



KON-TIKI FIELD REPORT SERIES **VOLUME 6/2002**

TEST INVESTIGATIONS

- at the Pulemelei site, Letolo, Vaitoa, Savai'i, Samoa, Sep.-Oct. 2002

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THOR HEYERDAHL'S RESEARCH FOUNDATION

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1. Introduction

The work described in this report was carried out by Drs Helene Martinsson-Wallin and Paul Wallin (The Kon-Tiki Museum, Oslo, Norway) and Dr. Geoffrey Clark (Australian National University, Canberra, Australia) during September 3 to October 15, 2002. We were not in the field all at the same time, but overlapped with each other so that we sometimes worked together and sometimes alone (see summary diary). The work was carried out in collaboration with the landowners from the Nelson Plantation Inc. About 20 persons from the nearby Vailoa village were employed during the time period 13th of September to 11th of October to help us with the fieldwork (clearing, mapping and excavations). We were also assisted by the foreman of the plantation who organised lunch in the field, liased with the company, and participated in site clearance.

The main goals of the initial investigation were to clear the Pulemelei mound, to obtain data to make an accurate map of the mound, and to carry out limited test excavations to investigate the nature of the sub-surface deposits. The information provides a base for future excavations and reconstruction work at the site.

2. Summary diary

3 September: Dr. Helene Martinsson Wallin (KTM) to Apia.

4 September: Helene in Apia, meeting at UNESCO office in Apia.

5 September: Helene in Apia, meeting at National University of Samoa.

6 September: Helene tour of 'Upolu, Dr. Geoffrey Clark (ANU) to Apia.

7 September: Helene and Geoff. Flied to Savai'i and visited the Pulemelei site and arranged practical matters concerning the fieldwork together with Joe Annandale (representative for Nelson inc).

8 September: Helene and Geoff in Apia.

9 September: Conference at National University of Samoa started.

10 September: Helene presented a general view of our 'Samoa Project' and Geoff presented a paper called 'THE STATUS OF ARCHAEOLOGICAL WORK IN SAMOA' at the conference.

11 September: Helene left Apia, Geoff attended conference in Apia.

12 September: End of Apia conference. Geoff arranging equipments in Apia

13 September: Geoff at Pulemelei. Started clearing the site. 20 men at work. Pay day.

14 September: Saturday, work half day. Geoff continued clearing. 20 men at work.

15 September: Sunday, Geoff surveyed for prehistoric sites at the river mouth at the plantation.

16 September: Geoff continued the clearing work. 20 men at work.

17 September: Geoff continued the clearing work. 20 men at work.

18 September: Geoff continued the clearing work. 20 men at work.

19 September: Geoff continued the clearing work. 20 men at work.

20 September: Geoff continued the clearing work. 20 men at work. Pay day.

21 September: Saturday.

22 September: Sunday.

23 September: Geoff continued the clearing work. 20 men at work.

24 September: Dr. Paul Wallin (KTM) arrived Savai'i, clearing continued, Geoff started mapping.

25 September: Geoff continued mapping, Paul described and made documentation on the east and south sides of the pyramidal mound, clearing continued 20 men at work.

26 September: Rain all day, Geoff continued mapping, Paul continued documentation on the south and west sides, clearing continued 20 men at work. Finished 1 hour early due to the heavy rain.

27 September: Paul started small test-excavation of sq. m pits on east and south sides, Geoff continued mapping, clearing continued, 20 men at work. Pay day.

28 September: Saturday. Geoff and Paul continued the mapping. Rain all day.

29 September: Sunday. Geoff and Paul continued the mapping.

30 September: Paul continued excavation of test pits on south and west sides, and Geoff continued the mapping, clearing continued on the north side. 20 men at work.

1 October: Geoff and Paul at meeting on Upolu, clearing continued on the north side. 20 men at work.

2 October: Paul continued excavations on the W side and started the Test Trench close to the wall on the south side. Clearing continued with burning and chainsaw on north and east sides. Geoff left Savai'i for Canberra, Australia. 20 men at work.

3 October: Paul continued excavation of Test Trench on south side and finished test pit on west side, clearing continued with burning and chainsaw etc. on east side. 20 men at work.

4 October: Continued excavation of test Trench at S side, started new test pit at north side, continued clearing on the east side. 20 men at work. Pay day.

5 October: Saturday, Paul worked on report.

6 October: Sunday, Paul worked on report.

7 October: Paul continued excavations and documentation of the site. Clearing continued on the east and south sides. 20 men at work.

8 October: Paul continued excavations and clearing. 20 men at work.

9 October: Paul continued excavations and clearing. 20 men at work.

10 October: Half day. Work at Pulemelei closed down for the season. Pay day.

11 October: Paul meeting the board of the Nelson plantation Inc. on Savai'i.

12 October: Paul in Apia, spent part of the day with Nelson board member Patrick Moors.

13 October: Paul in Apia, spent part of the day with Nelson board member Patrick Moors.

14 October: Paul flies out of Apia at 00.45.

15 October: Paul back in Oslo at 18.30.

3. Historical background to the archaeology of Samoa

The islands of the Samoa Group were formed by volcanic activity and are essentially mountains and ridges of erupted rock sitting on the Pacific Plate. Eruptions have been ongoing and the south and north coast of Savai'i are now covered by lava, which probably destroyed or made many archaeological sites inaccessible. The rapid rate of island subsidence calculated by Dickinson and Green (1998) at 1.4mm/year suggests that the oldest sites in Samoa might well be 4 m below their original position relative to sea level.

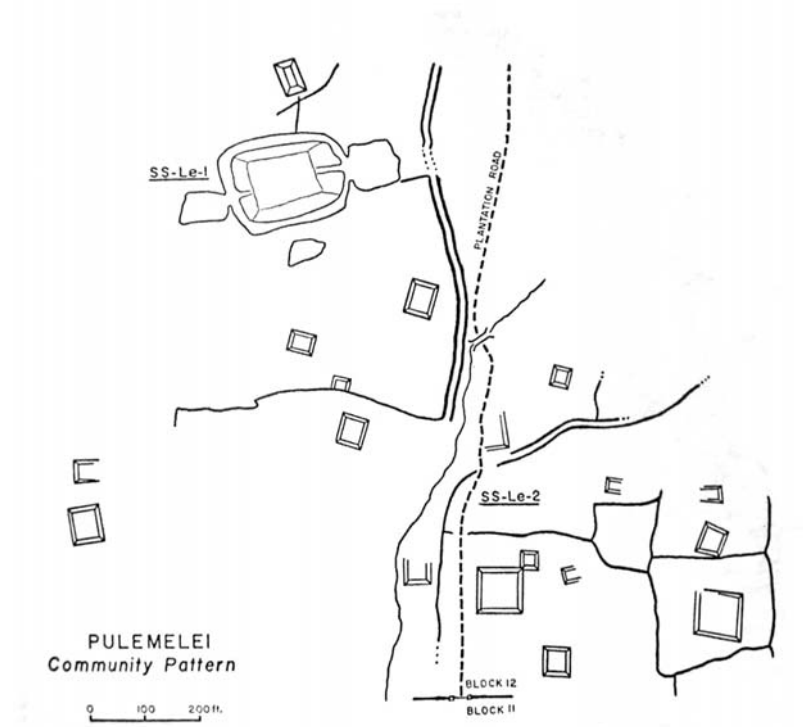
In recent years most of the archaeological activities has concentrated on American Samoa (Hunt and Kirch 1988, Kirch and Hunt 1993, Clark and Herdrich 1993, Clark and Michlovic 1996, Clark et al 1997, Ayres et al. 2001, Suafo'a 2001, Taomia 2001). Previous and current research on Fiji-Tonga-American Samoa has broadened knowledge of the prehistory of the central Pacific but Savai'i is still very much an archaeological 'no man's land' (see a recent summary on Samoan archaeology by Green 2002:125-152.)

As early as 1927, Andrew Thompson wrote an article called 'Earthmounds in Samoa' for the *Journal of the Polynesian Society*, which was followed in 1944 by J.D. Freeman writing a paper on 'The Vailele Earthmounds' in the same journal (Thomson 1927, Freeman 1944). These first accounts of monumental architecture in Samoa described the sites in general terms and no scientific excavations were carried out.

It was not until the late-1950s and during the mid-1960s that some prehistoric structures was excavated by Jack Golson, and later during Roger Green and Janet Davidson's extensive archaeological investigation program in Western Samoa (Green and Davidson 1969, 1974). This was followed by another research program organised by Jesse D. Jennings and others in 1974-1977 (Jennings et al 1976, Jennings and Holmer 1980).

Green and Davidson excavated house platforms and earth mounds on 'Upolu. They showed that most earth mounds were house platforms and that some of the investigated structures contained several layers of stone floors indicating several phases of house construction while some appeared to be the result of a single phase of construction (Golson 1969:108, Green 1969a and b, Terrell 1969:158, Davidson 1974:227). The

remains of one very large stone mound — a site that was reported disturbed around 1956 leaving a slight earth mound with some foundation stone paving — was also excavated. Under these stones recent material (rusty metal) was recovered which indicated that it might have been a post-European structure (Hougaard 1969:255).

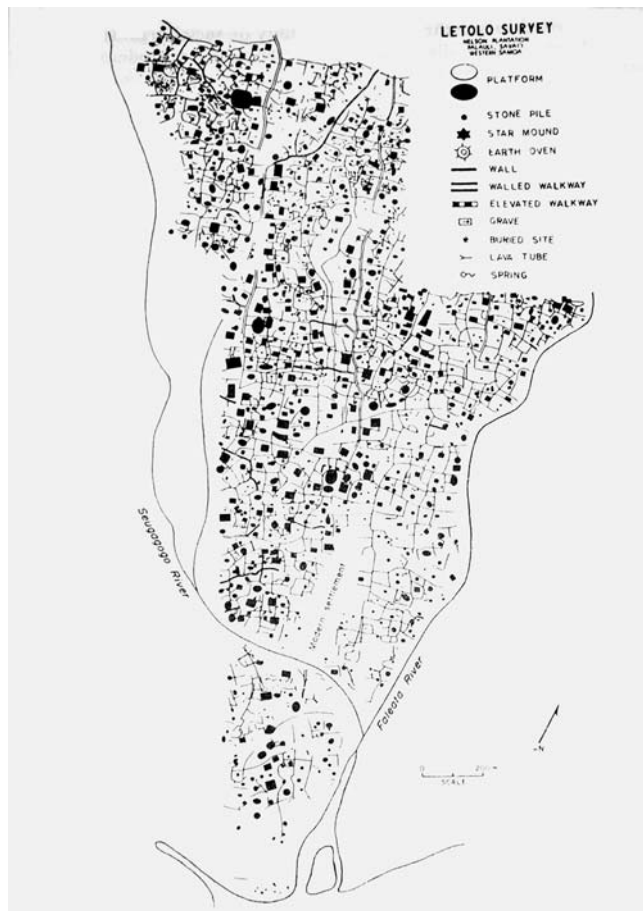


Overview of the Pulemelei area (after Scott 1969)

Besides excavations, Green and Davidson's team made surveys of other mounds, for example the Pulemelei mound (Scott 1969:69-90) and other surface architectural features in the mound's vicinity, such as walls, roads, stone piles, and described their general shape, size and location (Green and Davidson 1969:54-68, 200-204). Concerning the stone mounds, they concluded that there was little evidence to securely determine their age or internal structure (Davidson 1974:226), but Davidson examined relevant radiocarbon dates to suggest that 'mound construction may not have begun in Samoa until about the eleventh century A.D.' (1974:227).

The second team led by Jesse Jennings identified the first Lapita site under water at Mulifanua (dated to c. 800 BC) off the northwest coast of 'Upolu. They also excavated some stone platforms, including a 'star mound', and house platforms. When cutting into the star mound they found nothing but 'stone rubble fill', except for some scattered

charcoal within an area of the trench which was dated to A.D. 1600 ± 150, and A.D. 1450 ± 70, with no earlier structures found within or beneath it (Holmer 1976:23-28).



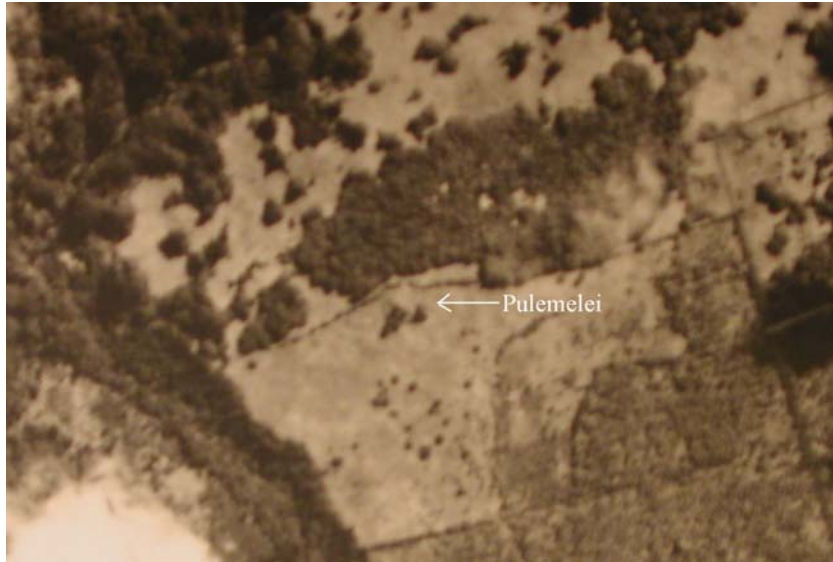
Survey map after Jennings et al. 1982.

A few quite large stone house mound platforms were also excavated of which some were built on rock outcrops, and some had features under the stone/earth platforms. Nancy Hewitt reported one radiocarbon date from a sample below a stone platform, which gave a date 1100 ± 110 B.P. (Hewitt 1980:44).

Jenning's team also carried out surveys and mapped settlement complexes. The largest example was the Letolo plantation survey which took in about 3000 prehistoric features including 1059 stone platforms, one of which was the large Pulemelei platform (Jennings et al. 1982).

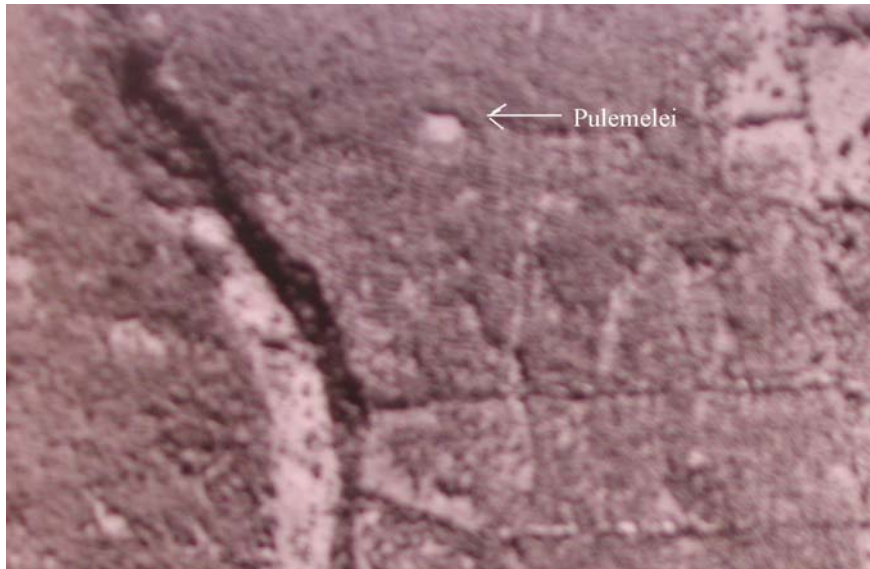
4. Clearing of the Pulemelei site

Previous archaeological work at the Pulemelei site in the 1960s and 1970s took place when the Letolo Plantation was producing copra and the development of secondary vegetation growth in the plantation was kept in check by the activities of the large plantation work force.



Aerial photo 1954, shows an open grass landscape around Pulemelei.

Aerial photographs taken in 1954 and 1981 clearly show that while the coconut plantation had extended to and surrounded the mound by 1981, the mound itself appears to have been largely clear of vegetation. When the collection of copra declined during the 1980s significant plant growth, particularly of tree ferns, juvenile coconut palms and other tree types, created a dense understorey to the mature and senescent plantation coconut trees. The secondary vegetation was well established on the mound's perimeter



Aerial photo from 1981, showing Pulemelei located in a coconut plantation.

in 2002, with some large trees growing on the flanks of the mound, as well as on the top platform. However, the main vegetation present on Pulemelei was a mixed scrub with abundant ferns. The development of the mixed fern-scrub had created a mantle of root material, soil and decomposing plant remains over the mound's volcanic boulder matrix. The organic layer was particularly thick on the south and north sides of the mound, where it was up to 15-20cm in depth, but in other parts, particularly on the east side and on the top platform, it was considerably less. Presumably this reflects the amount of previous clearance on the mound, which was more regularly undertaken on the top platform and east entrance way, as well as factors like the prevailing wind direction, and proximity to secondary vegetation.

Clearing of the mound began on August the 13th and continued to the end of the fieldwork period. A team of 17-20 men, from Vailoa Village, worked on the east side of the mound, before separating into two groups to simultaneously begin clearance of the south and north sides. When the sides were largely completed the full team reassembled to clear the top platform, before working to clear the platform's west side. A c.10m wide perimeter strip around the base of the mound was then cleared, with small teams working to expose the smaller northern mound, nearby structures and areas of pavement. Many of the trees on the mound's periphery were so large that cutting them with a machete was not feasible and a chainsaw was hired to enable their removal.

However, the main tools employed in the clearing phase were machetes, coconut frond baskets, wooden ‘hoes’ made from tree branches, and hand weeding.

Mound clearance typically started with the removal of the scrub/fern component and the chopping down of small-to-medium sized trees. The large amount of debris generated was usually removed by being rolled down the side of the mound. After a few days of drying it was burnt, in position near the walls of the base platform. After the scrub/fern component was removed any organic matting still covering the boulder matrix was weeded and dumped into piles before being placed in baskets and taken away for burning. The final stage involved the digging out of tree roots that had penetrated the mound and the use of a chainsaw to take out very large trees.



Clearing work on the W side of the structure.

5. Mapping

One of the three main objectives in the 2002 fieldwork was to make a new and accurate map of the Pulemelei mound. Published maps of the Pulemelei mound include Stuart Scott's plan and cross-sections made in 1965 (Scott 1969: Fig. 39, Fig. 40), and two large scale maps showing the mound and its relationship to other structures in the Letolo Plantation (Scott 1969: Fig. 42; Jennings et al. 1982). Scott's plane table maps appear to represent the only detailed record of Pulemelei's dimensions, although useful observations, sketches and maps might be unpublished in university and library archives. Enquiries are currently being made to try and locate documents and maps of the mound, including Green and Davidson's 1964 preliminary report, and files containing the work of Jennings and associates. There were three reasons for making a new map of the mound in 2002.

First, the original 1965 map was made using a plane table and while accurate maps can be made with this equipment, measurement error margins are typically larger than modern digital mapping devices, such as electronic theodolites produce. This is not meant to imply that Scott's 1965 map contains significant measurement errors, but only that technological advances have significantly improved the precision of map data. The accuracy of the results, of course, is related to basic survey practice, but if these are consistent then very accurate results and maps can be obtained with modern equipment.

Second, examination of the mound identified several features that were not included in Scott's map. These included a small terrace running parallel to, and approximately 60cm below, the top platform of the south wall, numerous rock cairns on the top platform, small sections of 'intact' wall, a 'ramp' on the south platform base, and places along the basal platform where sections of the outer wall appeared to have collapsed.

Third, in Scott's brief description of the Pulemelei mound he notes that its shape is essentially unaltered, and the minor amount of rock collapse observed could be explained by the root action of fast growing trees. Platform edges are described as carefully squared and levelled, and this is also suggested by slides of the mound taken in 1972 by Peter Bellwood (Australian National University). Clearly, since 1965 the structure of the mound has deteriorated, with some parts suffering substantial alteration,

particularly platform corners and sections of the base platform wall, while other parts are probably largely unaltered. One of the main purposes of the 2002 work was to make a map to track changes in the mound's structure that had occurred over a 37-year period. This would allow areas of the mound with heavy damage to be identified, and if necessary restored to their 1965 state, and would provide a means of monitoring subsequent change to the mound's structure.

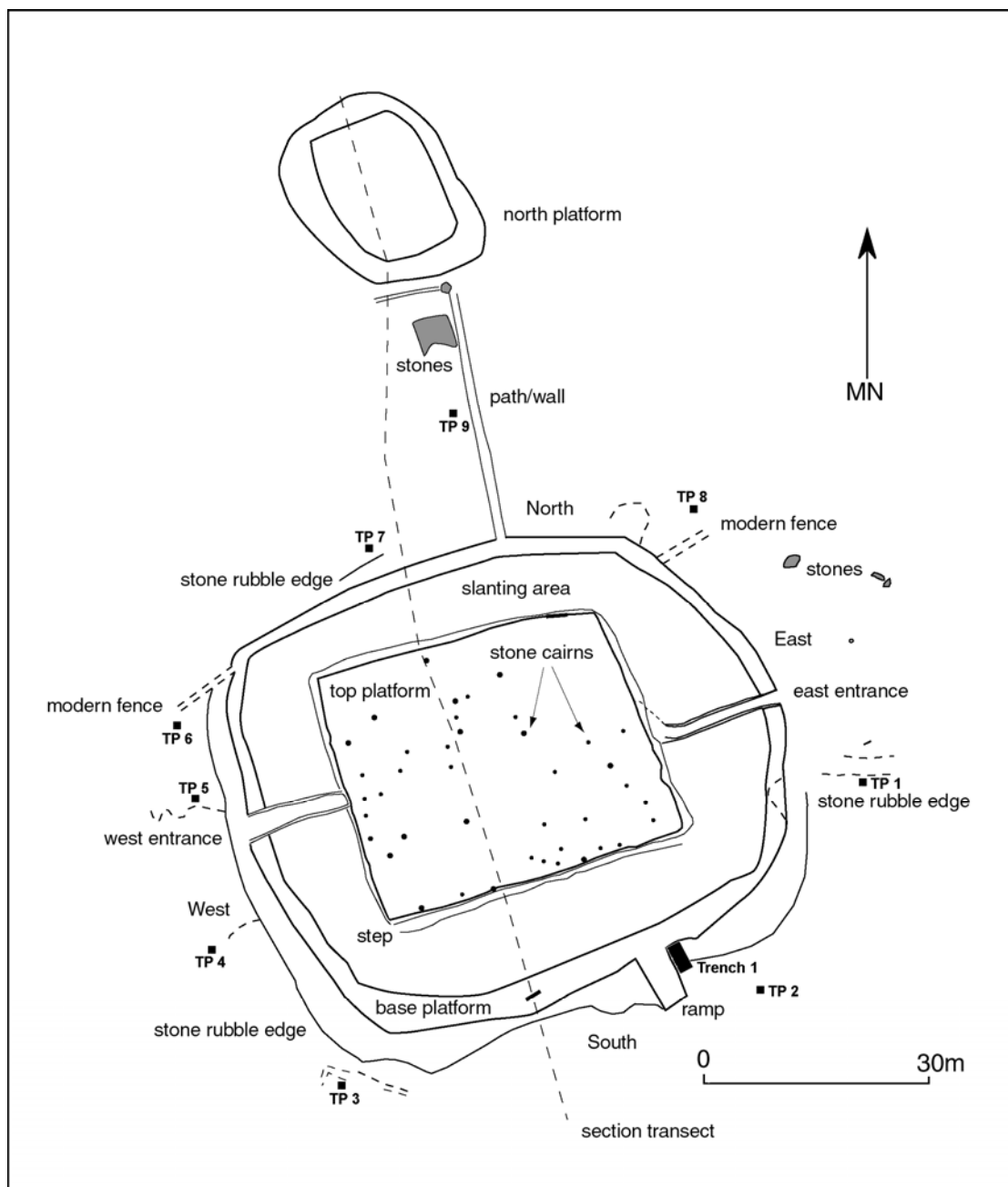
Pulemelei was surveyed with a Wild T-1000 electronic theodolite over seven days from the 24th-30th of August. Mapping the area required eight station points. Station Point 1 (ST. 1) was located on the top platform immediately north of the main entrance on the east side. ST. 2 was on the ground in front of the southeast corner of the basal platform, while ST. 3 was toward the middle of the south wall (base platform), near the ramp and adjacent sections of 'intact' wall. ST. 4 lay near the southwest corner of the basal platform, while ST. 5 was on the ground covering the northeast corner and parts of the smaller mound approximately 35m north of the northern mound edge. On the top of the smaller northern mound was ST. 6. ST. 7 was on the top platform just south of the western entrance, and ST. 8 was also on the south side of the top platform.



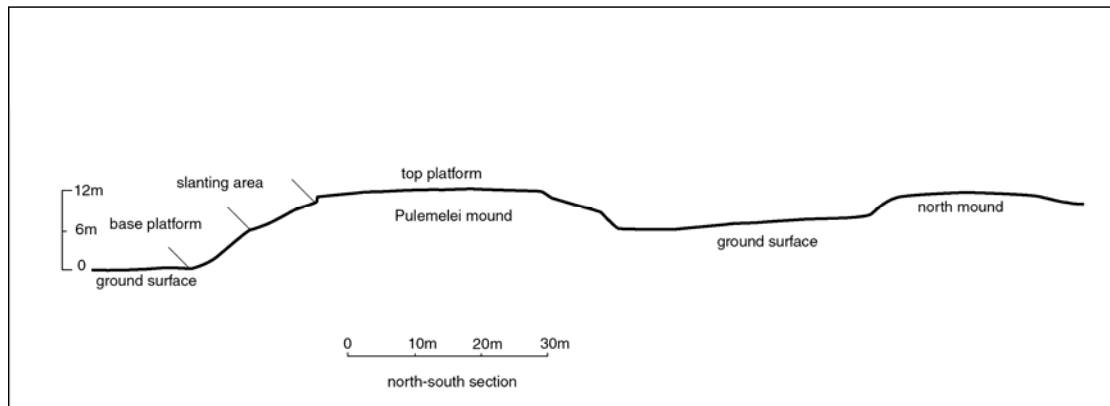
Fito Fareno holding the prism.

Coordinates recorded where the Point Number, Horizontal angle, Distance, Vertical Height, Easting and Northing position. ST. 1 coordinates entered where Instrument Height = 1.625m, Prism height = 1.625m, Hz = 0.000 (set to MN), VH = 0.000, Easting = 200.000m, Northing = 200.000m. A total of 733 points were taken and used to make

new plans and cross-sections of Pulemelei. In addition, all theodolite readings are being put into a computer program to try and develop a three-dimensional picture of the mound. The dense nature of the secondary growth meant that not all of the structures mapped by Stuart Scott beyond Pulemelei itself could be recorded in-depth in 2002. The areas included parts of the pavement leading to the east and west entrances, and several small stone structures and features that were either buried by cleared vegetation or were outside the perimeter clearance zone. However, there are sufficient survey points to be able to compare not only the main mound itself, but the majority of walls/walkways, pavements, stone mounds and platforms identified in the 1965 map. In total, the area mapped in 2002 covers an approximate area of 10,000 sq. m.



The new map of Pulemelei with the excavated trenches indicated.



New section of Pulemelei and the mound to the N.

6. Detailed description of the Pulemelei mound and surrounding features

Introduction

To create a better picture of the Pulemelei mound detailed descriptions of the structure and its closest surroundings were carried out. The structure was also documented by print photographs/digital pictures and by digital video. Since the site covers a large area (with surrounding structures it covers c. 10,000 sq. m), the detailed, qualitative and quantitative description below is given for each side of the monument. The mound consists of the following general elements; it has an oval shaped base platform, on top of this is a slanting area/platform and finally a top platform with vertical sides. The mound decreases in size from the base to the top. The description below is presented by the four cardinal points as these approximately match the orientation of the mound's sides (east, south, north, west), in addition to a detailed description of features on the sides of the mound and those situated near the base of the structure. A smaller mound situated about 50m to the north of Pulemelei is also described. The description of the features is concluded by a general description of its overall appearance.

East side

The width of the mound on this side is about 60m along the base. At the southeast corner, it has a height of about 5-6m from base to top and on the northeast corner it has a height of about 3-4m. Since the top is levelled, the difference in height is due to the original ground surface sloping downhill from north-south. On this side, the base platform is convex from the base up to the slanting area/platform. The first 10m of the slanting platform have a slight slope, which becomes steeper toward the top platform. On top of this is a level top platform with vertical side facing. The top platform is about 1m high at the northeast corner and has some intact sections. The mid-section of the top platform is collapsed. The southeast corner is also partly intact and reaches a height of about 1m above the slanting platform area.

Most of the facing on the east side has collapsed, but there are shorter sections with intact walls still standing both on the south part of the east side as well as on the north part. The original facing of the base platform is slightly slanting toward the west.

Horizontally laid basalt slabs/volcanic blocks have built up the front surface of the platform and have a mean size varying between 25 x 10cm to about 60 x 20cm. The most prominent feature on this side is a centred entranceway (a depression) running from the base to the top platform.



The E entrance, Pulemelei.

The east entrance

The entranceway appears as a 50-100cm deep depression and runs from base to the top platform. At the base, the entrance is about 2m wide and is slightly collapsed. About 4m up it has a width of c. 1.25m, which is the general width for about 20m. At this point the mound become steeper and about 25m from the base the entrance divides into a path to the north and a path to the south. This divide might be a recent alteration caused by the collapse of the central section of the top platform.

Additional features on the ground near the east side

On the ground level in front of the entrance depression is a stone pavement made of large slabs. The pavement continues with smaller stones about 25m to the east. It has an asymmetric edge and with its concave sides somewhat resembles a star mound platform. About 5m to the north of this pavement there are some smaller stone heaps (according Green and Davidson (1969:4) these might be graves). Towards the northeast corner of the mound a modern rock fence connects to the structure and about 15m to the east of the 'star shaped' pavement the remains of a prehistoric road were observed.

South side

The width of the mound on the south side is about 65m along the base. Here the mound reaches its maximum height above ground of 11-12m. It is the highest side of the mound because the ground surface slants from the north to the south. The base platform is also slightly convex, but not as much as on the east side. The height of the base platform is about 6m above ground. Most of the facing on this side has collapsed but there are a few short sections still standing. The side of the structure is from the edge of the base platform slanting quite steeply (slanting platform/area) toward the top platform. The top platform can today be observed as consisting of two steps, each about 0.5m high. The first step is about 1.5m wide and leads up to the second step. This may be due to some kind of collapse (possibly due to an earthquake, although we think this is unlikely), but since the southwest corner only seems to be built in one step and the two steps begin some meters from the corner it might also be a man-made feature. The stone material used is the same as on the east side. There is no sign of an entrance on this side of the structure.

Other features on the ground

About 20m to the west of the southeast corner is a ramp-like feature about 4m wide and 4m high, attached to the wall of the base platform. The ramp has obviously protected the south wall on both sides (about 2m to the west and 3m to the east of the ramp) and above it (c. 1m), as the original wall is still standing here. Some 25m to the south of the mound is a small stone platform and about 15m from the southeast corner is a wall. These features were observed but were not cleared during this work and were not described in detail.



The ramp on the S side of Pulemelei.

West side

The width of the mound on this side is about 60m along the base. The base platform is slightly convex and reaches a height of about 8m at the southeast corner. The northwest corner reaches a height of about 4m above ground and is divided into two corner ridges. The slanting platform/area is quite steep towards the top platform, but is flattened out closer to the edge of the base platform, in a similar way as on the east side (but not as much as on that side). The top platform is built in one step, and is about 1.2m high at both corners and lower at the middle part where it has collapsed. The base platform has no remaining original facing since the wall has collapsed. In a central position is a quite broad entranceway opposite to the one on the east side. It is c. 6m wide at the base and c. 4m wide at the top. The wall sides of the entrance depression have collapsed at the upper part of the slanting area and also below the edge of the base platform.



The W entrance, Pulemelei.

Other features on the ground

A rhomboid paving or low platform area is associated with the entranceway. The pavement extends about 20m to the west and was not completely cleared, and is not described further. An additional platform was also situated just to the west of this paving (not cleared, but recorded). At the southwest corner, there is a wall/path, which continues about 60 m to the west into uncleared areas. Two stone heaps are situated at the northwest corner, which have been previously described as potential graves by Green and Davidson (1969:80). A modern fence built of rock starts at the northwest corner of the structure and continues for about 60m to the west.

North side

The width of the mound on this side is about 65m along the base. The height of the base platform is about 4m and the whole side is quite steep. The base platform may on this side have been built in two steps. The extra step can be observed along the west section of the north side at the base on ground level, as a step c. 0.6m high and 1m wide. This step may be a later addition. The top platform is rather intact towards both corners,

where it reaches a height of about 1.2m. The mid-section of the top platform is collapsed. Most of the side is collapsed and there are only few sections left of the intact wall, mainly on the east part of the north wall. At ground level at the centre of the structure is a short wall running c. 3 m towards northwest. This wall has protected part of the base platform wall. When looking up at the base platform at this spot a slight depression is seen which may be the remains of a small entranceway. There is an original wall section still standing on the west side of this possible entrance way.



Possible N entrance, Pulemelei.

Other features on the ground

About 5-8m out from the west part of the north wall are three stone heaps. The westernmost is c. 2 x 2 x 0.25m. The middle heap is squared and 4 x 4 x 0.25m. The easternmost stone heap is rounded and about 3 x 3 x 0.25m. The stone material in these features contains stones c. 0.2-0.3m in diameter. Another feature can be seen close to the northeast corner. It is oval shaped c. 8 x 5m large and c. 0.3m high, and is made of mixed-sized stones c. 0.1-0.4m.



Small stone features, possible graves at the N side of Pulemelei.

These structures may be graves but Green and Davidson did not describe them (1969:80). A bit off the centre towards the east is a wall c. 1m wide and 0.5m high connected to the base wall and running about 50m towards the north. This connects Pulemelei with a smaller mound (see description below) at the other end of the wall. The wall continues along the west side of the small mound and continues in a westerly direction for about 30m. Midway between the north mound and Pulemelei, and a few meters to the east of the connecting wall, is another pile of stones about 7-8m in diameter. This feature was not completely uncovered during our work. Towards the northeast corner of Pulemelei there is a nicely rounded stone cairn 1.5 x 1.5 x 0.5m and further to the east of this is another small stone feature (not cleared).

Connected mound to the north of Pulemelei

About 50m to the north of the Pulemelei structure and connected to it by a wall/path is a smaller mound. This mound is orientated along a north-south axis and is about 30m long, while the east-west axis is about 24m wide at the base. The top of the mound is c. 12 x 20m in size and is flat and levelled, but the top surface is not paved and the sides of the mound slant towards the top. The south side is about 2-3m high and the north side is

only about 0.5m high. The unequal height is due to the angle of the ground surface which slants down toward the south. There are several pits on the top of the mound which are probably recent. About 10m to the south of the mound is a cluster of several large basalt blocks. A wall is also connected to the southeast corner running about 25m in a east-northeast direction.



Small mound to the N of Pulemelei.

Top platform of Pulemelei mound

The top platform is about 30 x 42m, and is generally c. 1.0-1.2m high. It is built in one step on the north, west and east sides, and in two steps on the south side (each step is about 0.5m high). The top surface is flat to slightly convex towards the sides. The surface is covered with small water-smoothed pebbles. The length of these stones varies between 2.0 and 25cm. Scattered on the top platform are about 40 cairns constructed of flat horizontal stone slabs which are built to a height of about 25-50cm, and with a size varying between c. 0.5-1.0 x 0.5-1.0m. Some may be of prehistoric origin, but most of them are probably of recent age. Green and Davidson observed ten such cairns in 1965. They also observed possible postholes but it was difficult to confirm this since holes in the top platform seem to result from trees growth and decay, in addition to recent human activities. Some of the cairns recorded on 1965 might be the same as those observed by us but this requires further verification. The platform edge is in some places marked by flat stones about 30 x 50cm long, but much of the edge has collapsed.



The surface of the top platform

General description of the mound structure

Before excavation the structure known as Pulemelei appeared to be 56 x 65m at the base and c. 30 x 42m on the top. It was built of natural volcanic stones and appears to be constructed in the following manner. At the ground level is a base platform constructed of local volcanic boulders, which have a vertical height of 4-8m. On top of this is a slanting platform area, which leads up to the vertical-sided and levelled top platform. The top platform is built of horizontal slabs and paved with small rounded stones. The highest point of the structure on the south is about 11-12m above ground surface. The structure is built on ground, which is sloping downhill from north to south and since the top is levelled the height of the mound varies between 7 and 12m.

7. Test excavations at the site

Introduction

The purpose of the test excavations was:

- To get a general understanding of the surrounding geological stratigraphy, and to find out if there were certain cultural layers/remains that could be tied to activities connected to the building of the Pulemelei mound.
- To find out whether prehistoric cultural layers predating the large mound were present, or if the building of the structure represents the earliest prehistoric activity in the area.
- To get a better understanding of the architectural features of Pulemelei. Especially how the foundations of the structure were constructed and whether the top platform was built at the same time as the other platforms or it was a later addition.

To examine these questions nine test pits (1 x 1m) were excavated close to the mound and distributed around each of its sides, as well as one test pit placed in the area between Pulemelei and the smaller mound to the north. The excavations were mainly carried out by documentation of 20cm levels within each test pit. The top platform of Pulemelei was preliminary investigated during the clearing of a tree stump, while the foundation base was investigated through Test Trench 1 (2 x 4 m) at the south side of the structure.

Test pit 1 (east side)

This test pit was placed on the east side of the structure, just south of the irregular pavement in front of the entranceway. The pit was 1 x 1m and oriented north-south.

Stratigraphy

0-20cm

The top 10cm consisted of a brown to yellow-brown vegetative soil with an abundance of roots from surrounding trees. Under this was a silty yellow-brown soil mixed with natural volcanic stones (10-20cm in size). No cultural material was recorded.

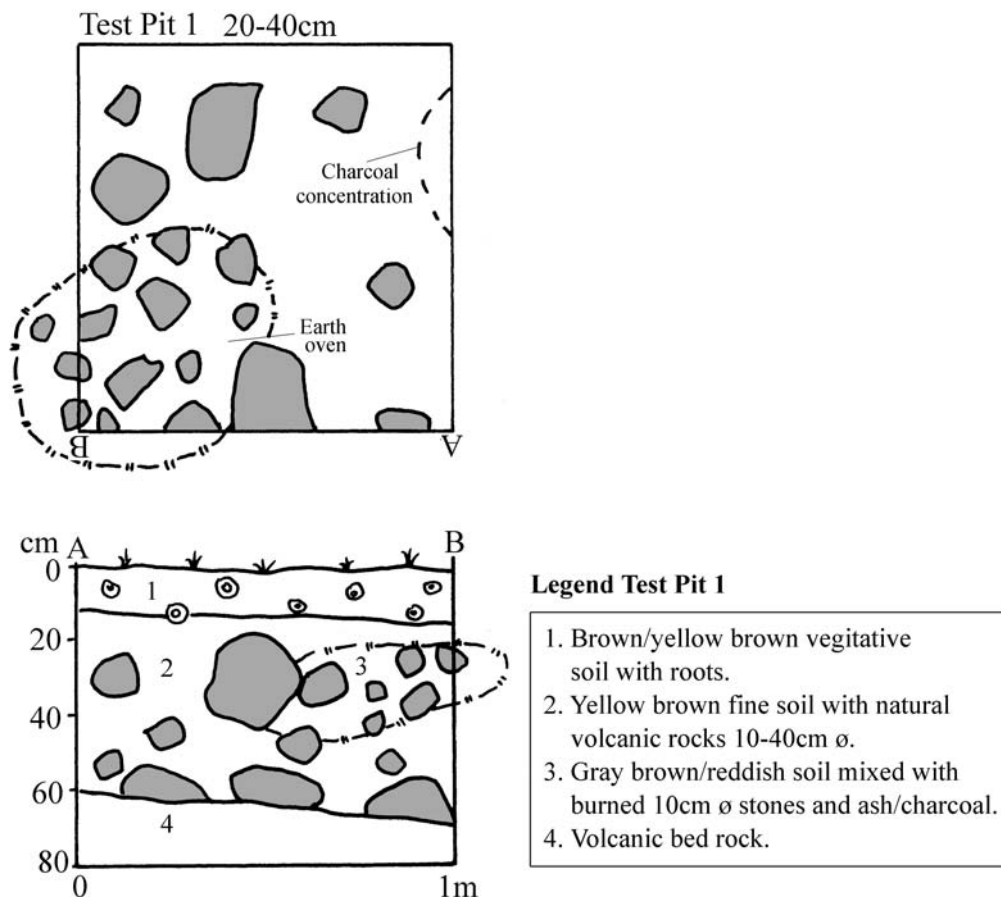
20-40cm

At a depth of about 20-25cm we found charcoal in the southwest part of the square. This was called *feature 1*. This oval shaped earth oven (*umu*), 55 x 75cm long and 24cm

deep contained charcoal/ash and burned stones c. 10-15cm in size. Part of a smaller charcoal concentration was found in the northeast corner at a depth of 30cm. The surrounding soil was silty yellow-brown mixed with natural volcanic rocks about 10-40cm in size. A charcoal sample from this oven was radiocarbon dated and it returned a result of 780 ± 120 BP).

40-70 cm

Feature 1 continued to a depth of 42cm below surface. The silty yellow-brown soil was mixed with natural volcanic rocks (20-40cm), but contained more clay closer to bedrock. The volcanic bedrock was reached at a depth of c. 70cm.



Test pit 2 (south side)

This test pit was located at the south side of the mound, about 10m from the original wall. The pit was 1 x 1m and oriented north-south.

Stratigraphy

0-20cm

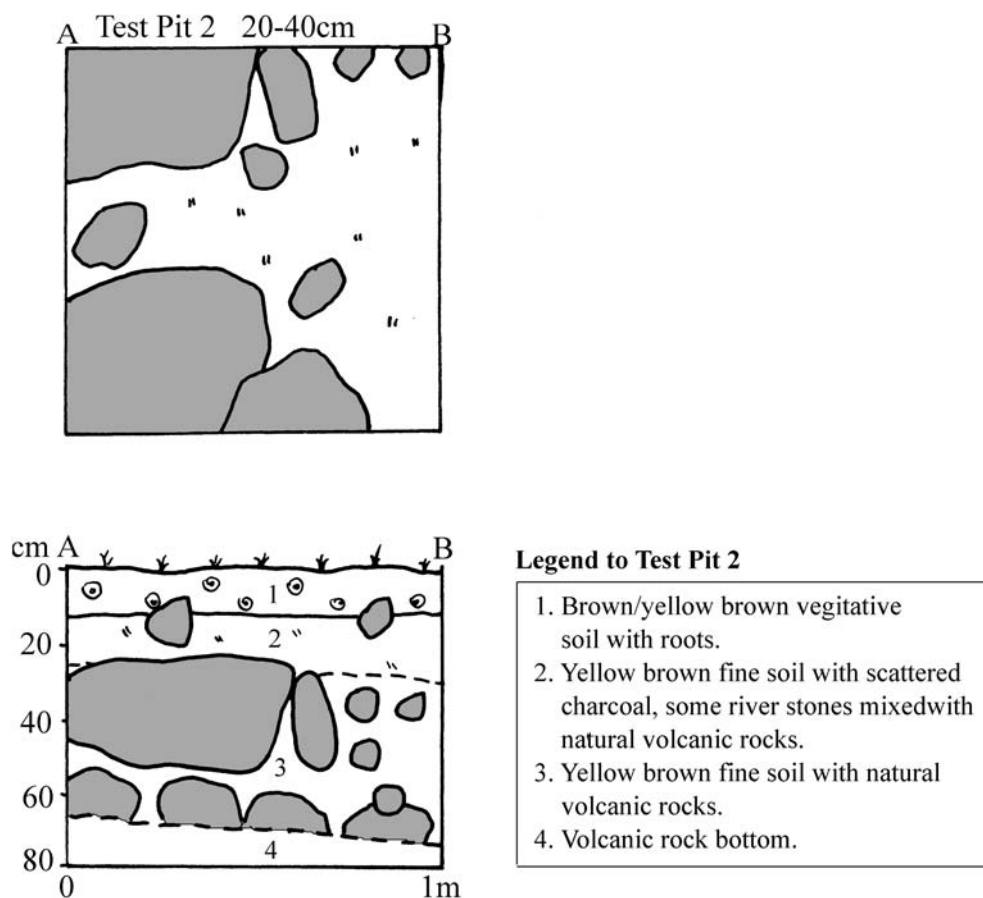
The top 10-15cm was made up of brown-to-yellow brown vegetative soil with roots. Under this followed a silty yellow-brown soil mixed with volcanic rocks. Some scattered charcoal was found at a depth of 15cm in the centre of the square.

20-40cm

Scattered charcoal and water smoothed pebbles (c. 4cm) were observed at a depth of 20-30cm. Some large natural volcanic boulders appeared towards the bottom mixed with the same kind of silty yellow-brown soil mentioned above. These stones could not be removed. No other cultural remains were recovered.

40-60cm

The volcanic bedrock was reached at a depth of c. 50cm. No cultural remains were recovered at this depth.



Test pit 3 (southwest corner)

This test pit was located on the southwest side of the small pathway wall close to the southwest corner of the structure and therefore oriented towards the stones of this feature almost in northwest/southeast. The size of the pit was 1 x 1m.

Stratigraphy

0-20cm

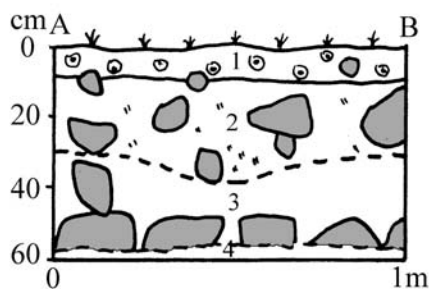
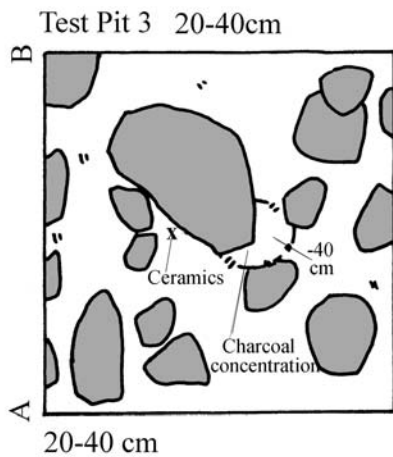
The top 10cm consisted of brown to yellow-brown vegetative soil with roots mixed with natural volcanic rocks. Scattered patches of charcoal were found from a depth of about 20cm. At this level, the yellow-brown silty soil became distinct.

20-40cm

The silty yellow-brown soil with natural rocks 10-45 cm in size, and some water smoothed pebbles (c. 4cm large) were mainly found between a depth of 20 and 30cm. Scattered charcoal occurred from a depth of 20cm, and a charcoal concentration was found at the centre of the pit at a depth of almost 40cm. A charcoal sample from the concentration was sent for radiocarbon analysis and it has a conventional age of 850 ± 50 BP). No other cultural remains were recovered at this depth.

40-60cm

The natural stratigraphy was the same as above but the soil contained more clay closer to the bedrock. The volcanic bedrock appeared at a depth around 45-50cm. No additional cultural remains were recovered at this depth.



Legend to Test Pit 3

1. Brown/yellow brown vegetative soil with roots.
2. Yellow brown fine soil with scattered charcoal, and natural volcanic rocks.
3. Yellow brown fine soil with natural volcanic rocks.
4. Volcanic rock bottom.

Comment

After the excavation was terminated earth samples were collected from the east section of this square from 5cm, 15cm, 25cm, 35cm, and 45cm depth below surface. During this work, a red plain ware ceramic sherd was found close to charcoal concentration at the bottom of the pit at c. 40cm depth.

Test pit 4 (west side)

This test pit was located at the west side of the mound immediately south of the rhomboid pavement in front of the west entrance. The pit was 1 x 1m and oriented north-south.

Stratigraphy

0-20cm

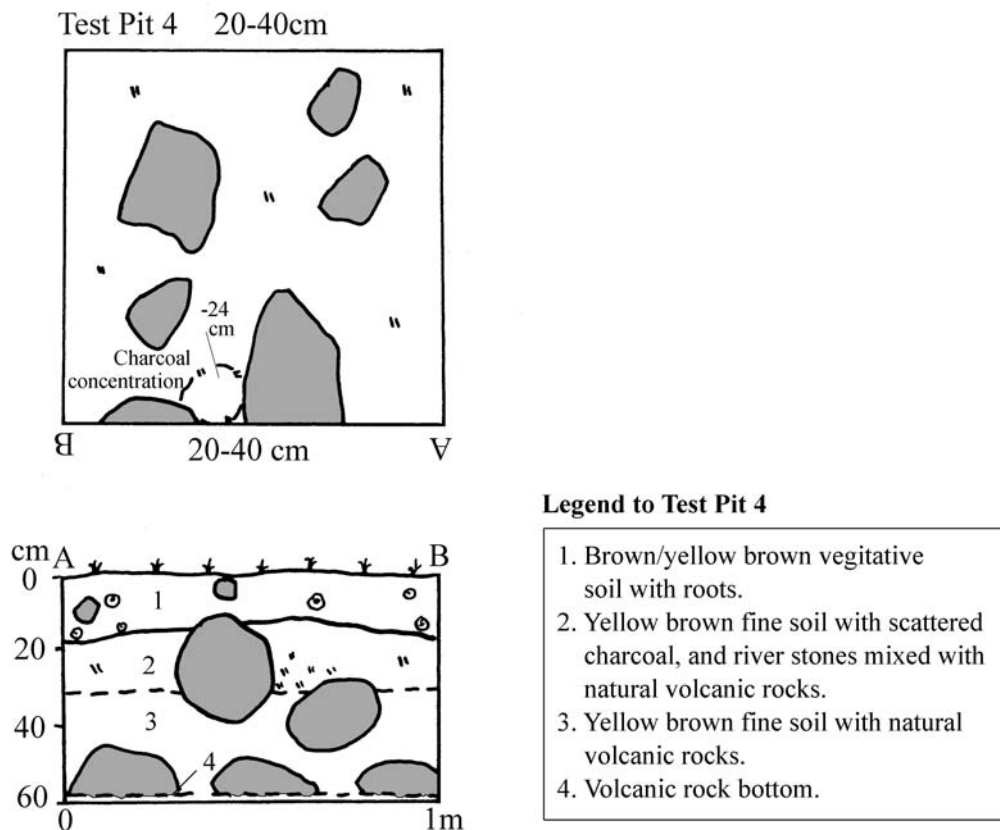
The top 10cm was made up of brown to yellow brown vegetative soil with roots. Below appeared a silty yellow-brown soil. The soil was mixed with some natural volcanic rocks and scattered charcoal was found from a depth of about 10cm.

20-40cm

Finds of scattered carbon in the fine yellow-brown soil mixed with natural rocks 10-40cm in size, and some small water rolled river pebbles were mainly found between a depth of 20 and 30cm. A charcoal concentration was found at the south end of the square at a depth of 24cm. No other cultural remains were recovered at this level.

40-60cm

The natural stratigraphy was unchanged but the soil contained more clay towards the bottom of the pit. The volcanic bedrock was found at a depth of about 50cm. No additional cultural remains were recovered at this depth.



Test pit 5 (west side)

Test pit 5 was located at the west side of the pyramidal structure immediately N of the rhomboid pavement in front of the west entrance. The pit was 1 x 1m and oriented north-south.

Stratigraphy

0-20cm

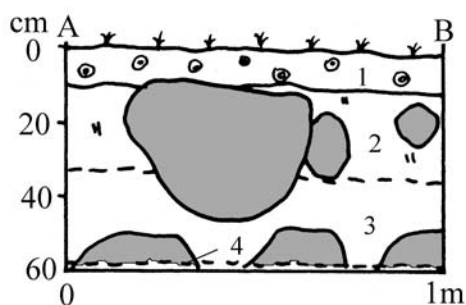
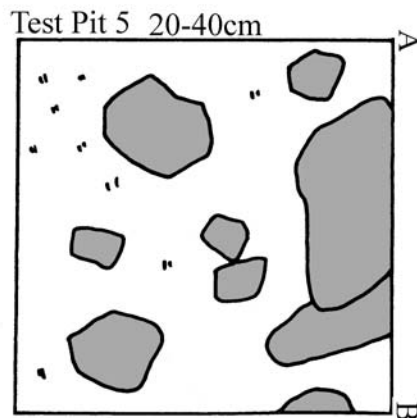
The top 10cm was made up of brown to yellow-brown vegetative soil with roots. Under this we found silty yellow-brown soil. Charcoal was found from a depth of about 10cm. The soil was mixed with some natural volcanic stones c. 10cm.

20-40cm

Some larger rocks appeared at the east part of the square at about a depth of 20cm. Scattered charcoal and water rolled-river pebbles were found in the silty yellow-brown soil to a depth of about 35cm. No other cultural remains recovered in this level.

40-60cm

The natural stratigraphy was unchanged but the soil contained more clay towards the bottom of the pit. The volcanic bedrock was found at a depth of about 50cm. No additional cultural remains were recovered at this depth.



Legend to Test Pit 5

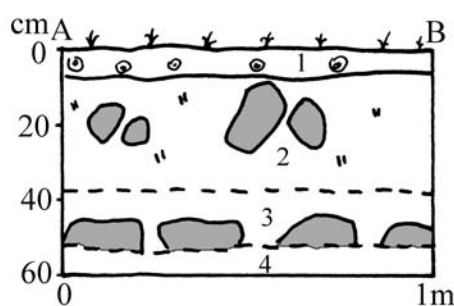
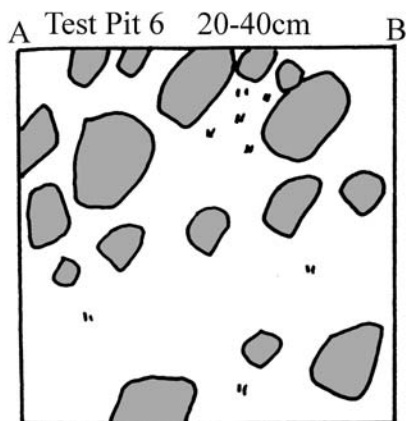
1. Brown/yellow brown vegetative soil with roots.
2. Yellow brown fine soil with scattered charcoal, and river stones mixed with natural volcanic rocks.
3. Yellow brown fine soil with natural volcanic rocks.
4. Volcanic rock bottom.

Comment

Earth samples were collected from the north section of the pit from 5cm, 15cm, 25cm, 35cm and 45cm depth below surface. During this work, a small red plainware sherd was found in the earth dump from the excavation of the square. The dump was investigated without finding any other cultural material. The sherd probably came from the bottom of the pit since it was found at the top of the dump.

Test pit 6 (northwest corner)

This test pit was located at the west side of the mound just south of the modern rock fence, which runs from the northwest corner of the pyramidal structure. The pit was 1 x 1m and oriented north-south.



Legend to Test Pit 6

- 1. Brown/yellow brown vegetative soil with roots.
- 2. Yellow brown fine soil with scattered charcoal, and river stones mixed with natural volcanic rocks.
- 3. Yellow brown fine soil with natural volcanic rocks.
- 4. Volcanic rock bottom.

Stratigraphy

0-20cm

The top 10cm was made up of brown to yellow-brown vegetative soil with roots. Under this we found silty yellow-brown soil. Scattered charcoal was found from a depth of

about 10cm. A charcoal sample was taken for radiocarbon analysis, which gave a conventional age of 660 ± 80 BP. The soil was also mixed with some natural volcanic stones.

20-40cm

Scattered charcoal was still found at this level in the silty yellow-brown soil mixed with natural rocks 10-30cm in size. Some water rolled river pebbles (c. 4cm large) were mainly found between a depth of 20 to 30cm. A few pieces of charcoal were found at a depth of around 40cm. No other cultural remains were recovered at this level.

40-60cm

The natural stratigraphy was unchanged but the soil contained more clay towards the bottom of the pit. The volcanic bedrock was found at a depth of about 50cm. No additional cultural remains were recovered at this depth

Test pit 7 (north side)

This test pit was located on the north side of the mound, about 15m to the west of the ancient wall that connects Pulemelei with the small mound to the north, and c. 1m outside the rubble base of the structure. The pit was 1 x 1m and oriented north-south.

Stratigraphy

0-20cm

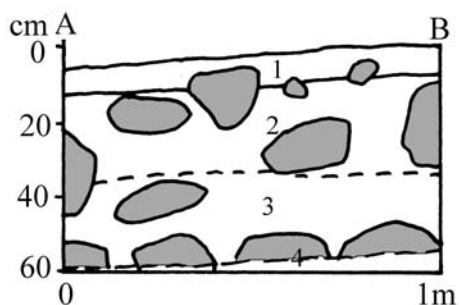
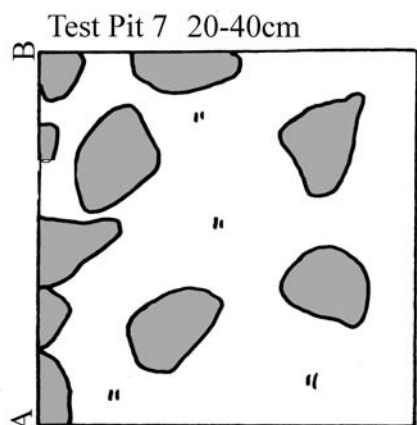
The top 10cm was made up of brown to yellow-brown vegetative soil with roots. Below was a silty yellow-brown soil. Scattered charcoal was found from a depth of about 10cm. The soil was mixed with a few natural volcanic rocks.

20-40cm

Finds of scattered charcoal in silty yellow-brown soil mixed with a few natural rocks 15cm in size continued at this level. Some water rolled river pebbles (c. 4cm large) were mainly found between a depth of 20 to 30cm. A few pieces of charcoal occurred down to a depth of 40cm. No other cultural remains were recovered at this level.

40-60cm

The natural stratigraphy was unchanged but the soil contained more clay towards the bottom of the pit. The volcanic bedrock was found at a depth of about 50cm. No additional find material was recovered at this depth.



Legend to Test Pit 7

1. Brown/yellow brown vegetative soil with roots.
2. Yellow brown fine soil with scattered charcoal, and river stones mixed with natural volcanic rocks.
3. Yellow brown fine soil with natural volcanic rocks.
4. Volcanic rock bottom.

Comments

Earth samples were collected from the east section of this square from 5cm, 15cm, 25 cm, 35cm, and 45cm depth below surface.

Test pit 8 (northeast corner)

This test pit was located 10m out from the northeast corner of the pyramidal structure and about 3m north of the modern wall fence, and right to the west of a 0.6m nicely rounded stone cairn. The pit was 1 x 1m and oriented north-south.

Stratigraphy

0-20cm

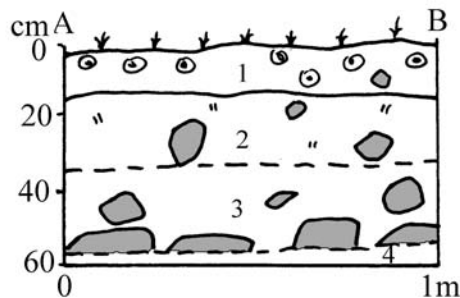
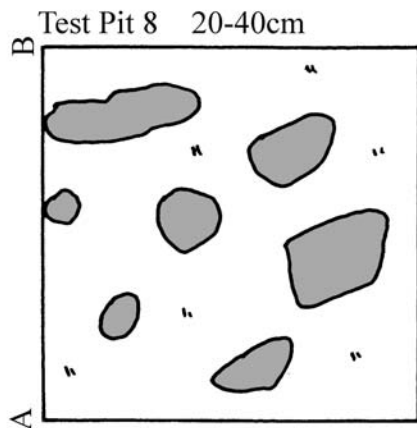
The top 15cm was made up of brown/yellow-brown vegetative soil with roots. Scattered charcoal was found at a depth of c. 20cm silty yellow-brown soil.

20-40cm

Finds of scattered charcoal was found in the silty yellow-brown soil down to a depth of c. 30cm. This soil was also mixed with some natural rocks 10-40cm in size.

40-60cm

The natural stratigraphy was unchanged but the soil contained more clay towards the bottom of the pit. The volcanic bedrock was found at a depth of about 50cm. No additional cultural material was recovered at this depth.



Legend to Test Pit 8

1. Brown/yellow brown vegetative soil with roots.
2. Yellow brown fine soil with scattered charcoal, mixed with natural volcanic rocks.
3. Yellow brown fine soil with natural volcanic rocks.
4. Volcanic rock bottom.

Test pit 9 (between Pulemelei and the north mound)

This test pit was located midway between Pulemelei and the smaller north mound, close to the west side of the ancient wall connecting the two structures. The pit was 1 x 1m and oriented north-south.

Stratigraphy

0-20cm

The top 10cm was made up of brown to yellow-brown vegetative soil with roots. Below was a silty yellow-brown soil. Scattered charcoal was found from a depth of about 20cm. The soil was mixed with a few natural volcanic stones.

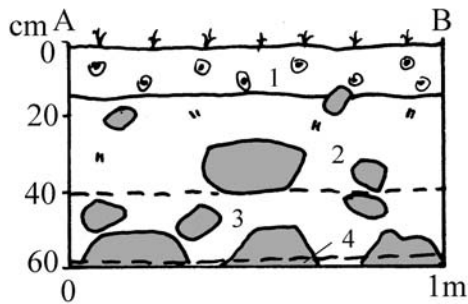
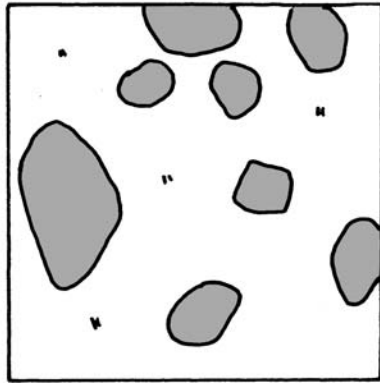
20-40cm

Finds of scattered charcoal was found in the silty yellow-brown soil down to a depth of c. 40cm, a few river pebbles (c. 4cm large), and some natural volcanic stones 10-25cm in size were also found.

40-60cm

The natural stratigraphy was unchanged but the soil contained more clay towards the bottom of the pit. The volcanic bedrock was found at a depth of about 50cm. No additional find material was recovered at this depth.

A Test Pit 9 20-40cm B

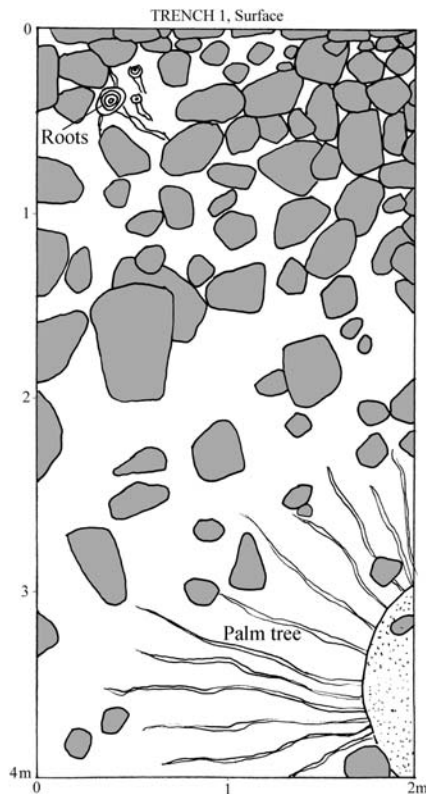


Legend to Test Pit 9

1. Brown/yellow brown vegetative soil with roots.
2. Yellow brown fine soil with scattered charcoal, and river stones mixed with natural volcanic rocks.
3. Yellow brown fine soil with natural volcanic rocks.
4. Volcanic rock bottom.

Test Trench 1 to the south of base platform

Test Trench 1 was located at the south side of the pyramidal structure, just east of the 'ramp' feature where it connects to the base platform wall. Here the original wall of the base platform was still standing, which gave the possibility that a section of intact wall all the way down to the foundation of the structure was preserved. The trench was 2m wide and 4m long and oriented in a east-west direction. All stones within the trench were mapped at 1:20 scale, and photographed before the loose stone rubble was removed.



Removing loose stones

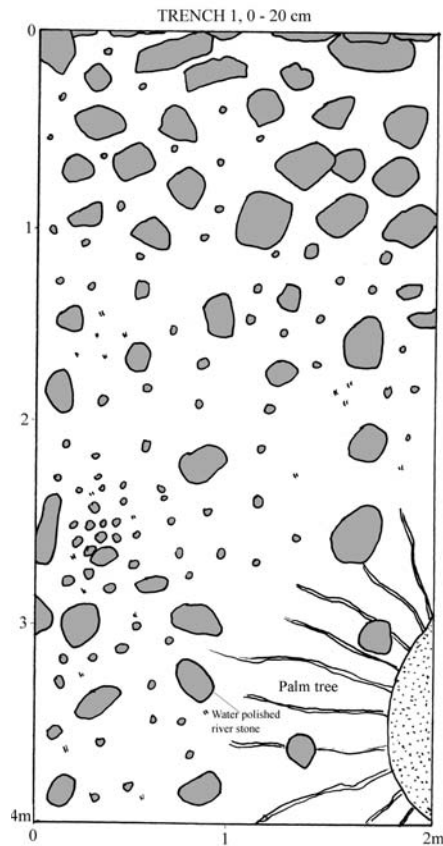
The loose stone material, which varied between 15-60cm in size, was carefully removed by hand. Close to the wall about five layers of stones were observed and the original wall of horizontal slabs could be followed down to about 60cm before the original ground surface was reached. Close to the wall there were stones mixed in with the soil.

The excavation

The trench was divided into 4 squares (1 x 2 m in size). Square 1 was closest to the base platform wall. We started the excavation in square 4, in other words in the south end of the trench 4m out from the wall.

Sq. 1: 0-40cm

In square 1 the top 20cm contained rubble and no charcoal was found at this level. The next 20cm level was also mixed with natural volcanic rocks of the same kind as in the upper layer. A few pieces of scattered charcoal were found. The original wall continued down.



40-60cm (equal to 20-40cm in the rest of the trench)

At this level, we found scattered charcoal close to the foundation stones, which proved to be quite large vertical standing blocks about 70 x 50 x 15cm. The bottom of the block was found at 60cm. (In other words, 1.2 m below the top of the stone rubble). This stone was observed in the east part of the square. The west part of the wall was pressed out, but when clearing this part another vertical slab of equal size could be seen at this side of the trench and was tilted forward. When looking further to the west of this block another even higher vertical stone could be seen there. When checking the top of these blocks a hand could be pressed in between the vertical blocks and the horizontal ones, which is laid on top of them, to feel that there was an earth fill behind the slabs (an earth sample from this deposit was collected)

Sq. 2-4

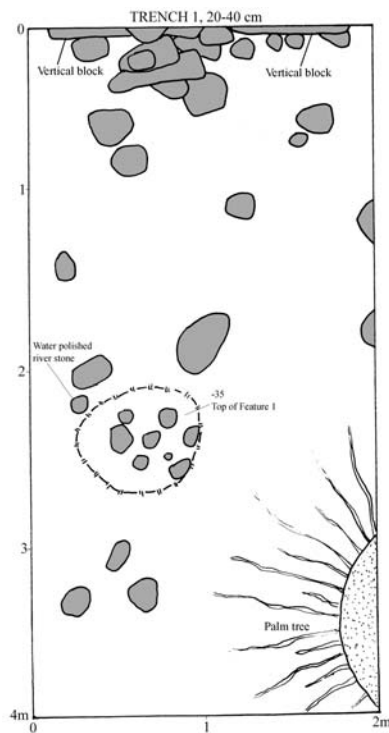
0-20cm

The top 10cm was made up of brown to yellow-brown vegetative soil with a lot of roots from a coconut tree (this tree made it in fact impossible to excavate the east section of this square). Under the vegetation layer we found the silty yellow-brown soil. Scattered

charcoal was found from a depth of about 20cm. The soil was mixed with a few natural volcanic rocks about 15cm size. At about 20cm depth water polished river pebbles (c. 4cm large) was found. The same pattern could be observed in square 2-4.

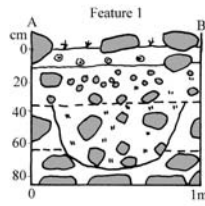
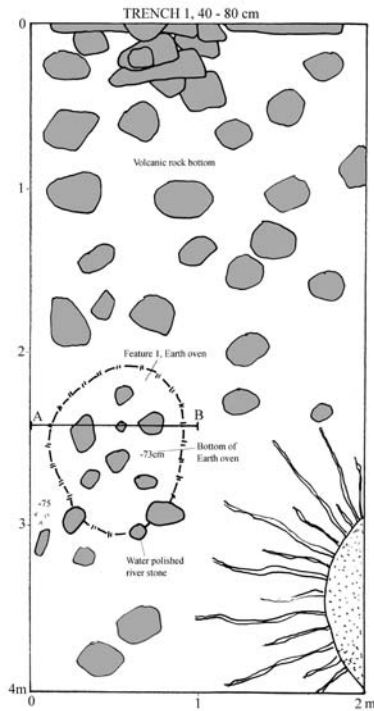
20-40cm

The top of this level makes up the original surface. In the silty yellow-brown soil, scattered charcoal and water polished river pebbles (c. 4cm large) were found mixed with natural volcanic rocks. In square 3, at a depth of about 35-40cm the top of a rounded c. 1m x 85cm, and about 35cm deep earth oven, **feature 1**, 'umu' was found, which contained an abundance of charcoal and stones. It was excavated down to the bottom, which came at a depth of c. 75cm from the surface. A charcoal sample was taken for radiocarbon analysis and gave a conventional age of 1250 ± 100 BP). The east part of this square could not be fully excavated due to the roots of a palm tree.



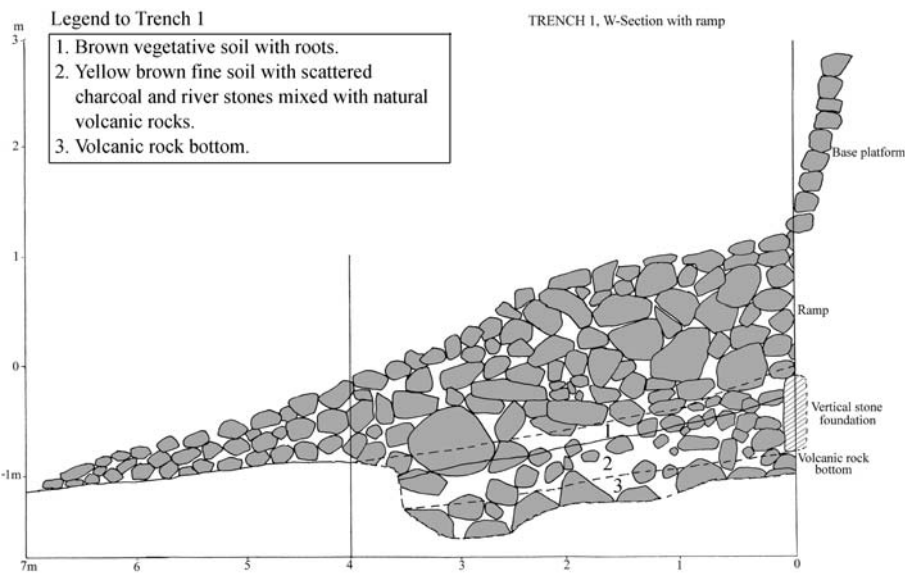
40cm-to bottom

The natural stratigraphy was unchanged but the soil contained more clay towards the bottom of the pit. The volcanic bedrock was found at a depth of about 50-70cm. No additional cultural remains were recovered at this level.



Legend to Feature 1, Trench 1

1. Brown/yellow brown vegetative soil with roots.
2. Yellow brown fine soil with scattered charcoal, river stones mixed with natural volcanic rocks.
3. Gray brown/reddish fine soil mixed with burned stones, ash and charcoal.
4. Yellow brown fine soil with natural volcanic rocks.
5. Volcanic rock bottom.



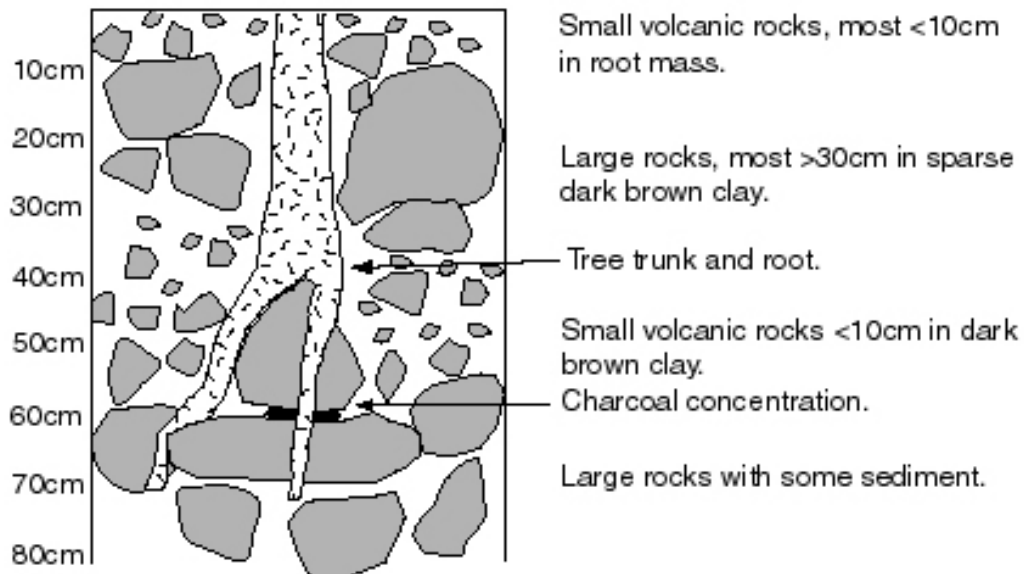
- Legend to Trench 1**
1. Brown vegetative soil with roots.
 2. Yellow brown fine soil with scattered charcoal and river stones mixed with natural volcanic rocks.
 3. Volcanic rock bottom.

W section of Trench 1, and side of ramp feature

Collection of charcoal sample from top platform

The stumps of large trees that had grown on the surface of Pulemelei had the potential to regenerate and were therefore removed by digging out all stumps and tree roots. For larger trees growing on the top platform this involved the removal of rocks surrounding the stump and roots over a surface area of up to 2m², and to a depth of 80cm below

mound surface. During removal of one such stump a concentration of charcoal suitable for radiocarbon dating was recovered.



The location of the stump was surveyed, but its general placement was about 3m north and 5m west of the northern edge of the sunken entrance approach on the east side of Pulemelei. The stratigraphy of the stump hole is shown in the section drawing and it suggests at least two phases of platform building.

The top 10-15cm of the top platform consisted of small and rounded (water smoothed) volcanic rocks (ca.<10cm in size) held in a humic and silty root mass. The smoothed rocks were likely collected from nearby stream and river drainages. Below the small rock were large stones with maximum length dimensions of more than 30cm, in a sparse clay sediment down to about 50cm. From 50-60/65cm there were small volcanic rocks in dark-brown silty clay with occasional larger-sized rocks. Only large stones were noted between 60cm and 80cm depth.

The charcoal sample was found at a depth of 60cm. It consisted of a small concentration about 20cm in diameter lying on the surface of a flat rock. On top of the charcoal was a small boulder that was held in place by root growth. There were no other signs of burning in the hole that might result from *in situ* stump burning, but introduction of the

charcoal from modern activity, such as hole and pit digging, or downward displacement by tree root activity cannot be ruled out. The same activities might also have caused the stratigraphic layering seen in the stump hole, which suggest several phases of platform construction. But this sequence was not recorded in other holes where stumps were removed. The general stratigraphy seen when removing tree stumps from the periphery of the main platform was a top layer of small stones about 10cm deep lying on top of a deposit of large rocks, which continued down the base of the holes (maximum depth ca. 1m below surface).



Carbon concentration found in the top platform.

The integrity of the stratigraphy can be made by conducting a series of small excavations on the top platform to examine the construction sequence in greater detail.

8. Radiocarbon dating

Five of the 35 charcoal samples that were collected during the excavations have so far been analysed. Four of the dates have clear provenance while the fifth sample was of scattered charcoal from the upper layer of a test pit (at 10-20 cm depth). The radiocarbon dates are the first for Savai'i and suggest that activities in the vicinity of the mound span the period AD 620-1690.

Samples from two earth ovens gave dates of: TP 1, 780 ± 120 BP (ANU-11891) with a calibrated 2 sigma range of AD 1020-1400 and Trench 1, 1250 ± 100 BP (Beta-172928) with a calibrated of AD 620-1000. These dated samples appear to follow in sequence and the *umu* in Trench 1 is indicated to represent earlier activity than the *umu* in TP 1. The sample from the charcoal concentration close to the bottom of the TP. 3 excavation at c. 40 cm's depth has an age to 850 ± 50 BP (Beta-172927), and when calibrated has a range of AD 1040-1270. The date is similar to the date of the *umu* in TP 1. The scattered charcoal from c. 10-20cm depth in TP 6 gave an age of 680 ± 80 BP (Beta-177607) and it has a calibrated range to AD 1230-1420. This date follows in sequence of the date for the charcoal concentration in TP 3 and the *umu* in TP 1, and it appears that there is temporal variation in site use.

A charcoal sample from the top platform was also analysed. This sample was found near the bottom of this platform under the roots of a tree that penetrated below the top platform surface (see description above). The sample has an age of 310 ± 90 BP (ANU-11890) and has the most recent calibrated age of AD 1420-1690. It appears as if the top platform might indeed be a later addition. Further investigations have to be carried out to obtain more information about temporal status of the mound and surrounding structures.

9. Conclusions and reconstructions based on test investigations

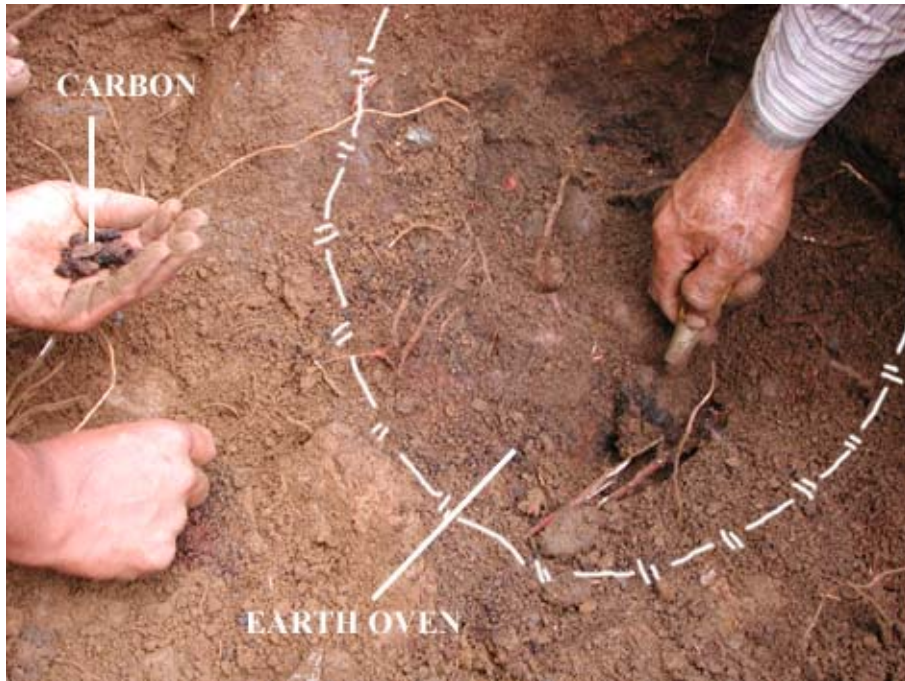
The main goals of the initial investigation focused on clearing, mapping and test-excavating the Pulemelei site, and in this we were relatively successful. The clearing work took more time than we initially expected, but at the same time the experience gave us a good insight as to how future work should be conducted, both concerning the amount of man-power and time needed when investigating large mounds. The Pulemelei mound was cleared down to the single stone and this allowed us to closely observe the structure and to make detailed documentation (by written description/photograph/digital video) in a way not done previously. The work also included clearing of an area about 10m wide all around the base of the structure and a strip following the wall/path up to the smaller north mound which was also cleared. The clearing work was carried out during the whole of the fieldwork period, most intensively during the first two weeks, and thereafter by part of the work team.

The mapping of the site was led by Geoffrey Clark with an electronic theodolite (borrowed from the School of Archaeology and Anthropology at the ANU). The complete Pulemelei structure and surrounding features were mapped and about 730 measuring points allowed us to create a new and accurate image of the Pulemelei site (see Figures pp. 13-14). When all the data points are processed into a computer program we will be able to produce plan drawings, cross sections and three-dimensional models of the site (this work is under way).



Geoff and Fito putting up the theodolite.

The test excavation was led by Paul Wallin, with the aid of four to six workers excavating in two places at the same time. The test pits were located close to the base of the main mound. We excavated nine test pits of 1 x 1m, and one larger trench of 2 x 4m. This resulted in several important discoveries including the collection of charcoal samples from all pits and the trench for radiocarbon dating. The charcoal was mainly collected at a depth of about 20-40cm below the present surface. At this level, we also found one earth oven and a charcoal concentration, which have been dated (see above). It is possible that this scattered charcoal and features stem from the initial clearing of the area done in connection with the building of the large mound, or it results from activities during the building process or even later post-construction use of the mound.

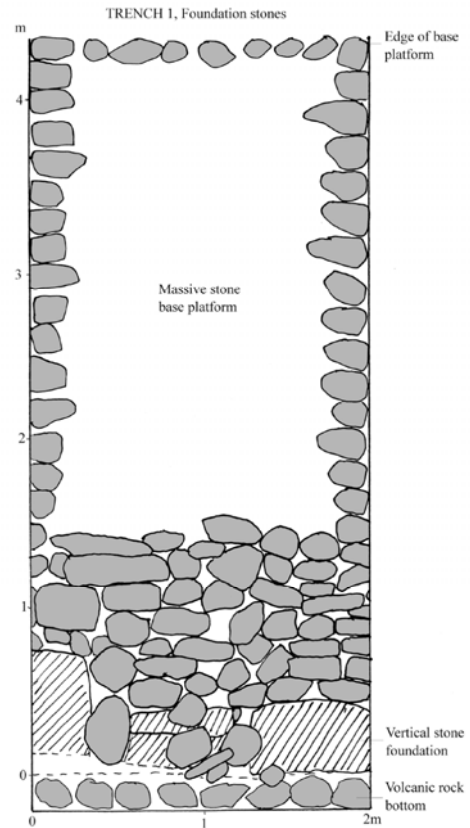


Earth oven found in TP 1.

From the preliminary work, we suggest that the structure known as the Pulemelei mound was constructed in the following way. At the bottom, we appear to have an earth-filled foundation platform, which was retained by vertical slabs of volcanic rock. On top of this was a base platform constructed of local volcanic boulders. Above the base platform is a slanting platform/area, which leads to a vertical-sided top platform built of horizontally-laid slabs paved with water-rounded stones. The top is levelled, but since the mound is built on a slope running downhill from the north-to-south it means that the highest point of the structure on the south side is about 11-12m above ground while the north side is only about 7m above ground surface.

The radiocarbon dates suggest that activities in connection with the mound span AD 620-1690, although the presence of a few ceramic sherds might indicate human use before AD 600. The dates on the two *umu* are different and do not overlap each other but follow in sequence suggesting ongoing use of the area. The oven closest to the mound found in Trench 1 has an earlier age (AD 620-1000) than the sample from the *umu* in TP 1 (AD 1020-1400). The age of the charcoal concentration in TP 3 (AD 1040-1270) is similar to the age of the TP 1 oven. The age of the scattered charcoal found at 10-20cm in TP 6 (AD 1230-1420) also indicates ongoing site use. The late age for the single sample we have from the top platform suggests that it might be the most recent

addition to the mound. Overall, the radiocarbon dates and presence of ceramics suggest that the area has been utilised by Samoans for the last 1500 years at least.



Trench 1, with foundation stones at the bottom

Further investigations and dating need to be conducted to be able to reach more secure conclusions. The preliminary work shows that large structures like Pulemelei are complex constructions that appear have been built over a long-time span. As a result, they are likely to have had multiple uses in the past. In 2003, we will be returning to Pulemelei to carry out more extensive investigations of the main mound and also of surrounding structures to examine questions of chronology and function raised by our initial research.



Ceramic shard found in TP 3, Pulemelei. Width c. 1,5 cm.

10. Suggestions for further investigations

The test investigations clearly show the potential of the Pulemelei site, and finds from the test pits show that there are probably extensive activity areas to be found around the base of the main structure. It would be of great importance to open up more extensive excavation areas, where earth ovens, postholes and so on might be found. A promising area to investigate could be the ground near the southeast corner as we have already found two ovens in this area. Another area to investigate is located to the southwest part of the structure where we found some potsherds. The top platform should also be systematically investigated, to find out if it was really constructed after the base sections of the mound. Other trenches should also be excavated along the base of the structure in areas where undisturbed sidewalls are located to find out if the foundation platform with vertical blocks is a continuous foundation wall or is a feature associated with ramp construction.

Another part of the project is to investigate the possibilities of mound reconstruction. To see if the original foundation base of the structure can be traced under the stone rubble is a first step to be able to clear the base of the structure from the stone rubble that has fallen from the sides. It is suggested that such a clearing could first be done on the east-southeast side of the structure. This should allow an initial phase of reconstruction work to be undertaken and results to be evaluated. Careful investigation should also be carried out on the north side of the structure to see if remains of an entranceway exist on this side.

Additional features found on ground level around the main structure, such as stone pavements, house foundations, small stone heaps (possibly prehistoric graves), pathways and walls should also be investigated, as well as the smaller mound to the north of the main structure. In addition to these features mounds of different sizes should be investigated to obtain structural data to compare to the Pulemelei site. Parallel with the investigations of the Pulemelei structure is the search for early ceramic settlement in the area.

We also strongly suggest use of ground penetrating radar on the top of Pulemelei and other additional mounds and walls to try to get additional information about the internal

construction of the structures. This would tell us whether the mounds are entirely built of stones or whether there might be an earth mound in the bottom of the structures or cavities within it.

The heavy rains that were frequent in October 2002 made stratigraphical excavations almost impossible. We therefore suggest that further excavations at the site be conducted between July and September when the chance of heavy rainfall is reduced.

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11. Literature

Ayres, W. S., J.A. Wozniak, G. Robbins and E. Suafo'a 2001. Archaeology in American Samoa: Māloatā, Malaeimi and Malaeloa. *Pacific 2000. Proceedings of the Fifth International Conference on Easter Island and the Pacific*. C.S. Stevenson, G. Lee and F.J Morin eds.: 227-235. Bearsville Press. Easter Island Foundation.

Clark, J.T., and D.J. Herdrich 1993. Prehistoric Settlement Systems in Eastern Tutuila. *Journal of the Polynesian Society* 102:147-85.

Clark, J.T., and M.G. Michlovic 1996. An Early Settlement in the Polynesian Homeland: Excavations at 'Aoa Valley, Tutuila Island, American Samoa. *Journal of Field Archaeology* 23:151-67.

Clark, J.T., P. Sheppard and M. Jones 1997. Late Ceramics in Samoa. A Test Using Hydration-rim Measurements. *Current Anthropology* 38:898-904.

Davidson, J. 1974. Samoan Structural Remains and Settlement Patterns. *Archaeology in Western Samoa*. Volume II, Bulletin 7. R.C. Green and J. Davidson eds: 225-46. Auckland: Auckland Institute and Museum.

Dickinson, W. R. and R. C. Green 1998. Geoarchaeological context of Holocene subsidence at the Ferry Berth site. Mulifanua, Upolu, Western Samoa, *Geoarchaeology* 13:239-263.

Freeman, J. D. 1944. The Vailele Earthmounds. *The Journal of the Polynesian Society*. vol. 53:145-162.

Golson, J. 1969. Preliminary Research: Archaeology in Western Samoa, 1957. *Archaeology in Western Samoa*. Volume I, Bulletin 6. R.C. Green and J. Davidson eds:14-20. Auckland: Auckland Institute and Museum.

Green, R. C. 1969a. Excavation at SU-Va-1. *Archaeology in Western Samoa*. Volume I, Bulletin 6. R.C. Green and J. Davidson eds:108-113. Auckland: Auckland Institute and Museum.

Green, R. C. 1969b. Excavation at Va-1 1963-64. *Archaeology in Western Samoa*. Volume I, Bulletin 6. R.C. Green and J. Davidson eds:114-137. Auckland: Auckland Institute and Museum.

Green R.C., 2002. A Retrospective View of Settlement Pattern Studies in Samoa. *Pacific Landscapes. Archaeological Approaches*. T.N. Ladefoged and M.W. Graves eds. :125-152. Bearsville press. Easter Island Foundation.

Green R. C., and J.M. Davidson, eds. 1969. *Archaeology in Western Samoa*. Volume I, Bulletin 6. Auckland: Auckland Institute and Museum.

Green R. C., and J.M. Davidson, eds. 1974. *Archaeology in Western Samoa*. Volume II, Bulletin 7. Auckland: Auckland Institute and Museum.

Hewitt, N. J. 1980. Tulaga Fale. *Archaeological Investigations in Western Samoa*. J.D. Jennings and R.N. Holmer eds: 42-50. Pacific Anthropological Records 32. Honolulu. Department of Anthropology, Bernice P. Bishop Museum.

Holmer, R. N. 1980. Mt. Olo Settlement Pattern Interpretation. *Archaeological Investigations in Western Samoa*. J.D. Jennings and R.N. Holmer eds: 93-103. Pacific Anthropological Records 25. Honolulu. Department of Anthropology, Bernice P. Bishop Museum.

Hougaard, M. P. 1969. Investigations at Inland Vailele. *Archaeology in Western Samoa*. Volume I, Bulletin 6. R.C. Green and J. Davidson eds:177-81. Auckland: Auckland Institute and Museum.

Hunt, T. L., and P. V. Kirch 1988. An Archaeological Survey of the Manu'a Islands, American Samoa. *Journal of the Polynesian Society* 97:153-83.

Jennings, J. D., and R. N., Holmer 1980. *Archaeological Investigations in Western Samoa*. Pacific Anthropological Records 32. Honolulu. Department of Anthropology, Bernice P. Bishop Museum.

Jennings, J. D., R. N. Holmer and G. Jackmond 1982. Samoan Village Patterns: Four Examples. *Journal of the Polynesian Society* 91:81-102.

Jennings, J. D., R. N. Holmer, J. C. Janetski and H. L. Smith 1976. *Excavations on Upolu, Western Samoa*. Pacific Anthropological Records 25. Honolulu. Department of Anthropology, Bernice P. Bishop Museum.

Kirch, P. V., and T. L., Hunt, eds. 1993 *The To'aga Site: Three Millennia of Polynesian Occupation in the Manu'a Islands, American Samoa*. Contributions 51. Berkeley: Archaeological Research Facility, University of California.

Scott, S. D. 1969. Reconnaissance and Some Detailed Site plans of Major Monuments of Savai'i. *Archaeology in Western Samoa*. Volume I, Bulletin 6. R. C. Green and J. M. Davidson eds. :69-90. Auckland: Auckland Institute and Museum

Suafo'a, E. 2001. History in the National Park of American Samoa: Field Methods and Archaeological Approaches. *Pacific 2000. Proceedings of the Fifth International Conference on Easter Island and the Pacific*. C.S. Stevenson, G. Lee and F.J Morin eds.: 205-212. Bearsville Press. Easter Island Foundation.

Taomia, J. M. E. Archaeological Survey on the Tafuna Plain and Adjacent Areas, Tutuila Island. American Samoa. *Pacific 2000. Proceedings of the Fifth International Conference on Easter Island and the Pacific*. C.S. Stevenson, G. Lee and F.J Morin eds.: 213-217. Bearsville Press. Easter Island Foundation.

Terrell, J. 1969. Excavations at Su-Va-4. *Archaeology in Western Samoa*. Volume I, Bulletin 6. R. C. Green and J. M. Davidson eds. :158-176. Auckland: Auckland Institute and Museum

Thompson, A. 1927. Earthmounds in Samoa. *The Journal of the Polynesian Society*
36:116-116-121.

12. Appendices: Radiocarbon dates

Lab no.	Location	Depth, Provenance	Material	¹³ C/ ¹² C Ratio	Conventional Radiocarbon Age BP	Calibrated d AD 2-sigma
Beta-172927	Test pit 3	40 cm, charcoal conc.	Charcoal	-27,5 0/00	850±50	1040-1270
Beta-172928	Trench 1	40 cm, from earth-oven	Charcoal	-26,1 0/00	1250±100	620-1000
Beta-177607	Test pit 6	10-20 cm, scattered char.	Charcoal	-26,6 0/00	660±80	1230-1420
ANU-11890	Top platform	60 cm, under flat stone beneath tree root	Charcoal	-24±2.0	310±90	1420-1690
ANU-11891	Test pit 1	40 cm, from earth-oven	Charcoal	-24±2.0	780±120	1020-1400

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