Micronesica, Suppl. 2: 303–316, 1990

Formation of a Complex Society in an Island Situation

TAKESHI UEKI

Kyoritsu Women's University
2-2-1 Hitotsubashi, Chiyoda-ku,
Tokyo 101, Japan

Abstract—Archaeological evidence from the district of Utwa and ethnohistorical accounts for the island of Kosrae as a whole are shown to support a new model which ties population pressure to the rise of local conflict and the emergence of three social echelons in Kosrae. However, the data presently available are very limited, and more extensive archaeological surveys are still necessary before this or any other model can be put forward with confidence.

Introduction

Increasing social complexity through time from an evolutionary viewpoint continues to be a critical topic among archaeologists. In 1983 I undertook a study of the emergence of complex society in a Pacific island situation, the main question treated being whether it is possible to demonstrate archaeologically, with the help of ethnohistorical information, how, when, and possibly why sociopolitical changes involving increasing stratification occur in physically and socially circumscribed settings (Ueki 1984). Kosrae (108 km^2), one of Micronesia's volcanic islands, was chosen to pursue this problem.

The circumscription imposed by an island setting tends, on the one hand, to produce a strong sense of psychological oneness and shared tradition among the occupants and, on the other, to act as a crucible in which society-wide change can take place rapidly. The islanders all know such things as who is related to whom and what events have taken place anywhere on the island. The flow of information can be very fast.

In this type of self-enclosed environment with nowhere to flee, social changes introduced from within or without may proceed at an explosive pace. A classic example in the Pacific is the precipitous decline of pre-contact Easter Island civilization in a space of approximately 40 years due to warfare and genocide. In post-contact Hawaii, on the other hand, outside assistance, primarily in the form of ships and weapons, aided Kamehameha I in his successful 15-year drive to unify most of the major islands under his rule.

EVOLUTIONISM AND COMPLEX SOCIETY

Evolutionary changes in human cultures have been a popular topic since the last century. The terms "chiefdom" and "state," taken from neoevolutionary studies, continue in widespread use. Twenty-five years of research by Pacific anthropologists, however, have failed to produce a consensus on which of the area's complex societies can be classified by the terms "chiefdom" and "state" (Ueki 1984: 18–28).

In analyzing sociopolitical development, one should consider the same two aspects

basic to any sort of data analysis: quality and quantity. The qualitative aspects of development—that is, the existence of societal characteristics associated with increasing complexity—have been emphasized almost exclusively by Pacific anthropologists. These alone do not allow one to argue convincingly when treating continuous evolutionary stages such as the chiefdom and the state. My suggestion is that the distinction in sociopolitical characteristics between a developed chiefdom and a state be considered as not merely a matter of their existence or non-existence but as a matter of degree. For example, the size and growth rate of the population can be useful criteria for judging development. When looking at a society diachronically or when comparing societies cross-culturally, we should also be asking *how* large the population was and *how* rapidly it increased—the quantitative aspects of development.

In my research I have avoided rigid chiefdom-state labels. When considering continual evolutionary change, I prefer the term "complex society," as used by Cordy (unpub.), to refer to both highly developed chiefdoms and state-level societies. Complex societies having highly developed econopolitical systems would be characterized by

1. large and fairly dense population,
2. clear distinction between rulers and ruled,
3. centralized government with the power to enforce its institutionalized laws,
4. indirect government by authorized officials of the central ruler,
5. direct access by rulers to goods and services and the offices controlling the redistribution of goods,
6. full-time artisans who contribute to economic and public activities, and
7. a large military for maintaining social stratification and for conquering neighboring areas.

These conditions are not to be taken as qualifications for complex society with the presence or absence of one or another being crucial. Rather, they should be more dynamically applied as part of a quantitative-qualitative analysis.

SOCIAL STRATIFICATION

To an archaeologist, evidence of social complexity necessarily involves physical remains in which the number of distinguishable strata is an important clue to the sociopolitical development of the society. On Kosrae, social stratification, as inferred from physical remains, is the best archaeologically identifiable indicator of the prehistoric level of complexity.

Work on social stratification, as reflected in archaeological remains such as tombs and house sites, is only just beginning in Micronesia. Some mention has been made of tombs in the literature (Reisenberg 1968: 72, Pickering 1980, Cordy unpub.), though these were not necessarily constructed for individuals. Kosrae's two pyramid tombs, for instance, may have held the bodies of kings or their family members only temporarily, the remains being removed later for burial at sea (John, personal communication; Obed, personal communication).

The study of Micronesian habitation structure as it relates to rank is also in the early stages, but indications are that factors such as size, number of doors, decorative features,

and roof shape covaried with the rank of the occupants (Kramer 1926, Ayres & Haun 1981, Reisenberg 1968, Cordy unpub., Hunter-Anderson 1983).

Ethnographic accounts of societies at the time of contact with the West help to clarify the sociopolitical aspects of architecture. Three early expeditions that included Kosrae produced several descriptions of its stratified social organization. Though parts of these classifications have been found to be in error, broadly speaking they agree fairly well (Ritter & Ritter 1982, Murphy 1983) (Fig. 1).

The picture that emerges is of a paramount chief and high chiefs who were the landowners, low chiefs, probably appointed by the landowners as land managers and collectors of tribute, and commoners who were farmers and fishermen. The paramount and high chiefs resided on Lelu islet, where Kosrae's massive stone ruins are located. Low chiefs and commoners lived on the main island. Among landowning high chiefs, there were nonhereditary titles bestowed by the paramount chief. Most of the land was held by those with higher-ranking titles. If a title holder lost his title or died, someone below him on the hierarchy could move up to fill the vacancy (Sarfert 1920: 341, 342). The positions of the low chiefs, on the other hand, *were* hereditary, being passed on to sons or brothers. Thus prehistoric Kosrae appears to have been a four-echelon society.

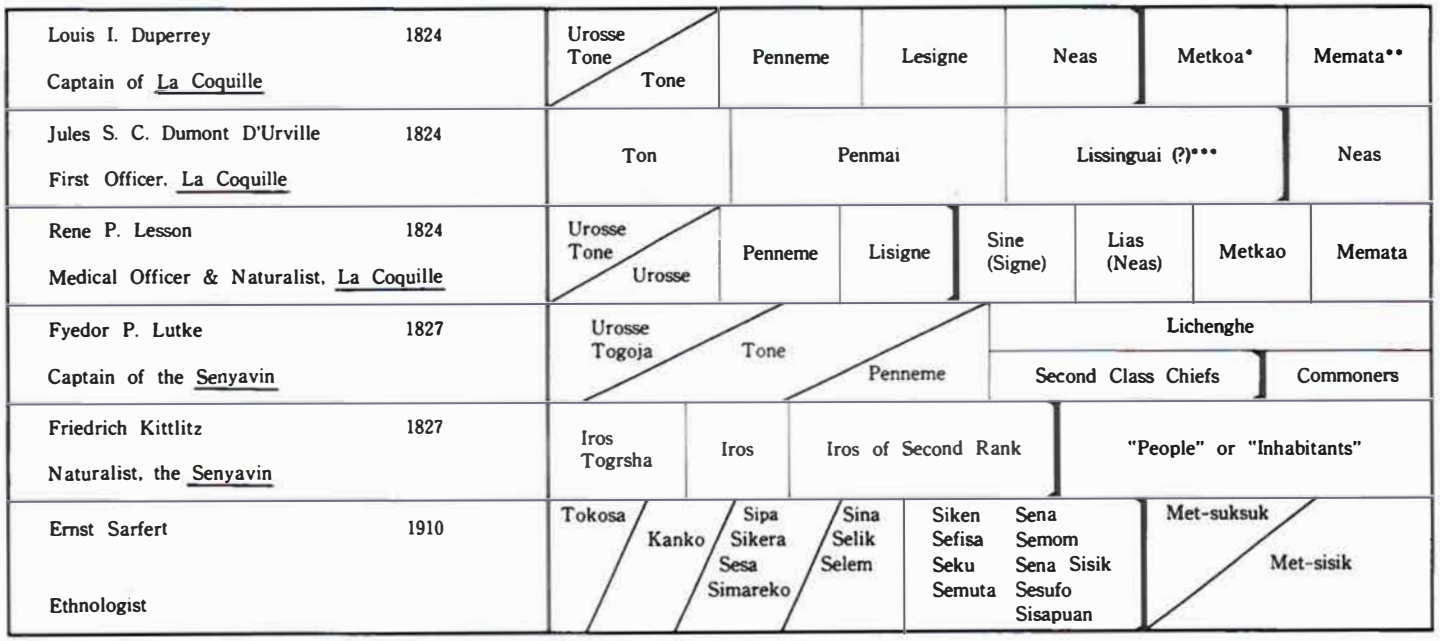
Recent archaeological survey and excavation on Lelu, looking particularly at labor expenditure on various sections of the stone ruins, have shown that the probable residents match well with such ethnohistorical information as is available (Cordy 1982, in press). A number of preliminary surveys on the main island also appear, so far, to support historic accounts of low chiefs' and commoners' residences being located there (Cordy *et al.* 1981).

Archaeological research in Micronesia has been sparse and disconnected, conducted over an 80-year period since the German Sudsee expedition at the turn of the century. Large-scale projects producing in-depth monographs had yet to be undertaken as recently as 10 years ago. The significance of the work begun on Kosrae in 1979 is therefore obvious. It will provide, when further along, a test case for the direct approach to the study of sociopolitical development, demonstrating the process by which one complex society developed in a circumscribed island situation.

The Model and Hypotheses

I have come to consider a "complex society" to be one that has a highly developed econopolitical system and exhibits, in varying degrees, many of the characteristics, such as a large population and centralized government, usually attributed to states. In a broader sense, it also includes societies conventionally considered highly developed chiefdoms. I felt the need for a new model to explain the development of this form of complex society on Kosrae and started out by considering the models for statehood development proposed by a number of researchers (Table 1).

Beginning in the mid-70s, some Pacific archaeologists have started testing these models with their own data (Cordy 1974, 1981, in press, Hommon 1976, Earle 1977, 1978, Tainter & Cordy 1977, Ayres & Haun 1981, Ayres *et al.* 1979, Athens 1980). On Kosrae, where many sites are exposed on the surface, preliminary surveys have shown no evidence whatsoever of hydraulic manipulation (Cordy *et al.* 1981). Similarly, the intra- and interregional exchange model seems not to be applicable because the island environment is highly homogeneous, and each traditional land unit cuts across all environmental



*Ritter and Ritter (1982: 35) state that Metkoa is probably Mwet Kuh, meaning "strong person," and thus it is neither a clan nor a caste.
**Ritter and Ritter (1982: 35) state that Memata is probably Mwet Mahtuh, meaning "old person," and thus it is neither a clan nor a caste.
***D'Urville is not sure about this group.

Figure 1. Kosraean social stratification. This figure is created from information in Ritter and Ritter's translation (1982) and Sarfert's account (1920). Vertical lines distinguish ranks, and slanting lines show subgroups within these ranks. Chiefly ranks are to the left of the heavy brackets.

Table 1. Models for state development.

Schools (Models)	Advocators
Hydraulic Model	Wittfogel 1953, 1955, 1957; Palerm 1955; Palerm and Wolf 1957; Sanders 1965, 1968; Sanders and Price 1968; Sanders et al. 1979.
Warfare Model	Carneiro 1970; Webb 1973; Webster 1975, 1977.
Population Model	Childe 1950, 1967; Boserup 1965; Adams 1966; Sanders and Price 1968; Carneiro 1970; Smith and Young 1972; Gibson 1973; Parsons 1974; Wright and Johnson 1975; Wright 1977a, 1977b.
Intra- and Interregional Exchange Model	Sanders 1968; Rathje 1971; Wright 1972; Johnson 1973; Wright and Johnson 1975; Wright 1977a, 1977b.
Multivariate Model	Adams 1956, 1960, 1966; Flannery 1972; Redman 1978a, 1978b; Sanders and Webster 1978.

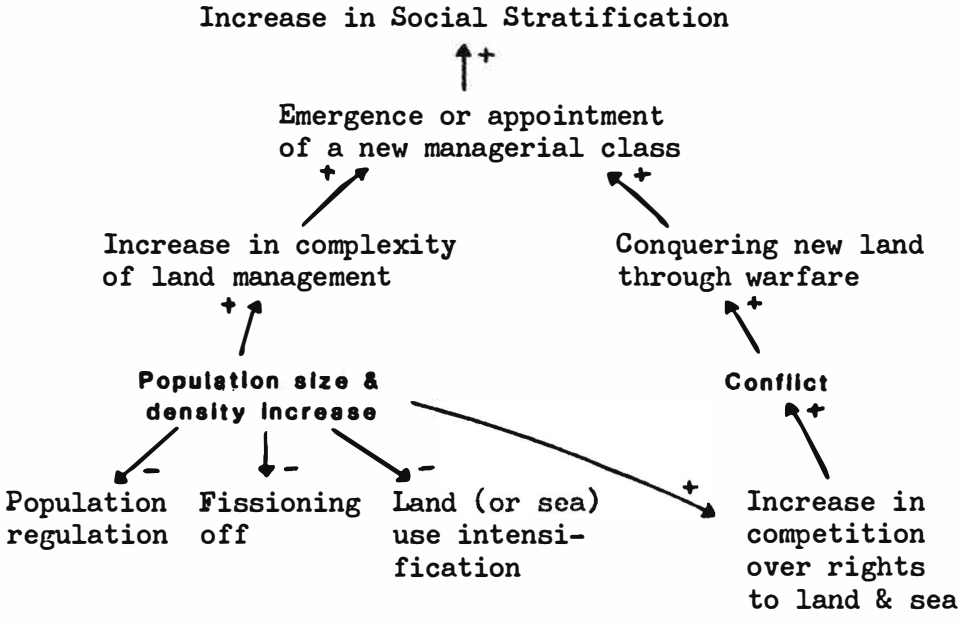


Figure 2. Multivariate model of the processes of increasing social stratification on Kosrae.

zones. As for long-distance trade, no archaeological finds to date suggest this. Arguing against it, also, is the fact that long-distance navigation technique seems to have been lost in the very distant past. On the other hand, warfare and population pressure remain potential "prime movers," and these have formed the basis of the hypothetical multivariate model I have proposed to explain the emergence of complex society on Kosrae (Fig. 2).

My model accounts for increasing social stratification mainly through conflict over restricted resources, initiated by population increase. Haves and have-nots, disputes over land ownership, and increasingly complicated problems of land management would ne-

cessitate the creation of a class of land managers. Alternately, warfare over land rights resulting in take-overs might end in the appointment of an overseer to manage the winner's expanded holdings.

To test the model, three hypotheses were created, two taken directly from the model and a third "groundwork" hypothesis for an area never excavated before, the Utwa District of Kosrae, furthest from the capital of Lelu.

HYPOTHESIS 1

Population pressure, in terms of both size and density, rose significantly around the time that the Utwa District changed into a three-echelon society and continued to rise up to and beyond the time of island unification into a four-echelon society (suggested by previous research to be around A.D. 1400).

If population size increased noticably around this period, it was predicted that many households in the interior of the valleys would date to the 13th and 14th centuries as a result of fissioning off from coastal villages and land use intensification.

HYPOTHESIS 2

Local conflict increased around the time that the Utwa District changed into a three-echelon society and continued up to and beyond the time of island unification into a four-echelon society (around A.D. 1400). As a result, evidence of forts and/or shelters dating to this period may exist in strategic locations such as the depths of valleys or on the ridges of mountains.

Given our understanding of past subsistence practices and requirements for settlements, the best habitational sites are either flat coastal land or dry, flat areas along rivers. Sites in highly inconvenient and/or strategic locations having high walls and situated in inconspicuous locations could be interpreted as fortifications or shelters. If their latest use dated to around the suggested time of island unification, this could indicate surrender or agreement to place Utwa under Lelu's control.

HYPOTHESIS 3

The Utwa District had emerged as a three-echelon society before pan-island unification by the Lelu administration (around A.D. 1400).

Assuming three-echelon society existed before four-echelon society, we predicted that there was more than one three-echelon society on Kosrae, and the Utwa District was the location of one of them. Support for this might be found in three types of household foundation that were distinguishably different in stone volume and architectural elaborateness (Cordy 1981). The largest and most elaborate type might indicate an outstanding local center.

Testing the Population Pressure Hypothesis

Three major methods were used to test the hypothesis that a rise in population took place around the time a three-echelon society emerged in Utwa District.

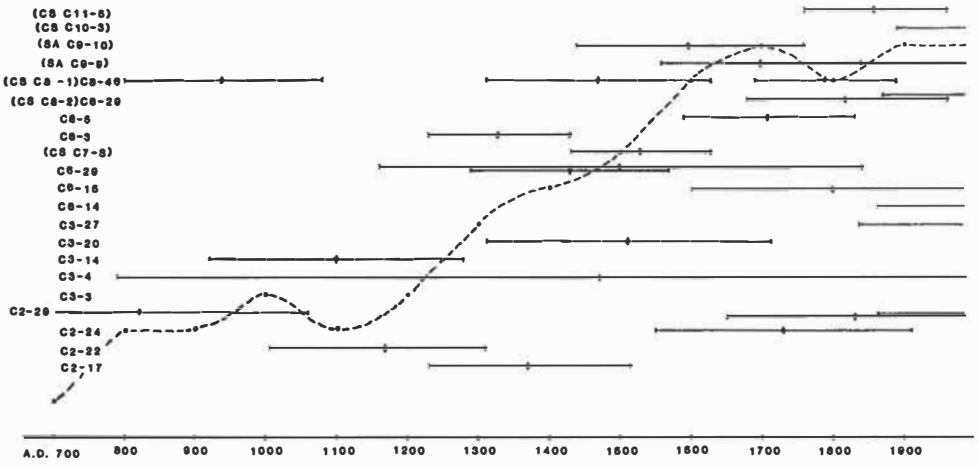


Figure 3. Population size change in Utwa District, Kosrae

First, an experimental method suggested by a colleague (P. Thorbahn, personal communication 1983) consisted of plotting the midpoint for each ^{14}C date on a graph on which the X axis was the time from A.D. 700 to the present and the Y axis a list of the sites which yielded ^{14}C dates (Fig. 3). Two standard deviations were included on either side of the midpoints. Then the number of dates for each century was counted and a dotted line added to show these frequencies throughout the periods of pre-unification, post-unification, and post-contact.

The result was intriguing. A rapid population increase was seen between A.D. 1100 and A.D. 1700, supporting the idea of such an increase coinciding with the emergence of three-echelon society in the district. (As explained in Section V, this is now thought to have occurred in the latter part of the 500-year period between the first dated occupation at the probable local center for the district [A.D. 940] and island unification [A.D. 1400].) In addition, as predicted, a number of dates from household sites in the middle and upper valleys fell between the 13th and 14th centuries.

A second method of estimating population was the plotting of two models of population increase over the past 2,000 years based on the oldest known ^{14}C date for the island (A.D. 1) and the estimated popultion at contact (in 1824). I had worked out a population estimate of 3,000 derived from the ethnographic accounts, and this proved to match well with that of 2,500–3,400 suggested by demographic anthropologist Philip Ritter (1981). Assumptions were that the original migrants were two families of about 10 individuals, that no further significant in- or out-migration took place in later years, and that population increased exponentially, which, of course, is seldom so over short periods of time, though roughly true in the long run.

As can be seen in Fig. 4, at hypothetical average annual growth rates of 0.313% (Model I) or 0.336% (Model II), the population started increasing significantly around the 12th, 13th, and 14th centuries.

For the third method of estimating population, we followed the example of Cordy

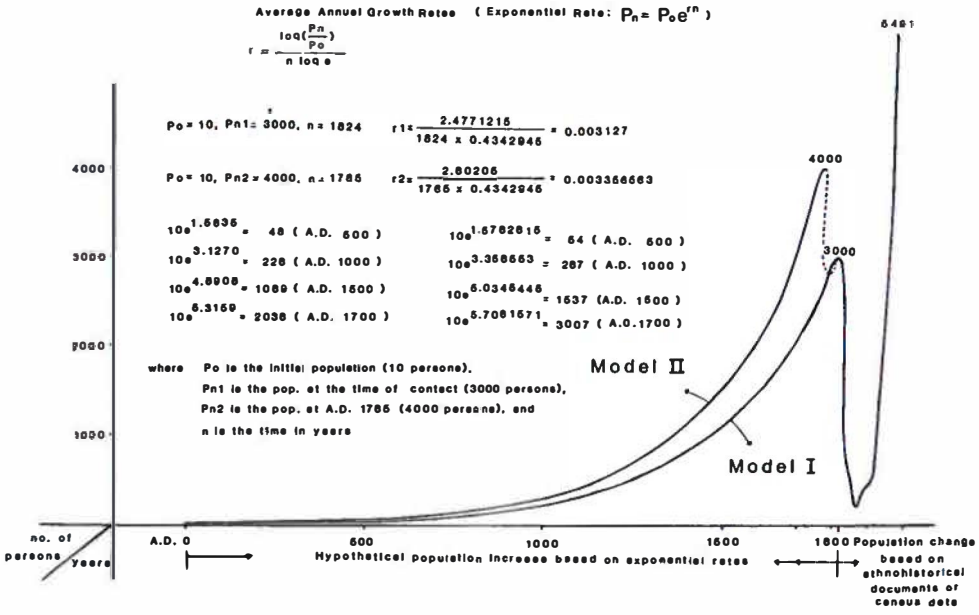


Figure 4. Population picture for Kosrae

and the Kosrae Historic Preservation Office (Cordy *et al.* 1981) in applying two previous formulas for such estimates, that of six persons per sleeping house, as used in Hawaii (Cordy in press), and that of 10 m^2 of roofed dwelling per person (LeBlanc 1971 revised from Naroll 1962).

Using the number of dwelling sites in the test valleys and their enclosed area for the estimates, a figure of 263 people at the time of unification was obtained. Extrapolated to cover the whole Utwa District, this became 405 people.

Three methods of estimating the prehistoric population, one highly experimental and two more traditional, produced results with a surprising degree of correlation. This tended to support the idea of increasing population pressure over the last 200–300 years before unification.

Testing the Local Conflict Hypothesis

Limitations on time precluded exploration of the mountains and steep valley sides, but extensive surveys deep into the test valleys turned up no identifiable fortifications or shelters. Less direct evidence emerged, however, which suggested that warfare or local conflicts were not uncommon during the 14th–16th centuries. There were, for instance, local residence groups dated to that time clustered deep in some of the valleys. In one case sites were located a strenuous walk (about 3.5 km) from the present coastal village, along a narrow, muddy footpath through dense tropical forest, despite presumably open land (with few house sites) much closer to the coast. Such unusual locations suggest a desire to settle away from some source of regional troubles, perhaps the local center.

A site near the presumed local center was said by a local historian to have been

constructed as a watch enclosure for sentries (Obed, personal communication). This site was dated to the 14th to early 16th centuries. Ethnohistorical research also brought out that the Lelu administration subdued main island groups by force. In fact, one functional aspect of the great walled compounds on Lelu was for defense against main island attacks (Sarfert 1919, 1920). Sarfert also listed eight traditional weapons, potential weapons, and war-related implements, which are considered direct evidence of warfare in the past (Sarfert 1919).

The sum of these pieces of information supports the idea that warfare, rare in historic times, was a more common occurrence in the past, particularly around the 15th century. Though partially based on ethnographic information that has not yet been archaeologically confirmed, presently available data do appear to support the hypothesis that warfare played a significant role in past social change on Kosrae.

Testing the Social Echelon Hypothesis

Most of the valleys examined proved to have a preponderance of similar small house foundations with one or two that were markedly more substantial than the rest, presumably occupied by people of higher rank than their neighbors. The individual valleys therefore appeared to have two echelons (Ueki 1984: 181–194).

During our stay in Utwa, archaeologists surveying the last segment of a circum-island road came upon a site, in an area called Nefalil, that was far larger than all others in the district in size and volume of stone used. In addition, in contrast to the typical single or double enclosure site, it consisted of many connected enclosures.

The Nefalil site (Fig. 5) stretches more than 430 meters east-west along the shoreline in back of the mangrove swamp, though it was probably on the channel or even the open sea in the past, according to old accounts of the geography of the area.

From the dates obtained so far, people appear to have begun residing there around

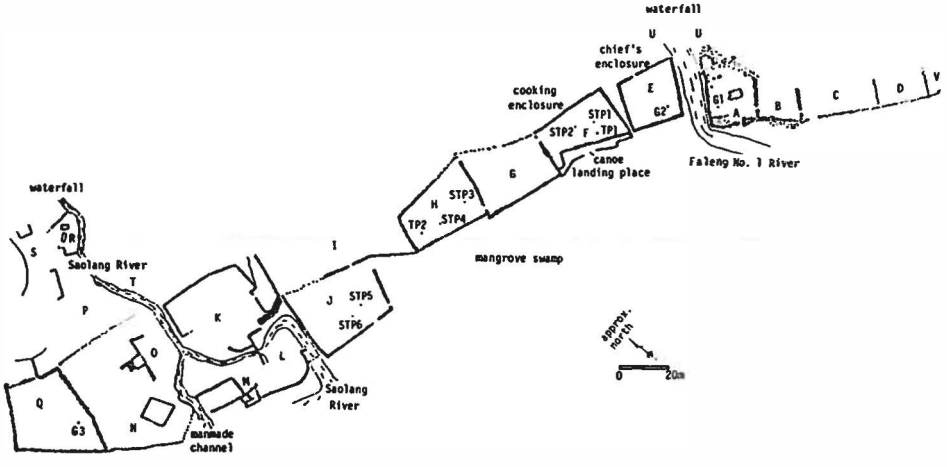


Figure 5. Complex Site C8-46 (CS C8-1), Nefalil Local Center (Map drawn by Charles Streck, 1982)

A.D. 940. The site then seems to have expanded to the west. An elder of Utwa village, whose grandparents owned the land on which the site is located and who used to live in one of its stone enclosures, pointed out an old canoe-landing area where food was presumably brought in to the residents (Obed, personal communication).

This site may have been a local center for the Utwa District because no other site at all comparable in scale of stone architecture or in size and likely number of occupants is located on the southern shore. In keeping with the physical expansion, I suggest that the site developed from local to district-wide influence sometime between A.D. 940 and 1470 (the ^{14}C date closest to the probable date of island unification), making Nefalil, although possibly still basically two echelons internally, a de facto third echelon over the rest of the district before Lelu influence upset the balance of power and caused a decline to set in. This rise to a position of dominance may have occurred in the later part of this 500-year period when first Nefalil and then Utwa District as a whole had become populous enough to support a tribute-demanding third echelon.

Thus the hypothesis that three echelons existed in preunification Utwa District appears to have been borne out.

General Synthesis

In a bounded environment such as a small island, or, to an even greater extent, a valley on such an island, an increase in population correlates with an increase in population density. For the people involved, this is quickly felt in a decrease in options for movement, access to basic resources, and a psychological sense of freedom. Unrelieved, the resulting social tension is prone to generate conflict, and among the ways to handle conflict is the appearance of a new rank of people to arbitrate disputes. Such a rank may evolve gradually, or it may be consciously created and forcefully imposed by some person or group with the power to enforce its will.

On prehistoric Kosrae, population pressure in the Utwa District seems to have reached the point where it was triggering social responses in the form of inter-group conflict and power-grabbing. The evidence for this is sometimes fairly direct, as in the formation of a large-scale local center and of high-density settlements in inner-valley locations, and sometimes circumstantial, as in the tale passed down of a possible sentry outpost in a strategic location. Overall, however, the picture suggested by the archaeological and ethnohistorical evidence does seem to be one of rising population, local conflict, and social change in the form of the emergence of three-echelon society.

Though much more extensive surveying and dating will be needed before it is possible to make any confident claims for the model presented, the limited evidence brought out so far does seem to uphold the factors suggested as possible forces triggering increasing social complexity on prehistoric Kosrae.

Acknowledgments

This paper is based on data collected during my dissertation research as well as data obtained through participation in two research projects on Kosrae, one sponsored by the National Geographic Society and directed by Ross Cordy, and another sponsored by the Trust Territory of the Pacific Islands' Historic Preservation Office.

References

Ayres, W., A. Haun, & S. Craig. 1979. Settlement and Subsistence on Ponape, Micronesia. Interim Report 78-2. Trust Territory of the Pacific Islands, Historic Preservation Office, Saipan.

Ayres, W. & A. Haun. 1981. Ponape Archaeological Survey: 1977 Research. Micronesian Archaeological Reports, 1. Trust Territory of the Pacific Islands, Historic Preservation Office, Saipan.

Athens, J. S. 1980. Archaeological Investigations at Nan Madol: Islet Maps and Surface Artifacts. Pacific Studies Institute, Agana, Guam.

Cordy, R. H. 1974. Complex Rank Cultural Systems in the Hawaiian Islands: Suggested Explanations for Their Origin. Archaeol. and Phys. Anthropol. Oceania 9(2): 90–109.

Cordy, R. H. 1981. A Study of Prehistoric Social Change: The Development of Complex Societies in the Hawaiian Islands. Academic Press, New York.

Cordy, R. H. 1982. Lelu, the Stone City of Kosrae: 1978–1981 Research. J. Polynesian Soc. 91: 103–119.

Cordy, R. H. In press. The Lelu Stone Ruins, Kosrae, Micronesia. Asian and Pacific Archaeology Series. Social Science Research Institute, Honolulu.

Cordy, R. H., C. Likiaksa, T. John, *et al.* 1981. Archaeological Survey in Innem, Okat, and Loal, Kosrae Island. Trust Territory of the Pacific Islands, Historic Preservation Office, Saipan.

Duperrey, L.-I. 1828. Mémoirs sur les Operations Géographiques Faites dans la Campagne de la Corvette de S. M. la Coquille, Pendant les Années 1822–1825. Annales Maritimes et Coloniales, 2e partie, tome 1.

D'Urville, J. S. C. D. 1835. Voyage Pittoresque Antour de Monde. Furne, Paris.

Earle, T. K. 1977. A reappraisal of redistribution; Complex Hawaiian chiefdoms. *In* T. K. Earle & J. E. Ericson (eds.), Exchange Systems in Prehistory, pp. 213–229. Academic Press, New York.

Earle T. K. 1978. Economic and Social Organization of a Complex Chiefdom: The Halelea District, Kauai, Hawaii. Anthropological Papers 63. University of Michigan, Ann Arbor.

Hommon, Robert. 1976. The Formation of Primitive States in Pre-Contact Hawaii. Ph.D. Dissertation, University of Arizona.

Hunter-Anderson, R. L. 1983. Yapese Settlement Patterns: An Ethnoarchaeological Approach. Pacific Studies Institute, Agana, Guam.

Kramer, A. 1926. Palau. Ergebnisse der Sudsee Expedition 1908–1910, 3. L. Friederichsen and Co., Hamburg.

Le Blanc, S. 1971. An addition to Naroll's suggested floor area and settlement pattern relationship. American Antiquity 36: 210–211.

Lesson, R. P. 1839. Voyage Autour du Monde Entrepris Par Ordre du Gouvernemente sur la Corvette la Coquille. P. Pourrat, Paris.

Lutke, F. 1835. Voyage Autour du Monde. Didot, Paris.

Murphy, E. A. 1983. Kusaie. Results of the South Sea Expedition, 1908–1910. 1, 2. L. Friederichsen and Co. Translated and edited. Pacific Studies Program, Honolulu.

Naroll, R. 1962. Floor area and settlement pattern. Amer. Antiq. 27: 587–589.

Pickering, R. (ed.). 1980. Archaeological and Ethnographic Investigations, Alignment 5B, Airport Historical Area, Yap, Western Caroline Islands. Manuscript. Trust Territory of the Pacific Islands, Historic Preservation Office, Saipan.

Reisenberg, S. 1968. The Native Polity of Ponape. Smithsonian Institute Press, Washington, D.C.

Ritter, P. L. 1981. The Population of Kosrae at Contact. Micronesica 17: 11–28.

Ritter, L. T. & P. L. Ritter. 1982. The European Discovery of Kosrae Island: Accounts by Louis-Isidore Duperrey, Jules Sebastien Cesar Dumont D'Urville, Rene Primevere Lesson, Fyedor Lutke, and Friedrich Heinrich von Kittlitz. Translated and edited. Micronesian Archaeological Survey Report 13. Trust Territory of the Pacific Islands, Historic Preservation Office, Saipan.

Sarfert, E. 1919. Kusae. Ergebnisse der Sudsee Expedition 1908–1910. 1. Halband. L. Friederichsen and Co., Hamburg. Translated by Elizabeth A. Murphy (1983). Pacific Studies Program, Honolulu.

Sarfert. E. 1920. Kusae. Ergebnisse der Sudsee Expedition 1908–1910. L. Friederichsen & Co., Hamburg.

Tainter, J. & R. H. Cordy. 1977. An archaeological analysis of social ranking and residence groups in prehistoric Hawaii. World Archaeology 9: 95–112.

Ueki, T. 1984. Processes of Increasing Social Complexity on Kosrae, Micronesia. Ph.D. Dissertation, Brown University.