KOLO VELATA: AN ANALYSIS OF WEST POLYNESIAN FORTIFICATIONS

by

Anthony P. Marais
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APPROVAL

Name: Anthony P. Marais
Degree: Master of Arts
Title of Thesis: Kolo Velata: An Analysis of West Polynesian Fortifications

Examiner Committee:

Chair: Jack Nance

David V. Burley
Senior Supervisor

Richard Shutler, Jr.

Douglas Sutton
External Examiner
Department of Anthropology
University of Auckland

Date Approved: June 20, 1995
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Kolo Velata: An Analysis of West Polynesian Fortifications

Author: _____________________________
(signature)

Anthony P. Marais
(name)

May 31, 1995
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ABSTRACT

For some time ring-ditch fortifications in Tonga have been the focus of archaeological interest. However, there has been little systematic excavation or survey of these sites and most studies of them have relied on historic sources that are biased toward a period of chiefly warfare in the 19th century. Consequently there is a lack of consensus about the origin and antiquity of such sites. This thesis addresses these issues by way of an archaeological and historic analysis of a specific fortification site, Kolo Velata, located on the island of Lifuka, in the central Ha'apai group of Tonga.

Research at Kolo Velata produced a detailed contour map of site features as well as limited excavation data relative to site occupation. Oral tradition suggests that the site was established in the mid-15th century and that rebuilding and reoccupation occurred in the 19th century. Evidence of occupation of the site prior to the construction of the fortification and disturbance due to post-abandonment cultivation activities were also recorded.

Data from Kolo Velata are placed within the broader context of fortification construction across Tonga and western Polynesia. This study indicates that the earliest dated fortifications occur in Fiji. It is suggested therefore that the form of Tongan fortification features is a result of diffusion from these islands.
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CHAPTER 1

INTRODUCTION

Throughout western Polynesia, including Fiji, a principal type of defensive feature was the ring-ditch fort. Typically this feature is a ditch and earthen bank enclosure, on top of which a palisade was once constructed. In Tonga, these sites (kolotau) have been the focus of archaeological interest. However, researchers have not yet formed a consensus concerning antiquity, origins and the mechanisms by which they were introduced into Tongan warfare. This situation is in part confused by a proliferation and wide-spread use of this site type during a period of 19th century chiefly wars. Indeed, it is this proliferation that has led some investigators to the assumption that virtually all of these sites date to this time frame (for example Spenneman 1988). It is the objective of this thesis to address these issues by way of an historical and archaeological analysis of Kolo Velata, a double ring-ditch fortification on the island of Lifuka in the central Tongan Ha'apai island group. The Kolo Velata data will then be placed within the framework of fortification construction across Tonga specifically and western Polynesia generally.

The organization of this thesis is as follows. Chapter 2 provides a summary of Tongan culture, archaeology, traditional history and warfare tactics, providing the necessary background for the remainder of the thesis. Chapter 3 continues this theme by reviewing the small number of archaeological projects in which Tongan fortifications have been recorded and the hypothetical contexts that these data have produced. This begins with a pioneering survey of W. C. McKern (1929) in 1920 and continues to the more recent period with the work of Spenneman (1986) and Burley (1991, 1992). Chapter 3 also provides a review of historical accounts of Tongan fortifications with a focus on the delineation of superstructural form and associated features.
Chapter 4 gives a historical context for Kolo Velata, outlining its contemporary significance to traditional Tongan history. Most of this history is associated with a series of engagements in the 1820s, the outcomes of which are critical to the rise and consolidation of power by Taufa'ahau Tupou I, the first of the modern day Tongan monarchs. Oral traditions in the village of Hihifo on Lifuka island, however, suggest the site was constructed during an earlier period of warfare in the 15th century. As argued by Burley (1993, in press), this seemingly occurred during the reign of Tu'i Tonga Kau'ulufonuafekai during his assertion or reassertion of centralized rule over the entirety of the archipelago. This earlier occupancy of Kolo Velata is important, for it bears upon the antiquity of ring-ditch fortification features in Tonga. A verification of this early date was one of the questions structuring archaeological investigations at Kolo Velata in 1992.

An account and analysis of the 1992 archaeological research program is given in Chapter 5. Carried out over a seven week period between June and July, this project resulted in the production of a detailed contour map as well as test excavations in a number of site areas. These latter tests were concerned with the delineation of a construction sequence for the encircling ditch and bank features as well as the identification and recording of superstructural features (palisade lines) and internal habitation areas (midden zone). Unfortunately, irrefutable archaeological evidence for a 15th century origin was not found.

Chapter 6 presents an historical and archaeological overview of similar fortification sites in Fiji and Samoa. Again dominated by historic descriptions of these sites, this analysis leads to the delineation of important similarities and differences with Tongan fortifications.

Finally, in Chapter 7, I summarize the thesis results and address the question of antiquity and origins for ring-ditch fortifications in Tonga.
The Tonga archipelago, comprising 169 islands of various sizes, is located on the western flank of the Polynesian triangle (Figure 1). These islands, of which 45 are inhabited, run some 300 km roughly north-south in two parallel chains; the west being volcanic, and the east uplifted coralline reef flats or makatea. Excluding its outliers, the archipelago roughly divides itself politically and historically into three groups: (1) Tongatapu and 'Eua in the south; (2) Ha'apai, which can be further divided into the Northern, Nomuka, Kotu and Otu Tolu groups in the middle; and (3) Vava'u in the north. The outliers of Niuatoputapu and Niuafo'ou to the north and 'Ata to the south are also part of the archipelago. The islands of Ha'apai, the group in which Kolo Velata is found, lie along the crest of the mostly submerged Tonga Ridge which forms the eastern chain of the archipelago. Ha'apai has 43 islands of which 16 are permanently inhabited. Ha'ano, Foa, Lifuka, 'Uiha and Mounga'one are principal islands in the Northern group and contain the majority of the population. The capital of Pangai is located on Lifuka, one of the largest and the most populated islands in the group. Kolo Velata is a short distance from this center.

Tongan Prehistory

The Tongan archaeological sequence has been generally characterized as having four phases: (1) ceramic, (2) aceramic formative, (3) mound construction and (4) European contact periods. Kirch (1988: 7) notes that at present only the earlier
Figure 1: Northern Ha’apai Islands and Their Position in the Pacific (after Burley 1992). Names and Shaded Areas Denote Villages.
portions of the sequence are adequately known. Similarly, Burley (1993: 2) has commented that although a consensus has been derived on the underlying structure of settlement systems during the ceramic and mound construction phases, the formative phase remains an enigma.

The ceramic phase begins with the earliest Lapita settlements in the islands, dating to as early as 1200 B.C., and continues until the cessation of ceramic production sometime after 400 A.D. (Shutler et al. 1994). Ceramic chronology begins with early Eastern Lapita wares and changes over time with a progressive loss of decorative designs along with a simplification of rim form and vessel morphology. By the end of the early Lapita period the ceramics are characterized as plain wares with no decoration at all. Settlement pattern of Early Lapita sites in Tonga consisted of aggregated settlements located along the shorelines of lagoons or protected bays (see: Poulsen 1988; Burley 1994a).

Sometime after 400 A.D. ceramic production is abandoned and from that time until approximately 1000 A.D. very little knowledge of the archaeological record exists. This formative aceramic period has thus been termed, perhaps inappropriately, the "Dark Ages" by Davidson (1979) and it has drawn the attention of several research projects (Spenneman 1986, Kirch 1988, Burley 1992). On the other hand, Burley (1994a: 393) suggests this phase may not exist at all with the ceramic period extending to as late as 600 A.D. and the monument construction period following thereafter.

No later than 1000 A.D. and lasting until approximately 1750 A.D., the construction of large earthen mounds, both faced and unfaced, become a dominant feature on the Tongan settlement landscape. It is during this phase of the sequence that most of the monumental archaeological sites present on the Tongan landscape
were constructed, including fortifications. Associated with these constructions is the rise of the Tu'i Tonga (paramount chief) lineage and an expansion of what has been called the Tongan maritime chiefdom (after Kirch 1988). Following Kirch's (1984: 111) demographic model for Polynesian island groups, this phase would coincide with a time when Tonga's gradually increasing population reached a critical density, the result being an increase in societal pressure and the full emergence of a centralized chiefdom.

**Tongan Socio-political Organization**

The general structure of Tongan social organization during the 18th century incorporated six levels: the (1) Tu'i Tonga or divine paramount and hau or secular paramouts, (2) falefa or great chiefs, (3) hou'eiki or subordinate chiefs, (4) matapule or ceremonial attendants of the falefa and hou'eiki, (5) tufunga or hereditary craftsmen, and (6) tu'a or commoners (see Bott 1982, Kirch 1984). This was a rigidly ascribed structure based on genealogical considerations of both mother and father.

At the top of the hierarchy was a dual paramountship; the Tu'i Tonga holding a divine role and the secular hau, including two chiefs: the Tu'i Ha'atakalaua and the Tu'i Kanokupolu. The role of the Tu'i Tonga was as an extension of and mediation with the ancestral dieties, thus assuring the fertility of the land (Kirch 1984: 230). During his lifetime the Tu'i Tonga was treated as a god and was ultimately buried in large stone faced tombs known as langi, meaning sky or heaven (Burley 1994b: 506). The hau were responsible for the secular responsibilities of the paramountship, such as assuring that first fruits tribute ('inasi) would be received from all districts. Although subordinate in status to the Tu'i Tonga, these chiefs
held the real power and authority throughout the chiefdom (Kirch 1984: 230). The *falefa*, meaning "four houses", were a group of landed chiefs subordinate to the Tu'i Tonga. The *hou'eiki* were a body of chiefs subordinate to the *falefa* within which was a hierarchical structure. Each of the *hou'eiki* had *matapule* or chiefly attendants. The *tufunga* were hereditary craftsmen who, although equal in rank to the *tu'a* or commoners, could yield a considerable amount of power depending on their skill. Examples are *tufunga fou vaka* (canoe builders) and *toutai vaka* (navigators) who might hold an even higher status than *matapule* (Kirch 1984: 230).

The 'api, or household, was the basic unit of settlement pattern consisting of the buildings and lands occupied and worked by a particular family group (Campbell 1992: 26). An extended family, including grandparents, unmarried adults and often the wives and children of married brothers, was known as a *fa'aahinga*. A group of related families formed a *kainga*, which according to Bott (1982: 57) was the basic kinship concept, translated as "kinsmen" or, in some contexts as "one's people". Several family *kainga* would constitute the *kainga* of a chief, even though that chief need not be related to the commoners. As Campbell (1992: 26) has observed, "the structure of the Tongan family unit was reflective of the structure of its society as a whole".

From the 10th to the 15th centuries, the Tongan chiefdom was under exclusive control of the Tu'i Tonga lineage. This paramountship split in the 15th century during the reign of the 24th Tu'i Tonga Kau'ulufo'ufu'afekai. Following the assassination of his father, Tu'i Tonga Takalaua, Kau'ulufo'ufu'afekai relinquished his secular responsibilities under the title of Tu'i Ha'atakalaua to his younger brother, Mo'unga-'o-motu'a. Campbell (1992: 16) argues that the murder of Takalaua was indicative of widespread dissatisfaction with the Tu'i Tonga and the act of splitting
the paramountship can therefore be seen as a revolution within the chiefdom. Burley (in press) also argues that the Takalaua murder undoubtedly represents a disintegration of the traditional chiefdom. However, he uses oral traditions to illustrate a reconsolidation of power by Kau'ulufonuafekai. The splitting of the paramountship may therefore reflect the burgeoning necessities of centralized rule.

A second split of secular responsibility occurred during the 17th century, when the Tu'i Kanokupolu title was formed. The 6th Tu'i Ha'atakalaua, Mo'unga-'o-tonga, is said to have created the title for his youngest son, Ngata, although the title was not actively used until the time of his great-grandson (Campbell 1992: 21). At that time, the Tu'i Kanokupolu lineage began to supersede the Tu'i Ha'atakalaua and gradually assumed the power within the hau. Campbell (1992: 22) notes that "in this process of absorption and expansion, the Ha'a Ngata's tactic was marriage rather than warfare", resulting in a Tu'i Kanokupolu pre-eminence. Thus, by the late 1700s, when sustained European contact had been established, the Tongan polity incorporated a dual paramountship of the sacred Tu'i Tonga and secular hau with the latter being dominated by the Tu'i Kanokupolu lineage.

**Tongan History**

European contact with Tonga first occurred with the Dutch voyage of Schouten and LeMaire in 1616 A.D., when the far northern islands of Tafahi and Niuatoputapu were sighted. Another early contact occurred in 1643 when Tasman visited Tongatapu. However, only after 1767 when Wallis anchored at Niuatoputapu did sustained historic contact become established. Cook visited the Tongatapu and Ha'apai groups in 1773 and 1777, and named Lifuka in Ha'apai the "friendly island", a term which has since become extended to the entire kingdom.
Relatively detailed historic accounts of Tongan society were subsequently provided by Cook (Beaglehole 1969), Mariner (Martin 1991), Vason (1810), Thomas (as described in Campbell 1992) and Wilkes (1985).

Due to long term power struggles within its political structure which were exacerbated by European influence, the Tongan polity underwent dramatic change during the last decades of the 18th century and the first of the 19th century. Subsequently, the entire kingdom was subjected to a lengthy period of chiefly wars lasting until 1852. Warfare caused a change in settlement pattern from dispersed households across the landscape to aggregated communities within fortifications. With the exception of Mu’a on Tongatapu, the number of fortified sites constructed during this period in time has led some archaeologists (Spenneman 1988) to argue that virtually all existing fortifications on the present Tongan landscape derive from this period.

During this 60 year period of civil war political order in Tonga was at times anarchical. A specific event cannot be given as its cause. Rather it appears to have resulted from a deteriorating political climate which had been developing over years. Burley (1994b: 506) outlines that climate in the following manner:

Incongruities in the succession of the Tu’i Tonga, multiple claims to the Tu’i Kanokupolu title and other factors led to warfare. At the same time, European presence exacerbated the situation. Introduced diseases wreaked havoc on chiefs and their following while firearms affected traditional warfare and its outcome.

Campbell (1992: 37) notes that "the first sign of trouble" is found in Cook's observation in July 1777 of an unorthodox 'inasi ceremony giving homage to the twelve-year-old son of Tu’i Tonga Paulaho. The act broke long standing traditions, and such aberrations became a recurrent theme during the civil war period. Campbell (1992: 40) goes on to explain that:
The immediate outcome of the strange events of 1777 is not known, but within a few years civil war broke out between the Tu'i Tonga and the Tu'i Kanokupolu lineage. Among the matters at issue was the succession to the Tu'i Kanokupolu title.

During the civil war settlement pattern in Tonga changed from being dispersed amongst plantations as witnessed by Cook in 1777 (Beaglehole 1969), to being aggregated in fortifications as witnessed by Mariner in 1806 (Martin 1991) and Wilkes in 1840 (Wilkes 1985). Fighting continued across the archipelago with control and authority contested by many chiefs. Beginning in the 1820s, the Ha'apai chief Taufa'ahau began to gain pre-eminence. Ultimately Taufa'ahau consolidated full control of the archipelago as Tu'i Kanokupolu in 1852 when his forces defeated the Ha'a Havea chiefs of Tongatapu (Latukefu 1977: 133).

In Ha'apai, critical battles were fought circa 1826 between Taufa'ahau and Laufilitonga. Taufa'ahau, son of former Tu'i Kanokupolu Tupoutoa, was at the time fighting for his recognition as Tu'i Ha'apai. Laufilitonga, son of Tu'i Tonga Fuanunuiava, "had grown up under the shadow of a title no longer respected by the greatest chiefs" and "if he was to be respected as a chief, Laufilitonga had to conquer a kingdom for himself" (Campbell 1992: 51). During these battles Kolo Velata was the bastion for Laufilitonga.

**Tongan Warfare**

Tongan warfare was traditionally carried out hand-to-hand with warriors wearing only a maro or loin cloth. Warriors decorated themselves by blackening their faces and painting black figures on their limbs (Ferdon 1987: 266). The warrior's hair was "cut close, except a bunch tied together, rising from the crown of the head, like a soldier's cockade" (Vason 1810: 163). A variety of weapons held
on the body were taken into battle including fighting clubs, fighting spears, bows and arrows, and unshaped stones carried by hand. Fighting clubs were the most common weapon. Apart from Cook in 1773, historic descriptions of Tongan warfare were made during the 19th century chiefly wars and describe both Fijian and European influence (Wilkes 1985; Martin 1991). Changes in the decoration of warriors, the type of bow and arrow used in battle, a modified form of throwing spear and cannibalism are attributed to Fijian influence (Clark 1976; Ferdon 1987). Firearms, including cannons, were acquired from Europeans and these had a major influence.

 Traditionally, battles were carried out as sudden attacks with the purpose of inflicting a maximum amount of casualties and damaging a community's food resources and property. In an historic description of a battle on Vava'u, Mariner (Martin 1818: 190) states that:

Finow [Finau 'Ulukalala] gave orders that a strong party should go forth early in the morning, towards the enemy's fortress, and destroy all the plantations they could come at, but in the case of an attack, they should make their retreat as speedily as possible.

Regarding warfare during the civil war period, West (1865: 267) comments that "the contending parties seldom met in general engagement" and that "the strife was usually a series of skirmishes". Describing attacks on Tongatapu by Finau 'Ulukalala during the civil war, Latukefu (1974: 18) notes that "in these attacks, a few unsuspecting victims would be killed, property hurriedly destroyed, and the raiders would then quickly escape to their canoes, and sail back to Ha'apai". The introduction of European cannons necessitated the construction of vehicles to transport them. In Mariner's account of 1806-10, the chief Finau 'Ulukalala
comments on the cumbersome nature of European cannons in relation to Tongan warfare:

...Finow expressed his opinion, that the gun was an instrument not well fitted (being too unwieldy) for their mode of warfare, which consisted in sudden attacks and retreats, according to circumstances, rather than in steady engagement (Martin 1818: 82).

Nevertheless, the use of European firearms in Tongan warfare was widespread by the mid-19th century. Battles were sometimes carried out in the open, with both men and women participating. Depending on the circumstances, the captured, including women and children, were either killed or taken as slaves (Vason 1810: 163; West 1865: 267). Armies numbering into the thousands might be involved (Martin 1991: 107). Most often battles took place around fortifications leading to a proliferation in their construction.

Summary

The Tongan archaeological sequence has been generally characterized as having four phases: (1) ceramic, (2) aceramic formative, (3) mound construction and (4) European contact periods. Although a general consensus has been derived regarding the ceramic, mound construction, and European contact phases of the sequence, the aceramic formative period remains enigmatic. The fortification of Mu'a on Tongatapu, at present, provides the earliest example of a Tongan fortification possibly dating to the site's origin in the 13th century during the mound construction period (Kirch 1984: 227). During the 15th century, the Tongan chiefly structure split and the Tongatapu chiefs gained control over the rest of the archipelago. By the time of extended European contact during the 18th century,
the general structure of Tongan social organization was hierarchic and incorporated six different levels. At the top of the hierarchy was a dual paramountship with the Tu'i Tonga holding a sacred role and the *hau* holding a secular role. By the end of the 18th century and lasting until the mid 19th century, political order in Tonga was anarchical. This period, known as the 19th century chiefly wars or the Tongan civil war, did not end until 1852 when the Tongan polity transformed into a monarchy under the rule of one chief, Taufa'ahau.
CHAPTER 3

TONGAN FORTIFICATIONS

The data produced during the survey and excavation of Kolo Velata is better understood within the context of fortification archaeology in Tonga and historic descriptions of these features as they were used. Both of these topics are addressed in the present chapter as background to later discussion.

Due to the relatively flat geography of the uplifted coral islands upon which most Tongan settlement occurs, fortification sites are almost solely of the flat terrain ring-ditch type. That is to say the defensive feature is formed by a circular or rectangular ditch and earthen bank upon which was constructed a palisade of bound coconut tree trunk and reed. Accesses were constructed by leaving portions of the bank open and by leaving causeways over the ditch. An opening in the palisade accompanied these and, in some cases, a stockade was built around the causeway for greater security. Traps, including camouflaged pits with sharpened stakes, were also excavated around fortifications. McKern (1929: 81) notes two types of traps associated with Tongan fortifications: lavosa (large traps) containing many stakes, and sokie (small traps) containing a single stake in a pit large enough to receive a man's leg. McKern (1929: 81) also describes examples of fortification ditches lined with stakes (sokii) for the purpose of defense.

Kirch (1984: 208) has constructed a typology of Polynesian fortifications. In this scheme the Tongan kolotau (fortification) most closely resembles a type Ib fortification, a homeland defence constructed on flat terrain. These were forts situated within a home base territory which basically consisted of a fortified hamlet or village. Although most Tongan kolotau were not permanently inhabited, they
were elaborate constructions which could safely house populations of people into the thousands for extended periods of time (Martin 1991: 107). The only exceptions to the flat ring-ditch fortifications thus far recorded in Tonga are a possible refuge fortification on the volcanic island of Late (McKern 1929: 85) and a ridge fortification on the island of 'Ata (Anderson 1978).

Based on his survey of Tongan fortifications along with existing historical descriptions, McKern (1929: 80) provides a general model of fortification construction in Tonga:

A fortification consisted of three essential elements: an earthen wall or embankment, several of them in some forts; a fence of upright posts or heavily reinforced reeds surmounting the embankment; a moat, in most forts dry, immediately surrounding the wall elements. Of less importance are lookout platforms and concealed pits serving as man-traps. Such a fort was called Kolo, or if impregnable, Kolomalohi.

A second characterization of Tongan fortifications is provided by Spenneman (1988: 58) for the island of Tongatapu:

Fortifications on Tongatapu come in different forms. The most common shape is round or oval, but square fortifications are also known. Some fortifications had a well nearby for their water supply. However, it is interesting to note that the well was often outside the defences. When the village was on the coast, the seaward side was undefended, resulting in a semi-circular fortification. This allowed canoes to be beached within the defences. In some places such as Nuku'alofa the canoe houses had to be kept outside of the fortification.

The Tongan word kolo has the dual meaning of "fortification" and "village". Based on change in Tongan settlement pattern during the 19th century chiefly wars, this occurrence has been used to argue the historic origins, in name and form, of the contemporary Tongan village (Burley 1994a: 385). Biggs (cited in Burley 1994a: 407) has defined the Tongan kolo as a proto-Polynesian root for "fortified enclosure", having correlates in Fijian (koro) and Samoan (olo). However, Green
(cited in Burley 1994a: 407) has pointed out that "kolo as a specific term meaning fort, does not occur in East Polynesia". Based on this occurrence, Burley (1994a: 407) suggests a possible misinterpretation of the term's meaning as a Proto-Polynesian root may have occurred. Rather he suggests that its application to "fortified enclosure" may have occurred after colonization of East Polynesia. The word kolotau is used today to distinguish a fortification from a village (Havea 1990).

Fortification Archaeology in Tonga

Fortifications in Tonga have been of interest to archaeologists from the onset of research in the archipelago. Initial studies were conducted by W.C. McKern from September 1920 to June 1921 and published in 1929, under the auspices of the B.P. Bishop Museum of Honolulu. While McKern's survey provided a descriptive overview of predominantly monumental sites throughout the three geographical divisions of the archipelago, he does speculate on the Melanesian origins of Tongan fortification construction and their similarities to Maori fortifications (pa). In this work, he provides brief descriptions for 19 fortifications with plan maps for those of Mu'a on Tongatapu, Feletoa on Vava'u, and Kolo Velata in Ha'apai. Significantly he attributed the defensive features of Mu'a to a period predating the 19th century chiefly wars (McKern 1929: 101). With this exception, the other fortifications were attributed to 19th century warfare as they were mentioned in local historical accounts.

Following McKern, archaeology in Tonga did not continue again until the 1960's. Relative to fortification sites, Green (1967) and Davidson (1967) redocumented McKern's features as well as finding numerous others. Davidson (1964) carried out surveys on Tongatapu and Vava'u. Significantly she was able to
illustrate problems with McKern's earlier work. For example, at Mu'a on Tongatapu she (1964: 14) states that "the southern part of this fortification follows a different and much larger course than that marked on McKern's map of the area". She (ibid) also observed that the form of Kolo Te'ekiu was "contrary" to McKern's description, it being rectangular rather than oval.

Green's surveys were focused on the island of Tongatapu where he mapped 16 fortifications. This material was used as a project at the University of Auckland by Swanson (1968). Again several problems with McKern's earlier data were revealed. In describing the fortification of Kolovai on Tongatapu, for example, Swanson (1968: 22) comments that "the fort appears to be larger than the dimensions given by McKern (1929: 88)". As for the fortification of Kolohule, Swanson (1968: 23) notes that "the fort is considerably smaller than McKern's (1929: 88) measurements". The fortification at Longoteme could not be found at all "in spite of McKern's (1929: 88) identification of one there" and it is thought that he is probably referring to the fort of Vaini (Swanson 1968: 25).

Swanson's (1968: 48) analysis provides the first comprehensive synthesis for Tongan fortifications. This review focussed on three variables: (1) site shape, whether circular or straight-sided; (2) complexity, whether single-ditched or more complex; and (3) geographical context. She subsequently hypothesized that straight-sided fortifications were an adaptation to the introduction of European firearms and, thus, more recent in age than the circular ones. The latter type was seen to resemble the Fijian Koro, or ring ditch fortification. It was also noted that "ethnographic accounts indicate that in most cases the straight-sided forts were the ones under Christian influence while the circular ones were used by the heathens" (Swanson 1968: 51). Swanson's comparison to Fiji was based on Palmer's (1967)
aerial surveys of Fijian fortifications which dated the circular ones to as early as 1000 A.D. (as cited in Swanson 1968: 51).


In the 1980s, Spenneman (1986) began an additional survey for fortifications on Tongatapu and was successful in expanding the inventory to 31 sites. With the exception of the data presented in this thesis, Spenneman (1986: 74) has produced the only excavated data from a Tongan fortification. At the fortification of Pouvalu on Tongatapu (To-At-30), he excavated a trench bisecting both the mound and ditch as well as several test units. From this work Spenneman (1986: 75-7) concluded that the fortification was the result of a single construction sequence and he (1988: 58) subsequently posited the view that "almost all fortifications visible in Tonga today date to the period of civil warfare" (circa 1780-1852), Mu'a being the exception. Also at Pouvalu (TO-At-30), Spenneman (1986: 76) makes reference to a post hole, located on top of its bank and forward of its apex. This, he argues, is indication of a palisade. Of final note is Spenneman's (1989: 480) observation that the banks in an overwhelming proportion of Tongatapu kolotau are positioned behind the ditch, contrary to most Fijian examples.

Havea (1990: 36) has recently re-examined Green and Swanson's data and argues that "the rise of Kolotau in Tongatapu can be explained by a model of environmental determinism: population explosion, deteriorating climate, limited natural and agricultural resources". The fortifications of Tongatapu are examined in
reference to the different soil conditions across the island, and it is thus deduced that "population pressure produced intensive competition over the [limited] resources" (Havea 1990: 40). Roads connecting *kolotau* are shown to correspond with present day estate boundaries and during the civil war "*kolotau* leaders were becoming the chiefs of the *kolotau*, and later awarded with estates" (Havea 1990: 31).

As part of general survey work in Ha'apai, Burley (1991, 1993) has most recently recorded fortifications on 'Uiha, Lifuka, Foa and Ha'ano islands (Figure 2). Examining them in the context of settlement pattern and oral tradition, he takes the view that Tongan fortifications may be of greater antiquity than is commonly accepted with at least circumstantial evidence indicating that two sites are of a pre-civil war period construction (Burley 1991). First, oral tradition for Kolo Velata (after Gifford 1929: 70) suggests it was constructed by Mata'uvave, governor for Tu'i Tonga Kau'ulufonuafekai in the 15th century. Second, the fortification features of Mata'aho on the island of 'Uiha were truncated by a former beachline, suggesting a pre-19th century age for the site. A third site, represented by fortification ditches on either side of the village of Lotofoa on Foa island, also appears early in so far as a second, more recent, refuge-type fortification occurs at the back of the village (Burley 1993). On Lifuka, Burley (1991) further identified an earthen embankment which, originally, was interpreted as a defensive feature. Later, he (1994a) interpreted this feature to be a unique example of a boundary to a *tofia* or hereditary land unit.

Finally, Pepa (1994) has provided an overview of Tongan fortification archaeology as well as some new hypotheses on the subject. Following the view of Best (1993: 434) that fortifications in Fiji and Samoa have developed independently in each island group under certain "basic principles" of construction, Pepa (1994: 51) argues the same
Figure 2: Location of Northern Ha'apai Fortifications (after Burley 1992).
scenario in the Tongan context. He (1994: 44) suggests that contrary to Swanson's (1968: 51) hypothesis of circular fortifications being of greater antiquity than rectangular ones, the reverse appears to be the case. Examples of fortified sites located on earlier beach lines, such as Mu'a on Tongatapu (McKern 1929: 101) and Mata'aho on 'Uiha (Burley 1992), are given to show the antiquity of the rectangular fortifications. Pepa (1994: 44) then points out Spenneman's (1989: 480) observation that the positioning of the ditches and banks of Tongan kolotau are contrary to most Fijian examples. Based on a tofia or hereditary land unit bounded by a low mound in Ha'apai (Burley 1994a: 400) and an account from Vason of a fort on Tongatapu that was nothing more than a pole-and-reed enclosure (Ferdon 1987: 273), Pepa (1994: 51) finally suggests that "the Tongan fortifications probably evolved out of structures used to demarcate property boundaries". The basic elements involved in Tongan fortifications need not be seen as Fijian introductions, but more likely as independent Tongan developments.

**Historical Descriptions of Tongan Fortifications**

The earliest and most thorough historical description of a Tongan fortification is made by William Mariner in his narrative account (Martin 1991) of his stay in Tonga from 1806-1810. Having survived the capture of the ship, the Port-au-Prince at Lifuka island, Mariner was taken under the control of the chief Finau 'Ulukalala. From the vantage point of a participant, Mariner witnessed many of the battles fought across Tonga during Finau's involvement in the civil war and provides several descriptions of fortifications employed during that time. The following description (Martin 1991: 79) is of the fortification of Nuku'alofa on Tongatapu, and is given as a model to which other Tongan fortifications might be
compared. It is particularly important for its description of the palisade superstructure and its features.

The fortress of Nioocalofa [Nuku'alofa] is situated on the western coast of the island [Tongatapu], about one hundred yards distant from the water's edge, occupying about four or five acres of ground. It consists in the first place, of a strong wall or fencing of reeds, something like wicker-work, supported on the inside by upright posts, from six to nine inches in diameter, and situated a foot and a half distant from each other; from which the reedwork is firmly lashed by tough sinnet, made of the husk of the cocoa-nut. This fencing is about nine feet in height, the post rising about a foot higher. It has four large entrances, as well as several small ones, secured on the inside by horizontal sliding pieces, made of the wood of the cocoa-nut tree. Over each door, as well as other places, are erected platforms even with the top of the fencing, supported chiefly on the inside, but projecting forward to the extent of two or three feet. These platforms are about nine feet square, and situated fifteen yards distant from each other; and as they are intended for the men to stand on, to shoot arrows, or throw down large stones, they are also defended in front, and half way on each side, by a reed-work six feet high, with an opening in front, and others on either hand, for greater convenience of throwing spears, &c. The lower fencing has also openings for a similar purpose. On the outside is ditch of nearly twelve feet deep, and as much broad; which, at a little distance, is encompassed by another fencing similar to the first, with platforms, &c. on the outside of which there is a second ditch. The earth dug out of these ditches forms a bank on each side, serving to deepen them. Opposite each large doorway, there is no ditch dug. The inner and outer enclosures are ornamented profusely with white shells. Some of these fortifications are square, others round, like that of Nioocalofa [Nuku'alofa].

Mariner (Martin 1991: 107) also describes the fortress of Feletoa in Vava'u in similar fashion. Here he provides a population estimate for a Tongan fortification and an example of architectural alterations in response to firearms.

The proposed fortress was to be the largest that ever was known in the Tonga islands, to be in short a fortified town, capable of holding all the inhabitants of Vavao (about 8000 in number), with their houses and burying places to be built around the moa. It was to be constructed, as usual, of reed enclosures, much on the same plan as that of Nioocalofa, formerly described, but to be surrounded by a deep and firm-set bank of solid clay, about twelve feet high, with a ditch on the inner side of it, from which the clay would be furnished, and thus be proof against guns.
Finally, Mariner provides an account of the construction of the fortification of Neiafu in Vava'u (Martin 1991: 126). This account describes the time needed and the construction of an unpalisaded outer bank for the purpose of firing guns. Neiafu also provides an example of a fortification built to accommodate the physical necessities of a particular location:

...armed parties were sent out to cut reeds, for the purpose of building a fortress at Neafoo; and whilst others were employed in digging a ditch about fourteen feet wide and ten feet deep, Finow and his principal chiefs remained to lay out the plan. The spot for the fortress was so situated, that one side stood upon the seashore, on a steep rocky bank, and therefore required no further defence...

During the following day the fencing was completed, and a second ditch planned round the former. This, however, was to be without any fencing, that the guns might be ready to bear upon the enemy...This ditch was to be eighteen feet wide, and about ten deep. In three days it was dug, and the fortress completed.

Describing the overseas missions of the Australian Methodist Church, Wood (1975) provides an account of the fortification of Nuku'alofa circa 1806. The account (Wood 1975: 15) provides both a description of the fortification and how it fared against European firearms:

Finau Ulukalala took eight cannons to conduct the war on a new scale in Tongatapu. In this invasion he first made an assault on the fort at Nuku'alofa. This fort, the largest of twelve then existing on Tongatapu, stood on the hill afterwards called Zion because of the Wesleyan chapel there. The fort was more than four acres in extent, surrounded by a reed fence nine feet high and two ditches, each twelve feet in width and the same depth. While the bombardment was being made from the beach, Finau observed the effect from the reef where he sat on a chair taken from the Port-au-Prince. After an hour, the fort seemed to show little sign of damage but, when Finau's men had gone closer and burned the fort, they were able to enter it without any opposition. The havoc resulting from the bombardment was then evident, and finau felt satisfied with the success of his new style of warfare. The bodies of 350 defenders who had been killed by the guns had been thrown into the sea.

The account of the midshipman Lieut. J. Orlebar, describing the voyage of H.M.S. Seringapatam during the year 1830, also records information about the
fortress of Neiafu. The expedition stopped in Vava'u where Orlebar had the opportunity to visit the fortification of Finau. The following description (Orlebar 1976: 73) comes from an account of the reception given to the crew of the British frigate:

...the crew of which with myself were ordered up to the fortress or strong hold where Fenou resided. We followed a guide up the steep side of a hill, whose only claim to the name of a fortress, were several wide trenches now half filled with earth, girting it around. On its broad top stood the houses of the king and his subjects, amid groves of the cocoa nut tree; Fenou's hut was small, and differed but from the rest in having a very handsome mat...

In his attempts at an historical ethnography for 18th century Tonga, Ferdon (1987: 273) provides a description of a fortification from Hihifo, Tongatapu, based on the account of Vason. He suggests that it may have been of local design inspired by an incident that had occurred during the battles immediately following the assassination of Tu'i Kanokupolu Tuku'aho on 21 April 1799.

It was nothing more than a pole-and-reed enclosure with two openings. It had been built by the people of Hihifo to defend themselves against the return of Finau 'Ulukalala. The flimsy material employed in its construction did not reflect its superior defensive nature when viewed in terms of the hand-to-hand combat techniques then dominating Tongan warfare. In fact, Finau found it impossible to attack the structure directly without considerable risk of high losses. This was due to the fact that the Hihifo warriors had stationed themselves around the inner perimeter of the enclosure and, with their spears stuck between the reeds of the fencing were capable of impaling anyone attempting to tear down the high barrier. (Ferdon 1987: 273).

Another historic description occurs in the records of the United States Exploring Expedition to Tongatapu in 1840 (Wilkes 1985). Written some 30 years after Mariner, this account illustrates potential changes that occurred in fortification features. These changes are the result of continued use of European firearms and altered patterns of Tongan warfare. The following description (Wilkes 1985: 13) is of the fortification of the chief Taufa'ahau on Tongatapu:
King George or Taufa'ahau, is building his town nearby, just without the fortification of King Josiah: it is an enclosure of four hundred yards square; the fence consists of close wicker-work, made of the small sugar cane, and in order to make it stronger, several thicknesses are put together: this makes a more effective defence than one would imagine; it is about eight feet high, and trimmed off on the top, and when new has a very pretty appearance. The permanency and arrangement with which the town is laid out, make Taufa'ahau's intentions quite evident. The avenues cross the square diagonally, the gates being at the corners, and in the centre is a large area, left for a chapel.

The houses of King Josiah's or Tubou's [Tupou] town are mostly within the fortress; this is a high mud wall or embankment, on the top of which is a wicker-work fence; on the outside of the wall is a ditch, twelve feet wide by five feet deep. There are three principle gateways, which are very narrow entrances, formed by thick cocoa-nut posts, set firmly and closely in the ground, admitting only two persons at a time; these entrances are about fifteen feet long, and in order to secure them against attack, they are so arranged as to be filled up with earth; they have likewise a number of hollow logs buried in the wall, and set obliquely, serving as loop-holes, through which they may have a cross-fire at their enemies approach. These loop-holes can only be used for muskets, and have been introduced since the natives began to use fire-arms, or since the time of Mariner, for he makes no mention of them in describing the fortresses.

Significantly, Wilkes also provides sketches of these defensive features giving visible insight into their construction. These are provided in Figures 3 and 4.

Summary

The archaeology of Tongan fortification sites can be seen as a progressive collection of survey and map data with limited excavation. There also has been some speculation on origins and time depth. Early studies looked to Fiji as the homeland for Tongan fortification sites (after Swanson 1968) where as recent work (Pepa 1994) proposes an independent development. The question of fortification shape also has been of importance to hypotheses regarding the origin and antiquity of Tongan fortifications. Unfortunately, few archaeologists have considered how their archaeological features were integrated into the overall site complex. It is from historical descriptions that this information can be derived.
Figure 3: Detail of Fortification of Nuku’alofa circa 1842 from Wilkes (1985: 1).
Figure 4: Causeway and Stockade, Nuku’alofa circa 1842 (Wilkes 1985: 14).
Historic descriptions of Tongan fortifications illustrate innovations to their superstructure over time while their underlying composition remained the same. In most cases they served as temporary refuge sites, could be constructed in a matter of days, and were built according to their surroundings. Size varied from fortifications capable of holding small communities of people to those capable of containing communities numbering into the thousands. It cannot be ascertained from the preceding historical descriptions as to whether square or circular fortifications were preferred during the later years of their use. It is of note, however, that Mariner's account describes the use of both. He also indicates that fortifications were constructed in relation to the particular site chosen.

Historical accounts illustrate a uniformity of fortification composition across the archipelago, providing a comparative data base for archaeological interpretation. As to origins, there is a historical bias toward 19th century chiefly wars. Caution however should be taken so as not to overlook the possibility of reuse and of existing banks and ditches dating to earlier periods of conflict.
CHAPTER 4

THE HISTORY OF KOLO VELATA

Among the fortified sites of northern Ha'apai, Kolo Velata has the best historical documentation and, thus, has often been used as a reference site in the archaeological literature (Hawe 1990, Burley 1992, Pepa 1994). More importantly, the site was the location of critical battles during the 19th century civil war period, the outcome of which having influenced the long term political development of the chiefdom. In addition to its civil war period history there are references for Kolo Velata that place its original construction as far back as the 15th century. These give support to a considerable antiquity for the Tongan fortification complex as a whole. The following chapter provides the historical context for Kolo Velata (also see Table 1 for a summary of critical historical events).

A History of Kolo Velata

Lifuka oral traditions pertaining to Kolo Velata's origins state that "its construction can be attributed to the first Mata'uvave of Ha'apai and that the labour force was drawn from all of Ha'apai" (Gifford 1929: 70). This Mata'uvave was a representative of the Tu'i Tonga Kau'ulufonuafekai from Tongatapu. Although the reference is brief, it is relevant to the present study in two ways. Firstly, with Mata'uvave being associated with Tu'i Tonga Kau'ulufonuafekai the site can be dated by genealogical chronologies to the mid-15th century A.D. thereby establishing site origins long before the Tongan civil war period. Secondly, Mata'uvave's arrival from Tongatapu and the amassing of labour from all of Ha'apai
1. Segmentation of the paramountship and political expansion from Tongatapu across archipelago as far as 'Uvea during reign of Tu'i Tonga Kau'ulufonua Fekai, 15th century A.D. (Kirch 1984; Campbell 1992).

2. Initial construction of Kolo Velata on Lifuka by the Mata'uvave of Tu'i Tonga Kau'ulufonua Fekai during the 15th century A.D. (Gifford 1929: 70). Probably an act of reassertion of control (Burley 1993).

3. Laufilitonga, son of Tu'i Tonga Faununuiava, is born on 24 August 1797. Taufa'ahau, son of Tu'i Kanokupolu Tupouto'a, is close in age (Campbell 1992: 51).

4. First Battle: Due to his prolonged stay in Ha'apai, Taufa'ahau is harassed by Laufilitonga and retaliates by attacking the island of Foa, allies of Laufilitonga (Gifford 1929: 210).

5. Second battle: Laufilitonga in turn retaliates by attacking Taufa'ahau and his warriors in Pangai on Lifuka. The fighting ends in stalemate (Gifford 1929: 211).

6. Third battle: Taufa'ahau's warriors land on Lifuka and chase Laufilitonga's forces back to the fortification at Velata. Taufa'ahau subjugates Laufilitonga's allies on Foa and Ha'ano and acquires firearms from 'Eua (Gifford 1929: 212).

7. Final battle: Takes place at Kolo Velata: September 1826: Taufa'ahau is the victor and Kolo Velata is levelled to the ground. Laufilitonga is then banished from Ha'apai (Campbell 1992: 54; Gifford 1929: 212).

8. Taufa'ahau is baptised 7 August 1831 and thereafter referred to as George by missionaries (Campbell 1992: 57 and 64).

9. Taufa'ahau is granted the title of Tu'i Kanokupolu 4 December 1845 (Campbell 1992: 62).

10. The last civil war in Tonga in 1852 which resulted in the defeat of the Ha'a Havea chiefs and the completion of the unification of Tonga under the supreme authority of the Tu'i Kanokupolu (Latukefu 1977: 133).


12. The title of Tu'i Tonga is abolished, 1875 (Bott 1982: 64).


Table 1: Historical chronology relevant to Kolo Velata
suggests a political expansion, or more likely a reassertion of control, from Tongatapu into the islands of Ha'apai (Burley 1993). The presence of Mata'uvave in Ha'apai must have been seen as aggressive through the association of his arrival with the construction of a fortification. Burley (in press) cites indirect historical accounts showing that principal opposition seems to have come from various Ha'apai chiefs including Malupo of 'Uiha and Tu'i Ha'angana of Ha'ano (Bott 1982: 103). Also involved were the chiefs of Lotofoa on Foa island where another fortification was constructed (Gifford 1929: 228).

Mata'uvave is a chiefly title owing allegiance to the Tu'i Tonga. Its creation is associated with the political expansion and restructuring of the Tongan chiefdom under Tu'i Tonga Kau'ulufonuafekai during the 15th century. Oral histories (Gifford 1929) describe Mata'uvave as "governor" of Ha'apai, although, this role is contentious. Some historians consider Mata'uvave no more than a "petty chief" (Bott 1982: 96) or "chiefly attendant" (Gifford 1929: 135), while others argue a more complex role, holding considerable power during his first years in Ha'apai (Burley in press). Significantly, his presence in Ha'apai is consistently associated with warfare.

Oral traditions establish that during the reign of Tu'i Tonga Kau'ulufonuafekai the chiefly system was in a state of crisis. Three of the preceding Tu'i Tonga, including his father, had been murdered (Campbell 1992: 15). To avenge his father's death, he pursued the assassins across the archipelago before catching them on 'Uvea and punishing them in such a way as to merit the name "fekeif" or "savage" (Campbell 1992: 15). Sand (1993: 45) notes from Gifford's (1929) chronology that Kau'ulufonuafekai "used the assassination of his father as an excuse to pursue the fleeing murderers, while at the same time trying to take control of autonomous or
independent islands". Kirch (1984: 225) interprets this pursuit as a metaphor for conquest. After Burley (1993) it can be argued that the construction of fortifications during this period is associated with that conflict.

More specific historical references to Kolo Velata do not occur until three centuries later during the civil war period. These are part of the accounts of the military campaigns of Taufa'ahau and Laufilitonga, narrated by Pita Vi and recorded by Gifford (1929: 210-214). Specifically, the accounts describe a series of four battles which took place in Ha'apai circa 1826 involving the two chiefs mentioned above. Kolo Velata, having been built or rebuilt for Laufilitonga, was at the center of these conflicts. Taufa'ahau was ultimately the victor and this allowed him to solidify control over Ha'apai.

The conflict in Ha'apai, according to Gifford (1929: 211), commenced with Taufa'ahau's arrival from Vava'u. Due to the marriage of his sister, Halaevalu Mata'aho, to the Tongatapu chief Teiho, Taufa'ahau and his party decided to remain on Lifuka for some time where Laufilitonga was the residing chief:

The Tu'i Tonga [Laufilitonga, who was actually not yet Tu'i Tonga] dwelt with a great number of people in his fort of Velata, Lifuka, and strengthened it. It was awful the way Taufa'ahau and his few people were treated. Taufa'ahau could not stand it so he went to war. Foa island sided with the Tu'i Tonga and the warriors of the Tu'i Tonga acted discreetly...That night Taufa'ahau's warriors forded over Makapulepule (the reef connecting Lifuka and Foa islands), and lay in ambush outside the fort till it was dawn. When it was nearly dawn they climbed over the fence and killed the people in the fort...Many escaped and were saved, but many were killed. They burnt the fort and returned to Lifuka (Gifford 1929: 212).

A second battle between Laufilitonga and Taufa'ahau took place in Pangai when Laufilitonga and his warriors from Velata retaliated (Gifford 1929: 212). In this case however, the fighting reached a stalemate at which time Taufa'ahau received assistance from the island of 'Uiha.
Suddenly the warriors of the Tu'i Tonga (Laufilitonga) from Velata made a rush, thinking to storm the fort of the Tu'i Ha'apai (Taufa'ahau) at Pangai. They came one day at noon. It was a big army as nearly all of Ha'apai was there...The battle raged and...Taufa'ahau went to their assistance and turned out the enemy... (who) thought they had received reinforcements, as there seemed a great number in the fort and a gun shot was heard. But it was only Taufa'ahau's little army of the day before. They were few and had no guns, but he was able to withstand the Tu'i Tonga (Laufilitonga), although they were many and had guns. (Gifford 1929: 212)

The reference to Taufa'ahau's fort at Pangai is interesting since no other ring-ditch fortification occurs on Lifuka. Presumably his defensive features included a palisade only.

Word of the Ha'apai conflict reached Finau Ulukalala in Vava'u who intervened and put an end to the battle. According to Gifford (1929: 213), the compromise was that Taufa'ahau be made Tu'i Ha'apai (chief of Ha'apai) under the condition that he rule from the island of 'Uiha. However, Taufa'ahau's role as Tu'i Ha'apai is not certain until after the final battle at Velata. Laufilitonga was left to control Kolo Velata and the island of Lifuka. Taufa'ahau thus installed himself at Mata'aho on 'Uiha (Gifford 1929: 213) the site of another fortification feature. Taufa'ahau subsequently travelled to Tongatapu and 'Eua where he secured more firearms. Upon his return, he found Laufilitonga and his warriors planning aggressive manoeuvres. The warriors from Velata then sailed to 'Uiha and began provoking Taufa'ahau who, according to the Vi account (Gifford 1929: 213), did not wish to fight. On the following day war was once again declared.

In preparation for the third battle, Taufa'ahau assembled his warriors from as far away as the southern Ha'apai island of Nomuka (Gifford 1929: 214). This party was first engaged by Laufilitonga as it came ashore on Lifuka and subsequently drove his forces back to the fortress of Velata. Laufilitonga then received aid from his allies on Foa (Gifford 1929: 214):
While the army of Taufa'ahau was still in disorder, two chiefs from Foa came down with their band of warriors. They attacked Taufa'ahau's army on the flank. The dead floated in the sea. Another part of Taufa'ahau's army surrounded the warriors from Foa, and killed many of them. They (Taufa'ahau's army) nearly exterminated them (the warriors from Foa), but the two chiefs (from Foa) were good leaders and led the small remainder (of their warriors) to Laufilitonga's fort (at Velata).

Following the battle, Taufa'ahau went to Foa and found all of its inhabitants assembled in surrender at Faleloa. The people of Foa were spared and word of this event was sent to the next island, Ha'ano. The people of Ha'ano, whose fortress Pa Lesi was in ruin, also asked for peace.

Kolo Velata was the scene of the final engagement in which Taufa'ahau gained victory over Laufilitonga. According to Campbell (1992: 54), "it had been fought in September 1826," and as the missionary John Thomas later recorded, "Taufa'ahau had been expected to lose." According to the Vi narrative (Gifford 1929: 214), the fortification at Velata was levelled to the ground. As for Laufilitonga, two different fates are found within the narrative (Gifford 1929: 214 and 220):

Somewhat later (Finau) Ulukalala arrived with all of the Vava'u vessels. It is not known whose side he would have joined had he arrived while the fort (Velata) was still standing, but when he arrived the fort had been taken and nothing more was done. And Finau (Ulukalala) said for the Tu'i Tonga (Laufilitonga) to go with him to Vava'u. Taufa'ahau said that the chief (Laufilitonga) was to please himself what he did. He (Laufilitonga) wished to go with (Finau) Ulukalala and he went and a great number of people went with him. The people of Ha'apai remained. Since then Ha'apai has been deserted and Taufa'ahau the only ruler. (Gifford 1929: 214)

The second reference (Gifford 1929: 220) to the end of the wars between Taufa'ahau and Laufilitonga is found later in the Vi narrative. The acquisition of firearms from Kaufana on 'Euа are mentioned and it is suggested that Laufilitonga had no choice but to leave Ha'apai:
When the fight at Velata was resumed, Taufa'ahau's warriors were having breakfast, as Laufilitonga's men made a sortie. Taufa'ahau's men quit eating, Taufa'ahau called for his gun. Malupo brought and asked permission to use it. It was granted. Malupo shot Laufilitonga's son. When he fell, Laufilitonga's men fled, but they asked where they got the gun and gun powder. Taufa'ahau's men replied from the *nato* (edge of precipice), referring to 'Eua. At the conclusion of the war Taufa'ahau put the Tu'i Tonga (Laufilitonga) and his chiefs in a boat and told them to go and not land again in Tonga, but Kaunanga, the mother of Tungi I, took them ashore at Lapaha (Tongatapu). (Gifford 1929: 220)

While at odds to the nature of Laufilitonga's fate, both references confirm his banishment from Ha'apai following the destruction of Kolo Velata.

During the years that followed the battles between Laufilitonga and Taufa'ahau, warfare in Tonga continued. In 1829 the Wesleyan mission sent a Tongan convert, Pita Vi, to Ha'apai followed in 1830 by the Missionary John Thomas. On 7 August 1831, Taufa'ahau was baptized and given the name George, in honour of King George III of England (Latukefu 1977: 127). In 1833, Finau Ulukalala of Vava'u died leaving Taufa'ahau to control these northern islands as Tu'i Vava'u. During that same year, Taufa'ahau eloped with Lupe Pau'u (later baptized as Salote), the principal wife of the Tu'i Tonga, Laufilitonga (Latukefu 1977: 129). Later, Taufa'ahau would fight under the Tu'i Kanokupolu Tupou (also known as 'Aleamotu'a and Josia) and eventually replace him as Tu'i Kanokupolu after his death on 18 November 1845 (Campbell 1992: 62). In 1852, Taufa'ahau fought the last of the principal battles against Tongatapu chiefs thereby consolidating his growing authority over the chiefdom. After the death of Laufilitonga in 1865, the Tu'i Tonga title was absorbed by Taufa'ahau who then abolished it altogether in 1875 (Bott 1982: 64). Taufa'ahau subsequently drafted a set of legal codes and land reforms, further destabilizing traditional chiefly rights and competing claims to rule. In the constitution of 1875 he finally established a parliamentary monarchy in which he and his descendants were guaranteed the right to rule. The events which
led to the transformation of the traditional Tongan polity during the first half of the 19th century illustrate the central role that Ha'apai played as well as the importance of Kolo Velata within those events.

Summary

Historical references to Kolo Velata suggest the site was used during two different periods in time. First, during the 15th century, when it was originally constructed, and later during the 19th century, when it was rebuilt during the chiefly wars. There is a general consensus amongst historians regarding the political hegemony of Tongatapu lineages, as far as 'Uvea, following the assassination of Tu'i Tonga Takalaua during the 15th century. Kolo Velata's association with the Tongatapu governor Mata'uvave, suggest it was constructed as part of this expansion and that this expansion was aggressive. The reference also provides an example of a Tongan fortification other than Mu'a that may have been built prior to the 19th century chiefly wars.

References to Kolo Velata in the 19th century chiefly wars establish it as an important historical site. During this time it was associated with the chief Laufilitonga who fought several critical battles against Taufa'ahau and lost. Taufa'ahau's victory gained him the title of Tu'i Ha'apai, a step in a political career that would end in his rule over the entire kingdom.
CHAPTER 5

THE ARCHAEOLOGY OF KOLO VELATA

This chapter will discuss the results of survey map preparation and excavation of Kolo Velata during the 1992 field season. Fieldwork focussed first on the production of a detailed contour map in which site features would be recorded. Second, test excavations were undertaken to examine subsurface features for palisade and causeway construction in the northern and eastern parts of the site. Limited excavation was also undertaken in the central area to determine the spatial extent of midden deposits that had been previously documented.

Prior Research

The first archaeological documentation of Kolo Velata was prepared by W.C. McKern (1929: 85) in his Tongan survey of 1920/1921. McKern's published report provides a brief site description along with an outline map in which site dimensions, shape and prominent features may be ascertained. McKern recorded Kolo Velata in the following manner (Figure 5):

Although the area of the fort at Velata, including the fortification, is largely under cultivation, the structure is apparent throughout. Two earthen walls with accompanying moats separated by an interval of 33 to 35 yards, concentrically surround a roughly circular area. Four gateways cut directly through all obstructions to the interior of the enclosure.

A large faitoka (grave mound) placed directly across the outer wall near the southern gateway has the form of a truncated cone (fig. 44, f). It is definitely identified as a grave mound by the Kili Kili pebbles and fine light, colored sand which mark its upper surface. An artificial well near this mound has the typical conical shape. A low oval bank of sand crossing the outer wall of the fortification near the western gateway is said to be the remains of a faitoka, but no evidence was found to support the statement (fig. 44, g). Velata is said to have been first constructed to resist the armies of Taufaahau, who later became George I Tupou. It was not used however at that time. (McKern 1929: 84)
Figure 44.—Plan of Kolo Vela, Leuku Island: a, enclosed area 553 yards by 540 yards; b, c, earthen walls 18 feet thick at base, 6 to 7 feet high with accompanying moats 6 feet maximum depth, 10 feet average width; d, gateways; e, artificial well; f, faitofo, height 12 feet, base diameter 165 feet, top diameter 60 feet; g, fafofo (?):
McKern's map depicts Kolo Velata as being roughly oval in shape and having a diameter of 553 yards.

In 1990 Burley also examined Kolo Velata as a part of his larger survey of the northern Ha'apai group. All of the basic site components recorded by McKern including the palisade ditch and causeways were still present (Burley 1991: 49). However, he found that the scale and orientation of the McKern site map were in error. Estimating site diameter by pacing off the distance, the diameter was suggested to be closer to 553 feet than yards. As well, the large burial mound located in the western end of McKern's map appeared to be farther south than documented. Burley also reported a midden area portion of the site from which a triton shell trumpet (*carenia tritonis*) was collected, the traditional instrument for sounding an alarm.

**Site Description**

Kolo Velata is located in the central interior of southern Lifuka island in what is now agricultural land. The site consists of two roughly circular and enclosing earthen banks and ditch features (Figure 6). Four areas of the inner bank are bisected by causeways which would have facilitated access into the fortification. One causeway was also documented in the outer bank. McKern (1929: 85) recorded the location of three other causeways in the outer bank that were not present in the 1992 survey. The diameter of the outer bank is roughly 220 m whereas the diameter of the inner bank is approximately 190 m.

As it exists today, the site integrates three burial mounds. The largest of these features is located between the two banks in the southern end of the site. It has a diameter of 47 m and rises 3 m in elevation. Associated with this mound, and as
Figure 6: Schematic Map of Kolo Velata Showing Site Features. Midden Boundary is Approximate.
documented by McKern (1929: 85), is a water well. This feature has a diameter of 12 m and a depth of 1 m. A second burial mound is located northwest of the larger one along the inner bank. This feature was recorded by McKern (1929: 88) and confirmed during the present fieldwork. During Burley's (1991: 52) 1990 survey, a third burial mound was located just outside of the confines of the fortification on the northwest end of the site. This feature, located 8 m west of the outer bank in the yard of a household adjacent to Kolo Velata, was confirmed during the 1992 survey and has a diameter of approximately 10 m and an elevation of approximately 0.5 m.

The midden area referred to by Burley (1991: 51) is located in the southern portion of the central area of the fortification (see Figure 6). This consists of a 0.25 to 0.3 m stratum of midden matrix including scattered shell, coral rock and charcoal. It is now situated within a tree covered area of the fortification.

In 1990 it was noted that a segment of the outer bank in the northern end of the site had been cut through for fill removal. This "cut zone" consists of an 8 m section within which a stratigraphic profile can be viewed. One of the missing "causeways" from the McKern map was in this vicinity and may have been destroyed as a consequence of this excavation.

Since its abandonment in 1826, Kolo Velata and the surrounding area has been subject to intensive cultivation. This was certainly the case by 1920 when McKern (1929: 84) records that "the area of the fort at Velata, including the fortification, is largely under cultivation". Burley (1991: 51) also states that "the enclosed space has been extensively cultivated since the site's last use and the archaeological integrity of the fort appears to be limited". In 1992 Kolo Velata was divided amongst three different 'api's or farm tracts. The different uses of the land by each 'api holder has now created two different vegetation regimes. On the southern end...
of the site is an area of secondary bush and scrub growth. The holder of this tract allows his chickens and pigs to forage here. The remainder of the site, with the exception of low brush in the northern end (Figure 7), is currently under agricultural production including taro, sweet potato and yam. The southern end of the site, which contained the large burial mound and well, is also covered with stands of fruit bearing trees such as mango, guava and lemon. Scattered coconut palms also cover the site.

Archaeological disturbance due to yam cultivation in Tonga has been addressed by Spenneman (1986: 80). The remains of yam planting holes in the archaeological record are highly similar in appearance to post holes (Figure 8). This presents a particular problem in the interpretation of architectural features generally, and palisade post hole features specifically. Spenneman (1986: 81) does however illustrate that while the planview of a yam hole is almost identical to a post hole, the profile will be different (Figure 9). The bottom of a yam hole will be rounded in shape rather than flat or pointed as in the case of post holes. Yam holes are also often randomly situated across an occupational surface whereas post holes, as related to architectural features, should be patterned.

Test excavations at Kolo Velata allow for description of a generalized stratigraphic profile for the site which includes three units. The upper two strata are composed of andesitic tephras while the third consists of underlying coral sands. Across Ha'apai, agricultural soils consist of an andesitic tephra base which, in some areas, forms a deep cover greater than 2 m (see Dickinson et al. 1994). Two layers have been consistently identified throughout the group: (a) upper (younger) andesitic tephra, and (b) lower (older) andesitic tephra (Wilson and Beecroft 1983: 6). The upper two strata at Kolo Velata seemingly correspond with these layers.
Figure 7: Kolo Velata, Low Brush Area in North East Portion of Site Showing Visibility of Outer Bank.
Figure 8: Kolo Velata, North Area Test Units Showing Possible Post Holes and Disturbance Due to Yam Cultivation.
Figure V.39: Classification of yam planting holes (upper row) and their manifestation in the archaeological record (bottom row). 1 - hole dug, but no yam planted. 2 - hole dug, yam planted, yam not harvested and rota in the hole. 3 - harvesting by digging round one half of the planting hole; 4 harvesting by digging all around the planting hole.

Figure 9: Spenneman’s (1986: 81) Classification of Yam Hole Disturbance.
Stratum I is a dark-reddish brown, friable clay containing varying degrees of small, fragmented shell. The agricultural zone is encompassed within this stratum and has been labelled Ia. Stratum Ia is a dark brown (10 YR 2/2) silty clay loam which is less compacted than the stratum beneath it. Comprising the first 0.1 to 0.2 m of deposit, it is present across the site and is distinguished from the midden deposit in that it does not contain the remains of burnt shell and charcoal. Stratum Ib lies below it. Also part of the organically stained tephra, it is a brown (10YR 3/2) silty clay loam which is more compacted than the a-horizon and does not contain shell. Stratum Ib has an average depth of 0.5 m across the site.

Stratum II is the lower andesitic tephra layer. Underlying the agricultural soil, it is a orange-brown friable clay with intrusive disturbances from yam cultivation and cultural features. Generally, it is described as an orange (5 YR 5/8) compacted clay without organic or cultural remains. Across most of the site, the banks have been constructed from Stratum II. In the case of Profile 2 in the north outer bank (see Figure 17), Stratum II showed various degrees of mixing with Stratum I due to bank construction activities. It was thus sub-divided into Strata IIa, IIb and IIc. Otherwise Stratum II is labelled as a single unit in other profiles. Its depth across the site is not even. In the north-eastern portion of the site it is greater than 1 m below the surface and in the south-central portion of the site it is not present at all. Both Strata I and II are also referred to as Lifuka clay (Wilson and Beecroft 1983: 17).

Stratum III is a sub-stratum consisting of white (10 YR 8/4) coral sands and containing large shell and coral fragments. It varies in depth across the site but generally underlies the andesitic tephra between 1 and 2 m below the ground.
surface. It is closest to the surface in the south-western and central portions of the site where it is present in the fill used to construct the banks and burial mounds.

In its present state Kolo Velata is not equally preserved in all portions of the site. The palisades of the eastern segment are considerably higher than those to the west, the former being almost 2 m above the bottom of the ditch (Figure 10) whereas the latter is rarely higher than 0.4 m. The reduced preservation of the western banks is a consequence of two factors. First, the depth of the tephra layer increases on a west to east trend. Thus, the banks on the west are partially constructed of coral sands which are subject to erosion. Second, the western site area is close to the village of Hihifo and appears to have had greater usage and disturbance.

**Map Preparation and Results**

Within the realm of traditional Tongan history and the rise of contemporary Tongan kingship, Kolo Velata is of importance. Until 1992, its documentation consisted of McKern's planview sketch and description of which individual details were known to be in error. Burley's (1991) research interests in the extension of the Tongan chiefdom to Ha'apai and its archaeological correlates required a firm documentation of site features. Consequently, a primary goal for the present project was the preparation of a detailed contour map (Figure 11).

Because of different vegetation coverage, a mapping strategy was chosen which incorporated a 4x4 m grid across the north-south axis of the site. Thus, elevation readings could be taken from all areas of the site including the central area and between the two banks. A large mango tree, located across from the disturbance in the northern end of the site (see Figure 6), was established as the site datum. A
Figure 10: Kolo Velata, East Area Test Units Showing Height of Inner Bank.
Figure 11: Topographic Map of Kolo Velata at 20 cm Contour Intervals.
Contour Numbers Denote Arbitrary Elevations in Meters, Not Elevation Above Sea Level.
second more permanent datum, a cement block located 25 m south of the large burial mound, was also incorporated. The baseline was set between these points and the grid was established at corresponding 4 m intervals. One area west of the large burial mound also necessitated the recording of data from three arbitrarily placed stations. The survey was carried out by a crew of three using a Nikon NT-2S transit and stadia rod.

Following the collection of the field data, the contour map was drafted by hand at 40 cm contour intervals with a scale of 1:400. Three computer-generated maps were drafted using the Surfer and Corel draw programs: the first being a topographic map with 20 cm contour intervals and the second two a pair of perspective views of the site on a 70 point grid, looking down on the site at a 15 degree angle (Figures 12 and 13). The first of the perspective views illustrates the site from the Z axis only and the second, a net graph, from the X and Y axis.

The 1992 contour map of Kolo Velata is different in several ways from the one produced by McKern. Firstly, contrary to its ovoid form in McKern's (1929: 85) illustration, Kolo Velata appears circular. Also, the size of the central area of the fortification in relation to the banks is considerably smaller than is illustrated by McKern thus confirming Burley's (1991: 49) concern that McKern's map was in error. The principal burial mound as depicted by McKern is larger with a diameter of 47 m and an elevation of 3 m (4 m above the bottom of the adjacent well feature). It also spans the two banks, not being solely within the outer one. The well feature recorded by McKern is now but one of several depressions situated around the base of the large burial mound. It is the deepest of the group, presumably the reason McKern singled it out as a well. Conical water wells are a common feature associated with chiefly traditions in Ha'apai (Burley 1994a) and have been associated with fortifications on Tongatapu (McKern 1929).
Figure 12: Kolo Velata Perspective View (z axis) to Grid North at an Angle of 15 Degrees. Notch in the North Center of the Map is Due to Recent Excavation Disturbance.
Figure 13: Net Graph (x and y axes) of Kolo Velata at an Angle of 15 Degrees, Perspective View to Grid North. Notch in the North Center of the Map is Due to Recent Excavation Disturbance.
The location of the midden area, described by Burley (1991: 50) as being in the southwestern vegetated portion of the central area of the fortification, is also confirmed through test excavation. In fact it can now be extended across most of the southern portion of the central area of the site outside of the densely vegetated area (see Figure 6). Excavations also revealed an 'umu or earthoven and a postmold within this midden zone. Slight rises and falls in elevation can be seen across the central area of the fortification. In particular, a rise surrounded by a large depression is located near the center of the site. It was suggested in the field that the rise was a house platform. Although possible, verification requires further archaeological research.

Archaeological Excavations

Test excavation at Kolo Velata was carried out over a period of one month and involved a crew ranging from four to seven people. Research focussed on three different areas of the site: (1) the outer bank; (2) the inner bank; and (3) the central portion of the fortification (Figure 14). Test excavations were to assess the presence of a single or multiple construction sequence for the banks, identify the presence or absence of architectural remains for palisade construction, determine the extent and depth of a midden deposit recorded in the central portion of the fortification during the 1990 field season and seek evidence for a determination of site age.

Excavation methods at Kolo Velata were expediently undertaken with spade and trowel, the primary purpose being the exposure of features visible in Stratum II as well as providing a cross sectional profile of the banks. Excavations were conducted by natural strata with the exception of a 1x1 m test unit (Unit 24) in the
Figure 14: Schematic Map of Kolo Velata Showing Test Excavations. Midden Boundary is Approximate.
central area. The latter, excavated by 10 cm arbitrary levels, served as a stratigraphic control unit. Screens were not used unless a specific feature, such as an earthoven, was located. In this case nested sieves of 1/16 and 1/8 inch mesh were employed. Possible post hole features were mapped in planview and selectively sectioned for profile. The latter process facilitated their identification relative to possible yam hole features which were also mapped.

The Outer Bank Excavations

The outer bank excavations were conducted in an area in the northern part of the fortification, the exception being a single 1x1 m unit on the eastern bank (Figure 14). On the north, a cross section trench had been previously excavated here for fill by the Tongan land holder. Because of the exposure it was possible to excavate narrow facing trenches along each side of the cleared area without causing further damage to the fortification. Thus, at a distance of 8 m from each other, two cross-section profiles of the outer bank were obtained. Additional units were placed adjacent to these trenches (Figure 15). Analysis of the trenches and test units addressed questions pertaining to (1) a single or multiple construction sequence for the bank, (2) the presence of a palisade on the bank, and (3) the identification of causeway/stockade architecture.

Profile 1 was excavated along the west side of the disturbance zone and had a length of 8.3 m (Figures 15 and 16). It begins roughly in the middle of the ditch in front of the bank and continues inward until there is no longer evidence of the feature. Also associated with Profile 1 were three test units excavated to the west side of the northern end of the trench and five others on its inner southern face. These were positioned so as to locate any architectural features associated with the
Figure 15: Kolo Velata, Planview of North Area Test Excavations.
STRATUM Ia:
Dark brown (10 YR 2/2) silty clay loam, less compacted with shell fragments.

STRATUM Ib:
Brown (7.5 YR 3/2) silty clay loam, compacted.

STRATUM II:
Orange (5 YR 5/8) clay, compacted without organic or cultural remains.

Fig. 16: Kolo Velata, Profile 1, West Face, Outer Bank.
bank. Profile 2 (Figure 17) had a shorter length of 2.8 m. It was excavated in a step-like manner following approximate surface elevations of the previously disturbed bank. The wall adjacent to Profile 2 on the north was also profiled and analyzed, and the floor was mapped in planview.

The stratigraphy of the outer bank as indicated in Profiles 1 and 2 suggests there was a single period of construction for this feature. As I interpret the profiles, the construction of the mound resulted from fill being excavated from the ditch and thrown back to create the bank. This provides a Stratum II sediment layer above the original land surface (Stratum I). Also incorporated within this Stratum II bank fill are lenses of Stratum I soils (see Figure 16). Our failure to reveal a multiple sequence of construction in this profile does not facilitate the verification of an initial 15th century construction and a later 19th century rebuilding phase. However, when construction of the outer bank occurred at Kolo Velata, and whether it is contemporaneous with that of the inner bank, remains to be determined.

The presence of palisades around fortifications in Tonga has been well documented in the historical literature as examined in Chapter 3. Mariner's (Martin 1991: 79) description of the fortification of Nuku'alofa, for example, describes a "wicker-work" reed wall supported by upright posts "six to nine inches in diameter" positioned "a foot and a half" distant from each other. Mariner's description, unfortunately, does not give the location of this palisade, whether on top of the bank or in some other location. In his work at the Pouvalu fortification on Tongatapu, Spenneman (1988: 78) did record the presence of a post hole within the cross-section of a bank. The depth and location of this feature on the bank led him to argue that it was a remnant of the fortification's original palisade. Based on a
STRATUM Ia:
Dark brown (10 YR 2/2) silty clay loam, less compacted with shell fragments.

STRATUM Ib
Brown (7.5 YR 3/2), silty clay loam, compacted.

STRATUM IIa:
Brown clay loam mixed with orange clay (5 YR 3/2).

STRATUM IIb
Darker orange (5 YR 4/6) clay loam.

STRATUM IIc:
Orange (5 YR 2/2) clay, with no cultural remains.

Figure 17: Kolo Velata, Profile 2, East Face in Outer Bank, Stepped Excavation.
depth of 0.85 m, Spenneman (1988: 77) estimated that a 3.85 m post would have supported the wall. The location of the post hole at Pouvalu is slightly forward of the current apex of the mound.

Outer bank test excavations at Kolo Velata did not produce any evidence of post holes that, indisputably, can be associated with an enclosing palisade. Profiles 1 and 2, test excavations carried out adjacent to the northern edge of Profile 1, and a 1x1 m test unit on top of the bank in the eastern portion of the site failed to find unequivocal evidence of palisade features. A possible exception is a post feature in the wall adjacent to Profile 2 (Figure 17, Feature 7). However, due to the disturbance in this area of the site, it could not be determined if this feature was originally located beneath the bank (Stratum II) thus predating the fortification.

There are several possible explanations for these negative results relative to palisade architecture. First, the palisade may not have existed to begin with. An account by Mariner (Martin 1991: 126) for example describes a fortification constructed with an unpalisaded outer bank for the purpose of firing muskets. Second, site erosion and post-abandonment disturbance may have destroyed the evidence of the original palisade. Finally, and perhaps most likely, if the palisade was located along the front of the bank, the present test excavations may not have been extensive enough to locate architectural remains. The location of the palisade forward of the apex of the bank would have been logical in that the defenders would have been afforded a higher vantage point than the attackers.

Earthen causeways as an access to the fort are also well documented in the historical record. They are generally described as a break in the bank with an associated earthen bridge over the ditch. An enclosed stockade feature was sometimes constructed over the break to control access into the fortification (see
Figure 4). By the time of Wilkes' expedition to Tonga in the late 1830s, additions had been recorded in fortification causeways such as "loop-holes" in the superstructure through which muskets could be fired. However, their composition, earthen banks with palisades on top, remained the same.

Originally it was believed that a post hole (Feature 2) identified in Profile 1 may have resulted from a stockade picket (see Figure 16). It is located at the point at which the mound ends on its inner side and has a diameter of .46 m and a depth of .43 m. These dimensions are comparable to the historical description of Wilkes (1985: 14) which depict the posts used to construct the causeway stockade as being considerably larger than those used to construct the palisade. This feature is also aligned with a row of posts in the north area test units (Figures 15 and 18) and another (Feature 1, Figure 16) in the profile. The latter, however, could also suggest a fence line predating the construction of the fortification.

Firm evidence for occupation of the site prior to the construction of the outer bank was recorded in the north area test units (Figure 18). Within two of these units a hearth (Feature 23) was recorded. It had a diameter of 1.13 m and a depth of 0.27 m, and was comprised of ash, fire-cracked rock, shell, and fish bone. Also, a tridacna adze fragment was collected from within the hearth and a Polynesian Plain Ware sherd was collected within the stained area around the hearth. Although within the limits of the fortification, the hearth is partially buried beneath the bank suggesting it predates the bank's construction. Associated with the hearth is a surrounding group of possible post holes suggesting a peito, or cooking house.

Still other evidence for an early occupation of the area occurs in Profile 2 (Figure 17). Here an earthoven (Feature 6) was recorded in the bottom of the northern corner. It has a diameter of approximately 1.1 m and a depth of 0.45 m.
STRATUM II:
Orange (5 YR 5/8) clay without organic or cultural remains.

Figure 18: Kolo Velata, Planview of the North Area Test Units.
The location of the earthoven in front of the mound and at a depth ranging from 0.2-0.65 m below ground surface would have made it impossible for its construction during or after the construction of the bank.

The Inner Bank Excavations

Test excavations of the inner bank were carried out in the northern and north-eastern portion of the site in a manner similar to those employed in the outer bank (see Figure 14). These excavations concentrated on two areas: the first in the northern end of the site directly adjacent to a causeway, and the second in the eastern end of the site also near a causeway and in a particularly well preserved portion of the inner bank. Also excavated on top of the inner bank was an isolated 1x1 m test unit (No. 5) in the south-eastern portion of the site. Research problems to be addressed pertained to: (1) whether the existing bank was the result of a single or multiple construction sequence; (2) the documentation of palisade features; and (3) the identification of architectural features related to causeway construction. In addition, recovered data could be used to compare construction features and profiles between inner and outer banks.

An 8.9 m north/south trench across the inner bank west of the northern causeway provides a continuous profile from the edge of the ditch to the inside of the bank (Figure 19). This section, labelled Profile 3 incorporates two strata (I and II), without evidence of superimposed sediments as was present in Profiles 1 and 2 from the outer bank. Below the ditch, Stratum III coral sands occur 1.1 m below the present surface. Integrated within this stratum is a large coral head. Again, the stratigraphic profile seems to indicate a single construction event and it is not possible to determine if the inner bank was constructed simultaneously with the
STRATUM I:
Brown (7.5 YR 3/2) silty clay loam, less compacted.

STRATUM II:
Orange (5 YR 5/8) clay, compacted without organic or cultural remains.

STRATUM III:
White (10 YR 8/4) coral sand, loose with large shell and coral fragments.

Figure 19: Kolo Velata, Profile 3, East Face, Inner Bank.
outer one. Both mounds, however, are similar in their construction with the ditch on the outside of the bank and the moved fill used to construct the bank.

As with the outer bank excavations, it was hoped that the Profile 3 trench would encounter evidence of a palisade. A post hole feature (No. 3) on the outer edge of the bank may relate to such construction (Figure 20). This post hole is 0.31 m in diameter and 0.42 m deep. However, in that yam hole disturbance has occurred on either side, its interpretation as a palisade feature is speculative.

The east area test units were excavated on top of and along the front of the bank near an existing causeway in areas where we anticipated palisade architecture (Figures 14 and 21). Excavation included two 2x2 m test units along the top of the bank, a series of five 1x1 m test units down the outside of its face, and two 1x1m test units along the bottom of its outside face. The two 2x2 m test units were excavated along the top of the bank to a depth of 0.2 m below the surface. Adjacent to these units, a 1x5 m trench was excavated along the outside face of the bank to a depth of 0.5 m below surface. These five test units ran from the top of the bank down to the ditch. Also excavated midway along the trench were two 1x1 m test units which ran perpendicular to the trench. All of these test units were excavated to an arbitrary depth and only Stratum II orange clay, from which the bank was composed, was present in their profiles and planviews. Again we failed to find evidence for palisade architecture. These negative results could have been due to the lack of depth of the test units, spacing between posts on the original palisade being greater than 1 meter along the front of the bank, the location of the palisade being behind the mound rather than in front of it , or finally, the unlikely possibility of there having been no palisade to begin with.
Figure 20: Kolo Velata, Possible Post Hole in Profile 3.
Figure 21: Kolo Velata, Planview of East Area Test Units.
Central Area Excavations

Three 1x1 m test units were excavated within the center of the fortification in different areas (Units 2, 23 and 24). Research objectives were focussed on questions pertaining to: (1) testing the midden area recorded by Burley during his 1990 survey of the site; and (2) identifying any cultural or architectural remains in this part of the fortification.

During his 1990 survey of Kolo Velata, Burley (1991: 51) notes, in reference to the limited archaeological integrity of the site, that:

One potential exception is a tree covered area on the southern perimeter. Here a 25 to 30 cm strata of midden matrix is present and a triton shell trumpet (*Carenia tritoni*) was collected from the surface.

This area is located in the south-western portion of the site within the central area of the fortification. In some areas burned shell was scattered on the surface. Thus, the first of the central area test units (Unit 23) was located in the same vicinity as the triton shell trumpet. The unit was excavated to a depth of 0.75 m. The profile (Figure 22) illustrates the top 0.35 m of the unit to consist of a dark brown midden deposit corresponding with Burley's description. Labelled Stratum Ia, it is a silty clay loam, dark brown in colour (10 YR 2/2), with loose consistency and the presence of shell flecks throughout. Stratum Ib occurs beneath it and is also a brown (7.5 YR 3/2) silty clay loam, but is compacted with no shell. Directly below Stratum Ib was Stratum III, a sterile substratum of white (10 YR 8/4) coral sands. Test Unit 23 did expose a probable post mold in its north profile.

Unit 24 was excavated in the south-eastern portion of the central area of the fortification. Here the midden (Stratum Ia) was still visible in the profile of the unit, however it was only 0.25 m below the surface. Below it was Stratum Ib into which
STRATIGRAPHY:

STRATUM Ia:
Midden deposit, dark brown (10 YR 2/2) silty clay loam, less compacted with shell fragments.

STRATUM Ib
Brown (7.5 YR 3/2), silty clay loam, compacted.

STRATUM III:
White (10 YR 8/4) coral sand, loose without organic or cultural remains.

Figure 22: Kolo Velata, Test Unit 23 Profile and Planview.
an 'umu or earthoven was excavated (Figure 23). Directly below Stratum Ib was the Stratum III coral sands. The 'umu was square in shape and had a depth from 0.3 m to 1 m below the surface. Recovered from this feature were the remains of pig, molluscs and a basalt kava grinding stone (see Appendix A). Once again, caution must be taken when associating cultural features with the time period in which the fortification was constructed and used. However, the location of the earth oven within the center of the fortification and directly beneath the midden deposit make this association appear likely.

The third test unit (Unit 2) was located in the northern portion of the fortification, approximately 5 m south of Profile 3 in the inner bank. Distinct midden deposits were not present and the Stratum I sediment had a depth of only 0.2 m below the surface, followed by Stratum II. Based on surface inspection and limited test excavation, it is now suggested that the midden deposit identified by Burley extends across the southern half of the central area of Kolo Velata with a depth of approximately 0.3 m below the surface.

The stratigraphy between the test units located within the midden area show Stratum III directly beneath Stratum I on the surface. In the northern units Stratum II occurs beneath Stratum I. The difference between these areas reflects differences in the natural stratigraphy across the site.

Summary

Archaeological research at Kolo Velata in 1992 was first focussed on the production of a detailed contour map. This illustrates that McKern's (1929: 85) original base map has several errors. Contrary to the ovoid shape in McKern's map, the site is more circular in form. Burley's (1991: 49) concern that the dimensions
STRATUM Ia:
Midden deposit, dark brown (10 YR 2/2) silty clay loam, less compacted with shell fragments.

STRATUM Ib
Brown (7.5 YR 3/2), silty clay loam, compacted.

STRATUM III:
White (10 YR 8/4) coral sand, loose without organic or cultural remains.

Figure 23: Perspective View of Test Unit 24 Showing Earth Oven.
and orientation of the first map were in error was also proven correct. The dimensions of the principal burial mound in the southern end of the site is also seen to be in error. It is much larger in relation to the banks and spans the space between them. The water well described by McKern (1929: 85) is the deepest of a series of depressions around the base of the principal burial mound. Two small burial mounds were added to the site map and a larger depression and rise was detected in the center of the fortification.

Excavations at Kolo Velata have shown that its banks are most likely the result of a single construction sequence. Although palisades are well documented in the historical literature as well as in the archaeological assessment of Pouvalu fortification on Tongatapu, no clear evidence was found during the current excavations. It has been shown that, in the area around the outer bank, the site was occupied before the construction of that mound. Thus, caution should be taken when making associations between what has been identified in the present occupation floor and the specific period in which the banks were constructed. The midden deposit recorded by Burley (1991: 51) was confirmed and it was found to cover the southern half of the central area of the fortification. Finally, cultural features such as earth ovens and post features were recovered in all areas of the site which supports historical references depicting concentrated populations within fortifications.
CHAPTER 6

FIJIAN AND SAMOAN FORTIFICATIONS

It is the goal of this chapter to provide a historical and descriptive background for fortification archaeology in Fiji and Samoa to which Kolo Velata can be compared. Traditionally, Fiji, Tonga and Samoa had close social and political ties. Fortification defense features, therefore, are expected to be similar. The following summary uses Best’s (1993) overview of Fijian and Samoan fortification archaeology as a guideline. To supplement Best’s overview, which provides a thorough inventory of the fortifications thus far recorded in each of the archipelagos, the interpretive trends over time are focussed on whenever possible.

Fijian Fortifications

Fijian fortification construction appears to have developed out of a long tradition of inter-tribal warfare, and ring-ditch and other defensive features can be found in wet and dry flatland regions and on ridges. However, unlike their Tongan equivalents, Fijian fortifications show a greater diversity of design presumably due to the more diverse landscape in which they were built. The most common fortification form is the roughly circular ditched enclosure or korowaiwai (Clunie 1977: 14). This was usually a refuge fort, used in times of war, surrounded by an encircling earthen bank, ditch and palisade. In most cases the ditch was situated behind the bank and in front of the palisade, creating an area in which an aggressor would be trapped and vulnerable to attack. In the case of wetland fortifications, the ditch was almost always filled with water and served as a moat. The upland fortifications are often situated on the tops of prominent ridges serving as vantage
points over large regions. In Kirch's (1984: 208) typology, the majority of Fijian koro are characterized as Type Ia and Ib, homeland defences which either utilized natural ridges (Ia), or were constructed on flat terrain (Ib). On Beqa, Crosby (1988: 35) has also described fortified sites as being "small defended knolls with lateral or ring-ditches" and "high inland hill fortifications".

Current archaeological descriptions of Fijian fortifications focus upon their internal composition including stone alignments, house platforms and surface artifacts. Pottery types have been used to support the antiquity of many Fijian fortifications. Crosby (1988: 37) provides a general description of coastal flatland defended sites on Beqa:

Type 2 sites were defended by earthwork ditches and natural water courses. They were all located at or near the margins of sandy and alluvial soils, usually directly associated with flowing fresh water streams and land considered by locals to be ideal for taro cultivation. All were highly stylised sites which were clearly defined by their defensive boundaries and were usually symmetrical in shape. They all had evidence of internal surface features such as yavu and stone alignments and usually contained dense concentrations of pottery and midden. The defences included transverse ditches, ring ditches, and combinations of both.

Rechtman's (1992: 129) description of the fortifications of Korolevu and Delaini on Wakaya island include a consideration of site stratigraphy, features, burials, faunal remains and artifacts. Features consisted of yavu (house mounds), stone walls and cooking pits. Faunal remains consisted predominantly of bird, pig, fish and human. Finally, a wide variety of artifacts were recorded of which the most abundant were ceramic sherds and adze fragments in both shell and stone.
Historical Descriptions of Fijian Fortifications

Historical accounts of Fijian fortification sites are plentiful occurring in the accounts of Lockerby, Twynning, Eagleston, Wilkes, Lyth, and Williams (see Best 1993). Best (1993) provides a substantial list of these historical descriptions along with a brief discussion for each source. Parry (1977) also gives a brief sample of historical descriptions for Fijian fortifications.

The earliest historical account is found in the account of William Lockerby, a sandalwood trader in Fiji during the years 1808-9. Lockerby's (Parry 1977: 30) description of the large flatland fortification at Bua in the Rewa Delta will be presented here to illustrate the architecture of a Fijian fortification before the widespread arrival of European firearms:

The ground he chose for the fort was a dry spot of rising ground in the middle of a swamp, about twelve hundred yards in circumference. Round the dry parts, logs of wood were placed at equal distances, about ten feet long and one foot thick, which had been collected by four hundred natives in the surrounding woods. Holes were then dug into the ground into which these poles were placed, and afterwards filling earth about them, that became quite solid. About these posts, two heights of small trees were lashed length-ways with vines, the first three, the other six feet from the ground; of these two heights of small trees they fasten in an upright position, bamboos, about forty feet long, which are placed closed to each other all around the fort: the ends of them being buried a considerable depth in the soil...They form a considerable rampart.

The fort has four gates, eight feet wide, at each of which they place perpendicularly four cocoa-nut trees, about sixty feet high: on top of these, platforms are erected sufficiently large to contain fifty men, and surrounded by a breast-work so strong and close as secures entirely those upon it, who by their slings and arrows have a great advantage over the besiegers. As an addition to the strength of the fort, they place the plantain tree, which is of a spongy substance, inside of the bamboos that surround it, which completely shelters them from the arrows etc. of the assailants.

This is the manner the fort is constructed, the outer works of which are equally calculated for defence. It is encompassed by a ditch full of water, sixty yards wide, except in front of the gates, to which narrow pathways run through it, six feet wide. In the middle of these pathways they have a gateway with a flanking barricade, so contrived that a number of men may conceal themselves behind it, and through which they have got holes for shooting their arrows, while they remain quite safe from the attacks of the enemy outside. At the outer extremity of the pathway there is also a barricade similar to that in the middle. This when
forced is abandoned, and a stand is made in the inner one, and should this be
 carried, they retreat into the fort. The ditch, or the different divisions of it, is so
 planned as to keep it full, and not allow it to overflow, the water being conducted
 underground by hollow bamboos. Such a fort as above was completed in less than
 a month.

In reference to the above description, Parry (1977: 30) notes that this is the only
account which provides any information on the manpower available for this type of
excavation and the span of time in which the work was completed. He also notes
that some of the dimensions given above are excessively large and that it is probable
that there is an error in the transcription (i.e. forty for fourteen, sixty for sixteen,
etc.). Also included in Lockerby's account is an illustration of a causeway and moat
from a Fijian fortification (Figure 24).

A second historical observation of importance for comparative purposes has
been provided by Wilkes during the U.S. Exploring Expedition of 1840. By this
time muskets were widely used in Fiji and fortification architecture, as was the case
in Tonga, had been adjusted to accommodate the new technology. The following
description is of the fortification of Waitora in Ovalau (Wilkes 1985: 80):

The towns are usually fortified with a strong palisade made of bread-fruit or
cocoa-nut trees, around which is a ditch partly filled with water. There are
usually two entrances, in which are gates, so narrow as to admit only one person
at a time. The village of Waitora, about two miles north of Levuka, is justly
considered by the natives as a place of great strength...

A palisade is constructed of upright posts of cocoa-nut tree, about nine inches in
diameter, and about two feet apart. To the outside of these, wicker-work is
fastened with strong lashings of sennit. Over each entrance is a projecting
platform, about nine feet square, for the purpose of guarding the approach by
hurling spears and shooting arrows.

The gates or entrances are shut by sliding bars from the inside, and are defended
on each side by structures of strong wicker-work, resembling bastions, which are
placed about fifteen feet apart. When there is a ditch, the bridge across it is
composed of two narrow logs. The whole arrangement affords an excellent
defence against any weapons used by the natives of these islands, and even
against musketry.
Figure 24: Causeway and Moat from Fijian Fortification as Illustrated in Lockerby (1982, Plate 2).
Parry (1977: 34) notes that changes in Fijian fortification architecture due to the introduction of firearms include the strengthening of the fences with multiple layers of cane or bamboo, the presence of loopholes set the walls and gates for musket fire, the construction of gate bastions for enfilading fire, and the excavation of interior ditches for protection against penetrating fire.

One of the few historic illustrations of a fortification in use during a battle is provided by J. Glen Wilson from H.M.S. Herald in 1856 (Figure 25). The fortification is circular in shape, consists of a group of houses and is enclosed by a single palisade. It is also encircled by a water-filled moat with small land-bridges serving as causeways into the fortification. The illustration shows innovations, such as loop-holes in the palisade, in response to European firearms.

Fortification Archaeology in Fiji

Fijian fortifications have attracted more archaeological attention than elsewhere in western Polynesia. To date, some 16 different archaeologists have contributed to its database. Beginning with Gifford (1951) in 1947 and continuing through to the present, research objectives have ranged from simple description (Parke 1961) to structural analyses of settlement pattern transformation (Kaplan and Rosenthal 1993). Following Best (1993), Fijian fortification archaeology can be divided into three periods of research. Using Best's words (1993: 397), the first period following Gifford's (1951) work can be termed that of the "enthusiastic amateurs". Next, beginning with the research of Palmer in the 1960's and continuing through the 1970s, Fijian fortification studies primarily address issues related to the origin and antiquity of the sites. Last, research during the 1980s and 1990s has focussed on fortifications in the context of internal settlement pattern (Crosby 1988; Kaplan and Rosenthal 1993).
Figure 25: Ring Ditch Fortification at Vewara, Nadi Bay, Vanua Levu, from the Painting by J. Glenn Wilson (H.M.S. Herald; Captain H.M. Denham), 1856 (Parry 1981, Plate 1).
The initial pioneering work of Gifford (1951) in 1947 consisted of a preliminary survey in which 39 archaeological sites were recorded. One of these was the large inland fortification of Korovatu. Although primarily descriptive in nature, Gifford employed an ethno-historical approach to trace the origins and use of this site.

Following the work of Gifford (1951) and continuing until the work of Palmer (1969), are Best's (1993: 396) "enthusiastic amateurs". Of this group, the greatest contribution was made by Aubrey Parke (1961) who served as District Officer and later District Commissioner of Fiji. He surveyed the Rewa Delta, locating several ring-ditch fortification sites. He also synthesized available archaeological information up to that time. For the first time Fijian archaeological sites were classified and described, with fortifications as one of 11 site categories (Best 1993: 397). Other research carried out during this time was that of Verrier on the islands of Beqa and Ono-i-lau (Parke 1961: 23).

Beginning in 1963 with the appointment of Bruce Palmer to the directorship of the Fiji Museum, a new interest in Fijian fortification sites was initiated. During this time, at least four archaeological surveys were carried out with "the recording of hill-forts as either the sole or a major part of each project" (Best 1993: 397). Whereas the earlier work of Parke (1961) classified fortification sites as a single group, the work of Palmer sought to identify the variations seen in the growing database. In a paper on fortified sites on ridge-junctions, Palmer (1969: 15) commented in reference to his earlier work that: "Elsewhere, attention has been drawn to the various forms of fortification in two localities in Fiji and the present note extends the distinctive regional varieties which are becoming apparent as fieldwork progresses." Palmer (1969) then used this new information to hypothesize the origins and settlement pattern of Fijian fortifications. In regard to
hill-top fortification sites, he (Palmer 1969: 191) argued that, based on form and technique of construction, they developed out of the flatland ring-ditch ones. Regarding settlement pattern, it was observed that in contrast to the upland hill forts, the flatland ring-ditch fortifications show a considerably higher density due to their proximity to land capable of intensive cultivation versus the shifting cultivation of the uplands (Palmer 1969: 190). Also associated with the work of Palmer was that of Thompson and Smart who both undertook surveys during Palmer's directorship and aided his research (Best 1993: 397).

Contemporary to Palmer's research was that of Hinds (as cited in Best 1993: 398) on the island of Taveuni. Her research, between 1966 and 1968, produced a five type classification of fortifications as well as the documentation of variation in the house mounds within the site and how these feature relate to social structure.

Frost (1974) excavated four of Hinds' inland fortifications as well as three more located by himself (Best 1993: 398). Frost's (1974: 116) research specifically addressed the origin and antiquity of Fijian fortification sites. Regarding origin, he argued (Frost 1974: 121) that they most likely diffused from the west, either from the New Hebrides (Vanuatu) or New Caledonia. His conclusion was based on the association of carved paddle impressed pottery, a type presumably representing a Melanesian immigrant population. Fortifications in Polynesia and Fiji, in Frost's view, would be historically related, ultimately having their origins in Fiji. Frost (1974: 126) states:

I assume that fortifications are not likely to be built unless they have an adaptive value and that conditions internal to an island or island group would have had to have led to the adoption of a diffused idea of fortification in that group. This interpretation of Fiji as a source area for Pacific fortifications does not require that objects of Fijian material culture be found in the Pacific, nor does it require a direct contact between Fiji and each island having fortified sites.
As for the antiquity of Fijian fortifications, an archaeological date of 1100 A.D. is given (Frost 1974: 58). This is based on a single radiocarbon date from an earlier, undefended phase of the site in conjunction with ceramics associated with its defended phase. Despite difficulties associating the radiocarbon sample with the site's defended phase, Best (1993: 398) believes this date is acceptable in light of results from similar contexts in the Lau group.

During the 1970s, 79 fortifications were added to the Fijian inventory. Best (1993: 399) summarizes three projects that recorded these sites. The first was headed by Rogers who surveyed in the northern Lau Group. He recorded 19 fortifications of which ten were inland hill forts, eight were coastal limestone ridge forts and one was a coastal ring-ditch site. The second project was headed by Best in the central and southern Lau Groups. He recorded 47 fortifications of which 12 were coastal ring-ditch forms and the remainder were either on inland volcanic hills or on coastal limestone ridges. Also from this research (Best 1984), the fortification of Ulunikoro was radiocarbon dated from eight different samples, their average being 969±20 BP (Best 1993: 433). The final project was headed by Vickers and Eyman on Viti Levu. They recorded 13 hill fortifications defended by a combination of natural features, terraces and ditches (Best 1993: 399).

Using air photo data, Parry addressed questions of Fijian fortification origins and antiquity through a settlement pattern analysis in three different regions of Viti Levu; the Rewa Delta (Parry 1977), the Navua Delta (Parry 1981) and the Sigatoka Valley (Parry 1984). In the Navua Delta (Parry 1981: 50), statistical analyses of the data revealed several patterns. For example, ring-ditch fortifications were seen to be concentrated along former distributary channels, there was a clear correspondence between settlement frequency and site conditions (i.e. good sites in
terms of both soil conditions and freedom from flooding), and the basic pattern of settlements was similar to that of the Rewa Delta. In reference to the antiquity of the fortification sites, Parry (1981: 61) stated that "it is difficult to establish a date for the earliest settlements, however the very subdued air photo contrast marks probably represent traces of settlement that flourished in the 17th century". In 1984, Irwin also mapped and test excavated a sample of flatland ring-ditch fortifications in the Navua and Rewa Deltas, and excavated "more fully" one site at Lauca (Best 1993: 399).

Crosby (1988) recorded some 40 defended sites on the island of Beqa. Whereas previous studies (Parry 1977, Frost 1974, Palmer 1969) had sought to explain the origins of Fijian fortifications under a culture historical model of change due to environmental and demographic pressure, Crosby's interests were with intrasite features and how these relate to contemporary village structures. In his own words:

I argue that the time has come to move beyond mechanistic explanations of culture change. Specifically, I argue that historical material available from the post contact-period of Fiji's occupation has been seriously neglected by archaeologists. By taking one island, Beqa, and interpreting its archaeology in the light of historical records and contemporary ethnographic observations, I aim to demonstrate that even modern Fijian societies have much to offer archaeological interpretation (Crosby 1988: 5).

Crosby asserted this view by demonstrating that the modern village of Lalati showed the same arrangement as the archaeological ring-ditch fortification site of Vaga (Crosby 1988: 252). Specifically, both sites had a large, central house mound upon which the chief would reside, surrounded by the smaller house mounds of the rest of the village.
Rechtman (1992) focused on the archaeological sequence of a particular island with the objective of producing a developmental model by which other Fijian fortifications could be compared. Specifically, the two fortifications of Korolevu and Delaini on the island of Wakaya were subjected to intensive archaeological survey and excavation. The result was a model for internal change on the island which sought to explain the inception of monumental fortification construction through predominantly ecological causes. Referring to Rechtman’s research while it was still under way, Crosby (1988: 3) summarized Rechtman's model as examining "the correlation of population and settlement density, differential control over resources and warfare with the increase of socio-political complexity." In reference to the development of fortifications in Fiji, Rechtman concludes:

However, unlike the previous studies (Best 1984, Frost 1974), I suggest that the concern for defence and the inception of monumental fortification were the result of developmental processes internal to Fiji-I do not discount the importance of eastward and westward immigrations, but I believe that such events were not the primary causes of culture change (Rechtman 1992: 121).

By way of intrasite analysis Rechtman parts with earlier hypotheses both in his concern for a general model of processual change rather than one which is culture historical, as well as in his emphasis on the independent rather than diffused development of Fijian fortifications.

Kaplan and Rosenthal (1993) undertook a structural analysis of the fortified site of Na Korowaiwai and its role in the Tuka political uprising during the 19th century. Anthropological issues are addressed through an archaeo/historical analysis and by comparison to two sites in northern Viti Levu - the fortification of Na Korowaiwai and the ceremonial center of Vale Lebu. The analysis addressed issues such as the transformation of the Fijian social landscape from battle site to
ceremonial center, and of the "inextricably historically linked" Fijian cycles of warfare and dynamics of ritual (Kaplan and Rosenthal 1993: 140). Their focus was not on the development of the fortification site itself but rather on its role in the development of the modern Fijian cultural landscape.

Building upon his previous research in the Lau group, in combination with more recent research in Samoa, Best (1993) has recently argued the independent origins of Fijian fortifications. In reference to fortification shape, he (Best 1993: 400) suggests:

There is little if any cultural determination in the actual shape of each fortification. For every situation to be defended there is one optimal design of fort and since the penalty for failing to meet this could be fatal, not just for the builder but for his whole tribe, cultural whims had no place in the plan...The principles behind constructing these [fortifications] are basic and cross-cultural, indeed world wide.

Best ultimately argued that similarities observed in fortification construction across western Polynesia can be attributed to these "basic principles" and need not be interpreted as the result of cultural diffusion.

**Samoa Fortifications**

As with Fijian fortification sites, Samoan fortifications, or 'olo, are found both on the coastal plain and atop ridges in the upland regions. Samoan warfare at the time of European contact followed the same basic form as that in Fiji and Tonga. The islands were subject to both local warfare, amongst chiefdoms, and long distance warfare, defending against Tongan invasions. Where conflict was prevalent fortifications were used. These consisted of strategically located temporary villages surrounded by a wooden palisade and accompanying earthen or stone embankment.
Types of fortifications represented in Western Samoa are ridge, hilltop peak and coastal. A survey of 'Upolu and Savai'i by Davidson (1969c: 187) found ridge fortifications to be most common. According to Kirch's (1984: 209) typology of fortifications, four different types can be found in Samoa: homeland defences which utilize natural ridges (Ib); strategic fortifications designed to deny the enemy access or entrance into a territory (II); fortified refuge sites which utilized either ridges or peaks (IIIa), or caves; and lavatubes (IIIb).

The following description of the fortified ridge site of Su-Lu-41 in Luatuanu'u can be used as a model by which other Samoan ridge fortifications may be compared:

In common with other other fortifications of the same type on Upolu and Savai'i, the dominant feature is a large earth embankment that protects the main approach along the ridge from the coast. The bank spans the entire width of the ridge terminating at each end at the point where the ridge drops abruptly over 100 feet to the stream beds below on each side. The main entrance, a simple direct cut through the bank, is offset to the east. Other defensive earth embankments examined by the writers on Upolu and Savai'i had their main entrance-exit feature consistantly off centre in the same manner. A smaller cut in the bank near its western end was presumably a secondary access to and from the defended area. The embankment itself at present stands about six feet above ground level. Although gently rounded on top by extensive root action and erosion, the top of the bank was probably level and wide enough for a multiple palisade (Scott and Green 1969: 205).

Scott and Green (1969: 205) also include borrow pits used for the construction of the earthen bank as a part of the defensive features. Other projects (Leach and Witter 1990) have associated a lithic quarry site with a Samoan fortification, however, their definition of the site as a fortified quarry has been subject to dispute (Best 1993).
Historical Descriptions of Samoan Fortifications

Historic accounts of Samoan warfare and fortification construction begin as early as 1787 with the voyage of La Perouse. According to Best (1993: 390), La Perouse's description of an aggregated village settlement on a hill was probably in reference to a fortified site. Other historic accounts of Samoan fortifications range from those of explorers such as Wilkes (1985), to missionaries such as Williams and Turner (as cited in Best 1993: 390), to anthropologists such as Krämer (1902) and Buck (1930). Again, Best's (1993) article on Samoan and Fijian fortification origins provides a comprehensive overview for these accounts.

The L.M.S. missionary John Williams, who stayed on the island of 'Upolu in 1832, gives the earliest detailed account of a Samoan fortification:

Each party generally provides itself with a strong ola or fort. This is composed of cocoa nutt trees placed about six feet deep in the ground & standing eighteen or twenty feet high. They generally select a high mountain as the place where to erect their fort. To this they remove their property, wives and children erecting temporary huts of cocoa nutt leaves inside. These forts serve very important ends. They afford a place of refuge for them in case of a defeat preserve them from being taken by surprise, & enable them to take every favourable opportunity of sallying out upon the enemy (as cited in Best 1993: 391).

An account by the missionary John B. Stair during the years 1838-45 describes the use of a cave as a refuge during battle:

Sometimes the olo was a cave in which the defeated army sought shelter from the pursuers. If the victors were able able to discover the hiding-place of the refugees, they immediately collected firewood and piled it up before the cavern, to smother the wretched captives (Stair 1897: 248).

By the mid-1890s, warfare in Samoa was heavily influenced by European firearms, and fighting was reduced to skirmishes between rebel groups. The German Anthropologist Krämer has described the fortifications built during this
time as "pretty scrappy affairs, with rough-looking stockades and a lookout platform up in a tree, and appear to be fairly temporary responses to local shoot-outs" (as cited in Best 1993: 393). It was this form of fortification that Krämer observed during the years 1897-1899. As he describes:

The construction of the forts,'olo, is still fairly similar to that of the old time ones, and the illustrations given here, which are taken from the war of 1896, may therefore be confidently considered as typical of the old time. During the Tongan invasion, the Tongans constructed numerous forts on every side in Samoa, their stone ramparts and the highways connecting them are still shown everywhere (as cited in Best 1993: 393).

It is interesting to note that Krämer cites oral traditions of Tongan invasions as an explanation for the origins of the earlier Samoan fortification sites. Krämer (as cited in Best 1993: 393) then states that Mariner's (Martin 1991: 79) description of the fortification at Nuku'alofa in Tonga is applicable to the Samoan fortifications.

Fortification Archaeology in Samoa

Archaeology in Samoa began in 1957 when Golson (1969) surveyed the island of 'Upolu in Western Samoa. The research objectives of the survey were preliminary in nature: to get a broad acquaintanceship with the visible field monuments in the area visited, to see and record such archaeological material as might have been incidentally recovered in the coarse of gardening or roadmaking, and to look for potential sites for excavation (Golson 1969: 14). Fortifications were given brief consideration. This included the use of a two type typology developed by Wright (Golson 1969: 14) consisting of (i) ring ditches on steep isolated hills or (ii) cross trenches on narrow ridges. The site of Mafafa was partially mapped and interpreted to be a fortification, whereas the other sites mentioned only refer to specific defensive features. Based on information retrieved
from local informants, the fortified sites recorded in the survey were associated with the Tongan wars and the Tongan occupation of Samoa during the 17th century. In his concluding remarks Golson found it interesting that Samoa had a tradition of terrace and scarp fortification construction. Further, and in reference to McKern's (1929) work in Tonga, he (Golson 1969: 18) states that "because of the radically different nature of the terrain in Tonga and Samoa, it seems a little rash to base cultural contrasts between Tonga and Samoa on differences in fortification as does McKern (1929: 122)." Inherent in this statement is an interest in defining the similarities between Samoan and Tongan fortifications rather than looking for the differences.

The first archaeological research in American Samoa was carried out by Kikuchi in 1961. In his discussion of evidence for fortified sites, Kikuchi (1963: 66) comments that "very little exists" in contrast to Western Samoa. He suggested that the lack of visible fortification sites in American Samoa is due to the rough geological terrain of Tutuila and Manu'a which provided natural defense to villages and hindered the large movements of warriors in any military maneuvers. Kikuchi did record four specific fortifications albeit none of the sites was subjected to survey or excavation. Based on direct observation and information gathered from local informants, the origins of the Samoan fortifications were attributed Fijian and Tongan influences. In reference to the diffusion of foreign construction technique, Kikuchi (1963: 66) states that "the similarities of trenching and protecting forts and villages between Tonga, Samoa and Fiji are too close to assume that no relationships existed." Apart from these speculative observations the work is primarily descriptive in nature and the sites would not receive further attention until later surveys (Leach and Witter 1987).
The largest archaeological project to be undertaken in Western Samoa thus far was that of Green and Davidson during the early 1960s. This resulted in two volumes of research (Green and Davidson 1969, 1974) and incorporated the efforts of several archaeologists (Golson 1969; Buist 1969; Scott and Green 1969). The survey and excavation of various sites on the islands of 'Upolu and Savai'i showed fortification sites to be present in some numbers in most regions. In Luatuanu'u on 'Upolu, Davidson (1969c: 185) recorded many fortified sites during a survey which sought to understand the relationship between a large hilltop fortification (SU-Lu-41) and the sites which lay between it and the coastline. Scott and Green (1969: 208) produced a radiocarbon date of 1500±80 BP from the fortification at Luatuanu'u (SU-Lu-41), however, this date could not with certainty be associated with the defended phase of the site (Best 1993: 433). Davidson (1969c: 187) described fortifications as being one of the most common types of site in the region and of these, the most common type being a "transverse ditch with scarp or inner bank cutting across a ridge from end to end." However, as Best (1993: 394) points out, Davidson's research is "somewhat enigmatic" in regard to fortifications. The majority of fortifications recorded during the different surveys consisted only of single features on ridges, such as ditches and banks, and only two large hilltop fortifications were described. Issues such as the origins, antiquity and internal structure of the fortification sites could only be speculated upon. Oral histories were used to suggest Tonga as a source for fortification origins.

Following the Green and Davidson project, no fortifications in Western Samoa were recorded, surveyed or test excavated until 1992 when Best (1993) resurveyed the existing fortification features.

In the late 1960s, at approximately the time that interest in fortification archaeology in Western Samoa ended, archaeological research in American Samoa
increased. Based on fieldwork begun in 1972, Janet Frost recorded and described two ridgetop fortification sites on the island of Tutuila: one at Mount Alava and the other at Lefutu (Best 1993: 395). Each site was surveyed and test excavated, while at Lefutu, a radiocarbon date of $810\pm210$ B.P. was acquired (Clark and Herdrich 1993: 159). From this data Frost concluded that the site of Lefutu was an isolated and fortified refuge site, representing a single occupation phase and demonstrating the occurrence of warfare on Tutuila as early as the 12th century (Clark and Herdrich 1993: 159). This would appear to be the first of such kind of site recorded on Tutuila. However, the interpretation of both of these sites as fortifications has recently come under criticism (Clark and Herdrich 1993).

Beginning in 1985, Clark and Herdrich (Clark 1989, 1992; Clark and Herdrich 1988, 1993) headed two surveys on Eastern Tutuila with the intention of interpreting regional settlement systems (Best 1993: 396). From this research seven sites with defensive features were recorded: three (possibly four) tia 'ave- defensive ditch combinations; and three highland fortification sites, two of which may be of a single complex (Clark and Herdrich 1993: 163). As for the fortification of Lefutu, Clark and Herdrich (1993: 159) observed that the site was "much more extensive than Frost realised". The resurvey of Lefutu by Clark and Herdrich (1993: 159) led them to differ with Frost's interpretation of the site as a refuge fortification, with a single occupation phase. Rather they argued that the site was a permanently occupied upland settlement. Other highland fortification sites were recorded on the peaks of Le'aeno and Olomoana. Clark and Herdrich (1993: 165) concluded that these two sites, along with the site of Tataga-matau (Leach and Witter 1987), were comparable to those of Western Samoa. Also, the location of each of these hilltop fortifications at or very near the junctures of two or three modern district boundaries
(associated with ancient political units) was concluded to suggest supralocal organization and authority at three levels: the village, the district and district alliances. 

Tutuila's valued stone resources, obsidian and basalt, were argued to be a causal agent for Samoan warfare as reflected in the fortified sites. The site of Tataga-matau, interpreted by Leach and Witter (1987) to be a fortified quarry, was suggested to be the principal supplier of basalt on the island, but not the sole supplier (Clark and Herdrich 1993: 177). However, as was the case with the site of Lefutu, this interpretation of Tataga-matau later received criticism from Best (1992: 40).

Also in 1985, Leach and Witter (1987) returned to the basalt quarry site of Tataga-matau on Tutuila, a site originally recorded by Peter Buck in 1927. The 1985 survey showed the original quarry site to be part of a much larger complex which included three major quarry areas, two large defensive ditches, four star mounds and numerous terraces. The inclusion of the defensive ditches led Leach and Witter to argue that the site was in fact a fortified quarry. It was argued that the close proximity of the high quality ovaline basalt source to the platform edge (only 10 m beyond and 8 m below) indicates that the fortification was designed to protect the resource from incursions down the ridge (Leach and Witter 1987: 38).

In a second article on the Tataga-matau site Leach and Witter further noted that other portions of the site were associated with the fortifications. As they state, "At one phase of the complex's long history, therefore, the quarries were closely associated with the fortifications, though it must be made clear that the ditches and scarps also protected what were probably living areas" (Leach and Witter 1990: 80). The antiquity of the fortified phase of Tataga-matau was suggested to be at least circa 600 BP or from the 13th century. This estimation was based on three radiocarbon dates of 580±63, 580±110 and 448±70 (Leach and Witter 1990: 58;
also as cited in Best 1993: 433). The identification of Tataga-matau as a fortified quarry site not only establishes the importance of this particular basalt source in terms of long distance trade but also expands the definition of the role of fortifications in Samoan society.

In the Manu'a group, Hunt and Kirch (1988) undertook an extensive survey from which there was a "total absence" of fortification features in any form. This observation was confirmed by three different data sources: local informants, archaeological survey and the collection of local traditions (Hunt and Kirch 1988: 166).

**Summary**

Historic descriptions of Fijian fortifications began in 1806 with Lockerby's account of Bua on the Rewa Delta. This fort, used as a comparative model, was described as a palisaded bank and ditch construction with a water-filled moat around it. Later accounts describe alterations such as loop-holes and strengthened fencing against European firearms, however, the fortification's structure remained the same.

Fijian fortification archaeology has shifted from studies concerned with comparing fortifications to those concerned with examining their internal structure. Research objectives have shifted from defining the origin and antiquity of fortifications to their role in the transformation of settlement pattern into the modern Fijian cultural landscape. Regarding the antiquity of fortification construction in Fiji, there is a consensus that they date to at least the 12th century A.D. (Frost 1974; Best 1993). The fortification of Ulunikoro in the Lau Group has been radiocarbon dated to 969±20 BP (Best 1984). Origins have been attributed to western influence, either Vanuatu or New Caledonia. However, recent studies
argue this need not be seen as a significant influence on the pattern of Fijian warfare and the inception of fortification construction (Rechtman 1992).

Historic descriptions of Samoan fortifications attribute Tongan invasions of the 17th century as having influencing their design and distribution. Subsequently, archaeologists have used these accounts to hypothesize earlier Tongan origins for Samoan fortifications. Historic descriptions depict Samoan 'olo as being palisaded, often located on ridges and used as a refuge containing temporary house structures. It is also documented that warfare during the 19th century inspired fortification construction, albeit these examples are seen to be less elaborate.

Fortification archaeology in Western Samoa initially concentrated on descriptive and culture historical interpretations. More recently Best (1993) has addressed issues of origin and function for the sites. The largest archaeological program to date was carried out during the 1960s and included a distribution analysis of fortifications in the vicinity of Luatuanu'u on 'Upolu (Green and Davidson 1967). In American Samoa, preliminary research was also descriptive. However, during the 1980s interpretations focussed on the function of fortifications with debate on the site of Tataga-Matau and its defininition as a fortified quarry (Leach and Witter 1987; Best 1993). To date there has been little speculation on the antiquity of Samoan fortification construction. Radiocarbon dates from Lefutu (875±210 B.P) and Tatagamatau (circa 600 BP) suggest their use by the 12th century. Origin has been attributed to Tongan influence, but independent origins are also possible (after Best 1993).
CHAPTER 7

CONCLUSIONS

The objective of this thesis has been to present the archaeology and history of Kolo Velata, a double ring-ditch fortification on Lifuka island in the Kingdom of Tonga. Additionally this research touches upon issues relating to the antiquity, origins and mechanisms by which ring-ditch fortifications were introduced into Tongan warfare. Accordingly, Kolo Velata data were placed within the framework of fortification construction across Tonga and western Polynesia. Providing this framework entailed an overview of fortification archaeology and historical descriptions from the Fijian, Samoan and Tongan archipelagos.

Historical analysis of Kolo Velata focussed on references associating the site with two periods in Tongan history. The first of these relates to the 15th century when Kolo Velata, based on oral tradition, is claimed to have been first constructed. The second dates to a 19th century period of chiefly warfare. Research objectives focussed on placing these isolated references within a general historical framework of Tongan history.

Initial archaeological concern led to a detailed contour map of Kolo Velata being drafted. This work was to complement Burley's (1992) interests in the traditional Tongan chiefdom and its correlates in monumental architecture and other features. Production of the map concentrated on providing an accurate illustration of the size, shape and composition of Kolo Velata which could then be used in comparison with other western Polynesian fortifications. A second objective was to determine and correct errors in an original sketch plan of the site that had been prepared in 1920/21 by W.C. McKern (1929). Subsequent test excavation focussed
first on defining construction features associated with the inner and outer defensive works. A second objective was to test a midden area located by Burley (1991) in 1990.

In comparison to Tongan sites generally, Fijian fortifications have a greater diversity of design due to topographic considerations in which wet flatland regions as well as dry upland areas were accommodated. However, in both zones fortifications are characterized by palisaded bank and ditch constructions. Contrary to Tongan fortifications, in most Fijian cases the ditch is situated behind the bank and in front of the palisade. Archaeology of Fijian fortifications has been undertaken since 1947 and, to date, some 16 archaeologists have contributed to its data base. At present, based on radiocarbon dates (Frost 1974: 58) and research in the Lau group (Best 1984), there is a consensus that the origins of the Fijian fortification complex occurs no later than 1100 A.D.. Origins have been argued to derive from the west, either Vanuatu or New Caledonia (Frost 1974: 121). More recently this possible western influence has been downplayed with indigenous origins being argued (Rechtman 1992: 121).

Samoan fortifications, like Fiji, are found both on the flat coastal plain and atop ridges in the upland regions. Their distribution across the archipelago was first seen to be concentrated in Western Samoa, particularly on the island of 'Upolu (Kikuchi 1963). However, subsequent research has located several fortifications in American Samoa as well (Clark and Herdrich 1993), the exception being the Manu'a group which has been surveyed with no evidence of fortifications (Hunt and Kirch 1988). Samoan fortifications are represented by palisaded bank and ditch construction of at least four different types (after Kirch 1984). Archaeology of Samoan fortifications began during the 1950s in Western Samoa with the majority of work being undertaken during the 1980s in American Samoa. The antiquity of Samoan sites
has received little discussion. Excavations at the fortification of Lefutu, however, produced a radiocarbon date of 810±210 B.P. which led Frost (1978: 241) to argue the occurrence of warfare on Tutuila as early as the 12th century. The origins of Samoan fortifications has been traditionally attributed to defensive needs against Tongan invasions between the 12th and 15th centuries. More recently Best (1993) has argued that this tradition might also have resulted from a need for defense independent of Tongan or Fijian diffusion.

Due to the relatively flat geography of the uplifted coral islands upon which most Tongan settlement occurs, fortifications are almost solely of the flat terrain ring-ditch type. Similar to Fiji and Samoa, they are constructed of a palisaded bank and ditch feature. Archaeology of Tongan fortifications began in 1920 with a survey by W.C. McKern (1929) and since that time there has been a progressive collection of survey and map data. To date, there are no radiocarbon dates from a fortification in Tonga and aside from Kolo Velata presented, only the site of Pouvalu on Tongatapu (Spenneman 1988: 78) has been test excavated. With the exception of Mu'a on Tongatapu, Spenneman (1988) has associated the majority of existing bank and ditch features with 19th century chiefly wars. Burley (1994a) has suggested earlier origins, dating them to at least the 15th century and the campaigns of Tu'i Tonga Kau'ulufonuafekai. While earlier researchers have attributed the origins of this complex to Fijian influence (McKern 1929; Swanson 1968); more recently Pepa (1994) argues that the tradition could have been internal to Tonga.

The contour map of Kolo Velata confirms Burley's (1991:49) suspicions that the dimensions and orientation of McKern's (1929: 85) map were in error. The size and location of two burial mounds were also corrected and a third, located outside of the fortification, has been added to the map. Also added was a rise in the center
of the fortification. The function of this rise is not known, but, can be speculated to have served as a house mound.

Test excavation of Kolo Velata has produced several results, much of which are negative data relative to the identified research concerns. Profiles of the banks have shown each of them to be of a single construction event and it has not been possible to either date this event or determine whether the inner and outer features were built at the same time. Test excavations around the outer bank has shown occupation of the site prior to construction of the bank and ditch features. This presents a problem when attempting to associate cultural features with the initial construction of the banks. Of those issues to be addressed by excavation, our greatest failure was to locate irrefutable evidence for an enclosing palisade on either of the inner or outer banks. A number of possibilities exist as to why this is so. The first, and least likely one, is that palisades did not exist. This is contrary to most historic and ethnographic accounts. However, one historic account by Mariner (Martin 1991: 126) does describe a double ring-ditch fortification with an unpalisaded outer bank for the purpose of firing guns. Second, it is possible that later disturbance has affected any associated architectural features, masking their presence. Third, it may be possible that our excavations fell between palisade posts and, thus, did not detect their presence. Finally, it may be possible that the palisade was not constructed on top of the bank but forward to it. The mound, then, would serve as an elevated ramp on which warriors could be placed.

Pepa (1994: 44) has suggested that in Tonga, rectangular fortifications have greater antiquity than circular ones. If Kolo Velata first dates to the 15th century as suggested, one must question this association in so far as it is circular in shape. Indeed, it seems more probable that individual landscape features rather than a
predefined template is responsible for site form. The variation in fortification shape described during the 19th century chiefly wars for example, was more likely due to the judgement of the architect in relation to each particular site than to general innovations over time. Mariner's description of Neiafu (Martin 1991: 126) provides an example of a fortification built to the specifications of a particular location. Vason's (Ferdon 1987: 273) description of Hihifo also provides an example of a fortification built for a specific event in a particular style. In relation to Fijian and Samoan fortifications, Best (1993: 400) argues that "there is little if any cultural determination in the actual shape of each fortification". If this is true, then it is unlikely that general developments in fortification construction would occur uniformly over time and across the entire Tongan archipelago.

Regarding the origins of West Polynesian fortifications, Best (1993: 400) suggests that "basic principles" of defense and survival are suggested to motivate fortification design rather than cultural aesthetic. He (1993: 400) suggests the independent origins of fortification construction in each of the West Polynesian archipelagos, attributing similarities between fortification construction in each of these areas to basic needs rather than to cultural diffusion. Pepa (1994: 51) also argues "that fortifications developed locally in Tonga, in line with Best's view on the topic." In Pepa's (1994: 51) view "the basic elements involved in Tongan fortifications were the ditch and the bank/wall, and when these two elements were combined, the bank/wall would always be situated behind the encircling ditch." While Best and Pepa may be right, one cannot ignore the fact that Fijian fortification construction is suggested to occur no later than 1100 A.D. and possibly earlier. Evidence in Samoa suggests a similar scenario with a radiocarbon date from a fortification site relating to the 12th century (Frost 1974) along with early
references in oral histories. In Tonga, the earliest fortification features are found at Mu'a on Tongatapu. By geneological age, these are attributed to the 13th century when the site was founded or slightly later (Kirch 1984: 227). Consequently, fortification construction in Tonga would appear to have begun one to two centuries later than in Fiji and Samoa. With close ties between these islands in prehistoric and historic periods, it is difficult to rule out diffusion as the process by which the form and features of Tongan fortifications were introduced. Further research is needed to clarify this problem.
REFERENCES

Anderson, A.J.  
1978  Archaeological Explorations on 'Ata Island, Tonga. 

Beaglehole, J.C. (editor)  

Best, S.B.  

1992  Fortifications in Fiji and Samoa: Comparisons and Predictions.  
*Archaeology in New Zealand* 35(1): 40-44.

1993  At The Halls Of The Mountain Kings. Fijian and Samoan Fortifications: Comparison and Analysis.  

Bott, E.  

Buck, P.H. (Te Rangi Hiroa)  
1930  *Samoa Material Culture.* Bulletin No.75, B.P. Bishop Museum, Honolulu, HI.

Buist, A.G.  

Burley, D.V.  


Archaeological Association, University of Calgary, Calgary, Alberta, pp. 437-443.


in press Mata'uvave and 15th Century Ha'apai: Archaeological and Historical Landscapes in the Validation of Traditional Tongan History. *Journal of Pacific History*.

Campbell, I.C.

Clark, J.T.


Clark, J.T. and D.J. Herdrich


Clark, W. F.

Clunie, F.

Cordy, R.

Crosby, A.
Davidson, J.M.


1967 Site Survey on Tongatapu. Unpublished manuscript on file, Department of Anthropology, University of Auckland, Auckland, NZ.


Dye, T.S.

1987 Social and Cultural Change in the Prehistory of the Polynesian Ancestral Homeland. Unpublished PhD. Dissertation, Department of Anthropology, Yale University, New Haven, CT.
Ferdon, E. N.
1987  *Early Tonga: As the Explorers Saw It 1616-1810.* University of Arizona Press, Tucson, AZ.

Firth, R.

Fox, A.
1976  *Prehistoric Maori Hill Fortifications in the North Island of New Zealand.* Longman Paul, Auckland, NZ.

Frost, E. L.
1974  Archaeological Excavations of Fortified Sites on Taveuni, Fiji. *Asian and Pacific Archaeology Series, No.6.* University of Hawai‘i Press, Honolulu, HI.

Frost, J.

Gailey, C. W.
1987  *Kinship to Kingship: Gender Hierarchy and State Formation in the Tongan Islands,* University of Texas Press, Austin, TX.

Gifford, E. W.
1929  *Tongan Society.* Bulletin 61, Bernice P. Bishop Museum, Honolulu, HI.


Golson, J.

Green, R. C.


Green, R.C. and J.M. Davidson (editors)
1969  *Archaeology of Western Samoa, Volume I.* Bulletin of the Auckland Institute and Museum No. 6, Auckland, NZ.

1974  *Archaeology in Western Samoa, Volume II.* Bulletin of the Auckland Institute and Museum No. 7, Auckland, NZ.

Green, R.C. and J. Terrel
1965 Site Survey on Tongatapu. Report on file, Department of Anthropology, University of Auckland, Auckland, NZ.

Groube, L.M.

Havea, S.F.
1990 *Tongan Kolotau in Tongan Settlement Patterns.* Unpublished M.A. Thesis, Department of Anthropology, University of Auckland, Auckland, NZ.

Herdrich, D.J.

Hunt, T.L. and P.V. Kirch

Kaplan, M. and M. Rosenthal

Kikuchi, W.K.
1963 Archaeological Surface Ruins in American Samoa. Unpublished M.A. thesis, Department of Anthropology, University of Hawai'i, Manoa, HI.

Kirch, P. V.

1988 *Niuatoputapu: The Prehistory of a Polynesian Chiefdom.* Monograph 5, Burke Museum, Seattle, WA.

Krämer, A.
1902 *Die Samoa-Inseln.* Schweizerbartsche Verlag, Stuttgart.

Latukefu, S.


Leach, H.M. and D.C. Witter


Leahy, A.
1974 Tongan Fortifications. Unpublished manuscript on file, Department of Anthropology, University of Auckland, Auckland, NZ.

Lockerby, W.

McKern, W.C.
1929 Archaeology of Tonga, Bulletin 60, Bernice P. Bishop Museum, Honolulu, HI.

Malia, S. (Missionaire a Tonga)

Marcus, G.E.

Marshall, Y.M.

Martin, J.

Orlebar, Lieut. J., R.N.
1976  *A Midshipman's journal, on board H.M.S. Serengapatam, During the Year, 1830: Containing Observations of the Tonga Islands and Other Islands in the South Sea*. Tofua Press, Nuku'alofa. Originally published in 1833.

Palmer, B.


Parke, A.L.

Parry, J.T.


Pepa, K.

Poulsen, J.
1988  *The Prehistory of the Tongan Islands*. Two Volumes, Terra Australis, Canberra, ACT.

Rechtman, R. B.

Rogers, G. A.
Rutherford, N. (editor)  

Sand, C.  

Scott, D. and R. Green  

1994 Early Lapita sites, the colonisation of Tonga and recent data from northern Ha'apai. *Archaeology in Oceania* 29: 53-68.

1994 Early Lapita sites, the colonisation of Tonga and recent data from northern Ha'apai. *Archaeology in Oceania* 29: 53-68.

Sinoto, Y. H.  

Spenneman, D.H.  
1986 *Archaeological Fieldwork in Tonga, 1985-86.* Tongan Dark Ages Research Programme, Report No. 7, Department of Prehistory, Australian National University, Canberra, ACT.

1988 *Pathways to the Tongan Past,* Tongan National Centre, Nuku'alofa, Tonga.

1989 'Ata 'a Tonga mo 'Ata 'o Tonga: Early and Later Prehistory of the Tongan Islands. Unpublished Ph.D. dissertation, Department of Prehistory, Australian National University, Canberra, ACT.

Stair, J. B.  
1897 *Old Samoa; or, flotsam and jetsam from the Pacific Ocean.* By Rev. John B. Stair, with an introduction by the Bishop of Ballarat. The Religious Tract Society, London.

Swanson, L.  
1968 Field Monuments on Tongatapu. Unpublished M.A. thesis, Department of Anthropology, University of Auckland, Auckland, NZ.

West, T. 1865 *Ten Years in South-Central Polynesia: being reminiscences of a personal mission to the friendly islands and their dependencies.* James Nisbet and Co., London.

Wilkes, C. 1885 *Narrative of the United States Exploring Expedition, During the years 1838, 1839, 1840, 1841, 1842.* Volumes II and III. Reprinted by Fiji Museum, Suva. Originally published 1845.


Wood, A.H. 1945 *History and Geography of Tonga.* Government Printer, Nuku'alofa, Kingdom of Tonga.

APPENDIX A

Artifacts, Molluscs and Faunal Remains Collected at Kolo Velata

The following is a list of the artifacts, molluscs and faunal remains collected during test excavations at Kolo Velata during the 1992 field season. Generally, sediment was not sieved unless a feature was encountered. The majority of collected material, therefore, is associated with individual features. Faunal remains were identified by Randall Preston, Department of Archaeology, Simon Fraser University.

FEATURE 33 (Unit 24):
Earth Oven, Central Area

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<th>Burned</th>
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Earth Oven

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