



KON-TIKI FIELD REPORT SERIES **VOLUME 9/2004**
EXCAVATIONS OF MARAE STRUCTURES ON HUAHINE
October and November 2004

by **Paul Wallin,**
and Reidar Solsvik

EXCAVATIONS OF MARAE STRUCTURES ON HUAHINE

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THOR HEYERDAHL'S RESEARCH FOUNDATION
THE KON-TIKI MUSEUM 2004

Paul Wallin
and Reidar Solsvik

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CHAPTER 1

BACKGROUND AND METHODOLOGY

1. Introduction

The excavations reported below are a continuation of research initiated in the spring of 2002 to study the settlements and *marae* structures in the area around Maeva village, on the Northeast coast of Huahine, in the Leeward group of the Society Islands. The 2004 field season was devoted in its entirety to investigation of *marae* site, and test-excavations were conducted on three *marae* structures.

Research in Maeva District at the north end of Huahine Island has identified numerous archaeological resources important to the prehistory of the area (Sinoto, 1996, Sinoto & Komori, 1988, Komori & Sinoto, 2002). These include religious structures such as *marae*, residential areas, agricultural features, and specialized structures that include historically described chief's meeting platforms called *Tahua Umu Pua`a* (Emory, 1932 Sinoto, *et al* 1980). Excavations show that many of the inland sites contain intact cultural deposits that represent prehistoric and early historic occupation of the area from about AD 1000 to AD 1800. In the literature of the early historic period for this region, Maeva is noted as an important centre for the chiefly lineages of Huahine (Henry, 1934).

1.1 The history of the current project

In 2001, Dr. Yosihiko H. Sinoto, of the B. P. Bishop Museum on Hawai'i, invited Dr. Paul Wallin of the Kon-Tiki Museum, Oslo, Norway, to participate in his work in Maeva on the Northeast tip of Huahine. Participation in two field seasons, during fall 2001 and spring 2002, resulted in an expressed interest in initiating excavation of *marae* structures in this part of Huahine. During this same period, it was decided to combine the research resources in a joint project were Dr. Sinoto's associates continued the investigation of the costal area of the Te Ana land division, which they have initiated on the request of the Ministry of Culture, Government of French Polynesia (Komori and Sinoto 2002:1) in 2001. Dr. Paul Wallin, and the Institute for Pacific Archaeology and Cultural History at the Kon-Tiki Museum was going to initiate test-excavations of *marae* structures.

Since 1979, Dr. Sinoto and his associates Eric Komori and Elaine Rogers-Jourdane, and later Toru Hyashi, have conducted a survey program of the Mata'ire'a Hill and adjacent areas, recording *marae* structures, terraces, house foundations, and other features (Sinoto and Rogers-Jourdane 1980; Sinoto, Komori et al. 1981; Sinoto, Komori et al. 1983). They have also completed a program of test-excavations of house sites in the upper part of the Te Ana land division (Zone 1) (Sinoto and Komori 1988; Komori and Sinoto 2002).

Dr. Sinoto's first interest in the area stemmed from an extensive program of *marae* restoration, which he initiated in collaboration with the Tahitian Tourist authorities in the early 1960s (i.e. Sinoto 1969). Based on this work, and the above mentioned survey of the Mata'ire'a Hill, Dr. Sinoto and his associates have developed morphological classifications (Sinoto, Komori et al. 1981:7-9) of the Huahine *marae*, and Dr. Sinoto have also established typologies and chronologies for the Tahitian *marae* complex in general (i.e. Sinoto 1996). However, these classifications and

typologies have not been tested through archaeological excavation, and a program of test-excavation of *marae* structures was important to complement the survey and test-excavations of settlement sites.

From this, Dr. Sinoto and Dr. Wallin worked out five main research objectives for the joint research program to be initiated in the fall of 2002.

This is also the final report from the project “Local Developments – Regional Interactions to the Service de Patrimoine, Punaauia, Tahiti.

1.2 Research Objectives

1. To date the initial construction, through non-destructive test-excavation, of the *marae* structures of the Te Ana land division, and to document their morphological and typological developments. This work was begun in August 2002 (Solsvik 2003).
2. To investigate the cultural chronology and use of the extensive, water lodged settlement area at the coastal end of the Te Ana land division, Zone III, which extends to the northeast. These house sites are thought to be contemporaneous with the *marae* structures located along the Fauna Nui lagoon lake. This is a continuation of work initiated in 2001 (Komori and Sinoto 2002).
3. To investigate the changes in landscape and ecological conditions of the coastal part of the Te Ana land division. Also, a continuation of work initiated in 2001.
4. To date the initial construction and investigate structural developments of various *marae* structures on the Mata’ire’a Hill and along the coast, to complement data from the Te Ana land division.
5. To re-survey *marae* structures of Huahine, in particular around Maeva village, with a special reference to the landscape these structures are situated in. In this way a historical record of these structures might be constructed, and social analysis of *marae* structures can be undertaken. This work have been completed for the main structures located around Maeva village (Wallin and Solsvik 2002).

Before the 2003 field season, Dr. Paul Wallin became the Principal investigator of the project, which is financed jointly by the B. P. Bishop Museum, Hawai’i, and the Kon-Tiki Museum, Oslo.

1.3 Site location

Huahine is part of the Leeward group of the Society Islands, and situated at 16° 5’ south latitude and 151° 2’ west longitude, about 160 km northwest of the island of Tahiti, and consists of two main volcanic islands with about 112 square km of dry land. Huahine Iti, the smallest, is located to the south-southeast of the slightly larger Huahine Nui.

The district of Maeva comprises the north and north-eastern part of Huahine Nui that surrounds the ‘sacred’ mountain Moua Tapu. The field seasons of 2004 focused on

one *marae* structure in the district of Maeva and two *marae* structures in the district of Fare.

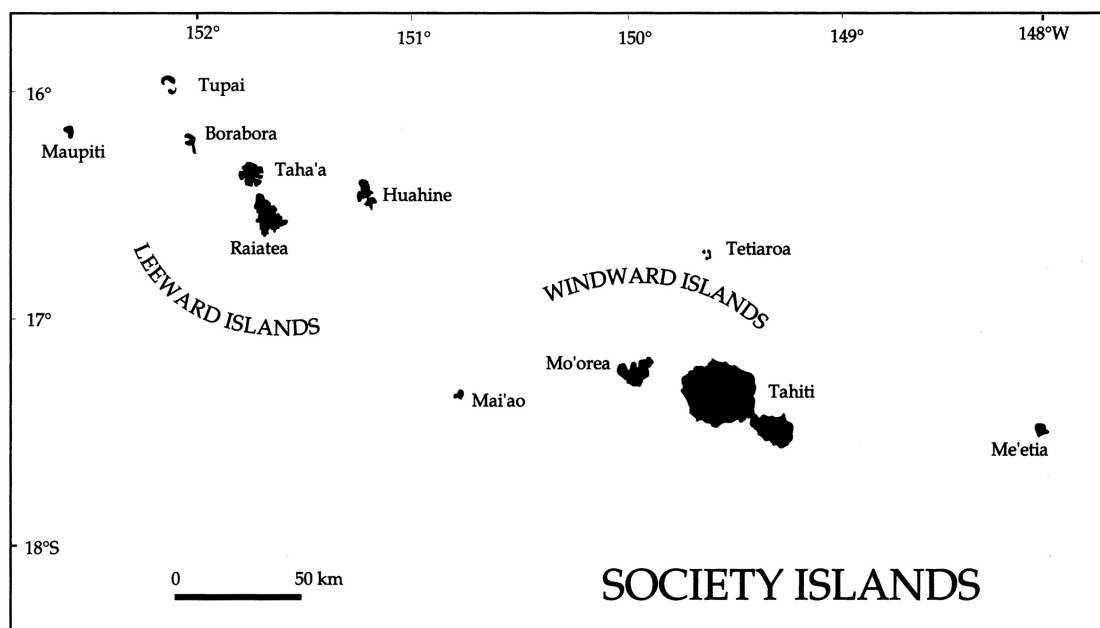


Fig. 1: Map of the Society Islands, showing the location of Huahine in the Leeward group.

Marae on land Tiamaue: This *marae* is located behind the village of Fare in the valley of Tepua, on the property of Richard Lai, named Tiamaue. This property is located on the left side of the valley. No name was associated with this structure, so we have given it the same name as the tract of land it was located on.

Marae on land Tuituirorohiti: This *marae* is located on land Tuituirorohiti, which is said to be one of three parts of the Fa'ahia land division. It is located midway between the fire station and the town of Fare, just towards the coast from the road. It is on the property of Chez Lovina. Mark Eddowes has recently claimed that this is *marae* Tahuea (Eddowes 2003:58-59) an important *mare* of proto-historic Huahine.

Marae on land Haupoto: This *marae* is located a few kilometres to the South of Maeva village, just besides the road on the mountain side. On the opposite side of the lagoon is the Heiva Hotel of Motu Ovaei. It is next to the house of Jean-Marie Faatauirā, on a land called Haupoto. No name was associated with this structure, so it is named after the piece of land on which it is located.

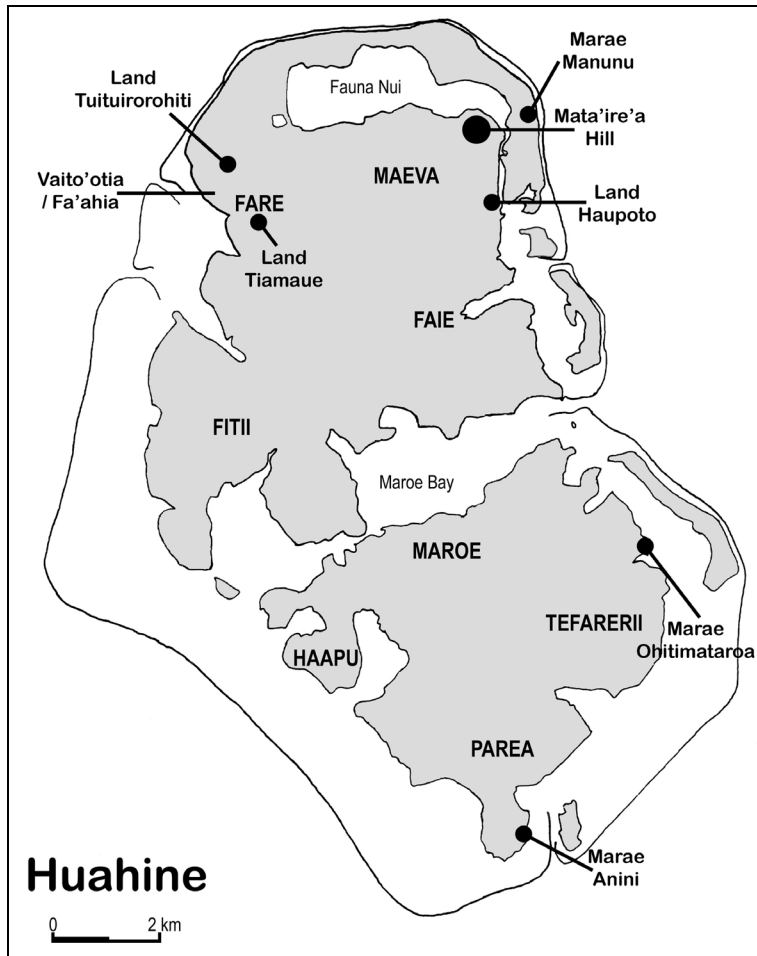


Fig. 2: Map of Huahine with the location of archaeological sites discussed in the text.

1.3 Documentation and Methods employed

All artefacts from the excavations are deposited with the Service de la Culture et du Patrimoine in Punaauia, Tahiti. The charcoal samples and sample of bones for ^{14}C dating purposes are on loan to the Kon-Tiki Museum for analysis.

Digital photographs of all materials selected for analysis are included in CD-ROMs deposited with the Service de la Culture et du Patrimoine in Punaauia, Tahiti. Original plan and section drawings, field notes, photographs, artefact lists etc. are deposited at the the Kon-Tiki Museum.

In preparation for excavation a plan drawing of each structure was made, using a plane table, alidade, and measuring tape, in scale 1:50 or 1:100. Any units or trenches were located on these plans. Where feasible sections through the long axis of the structure and through the long axis of the *ahu* was also drawn in scale 1:50 or 1:100. Prior to excavation, trenches were mapped in scale 1:20. The trenches were usually placed perpendicular to constructional elements of the *marae*, such as trenches cutting through the *ahu* or units excavated along a terrace or wall of the *marae*. Excavation proceeded in 10 cm spits when natural layers could not be identified, and all soil was dry-screened through 1/4-inch mesh screens.

Human bones encountered during excavation was re-deposited when they stemmed from a burial context or it was skull bones clearly from a sacrificial context. All human remains were examined in the field by an osteological-trained archaeologist.

To expand the basis for dating the initial construction and use phases of these *marae* structures, samples of shells and coral was taken from structures outside excavated context.

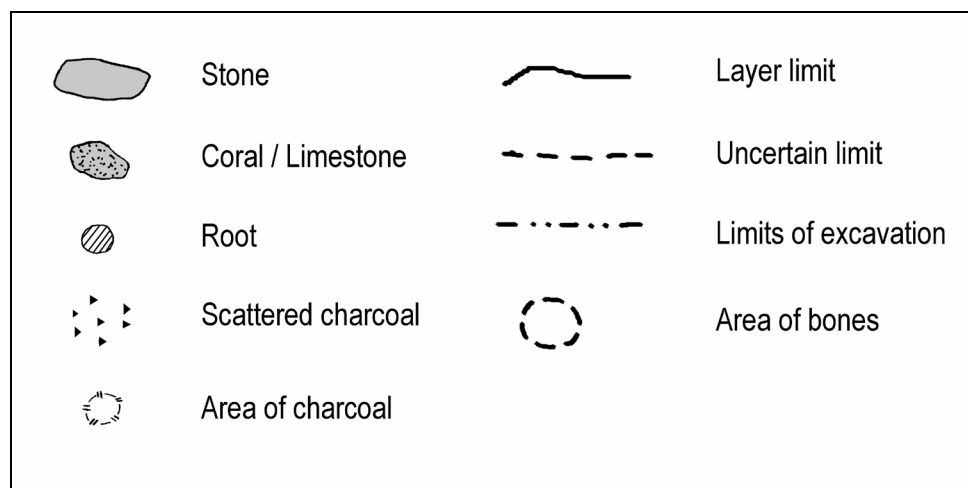


Fig. 3: Legend of symbols used in the plan and section drawings.

1.4 Itinerary

Reidar Solsvik arrived on Huahine on Tuesday 28. August and Paul Wallin came on the 21. October.

Marae Tiamaue: 30. September – 7. October, and 18. October.

Marae Tahuea: 23. October – 2. November.

Marae Haupoto: 4. November – 9. November.

1.5 Acknowledgement

Financial support for this project was provided by funds from the Kon-Tiki Museum, by the Norwegian Research Council, and by a grant of Nkr. 25.000 from the Institute for Comparative Research in Human Culture to cover travel and other expenses for the junior author.

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Our gratitude goes to the people of Huahine, represented by Mayor Marcelin Lisan who provided encouragement for the project. Permission to work on land Tiamaue was kindly given by Richard Lai; permission to work on land Tuituirorohiti, which is part of the Fa'ahia land division, was kindly given by Virginia Richmond; and

permission to work on land Haopoto was kindly given by Tefaataumarama Timiona Dit Atamu.

A very special thank goes to Mark Eddowes for help, support, and much hospitality during our stay on Huahine. A special thanks to Peni and Sophie Teururai who have supported the work in so many ways over many years. We would like to thank Dorothy Levy, Marty and Moe Temahahe for information, help, and support, as well as Pu'ai Tinirau who is a most excellent foreman and friend in the field.

The following people participated in the fieldwork and their energy, enthusiasm and perseverance contributed greatly to the research effort.

The crew of this project: Ph.D. Paul Wallin, Kon-Tiki Museum, Norway,
M.A. Reidar Solsvik, UKM, Univ. in Oslo, Norway,

Local workers: Pu'ai Tinirau, foreman,
Martel Teavae,
Toto Tiihiva Gerome
Teva Parker
Hiro Oopa
Giles Oopa
Jose Tefaataumarama
Jean-Marie Faatauiria

CHAPTER 2

MARAE TIAMAUE

2. Marae Tiamaue, on land Tiamaue, district of Fare

2.1 Descriptin of the marae September 2004

This is a small family *marae* located next to the house of Romuald Lai and has not been surveyed before. It is situated on the beginning of a slope that must have continued up the valley side, before a terrace was cut for Mr. Lai's house. A small dry stream is located just to the NE of the *marae*.

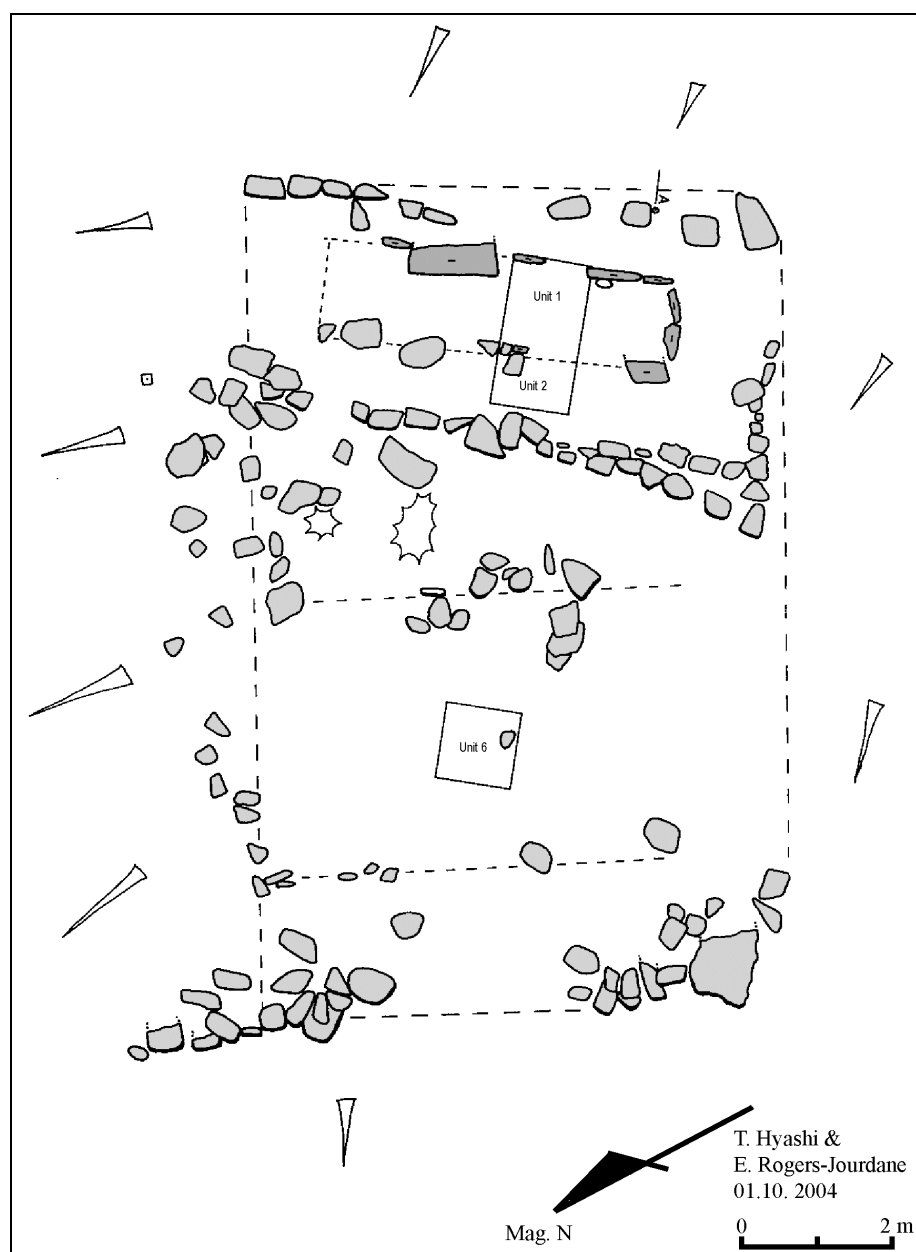


Fig. 4: Plan drawing of marae on land Tiamaue, Fare district, Huahine.

The *marae*, c. 9 x 6 m, is located on a slope with the *ahu* on the upslope end and oriented with the long-axis of the *marae* almost SE-NW (*ahu* at SE, upslope end); the court-yard consists of two retaining terraces of basalt stones filled with earth. The

first, which has the *ahu* located on it, is c. 3-4 by 6 m, and have probably been paved with flat basalt boulders. This terrace / pavement is quite distinct on its SE and NW sides and on the SW end. On the NE end there is virtually no stones left in the terrace / pavement, and one can but wonder whether there was a distinct line of boulders here at any time. The ground breads off quite distinctively at the end of the *marae* and slopes gently down to a small stream to the NE of the *marae*. The second retaining terrace is 5-6 by 6 m and being c. 0.5 – 0.6 m high on the down-slope end on the outside.

The *ahu* is a classic coral and basalt slab *ahu*, with 7 coral and 3 basalt slabs remaining. One of the basalt slab is exceptionally long and thin (c. 1 m long). It does not seem to have been filled with stones very high up, although presence of small basalt stones (size of a small fist) indicate that it has been filled at one point.

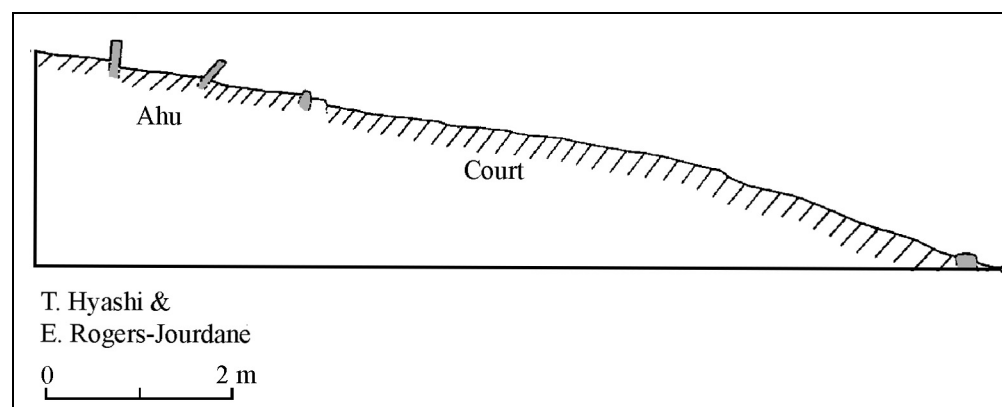


Fig. 5: Transection, marae on land Tiamae.

In the centre of the second terrace, just 1.5 – 2 m down-slope from the first terrace, there is a cluster of 10-12 stones that either forms the remaining part of a third retaining terrace or marks the place for a square structure seen on the *marae* structures on land Te Ana (ScH-2-65-1 and ScH-2-66-1). These stones are just further out in the court-yard than we generally find on *marae* in the Society Island.

Just down-slope from the NE part of the second terrace, there is a small shrine or burial structure consisting of six – 6 – basalt stones on end, forming two side conjoining sides of a square enclosure, with a basalt stone upright in the middle, c. 21-23 cm high.

2.2 Test-excavation of the ahu and courtyard

Trench I, a 1 by 7 m trench was laid out perpendicular to the long-axis of the *ahu*, with the first unit inside the *ahu*. The reference point is the E corner of the uppermost unit. Units 1, 2, and 6 was excavated.

Units 1 was excavated down to ± 30 cm b.s. and Unit 2 was excavated down to ± 20 cm b.s.; then the NE part of these trenches was taken down with a shovel to c. ± 40 to ± 45 cm, where sterile red clay began to appear in the uppermost part of Unit 1. In the first level, 0-10 cm b.s. we found a lot of modern debris resulting from using the *marae* as a rubbish dump. The rest consisted of a mix of brown soil with red and grey clayish soil, with stones, decomposing stones and infrequent specks of charcoal.

Unit 6 was excavated down to ± 10 cm b.s.; then only the N $\frac{1}{4}$ was excavated down to ± 30 cm b.s., with the same result as for Units 1 and 2.

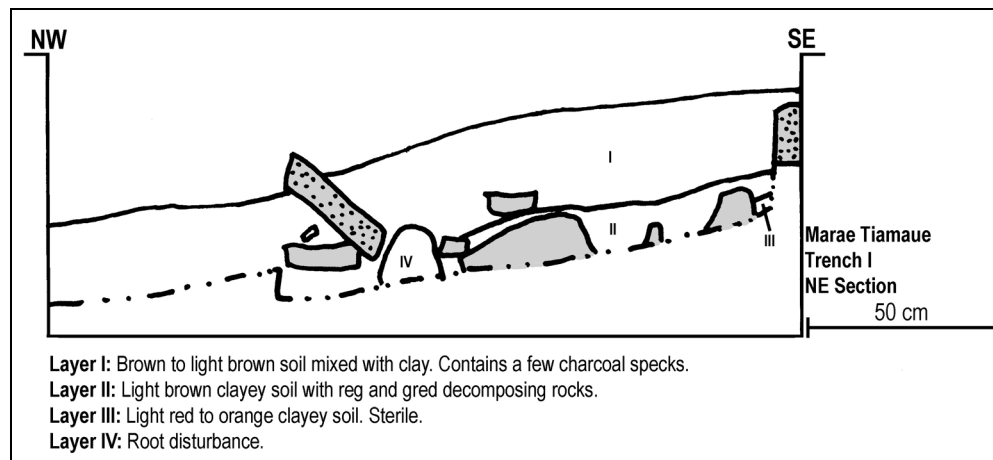


Fig. 6: Trench I, N section drawing.

No artefacts or cultural waste, nor bone fragments or charcoal samples suitable for dating were encountered. There were a few pieces of charcoal in the soil, but totally without context. The area excavated had in some place clearly been used for agricultural purposes, but most likely this is in modern times.

2.3 Summary of investigations at Tiamaue

Based on this lack of any cultural deposits, except very modern stuff on the top, excavations were discontinued. The soil of the *marae* has evidently been used for some agricultural activity (turned over), but not to any great extent, indicating that this activity is fairly recent. On the other hand the lack of any kind of bones or shell is interesting. The chemical composition of the soil here should not be too different from the ones found in Te Ana, and this clearly demonstrates that deposition of large amounts of bones did not take place on this *marae*. There can be two reasons for this. One, it might be that the *marae* was founded quite late during proto-historic times and therefore it was not used much within the ancient religious system. Two, this *marae* is either a family or agricultural *marae* and offering of pigs or humans probably was not required on this structure. It might be that only vegetables produce were offered up on this *marae*, which would explain the lack of bones from excavation of this structure.

CHAPTER 3

MARAE ON TUITUIROROHITI

3. Marae on land Tuituirohiti, Fa'ahia land division, district of Fare

3.1 Description of the marae October 2004

The *marae* is situated in an old groove of *ati* (iron-wood) trees just behind Chez Lovina on land Tuituirohiti, which is one part of the Fa'ahia land division, in the district of Fare. This structure also has an *fare-pote*, c. X by X m associated with it, South of the courtyard.

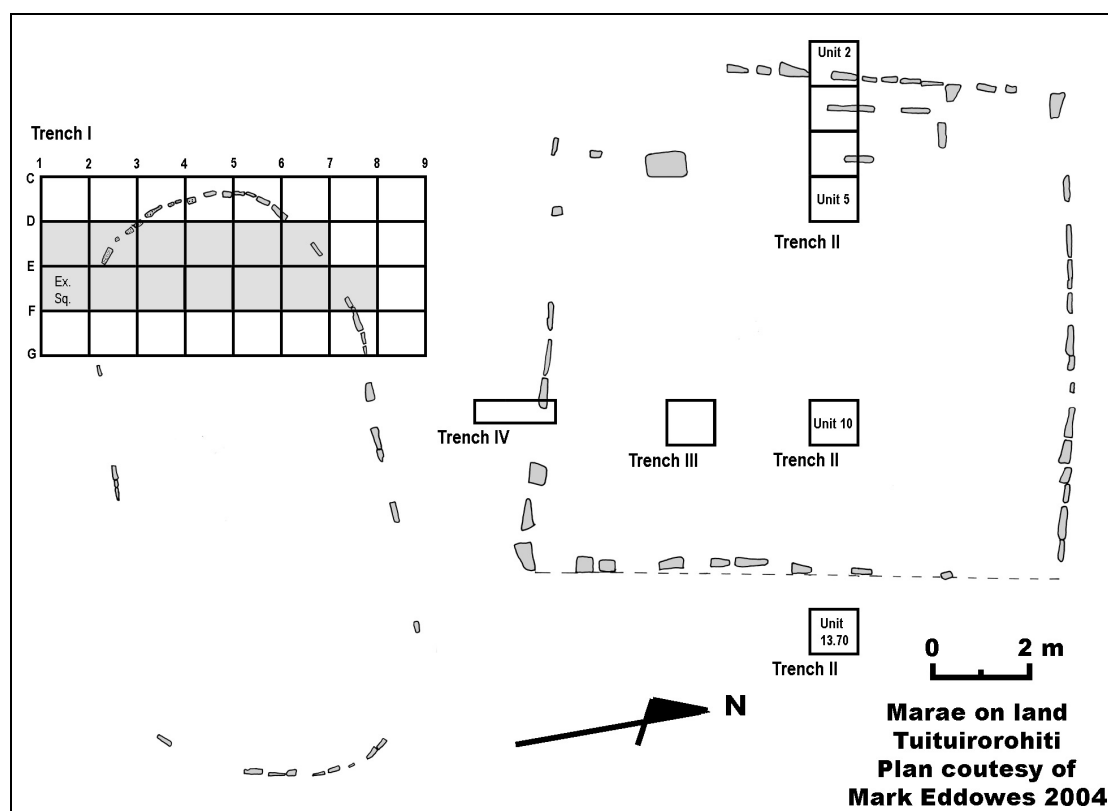


Fig. 7: Plan drawing of marae and the associated round-ended house, showing location of test-units.

The *marae* is a low platform type with a square courtyard, c. 14 by 14 m, outlined by basalt slabs on end, and a few remaining pavement stones of large basalt flagstones, one course high.

The *ahu*, which is oriented almost N-S and c. 6 m long, is constructed predominantly of basalt slabs about X m high, but two big *ati* (iron-wood) trees is growing on both ends of the *ahu* and makes it impossible to see the whole construction. The fill consists of coral, the size of a small fist, and larger flat basalt boulders.

3.2 Excavations at the site

Two major trenches was dug; Trench I through the West-end of the *fare pote* where units were named with letters (A, B, C, D, ...) going from West to East and numbers

(1, 2, 3, 4, ...) going from South to North and the south-western corner designates the unit; Trench II, running from the W end of the *marae* to the E end, cutting the *ahu* perpendicular to its long-axis. Here, the units were given number designations from West to East, and six units were excavated: Unit 2, 3, 4, and 5, in relation to the *ahu* itself, Unit 10 out on the courtyard, and Unit 13.70 at the back of the *marae* platform.

3.2.1 Trench I, areal excavations of a fare-pote

Nine square meters of the western end of the *fare-pote* were excavated in spits of 10 cm. The soil inside the house consisted of soil mixed with coral sand, grey to dark-grey with charcoal dust in some places, and sterile soil was reach between ± 10 and ± 15 cm b.s.

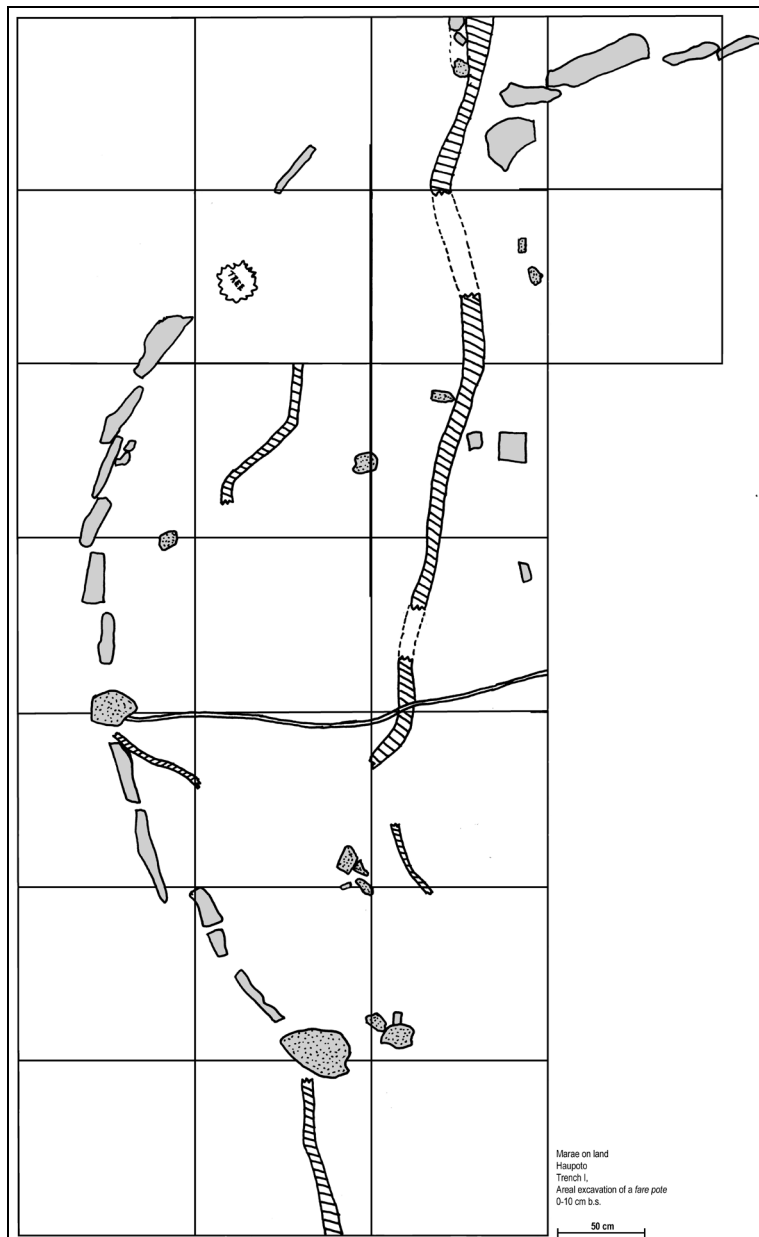


Fig. 8: Trench I. Plan-drawing, 0-10 cm b.s.

No postholes nor a clearly defined floor of the house was found and the finds consisted mainly of pig bone and teeth fragments, a few fish bone fragments, and a couple of pieces of pearl shell, one which might have been worked. Consequently, there is no evidence for this house ever being inhabited, the few bone and shell fragments could have been deposited both before or after the curb-stones for this *fare-pote* were stuck in the ground. Pieces of pig bones were found all over the site and in trench II a piece of whalebone and a piece of pearl-shell fish-hook was found. People have utilized this area, but there is no data tying specific functions to the *fare-pote* foundation next to the *marae*.

3.2.2 Test-excavations of the *ahu* and courtyard of the *marae*

3.2.2.1 Trench II

Four square meters, units 2, 3, 4 and 5 from the west end of the *marae* platform and through the *ahu* were excavated in order to establish a cross-section through the *ahu*, although without moving the slabs in the *ahu* walls. The slabs of the *ahu* were set into a layer of sand mixed with small coral lumps, probably a beach-flat; the bottom part of the fill consisted of a mix of sand and coral lumps is used as fill with some flat basalt stones on top; and the top part of the fill consisted of lumps and pieces of coral. Some smaller, fire-damaged basalt stones, probably from an *umu* was also found in the top part of the fill. In between the stones, both outside and inside the *ahu* we found small fragments of pig bone and a few human bone fragments and one tooth.

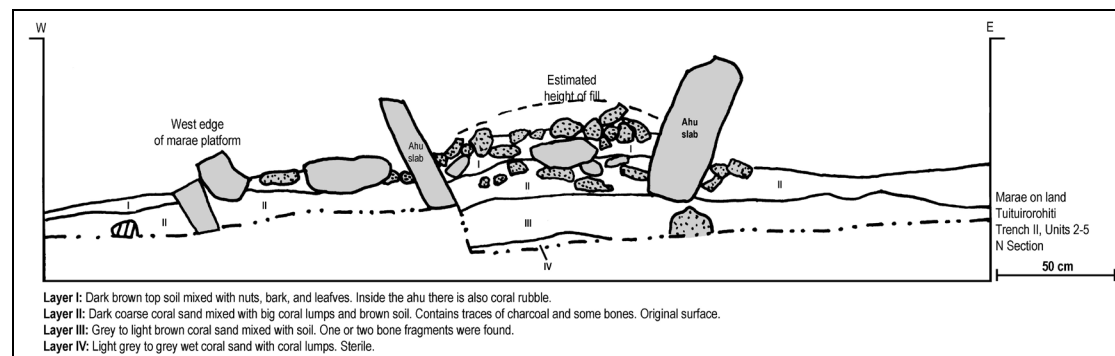


Fig. 9: Trench II, N section drawing.

Unit 10 was 1x1 m large, located 10 m from 0 (origo) in a central position on the *marae* court in trench II. The top 0-8 cm consisted of dark brown vegetative soil. Only a few shells were found. The soil at the depth of 8-17 cm consisted of brown-grey coral sand. Between 17 and 25 cm the coral-mixed sand was grey, and between 25-40 cm the sand was a grey to light brown sterile beach sand.



Fig. 10: Trench II, Unit 10, N section drawing.

In the layers between 8-24 cm a few scattered bones, as well as, shells were recovered. One pig bone showed cut marks. In the same layer it was found scattered *umu* stones with the size of 5-10 in diam.

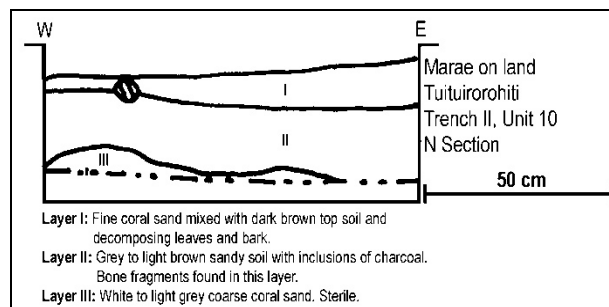


Fig. 11: Trench II, Unit 10, N section drawing.

Unit 13.7 was located 13,7 m from 0, at the front end of the court yard marked with stones on end. The 1x1 m large square was excavated right behind these stones outside the courtyard. The top 0-10 cm consisted of strongly mixed vegetative dark brown soil. The soil between 10-25 cm consisted of brown grey coral sand. Between 25-30 the sand was greyish and between 30-40 it consisted of sterile grey to light brown beach sand. Between 10-25 cm the sand was mixed with a few bones. The fragment of a pearl shell fishhook was found at a depth of 14 cm b.s.

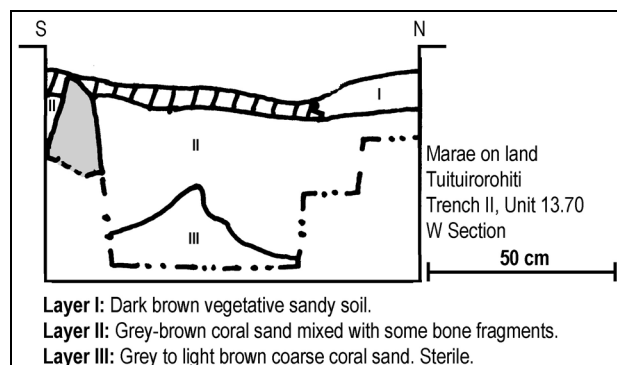


Fig. 12: Trench II, Unit 13,70, W section drawing.

3.2.2.2 Trench III

The trench is situated 10 m from 0 and 3 m to the S. The main trench was 1x1 m, but extended 2x0,5 m in the NE part towards the E. The trench is located in a central position of the *marae* court. The top 0-15 cm consisted of vegetative grey sand. Scattered shells and pig bones were discovered in this layer. In this grey sand at a depth of c. 15 cm a concentration of coral stones c 5-10 cm in diam. were found in the E part of the square. Among these stones was some scattered charcoal. The stone concentration was called Feature 1 (F1). A mix of coral and basalt stones continued down in F1, in the E part of the square, to a depth of about 35 cm b.s. At 30-35 cm a charcoal lens was visible and at the base of the feature there was a layer of basalt *umu* stones c. 10-12 cm in diam. large. The total size of the feature was discovered by extending the trench by 2x0,5 m to the E, by doing this we could see that F1 obviously was a rounded *umu* about 1,5-2m in diam. Among the *umu* stones in F1 we found the remains of different shells and sea urchins. No bones were recovered inside the *umu*. Several 14C samples were secured from different levels of this feature.



Fig. 13: Bottom and E section of umu, found in Trench III.

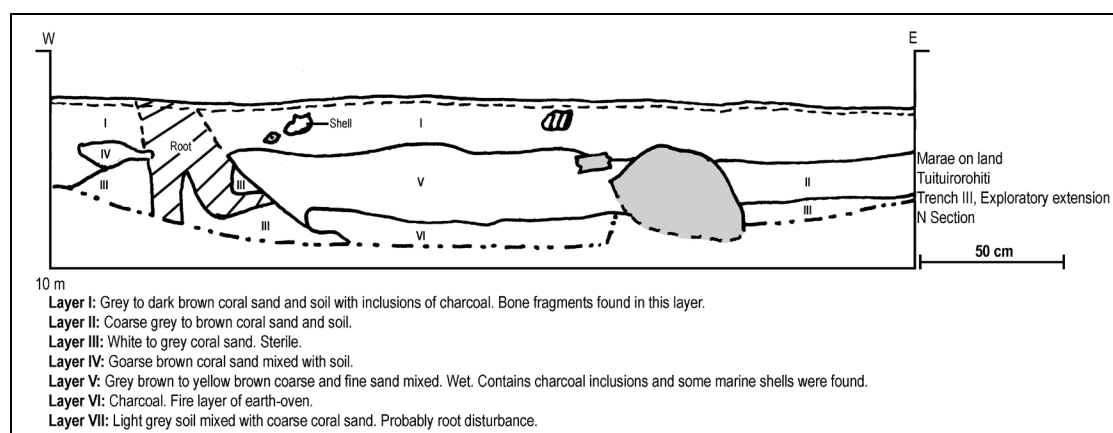


Fig. 14: Trench III, N section drawing.

3.2.2.3 Trench IV

Trench IV was a 1.4 by 0.5 m test-unit at the N side of the *marae* court, establishing a section through the *marae* court/platform. An additional reason for the location of the trench was that the surface soil was stained black and indicated an area with extensive burning. Fire-damaged stones and charcoal appeared in the S end of the trench, that is outside the *marae* platform.

The excavation was discontinued due to time limitations and when we encountered a solid mass of burned coral at c. ± 25 cm b.s. It might be that this trench touched the outskirts of an *umu* that we could not locate. In the trench was found bone fragments from pig, dog, bird, and some sea-urchin spines, mostly collected from outside the *marae* platform.

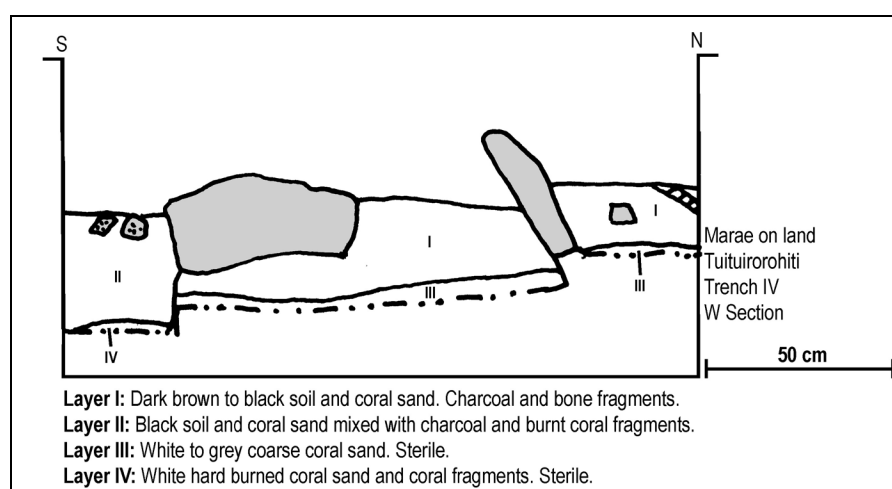


Fig. 15: Trench IV, W section drawing.

3.3 Summary of investigations at marae on land Tuituirohoiti

The excavations produced evidence of the utilization of the area in the form of pig, dog, fish, whale, and bird bones; pieces of worked shells and one part of a pearl-shell fish-hook, both on the courtyard, outside the *marae*, and “inside” the *fare-pote* located S of the *marae*. Most of these finds, except the pig and human bones found in the excavation of the *ahu*, were found in layers situated underneath the courtyard of the *marae*, and, hence, pre-dating its construction. No finds were connected to use of the *fare-pote* next to the *marae*, and it is suggested that either it was not used as a habitation house or it was constructed just before the site was abandoned.

Centrally located on the courtyard we encountered an earth-oven that pre-dates the construction of the *marae*. A variety of bone and shell fragments as well as sea-urchin spines were recovered from this *umu*. There is three possibilities with regards to the function of this earth-oven: 1) It is evidence of settlement of the area prior to the construction of the *marae*; 2) It was fired as part of ceremonies to consecrate the site when the *marae* was established; 3) This *umu* constitutes evidence for early ritual activity unrelated to the *marae* site.

Two charcoal samples and one piece of coral from the fill of the *ahu* were sent to Waikato Laboratory for radiocarbon analysis. The two charcoal samples were first

sent to Dr. James Coil, Berkeley, for wood identification and then pieces of short-lived taxa from these samples were AMS dated. The first sample, Wk-17062, from ± 35 to ± 40 cm of the earth-oven found in trench III were composed of *hibiscus tiliaceus*, and produced a data of 441 ± 31 calibrated to AD 1436-1510, 1554-55, and 1575-1621 at 2 sigma. The second sample, Wk-17063, was also from charcoal found at c. ± 40 cm b.s. in the earth-oven found in trench III. This sample were composed mainly of *hibiscus tiliaceus* and *artocarpus sp.*, or breadfruit tree, and pieces of the *hibiscus tiliaceus* were AMS analysed and produced a date of 438 ± 32 or calibrated to AD 1437-1511 and 1549-1622 at 2 sigma. A third sample was analysed on a piece of coral from the fill of the *ahu*, but this date came out as 2429 ± 36 and must be considered as too old. During excavation of the *ahu* two pieces of coral were collected, one from the top and one from the bottom of the *ahu* fill, with the intention of dating one of them to see if this would date the construction of the *ahu*. The coral sample sent for dating was from the bottom of the *ahu* and since the original surface under the *ahu* consisted of sand and coral pieces, it is likely that this piece of coral originates from the natural surface under the *ahu*. If this is the case, this date would approximately date the formation of this beach flat. Presently we can state that the earth-oven was fired between AD 1430 and 1600, and that the *marae* was constructed sometime after this event, whether or not shortly after is not known.

CHAPTER 4

MARAE HAUPOTO

4. Marae Haupoto, on land Haupoto, district of Maeva

4.1 Description of the marae November 2004

This is a classic “costal” *marae* with two *ahu* of coral slabs located almost due N-S and an *ava'a* structure which is located between, and not in front of, the two *ahu*. The courtyard is paved with basalt flagstones. The size of the complex with both *ahu* is c. 20 by 14 m.

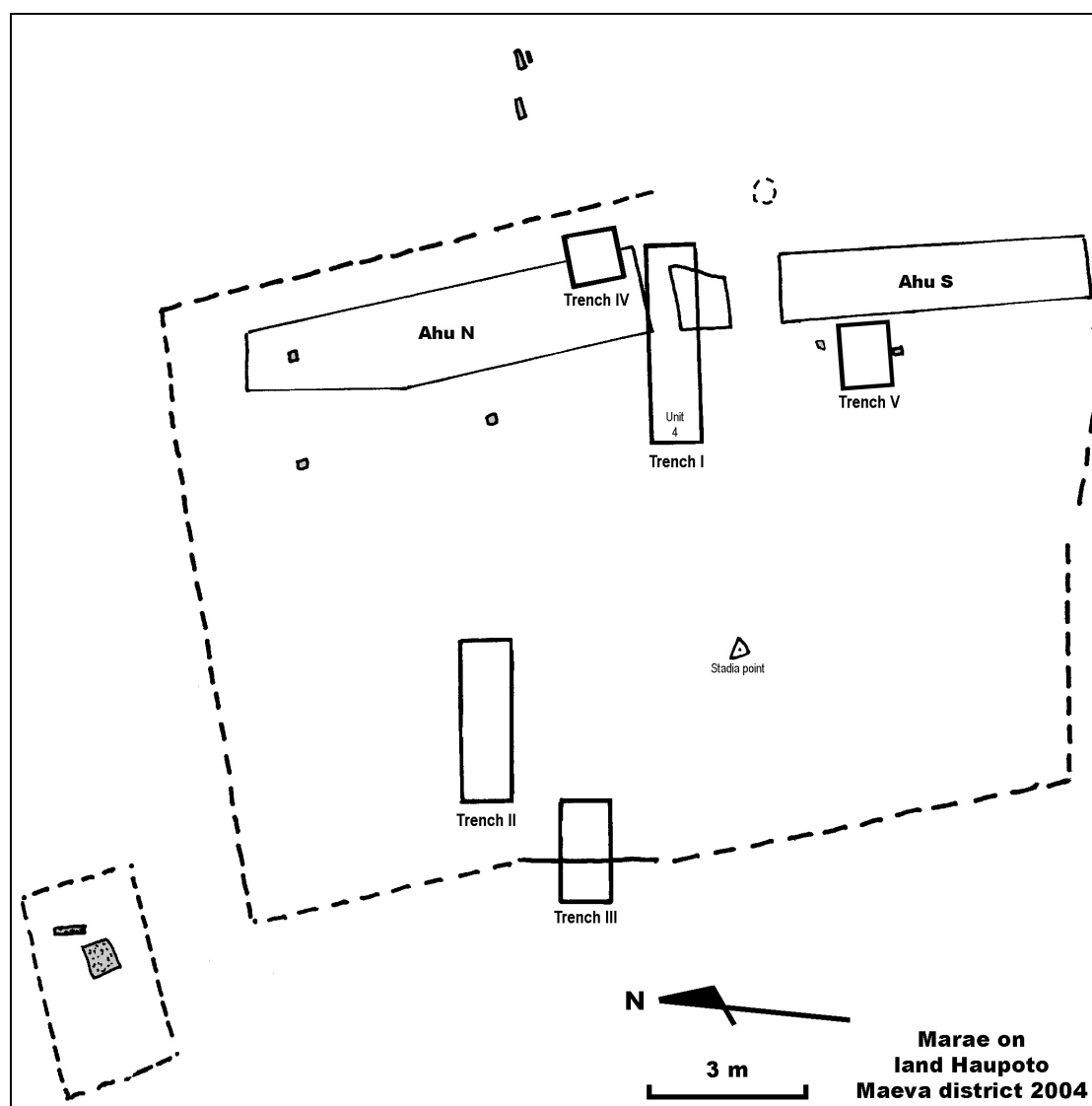


Fig. 16: Plan drawing showing location of test-units.

Ahu 1 (to N): A coral slab *ahu*, c. 8 m long by 1.3 to 1.6 m wide, and has 17 remaining slabs standing, with heights from ranging from 0.43 to 0.95 m. Average height of the slabs are 0.7-0.8 m. In the front wall, 0.7 m from the N end, there is a gap, c. 0.95 m wide, which is filled with about 10 stacked basalt slabs. Inside the *ahu*, 0.7 m from the N end and 0.4 m from the back wall, there is a basalt upright 0.39 m high (dimensions 0.17 by 0.8 m). C. 1.4 m out into the courtyard and 0.9 m from the

N end there is a basalt upright 0.17 m high (dimensions 0.14 by 0.1 m). About 4 m to the South of this second upright, a third basalt upright is found 1.1 m into the courtyard and this is 0.33 m high (dimensions 0.14 by 0.12 m). Behind this *ahu* there are five or six upright basalt stones that may have been parts of boundary markers (see map).



Fig. 17: Marae on land Haupoto. Photo taken on last day of excavation.

Ahu 2 (to S): A coral slab *ahu*, c. 7 m long and between 1.1 and 1.25 m wide. It has 13 remaining coral slabs standing. At least two slabs are missing in the back wall of this *ahu*, and possible one missing slab at the N end wall. The gaps in the back wall had been filled with stacked basalt slabs that had fallen into the *ahu*. The remaining coral slabs are between 0.41 to 0.74 m high. There is no upright inside this *ahu*, but one basalt upright is located 0.7 m from the N end and 0.5 m out into the courtyard. It is 0.11 m high (dimensions 0.15 by 0.12 m). About 1.25 m to the S of this, another basalt upright is located 0.65 m out into the courtyard. This second upright is 0.19 m high (dimensions 0.23 by 0.13 m). At the far N end of the *ahu*, c. 12 m out into the courtyard, a broad slanting basalt stone is found, 0.65 m across. It may be a backrest for this second *ahu*, but it could very well be a dislodged pavement stones. Several were found, but none so close to an upright position. The placing of this stone, at the far N end of the *ahu* suggest that it is not an backrest.

Ava'a: The *ava'a* is a small square enclosure, 1.25 by 1.25 m and between 0.2 and 0.25 m high, built of coral slabs on end and with a layer of fairly large basalt flag stones as a pavement on top. It is built in line with the front slabs of the two *ahu* structures.

Courtyard: The courtyard is paved with big basalt flagstones and seems to have run all around the two *ahu* structures. Behind *Ahu 1* there is evidence of pavement stones next to the back wall and c. 1 m out from it. Behind *Ahu 2* pavement stones are found only c. 0.75 m out from the back wall. The southern limit of the courtyard seems to have been in line with the S end wall of *Ahu 2*. The N side of the courtyard is more

difficult to delimit. It extends at least 1.1 m North of the N end wall of *Ahu 1*, but a few basalt flagstones are found on a line c. 2.7 m North of the N end wall.

Auxiliary platform: A small, roughly square area paved with basalt flagstones and with one large coral slab, probably taken from *Ahu2*, centrally placed at the eastern end of this area, might constitute an auxiliary platform for this *marae* complex. It is located WNW of the north western corner of the *marae* and is c. 5 by 3.5 m. It was not possible to clearly define the shape of this structure and therefore not possible to state for sure what function it had. Information from the son of the landowner, Jean-Marie Faatauro, suggested that it was a historic-period grave. It is also possible that it has been a late period *marae* structure with the centrally placed coral slab functioning as a backrest.

Grave under coconut tree: About 2 m behind the southern *ahu* of *marae* Haupoto human remains were found visible among the roots of a fallen coconut tree. Most of the cranial bones were still in situ for example frontale, parietale, occipitale, and parts of maxilla and mandibula. Some of the facial bones were missing. The occipital bone had a marked protuberantia which indicates a male individual. The right mandibula were complete with teeth that showed a quite worn surface but they had no caries but some tartar was present. The teeth indicate an adult individual probably somewhere over the age of 30+ years. Other bones found were some cervical vertebrae, a part of the clavícula, some costae and a part of the humerus. In short this find indicates that an adult man around 30+ years of age sometime was buried/dug down behind the *ahu* with the head pointing towards the *ahu* (or inland to the W). These bones were re-buried close to the original place under a flat stone behind the same *ahu* (one head bone was collected for possible 14C determination).

4.2 Test-excavations of the *ahu*, *ava'a*, and courtyard

Four trenches were excavated on this structure. Trench I, a 1 by 4 m trench cut the North end of the *ava'a* and into the courtyard, with unit 1 in the East part of the trench. Trench III, a 1 by 2 m trench, was located at the West side of the courtyard back of the pavement. Trench IV, a 1 by 1 m unit, was located inside the South-eastern corner of the North *ahu*; and Trench V, a 1 by 1.2 m trench, was located in between the two uprights of the South *ahu*; Trench II at the back of the *marae* pavement was abandoned due to extreme amounts of roots and large stones. Modern glass was encountered in the top five cm in nearly every trench, except for trench IV inside the *ahu*, where modern glass fragments were found deep in the fill and this trench was therefore discontinued.

4.2.1 Trench I

Trench I was a 1 by 4 m trench located between the north *ahu* and the *ava'a* structure, and oriented east-west and perpendicular to the *ava'a*.

This trench produced evidence for two layers of pavement that might be from two different time periods. In unit 3, flush with the top of the lowermost pavement stones a buried upright was found that had been set c. 40 cm into the ground. Under this lowermost pavement a layer of charcoal mixed with soil c. 10 cm thick was found in

units 2 to 4. A few fragments of bones, two basalt flakes, and 1 adze was also found in this trench.



Fig. 18: A buried upright set in a layer with plenty of scattered charcoal, Trench I.

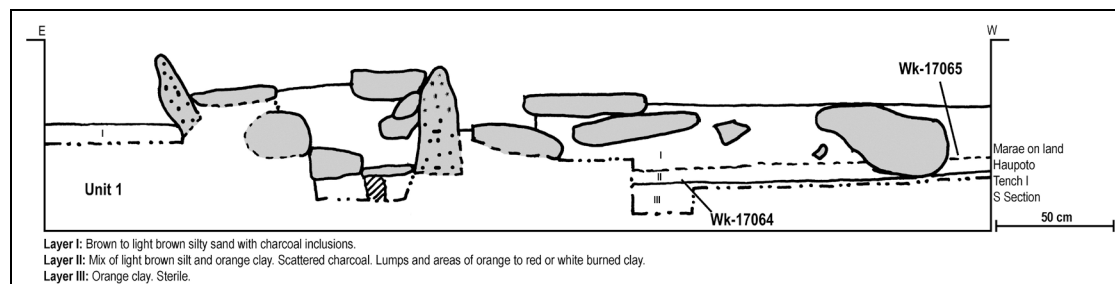


Fig. 19: S section drawing of Trench I, showing the locations of charcoal samples Wk-17064 and Wk-17065.

4.2.2 Trench II

The trench was outlined as a 1x3 m EW oriented trench located in front and behind a courtyard upright situated on the NW part of the *marae* courtyard. The trench was full of court paving stones and big roots, and was abandoned after the removal of the clayey top soil. No finds were detected in this trench.

4.2.3 Trench III

This trench was outlined as a 1x2 m EW oriented trench. It was placed at the limit of the courtyard in front of the *ahu*. Unit 1 was placed on the court, and Unit 2 just behind the edge of the pavement stones. Unit 1 was finished after the clayey top soil was removed, and contained no find materials.

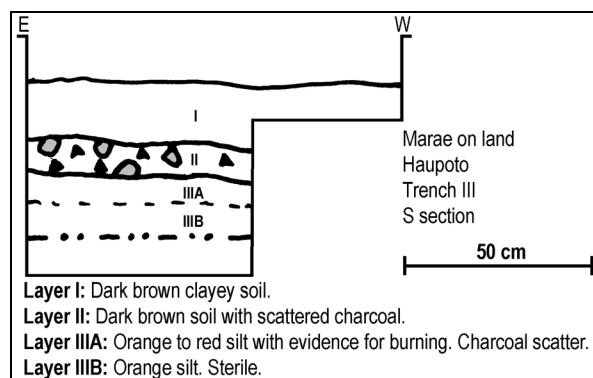


Fig. 20: Marae on land Haupoto, Trench III, S section drawing.

4.2.3.1 Trench 3, Unit 2

The top 0-10 cm contained brown vegetative clayey soil with intruding roots. No finds were recovered in this layer. At a depth of about 10-15 cm some scattered *umu* stones c 10 cm in diam. were found in the clayey soil. At a depth of 15-20 cm more of the burned *umu* stones of the same size were found now mixed with spread charcoal fragments in a grey brown soil. At the depth of 20-30 cm there were more *umu* stones, scattered charcoal, and at the bottom reddish burned soil was observed.

The weather condition was very poor with heavy rains, and this trench was filled with water, and the soil became extremely clayey, which made more detailed observations difficult. But obviously the remains of an *umu* and proof for in situ fire was detected under the courtyard at this spot of the *marae*. However, no bones or shells were found in this trench.

4.2.4 Trench IV

This thrench was outlined as a 1 by 1 m unit located at the southeast corner of the north *ahu*. C. half the unit was located inside the *ahu* and it was only this portion that was excavated, in order to search for datable material.

Three layers of the stone fill inside the *ahu* were exposed and historic glass and china were found in all layers. Consequently, the excavation was stopped at this point and the fill of the *ahu* restored. One human tooth was found as part of the fill.

4.2.5 Trench V

This trench was excavated in order to expose what we believed to be a small localized *ava'a* structure in front of the South *ahu* (both *ahu* had such features) between two uprights found just in front of the *ahu*. The excavation revealed that the stones had been set on top of the basalt pavement on top of another buried upright in line with the buried upright found in trench I. The top of this upright was also flush with the top of stones in the lowermost pavement stones. The same layer of charcoal mixed with soil, c. 10 cm thick, was discovered in this trench as in Trench I.

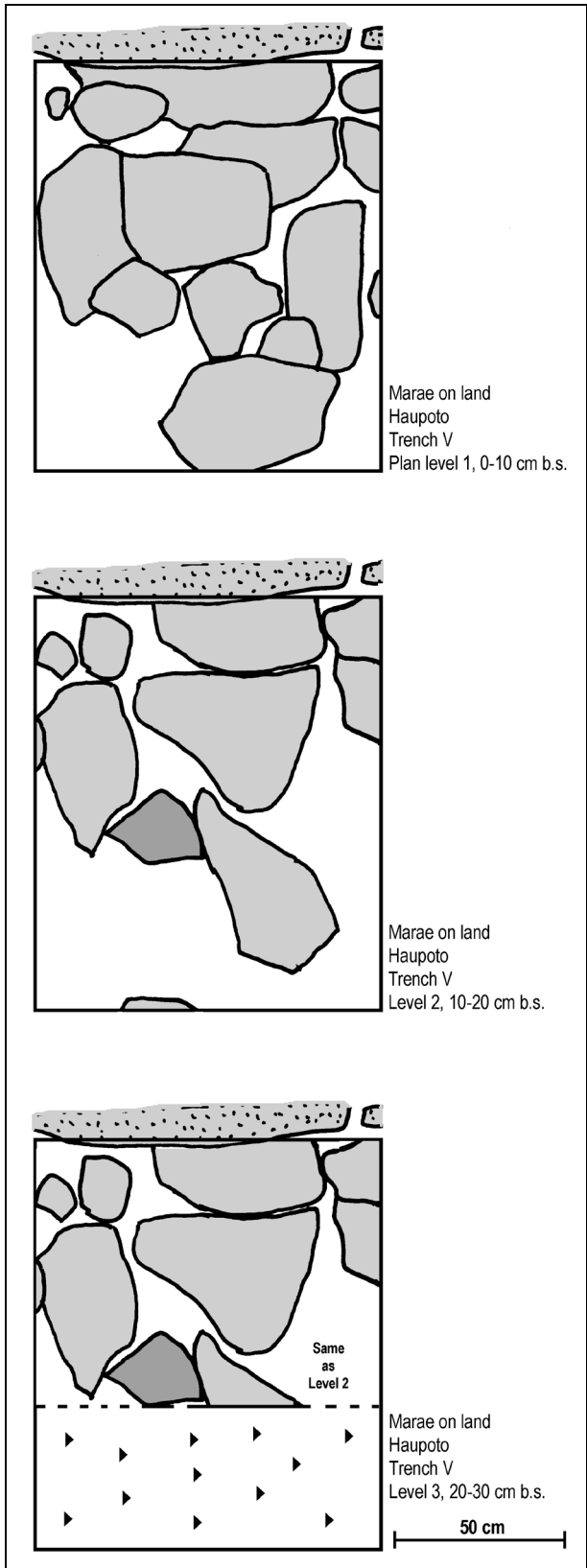


Fig. 21: Trench V, Plan drawing.



Fig. 22: Trench V prior to excavation. A small basalt upright can be seen in the lower left corner, while the buried upright in Trench V is not yet visible.

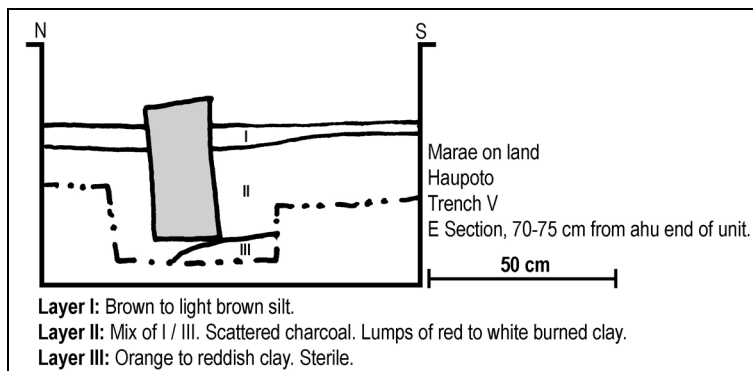


Fig. 23: Trench V, E section drawing about 70 cm out (W) from the ahū-end of the unit. The top layer of this section begins -30 cm b.s.

4.3 Summary of investigations at marae on land Hauptoto

A layer of mixed soil and scattered charcoal, with a layer of burned clay underneath was found in both trenches I, III, and V. The top of a similar layer was found in trench II before it was discontinued. This layer of charcoal and burned soil indicates that the whole site was cleared by fire some time prior to the construction of a *marae*. Excavations revealed two layers of pavement stones indicating two phases of construction at this site. Initially, our investigations at the site had to be postponed

several days because the entire area was flooded due to heavy rain, and this was probably the case during prehistoric times as well. *Marae* structures are frequently constructed at sites that are seasonally flooded. This is seen at several of the *marae* structures located at the lagoon at Maeva Village, in the case of *marae* Ohiti Mataroa on Huahine Iti, and are illustrated on drawings by Tobin from the a *marae* in the Pare district of Tahiti in 1792 (Garanger 1979:9, fig. 5). The swampy ground at the site might be the reason for multiple layers of pavement stones, however, the location of two upright basalt stones buried in the ground with their top flush with the top of the lowermost pavement stones argues against such an environmental explanation. That these two uprights were aligned indicates that they were deliberately buried in these positions. These uprights are not evidence for an reconstruction of the *ahu* enclosures at this *marae* because the two uprights would not have been visible even when the lowermost pavement was exposed, but their deliberate concealment points to two phases of pavement in front of the two *ahu* structures present today.



Fig. 24: Buried upright before and during excavation. The buried upright is level with a prior pavement of the *ahu*.

Two samples of charcoal and one piece of coral were sent to the Waikato Laboratory in New Zealand for radiocarbon age assay. The charcoal samples were first sent to Dr. James Coil, Berkeley, for wood species identification, who identified pieces of short-lived taxa that were AMS dated. The first sample, Wk-17064, from trench I, unit 3, ± 35 cm b.s. identified as *morinda citrifolia*, which may have some inbuilt age, resulted in a date of 387 ± 34 BP or AD 1460-1627 at 2 sigma. The second sample, Wk-17065, from trench I, unit 4, ± 15 to ± 23 cm b.s. identified as coconut husk resulted in a date of 406 ± 32 BP or AD 1452-1626 at 2 sigma. These two samples were both from the layer of scattered charcoal and burned clay that was found under the pavement stones of the *marae* and which was interpreted as a burn-off of the vegetation before the construction of the *marae*. If this is correct, then the *marae* must have been constructed sometime between AD 1450 and 1630. A third date was analyzed on a piece of coral collected from the fill of the S *ahu* and this resulted in a date of 636 ± 38 or AD 1589-1842 calibrated at 2 sigma. These dates, then, points to the construction of the *marae* on land Haupoto during the 17th century.

CHAPTER 5

SUMMARY

5. Summary and conclusions

Work during the fieldwork season of 2004 was frequently interrupted by heavy and continuous rain and less work than planned as accomplished, however, at both site Tuituirohiti and site Haupoto did the excavations reveal excellent data for radiocarbon dating. Three *marae* structures were excavated, all outside the core area of Mata'ire'a Hill and Maeva Village, on the north-eastern corner of Huahine Nui. One small *marae* was excavated up in Tepua Valley in the district of Fare. Here, no material suitable for dating was found, but the lack of bones in the excavation units may constitute evidence for a different ritual practice on these small *marae* than we have uncovered in other larger and more central *marae* structures. One *marae* south of Maeva Village on the east coast of Huahine Nui was investigated, on land Haupoto, and here two buried uprights, one in front of the southern *ahu* and one in front of the *ava'a*, were discovered. To our knowledge this is the first documented case of buried uprights at *marae* sites in the Society Islands, and further investigations at this site might be very informative concerning ritual practices and symbolism at *marae* sites in the Leeward group.

CHAPTER 6

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CHAPTER 7

LISTS OF SAMPLES, BONES, AND ARTEFACTS

7.1 List of Charcoal samples

No.	Island	Land	Tr.	Unit	Level	Cm b.s.	Year	Month	Description
1000	Huahine	Tuituiroohiti	I	C3	2	10-20	2004	October	Some charcoal
1006	Huahine	Tuituiroohiti	I	D3	1	0-10	2004	October	Some charcoal
1009	Huahine	Tuituiroohiti	I	E3	1	0-10	2004	October	Some charcoal
1010	Huahine	Tuituiroohiti	I	E5	1	0-10	2004	October	Some charcoal
1011	Huahine	Tuituiroohiti	I	E6	1	0-10	2004	October	Some charcoal
1014	Huahine	Tuituiroohiti	I	C3	1	0-10	2004	October	Charcoal sample
1015	Huahine	Tuituiroohiti	I	C5	2	10-Grey	2004	October	Charcoal sample A, -18 cm b.s.
1016	Huahine	Tuituiroohiti	I	C5	2	10-Grey	2004	October	Charcoal sample
1020	Huahine	Tuituiroohiti	I	E7	1	0-10	2004	October	Charcoal sample
1034	Huahine	Tuituiroohiti	II	4	Bottom of fill	16-19	2004	October	Charcoal
1044	Huahine	Tuituiroohiti	III		1	0-10	2004	October	Some charcoal
1045	Huahine	Tuituiroohiti	III		2	10-20	2004	October	Some charcoal
1047	Huahine	Tuituiroohiti	III	F1	Top	20	2004	October	Charcoal sample
1048	Huahine	Tuituiroohiti	III	F1	-	20-35	2004	October	Charcoal sample
1050	Huahine	Tuituiroohiti	III	F1	-	35-40	2004	October	Charcoal sample
1052	Huahine	Tuituiroohiti	III	F1	Bottom	40	2004	October	Charcoal sample
1053	Huahine	Tuituiroohiti	III	Extension	Bottom	-	2004	October	Charcoal from bottom of umu
1055	Huahine	Tuituiroohiti	IV	Inside	2	10-20	2004	October	Some charcoal
1057	Huahine	Tuituiroohiti	IV	Outside	2	10-20	2004	October	Charcoal sample
1058	Huahine	Tuituiroohiti	IV	Outside	2	10-20	2004	October	Charcoal attached to bone fragment
1059	Huahine	Tuituiroohiti	IV	Outside	F1	20-25	2004	October	Some charcoal
1060	Huahine	Tuituiroohiti		F4	1	0-Grey	2004	October	Charcoal sample
1064	Huahine	Haupoto	I	2-Ins-Ava	-	65-69	2004	November	Charcoal sample for flotation
1066	Huahine	Haupoto	I	2-Ins-Ava	-	78-84	2004	November	Charcoal sample
1067	Huahine	Haupoto	I	2-Ins-Ava	-	83-90	2004	November	Charcoal sample
1068	Huahine	Haupoto	I	2-Ins-Ava	-	Bottom	2004	November	Charcoal sample; 1 frag. moua shell
1069	Huahine	Haupoto	I	3	Outside fire	77/80-?	2004	November	Charcoal sample
1070	Huahine	Haupoto	I	3	Fire	15-25	2004	November	Charcoal sample
1071	Huahine	Haupoto	I	3	3	25	2004	November	Charcoal sample
1072	Huahine	Haupoto	I	3	Firepit	25-35	2004	November	Charcoal sample
1073	Huahine	Haupoto	I	3	Firepit	25-35	2004	November	Charcoal sample; in siw
1074	Huahine	Haupoto	I	3	-	35	2004	November	Charcoal sample
1076	Huahine	Haupoto	I	4	Fire	c. 20-35	2004	November	Charcoal sample
1079	Huahine	Haupoto	I	4	Fire	73-81	2004	November	Charcoal sample
1080	Huahine	Haupoto	III	-	Outside court	15	2004	November	Charcoal sample
1081	Huahine	Haupoto	III	-	Outside court	30	2004	November	Charcoal sample
1085	Huahine	Haupoto	IV	-	-	25-30	2004	November	Charcoal sample
1089	Huahine	Tiamaue	I	1	-	20-30	2004	November	Charcoal sample
1090	Huahine	Tiamaue	I	6	-	10-20	2004	November	Charcoal sample

7.2 List of bone samples

No.	Island	Land	Tr.	Unit	Level	Cm b.s.	Year	Month	Description
1000	Huahine	Tuituirorohiti	I	C3	2	10-20	2004	October	1 frag. bone ¹
1001	Huahine	Tuituirorohiti	I	C4	1	0-10	2004	October	1 pig tooth; 5 frags. of bones
1002	Huahine	Tuituirorohiti	I	D2	1	0-10	2004	October	1 pig tooth
1003	Huahine	Tuituirorohiti	I	D2	2	10-Grey	2004	October	4 fishbone frags.
1004	Huahine	Tuituirorohiti	I	D2	1	0-10	2004	October	1 pig tooth fragment
1005	Huahine	Tuituirorohiti	I	D2	1	0-10	2004	October	1 fragment of bone
1006	Huahine	Tuituirorohiti	I	D3	1	0-10	2004	October	1 frag. of pig tooth; 1 bone frag.; 1 shell frag.
1007	Huahine	Tuituirorohiti	I	D4	1	0-10	2004	October	3 fragments of pig bone
1008	Huahine	Tuituirorohiti	I	E2	1	0-10	2004	October	1 frag. of pig tooth; 1 bone frag.
1009	Huahine	Tuituirorohiti	I	E3	1	0-10	2004	October	1 frag. pig tooth; 3 bone fragments
1010	Huahine	Tuituirorohiti	I	E5	1	0-10	2004	October	3 pig tooth frags.; 1 snail frag.; 3 pearlshell frags.
1011	Huahine	Tuituirorohiti	I	E6	1	0-10	2004	October	1 pig tooth frag.; 1 bird bone frag.; 1 shell frag.; 2 bone fragments
1012	Huahine	Tuituirorohiti	I	E7	1	0-10	2004	October	5 pig bone frags.; 1 bird bone frag.; 5 bone frags.
1013	Huahine	Tuituirorohiti	I	F3	1	0-Grey	2004	October	1 pig bone frag.
1019	Huahine	Tuituirorohiti	I	E2	1	0-10	2004	October	1 bone frag.
1022	Huahine	Tuituirorohiti	II	2	1	0-10	2004	October	2 human bone frags.; 2 pig bone frags.
1023	Huahine	Tuituirorohiti	II	2	1	12-12	2004	October	1 human tooth
1025	Huahine	Tuituirorohiti	II	3	Inside ahu	Top of fill	2004	October	1 pig skull frag.; 1 bone (skull) frag.
1026	Huahine	Tuituirorohiti	II	3	Bottom of top soil	-	2004	October	1 human bone frag.; 2 fish bone frags.; 9 bone fragments
1027	Huahine	Tuituirorohiti	II	3	Fill	-	2004	October	5 bone fragments
1028	Huahine	Tuituirorohiti	II	3	Fill	-	2004	October	1 pig bone frag.; 1 skull frag.
1029	Huahine	Tuituirorohiti	II	3	Fill	-	2004	October	5 bone fragments
1030	Huahine	Tuituirorohiti	II	3	Bottom of fill	-	2004	October	1 pig bone fragment
1031	Huahine	Tuituirorohiti	II	4	Fill	-	2004	October	3 human skull fragments; 10 pig bone frags.
1032	Huahine	Tuituirorohiti	II	4	Fill	-	2004	October	1 pig bone fragment
1033	Huahine	Tuituirorohiti	II	4	Bottom of fill	10-20	2004	October	3 pig bone fragments; 5 bone fragments
1035	Huahine	Tuituirorohiti	II	4	Outside ahu	0-10	2004	October	1 human bone frag.; 1 pig bone frag.; 1 bird bone frag.; 4 bone fragments
1036	Huahine	Tuituirorohiti	II	5	1	0-10	2004	October	3 pig bone fragments; 2 bone fragments
1037	Huahine	Tuituirorohiti	II	10	1	0-10	2004	October	1 fish bone frag.; 1 pig bone frag.; 1 sea urchin spine; 1 coral piece; 13 shell frags.
1038	Huahine	Tuituirorohiti	II	10	1	8	2004	October	1 pig tooth; 2 pig bone fragments
1039	Huahine	Tuituirorohiti	II	10	2	17	2004	October	4 pig bone fragments; 1 shell fragment
1040	Huahine	Tuituirorohiti	II	13.70	2	15	2004	October	1 pig bone fragment
1041	Huahine	Tuituirorohiti	II	13.70	Upper	-	2004	October	1 shell fragment
1041B	Huahine	Tuituirorohiti	II	13.70	2	10-20	2004	October	4 pig bone fragments; 1 pig tooth; 1 bird bone frag.; 4 bone fragments
1042	Huahine	Tuituirorohiti	II	13.70	2	14	2004	October	1 shell fishhook fragment
1043	Huahine	Tuituirorohiti	II	13.70	3	25	2004	October	1 whale bone frag.; 1 shell frag.
1044	Huahine	Tuituirorohiti	III	-	1	0-10	2004	October	2 pig bone frags.; 1 fish bone frag.; 2 bone frags.
1045	Huahine	Tuituirorohiti	III	-	2	10-20	2004	October	1 human bone frag.; 2 bone frags.; 1 shell frag.
1054	Huahine	Tuituirorohiti	IV		1	0-10	2004	October	1 bird bone frag.; 1 bone fragment
1056	Huahine	Tuituirorohiti	IV		1	0-10	2004	October	1 pig tooth frag.; 2 bird bone frags.; 8 bone fragments
1057	Huahine	Tuituirorohiti	IV		2	10-20	2004	October	2 bird bone frags.; 3 pig teeth frags.; 2 dog bone frags.; 1 sea urchin spine; 9 bone fragments
1058	Huahine	Tuituirorohiti	IV		2	10-20	2004	October	1 bone fragment, with charcoal attached
1059	Huahine	Tuituirorohiti	IV		F1	20-25	2004	October	2 bone fragments
1062	Huahine	Hauptoto	I		2	6	2004	November	2 skull bone fragments
1083	Huahine	Hauptoto	IV		1	-	2004	November	2 bone fragments
1086	Huahine	Hauptoto			-	None	2004	November	3 bone fragments

¹ When the term «bone fragment» is used it refers to unidentified bone, either animal or human.

7.3 List of artefacts (shells)

No.	Island	Land	Tr.	Unit	Level	Cm b.s.	Year	Month	Description
1010	Huahine	Tuituiroohiti	I	E5	1	0-10	2004	October	Some charcoal
1011	Huahine	Tuituiroohiti	I	E6	1	0-10	2004	October	Some charcoal
1017	Huahine	Tuituiroohiti	I	D6	1	1-10	2004	October	Some charcoal
1018	Huahine	Tuituiroohiti	I	E2	2	10-Grey	2004	October	Some charcoal
1021	Huahine	Tuituiroohiti	I	F4	1	0-Grey	2004	October	Some charcoal
1024	Huahine	Tuituiroohiti	II	2	1	0-10	2004	October	Charcoal sample
1034	Huahine	Tuituiroohiti	II	4	Bottom of fill	16-19	2004	October	Charcoal sample A, -18 cm b.s.
1037	Huahine	Tuituiroohiti	II	10	1	0-10	2004	October	Charcoal sample
1039	Huahine	Tuituiroohiti	-	10	2	17	2004	October	Charcoal sample
1041	Huahine	Tuituiroohiti	II	13.70	Upper	-	2004	October	Charcoal
1041B	Huahine	Tuituiroohiti	II	13.70	2	10-20	2004	October	Some charcoal
1042	Huahine	Tuituiroohiti	II	13.70	2	14	2004	October	Some charcoal
1043	Huahine	Tuituiroohiti	II	13.70	3	25	2004	October	Charcoal sample
1045	Huahine	Tuituiroohiti	III	-	2	10-20	2004	October	Charcoal sample
1046	Huahine	Tuituiroohiti	III	F1	Top	c. 20	2004	October	Charcoal sample
1049	Huahine	Tuituiroohiti	III	F1	-	24-35	2004	October	Charcoal sample
1051	Huahine	Tuituiroohiti	III	F1	-	35	2004	October	Charcoal from bottom of umu
1053	Huahine	Tuituiroohiti	III	Extension	-	-	2004	October	Some charcoal
1057	Huahine	Tuituiroohiti	IV	Outside	2	10-20	2004	October	Charcoal sample
1061	Huahine	Haupoto	I	2 outside ava	1	0-5	2004	October	Charcoal attached to bone fragment
1063	Huahine	Haupoto	I	2 inside ava	1	-	2004	October	Some charcoal
1065	Huahine	Haupoto	I	2 inside ava	-	78	2004	October	Charcoal sample
1068	Huahine	Haupoto	I	2 inside ava	-	-	2004	November	Charcoal sample for flotation
1075	Huahine	Haupoto	I	4	-	10-15	2004	November	Charcoal sample
1077	Huahine	Haupoto	I	4	-	70-75	2004	November	Charcoal sample
1078	Huahine	Haupoto	I	4	-	82	2004	November	Charcoal sample; 1 frag. moua shell
1082	Huahine	Haupoto	IV	-	1	-	2004	November	Charcoal sample
1083	Huahine	Haupoto	IV	-	1	-	2004	November	Charcoal sample
1084	Huahine	Haupoto	IV	-	2	-	2004	November	Charcoal sample
1086	Huahine	Haupoto	Burial	Behind ahu	-	-	2004	November	Charcoal sample
1087	Huahine	Haupoto	-	Ahu 2	-	Fill	2004	November	Charcoal sample; in siw
1088	Huahine	Haupoto	-	Ahu 1	-	Fill	2004	November	Charcoal sample
1091	Huahine	Tuituiroohiti	-	Top fill	-	-	2004	November	Charcoal sample
1092	Huahine	Tuituiroohiti	-	Bottom fill	-	-	2004	November	Charcoal sample

CHAPTER 8

SOURCING OF CHARCOAL SAMPLES

By James H. Coil

Identification of archaeological charcoal samples from Huahine, Society Islands, French Polynesia.

Report JCRS-0502, October 25, 2005

by James H. Coil, Ph.D.

8.1 Introduction

This report details the methods and results of a laboratory charcoal identification project conducted for Reidar Solsvik of the University of Oslo Ethnographic Museum. A total of 9 charcoal samples from Huahine Island were analyzed, with a total count of 146 individual charcoal fragments. In the first phase of the project, five samples were examined to select relatively short-lived types of wood or other plant parts for radiocarbon dating. This was done to minimize the possibility that in-built age could be contained in samples. In the second phase, four other samples were identified more completely for environmental and cultural information regarding the types of woods that were present in the archaeological sites from which the samples were excavated. During this phase further work on the original dating samples was also done to increase the number of fragments identified for the project as a whole.

8.2 Methods

Charcoal samples in this project were received in small plastic bags, and appeared to have sustained some damage by crushing. However, all of the samples were found to contain between 10 and 25 intact charcoal fragments large enough to be identified in the laboratory. Individual charcoal fragments of sufficient size (generally -2ϕ or larger) were examined with two microscopes: A Wild M5a stereoscopic (12-50x) and an Olympus BHS-2 metallurgical (50-500x). The method used to examine the charcoal was that originally described by Leney and Casteel (1975). The wood anatomy characteristics preserved in the unknown archaeological charcoal fragments were compared with those recorded from the study of Pacific Island wood reference materials curated at the UC Berkeley Oceanic Archaeology Laboratory, and with photomicrographs and descriptions found in published sources (esp. Detienne and Jacquet 1999).

8.3 Results

Sixteen wood types were identified as present in these samples, and have been identified to the level of genus or in some cases to the species level. Included in this figure are four unknown types of dicotyledonous wood and one unknown monocotyledonous type. Table 1 presents the results of this study, with two quantitative summations given for types within individual assemblages. First, number of fragments is given for each identified type, and second, percentage by weight of total identified wood for each type is given (e.g. 4/50%).

These counts or proportions of charcoal types, though provided in Table 1, should be considered as subject to biases in terms of charcoal selection, formation, and preservation. These numbers should be considered as accurately reflecting proportions of charcoal

fragments in analyzed samples, but cannot be directly related to proportions of these trees or shrubs in site environments.

Figures in Table 1 with bold boxes represent the specific wood type from which the five radiocarbon samples were selected. All of these materials should have low potential for in-built age, which should improve the accuracy of the resulting dates (Bowman 1990).

These woods identified in this study are both economic types--introduced and often cultivated by Polynesians--and elements of the island's native vegetation. The unknown types in this study probably represent mainly native plant types, especially shrubbier taxa, as these are most poorly represented in the current reference collections being utilized. Further identification of these at a future date may be possible when a more diverse reference collection is available.

In terms of ubiquity (number or percentage of samples in which a given type is present in any quantity), *Artocarpus* was the most commonly present (in 5 of 9 samples), while five other taxa occurred in 3 of 9. All other types were found in only 2 samples or less:

Artocarpus sp. (5 of 9 samples)

Hibiscus tiliaceus (3 of 9)

cf. *Pandanus* sp. (3 of 9)

Barringtonia (3 of 9)

Casuarina (3 of 9)

Cocos (3 of 9)

8.4 Discussion and conclusion

It is clear that there is substantial variation in the distributions of particular wood types between the sample contexts focused upon in this study. It is likely that some of the woods identified in this study were culturally selected to be utilized in particular ritual burning or construction purposes in these sites. Several of the wood types have been recorded as being traditionally planted in associated with marae contexts or used in marae construction in the Society Islands, including *Casuarina*, *Calophyllum*, *Cordia*, *Ficus*, and *Thespesia* (J. Kahn, unpub. m.s.). Most of the sample examined contained at least some of these taxa. Other charcoal formed from *Hibiscus tiliaceus*, *Cocos* husk and *Pandanus* wood and keys probably represents materials selected specifically for use as fuel for ovens or hearths. All of these trees and shrubs were probably relatively common components of pre-contact coastal or near-coastal plant communities in Huahine, which were formed as a combination of native coastal vegetation and economic plants introduced and cultivated by Polynesians, including both trees and shrubs.

Further consideration of the archaeological contexts from which these samples have been excavated would help to evaluate more closely the relation between certain wood types and certain types of sites, site features, or archaeological contexts. The ethnohistoric and ethnographic records pertaining to Polynesia contain many descriptions of particular woods being associated with particular types of cultural and economic activities, and further research into these topics may help uncover more specific relations between the components of these samples and their cultural contexts.

Site	Sample	g	n=	<i>Artocarpus</i> sp.	<i>Barringtonia asiatica</i>	<i>Calophyllum inophyllum</i>	<i>Casuarina equisetifolia</i>	cf. <i>Coccos</i> wood	<i>Coccos</i> husk	<i>Cordia subcordata</i>	<i>Ficus</i> sp.	<i>Hibiscus liliaceus</i>	<i>Morinda</i> cf. <i>citrifolia</i>	cf. <i>Pandanus</i> (wood)	<i>Pandanus</i> (key)	<i>Thespesia populnea</i>	Nut Shell	Unknown Type A	Unknown Type B	Unknown Type C	Unknown Type D	Unknown Monocot.	Unidentifiable Dicot.
Marae Tahurea	1050	1,30	15							7/35%		8/65%											
Marae Tahurea	1052	0,40	10	3/49%	1/16%							6/35%											
Sch2-62	1059	2,17	20	5/13%	1/10%	3/12%	1/6%					2/5%	2/6%	4/38%							1/2%		
Marae Haupoto	1074	2,70	15										15/100%										
Marae Haupoto	1079	3,20	16						10/87%					6/13%			X						
Sch2-62 umu	1086	4,90	25	10/29%						3/12%			3/9%	6/44%	2/3%								
Sch2-62	1112	1,27	20	11/48%		3/17%				2/11%								1/9%	1/4%	1/7%		1/4%	
Tea ana	1217	4,30	25	4/10%	3/12%	10/58%		1/3%									X						6/16%
Matairea	Matairea Tr.	1,60	20			24/91%	1/9%																

Table 1: Wood types identified in Huahine samples. First number is fragment count, second is percentage by weight among identified fragments. Bold boxes represent AMS radiocarbon sample sources. "Cf." reflects less confident identifications.

7.2.5 References cited

Bowman, S. 1990. *Radiocarbon dating*. Berkeley/London: University of California Press/British Museum.

Detienne, P. and P. Jacquet. 1999. *Manuel d'identification des bois de Polynesie*. Paris: Cirad, Cnrs, Mnhn.

Leney, L. and Casteel, R. 1975. A simplified procedure for examining charcoal specimens for identification. *Journal of Archaeological Science* 2:153-159.

CHAPTER 9

RADIOCARBON DATES

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Report on Radiocarbon Age Determination for Wk- 17062
(AMS measurement by IGNS [NZA-22697])

Submitter R.S. Solsvik
Submitter's Code 31/5/05_ScH-Sourced-1-1050
Site & Location Huahine Island, District of Fare, c. 1 km N of the port of Fare., French Polynesia
Sample Material Hibiscus tiliaceus (purau)
Physical Pretreatment Possible contaminants were removed. Washed in ultrasonic bath.
Chemical Pretreatment Sample washed in hot 10% HCl, rinsed and treated with hot 1% NaOH. The NaOH insoluble fraction was treated with hot 10% HCl, filtered, rinsed and dried.

$\delta^{14}\text{C}$	-53.3 ± 3.3	‰
$\delta^{13}\text{C}$	-26.6 ± 0.2	‰
D^{14}C	-53.4 ± 3.7	‰
% Modern	94.7 ± 0.4	‰
Result	441 \pm 31 BP	

Comments


22/7/05

- Result is *Conventional Age or % Modern* as per Stuiver and Polach, 1977, Radiocarbon 19, 355-363. This is based on the Libby half-life of 5568 yr with correction for isotopic fractionation applied. This age is normally quoted in publications and must include the appropriate error term and Wk number.
- Quoted errors are 1 standard deviation due to counting statistics multiplied by an experimentally determined Laboratory Error Multiplier of 1.
- The isotopic fractionation, $\delta^{13}\text{C}$, is expressed as ‰ wrt PDB.
- Results are reported as % *Modern* when the conventional age is younger than 200 yr BP.

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Report on Radiocarbon Age Determination for Wk- 17063

(AMS measurement by IGNS [NZA-22698])

Submitter R.S. Solsvik
Submitter's Code 31/5/04-Sch-Sourced-1-1052
Site & Location Huahine Island, District of Fare, c. 1 km N of the port of Fare., French Polynesia
Sample Material Hibiscus tiliaceus
Physical Pretreatment Possible contaminants were removed. Washed in ultrasonic bath.
Chemical Pretreatment Sample washed in hot 10% HCl, rinsed and treated with hot 1% NaOH. The NaOH insoluble fraction was treated with hot 10% HCl, filtered, rinsed and dried.

$\delta^{14}\text{C}$	-50.9 ± 3.4	‰
$\delta^{13}\text{C}$	-25.5 ± 0.2	‰
D^{14}C	-53.1 ± 3.7	‰
% Modern	94.7 ± 0.4	$\%$
Result	438 \pm 32 BP	

Comments

22/7/05

- Result is *Conventional Age* or % *Modern* as per Stuiver and Polach, 1977, Radiocarbon 19, 355-363. This is based on the Libby half-life of 5568 yr with correction for isotopic fractionation applied. This age is normally quoted in publications and must include the appropriate error term and Wk number.
- Quoted errors are 1 standard deviation due to counting statistics multiplied by an experimentally determined Laboratory Error Multiplier of 1.
- The isotopic fractionation, $\delta^{13}\text{C}$, is expressed as ‰ wrt PDB.
- Results are reported as % *Modern* when the conventional age is younger than 200 yr BP.

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Report on Radiocarbon Age Determination for Wk- 17064

(AMS measurement by IGNS [NZA-22699])

Submitter R.S. Solsvik
Submitter's Code 31/5/05-ScH-Sourced-1-1074
Site & Location Huahine Island, District of Mave, c. 3 km S of the village of Maeva, on the East side of Huahine Nui., French Polynesia
Sample Material Morinda citrifolia (noni)
Physical Pretreatment Possible contaminants were removed. Washed in ultrasonic bath.
Chemical Pretreatment Sample washed in hot 10% HCl, rinsed and treated with hot 1% NaOH. The NaOH insoluble fraction was treated with hot 10% HCl, filtered, rinsed and dried.

$\delta^{14}\text{C}$	-45.3 ± 3.7	‰
$\delta^{13}\text{C}$	-25.7 ± 0.2	‰
D^{14}C	-47.1 ± 4.0	‰
% Modern	95.3 ± 0.4	%
Result	387 ± 34	BP

Comments

22/7/05

- Result is *Conventional Age* or % *Modern* as per Stuiver and Polach, 1977, Radiocarbon 19, 355-363. This is based on the Libby half-life of 5568 yr with correction for isotopic fractionation applied. This age is normally quoted in publications and must include the appropriate error term and Wk number.
- Quoted errors are 1 standard deviation due to counting statistics multiplied by an experimentally determined Laboratory Error Multiplier of 1.
- The isotopic fractionation, $\delta^{13}\text{C}$, is expressed as ‰ wrt PDB.
- Results are reported as % *Modern* when the conventional age is younger than 200 yr BP.

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Report on Radiocarbon Age Determination for Wk- 17065

(AMS measurement by IGNS [NZA-22700])

Submitter R.S. Solsvik
Submitter's Code 31/5/05-ScH-Sourced-1-1079
Site & Location Huahine Island, District of Mave, c. 3 km S of the village of Maeva, on the East side of Huahine Nui., French Polynesia
Sample Material Burnt coconut husk.
Physical Pretreatment Possible contaminants were removed. Washed in ultrasonic bath.
Chemical Pretreatment Sample washed in hot 10% HCl, rinsed and treated with hot 1% NaOH. The NaOH insoluble fraction was treated with hot 10% HCl, filtered, rinsed and dried.

$\delta^{14}\text{C}$	-46.0 ± 3.4	‰
$\delta^{13}\text{C}$	-24.9 ± 0.2	‰
D^{14}C	-49.3 ± 3.7	‰
% Modern	95.1 ± 0.4	$\%$
Result	406 \pm 32 BP	

Comments

22/7/05

- Result is *Conventional Age* or % *Modern* as per Stuiver and Polach, 1977, Radiocarbon 19, 355-363. This is based on the Libby half-life of 5568 yr with correction for isotopic fractionation applied. This age is normally quoted in publications and must include the appropriate error term and Wk number.
- Quoted errors are 1 standard deviation due to counting statistics multiplied by an experimentally determined Laboratory Error Multiplier of 1.
- The isotopic fractionation, $\delta^{13}\text{C}$, is expressed as ‰ wrt PDB.
- Results are reported as % *Modern* when the conventional age is younger than 200 yr BP.

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Report on Radiocarbon Age Determination for Wk- 17066

(AMS measurement by IGNS [NZA-22701])

Submitter R.S. Solsvik
Submitter's Code 31/5/05-ScH-Sourced-1-1217
Site & Location Huahine Island, Mave, Te Ana, Structure ScH-2-66-1, on the Mata'ire'a Hill just behind Maeva village., French Polynesia
Sample Material Charcoal
Physical Pretreatment Possible contaminants were removed. Washed in ultrasonic bath.
Chemical Pretreatment Sample washed in hot 10% HCl, rinsed and treated with hot 1% NaOH. The NaOH insoluble fraction was treated with hot 10% HCl, filtered, rinsed and dried.

$\delta^{14}\text{C}$	168.1 ± 4.5	‰
$\delta^{13}\text{C}$	-25.8 ± 0.2	‰
D^{14}C	166.9 ± 4.8	‰
% Modern	116.7 ± 0.5	‰
Result	116.7 ± 0.5	% M

Comments

22/7/05

- Result is *Conventional Age* or % *Modern* as per Stuiver and Polach, 1977, Radiocarbon 19, 355-363. This is based on the Libby half-life of 5568 yr with correction for isotopic fractionation applied. This age is normally quoted in publications and must include the appropriate error term and Wk number.
- Quoted errors are 1 standard deviation due to counting statistics multiplied by an experimentally determined Laboratory Error Multiplier of 1.
- The isotopic fractionation, $\delta^{13}\text{C}$, is expressed as ‰ wrt PDB.
- Results are reported as % *Modern* when the conventional age is younger than 200 yr BP.

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