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ARCHAEOLOGICAL EXCAVATIONS
- at ahu Ra'ai, La Pérouse, Easter Island, Oct.-Nov. 1997

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Technical Report

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The Kon-Tiki Museum excavation at ahu Ra'ai 31-19 and Ahu Hanga o Miti 31-14, La Pérouse 1997

1. Introduction and aims

The La Pérouse area houses several large ceremonial sites and areas with rock carvings and Hanga Ho'onu bay probably was a favorable place for settlement and a good landing place in pre-historic times. This makes it interesting in relation to early settlement and important ceremonial sites. A survey of archaeological sites and minor excavations of settlement and plantation sites have been performed by Dr. Chris Stevenson with support from the Earth Watch Organization since 1995. The Kon-Tiki Museum joined this project in 1996 and the specified aim by the Kon-Tiki Museum was to perform test excavation at *ahu* structures within the project area in order to gather data on construction and chronology. Our interest in ceremonial sites and early settlement on the island is to be seen as a continuation of earlier research performed by the museum (Skjølsvold 1994, Martinsson-Wallin 1994). The intention with the joint project was to tie together the results from studies of settlement and plantation sites with ceremonial sites, in order to study the process of social development in prehistoric Rapanui society and get a more complete picture of what happened in the area in pre-historic times. In 1996 excavations were performed at *ahu* Heki'i and associated structures and it is assumed that Heki'i represented a primary ritual center. Remains of a large chiefly village are situated c. 150 m inland from this complex.

In 1997 the excavations were concentrated to another major site in the area, namely *ahu* Ra'ai. This structure may represent a secondary center in the territorial unit.

The investigations were performed between October 6 and November 14, and the excavation team consisted of Dr. Paul Wallin (KTM), Dr. Helene Martinsson-Wallin (KTM), Cand. Mag. Reidar Solsvik, Easter Islander Maku Tuki and volunteers from the Earth Watch organization. During 10-14th of November, Assistant Professor Matthew Bampton from the University of Southern Main and System Manager Pernilla Flyg from the Swedish Central Board of National Antiquities, joined the team. Bampton and Flyg mapped the area with the aid of an Electronic Total Station and GPS. This was done in order to digitalis the excavation and use GIS (geographical information systems) to present and do analyses of the excavation and different sites in the area. Their technical report will be presented in appendix 1.

The excavations were concentrated at the main structure at the site, namely *ahu* Ra'ai. To be able to get some information to the age and construction of this structure, eight trenches were excavated. Our intention was to excavate some trenches in connection to *ahu* 31-38, 31-36, 31-30, 31-11, 31-12 and 31-14 as well, but we only managed to start a small trench in *ahu* 31-14 when the fieldwork was stopped.

The excavations were photo documented and video filmed, and different features and sections of the trenches were mapped level by level (see appendix 2 and 3). The trenches were mainly excavated in levels of 10 cm if no natural layers could be indicated. All trenches were excavated by the use of trowel and all soil was screened trough 6mm mesh screens. Carbon and obsidian samples for dating (see appendix 4 and 5), and soil samples for pollen, phytolith and phosphate analyses were recovered. All features found were treated separately and all artifacts are registered according to procedures required by the Padre Sebastian Englert Museum on the island and stored in this museum (see appendix 7). The original documentation (maps, photos, forms) is so far stored in the KTM archives but copies will eventually also be available in PSE museum on Easter Island. All trenches were restored after the excavation.

After two weeks of excavation local activists stopped our fieldwork on three occasions. This was done by them to get attention from the local and Chilean authorities concerning political issues of land rights etc. This group who call themselves the Council of Elders (Korohua) # 2 is not legally accepted, but represent a part of the population that demand independence from Chile. They asked us to stop our investigations until the issue of land rights had been settled and was clear to point out that this was not an action against the excavation team on a personal level. After negotiations and a payment of 500\$ we managed to end our excavations in a proper way and do some mapping of the area. Due to these

incidents our field time was cut to half the time planned, and some of the actions showed high level of aggression but nobody was physically hurt. The situation had many political implications and the fact that a harbor is planned in the area was one of the issues that triggered the situation of. Prior to the excavations of *ahu Ra'ai* we were however informed by the director of the National Park CONAF that the plans for a harbor in the area had been changed due to national and international protests. However, during the time of our work we got indications that the harbor still was planned to be built in this area, which belong to the National Park. *We will already here clearly declare that the results from these test excavations not in any way can be used as an argument and foundation for the decision of the development of a harbor in this area.*

2. Test unit Excavations, site 31-19, *ahu Ra'ai*

Trench 1, site 31-19 (*ahu Ra'ai*)

Level 1 (0-10 cm)

The trench was outlined as a 1x2 m rectangular pit at the base of the rear wall of *ahu Ra'ai*. This section of the rear wall of the central platform is divided in two steps consisting of big boulders of fitted and partly worked stones. The surface of the trench consisted of gravel mixed with stones of red scoria, poro stones, basalt flakes and obsidian pieces and on the surface were also some larger stone c. 10-20 cm in size situated. Below the surface a lot of red scoria pieces were found, including larger chunks as well. Basalt flakes, poro stones and obsidian pieces were also found as well as larger stone c. 10-20 cm in size. At the bottom of this level the bedrock was visible in the north part of the trench.

Level 2 (10-38 cm)

The trench is shallow and after 38 cm from the surface the bedrock was uncovered in the whole trench. The fill in this level consisted of brown soil mixed with gravel and small stones. Some obsidian flakes and red scoria pieces were found as well. The bedrock was uneven and the rear-wall foundation stones were fitted into the shape of the bedrock.

Trench 2, site 31-19/49 (*ahu Ra'ai* and settlement)

The trench was placed in a small house terrace in front of *ahu Ra'ai* (site 31-19/49), at the end of the slope down from the main platform. The stones that once formed the lower part of the ramp and the plaza had been pushed aside to clear this area. In the south edge the terrace is bordered by an alignment of stones running east to west, curving towards northeast at the eastern end. The alignment stones are both cut and uncut and some of them were of water worn basalt, (35-50x50-80x30 cm). North of the end-stones there was a fill of larger stones, probably for making the end of the terrace stronger. On the terrace itself, there is still part of a house pavement of *poro* stones consisting of at least 19 stones (10-25x10-35 cm). The pavement was of classical shape and extending 120x240 cm.

Northwest of the terrace there is an alignment of four fitted stones (35-40x17-25x30 cm) bordering another terrace, which covered an area of 150x250cm. Some stones and rubble and red scoria was found on the surface of this small terrace and it could possible be a crematoria or burial feature in connection to the house site. East of the main terrace there is a large *manavai*, and to the west a partly destroyed *haremoa*. Two *umu pae* features were also in the vicinity. All the classic features of a proto-historic habitation are shown at this site.

The trench (1x5 m) was placed over the area with the *poro* pavement to get an idea of the time frame of the building and destruction of the ceremonial site as well as the time frame of the late habitation. The trench was excavated in 1sq. m. units, and 10 cm levels down to bedrock. On the surface in square 4 was a *poro* pavement, *feature 1*, with an entrance stone belonging to a hare paenga house situated. Otherwise the surface consisted of thin grass, wind blown soil and two areas scattered with small stones (5-10 cm in diameter).

Level 1-2(0-15 cm)

Layer 1

Was found in unit, 3,4, and 5 in connection to the *poro* pavement. It consisted of finely grained dark brown soil 2-4 cm thick. This soil was probably wind blown sediments that built up after the house structure was constructed. Finds were not separately collected from this layer, but ascribed to level 1, 1-10 cm.

Layer 2

Consisted of a brown to dark-brown sandy soil with a lot of small tuff stones (c. 2-5 x 2x10 cm) found in most of the units. This layer was 10-15 cm thick and in units 1 and 2 there seemed to be a higher content of sand than in the rest of the trench. In unit 4 and part of unit 5 there were specks of carbon, and a carbon concentration, *feature 2* found at a depth of c. 6 cm from the surface. In unit 4 at the edge of feature 1, there was an area around feature 2 with soft soil and less tuff stone. This area and the NNW-half of unit 5, rather large quantities of bone-fragments of pig, bird, fish, and human, and a lot of small shells were encountered as well as specks of carbon. However, excavations did not indicate that this was either a trench or a pit, but it seemed to be shifts in the soil. In units 1 and 2 there was also an area with soft soil. The finds were most frequent in unit 4 and 5 and consisted of obsidian, basalt, red-scoria, moai-tuff, coral, and bone- and shell-fragments.

Level 3 (15-47 cm)

Layer 3

Consisted of dark-brown soil, which was softer than the soil in layer 2 and without the many tuff-stones. Large pieces of red scoria were found, which differed in color from the ones in layer 2. Finds of obsidian, basalt, red-scoria, moai-tuff, coral, and bone- and shell-fragments were still abundant and most numerous in unit 5. In unit 3 and 4 the bedrock appeared under this layer.

Layer 4

It was a naturally deposited brown to light-brown, coarsely grained humid soil, almost loamy in consistency – less sand. It was 2-15 cm thick, situated on top of the bedrock and had some specks of a red-brown (iron-oxidize) loam. This layer contained no finds and it was not found in unit 3 and 4.

Layer 5

It was a naturally deposited red-brown loam found in the bottom of unit 5 on top of the bedrock. It was 6 cm thick and contained no finds.

Feature 1

Consisted of a partly destroyed *poro*-pavement. It consists of ca. 19 stones, arranged in such a manner that the usual form of a half moon was indicated. Stone no. 1 could be the entrance stone, but there is just this stone, and no other stones at the sides. Most of the stones were not very deeply imbedded in the ground, but the bigger ones were founded in layer 2, making layer 1 younger than the actual building phase of the house.

Feature 2

Consisted of a small, round concentration of carbon, (c. 20x20 cm) found under the *poro* stones at a depth of 6 cm from the surface in unit 4, layer 2. It was 4 cm deep and interpreted to be a fireplace. Burned soil indicates that it has been burned in-situ. Just outside to the SSE was a concentration of small shells.

Trench 3, site 31-19 (ahu Ra'ai)

This trench was placed c. 6 m to the west of trench 1 at an addition to the rear-wall. This part of the rear-wall is made up of unworked stones and is probably a later addition. The trench was 1x2 m in size.

Level 1 (0-10 cm)

The surface consisted of brown soil with some thin grass and a few stones, c. 10-15 cm size. The level contained brown soil mixed with stones of the size of c. 5-20 cm. A worked piece of red scoria (20x15 cm) was found. Besides this some obsidian flakes and small carbon pieces were found.

Level 2 (10-20 cm)

This level had the same composition as level 1

Level 3-5 (20-55 cm)

Consisted of sterile soft red/brown soil and the uneven bedrock appeared at a depth of 35-55cm.

Trench 4, site 31-19 (ahu Ra'ai)

This trench was placed at the base of the west part of the rear wall almost in line with trench 6 that was excavated in the central platform of the structure. The trench was 1x1 m in size

Level 1 (0-10 cm)

Consisted of brown soil mixed with gravel, stones red scoria pieces and obsidian flakes. This filling material was very similar to level 1-2 in trench 1. The trench proved to be very shallow and the bedrock appeared in the whole square within this level.

Trench 5, site 31-19 (ahu Ra'ai)

A 1x3m large trench was placed in a crematorium, attached to the north side of the west wing. The trench was placed here to be able to date the crematoria. The surface consisted of stones c. 5-10 cm with some larger stones 30-50 cm, that probably mark the boundaries of the crematoria. The trench was divided in the section inside the crematoria and outside the crematoria.

Inside the crematoria

Level 1 (0-10 cm)

The surface mainly consisted of stones of c. 5-10 cm, but a few larger stones c. 20-30 cm was also found. The level consisted of stones and gravel mixed with brown sandy soil and a lot of red scoria fragments were recovered. Some obsidian flakes and cremated bones were also found.

Level 2 (10-20)

This level had the same composition as level 1, but the red scoria fragments were fewer in number.

Level 3-5 (20-45 cm)

The composition of the soil changed at c. 20 cm below the surface where it was made up of dark brown soil mixed with stones. A few finds of obsidian flakes and cremated bones were made at c. 20-25 cm below the surface, but nothing was found at lower levels. The bedrock appeared at 35-45 cm below the surface.

Outside the crematoria

Level 1 (0-10 cm)

The surface consisted of stone c. 5-10 cm and two larger stones 40-50 cm, which were standing on edge, placed next to the boundary stones for the crematoria. The level consisted of stones and gravel mixed with brown sandy soil and a lot of red scoria fragments were found in this level as well as some obsidian flakes. Between the boundary stones of the crematoria and the two stones on edge a pocket with cremated human bones was found. This was called *feature 1* and it contained 2 liters of human cremated bones (osteological analysis in appendix). This feature was found at c. 5 cm below the surface and continued down to 35 cm below the surface.

Level 2 (10-20cm)

This level had the same composition as level 1, but there were fewer finds.

Level 3-4 (20-40cm)

The composition of the soil changed at 20 cm below the surface, where it was made up of dark brown soil mixed with stones. No finds were made at these levels. Feature 1 continued down to 35 cm below the surface. The bedrock appeared at 35-40 cm below the surface.

Feature 1

A pocket c. 20x65 cm containing cremated bones was found in between the rear wall stones of the wing and two upright stones close to the rear wall. The feature was indicated 5 cm under the surface and continued down to 35 cm below the surface.

Trench 6, site 31-19 (ahu Ra'ai)

It was outlined as 1x3 m trench reaching from the rear wall through the central platform on the inland side of the structure. The trench was placed at the West end of the central platform in a place where it had partly been disturbed on the surface and it covered both the central platform and ramp part. The trench was opened in this area to be able to get information of the construction of the central platform and how it related to the other parts of the structure as rear wall and ramp. The area was carefully reconstructed after excavation. This trench was very difficult to excavate in levels since the filling mainly consisted of smaller (5-20 cm) and larger stones (20-80 cm) with only a little soil in between them. The trench was divided in the central platform part and the ramp part.

Central platform

Level 1 (0-20 cm)

The surface and the first 20-cm, mainly consisted of stones c. 5-20 cm in size, sometimes with some brownish red soil and gravel in between the stones. A lot of pieces of red scoria and a few obsidian flakes were found in this layer.

Level 2 central platform (20-70 cm)

The fill in the central platform consisted of stones c. 20-60 cm in size mixed with some brownish red soil with a few finds of red scoria, coral and obsidian pieces, and some shell and one fragment of a fire damaged bone. At a level of 50 cm from the surface, on top of a flat rock close to the rear wall some carbon pieces were found. The rock was a little chipped on the surface and it showed some spots of soot. This could indicate that a small fire had been made on the rock when building this part of the structure. This part of the trench could not be excavated deeper since it was a risk that the top row of the rear wall would fall into the trench.

Ramp

Level 1 (0-10 cm)

Consisted of stones c. 5-20 cm in size mixed with some brownish red soil with finds of a few obsidian, coral, red scoria and basalt pieces. The surface sloped from north to south.

Level 2 ramp (10-150 cm)

The excavation continued down to 150 cm at its deepest in this part of the trench but we could generally continue down to 105 cm. The fill of the ramp consisted of stones of c. 25-80 cm in size mixed with some brownish red soil with finds of obsidian flakes, a red scoria, a moai tuff and a coral piece and a few bone and shell fragments. The bones were from rat and humans and they were found in a pocket between two stones, at a level of 60 cm from the surface.

Trench 7, site 31-19 (ahu Ra'ai)

It was outlined as a 1x2 m large trench on the inland side in west wing or addition to *ahu Ra'ai*. This was done to try establish the chronological sequence of the different parts of *ahu Ra'ai*.

Level 1 (0-10 cm)

The surface consisted of gravel and brownish red soil and the top of 2 *poro* stones could be seen, indicating a ramp pavement. The surface sloped from north to south. In the first 10 cm of this trench was 4 other *poro* stones uncovered as well. They probably once formed a part of a paved ramp, which later have been disturbed. Besides these stones this level consisted of gravel and stones (mainly 5-10 cm) and lots of small red scoria pieces and a lot of small shell mixed with light brown sandy soil. The shell and red scoria were especially numerous in the south square. In the bottom of this level in the south part of the north square, in an area with lots of scoria, were and a chunk of coral and a large basalt flake set on edge found. The shells were for the most parts so fragmented, almost like powder and the red scoria pieces were very numerous and fragmented as well. A lot of obsidian and basalt chips and flakes were also recovered as well as a lot of coral pieces (two types) as well as some fragments of statue stone (*moai* tuff). Besides these finds two adzes made from basalt were also recovered.

Level 2 (10-40 cm)

This level had almost the same composition as level 1 but the stones had a slightly larger size (10-30 cm). A large amount of red scoria fragments was still found but the main bulk of them were recovered at 10 to 20 cm from the surface. The same pattern is seen concerning the occurrence of small shells, which are in a more complete state than the ones found in level 1. Several small "poro" stones and stone fragments from statues are also found in this level as well as obsidian and basalt flakes. Some bone fragments were also recovered, which were identified as human, fish and bird bones and a possible turtle bone.

Level 3 (40-60 cm)

Consisted of stones of a size of c. 10-30 cm with brown soil in between the stones. The bottom of the stone and earth fill was reached at c. 52-60 cm below the surface. Here the soil shifted some in character and was of a darker shade of brown, which contained more clay. This darker soil layer was interpreted as the original ground surface on which the structure had been built. At a depth of 40-45 cm below the surface in the south part of the North square was a 20-cm large area containing rat and bird bones found. Other finds in the fill consisted of shell and coral fragments and obsidian and basalt

flakes. In the bottom layer in the south part of the south square was an area with some stones, carbon, soot and burnt clay found. This was interpreted as a primitive hearth, *feature 1*. Carbon samples were taken to date this activity. In association to the feature were many small fragments of shell and some bones from rat and fish found as well as some few pieces of basalt and obsidian flakes and coral pieces.

Feature 1

Was a c. 30x50-cm large area of soot, carbon and burnt clay associated with some also stones (5-15 cm) in size. This cultural remain may have been a primitive hearth.

Trench 8, site 31-19 (ahu Ra'ai)

This trench was placed parallel to the rear wall of the west wing, right north of trench 7. A group of stones seemed to form a semicircular structure next to the rear wall. This possible indicated another crematoria or burial structure.

Level 1 (0-10 cm)

This level consisted of brown sandy soil mixed with stones and gravel. A lot of red scoria pieces and chunks were found as well as some statue stones, coral pieces, poro stones and many obsidian and basalt flakes. In the bottom of this level were two human teeth from young persons found. The bones were not cremated.

Level 2-5 (10-50 cm)

The composition in these levels was the same as in level 1 but in the bottom of level 3 there were some large stones (80 cm) found. A total of c. 40 teeth and some other bone fragments were recovered from these levels. In the bottom of level 3 and in level 4, under a big rock, some cremated bones were found as well. The large stones had to be removed to continue down in the next level. In level 4 the base of the foundation stones in the rear wall of the wing became visible and they continued down in level 5. Pieces of charcoal were found in level 5.

Level 6 (50-60 cm)

The soil changed to a dark brown color and a texture containing more clay. There are fewer finds but some charcoal concentrations were found. The charcoal may derive from small fires that were made on the original ground surface before the wing was constructed. Some burnt bones were found as well. *Feature 1* was found at a depth of 56 cm below the surface and consisted of an ash lens mixed with pieces of carbon.

Level 7-8 (60-80 cm)

The soil changed to a red brown color and a fine texture and this was mixed with bedrock stones. No finds were made in these levels situated on top of the bedrock.

Feature 1

An ash lens mixed with pieces of carbon c. 5 cm thick and with a diameter of c. 40 cm. found at a depth of 56 cm below the surface.

3. Test unit Excavations, site 31-14, ahu Hanga o Miti

Trench 1

Level 1(0-10 cm)

The trench was 1x1 m and placed next to the rear wall in the central part of the structure. When the topsoil was removed this level contained dark brown sandy soil mixed with gravel. The excavation was stopped before the trench was excavated down to the bedrock but it was indicated that the soil layer was rather thin. No samples were recovered from this trench.

4. Chronological determination and discussion

Five carbon samples from *ahu Ra'ai*, trench 2, 5, 6, 7, and 8 were sent to 14C analyze (see appendix 4 and 5). Furthermore, 56 obsidian samples from trench 1-8 were dated by the obsidian hydration method (see appendix). The carbon samples indicated a building phase of the central platform to AD1300-1450. The pocket with cremated bones next to the crematoria in the wing is dated to c. AD1400-1500 and the activities predating the construction of the wing are dated to AD1300-1400. The habitation in front of the ahu is indicated to be from the proto-historic and/or historic time. The obsidian dates from trench 2 (habitation) indicate a range from c. AD1250-1800 (majority between AD1450-1800). Since the terrace is built up by fill material the early dated obsidian pieces probably derive from earlier

activities in the area. The obsidian dates from the central platform (AD1432) fall into the range of the 14C date. The obsidian dates from the crematoria range from AD1380-1830 with a cluster to the 16th century. An AD 1500 date for the cremated burial fall into the range of the 14C date. The activities that predate the wing range from AD1080-1570 with a cluster of dates from the 15th century. An AD1400 date is a c. 100 years later than what was indicated by the 14C dates but the obsidian samples also point at earlier dates.

5. Osteological analysis

The bones were found inside a semicircular stone alignment, *feature 1*, attached to the crematoria in trench 5. A total of c. 2 liters of cremated bones was found in feature 1 and c.4 dl of bones found outside the feature most probably belong to feature 1. The osteological analysis indicated that the bone fragments derive from one individual but that the cranial bones and teeth were missing. One explanation of their absence is that the head had been removed prior to the cremation and used in some other ceremony or buried somewhere else (see appendix 6).

6. Conclusion and interpretation

The trenches excavated behind the rear wall, 1, 3, and 4 was very shallow and the *ahu* structure seems to be built right on top of a uneven bedrock ridge or, which in some places had a thin layer of soil. The gravel with a lot of red scoria found in trench 1 seems to be some kind of filling material which have been spread out to even out the ground behind the rear wall and it may also have served drainage purposes. The obsidian flakes found in the filling material may thereby date the building of this part of the *ahu* or derive from an activity that may pre-date the *ahu*. One obsidian flake indicates an age of AD 1295.

Trench 2 on the inland side of the structure was placed on a terrace that most likely was constructed as part of the *ahu*-ramp, because the stratigraphy gave no indications that it was re-constructed after the initial construction of the *ahu*-ramp. This is also indicated by the difference of layer 2 and 3, where layer 2 contains markedly more stones than layer 3. It seems as if the stones are used as a kind of fill, to reinforce, or stabilize, the terrace. However, the stone fill had been cut trough in some areas in connection to the late settlement activity. The small fireplace (feature 2) was probably used after the terrace was cleared from the stones covering the ramp/plaza but before the *poro* pavement to the house was placed there

During the work-process in the area there have been a lot of "refuse" activities, and probably some preparation of meals. Several "pockets" of bone- and shell-fragments were found. As well as the small "fireplace" (feature 2) in unit 4, with a lot of shell fragments at one side. The area under the *poro* pavement show the highest frequency of refuse of this kind, indicates that the area was used for habitation also before the *poro* pavement was in place. However, since both obsidian tools and bone- and shell-fragments were found among the stones in the pavement, it is indicate that the place has been occupied for some time after the *poro* pavement was constructed. No *hare paenga* stones or postholes were found in the area, only one stone that may have served as an entrance stone to the house.

The activities associated with trench 2 were dated to the late prehistoric and proto historic times. At this time the *ahu* structure most probably had lost some or all its value as a ceremonial site.

Since *ahu* Ra'ai is very destroyed and stripped of almost all its worked stone it provided a unique opportunity to excavate a trench in the central platform and ramp, trench 6. This was done to be able to see the construction of the structure. It was not possible to excavate down to the original ground surface since it was a risk of the trench caving in. However, the excavation gave an insight to the construction and it provided also a carbon sample for dating. The stone material varied in size but the stones tended to be larger inside the structure. While the structure had been built a small fire had been lit on top of a flat stone inside the central platform. This carbon sample has been dated and the activity of the building of the central platform is set to AD 1300-1450.

The excavation in the west wing gave the result that several burials were found. One cremation placed in a stonelined concentration and parts of unburnt bones from several individuals placed next to a big boulder on the north side of the wing. The cremation was dated to AD 1400-1500. Under the wing was a thin layer containing cultural deposits found dated to AD 1300-1400, which indicate that the central part of the structure probably was build prior to the addition of the west wing.

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Technical report

**(Technical Report of) Field Mapping the *ahu* Ra'ai, La Pérouse area.
Kon-Tiki Museum Expedition to Easter Island, November 1997**

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1. INTRODUCTION

1.1. Site description

In October/November 1997 the Research Department of the Kon-Tiki museum, Norway conducted an archaeological project at the *ahu* Ra'ai site in the La Pérouse area, on the northern shore of Rapa Nui (Easter Island).

The central feature of the site is an *ahu* ceremonial platform, surrounded by elements typical to the region including an elite village, other lesser habitations, an area of petroglyphs, and a number of other *ahu* structures, with crematoria, *tupa*, *manavai*, *hare moa*. Immediately in front of the site is the ocean. The entire study area measures about 700m by 450m, and it is in some areas fairly steeply sloped, rising from sea level to about 18 m. The overall shape of the area bounded by the *ahu* Ra'ai and the petroglyph area is rather flat and slightly basin shaped, rising from sea level to about 18m (Fig. 1). The *ahu* was probably constructed in the 11th and 14th centuries, but there may well be older settlements and structures underneath it. It was almost certainly destroyed during the civil unrest in protohistoric times, between the 17th and 18th centuries.

Fig. 1. The La Pérouse area. Central structure is *ahu* Ra'ai

1.2. Objectives

Our objectives were to map the excavation and its immediate surroundings as accurately as possible, and to create a digital database with geographic and attribute data that would be compatible with other data such as aerial photographs and conventional maps. Our field tools were a global positioning system (GPS) and an electronic total station (EDM). The data were

gathered using a field documentation system that made possible direct downloading to a geographical information system (GIS), on a portable PC.

2. TECHNICAL CHALLENGES

Three technical problems confronted us: the extreme remoteness of the site, the limited time available to complete the survey, and the scarcity of reliable previous survey data, benchmarks or reference points.

The site is unusually remote in two ways. Rapa Nui is globally remote, being arguably the most isolated inhabited place on earth. The *ahu* is remote by standards of the island itself, being at the end of 5km of unimproved road. Consequently neither technical support, nor a return visit at the conclusion of the fieldwork to rectify flawed data were practical possibilities. Our field time was limited; we had only five days to complete the survey work for the mapping. This limited time was the result of some local political difficulties. Finally, the scarcity of reliable maps, previous survey data and reference points was a product of the isolation of the island. Some fairly accurate topographic coverages are available, as well as some air photograph surveys from the 1960s and photogrammetric surveys from 1981. However these data are often unreliable at the extremely fine scales useful for archeological work. Further, combining photogrammetric survey data, field data, and prior maps is extremely difficult in the absence of any reliable local reference points.

This combination of challenges demanded a mapping strategy that would produce accurate, field verifiable data that recorded site characteristics well enough so that they could be analyzed effectively, and also combined with other data sources.

3. METHODS

We ran two technologies in tandem to complete the survey: a GPS and an EDM. The GPS served to produce a grid of reference points that could be used to georeference the EDM data, and to produce maps of reference features that could be used to register the EDM data to the air-photo survey data. We used two GPS units, a 12 channel Trimble receiver, with a TDC2 data logger to serve as a base station, and an 8 channel Trimble receiver with a TDC1 data logger to serve as a rover unit. The base station was situated on the one known reference point for the island, a NASA GPS position monument close to the airport. The rover was used to log the

locations of six reference points on site, and to produce two outlines of the coast fronting the site (we also planned to use the center-line of the road as a reference feature, however when analyzing the data we discovered that equipment problems had corrupted that data file). All GPS data were gathered with sub-meter accuracy, in latitude and longitude, using the World Geodetic System of 1984 (WGS 84).

The bulk of the work was done with two operators. For the GPS survey one person was required to run the base station C given the delicacy of the political situation we decided it was inadvisable to leave equipment unattended C and one to run the rover unit. For the EDM survey one person operated the station and one the staff.

As no reliable almanac was available for satellite availability in the Central South Pacific we optimized our use of time by creating the local EDM grid in free coordinate space. Whenever seven or more satellites could be tracked we took our GPS readings, georeferencing the EDM data during post-processing. Using this strategy in three days the EDM mapping of the archaeological features was completed, and in the remaining two days the surrounding topography within an area of about 540m by 700m was mapped. During the same period a GPS survey of the coast and of the EDM reference points was completed.

The EDM mapping was done with an EDM Geodimeter 520 (Spectra Precision). This instrument generated vector data within a very precise x, y, z coordinate system accurate to within less than a centimeter. It also recorded basic attribute codes for the area. The vector points provide the basis for a digital terrain model (DTM). The precision of the data sets was further enhanced by the fact that all materials were gathered at 1:1 scale, using a system of annotation called the field system, described in detail below.

The EDM proprietary software GeoTool was used to transfer data from the EDM to a portable PC. The database program Microsoft Access was used for field editing of the data, and ArcView GIS was used to field-verifying the maps produced. Data were transferred from the EDM to ArcView using a script written by Ulf Bodin of the National Heritage Board, Sweden.

4. FIELD SYSTEM

The method of field recording used at La Pérouse was developed at the Archaeology Department of the Swedish National Heritage Board, and has been used at over five hundred excavations since 1991 (Bodin 1994, Flyg 1995). It was developed in a effort to standardize the collection of digital

data for a large state archive, and so was designed to be sufficiently flexible to allow for the inclusion of paper, text, and photographic records within a single coding, storage and retrieval system. It is object-oriented, and uses the database, georeferencing, and mapping capabilities of GIS to integrate the diversity of data types. The system is a combination of a custom-written import macro (script) specific to the software package used to process the data (ArcView), and a procedure for data gathering and annotation that allows for the coding and description of features as they are recorded in the field.

5. RESULTS AND CONCLUSIONS

In the five days available for the survey, we successfully mapped the primary site features, trench locations, and topography of the surrounding area with over 2700 measurement points. From these data site maps of landscape features, site features and topography were generated (appendix A). At present a preliminary design for a broader modeling effort is being planned. This will use the GIS to generate an analytical model comparing basic site characteristics to those of other sites on Rapa Nui as the first step in developing a human ecological model of the island (appendix B).

6. TECHNICAL SPECIFICATIONS

6.1. Hardware

Electronic total station (EDM) Spectra Geodimeter 520

GPS Satellite receivers Trimble 12 channel with a TDC2 data logger (base station), 8 channel with a TDC1 data logger (rover unit).

Portable PC Siemens Nixdorf Mobile 700

6.2. Software

ESRI: ArcView 3.0a, Spatial Analyst, 3D Analyst

ADOBE: PhotoShop 6.5

Spectra Precision: GeoTool

Microsoft: Access 97

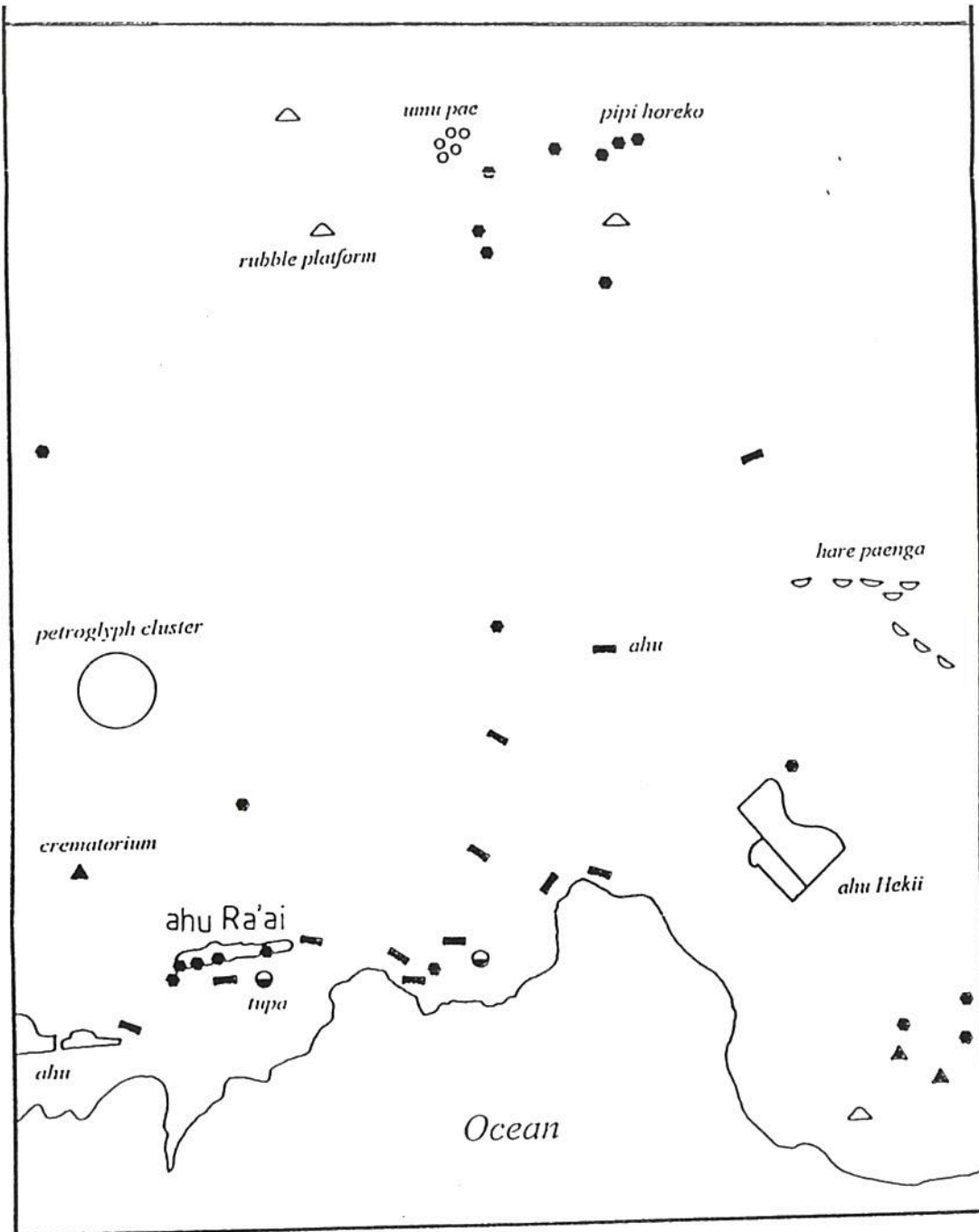
Platform: Windows NT4

6. REFERENCES

- Bodin, U. 1994. Arkeologi och informationsteknologi. *Kulturmiljövård 4:94*.
Riksantikvarieämbetet, Stockholm.
- Flyg, P. 1995. Digital medeltidsarkeologi på UV. *META 94:1*. Lund.
- Flyg, P. 1997. GIS in Swedish Archaeology. In: North M. Johnson, I. (Eds.).
*Archaeological Applications of GIS: Proceedings of Colloquium
II, UISPP XIIIth, Forlì, Italy*. (CD-ROM). Sydney University
Archaeological Series 5. Sydney.

Appendix 2

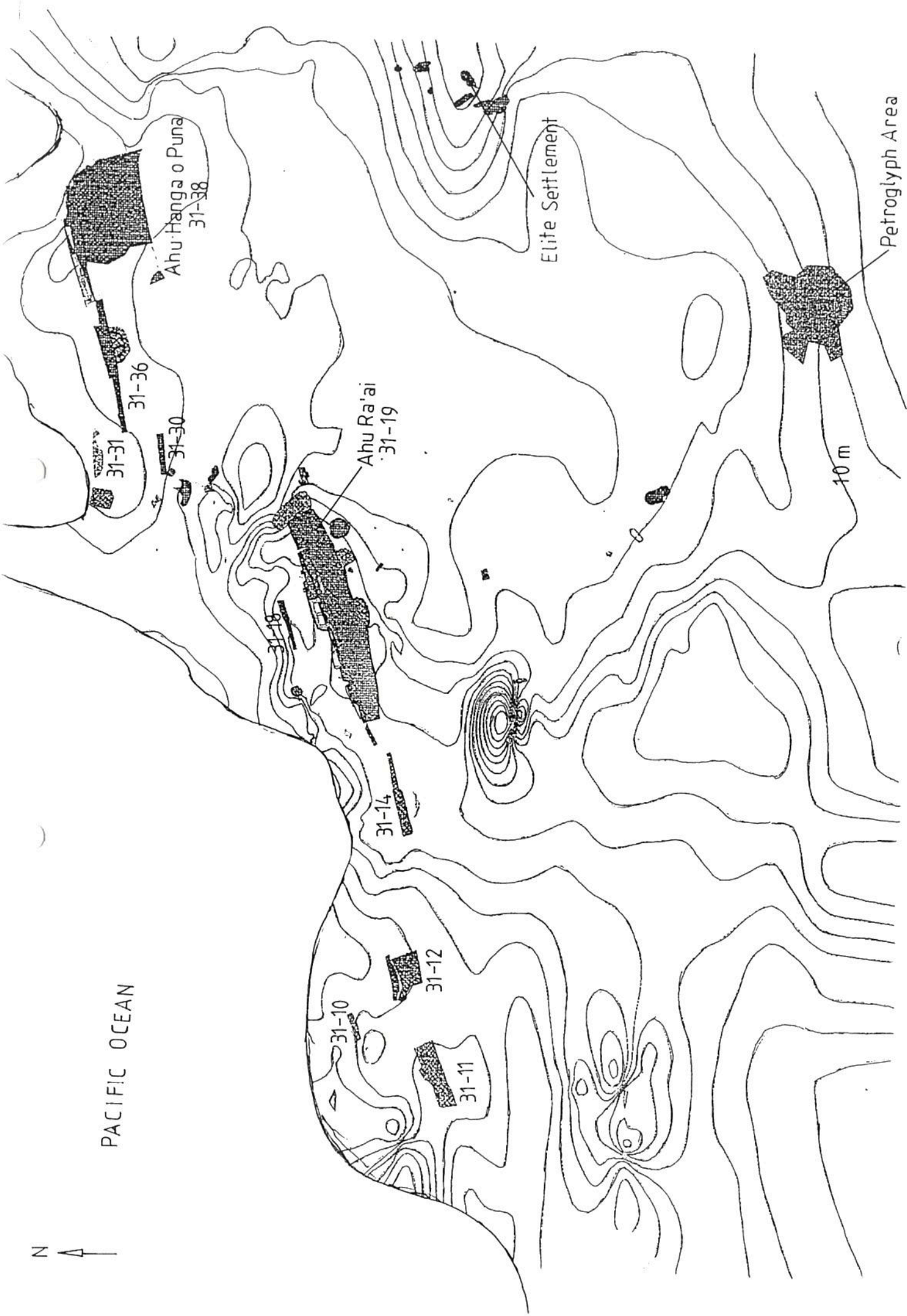
Maps, plans and section drawings



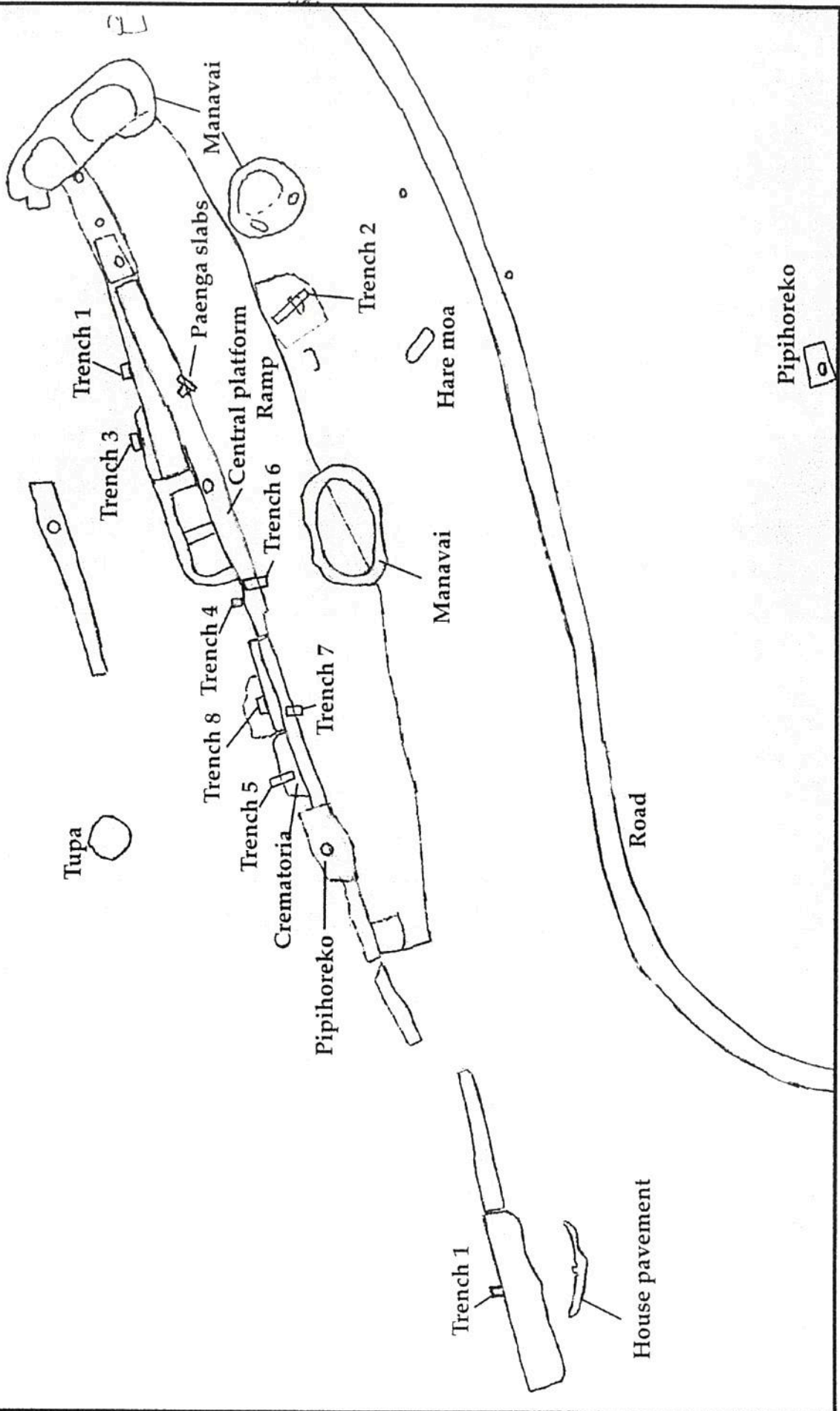
Prehistoric religious structure locations within the La Perouse project area

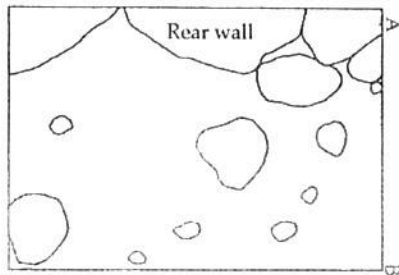
N ↑

PACIFIC OCEAN

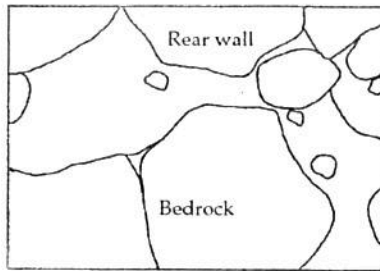


Ahu Ra'ai and surrounding features

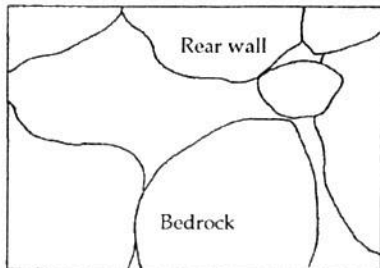




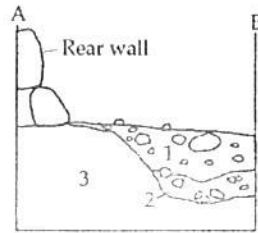
Plan drawing, Surface



Plan drawing, 0-10 cm



Plan drawing, 10-40 cm

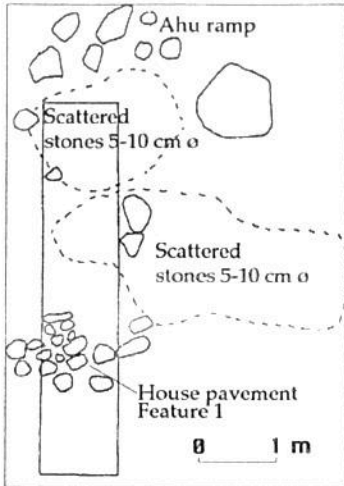


W Section

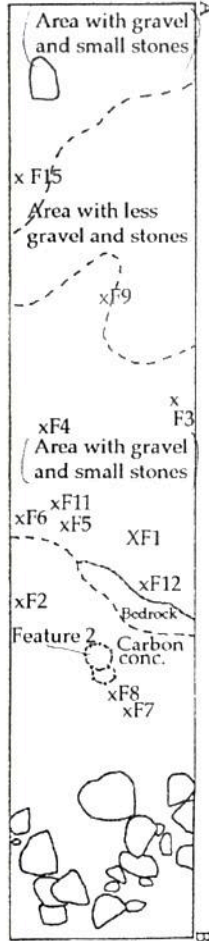
1. Brown sandy soil with stones and gravel.
2. Red-brown soil mixed with bedrock stones.
3. Bedrock.

**EASTER ISLAND
LA PÉROUSE
AHU RA'AI, SITE 31-19
TRENCH 1
OCT. 1997**

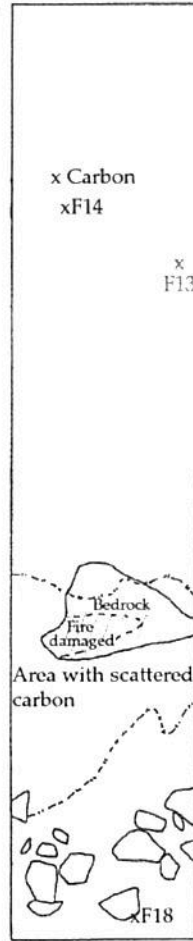
0 1 m



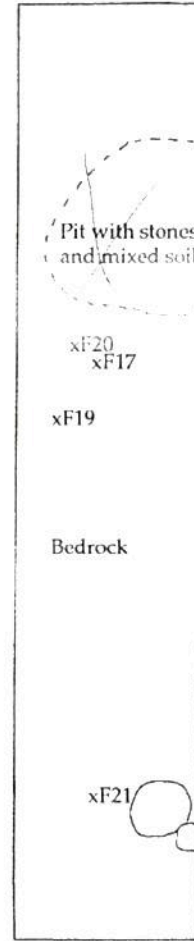
Plan drawing of surface of trench 2, and close surroundings



Plan drawing, 0-10 cm



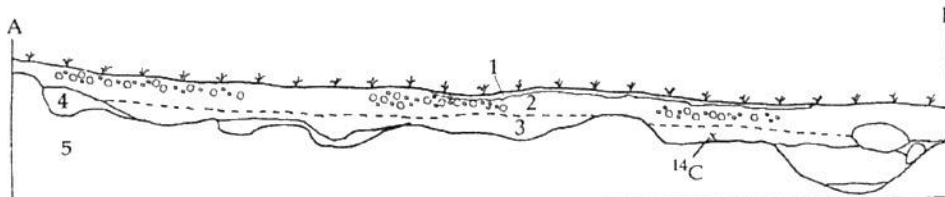
Plan drawing, 10-20 cm



Plan drawing, 20-40 cm

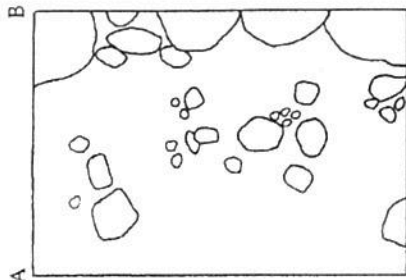
**EASTER ISLAND
LA PÉROUSE
AHU RA'AI, SITE 31-19:49
TRENCH 2, (HABITATION)
OCT. 1997**

0 1 m

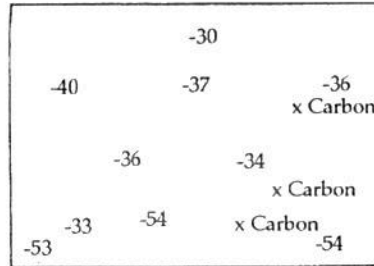


E Section

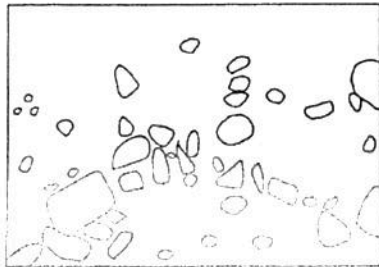
1. Brown sandy soil.
2. Dark brown sandy soil mixed with stones
3. Dark brown sandy soil
4. Red-brown soil.
5. Bedrock



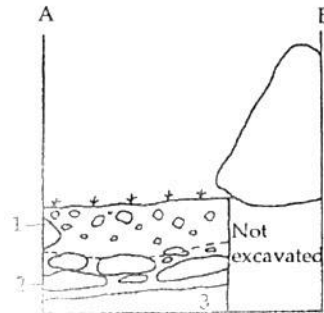
Plan drawing, Surface



Bedrock

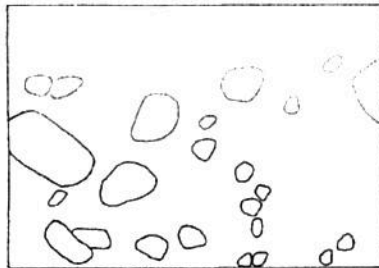


Plan drawing, 0-10 cm



E Section

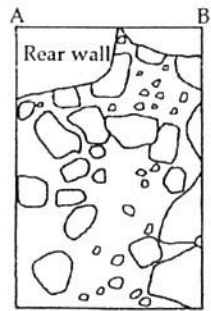
1. Brown sandy soil mixed with gravel and stones.
2. Red-brown soil mixed with bedrock stones.
3. Bedrock.



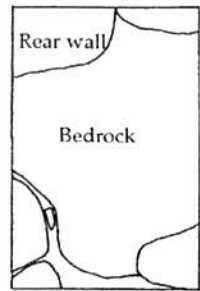
Plan drawing, 10-20 cm

**EASTER ISLAND
LA PÉROUSE
AHU RA'AI, SITE 31-19
TRENCH 3
OCT. 1997**

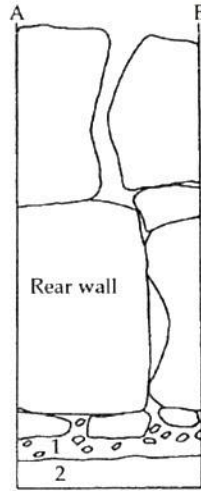
0 1 m



Plan drawing, Surface



Plan drawing, 0-20 cm

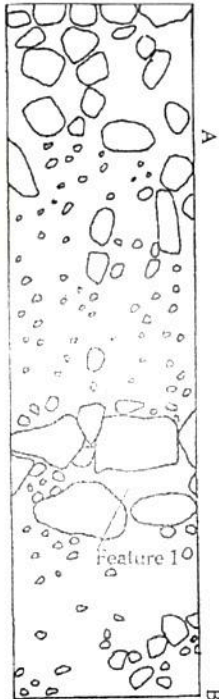


S Section

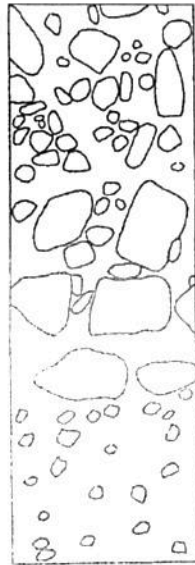
1. Brown sandy soil mixed with stones and gravel.
2. Bedrock.

EASTER ISLAND
LA PÉROUSE
AHU RA'AI, SITE 31-19
TRENCH 4
OCT. 1997

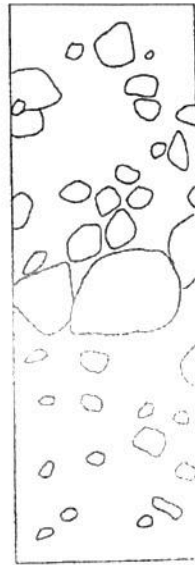
0 1 m



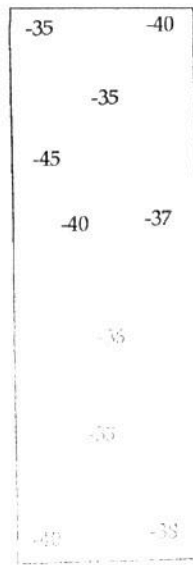
Plan drawing,
Surface



Plan drawing,
0-10 cm



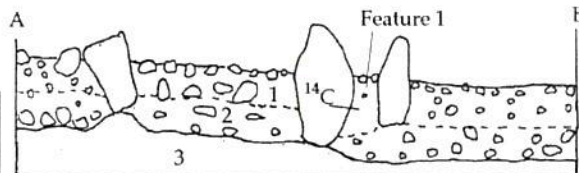
Plan drawing,
10-20 cm



Plan drawing,
Bedrock

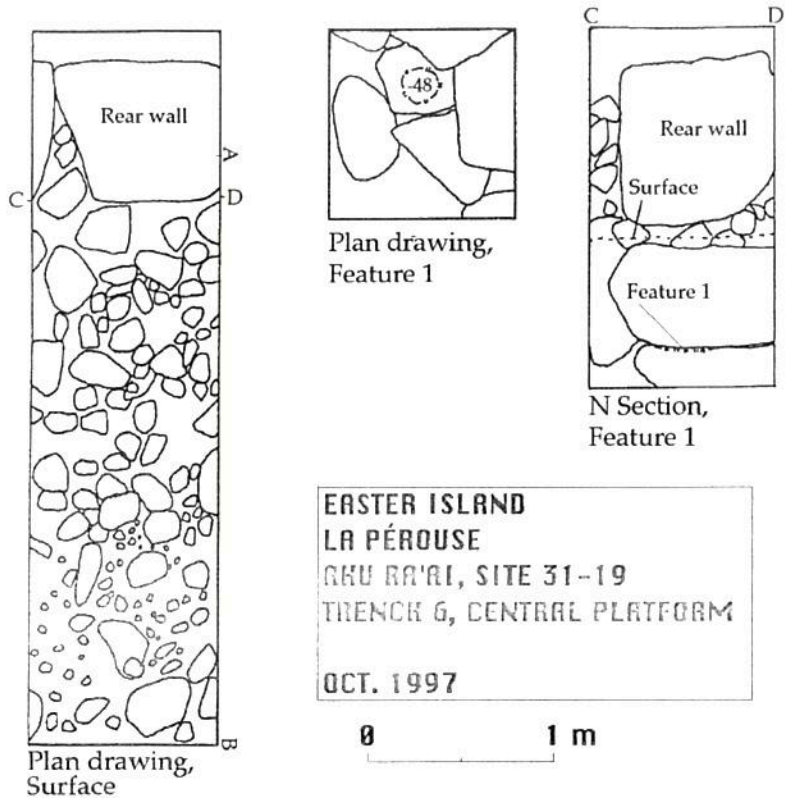
EASTER ISLAND
LA PÉROUSE
AHU RA'AI, SITE 31-19
TRENCH 5 (CREMATORIA)
OCT. 1997

0 1 m

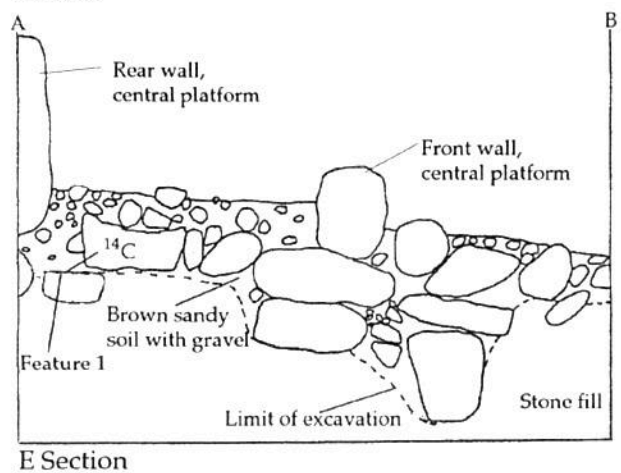


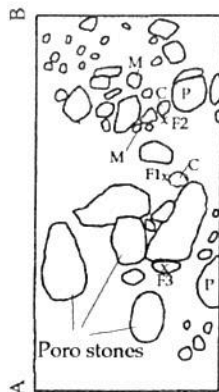
E Section

1. Brown sandy soil mixed with gravel and stones.
2. Red-brown soil mixed with bedrock stones.

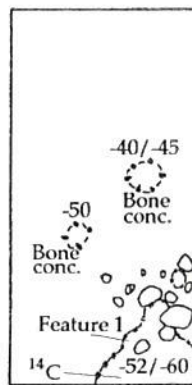


EASTER ISLAND
LA PÉROUSE
 ANU RA'AI, SITE 31-19
 TRENCH G, CENTRAL PLATFORM
 OCT. 1997

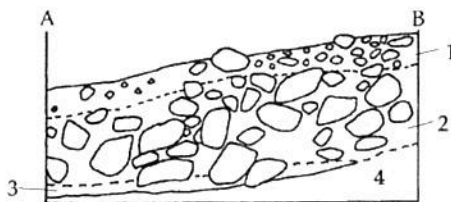




Plan drawing,
Surface-10 cm



Plan drawing,
40-60 cm



W Section

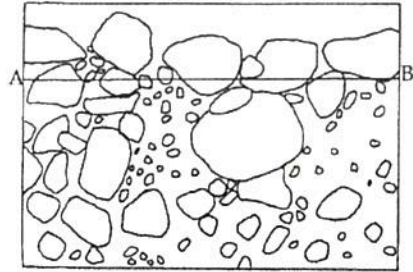
1. Brown sandy soil , mixed with gravel.
2. Stone fill, mixed with brown soil.
3. Dark brown clay soil.
- 4 . Bedrock.

P=Poro stone, M=Moai stone, C=Coral.

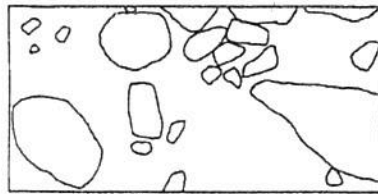
EASTER ISLAND
LA PÉROUSE
AHU RA'AI, SITE 31-19
TRENCH 7, (W. WING)

OCT.-NOV. 1997

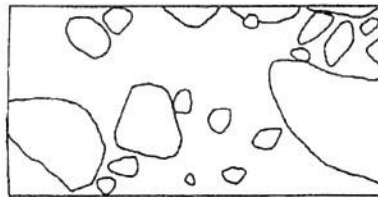
0 1 m



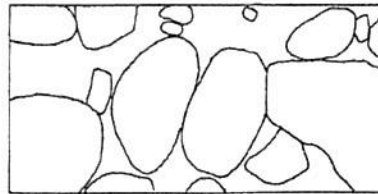
Plan drawing, Surface



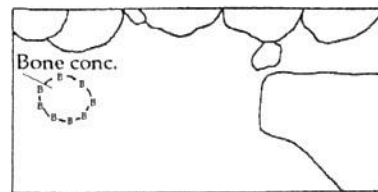
Plan drawing, 0-10 cm



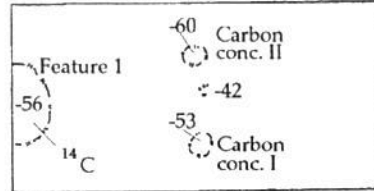
Plan drawing, 10-20 cm



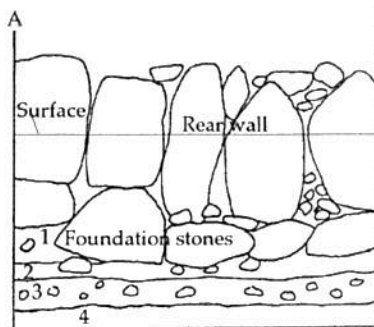
Plan drawing, 20-30 cm



Plan drawing, 30-40 cm



Plan drawing, 40-60 cm



S Section

1. Brown sandy soil mixed with gravel and stones.
2. Brown soil.
3. Brown-red soil mixed with bedrock stones.
4. Bedrock.

**EASTER ISLAND
LA PÉROUSE
AHU RA'AI, SITE 31-19
TRENCH 8
OCT.-NOV. 1997**

0 1 m

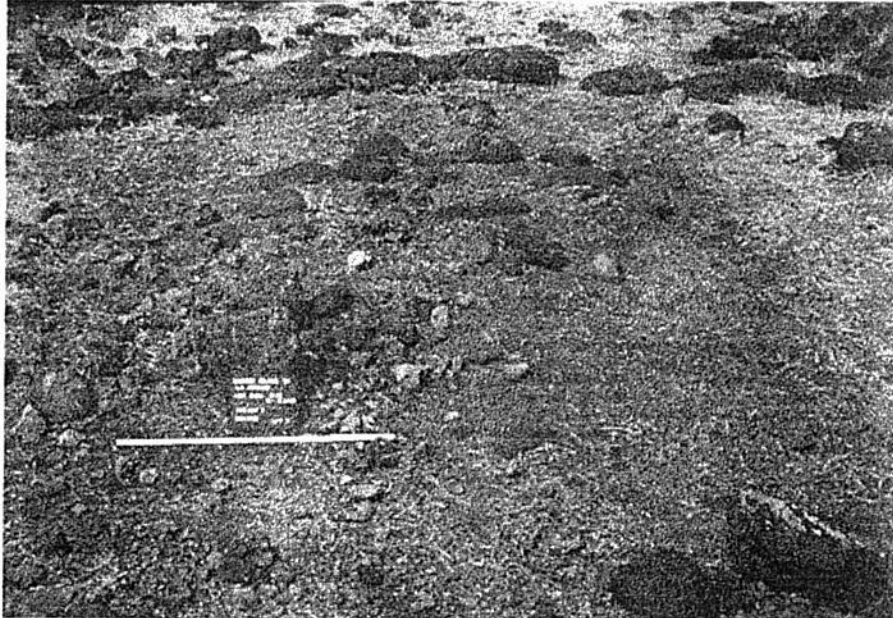
Appendix 3
Photos



Trench 1



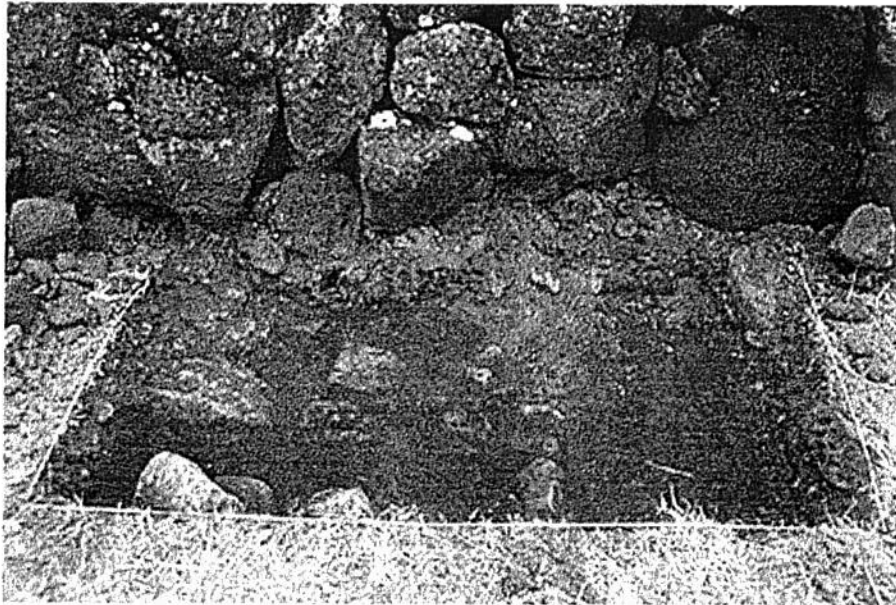
Surface, Trench 2



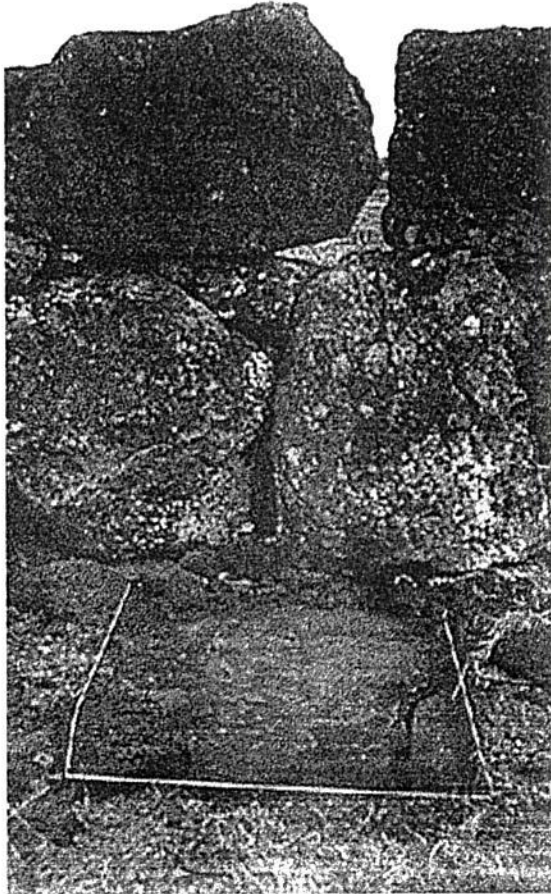
Trench 2



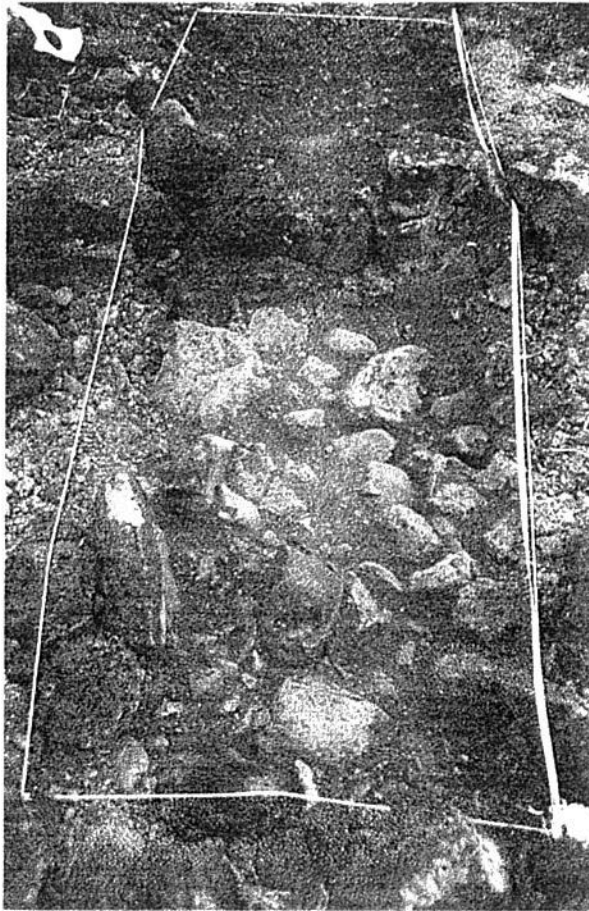
Trench 3



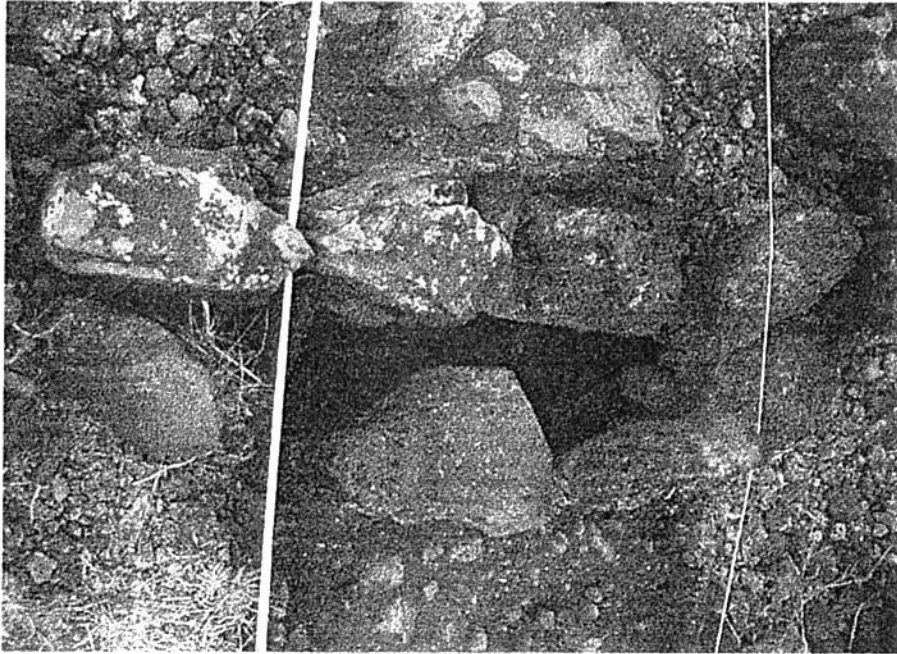
Trench 4



Trench 5



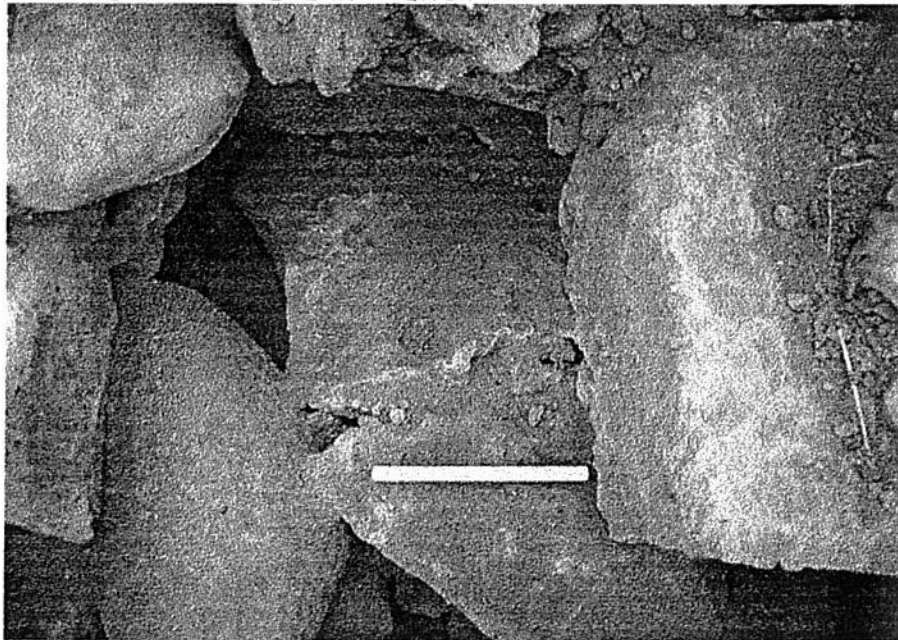
Feature, Trench 5



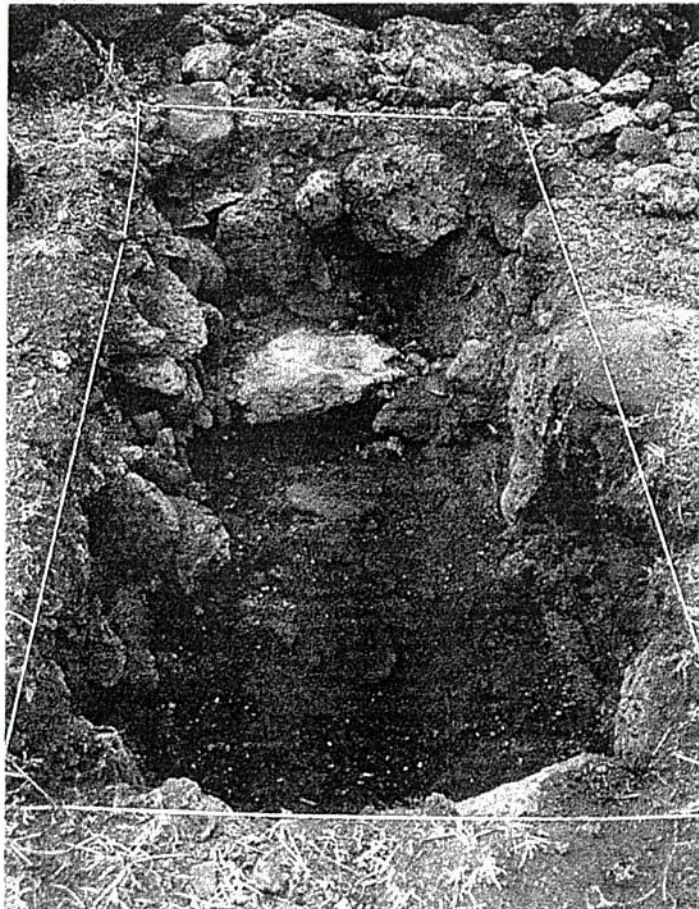
Trench 6



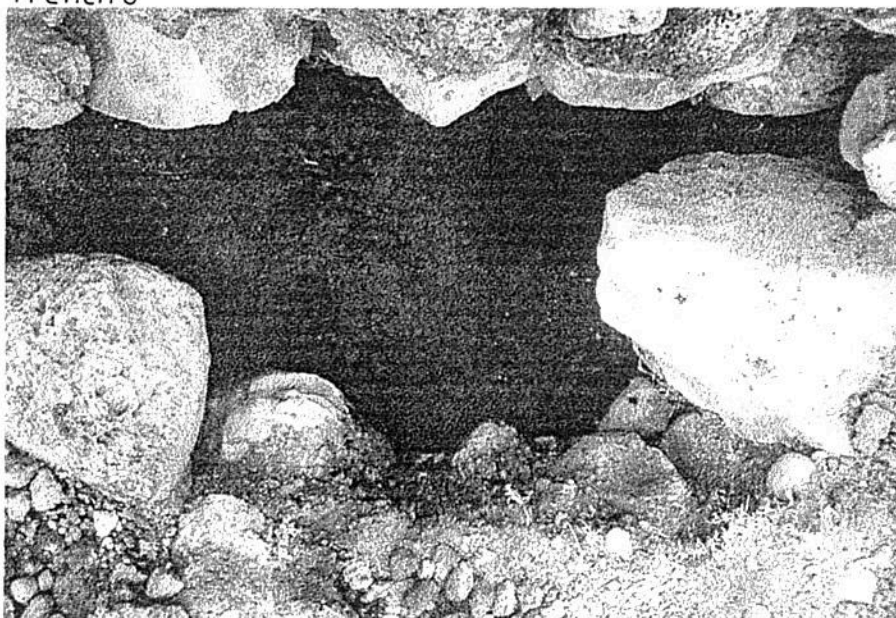
Location of Feature in Trench 6



Trench 7



Trench 8



Appendix 4
14 C dates

ÅNGSTRÖMLABORATORIET
AVD FÖR JONFYSIK, ¹⁴C-LAB
UPPSALA UNIVERSITET

Uppsala 1998-04-23

Helene Martinsson-Wallin
KON-TIKI Museet
Institutt for Stillehavs-arkeologi og kulturhistorie
Bygdøynesveien 36
N-0286 OSLO
Norge

Resultat av ¹⁴C datering av träkol från Påskön, Chile.

Förbehandling av träkol och liknande material:

1. Synliga rottrådar borttages.
2. 1% HCl tillsätts (6-8 timmar, under kokpunkten) (karbonat bort).
3. 1% NaOH tillsätts (6-8 timmar, under kokpunkten). Löslig fraktion fälls genom tillsättning av konc. HCl. Fällningen som till största delen består av humusmaterial, tvättas, torkas och benämns fraktion SOL. Olöslig del , som benämns INS, består främst av det ursprungliga organiska materialet. Denna fraktion ger därför den mest relevanta åldern. Fraktionen SOL däremot ger information om eventuella föroreningars inverkan.

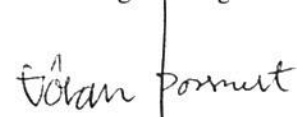
Före acceleratorbestämningen av ¹⁴C-innehållet förbränns det intorkade materialet, surgjort till pH 4, till CO₂-gas, som i sin tur konverteras till fast grafit genom en Fe-katalytiskreaktion.

I den aktuella undersökningen har fraktionen INS daterats.

RESULTAT

Labnummer	Prov	δ ¹³ C ‰ PDB	¹⁴ C ålder BP
Ua-13163	Ahu Ra'ai site 31-19/49, trench 2-4, sample 14	-23.83	135 ± 60
Ua-13164	Ahu Ra'ai site 31-19/49, trench 5, sample 21	-26.02	515 ± 60
Ua-13165	Ahu Ra'ai site 31-19/49, trench 6, sample 25	-26.67	570 ± 50
Ua-13166	Ahu Ra'ai site 31-19/49, trench 7, sample 26	-26.49	635 ± 50
Ua-13167	Ahu Ra'ai site 31-19/49, trench 8, sample 29	-21.73	645 ± 50

Med vänlig hälsning



Göran Possnert / Maud Söderman

Calibrated 14 C datings from ahu Ra'ai

Ua 13163 Trench 2-4, Ahu Ra'ai: BP 135+60 cal. Age AD 1680-1740 (1 sigm)/AD1810-1930 (2 sigm)

Ua 13164 Trench 5, Ahu Ra'ai: BP 515+60 cal. Age AD 1390-1470 (1sigm)/1290-1520 (2 sigm)

Ua 13165 Trench 6, Ahu Ra'ai: BP 570+50 cal. Age AD 1310-1440 (1 sigm)/1290-1450 (2 sigm)

Ua 13166 Trench 7, Ahu Ra'ai: BP 635+50 cal. Age AD 1290-1400 (1 sigm)/1280-1410 (2 sigm)

) Ua 13167 Trench 8, Ahu Ra'ai: BP 645+50 cal. Age AD 1290-1400 (1 sigm)/1280-1410 (2 sigm)

)

Appendix 5

Obsidian hydration dates by Christopher Stevenson, Obsidian lab. ASC Group, INC.

Obsidian dates

Lab No.	Trench	Rim	Density	EHT	%Rh	%OH	A	E	Rate	Age BP	Age AD	S.D.
98-2	Tr. 1, L.1	1,35	2,3943	22,6	0,98	0,09	0,99	85814	5,36	340	1610	52
98-3	Tr. 1, L.2	1,61	2,4177	22,6	0,98	0,08	0,80	86503	3,96	655	1295	84
98-4	Tr. 1, L.2	1,63	2,3935	22,6	0,98	0,09	1,00	85792	5,41	491	1459	62
98-5	Tr. 2-1, L.1	1,39	2,3917	22,6	0,98	0,10	1,01	85744	5,53	350	1600	52
98-6	Tr. 2-1, L.1	0,96	2,3892	22,6	0,98	0,10	1,03	85679	5,68	162	1788	36
98-7	Tr. 2-1, L.2	1,63	2,3965	22,6	0,98	0,09	0,97	85874	5,23	508	1442	64
98-8	Tr. 2-1, L.2	0,92	2,3957	22,6	0,98	0,09	0,98	85852	5,28	160	1790	37
98-10	Tr. 2-1, L.3	1,84	2,3908	22,6	0,98	0,10	1,02	85721	5,58	607	1343	68
98-11	Tr. 2-2, L.1	1	2,3905	22,6	0,98	0,10	1,02	85713	5,60	179	1771	38
98-13	Tr. 2-2, L.2	1,63	2,396	22,6	0,98	0,09	0,98	85860	5,26	505	1445	64
98-14	Tr. 2-2, L.2	1,2	2,4019	22,6	0,98	0,09	0,93	86025	4,90	294	1656	51
98-15	Tr. 2-2, L.3	0,92	2,3956	22,6	0,98	0,09	0,98	85849	5,28	160	1790	37
98-16	Tr. 2-2, L.3	1,59	2,3918	22,6	0,98	0,10	1,01	85747	5,52	458	1492	59
98-18	Tr. 2-3, L.1	1,59	2,39	22,6	0,98	0,10	1,03	85699	5,63	449	1501	58
98-19	Tr. 2-3, L.2	0,92	2,3846	22,6	0,98	0,10	1,07	85560	5,97	142	1808	33
98-21	Tr. 2-3, L.3	0,96	2,4068	22,6	0,98	0,09	0,89	86167	4,60	200	1750	44
98-22	Tr. 2-3, L.3	1,57	2,3967	22,6	0,98	0,09	0,97	85879	5,22	472	1478	62
98-23	Tr. 2-4, L.1	1,82	2,394	22,6	0,98	0,09	0,99	85806	5,38	615	1335	69
98-24	Tr. 2-4, L.1	0,96	2,3949	22,6	0,98	0,09	0,99	85830	5,33	173	1777	38
98-25	Tr. 2-4, L.2	1,35	2,3998	22,6	0,98	0,09	0,95	85965	5,03	362	1588	56
98-26	Tr. 2-4, L.2	1,51	2,3879	22,6	0,98	0,10	1,04	85645	5,76	396	1554	54
98-28	Tr. 2-5, L.1	1,14	2,4014	22,6	0,98	0,09	0,94	86010	4,93	264	1686	48
98-29	Tr. 2-5, L.1	1,59	2,3907	22,6	0,98	0,10	1,02	85718	5,59	452	1498	59
98-30	Tr. 2-5, L.2	1,02	2,4002	22,6	0,98	0,09	0,95	85976	5,00	208	1742	43
98-31	Tr. 2-5, L.2	1,82	2,4043	22,6	0,98	0,09	0,91	86094	4,75	697	1253	79
98-32	Tr. 2-5, L.3	1,39	2,3978	22,6	0,98	0,09	0,96	85909	5,15	375	1575	56
98-33	Tr. 2-5, L.3	1,25	2,3943	22,6	0,98	0,09	0,99	85814	5,36	291	1659	48
98-34	Tr. 3, L.1	1,21	2,3872	22,6	0,98	0,10	1,05	85627	5,80	252	1698	43
98-35	Tr. 3, L.1	1,63	2,4048	22,6	0,98	0,09	0,91	86108	4,72	562	1388	71
98-36	Tr. 3, L.2	1,41	2,3973	22,6	0,98	0,09	0,97	85896	5,18	384	1566	56
98-37	Tr. 3, L.2	1,63	2,4017	22,6	0,98	0,09	0,93	86019	4,91	541	1409	68
98-38	Tr. 4, L.1	1,39	2,3976	22,6	0,98	0,09	0,97	85904	5,16	374	1576	56
98-39	Tr. 4, L.1	1,65	2,3944	22,6	0,98	0,09	0,99	85817	5,36	508	1442	63
98-40	Tr. 5, L.1	1,41	2,3953	22,6	0,98	0,09	0,98	85841	5,30	375	1575	55
98-41	Tr. 5, L.1	1,51	2,3967	22,6	0,98	0,09	0,97	85879	5,22	437	1513	60

Obsidian dates

98-42	Tr. 5, L.1	1,72	2,3977	22,6	0,98	0,09	0,97	85907	5,16	574	1376	69
98-43	Tr. 5, L.1	1,63	2,4013	22,6	0,98	0,09	0,94	86008	4,94	538	1412	68
98-44	Tr. 5, L.2	1,59	2,3893	22,6	0,98	0,10	1,03	85681	5,67	446	1504	58
98-45	Tr. 5, L.2	1,41	2,3948	22,6	0,98	0,09	0,99	85827	5,33	373	1577	55
98-47	Tr. 5, L.2	0,82	2,3879	22,6	0,98	0,10	1,04	85645	5,76	117	1833	30
98-49	Tr. 5, Crem	1,25	2,3964	22,6	0,98	0,09	0,98	85871	5,24	298	1652	50
98-50	Tr. 6, L.1	1,55	2,4062	22,6	0,98	0,09	0,90	86149	4,64	518	1432	69
98-51	Tr. 7, L.1	1,71	2,3963	22,6	0,98	0,09	0,98	85868	5,24	558	1392	67
98-52	Tr. 7, L.1	2,12	2,3982	22,6	0,98	0,09	0,96	85921	5,13	877	1073	85
98-53	Tr.7, L.2	1,65	2,3955	22,6	0,98	0,09	0,98	85846	5,29	515	1435	64
98-54	Tr.7, L.2	1,72	2,3974	22,6	0,98	0,09	0,97	85898	5,17	572	1378	68
98-55	Tr. 7, L.3	1,59	2,396	22,6	0,98	0,09	0,98	85860	5,26	481	1469	62
98-56	Tr. 7, L.3	1,63	2,3958	22,6	0,98	0,09	0,98	85855	5,27	504	1446	64
98-57	Tr. 8, L.1	1,25	2,415	22,6	0,98	0,08	0,82	86417	4,12	380	1570	63
98-58	Tr. 8, L.1	1,63	2,3922	22,6	0,98	0,10	1,01	85758	5,49	484	1466	61
98-59	Tr. 8, L.2	1,71	2,3925	22,6	0,98	0,10	1,01	85766	5,48	534	1416	64
98-60	Tr. 8, L.2	1,59	2,3904	22,6	0,98	0,10	1,02	85710	5,61	451	1499	59
98-61	Tr. 8, L.3	1,74	2,3921	22,6	0,98	0,10	1,01	85755	5,50	550	1400	65
98-62	Tr. 8, L.3	1,59	2,4029	22,6	0,98	0,09	0,92	86053	4,84	522	1428	68
98-63	Tr. 8, L.4	1,76	2,3928	22,6	0,98	0,10	1,00	85774	5,46	568	1382	66
98-65	Tr. 8, L.5	1,76	2,3834	22,6	0,98	0,10	1,08	85530	6,04	513	1437	60
98-66	Tr. 8, L.5	1,69	2,3844	22,6	0,98	0,10	1,07	85555	5,98	478	1472	58

Appendix 6
Osteological analysis

Osteological report , trench 5

By Paul Wallin

The bones were mainly found inside a semicircular stone alignment attached to the crematoria, *feature 1*. A total of c. 2 liters of cremated bones were found inside the feature and furthermore was c.4 dl of bones found outside the feature but they most probably belong to feature 1. Inside the crematoria was also a small amount of human cremated bones found.

The main part of the bones is not so heavily fire damaged but variations do occur and some heavily burnt whitish bones are found as well. The variation indicates that the body/skeleton probably was burnt in an open fire. The bone fragments from feature 1 vary in size from 4mm-60mm and the bones from the crematoria are smaller in size 2mm-20 mm. All the bones have probably been crushed after the cremation. All the bone fragments are from human individual(s)

Aside from the cremated bones 2 non-cremated teeth fragments were found; (1 canis, 1 molar from a young individual). They may be a later intrusion since they were found at the very top of the feature.

Bones from feature 1

Identified bone fragments. Cat. no. 361, 363

A total of 0,65 liters of bone could be identified to which bone and which part of the bone it derived from:

<i>Axis;</i>	1 fr dens axis
<i>Vertebrae;</i>	4 fr arcus, 1fr corpus
<i>Clavicula;</i>	1 fr.
<i>Humerus;</i>	6 fr. diaphys
<i>Radius;</i>	1 fr.caput, 1 fr. diaphys dist, 2 fr. diaphys.
<i>Ulna;</i>	2 fr diaphys.
<i>Phalanx 2;</i>	1manis prox (marked osteophytes)
<i>Costae;</i>	2 fr.
<i>Coxae;</i>	16 fr
<i>Femur;</i>	1fr caput, 20 fr. diaphys
<i>Tibia;</i>	39 fr. diaphys (3 with possible cut mark), 1 fr. dist

Not identified bone fragments. Cat. no 361, 362:

An amount of bones of 1,5 liters not identified to exact bone but all belong to different human long bones.

Bones outside of feature 1

Identified bone fragments. Cat. no 364:

An amount of 0,4 liters of cremated bones was found just outside feature 1 at a level of 10-20 cm under the surface. They most probably belong together with the cremated bone concentration in feature 1. The bones are identified to;

<i>Costae;</i>	1 fr
<i>Coxae;</i>	4 fr
<i>Humerus;</i>	2 fr diaphys
<i>Radius;</i>	3 fr (1 with possible cutmarks)
<i>Ulna;</i>	3 fr diaphys
<i>Femur;</i>	3 fr prox (2 fr with parts of caput), 4 fr diaphys (3 with a pronounced linea aspera)
<i>Tibia;</i>	1 fr prox, 3 fr diaphys

Bones from the crematoria

A few fragments of cremated bones were found inside the crematoria. These bone fragments was smaller (2-20 mm in size) than the ones found in connection to feature 1.

Bone fragments from level 1 (0-10 cm). Cat. no 374.

The identified bones were;

<i>Tibia;</i>	1 fr prox, 1 fr dist
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The other 23 bone fragments were not identified.

Bone fragments from level 2 (10-20 cm). Cat. no 380.

No fragments could be exactly identified but 4 fr belonged to diaphys parts of human long bones. 18 fr was unidentified.

Bone fragments from level 3 (20-30 cm). Cat. no 383.

The 6 bone fragments that were recovered could not be identified

Appendix 7
Find lists

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III. REGISTRO BÁSICO DE MATERIAL ARQUEOLÓGICO.

Código de sitio : 31-19

No de inventario :

Material : Lithics

Ubicación en depósito :

No de inventario :

Ubicación en depósito :

No Correl	UBICACIÓN		CONTEXTO		DESCRIPCIÓN DEL MATERIAL	CANTIDAD	OBSERVACIÓN
	No caja	No bolsa	Unidad	Nivel			
		240	1	Superficie	Obsidian, flakes/chips/waste	12	Not used
		241-243	1	Superficie	Obsidian, tools	5	Some used
		244-248	1	Superficie	Obsidian, tools	5	Used
		253	1		Obsidian, flakes/chips/waste	27	Not used
		254-256	1		Obsidian, tools	9	Used
		257-262	1		Obsidian, tools	6	Used
		265	1	2	Obsidian, flakes/chips/waste	11	Not used
		266-269	1	2	Obsidian, tools	4	Used
		275	3	1	Obsidian, flakes/chips/waste	46	Not used
		276-280	3	1	Obsidian, tools	7	Used
		281-292	3	1	Obsidian, tools	12	Used
		296	3	2	Obsidian, flakes/chips/waste	27	Not used
		297-307	3	2	Obsidian, tools	12	Used
		313	4	1	Obsidian, flakes/chips/waste	39	Not used
		314-320	4	1	Obsidian, tools	12	Used
		321-329	4	1	Obsidian, tools	9	Used
		331	5-Outside	1	Obsidian, flakes/chips/waste	30	Not used
		332-336	5-Outside	1	Obsidian, tools	10	Used
		337-344	5-Outside	1	Obsidian, tools	8	Used
		347-349	5-Outside	2	Obsidian, chips	2	Cat. no. 348-349 are obsidian
		355-356	5-Outside	Feature 1	Obsidian, flakes/chips/waste	3	Not used, 356 taken for dating
		357-360	5-Outside	Feature 1	Obsidian, tools	4	Used
		366	5-Inside	1	Obsidian, flakes/chips/waste	29	Not used
		367-374	5-Inside	1	Obsidian, tools	7	Used
		377-379	5-Inside	2	Obsidian, flakes/chips/waste	9	One used, 378 taken for dating
		382	5-Inside	3	Obsidian, flakes/chips/waste	6	Not used
		385	6-Central	Surface	Obsidian, flakes/chips/waste	6	Not used
		386-391	6-Central	Surface	Obsidian, tools	6	Used
		395	6-Central	Fill	Obsidian, chip	1	Not used
		396	6-Central	Fill	Obsidian, chip	0	Taken for dating
		401	6-Ramp	Surface	Obsidian, flakes/chips/waste	3	Not used
		402-404	6-Ramp	Surface	Obsidian, tools	3	Used
		410	6-Ramp	Fill	Obsidian, flakes/chips/waste	3	Not used
		411-417	6-Ramp	Fill	Obsidian, tools	8	Used

III. REGISTRO BÁSICO DE MATERIALES ARQUEOLÓGICOS.

Código de sitio : 31-19
 Material : Líthics

No de inventario :
 Ubicación en depósito :

No Correl	UBICACIÓN		CONTEXTO		DESCRIPCIÓN DEL MATERIAL	CANTIDAD	OBSERVACIÓN
	No caja	No bolsa	Unidad	Nivel			
		421		7 Surface	Obsidian , flakes/chips/waste	6	Not used
		422-430		7 Surface	Obsidian , tools	11	Used
		439		7	Obsidian , flakes/chips/waste	62	Not used
		440-447		7	Obsidian , tools	11	Used
		448-457		7	Obsidian , tools	10	Used
		468		7	Obsidian , flakes/chips/waste	69	Not used
		469		7	Obsidian , possible tools	22	Used
		470-474		7	Obsidian , tools	15	Used
		475-483		7	Obsidian , tools	9	Used
		487		7	Obsidian , flakes/chips/waste	15	Not used
		488-496		7	Obsidian , tools	10	Used
		516		8	Obsidian , flakes/chips/waste	4	Not used
		517-518		8	Obsidian , tools	14	Used
		519-524		8	Obsidian , tools	10	Used
		525-530		8	Obsidian , tools	6	Used
		531-535		8	Obsidian , tools	5	Used
		542		8	Obsidian , flakes/chips/waste	26	Not used
		543-A-545		8	Obsidian , tools	9	Used
		546-549		8	Obsidian , tools	6	Used
		550-551		8	Obsidian , tools	2	Used
		558		8	Obsidian , flakes/chips/waste	29	Not used
		559-564		8	Obsidian , tools	11	Used
		565		8	Obsidian , tools	1	Drill
		573		8	Obsidian , flakes/chips/waste	8	Not used
		574-579		8	Obsidian , tools	6	Used
		584		8	Obsidian , flakes/chips/waste	13	Not used
		585-587		8	Obsidian , tools	3	Used
		236		1 Surface	Basalt , flakes	4	Keep
		237		1 Surface	Basalt , possible tool	1	Keep
		252		1	Basalt , flakes	8	Keep
		264		1	Basalt , flake	1	Keep
		272-273		3	Basalt , flake	7	Keep
		274		3	Basalt , adze fragment	1	Keep
		312		4	Basalt , flakes	8	Keep
		347-349		5-Outside	Basalt , flakes	3	Keep
		376		5-Inside	Basalt , worked stone	1	Stone with lines: Keep

III. REGISTRO BÁSICO DE MATEF L ARQUEOLÓGICO.

Código de sitio : 31-19
 Material : Lithics

No de inventario :
 Ubicación en depósito :

No Correl	UBICACIÓN		CONTEXTO		DESCRIPCIÓN DEL MATERIAL	CANTIDAD	OBSERVACIÓN
	No bolsa	Unidad	Unidad	Nivel			
		400	6-Ramp	Fill	Basalt , flakes	1	Keep, Possible used
		435	7	7	Basalt , flakes	72	Keep
		436	7	7	Basalt , flakes	1	With coral; Keep
		437	7	7	Basalt , toki	1	possible not finished
		438	7	7	Basalt , toki	1	not symmetrical
		465	7	7	Basalt , flakes	62	Keep
	466-467	486	7	7	Basalt , tools	2	Possible used; Possible adze
		507	8	8	Basalt , possible tool	43	Keep
		514	8	8	Basalt , flakes	1	Possible pounding stone
		515	8	8	Basalt , tools	64	Keep
		540	8	8	Basalt , flakes	1	Fragment of toki
		552	8	8	Basalt , flake	33	Also chips; Keep
		555	8	8	Basalt , flakes	1	Used; Keep
		556	8	8	Basalt , tools	20	Keep
		557	8	8	Basalt , tools	1	Possible small adze or toki
		572	8	8	Basalt , flakes	1	Neck-fragment of chisel
	234-235	271	3	3	Moai-tuff	13	Keep
		310	4	4	Moai-tuff	9	Keep
	353-354	407	6-Ramp	Fill	Moai-tuff	4	Keep
		434	7	7	Moai-tuff	4	Keep
		464	7	7	Moai-tuff	21	Keep
		510	8	8	Moai-tuff	37	Keep
		537	8	8	Moai-tuff	12	Keep
		570	8	8	Moai-tuff	1	Keep
		239	1	1	Poros-stones	23	Sample
		250	3	3	Poros-stones	4	Sample
	272-273	293-294-295	3	3	Poros-stones	2	Sample
	310-311	352	5-Outside	Feature 1	Poros-stones	2	Sample
		406	6-Ramp	Fill	Poros-stones	16	Sample
		460	7	7	Poros-stones	3	Sample
		511	8	8	Poros-stones	1	Sample
	234-235	238	1	1	Red-scoria	31	Sample
		249	1	1	Red-scoria	8	Sample
						ca. 10 dl	Sample
						ca. 3 dl	Sample
						ca. 3-4 dl	Sample

III. REGISTRO BÁSICO DE MATERIALES ARQUEOLÓGICOS.

Código de sitio :

31-19

No de inventario :

Material

Bones, shell, corals.

Ubicación en depósito :

No Correl	UBICACIÓN		CONTEXTO	DESCRIPCIÓN DEL MATERIAL	CANTIDAD	OBSERVACIÓN
	No caja	No bolsa				
		251	Unidad 1	1 Coral	1	Keep
		351	5-Outside	1 Coral	1	Keep
		393	6-Platform	1 Coral	1	Keep
		399	6-Ramp	1 Coral	2	Keep
		408	6-Ramp	1 Coral	5	Keep
	519-520		7 Surface	1 Coral	1	Keep
		432	7	1 Coral	21	Keep
		461	7	2 Coral	22	Keep
	484-485		7	3 Coral	18	Keep
		509	8	1 Coral	53	Keep
		538	8	2 Coral	26	Keep
		554	8	3 Coral	40	Keep
	569-571		8	4 Coral	13	Keep
		583	8	5 Coral	14	Keep
	419-420		7 Surface	1 Shell	2	Keep
		433	7	1 Shell	?	Keep
		463	7	2 Shell	171	Keep
	484-485		7	3 Shell	65	Keep
		513	8	1 Shell	12	Keep
		539	8	2 Shell	1	Keep
	569/571		8	4 Shell	1	Keep
		361	5-Outside	Bones and teeth , cremated	?	Analysed by P. Wallin
		362	5-Outside	Bones and teeth , cremated	?	Analysed by P. Wallin
		363	5-Outside	Bones and teeth , cremated	?	Analysed by P. Wallin
		364	5-Outside	Bones and teeth , cremated	?	Analysed by P. Wallin
		374	5-Inside	Bones and teeth , cremated	?	Analysed by P. Wallin
		380	5-Inside	Bones and teeth , cremated	?	
		383	5-Inside	Bones and teeth , cremated	?	
		394	6-Platform	Bone , fire-damaged	?	
		409	6-Ramp	Bones , some fire-damaged	min. 18	1 And two shells
		458	7	1 Tooth	1	Rat and ?
		462	7	2 Bones and teeth , rat and sea-mammal?	10	Broken
		497	7	3 Bones	?	Not identified
		399	7	3 Bones	4-5	Bird and rat
		512	8	1 Bones and teeth	?	Rat
		541	8	2 Bones and teeth	?	
		566	8	3 Bones and teeth	?	
		567	8	3 Bones	?	
		580	8	4 Bones and teeth	?	Cremated

III. REGISTRO BÁSICO DE MATERIAL LITOLÓGICO.

Código de sitio : 31-19/49
 Material : Líticos

No de inventario :
 Ubicación en depósito :

No Correl	UBICACIÓN		CONTEXTO		DESCRIPCIÓN DEL MATERIAL	CANTIDAD	OBSERVACIÓN
	No caja	No bolsa	Unidad	Nivel			
		6	2-1	1	Obsidian , flakes/chips/waste	54	Not used
	1-5/10-13		2-1	1	Obsidian , tools	9	Used
	19-21	18	2-1	2	Obsidian , flakes/chips/waste	48	Not used
			2-1	2	Obsidian , tools	4	Used
		22	2-1	3	Obsidian , flakes/chips/waste	1	Not used
		28	2-2	1	Obsidian , tools	1	Piece of mata
		29	2-2	1	Obsidian , tools	1	Possible knife
		31	2-2	1	Obsidian , cores	2	Used
		32	2-2	1	Obsidian , flakes/chips/waste	7	Not used
		33	2-2	1	Obsidian , flakes/chips/waste	87	Not used
	34-39		2-2	1	Obsidian , tools	6	Used
		44	2-2	2	Obsidian , flakes/chips/waste	4	Not used
		45	2-2	2	Obsidian , flakes/chips/waste	2	Not used
		46	2-2	2	Obsidian , flakes/chips/waste	39	Not used
	47-52		2-2	2	Obsidian , tools	6	Used
		53	2-2	2	Obsidian , tools	1	Tang of mata, F13
		59	2-2	3	Obsidian , flakes/chips/waste	8	Not used
		60	2-2	3	Obsidian , tools	1	Tang of mata
		61	2-2	3	Obsidian , tools	1	Scraper
		68	2-3	1	Obsidian , flakes/chips/waste	5	Not used
		69	2-3	1	Obsidian , chips	15	Not used
		70	2-3	1	Obsidian , flakes/chips/waste	56	Not used
		71	2-3	1	Obsidian , tools	6	Used
	72-74		2-3	1	Obsidian , tools	3	Used
	75-82		2-3	1	Obsidian , tools	8	Used
		83	2-3	1	Obsidian , tools	1	Used
		84	2-3	1	Obsidian , tools	1	Used
		85	2-3	1	Obsidian , tools	1	Used
		86	2-3	1	Obsidian , tools	1	Possible chisel, Used
		87	2-3	1	Obsidian , tools	1	Used
		88	2-3	1	Obsidian , tools	1	Used
		94	2-3	2	Obsidian , flakes/chips/waste	4	Not used
		95	2-3	2	Obsidian , flakes/chips/waste	41	Not used
	96-99		2-3	2	Obsidian , tools	4	Used
	100-105		2-3	2	Obsidian , tools	6	Used
		107	2-3	3	Obsidian , flakes/chips/waste	16	Not used

III. REGISTRO BÁSICO DE MATERIAL ARQUEOLÓGICO.

Código de sitio : 31-19/49

No de inventario :

Material : Lithics

Ubicación en depósito :

No Correl	UBICACIÓN		CONTEXTO		DESCRIPCIÓN DEL MATERIAL	CANTIDAD	OBSERVACIÓN
	No caja	No bolsa	Unidad	Nivel			
		108-109	2-3	3	Obsidian , tools	5	Used
		110-114	2-3	3	Obsidian , tools	5	Used
		115	2-3	3	Obsidian , tools	1	Used
		124	2-4	1	Obsidian , flakes/chips/waste	145	Not used
		125-126	2-4	1	Obsidian , tools	6	Used
		127-129	2-4	1	Obsidian , tools	3	Used
		130-136	2-4	1	Obsidian , tools	7	Used
		137-143B	2-4	1	Obsidian , tools	8	Used
		144-150	2-4	1	Obsidian , tools	7	Used
		151-156	2-4	1	Obsidian , tools	6	Used
		157	2-4	1	Obsidian , tools	1	Used
		158	2-4	1	Obsidian , tools	1	Used
		159	2-4	1	Obsidian , tools	1	Used
		160	2-4	1	Obsidian , tools	1	Piece of mata; Used
		161	2-4	1	Obsidian , tools	1	Scraper; Used
		167	2-4	2	Obsidian , flakes/chips/waste	61	Not used
		168	2-4	2	Obsidian , tools	3	Used
		169-174	2-4	2	Obsidian , tools	6	Used
		176-177	2-4	3	Obsidian , tools	2	177 taken for dating; Rest not used
		183	2-5	1	Obsidian , flakes/chips/waste	46	Not used
		184	2-5	1	Obsidian , tools	4	Possible used
		185-189	2-5	1	Obsidian , tools	7	Used
		190-196	2-5	1	Obsidian , tools	7	Used
		197-200	2-5	1	Obsidian , tools	4	Used
		205	2-5	2	Obsidian , flakes/chips/waste	34	Not used
		206-208	2-5	2	Obsidian , tools	5	Used
		209-211	2-5	2	Obsidian , tools	3	Used
		212	2-5	2	Obsidian , tools	1	Piece of mata; Used
		220	2-5	3	Obsidian , flakes/chips/waste	52	Not used
		221-225	2-5	3	Obsidian , tools	6	Used
		226-232	2-5	3	Obsidian , tools	7	Used
		233	2-5	3	Obsidian , waste	1	Not used
		14	2-1	1	Basalt , flakes	13	Keep
		17	2-1	2	Basalt , flakes	13	Keep
		30	2-2	1	Basalt , flakes	13	Keep
		43	2-2	2	Basalt , flakes	16	Keep

III. REGISTRO BÁSICO DE MATERIAL ARQUEOLÓGICO.

Código de sitio :

31-19/49

No de inventario :

Material

Líthics

Ubicación en depósito :

No Correl	UBICACIÓN		CONTEXTO		DESCRIPCIÓN DEL MATERIAL	CANTIDAD	OBSERVACIÓN
	No caja	No bolsa	Unidad	Nivel			
		54	2-2	2	Basalt , tool	1	Hammerstone
		58	2-2	3	Basalt , flakes	6	Keep
		67	2-3	1	Basalt , flakes	21	Keep
		93	2-3	2	Basalt , flakes	22	Keep
		116	2-3	3	Basalt , tool	1	Hammerstone
		123	2-4	1	Basalt , flakes	25	Keep
		166	2-4	2	Basalt , flakes	11	Keep
		182	2-5	1	Basalt , flakes	1	Keep
		203	2-5	2	Basalt , flakes	4	Keep
		219	2-5	3	Basalt , flakes	18	Keep
		8	2-1	1	Moai-tuff	4	Keep
		57	2-2	3	Moai-tuff	1	Keep
		63	2-3	1	Moai-tuff	3	Keep
		90	2-3	2	Moai-tuff	2	Keep
		119	2-4	1	Moai-tuff	2	Keep
		215	2-5	3	Moai-tuff	1	Keep
		16	2-1	2	Poros stones	14	Sample
		24	2-1	3	Poros stones	2	Sample
		27	2-2	1	Poros stones	3	Sample
		41	2-2	2	Poros stones	17	Sample
		56	2-2	3	Poros stones	6	Sample
		64	2-3	1	Poros stones	14	Sample
		91	2-3	2	Poros stones	28	Sample
		118	2-4	1	Poros stones	30	Sample
		163	2-4	2	Poros stones	17	Sample
		202	2-5	2	Poros stones	10	Sample
		216	2-5	3	Poros stones	15	Sample
		9	2-1	1	Red-scoria	ca. 2 dl	Not sample
		15	2-1	2	Red-scoria	ca. 2 dl	Not sample
		23	2-1	3	Red-scoria	13	Not sample
		25	2-2	1	Red-scoria	ca. 1,5 dl	Not sample
		40	2-2	2	Red-scoria	ca. 10 dl	Not sample
		55	2-2	3	Red-scoria	ca. 2 dl	Not sample
		62	2-3	1	Red-scoria	ca. 2 dl	Not sample
		89	2-3	2	Red-scoria	ca. 5-6 dl	Not sample
		106	2-3	3	Red-scoria	ca. 0,2 dl	Sample

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