Settlement on Ulithi Atoll, Western Caroline Islands

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ATOLLS ARE GENERALLY characterized by their limited space and minimal environmental diversity. At first glance, they are a rather unlikely place to investigate settlement patterns. Archaeological research on atolls is a recent phenomenon and to date little attention has been given to their settlement patterns. However, ethnographic patterns of village configuration on atolls have been shown to vary widely (cf. Green 1971).

In 1978, an archaeological survey of Ulithi Atoll was conducted to locate, record, and assess the archaeological potential of prehistoric and historic sites (Craib 1980). Within the atoll, cultural factors (e.g., contemporary village activities; United States military presence during World War II) and natural factors (e.g., typhoons) have had significant impact on some of the archaeological remains. Fortunately, surface and subsurface remains have survived on many of the islets. This paper will focus upon the pattern of settlement within the atoll, including the internal configuration of villages as well as the distribution of sites throughout the atoll. Discussion of settlement here derives from the pattern of surface remains only. No subsurface excavations were undertaken beyond coring to determine the presence and distribution of subsurface deposits.

Ulithi is unique among the atolls in the Western Carolines. It has both a larger number of islets and greater areal extent than other atolls. There are approximately 40 islets situated along the various portions of the reef which comprise the atoll (Fig. 1). The main lagoon is roughly 460 km^2, so large that it is impossible to view all the islets from any single point. Despite its great expanse, the combined land area of about 4.7 km^2 is only slightly larger than the neighboring atolls (cf. Bryan 1971). Con-

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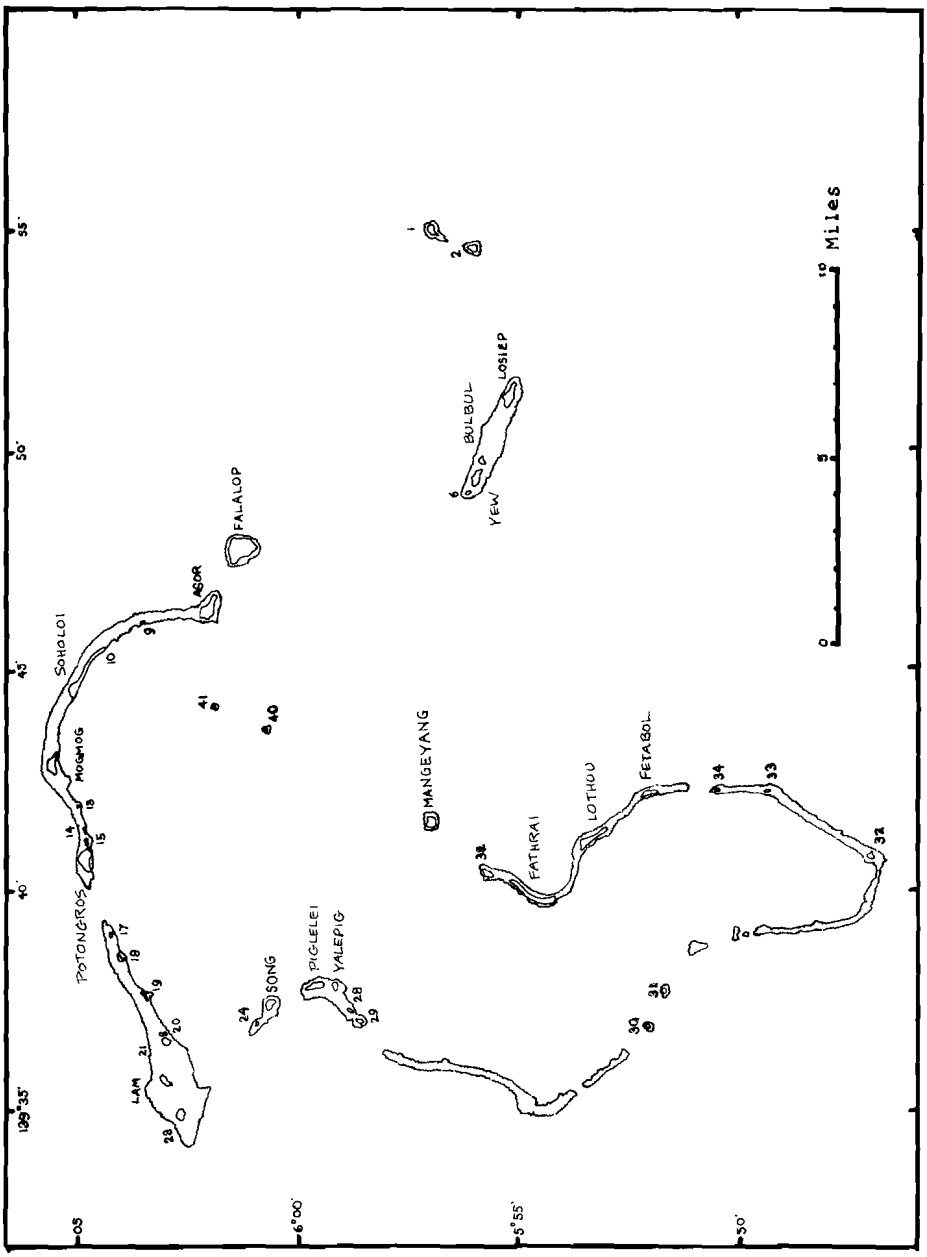

Fig. 1 Ulithi Atoll.

sequently, the islets of Ulithi are quite small. The largest, Falalop, covers an area of about 94 hectares, with the next largest, Fathrai, not even half as large (c. 36 hectares).

Of the smallest islets, some are barren sandbars while others are slightly raised reefs containing stands of the tree-shrubs *Messerschmidia* and *Scaevola,* which serve as nesting areas for scores of sea birds. These latter islets are periodically visited by the Ulithians to gather eggs and catch birds for food. Lastly, there are the larger (1+ hectares), forested islets containing various combinations of the available economic trees on Ulithi: coconut *(Cocos nucifera),* breadfruit (*Artocarpus* spp.), banana (*Musa* sp.), and pandanus.

Although only four islets are presently inhabited (Falalop, Asor, Mogmog, Fathrai), historical and ethnographic sources (Cantova 1731; Senfft 1904; Lessa 1950*a*) indicate that as many as nine islets have been inhabited. Ulithian tradition states that an additional five islets may also have been occupied. Since 1903, when Senfft listed nine inhabited islets in Ulithi, two factors have contributed to reduce this number. First, the typhoon of 1907 not only resulted in the withdrawal of people from many islets, but there was also considerable movement of people away from the atoll (Lessa 1950*a*). As the atoll began to recover, some islets began to be reoccupied, although details are lacking. Second, under the Japanese administration of Ulithi, in order to police the population, the Japanese ordered that only the islets of Falalop, Asor, Mogmog, and Fathrai were to be occupied. Most of the formerly occupied islets are used today as garden islets, where root and tree crops on family-owned lands are tended.

A main concern of the archaeological survey was to ascertain if remains of any of these former villages were in existence and how they conformed to or varied from the ethnographic pattern. Using ethnographic data from Ulithi (Damm 1938; Lessa 1950*a*; Craib 1980), I devised a descriptive model of traditional site location and intravillage composition and configuration.

Ethnographic Settlement Patterns

The present villages on Falalop, Asor, and Mogmog have all been rebuilt since the end of World War II. Each had been used as a military base from 1944 through 1946. The only modern village predating 1944 is on Fathrai. Nevertheless, it appears that the traditional Ulithian village plan remained intact when these three former villages were restored.

Ulithian villages are compact clusters of features, situated along the lagoon strand, on the leeward side of an islet. The location along the lagoon strand is correlated with the widest portion of the islet. For example, the village on Fathrai, rather than being located in the central portion of the long, thin islet, is situated at the southern end where a maximum width of about 225 m is found.

Trails and open areas within a village are "paved" with a thin layer of coral rubble. The confines of a village are often bordered on one or both sides by clusters of graves. Individual graves *(pei)* or small groups may be found within a village. Graves are traditionally formed by creating a rectangular, box-like structure over the burial pit. The structure is formed by placing large, thin coral slabs on their sides to form the walls. A single slab is then placed on top to enclose the grave. These structures average about 1.5 m × 0.7 m × 1 m.

Traditional structures within a village consist of canoehouses, men's house, women's house, residential platforms, cookhouses, and graves. All platforms *(thaif)* are built by outlining a rectangular or hexagonal area with small (c. 15 cm × 20 cm) slabs of coral. These are either placed on their sides, partially embedded in the ground, or stacked. The interior space is filled with well-sorted coral rubble, similar to that used along the trails. All platforms within a village are roughly perpendicular to the shore.

The men's house *(metalefal)* is located toward the center of the village, along the shore. This is always the largest and tallest platform within a village (average floor space is 256 m^2). In smaller villages, a canoehouse serves as the men's house. More heavily populated islets may contain two *metalefal.* Currently, Falalop has two houses and tradition holds that Mogmog formerly had an additional one. Informants state that the large, raised platforms are a recent (historic) introduction from Yap. Previously, men's houses in Ulithi were built directly upon the ground.

The women's house *(imölipöl)* are much smaller than the men's house (closer in size to a residence) and are built directly upon the ground and not upon a prepared platform. This is the only traditional structure in a village which has its long axis parallel to the shore.

Lessa (1950*a*:84) has stated that social stratification is present but weak in Ulithi, and symbols accompanying rank are virtually absent. No significant variations were noted in the size, shape, or location of residence platforms of currently higher ranking people. Residence platforms are roughly twice as long as they are wide and average about 100 m^2 in area with minimal variation. Some contain a second tier formed by a smaller, rectangular alignment of coral within the platform. The house sits directly upon this internal alignment. Alkire (1978:43) states that in more traditional times on Woleai, the pitch of the roof was a symbol of rank. This has not been recorded from Ulithi nor would it be useful archaeologically.

Other structures include cookhouses *(malum)* found adjacent to some of the residences. These are small sheds built upon the ground, containing a hearth and, more recently, kerosene stoves and various cooking utensils.

Canoehouses *(fagil)* are built directly upon the strand. The supporting posts are hewn breadfruit trunks. Traditional materials contained in this structure include those things pertaining to the canoe and fishing. Males perform many of these daily activities in this area.

Damm (1938) briefly describes and illustrates structures identified as spirit houses. These were small wooden structures placed atop wooden posts on a prepared platform. These "houses" served as receptacles for religious offerings. Lessa (1950*a*:157) states that there were two types of spirit shrines. The first is the *fangeliälus,* a domestic shrine located within a house, made principally for the ghosts of dead relatives. The second type, presumably the one mentioned by Damm, are separate shrines built for Marespa *(fangelmarespa),* a prominent mythological/historical figure in the Carolines. None of these is in evidence today.

Whether garden islets existed as special activity sites in Ulithian prehistory is unclear. As mentioned, most of those used in this fashion today contain former village areas.

Archaeological Evidence

The archaeological survey of Ulithi resulted in the recording of sites on nine uninhabited islets (Table 1). Fortunately, the impact of typhoons may not be as critical to site pres-

TABLE 1. ARCHAEOLOGICAL SITES ON PRESENTLY UNINHABITED ISLETS

ISLET	TOTAL LAND AREA (hectares)*
Losiep	16
Yew	8.5
Potongros	25.5
Lam	12
Song	12
Piglelei	18
Fetabul	15
Lothou†	19
Mangeyang	13

NOTE: Islets underlined are included in Senfft's (1904) census. Spelling of islets follows Figirliyong (1976).
*Areas are converted to hectares from square mileage as presented in Bryan (1971).
†Most platforms and other features are post-World War II.

ervation as some have suggested (e.g., Davidson 1968; Howells 1973; Bellwood 1979). Twice in this century (1907, 1960), Ulithi has received the full force of major typhoons (Lessa 1964), yet surface remains are evident on islets which have not been permanently occupied for most of this century. Two islets, Song and Losiep, may have been abandoned even earlier and subjected to additional typhoons. Surface sites were found on both (Fig. 2). Natural agents having the greatest effects were the indigenous flora and fauna. The root systems of large *Ficus* trees, on some of the islets, were found expanding under and through platforms and graves. Additionally, land crabs have turned over large quantities of soil.

Unquestionably, the greatest impact on archaeological deposits occurred as the result of the U.S. military presence in the atoll. All surface traces (except graves) of the villages of Falalop, Asor, and Soholoi have been demolished, in addition to most, if not all, subsurface deposits. On Mogmog, only graves and the men's house platforms survived the military. However, on Mogmog the presence of well-stratified subsurface deposits has been documented (Craib 1980:83–89).

Variation in composition and configuration among the sites is minimal. On archaeological evidence alone (i.e., presence of residence platforms) all sites would be considered habitation areas. Damm (1938:336) states that there were only two villages in Ulithi, one on Falalop, the other on Mogmog. Other islets were said to have only hamlets. Although population and village size must have fluctuated, it must be remembered that the Sudseë personnel arrived in Ulithi in 1910, just three years after a major typhoon. It is doubtful whether the distribution of people within the atoll reflected the pre-1907 density.

While the variety of remains among sites was constant, the number of specific features often varied greatly. For example, Lam exhibited 15 features (Fig. 3) while on Song only portions of perhaps six platforms were found. Both of these islets are about 12 hectares in total area. Whether the variation in numbers is due to differential preservation or reflects an actual difference in village size is not known.

Surface artifactual materials associated with the former villages were not numerous, though time did not allow for extensive clearing of sites and no collections were made. Pottery sherds were the most numerous artifact at each site. They consisted entirely of the

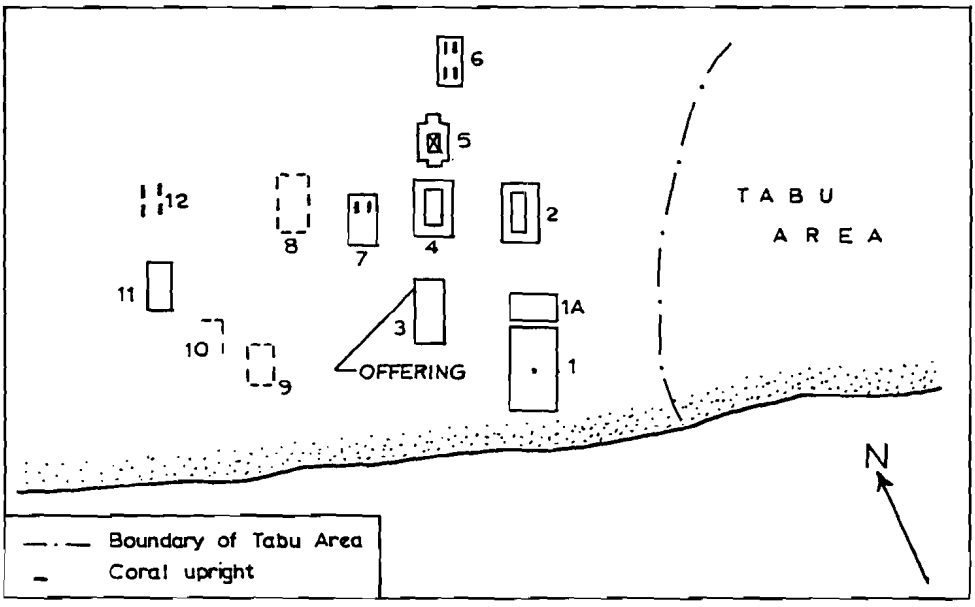

Fig. 2 Village of Losiep (no scale). From Craib 1980. 1. men's house. 2, 4, 11. house platforms. 3. house platform containing oyster shell offering. 5. chief's grave. 6. chief's house platform with four uprights. 7. house platform with two uprights on the north end. 8, 9, 10. house platform fragments. 12. four uprights apparently on the ground; no platform.

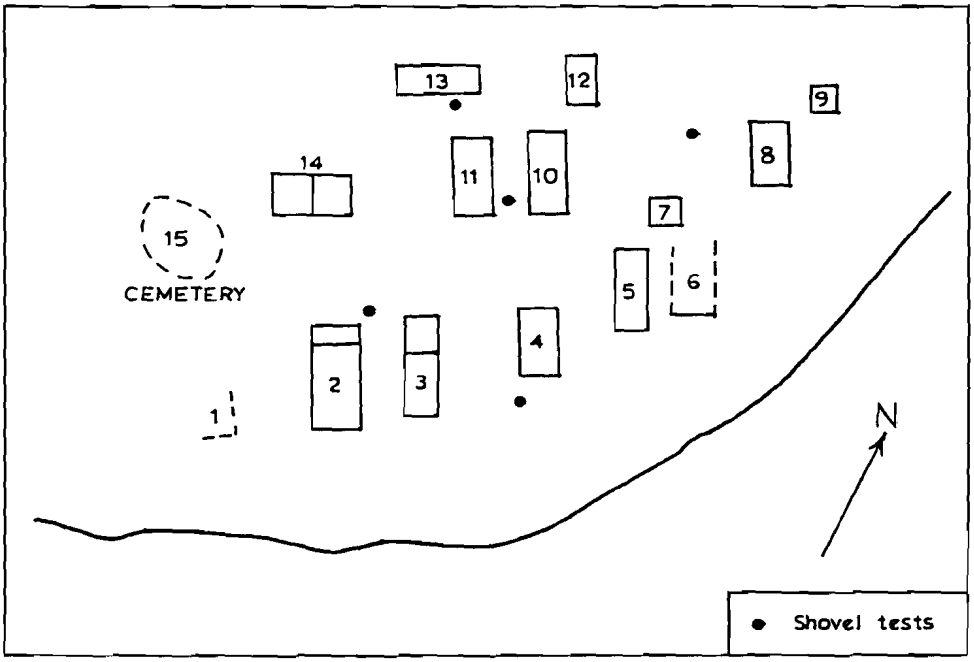

Fig. 3 Lam Village (not to scale). From Craib 1980. 1–6, 8, 9(?), 10–14. platforms. 7. well. 15. grave area.

untempered, laminated wares from Yap described by Gifford and Gifford (1959). These sherds were presumably brought into the atoll as part of the *sawei* exchange system (see Lessa 1950*b* and Alkire 1978 for details of this trade network). Shell adzes, *Cassis* bowls, and *Conus* scrapers were also common items. Historic items such as metal fragments and bottle glass sherds were found on some islets. Ulithians explained that temporary encampments are sometimes made when collecting coconuts for copra. Apparently little if any construction or maintenance of platforms occurs during this time.

The archaeological evidence did not reveal any pattern to support the ethnographic distinction between a village islet and garden islet. Potongros and Fetabol were the only two islets identified by informants as garden islets which had never had a permanent occupation. Unfortunately, any surface remains on Potongros were obliterated during World War II. A few shell adzes lying randomly across the surface and small shell tools observed in and around a modern borrow pit indicate that the islet had been utilized in an earlier period. Fetabol was spared the impact of the military bases. Three platforms were recorded in association with a limited (c. 40 m^2) scatter of Yapese laminated sherds and shell tools. Further archaeological testing will be required to clarify the qualitative and quantitative variations between village sites and these special activity areas.

The distribution of villages within the atoll was quite dispersed, reflecting the availability of islets sufficiently large to support habitation. The locational variables involved in site placement are few and specific. In Ulithi, sites are found (1) on the lee of an islet; (2) along the protected strand; and (3) fronting the widest portion of the islet. No variation was found to exist between the ethnographic and archaeological evidence.

The northeast trades comprise the dominant wind pattern for most of the year. Prime consideration was given to placing a village away from the prevailing winds. This appears as a recurrent pattern in atoll settlement. However, atoll villages are often characterized in the literature as lagoon-facing with only occasional acknowledgment that they are also in a leeward position. Generally, the majority of land within an atoll will be found at ends in the reef, usually occurring along the eastern side. In this instance, lagoon-facing and leeward position are synonymous. However, on larger reef systems, islets begin to form or extend toward the western side. Because of its size, Ulithi contains eight islets along its western border. It did not seem reasonable to expect villages, if they existed on any of these islets, to be located along the lagoon side, facing into the prevailing winds. Village sites were recorded from Song and Piglelei, both of which were oriented westward, on the lee of the islet, toward the open sea.

Of the two other variables, a protected strand area was necessary to facilitate the comings and goings of sailing canoes. The widest portion of the islet provided the best freshwater lens in which taro swamps could be constructed. Ethnographic data indicate that this last variable was strictly adhered to and, in extreme cases, if the islet was modified due to storm activity, the village would be resituated along the strand. This occurred on Soholoi, according to one of the chiefs of the islet. At one time, the village was located at a more central point along the strand but as storm activity washed away the major portions of this part of the islet, the village was placed toward the western end where it existed until destroyed by the U.S. armed forces. Apparently, all subsurface deposits were also destroyed.

On an intravillage level, the Ulithian village patterns, at least into the protohistoric period, are consistent. No major variations were observed between the ethnographic and

archaeological villages. Archaeological remains consisted of platforms and graves. It was impossible to identify, archaeologically, women's house areas and cookhouses. However, many women's house areas are still remembered on many of the formerly inhabited islets and were so recorded.

As Davidson (1968) has pointed out, delineating the areal extent of a site on coral islands from surface indications is difficult at best. On Ulithi it was especially difficult within current villages, nor did it become any easier in the abandoned village sites. For recording purposes, the boundaries of a village were generally defined by the areal extent of the platform cluster. Artifacts were rarely observed much beyond the area of platforms, and subsurface midden deposits became less distinct outside of this area.

An initial pair of radiocarbon dates indicate that Ulithi was occupied at least 1500 years ago and probably earlier (Craib 1980:198). Undoubtedly, during this time population has fluctuated considerably. However, by at least the protohistoric period, most of the habitable islets in the atoll had been occupied.

It is not so much the initial date(s) or order of settlement that is important but rather how villages developed. With such small land areas available, population size would be a constant, critical variable, and it would not take a large increase in numbers to put pressure upon space and local resources. If habitation of Ulithian villages occurred as the result of population growth within the atoll (there are no local traditions indicating any external population influx), then a number of alternate hypotheses can be generated to explain this occurrence, among which are:

1. As the general population within the atoll increased, movement to suitable islets occurred and new villages were created.
2. As population within specific islets increased (perhaps faster than other islets), movement occurred to suitable islets within the established political domain of the home islet (cf. Lessa 1950*a*; Figirliyong 1976).
3. As population increased but before it became too large, neighboring islets began to be cultivated in order to increase garden space. As population continued to grow, establishment of permanent settlements on these garden islets occurred.

During initial settlement of an atoll, as root and tree crops were being established, extensive use of marine resources must have occurred (Alkire 1978). As the gardens developed, they began to play a greater role, although the lagoon and/or open sea remained a primary resource. This same pattern must have also occurred following a typhoon, which would have destroyed gardens as well as toppling most of the trees. Possibly, detailed analysis of midden constituents may suggest some of these variations.

It may be expected that a garden component of a site would yield a specialized range of artifacts distributed over a small horizontal area with little, if any, midden accumulation. Features would be rare. A village component would be represented by midden accumulation, a variety of features (subsurface features such as platforms and fire hearths have been observed on Mogmog), and a wide range of artifactual and ecofactual materials.

I hope that this brief paper has demonstrated the possibilities for archaeological settlement pattern analysis on atolls. If, as work continues among atolls, attention is given to some of these questions, we may begin to recognize and explain the processes and variations in adapting to these limited environments.

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