suggest larger consuming groups. We propose that around 2500 BP, a rise in the size of food-consuming groups did occur, as part of a series of social adjustments to larger settlements, and that the size of settlements was increasing because human population density was rising and had reached a threshold level that resulted in larger settlements. Archaeological evidence for a higher population in Guam during the Intermediate Pre-Latte includes an apparent geographic expansion of site locales (Kurashina 1986), as well as more of them. Small sandy beaches, the only geographic setting known for Early Pre-Latte sites, continued to be occupied (Leidemann 1980; Hunter-Anderson 1994; Moore *et al.* in prep.a; Moore *et al.* in prep.b; Olmo pers. comm. 1996), but rockshelters began to be used. We have Intermediate Pre-Latte pottery at rockshelters on coastal terraces (Reinman 1974; Moore *et al.* 1988; Liston 1996) and in a lower river valley (Reinman 1977). Unfortunately, there are not enough data to determine whether this pattern occurs outside of Guam (see Butler 1988; Craib 1990; Henry and Haun 1994; Ray *et al.* 1996). Why human population density was increasing needs to be specified. While not discounting the possibility of exotic population influx, we think it likely that population growth was related to geomorphological changes, primarily sea level decline and beach progradation, and possibly uplift (see discussion in Hunter-Anderson and Butler 1995). As beaches prograded, a larger proportion of coastal alluvial soils would be available for agriculture as well as settlement. If agricultural use was made of these soils, the result would have been an increase in the proportion of terrestrial food to sea food in the human diet, effectively lifting the human population ceiling imposed by heavy reliance upon sea food (Bayliss-Smith 1975; Hunter-Anderson and Zan 1985). It should be remembered that the first successful settlements in the Marianas ca. 3500 BP were possible because relative sea level had fallen sufficiently to open up a few beaches in these otherwise steep-sided islands (see Nunn 1995). Continuing sea level decline during the Intermediate Pre-Latte would have produced more and wider beach areas for residence, and more land for crops, and uplift may have accelerated this process in some areas.

In Kosrae, in the eastern Carolines, Miyagi *et al.* (1995) have found geomorphological evidence that the lowest sea level since the mid-Holocene highstand (6000-3000 BP) occurred between 2000 and 1800 BP (more or less the mid-point of the Intermediate Pre-Latte interval), after which mangroves began to expand. On the basis of similar sea level curves for Pohnpei and two islands in the Philippines, these authors suggest the pattern of maximal sea level drop and then rapid expansion of mangroves holds for the northwestern tropical Pacific. Our pollen data from a deep paleosediment core at the mouth of the Laguas River on Guam's southwestern coast indicate a decline in wet forest starting around 3500 BP and a marked rise in mangroves just after 2000 BP (Ward 1995), suggesting the Marianas were part of this regional phenomenon.

Archaeological evidence for sea level decline and beach progradation during the Intermediate Pre-Latte is scant, but at the Borja and Maratita sites on the north-central coast of Rota, Butler (1988) found that the earliest cultural levels contained Intermediate Pre-Latte sherds (Table 1). In Guam there is the Intermediate Pre-Latte occupation at Ipao Beach, which is considerably seaward of the Early Pre-Latte deposits (Leidemann 1980). At other coastal sites in Guam, the Intermediate levels are the earliest cultural deposits present, and they are very near the juncture of the limestone cliffs and sandy beach (Hunter-Anderson 1994; Olmo pers. comm. 1996; Moore *et al.* in prep.a). We take this to mean that these locales were first occupied during the Intermediate Pre-Latte, perhaps shortly after they became habitable.

In southwestern Saipan, Amesbury *et al.* (in press) found evidence for beach progradation from the Early Pre-Latte deposits at Chalan Piao, farthest inland, to the Latte Phase deposits at Afetna, closest to the present shoreline. Farther north on the western coast, Butler and DeFant (1990) have noted erosion and subsequent progradation of the beach within the last 3,000 years; intact Latte Phase deposits overlie re-deposited Pre-Latte materials and may indicate a lack of uplift in this area. Sorting out local shoreline histories from regional trends is, of course, one of our many challenges.

The new social milieu following on expanded coastal lowlands would have involved larger numbers of people interacting on a regular basis than had been the case previously, as settlements became larger and got closer together. It is also possible that with larger group size, residential mobility decreased as a practical matter, and a more logistically organized settlement system (Binford 1980) involving small interior sites used for limited purposes and short occupation times may have begun to develop (Hunter-Anderson and Butler 1995:34-38).

When people interact frequently, the potential for disputes and misunderstandings increases, particularly during times of shortages. Successful groups would be those who put into place social organizational structures that minimized conflicts and disputes. One solution to the problem of minimizing the occurrence and adverse effects of disputes and misunderstandings as social interactions increase, is an ideologically-supported program of public exchange events which are perceived by participants as necessary to satisfy social obligations between and among related persons and groups. These exchange events are good ways to gauge whether obligations have been met, since what is presented and/or exchanged is readily countable. Micronesian examples include simple food gifts exchanged between neighbors, who are usually close relatives. These exchanges are enacted at fairly frequent intervals. Less often, community-wide celebrations involve large quantities of food, grouped in baskets or bundles, and other presentations of valuables between co-obligates. In the central Carolines, the community celebration of a girl's first menstruation is such an event; another is the birth of a child; yet another the successful completion of a young man's apprenticeship to a navigator.

Each is marked by community-wide feasting, dancing, and other celebratory practices. Even rarer inter-community celebrations occur when a new paramount chief within an atoll or atoll group is selected (see Alkire 1965). This is where some of the Intermediate Pre-Latte open bowls/pans come in: as containers in which food was cooked and/or presented at such events. During the Intermediate Pre-Latte, good inter-personal and inter-community relations may have been maintained in part by the performance of such social obligation-fulfilling events.

Finally, we have to ask, if the open bowl/pan form was so useful, why did it drop out, and, not to duck the issue of stylistic change, why did the bold line decorations disappear, during the Transitional? Time does not permit going into the social theory required to begin to answer the latter question, but suffice it to say that the social identities of pottery makers, owners and users must have been established through different means by this time, perhaps as a function of shifts in the way the kinship system articulated with the political system.

As to the disappearance of the open bowl/pan, our previous arguments imply that food preparation in earth-ovens and shallow-basin hearths using these vessels ceased or became exceedingly rare. We suspect there were changes in the social contexts of cooking and serving food such that the ceramic vessels formerly used for this purpose became unnecessary, undesirable, or no longer available. The archaeological record shows that earth-ovens and shallow-basin hearths continued to be used through the Transitional and Latte Phase, so abandonment of these cooking methods cannot be the cause. However, the Transitional and Latte Phase ceramics are characterized by vessel forms that are better suited to above-ground hearth cooking (round-bottom bowls), and to free-standing storage (large jars) of water and grain (Butler 1990) (possibly rice, see Hunter-Anderson *et al.* 1995).

These are major technological shifts within the ceramic realm which articulated in new ways with changes in other areas of culture, such as an increasing use of Isognomon and Tridacna for fishing gear and adzes, respectively; basalt for adzes, pounders, mortars, and hearth stones; the adoption of latte stone architecture, primary and secondary interments in residential areas, and of a settlement system that encompassed all the island habitats, from wide sandy beaches to high volcanic ridges and valleys. We expect that these material culture domains will yield clues about the causes of ceramic change in the Marianas, if we will but pay close attention to the forest without getting lost in the trees.

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