

THE KON-TIKI MUSEUM
INSTITUTE FOR PACIFIC ARCHAEOLOGY
AND CULTURAL HISTORY

ARCHAEOLOGY,
COMMUNICATION
AND LANGUAGE

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KON-TIKI MUSEET
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ARCHAEOLOGY, COMMUNICATION AND LANGUAGE

Papers presented at the 1st No Barriers
Seminar, April 28, 1998

Preface

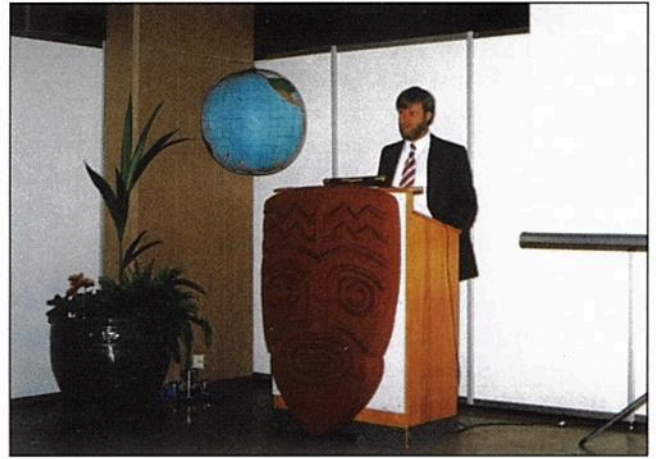
Paul Wallin¹ and Knut Nordby²

The idea of the *No Barriers* research grant arose in the collaboration between the Kon-Tiki Museum and its main sponsor Telenor, the principal Norwegian telecommunications operator. Telenor had a programme called *No Barriers*. The Kon-Tiki Museum's research interests and the accomplishments of Thor Heyerdahl over a period of nearly 60 years fitted the concept and spirit of *No Barriers*, demonstrating that collaboration can break down barriers and provide opportunities for innovative, high quality research.

On April 28 1997, the 50th anniversary of the Kon-Tiki expedition, the first *No Barriers* research grant was awarded. The size of the grant then was US\$ 7500. The first recipient was Professor of periodontology Dr. Hans Preus, University of Oslo, a microbiologist who worked on mitochondrial DNA in teeth. He received the grant to carry out studies of teeth excavated from Easter Island and South America. In his analyses of minute samples of mitochondrial DNA, he encountered great problems traced to the proprietary materials used in the analyses being DNA contaminated. This finding became a central issue in his investigation (described in detail in his paper in this publication).

In 1998, the Review Committee suggested that the call for applications should be advertised internationally, and that the grant should be raised to US\$ 15 000. The board of the Kon-Tiki Museum, which is in charge of the sponsor trust funds, saw the importance of the *No Barriers* research grant and agreed to our suggestions. This resulted in a dramatic increase in the number of applications, which were generally of a very high standard. Grant applications came from countries all around the Pacific, especially from Australia, New Zealand, Tahiti, Hawaii and North America, but also from European scientists. Suddenly the *No Barriers* research grant became well known at universities and institutions doing Pacific research.

Deciding which applicant should receive the grant was no easy task for the Review Committee. Eventually, the 1998 *No Barriers* grant was awarded to Professor Matthew Spriggs, the Australian National University, Canberra, for a project named "Remote Delivery of Archaeological Discovery Results to a Classroom Context". His project belongs, in many ways, to the future of archaeological field research, but he wanted to do it now! He wished to demonstrate the possibility of doing excavations in a remote location (in this case an important site named Mangaasi in



Matthew Spriggs at the *No Barriers* seminar.

the Vanuatu islands) while communicating with students and teachers at his own university via e-mail over Internet, using both conventional telephone lines and a satellite telephone. In this way, anyone interested may follow the actions of the excavation team almost at the same time as it happens, which is extraordinary when it comes to a science like archaeology.

Since the grant recipient had been invited to receive the grant at the Kon-Tiki Museum on the anniversary of the Kon-Tiki expedition, this was found to be an excellent occasion to have a seminar at the museum. The seminar was named *Archaeology, Communication and Language*, subjects that are very central in Prof. Spriggs' research. In addition to the grant recipients Prof. Spriggs and Prof. Preus, we invited Dr. Stephen Wickler, archaeologist at Tromsø Museum, specialist in Micronesian archaeology (and a former student of Prof. Spriggs), Dr. Ingjerd Hoëm, social anthropologist/linguist at Oslo University, specialist in the Tokelauan language and its cultural context, and Dr. Helene Martinsson-Wallin, Curator at the Kon-Tiki Museum and specialist in Polynesian archaeology, especially Easter Island. The presentations are collected in this Seminar Report.

The aim of this seminar was that, hopefully, it would lead to a closer dialogue between scientists in various fields in different institutions and universities (especially in our own region), and to promote the Kon-Tiki Museum, with its unique research library, as a centre for researchers and students specialising in Pacific studies. Archaeologists, anthropologists and linguists from different Norwegian universities were also invited to attend the seminar and contributed with interesting comments to the presented papers.

The Review Committee wishes to thank the presenters, who made this seminar so successful with their great knowledge of Pacific research.

By the way, why not have a look at Professor Spriggs' results, to be found at the following Internet web site:

<http://artalpha.anu.edu.au/nobarriers/>

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**Speech by Thor Heyerdahl on the Occasion of
the Award of the *No Barriers* Grant, 28th
April 1998, Oslo, Norway**

Delivered by his son Thor Heyerdahl Jr.

On the occasion of the presentation of the *No Barriers* grant to the Australian scholar Matthew Spriggs, I want to congratulate the recipient and wish him good luck in his continued research.

I am delighted to learn that the Kon-Tiki Museum, which has concentrated most of its efforts and funding on research on Easter Island and surrounding territories in the East Pacific, is able to promote and support investigation by other scholars also to the west of the Polynesian island territory. By this year's selection among the many competent applicants, the Kon-Tiki Museum sponsored by Telenor has demonstrated that there is no barrier in our desire to detect and identify the pre-European migration routes into the Oceanic island territory of the East Pacific.

Although the Kon-Tiki Museum was founded to house a vessel that proved that there were no barriers between South America and Polynesia in pre-Columbian times, it should not be forgotten that I, as leader of that raft expedition, looked for the route for the Southeast Asiatic ancestors of the Polynesians long before I decided to build and test the South American raft. As early as 1939 when my son who reads this message was one year old, he accompanied his parents to the extreme Northeast Pacific archipelago of British Columbia where I was looking for vestiges of possible emigrants from Southeast Asia that had followed the Japan current and, after a prolonged sojourn in that area, continued with the same elements down to Hawaii.

There are only two routes by which the generally accepted Asiatic element can have reached Polynesia on the very opposite side of the vast Austro-Melanesian territory: One is by island hopping eastwards straight through this 4,000 km. wide territory, the other is by bypassing it following the global curves in the extreme North Pacific. Any efforts to support scientific research along either of these two routes are of basic importance to an understanding of the origins of the Polynesian people. By supporting the Australian scholar Matthew Spriggs in his research in the Southwest Pacific and at the same time a multi-disciplinary group of American anthropologists which leaves for research in British Columbia in the Northeast Pacific next month, the Kon-Tiki Museum has demonstrated its unbiased attitude to anthropological research in the Pacific Island territory, and as one who since 1941 has published his conviction that both South America and Asia have contributed to the settlement of the East Pacific, it is a great pleasure to wish the recipient of the *No Barriers* grant my very best wishes for success in his investigations.

Thor Heyerdahl



At the delivery of the No Barriers Grant. From the left: Fredrick Grindland (Telenor), Knut Nordby (Telenor), Matthew Spriggs (Australian National University), Hans Preus (University of Oslo), Maja Bauge (Kon-Tiki Museum), Paul Wallin (Kon-Tiki Museum), Thor Heyerdahl Jr. (Kon-Tiki Museum).

Speech in Reply by Matthew Spriggs

I would like to thank Thor Heyerdahl Junior for reading his father's speech and for his additional kind words. It is a great honour for me to have won the Kon-Tiki Museum and Telenor *No Barriers* grant. We are celebrating tonight the 51st anniversary of the Kon-Tiki leaving Callao in Peru on its epic journey to East Polynesia. Thor Heyerdahl inspired generations of generally obnoxious small boys such as myself (and hopefully, too, some less obnoxious small girls!) to pursue an archaeological career. His pioneering work in Pacific archaeology has inspired much modern archaeological research in the Pacific and, as importantly, the international public's interest in the region and its cultures, and thus the funding of research concerning them.

Present here tonight from that same pioneering generation is Professor Arne Skjølsvold, and I would like to acknowledge his important contribution as well.

I would like to thank the *No Barriers* grant selection committee, Dr Knut Nordby (Senior Researcher, External Relations, Telenor Research and Development) and Dr Paul Wallin (Head of Institute for Pacific Archaeology and Cultural History, Kon-Tiki Museum); the Director of the Kon-Tiki Museum, Maja Bauge; from Telenor - Oddvar Hesjedal (Vice-President, Telenor Research and Development), Fredrik Grindland (Manager Marketing and Public Relations), and the many staff who made my visit to Telenor extremely interesting and informative. I would like to single out particularly Knut Nordby, who has organised much of my schedule for the week in Oslo. Both he and his wife Mina have been most hospitable, as have Paul Wallin and Helene Martinsson-Wallin, and Arne Skjølsvold who have shown me around Oslo.

The *No Barriers* grant is an inspired and innovative co-operation between industry and museums, backing exciting but risky research that might not otherwise be done at all. I will be doing all I can to live up the faith in my project that the *No Barriers* grant committee has displayed.

Matthew Spriggs
28-IV-1998.

Remote Delivery of Archaeological Discovery Results to a Classroom Context

Matthew Spriggs¹

The project in question will take place at the Mangaasi or Mangaas archaeological site and other locations near the village of Mangaliliu, Northwest Efate, Republic of Vanuatu, South Pacific (Fig. 1). For two years the Department of Archaeology and Anthropology at the Australian National University in Canberra has run a training excavation for indigenous archaeologists associated with the Vanuatu National Museum. The training program is run by Professor Matthew Spriggs of ANU and Ralph Regenvanu, Director of the National Museum. The project has been funded by the South Pacific Cultures Fund of the Australian Department of Foreign Affairs and Trade (1996) and funds awarded to Professor Yosi Sinoto of the Bishop Museum in Honolulu by a Japanese foundation (1996-1998).

The initial challenge of the current development of the project was to convey the experience of excavating a remote site in a cross-cultural context, in particular the decision-making and interpretive processes, to students in Australia who will need to develop these skills, when their direct participation is impossible. The project also recognises a need to allow interaction directly with students and to encourage their feedback as part of this process.

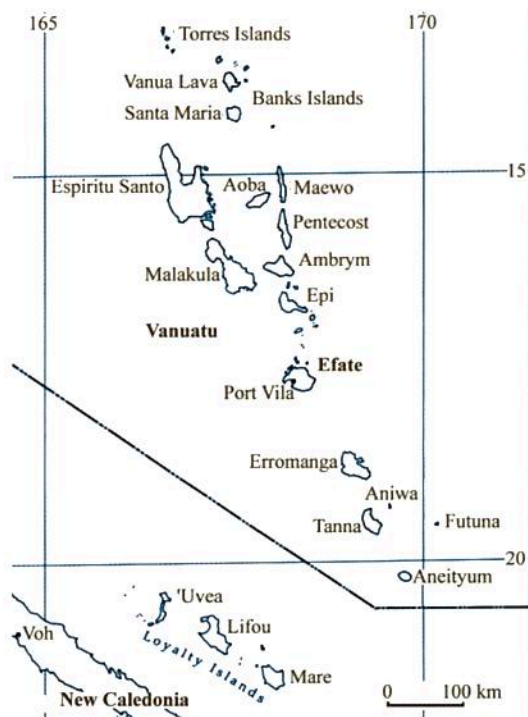


Fig. 1. Location of the Vanuatu Islands in the Western Pacific.

Why is their direct participation impossible en masse?

- Transport and subsistence costs would be prohibitive.
- There are significant health risks working in a malarial and dengue fever area.
- Many students today are also working full or part-time and thus have limited time for study. They cannot take several weeks off to be present at a remote site.

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- MOST IMPORTANTLY, the disruption caused to relatively remote, rural communities by dumping numbers of students in them for extended periods of time would be immense. It is too much to ask, even of good friends!

What is the solution?

- Web-based learning, delivered by satellite technology from the remote site, not in real time exactly, i.e. it is not live video-conferencing, but on a daily or every other day basis.
- Development of a CD-ROM using the same stages of learning, as the «live» version, i.e. the same stages of development of the project, unfolding over time like the daily web page updates.

Features of the Web Site:

- Background information, available before excavation.
- Transmission of daily field data, both standard recording sheets and the field diaries of project leaders.
- Digital photographs, such as photographs of artefacts found and the stratigraphy, etc.
- Quick-time video «tours» of the site and environs.
- Voice information (also perhaps available as text) in the form of interviews with stakeholders in the project, such as the trainers (Matthew Spriggs and Glenn Summerhayes), the trainees from the Vanuatu National Museum and «Fieldworkers» group, local labourers on the site, traditional landowners and custodians, chiefs and other local leaders, ordinary villagers from the community.
- Depending on progress of the excavation, analysis of some materials recovered could proceed remotely, at the Australian National University, with subsequent feedback influencing the course of research at the site. This depends on how much basic data analysis or at least presentation via the web site of data is possible in the field, given constraints of time and inclination!
- Interaction by email with (1) Australian National University students, (2) Students at Vanuatu High Schools, and (3) other selected individuals with a Vanuatu or Pacific Archaeology Interest.

Although we anticipate the Web Site having open access, we will not be able to field questions and other input from everyone interested. We would not have time to do anything else. We will, however, set up section of the web site on FAQs or «Frequently asked questions».

Requirements of the Project:

- A powerful portable computer, connected to a satellite phone via a modem.
- Peripherals such as digital still and video cameras, means of recording audio etc.
- Power sources to run the equipment.

Major problems currently recognised:

- Data transmission over current models of small, portable satellite phones are very slow, 2.4 kbps/second, compared to conventional telephone lines at about 33 kbps/second. Basically, we appear to be about 2-3 years ahead of current technology.
- Satellite phone transmission costs are very high, and given the slow speed of transmission it would take an inordinately long period of time to send images, making the cost prohibitive.

- The standard battery on a small satellite phone lasts only 50 minutes during data transmission (longer using it as a voice phone). Solar rechargers have their limits and we are operating in an area with no mains power. Solutions might include use of larger batteries and/or purchase of a small diesel generator to run the computer, etc.

Given the constraints identified above, we will probably use the satellite phone for email and for some text transmission, and arrange travel to the nearest conventional phone lines on Tuesdays, Thursdays and Saturdays to send graphics and other large blocks of data. It could all be done by satellite if we had access to more expensive and larger/heavier equipment - such as is currently used on ships for communication - which can currently send data at 64 kbps/second. Such equipment is probably outside of our budgetary range and would certainly require a power source beyond solar.

In conclusion, our aim with the «real time» and CD-ROM versions of the project is to track the stages of an archaeological project as new evidence comes to hand and as new situations arise in the field - perhaps in relation to other stakeholders. We will thus include all the things left out of a «Final Report», warts and all. The email interaction/feedback introduces a further level of «monitoring» of the project by students and colleagues.

Culture History Background to the Project

During the mid-1960s Professor José Garanger excavated at the site of Mangaasi on Efate Island in Central Vanuatu (until 1980 the Anglo-French Condominium of the New Hebrides). His research defined the Mangaasi style of pottery, consisting of incised and applied relief decorated pottery, which he related to

scattered and at the time little-understood pottery collections from various areas of Melanesia from New Guinea to Fiji (Garanger 1972, 1982).

A recent study by the ANU (Australian National University) student Ephraim Wahome, currently teaching at the University of Nairobi, Kenya, examined the links between the various pottery assemblages in the Island Melanesian region identified as «Mangaasi-like» and confirmed the previously only superficial comparisons between them as representing a widespread phenomenon (Wahome 1997). He was able to show that starting with the earliest pottery in the region, the Lapita style, pottery through Island Melanesia changed in step over a thousand years until about 1500 to 1000 years ago. After that time the number of pottery-producing centres decreased significantly. The distance between active pottery production centres became such that contacts between them were broken and potters of one centre no longer saw the products of others. Innovations which had previously spread from the Bismarck Archipelago as far as Fiji and New Caledonia along the chain of pottery makers, no longer did so. What then occurred as a result of isolation was a rapid «speciation» of pottery styles in the few places where pottery making continued.

An important problem Wahome found with his analysis was one of tying down the chronology of changes in pottery style. Although the changes seemed to occur in the same order nearly everywhere, there were significant anomalies in the timing of the changes between regions. The most glaring of these was at the Mangaasi pottery type site itself. Changes seen elsewhere at about 2000 to 1800 years ago were dated at Mangaasi at about 2700 years. The classic incised and applied relief assemblage which gave its name to the Mangaasi style was dated by Garanger as earlier than the Lapita style in central Vanuatu and earlier than another style he called «Erueti Ware» after a site in Southern Efate. The Erueti style had similarities to pottery

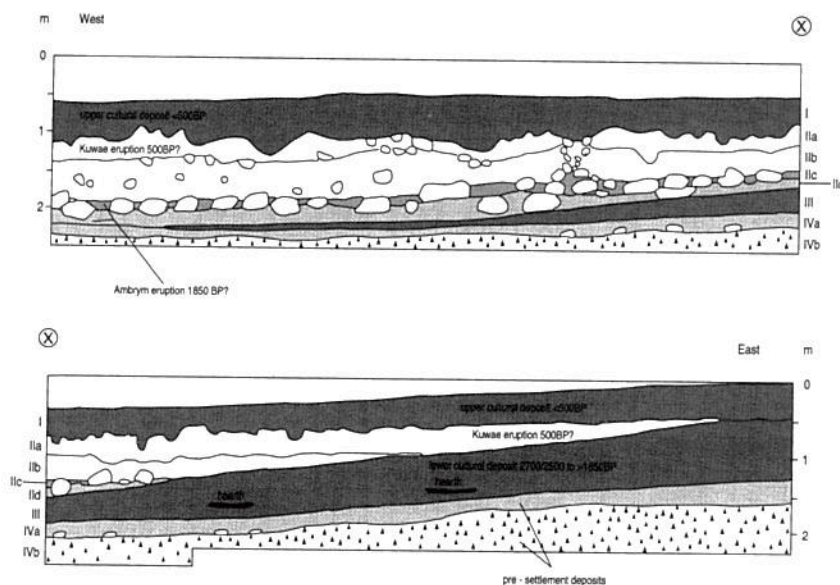


Fig. 3. Stratigraphic section of the Mangaasi excavation with a reinterpretation of the stratigraphy. Based on Garanger 1972a: fig. 99. Layer 1: upper cultural deposit, post-1452 AD. L.IIa: sand with pumice, possibly associated with Kuwae eruption 1452 AD. L.IIb: fine light-grey sediment (volcanic ash?), with shell and large coral debris. L.IIc: pumice and sand, possibly associated with Ambrym eruption 1850 BP. L.IId: fine light grey-brown sediment (ash?) with coral debris. L.III: lower cultural deposit, 2700/2500 BP to pre-1850 BP. L.IVa and b: lower marine deposits on top of coral platform, pre-human. (After Spriggs 1997:180)

Fig. 2. Section drawings from the Mangaasi site (after Spriggs 1997).

which elsewhere, in Manus (Admiralty Islands) for instance, was found to be earlier than Mangaasi-like pottery. Work by an ANU team starting in 1994 on Vanuatu islands to north and south of Efate also suggested that Erueti-style pottery was earlier than Mangaasi style (discussed in Spriggs 1997: Chapters 5 and 6).

Clearly a re-evaluation of the Mangaasi type-site was required, and with the blessing of the original excavator, Professor Garanger, further excavations took place at Mangaasi in 1996 and 1997 as part of a training program for indigenous archaeologists and Fieldworkers of the Vanuatu National Museum.

The results so far suggest that:

1. The area excavated by Professor Garanger in the mid-1960s was largely disturbed by tidal wave damage subsequent to site occupation, and so the dating of the site and the postulated sequence of Early, Middle and Late Mangaasi pottery sub-styles was unsound.
2. Inland of the area excavated by Professor Garanger a program of test pit transects has located intact cultural deposits, with layers in some areas separated by volcanic ash layers from mayor eruptions occurring about AD 100 and AD 1452 (Fig. 2).



Fig. 3. A Lapita pot found at the Mangaasi site (after Garanger 1972).

3. Erueti style pottery was used by earliest inhabitants of the site, starting about 700BC. This was predominantly a plainware, but with some decoration of the lip of the pots. Over time through to about 150 BC, the style developed with an increase in incised designs on the body of the pots and a change in rim form. Garanger had not found Erueti style pottery in his earlier excavations.
4. The excavations, along with recent work elsewhere in Vanuatu and in New Caledonia, confirm that, at least for the area outside the Bismarck Archipelago, Lapita-style pottery (Fig. 3) was not made after about 800 BC. Previously it was often stated that Lapita lasted about 1500BC to 500/550 BC over much of its distribution.
5. The «Classic» Mangaasi style of pottery with incised and applied relief designs and handles to some pots is found only after 100BC, and possibly only within the last 1800 years. This fits very well with the appearance of related pottery in an area of the Pacific stretching from the

Bismarck Archipelago off New Guinea, through the Solomons, Vanuatu, New Caledonia and Fiji.

The mystery of the dating of Mangaasi pottery is thus largely solved. The ideas of Wahome and others about continuing cultural connections between the potters of this region continuing until about AD 500 seem confirmed. Previously it was thought that wide-ranging cultural connections ended with the end of the Lapita period, but this «community of culture» continued for another 1000 to 500 years longer. The cultural diversity for which the region has been known anthropologically can thus be seen as a product of comparatively recent history. The textbooks on Western Pacific history will need to be rewritten.

Yet, the Mangaasi site and its immediate region have not yielded all their secrets. The Erueti style pottery which is the earliest there clearly developed out of the Lapita style pottery, and other items of material culture at the site also owe their origins to the Lapita period, the era of initial settlement of the Vanuatu archipelago some 3000 or so years ago. Was there a Lapita period settlement in the Mangaasi area or does it represent a secondary colonising event? There is a hope that new excavations possibly could provide evidence of earlier settlements in the area.

It is possible that we are missing about 300 years of the cultural sequence at Mangaasi, between about 100BC and AD 200. Other locations in the Mangaasi area might fill in this apparent gap. In addition, we do not know when pottery making ceased in central Vanuatu. The latest dates associated with pottery at Mangaasi are about AD 400, after which the area seems to have been used as garden land or abandoned entirely. There are other sites in the area with late-style incised and applied relief pottery, such as at Mangaliliu village (the expedition base about 20 minutes walk from Mangaasi). Excavations there may extend the cultural sequence further towards our own time and detect when pottery making died out in central Vanuatu. By the time of the 1452 AD Kuwae eruption, pottery making had certainly been abandoned, but there is a gap in our knowledge of about 1000 years before that date.

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Ancient mitochondrial DNA, is it Reproducibly Detectable?

-A Comment to Current Methodology

Hans Preus¹

Introduction

Analysis of ancient DNA (aDNA), specifically mitochondrial DNA (mtDNA) has been one way to obtain information from prehistoric human and animal remains. In a pilot study of genetic variation of prehistoric Easter Islanders, we have applied a short noncoding region (region V) of the human mtDNA to distinguish samples of Polynesians from other populations. (Wrischnik et al 1987). Studies of ancient mtDNA, from several thousand years old specimens, are definitely an enormous methodological and intellectual challenge. Moreover, at any given time, humans shed hundreds of cells, and it is possible that our environment is thoroughly polluted by human mtDNA. If so, specific measures must be taken in order to avoid contamination during laboratory procedures. Among a number of sources of contaminant mtDNA are the researchers and their assistants, handling the specimens from the site to the storage room and further to the laboratory. Consequently, at any given time from dig site to laboratory test tubes (Schmidt et al 1995), through laboratory procedures to the thermocycler - the specimens to be analysed may become polluted with mtDNA from the surrounding environment. Thus, the aim of this study was to investigate reaction tubes, DD water, and chemicals used in the PCR for contamination with human mtDNA.

Materials and methods

Probable aDNA source:

2 teeth from Easter Island, excavation site Nau Nau east, Anakena, Easter Island were used for the study (Fig. 1a,b). The teeth were found in a sand layer, 20 - 40cm below the surface, and has been preliminary dated to AD 1400 - 1800. A Scandinavian person, who was not wearing any mask, hood or gloves excavated the specimens. After detection and registration, the teeth were subsequently transferred to separate sterile cryotubes and labelled. The tubes were then transported to Clinical Laboratory for Dental Research, University of Oslo, Norway, where two skilled researchers received the specimen tubes unopened. During this procedure, the researches wore gloves, masks and hood in order not to contaminate the specimens with their own mtDNA. The teeth were photographed (Fig. 1a,b), and a roentgenogram was taken from each of them (Fig. 2a,b).

A tooth is mostly made up of hard tissues like dentin, enamel and cementum (Fig. 1a,b/2a,b). However, centrally a soft tissue organ - the pulp - contains cells, blood and lymphatic vessels as well as nerves. If the tooth is undamaged, this pulpal organ is very well protected from environmental influence, even fire. Therefor, this organ is probably the best preserved soft tissue that may be systematically found, in any archaeological human remains. The pulp may be totally disintegrated, and it is



Fig 1a. The tooth is the second left incisor of the upper jaw (#22), Perfectly preserved, and not worn down.



Fig 1b. The tooth is one of the incisors of the lower jaw, severely worn by abbration. There is no clinical communication through the crown portion to the pulpal chamber.

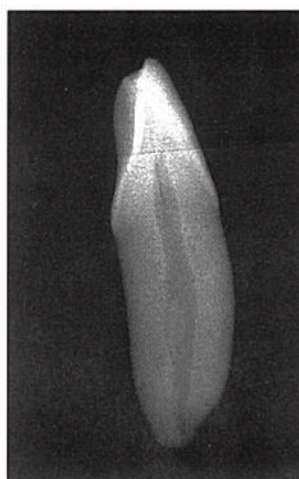


Fig 2a. Roentgenogram of tooth #22 (Fig. 1a).

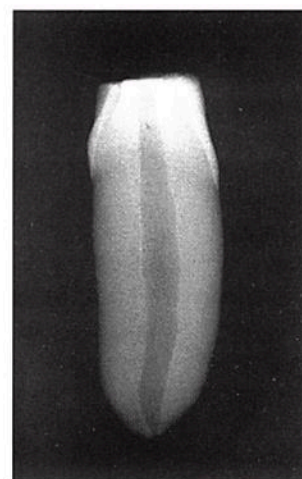


Fig 2b. Roentgenogram of tooth (Fig. 1b). Abraded tooth. The abbration may have resulted in microscopical communication between the environment through the crown portion and the pulp. This communication may have been evident also during the persons life, and may have resulted in bacterial colonization and infection. Likewise, the apical foramen is not sealed, and the content of the pulp may have been destroyed by bacterial colonization of the pulpal chamber by soil bacteria.

evident that bacterial contamination may destroy aDNA, given time and opportunity (Burger et al 1997) but one may also expect mummification of this protected organ. The only naturally occurring entrance to the pulp (unless the tooth is damaged by caries, fractures or abbration), is the

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foramen apicale. Through this tiny opening at the base of the root, disintegrating forces may enter during the life, or after the death of the patient, during the centuries to follow before it is excavated, and defined as archeologically interesting. In certain persons, who use their teeth as tools, or experience unnatural wear (grinding) for any reason, the pulp entrance may be sealed by calcium deposits. In these cases, one may expect to find a noncontaminated and mummified pulpal organ even after centuries in the soil.

According to the X-rays, our two teeth (Fig. 2a,b) were not of the «sealed» kind. Since the lower jaw incisor (Fig. 1b, 2b) was abraded so much that microcommunication could have been possible during life, we chose only to work with the tooth #22 (Fig. 1a, 2a). The tooth was opened by turning it up side down (root tip up), and cutting off 2 mm of the root tip with a sterile diamond disc. This procedure gave access to the pulpal cave, so that a sterile needle could be inserted into the pulpal channel and 10 ul of sterile, distilled and deionized water could be deposited into the pulpal chamber. A Hedstoems file (#10) was then used to work the content and the walls of the pulp, where after the resulting blend was transferred to a sterile Eppendorf tube by a sterile syringe and needle.

PCR protocols were set up in parallel in buildings separate from the building containing the facilities where the specimens were received, treated, opened, and possible aDNA extracted. The following PCR reaction were set up in order to possibly uncover mtDNA contaminated components in the PCR mix.

The reaction was set up according to the method recommended by the manufacturer, Perkin Elmer in 25 ul reaction tubes with AmpliTaq Gold as the polymerase. PCR profile was one cycle of 3 min at 97 °C, followed by 38 cycles of 1 min 10 secs at 94 °C, 1 min at 40 °C, one min at 72 °C, ended by one cycle 1 min 10 secs at 94 °C, 1 min at 40 °C and 5 min at 72 °C.

Twenty ul of the PCR products were loaded in wells of agarose gels (1.5%) and run for 2 hrs at 120 V, under constant cooling. After 2 hrs the gels were stained by ethidium bromide, washed and photographed upon transilluminating them by UV light, visualising the amplified DNA. Markers, representing 110 and 120 base pairs, were applied for comparison to the region suggested to distinguish the Polynesians from other populations.

The studies were performed in duplicate in two different highly estimated molecular laboratories, and repeated 6 times with one week separating every experiment.

Results

The mtDNA amplified in our PCR reactions, did not contain the Polynesian 9 base deletion in the conserved V region, indicating that the teeth were from «other than Polynesians».

However, systemic experiments carried out on normal PCR mixtures as well as DNase treated negative controls showed that all samples from DD water from the 2 different molecular labs were contaminated with from «other than

Polynesian» mtDNA. Also a variable number of reaction tubes from different manufacturers, as well as manufactured PCR chemicals, were contaminated in the same way. In order to verify or refute our findings we treated the DD water, dNTPs and buffers with RNase free DNase for 10 min at 37°C, followed by 30 min. enzyme denaturation at 95°C. This resulted in a lower grade of contamination, but could not rid us of the discomfort that both primer and taq-polymerase could be contaminated with mtDNA. Direct contact with the manufacturers of both primers and taq-polymerase could not ease our minds, as their representatives strongly denied that such contamination could be found in their product. However, they would «be more than happy to supply us with new batches with the PCR chemicals».

Discussion

Methodological consideration and discussion

Polymerase Chain Reaction is a very sensitive method for identifying sequences of nucleic acids. Its extreme usefulness as well as its severe problem lies in its ability to pick up and amplify single target sequences of DNA. This means that if there is one target sequence present in the reaction mixture, even if it is not from the test specimen, it will be amplified and identified as the target sequence regardless of origin. Normally, when applying PCR in comparative studies, one works with nucleic acid sequences that are not universal, and at least not present in the laboratory environment. However, using mtDNA sequences, one has the problem that all humans shed cells into the environment by their activity, scratching, combing ones hair, sneezing or rubbing of epithelial cells by touching any object. Therefore, the specimen from the archaeological site may be exposed to contaminating mtDNA from, however unlikely, people that has passed over the site through the centuries. More possible is the contamination from the person(s) that handles the specimen, from excavation, through transport and storing, to sectioning of the specimen for extracting mtDNA. The holding and handling of bone fragments in the archaeologists - or more probably the assistant's hands - will rub of lots of epithelial cells. This would serve as an abundant source of mtDNA that will be a more possible template for amplification of mtDNA sequences than the possible presence of conserved mtDNA dated hundreds or thousand years back.

Moreover, we have shown that both water, air and reaction tubes are contaminated with mtDNA, and possible also other PCR chemicals. This is in concert with previous studies by Schmidt and coworkers (Schmidt et al 1995). Thus the sources of contaminating mtDNA is vast, well known, but less accounted for in the literature.

Thus the finding of Polynesian mtDNA or «other» mtDNA may be due to in reality who handled - and possibly contaminated the specimens. If Polynesian inhabitants of Easter Island - and those are probably the only existing inhabitants of the modern Easter Island - were assistants to the archaeological excavation, the mtDNA contaminating the bony and skeletal remains should be Polynesian, giving

rise to the conclusion that the bony material was from Polynesians. In our case, there were 2 Scandinavians handling the tooth specimens, and the lab contamination could be Norwegian/European mtDNA, resulting in «other» than Polynesian mtDNA.

This finding suggest that PCR reactions with mtaDNA must be set up with the utmost care, from archaeological dig site to the thermocycler block in the laboratory, in order to provide mtDNA free reaction mix before adding the test DNA. Also, a vast amount of control specimens must be provided in order to substantiate the results claimed. However, it might be a pertinent question if sufficiently stringent conditioned may be achieved at all.

Moreover, this study suggests that the pulp cavity may be a more useful and purer source of a DNA than bone remains, since the contamination possibilities of this organ is less than bone and skeletal remains.

General considerations and discussion

As a non- archaeologist I have been puzzled with the passion that the discussion of where the Easter islanders come from has been going on for decades. My interest in the case arose when I saw Dr Heyerdahl meet tremendous antagonism for his hypothesis about Peruvians being the first immigrants to Easter Island, in a scientific meeting. At least he has substantiated his hypothesis by the Kon-Tiki expedition that emphasised that «at least it is possible». None of the sides in this discussion could substantiate their views with more than the other. Therefore, I wanted to have a closer look at the methodology, and above I have tried to discuss my findings and substantiate my conclusions.

During the studies I also started to take interest in another, and more general, aspect of this problem. Everybody seems to use the mtDNA to substantiate or refute his or her hypothesis in this discussion. Is it possible that the studies of mtDNA is, besides giving rise to severe methodological problems, totally unsuited to answer the questions asked? Mitochondrial DNA is DNA strands in mitochondria. The reason why mitochondria contain DNA may be that they have been separate organisms, but through the evolution has fusioned with cells, resulting in a prosperous symbiosis. However, mtDNA is only maternally inherited, due to the fact that the mitochondria of sperm cells are oriented around the tail portion, which needs the energy generated by the mitochondria in their to swimming towards the egg cell. As the sperm cell enters the egg, the tail portion, with its mitochondria and mtDNA, is left outside the zygota. Thus the mitochondrial DNA found in any human or animal cell is only derived from the egg cell.

Conclusively, anticipating that the Peruvians were the first to arrive at Easter Island; what is the chance to find the mtDNA from these first immigrants? Probably none. The reason for this is that, in order to actually identify it, one need to dig up the remains of a descendant from a direct line of female descendants of the first immigrant Peruvian females. Even with a migrating tribe, there would be few females surviving such a travel, giving rise to a strain of

«other than Polynesian» mtDNA. So, by chance one can find such an ancestor, but very unlikely, and one would probably not be aware of what was found.

Therefore, it is my point of view that this question will never be solved, and that the mystery of the Easter Islanders origin should be left where it is, leaving the Kon-Tiki expedition as one of the really daring and mystical endeavours of the century.

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Material Culture and Communication - An Example of Archaeological Research on Ceremonial Sites in Polynesia

Helene Martinsson-Wallin¹

Introduction

The aim of this paper is to discuss and give some examples on how archaeologists deal with material remains. I am reflecting here on the use of type classification and interpretation of the material remains studied. As archaeologists we deal mainly with the study of the excavated prehistoric material culture. To be able to reach a more contextual interpretation of these material remains, and try to grasp the significance and meaning behind the material expression, the archaeologist uses analogies, often obtained from the ethnohistorical record. Results from other sciences such as cultural and social anthropology, linguistics and various natural sciences are used as well. Since the people that made and used the material remains, and thereby gave the material cultural expression certain meanings, are long gone, they can only communicate to us in an indirect way the meanings of their material culture. The material remains may be seen as signs in a text with symbols and meanings that are hidden to us, which we possibly can be able to understand if we place them a relevant context. In aiming to try and understand the society and individuals that created and changed the material culture, we as archaeologists and scientists play an active part when we try to recreate the past. We make different

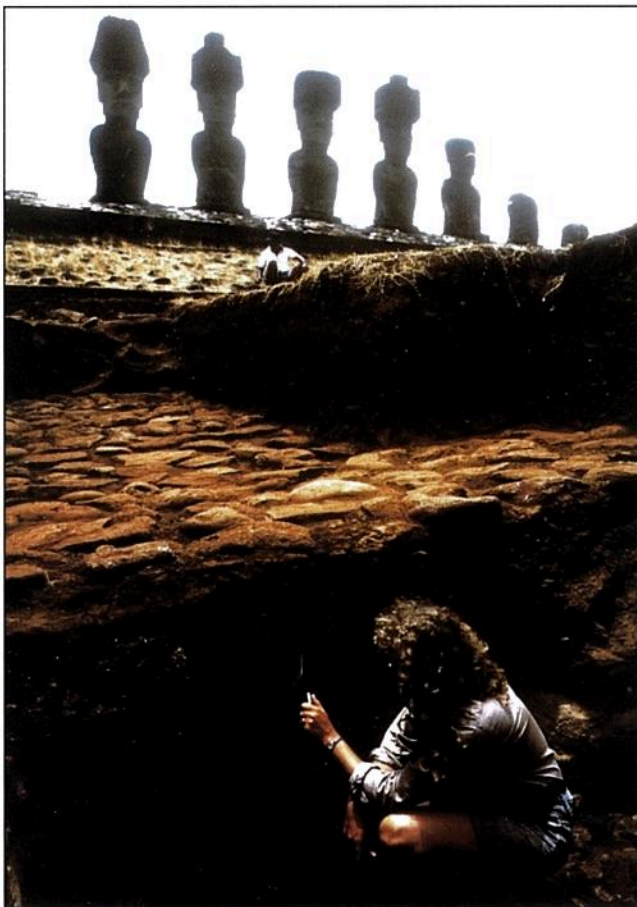


Fig.1. Excavations at Anakena, Easter Island.

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choices about where and how to excavate, and which methods to use. We have varied sets of analogies when interpreting our data as well as different access to funding, which may limit us in performing different analyses (Fig. 1). We always deal with samples of the past, which is like reading a text where single words and/or whole sentences, sections or chapters are missing or have to be deciphered. However, the link to the past is important and archaeology is very challenging from a set of various aspects. One of my intentions when dealing with this field of science, is in our present, to try to establish a communication with and understanding of the peoples of the past through their material remains and then bring this experience with me into the future.

Type classification of ceremonial sites, *ahu*, on Easter Island

Issues concerning origin and change of prehistoric societies are fundamental to the archaeological research. To be able to understand these issues, it is very important to obtain a time frame concerning different types of material culture. The classical archaeological methods for dealing with this is by performing comparisons and to classify the material culture into different types and type elements, which are given temporal, spatial or societal relevance on, for example stylistic or morphological grounds. The foundation for all type divisions are the elements of similarity and difference concerning, for example, the material of the artifact, the form and the ornamentation of it (Malmer 1963). However, there are some problems involved in performing type divisions, and then using the types as chronological meters and/or indicators for social or spatial change.

As an example I would like to discuss the ceremonial sites found on most Islands in East Polynesia. These structures are called *marae* or *ahu* and they usually consist of stone platforms, upright stones, ramps and courtyards. According to the ethnohistorical records this was the meeting place between man and the divine. Chiefs and priests acted as representatives for man and the divine was represented by different gods (Henry 1928). The stone structures were the physical representation of a communication between man and the gods, however it also represented a communication within the society, between different groups and/or individuals (Wallin 1998). Since the ceremonial sites are included in the ideological realm, the sites and their different features are thereby ascribed certain meanings and meaning relations. The ceremonial stone structures in Polynesia have been submitted to several different type divisions but the types have been too general or too locally based to be able to be used for in-depth temporal, spatial and social analyses (Emory 1933, Green 1961, Descantes 1991). This presented a challenge and created an interest in trying to find a new method of analysing the similarities and differences of the physical expressions of these sites (Wallin 1993, Martinsson-Wallin 1994).

Ceremonial sites, especially on Easter Island, are complex structures, which probably have been rebuilt with different features added over time. This is why it is so difficult to

perform a traditional type classification. Each ceremonial structure has to be analysed on an individual basis to be able to obtain the knowledge of which features the individual structure is made up of. This formed a base for an intra- and inter-structure analysis where the dynamics between the single features and also the complex of features are investigated. One powerful tool for such analyses is a statistical multivariate method (Martinsson-Wallin 1994:63). By which an interaction between the single feature and the whole complex was shown where the different parts are equal in value for the understanding of the structure. Both qualitative (the description and classification of different features) and quantitative methods (for example different statistical analyses) were being used. In this way a flexible system was obtained that has many possibilities for performing further analyses and interpretations of the material culture as communicating something about ideological and societal change and power relations etc. over time.

Easter Island has c. 164 ceremonial sites, of which 113 are associated with statues, so called image *ahu* (Martinsson-Wallin 1994:52). When performing the multivariate analysis two sets of data were submitted. In the first set 83 *ahu* structures with 19 variables were analysed and in the second set 37 *ahu* with 43 variables were analysed. The outcome of the result indicated that large *ahu* structures show a higher frequency of well dressed stones in the retaining rear wall than do small structures. A seriation of the outcome of the multivariate analysis indicated that well dressed stones in the rear and front wall are probably early construction variables (Fig. 2). Ramp, wings, the statue head-gear, (*pukao*) and red lintel on the front wall are probably features that were added over time. This may indicate a shift in power relations between the chiefs, priests and the warriors. Spatial differences of the presence of *pukao* and red lintel on the front wall were also seen.



Fig. 2. The rear wall of *ahu* Vinapu, Easter island.

The eyes of the *moai*, lost and re-discovered

I mentioned above that the prehistoric material remains may be seen as signs in a text with hidden symbols and meanings. To be able to understand the object and what it signified in the prehistoric society it is important to place it in a relevant context. In the end of the 70's a new type of artifact was found during excavations in Anakena on the North coast of Easter Island. The object was made from coral and had an oval form and a slot and an opening for

placing a round object. This was interpreted as an eye that had been inlaid into the eye sockets of a statue. This was tested and the idea seemed very likely. This discovery functioned as an «eye opener» for the archaeologists and since then several eyes or eye fragments and rounded discs that have represented the iris of the eye have been found (Skjølsvold 1994:103). During a re-inventory of artifacts at KTM 6 pieces were re-classified as eyes (Fig. 3) or iris discs (Martinsson-Wallin 1996). The local museum on



Fig. 3. Re-discovered eye at exhibition in the Kon-Tiki Museum.

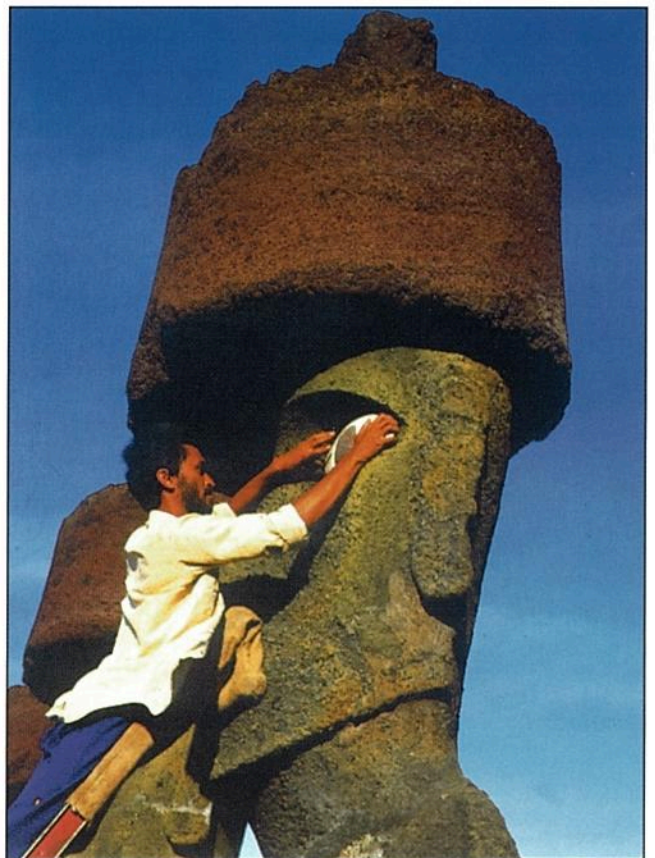


Fig. 4. The Easter Islander, Alberto Ika, placing the eye into a statue at Anakena.

Easter Island has made copies of the eyes found in Anakena and they are put into the eye sockets in the restored statues on certain occasions (Fig. 4). This makes the expression of the statues a lot different.

The statues in the quarry (Fig. 5) do not have carved eye sockets but this is something that must have been done at

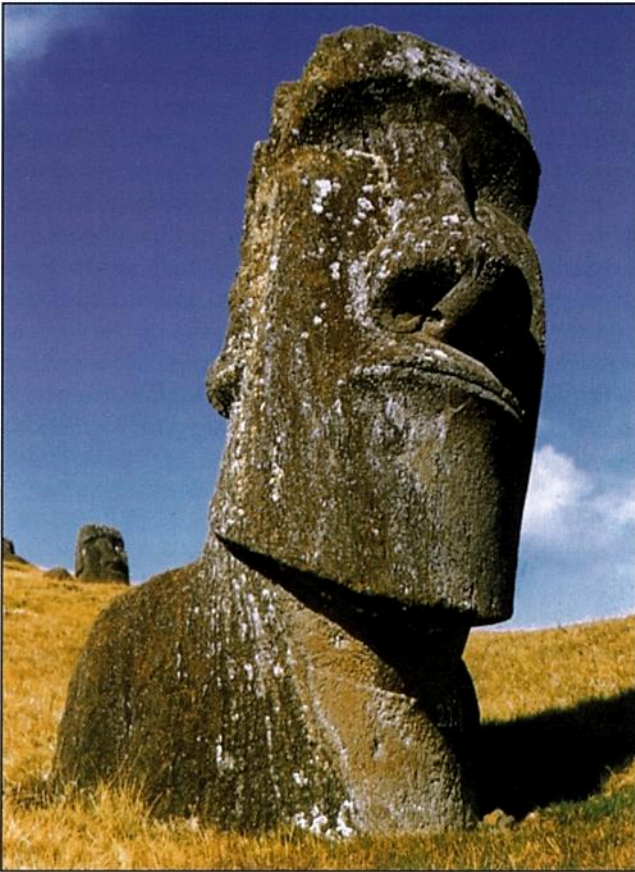


Fig. 5. «Blind» statue in the quarry.

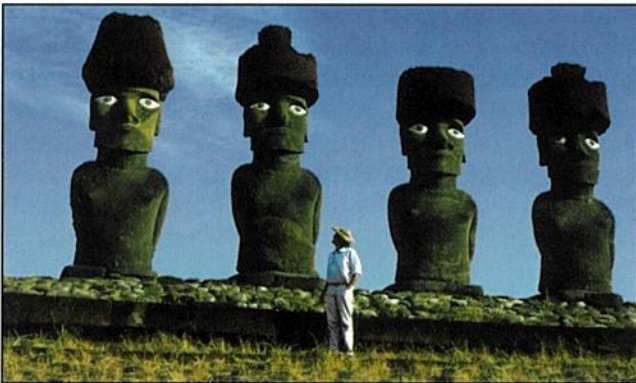


Fig. 6. Statues on ahu Nau Nau with inlaid eyes.

the ceremonial site as a kind of «eye opening» ceremony (Fig. 6). The word for eye in Rapanui language is *mata* and if one turns to the ethnohistoric records we also find that the same word is used for clan group (Metraux 1940:120). This may indicate that there was a connection between the representation of the eye and the clan. The statues have been interpreted as the images of dead chiefs that were raised on the ceremonial platform that belonged to the deceased lineage group or clan group. Decent was and is very important on Easter Island and in the Polynesian ideological realm there was also a strong tie between the clan or lineage group and the land upon which they. The chiefs were the representatives and the representation of the clan or lineage group as well as a link to and the representatives and the representation of the gods. The meeting place of the gods and man was the ceremonial site and as a sign of the tie between man and the gods and a tie to the land on which the ceremonial site was standing on,

the chief's umbilical cord was buried at the ceremonial site (Handy 1927). A connection between the clan group, the land and the ceremonial site, where the eyes may have played an active part, is therefore postulated. The eyes in the sockets of the statues can be interpreted in several ways that may have interacted. For example, it can be seen as the statue that represented the chief keeping his eyes on the land of his clan or lineage group to protect his people and the land. On the other hand the chief and the divine may have «watched» the clan members so they would behave and no *tabu* was broken. Thereby restraining the members of the clan or lineage group to keep the balance of power. This is one example of how a prehistoric material remain, in this case the inlaid eye, can communicate something further to us than just to state the fact that it is an eye that has been inlaid into the eye sockets of an Easter Island statue.

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Oral Traditions and Archaeology: Modeling Village Settlement in Palau, Micronesia

Stephen Wickler¹

Introduction

Oral traditions are an exceptionally rich source of knowledge among Pacific cultures, especially in the island groups where Western contact was relatively late and indigenous societies have been able to maintain their cultural integrity despite foreign control and the negative consequences of colonialism. It is important to keep in mind that oral traditions are much more than static records of the past expressing the collective consciousness of societies prior to the introduction of writing. On the contrary, oral traditions are living entities which continue to reflect and mold indigenous Pacific societies (Keesing 1989). This is the case even in highly westernized archipelagos such as Hawai'i where modern myths have evolved to validate native rights to the land and resources and reclaim the past for indigenous Hawaiians (Linnekin 1983). The «invention of tradition» has played a central role in the struggle for Native Hawaiian sovereignty and led to considerable debate (Trask 1991).

Oral traditions and traditional historical evidence are an important source of information for archaeologists in the Pacific, having had a marked influence on the interpretation of archaeological data (see Dye 1989 and Cachola-Abad 1993 for a discussion of the Hawaiian case). Despite the potential contributions from oral traditions and oral history to archaeological interpretation, traditional sources must be used with caution and examined in a critical manner. This is not to say that traditional sources are of lesser value than the 'empirical proof' offered by the 'scientific' approach in archaeology. Acting as the handmaiden of western ideology, archaeology has been employed as a tool to justify the actions of a colonial elite and create a version of the past that is politically acceptable (Bray and Glover

1987; Trigger 1984). Despite claims of scientific objectivity, the manner in which archaeologists read the past is also inevitably colored by their cultural baggage.

The intention of this paper is to examine the dynamic interplay of oral traditions and archaeology from the group of islands in Western Micronesia which comprise the Republic of Palau or *Belau* as it called by the indigenous inhabitants (Fig. 1 and 2). More specifically, attention is focused on a comparison of models for traditional village development and organization based on oral traditions and archaeology. Archaeological data from recent investigations at a complex of three traditional village sites in the state of Ngatpang on the island of Babeldaob are used to test an idealized model of village organization derived from traditional sources. The results of this exercise demonstrate the importance of research integrating traditional knowledge and archaeological evidence beginning with the initial stages of field investigations.

Oral Traditions in Palau

Although the first European sightings of Palau were made by the Spanish during the first half of the 16th century, the wreck of the English packet *Antelope* in 1783 initiated European intervention in Palauan affairs and the recording of indigenous customs and traditions by foreigners (Keate 1789). Outside contacts increased steadily during the 1800s when visits from first English and later American trading vessels became a common occurrence. Although the Spanish had administrative control over Palau from 1885 to 1898, German commercial involvement in the archipelago expanded during this period and continued to grow after the purchase of Palau from Spain by Germany in

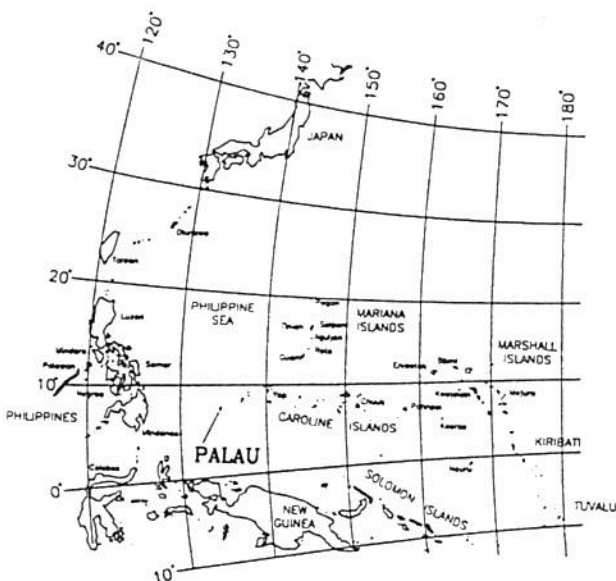


Fig. 1. Location of Palau in the western Pacific.

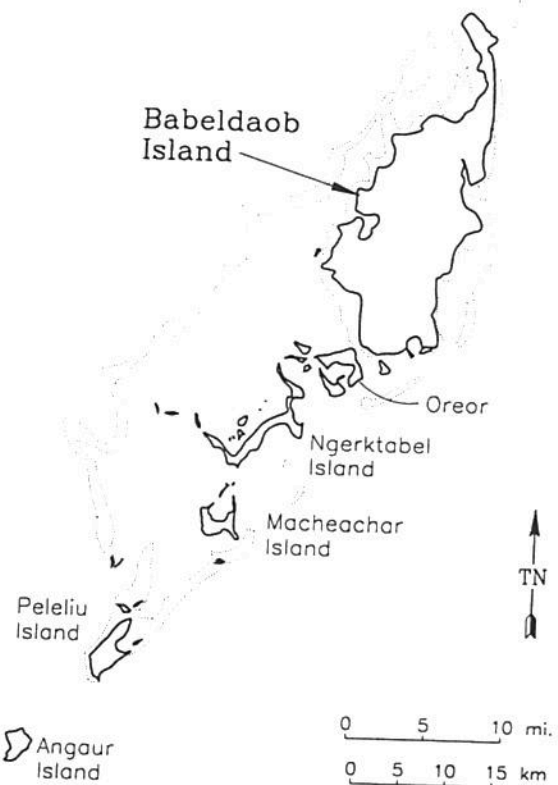


Fig. 2. The major islands of the Palau archipelago.

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1898. The Japanese took control Palau at the outbreak of World War I in 1914 and continued to govern the islands until the close of World War II. Since this time Palau has gone through a series of political transformations beginning with administration by the American military until 1951, followed by Trust Territory status, and finally the establishment of the independent Republic of Palau in 1994.

Baseline ethnographic data from Palau was collected during the period of German activity from the late 19th century to the early 20th century (Kubary 1885; Semper 1982). Most of our present knowledge of 'traditional' Palauan society is based on the detailed accounts of ethnographer Augustin Kræmer who spent nine months in Palau collecting information as part of the German South Seas Expedition from 1909 to 1910 (Kræmer 1917, 1919, 1926, 1929). A more limited amount of work recording oral traditions was also carried out during the subsequent Japanese period, most notably by the anthropologist Hijikata who also described various elements of Palauan material culture (Endo 1995).

Prior to the 1970s, the recording of Palauan history and traditions was in the hands of foreigners often directly employed by the colonial administrations. Political activism in the 1970s and 1980s during negotiations with the American administration for self determination led to an increased awareness on the part of indigenous Palauans of a shared cultural identity and the importance of fostering traditional values, including the recording of oral traditions. A variety of projects were initiated during this period which sought to provide an indigenous perspective on the past and Palauan traditions. Much of this work has been coordinated by the Palau Community Action Agency, including the writing of a history of Palau (PCAA 1976, 1977, 1978) and the compilation of oral traditions by the Society of Historians (1993). The Society of Historians is comprised of respected clan elders who are recognized as knowledgeable guardians of Palauan traditions.

The need for documentation of oral traditions has become more urgent over the past decade as traditional leaders pass away without transmitting traditional knowledge to the next generation. Many of the new generation of leaders no longer see the importance of tradition as the political power base has become more dependent on success in business than the control of traditional knowledge. The increased rate of change has created a cultural vacuum of sorts and produced a generation of Palauans with diminished ties to traditional values and increased reliance on imported Western goods and values.

Archaeology and Oral Traditions in Palau: the Compact Road Project

Osborne (1966) was the first archaeologist to carry out field investigations in Palau with a survey of sites throughout the archipelago and limited test excavations in 1954. In 1968, Osborne (1979) returned to Palau and conducted excavations at eight sites from which the first Palauan radiocarbon dates were obtained. Beginning in the mid 1970s, the pace of archaeological activity in Palau quickened in response to the enforcement of laws requiring the assessment of cultural resource impacts for projects

funded through U.S. agencies and the establishment of parallel laws in Palau. Much of this work was conducted by personnel from Southern Illinois University at Carbondale (SIU) as part of a long range research program from 1979 to 1983, the Palau Archaeological Project. Since the mid-1980s, most of the archaeological work in Palau has been carried out by the Palau Division of Cultural Affairs (DCA) within a cultural resource management framework and as part of the ongoing state by state survey program. As a result of this program, reconnaissance surveys have taken place in nearly all states, although coverage in many areas remains spotty. Surveys on Babeldaob have concentrated for the most part on coastal locations and much of the interior has yet to be investigated. As the focus of the DCA work has been on recording surface remains and the collection of oral histories rather than excavation, the chronological framework for prehistoric occupation remains sketchy in most areas.

The latest round of U.S. financed projects was stipulated in the Compact of Free Association signed in 1994 and include the installation of improved public utilities and the planned construction of a surfaced road encompassing the main island of Babeldaob, commonly referred to as the Compact Road. These projects have required archaeo-logical survey, testing, data recovery and monitoring, resulting in a tremendous increase in baseline data on Palau's past. A majority of this work has been carried out by the International Archaeological Research Institute, Inc. (IARII), including the ongoing investigations for the proposed Compact Road under contract to the U.S. Army Corps of Engineers. The Compact Road archaeological field investigations consist of three phases; intensive survey, data recovery, and monitoring during road construction. The initial two phases were completed in 1996 and 1997, respectively, along the proposed 95 km long Compact Road corridor skirting Babeldaob, a volcanic island 40 km long and 15 km wide (Fig. 3, page 16).

The Compact Road project has provided an unprecedented opportunity to sample sites in geographic locations across the entire island of Babeldaob and nearly all of the terrestrial environmental zones, from mangrove swamps to forested interior hills and grassland savannas. Over 110 traditional Palauan sites had been recorded and 70 radiocarbon dates obtained by early 1998, close to doubling the previous number of dates from Palau (Liston 1997; Wickler et al. 1997, 1998). As a result of this work, a new chronological framework for Palau is developing with firm archaeological evidence for settlement by the early first millennium B.C. (Wickler 1998) and evidence for anthropogenic disturbance from dated pollen sequences in sediment cores suggesting potential colonization as early as 2000 B.C. (Athens and Ward 1998).

An innovative aspect of the Compact Road project has been the integration of oral history documentation with archaeological field investigations (Tellei et al. 1997). This process has included extensive literature review, the identification of informants and subsequent interviews, and field visits with archaeologists to identify problems related to the oral traditions of individual sites and features. In contrast to most previous attempts to record oral traditions, all documentation was carried out by indigenous Palauan

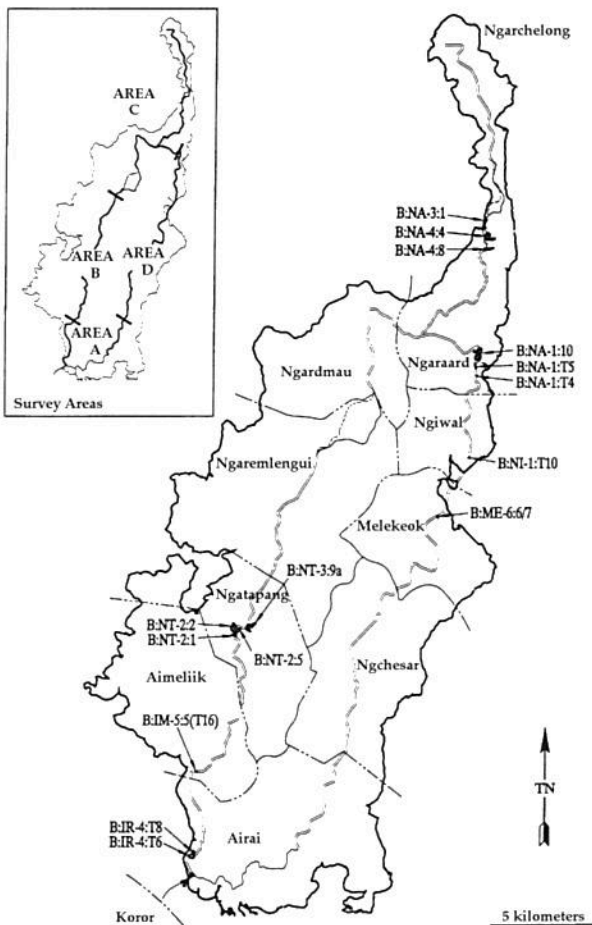


Fig. 3. The Compact Road route showing the locations of Phase I survey sections and sites at which test excavations were conducted.



Fig. 4. Oral history researcher Julita Tellei interviewing informant Mr. Ridep (in center) at the traditional village site of Ngerumlol.

researchers rather than outsiders (Fig. 4). The common language and shared cultural identity of the researchers and informants was an obvious benefit which facilitated the sharing of traditional knowledge. However, the recording of oral traditions is not without difficulties as traditional knowledge includes privileged information which is the property of clans, lineages or social groups and cannot be freely shared with individuals outside of a given group.

This attitude is directly linked to the importance of knowledge in the maintenance of political power within traditional Palauan society and concomitant loss of power when knowledge is shared with outsiders.

The integration of oral traditions and archaeological data during the Compact Road project has made it possible to explore the complexities of the cultural landscape and provide a social context for the material remains of past human activity on Babeldaob to a much greater extent than would have been possible from material culture alone. For example, traditional narratives linked to place names, physical features, and structural remains have been of considerable value in understanding Palauan concepts of space and time in an environmental context. Another benefit of oral history documentation has been the close contact with traditional land owners providing them with an opportunity to express their concerns about the potential adverse impacts of the proposed road on traditional sites.

A Traditional Model of Palauan Village Organization

At the beginning of sustained Western contact at the end of the 18th century, Palauans were living in a number of villages scattered throughout the islands. Villages were generally located on the lower hill slopes just above the coastal plains, which were planted in taro, the major subsistence crop, grown in diked wetland fields. The remains of these «traditional» villages are one of the principal site types recorded during the Compact Road project and provide an excellent opportunity for examining the interplay of oral traditions and archaeological data. A complex of three abandoned traditional villages in Ngatpang State along the proposed Compact Road corridor was recorded in detail through the mapping of structural remains and limited test excavations. As a result of previous research and oral history documentation associated with the current archaeological field investigations, we have extensive information from traditional sources on the function and ownership of individual structural features for portions of these villages. Following a brief discussion of traditional Palauan socio-political structure, archaeological evidence from the three Ngatpang village sites is reviewed to determine how well they conform to an idealized model of traditional village organization.

At the time of Western contact, Palau was politically stratified and divided into numerous polities (Cordy 1986). Ideally, each polity controlled an area of land and a part of the lagoon. The island of Babeldaob was divided among several polities and alliances linked individual villages into federations (e.g., villages in the Ngatpang complex were part of a single federation). The boundaries between polities and the structure of the villages within each polity were constantly changing as new alliances were struck and power shifted.

Within each village were a variable number of ranked clans but the ideal number was thought to be ten (Force and Force 1972). Individual families were ranked within each of the clans. The ability of an individual to obtain and maintain power and status was determined to a significant extent by the rank of the family within the clan, by the rank of the clan within the village, by the rank of the village

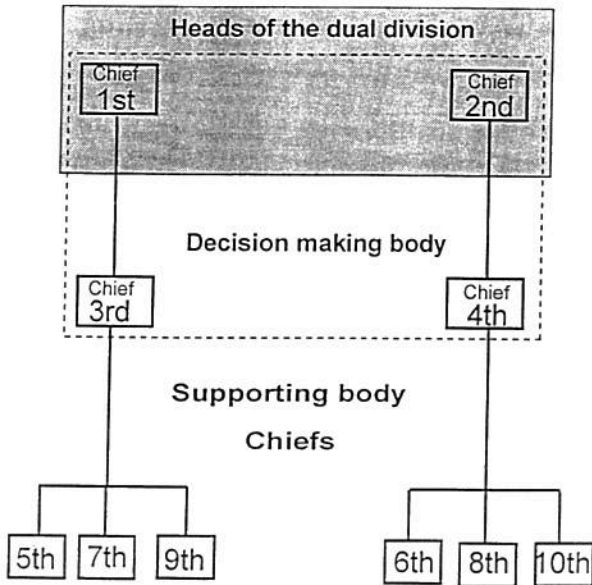


Fig. 5. Diagram illustrating the symmetrical organization of the village council (from Olsudong 1995).

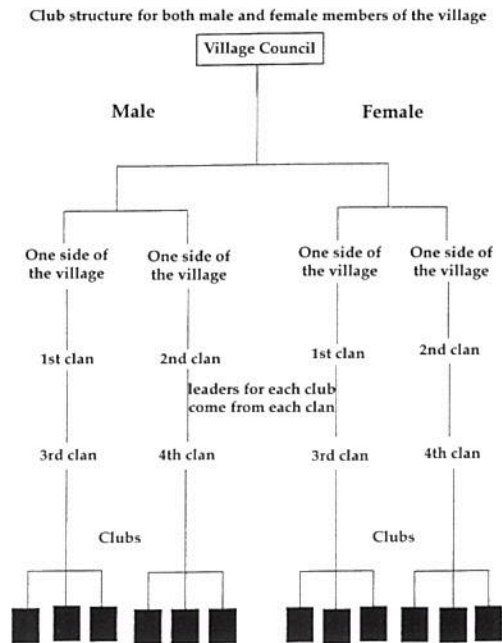


Fig. 7. Symmetrical structure of male and female village clubs (from Society of Historians 1993).

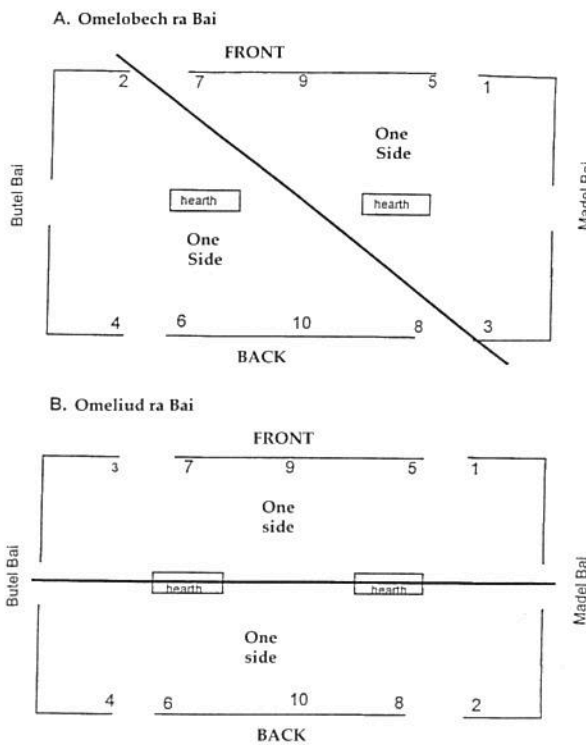


Fig. 6. Idealized symmetrical division of the chief's meeting house (bai) diagonally (A) and lengthwise (B) (from Society of Historians 1993).

within the polity, and by the rank of the polity within the society (Smith 1983). Despite the rigid system of ranking which is traditionally viewed as the cornerstone of Palauan political and social organization, social interaction across ranked divisions was made possible through a variety of institutions such as age graded clubs for both sexes.

Political leadership at the village level was and is usually comprised of ten members representing the ten highest ranking clans. This is reflected in the village council of chiefs (Parmentier 1987; Society of Historians 1993). The four highest ranking chiefs form a single unit that has ultimate power control the decision making process at both

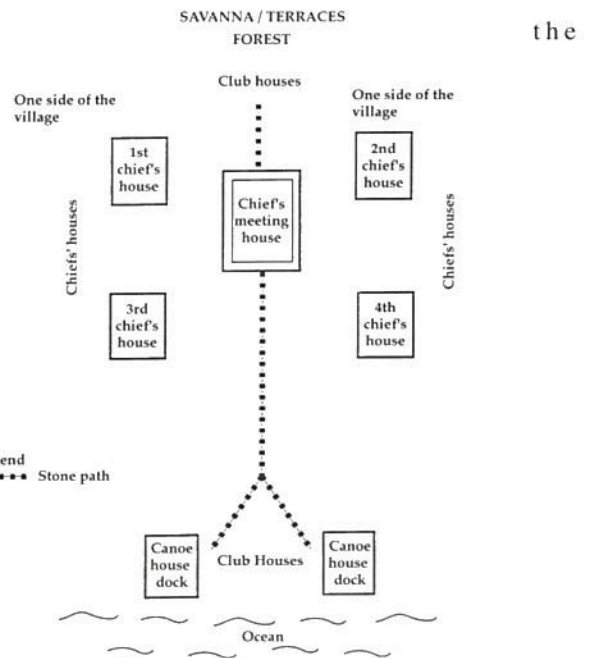


Fig. 8. Idealized model of traditional Palauan village organization (from Olsudong 1995).

council and village level. The fifth ranked chief acts as a mediator between this unit and the remaining chiefs. The village council is divided into two equal parts with the first and third chiefs leading half of the village and the second and fourth chiefs leading the other half (fig. 5). This symmetrical organization is also reflected in idealized designated seating arrangements within the chief's meeting house (bai) by a diagonal or lengthwise physical division of ranked chiefs (fig. 6). The symmetry of the village council extends to the village as a whole which is divided into two equal halves. Each half of the village has clubs which are also organized symmetrically by sex and clan (fig. 7).



Fig. 9. Crown and brim defensive earthwork at Ngermelkii hill adjoining the traditional village site of Ngimis.

It has been argued that the symmetry in village level political structure is the main factor influencing the physical layout of the traditional village. An idealized traditional village model reflecting the symmetry of social organization has been proposed by Rita Olsudong, the only indigenous Palauan to date with a graduate degree in archaeology (Olsudong 1995). In this model, the chiefs meeting house (bai) is the largest structure in the village and centrally located (fig. 8, page 17). A stone path leading from the bai divides the village into symmetrical halves and extends to the ocean where pairs of canoe houses and docks are located. Men's club houses are also located towards the seaward end of the main stone path near the entrance to the village. As a reflection of the duality which

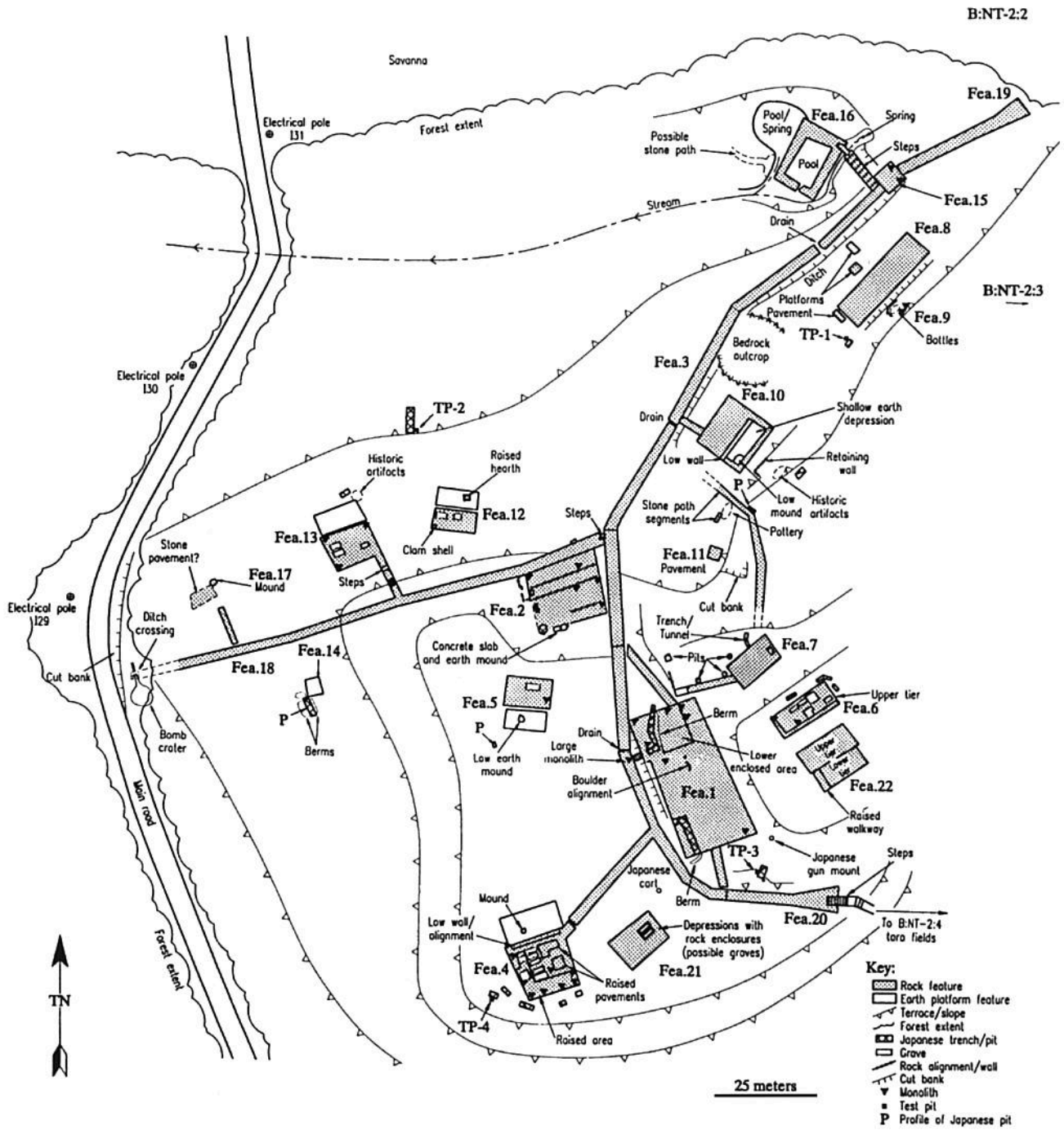


Fig. 10. The traditional village of Ngimis (Site B:NT-2:1).

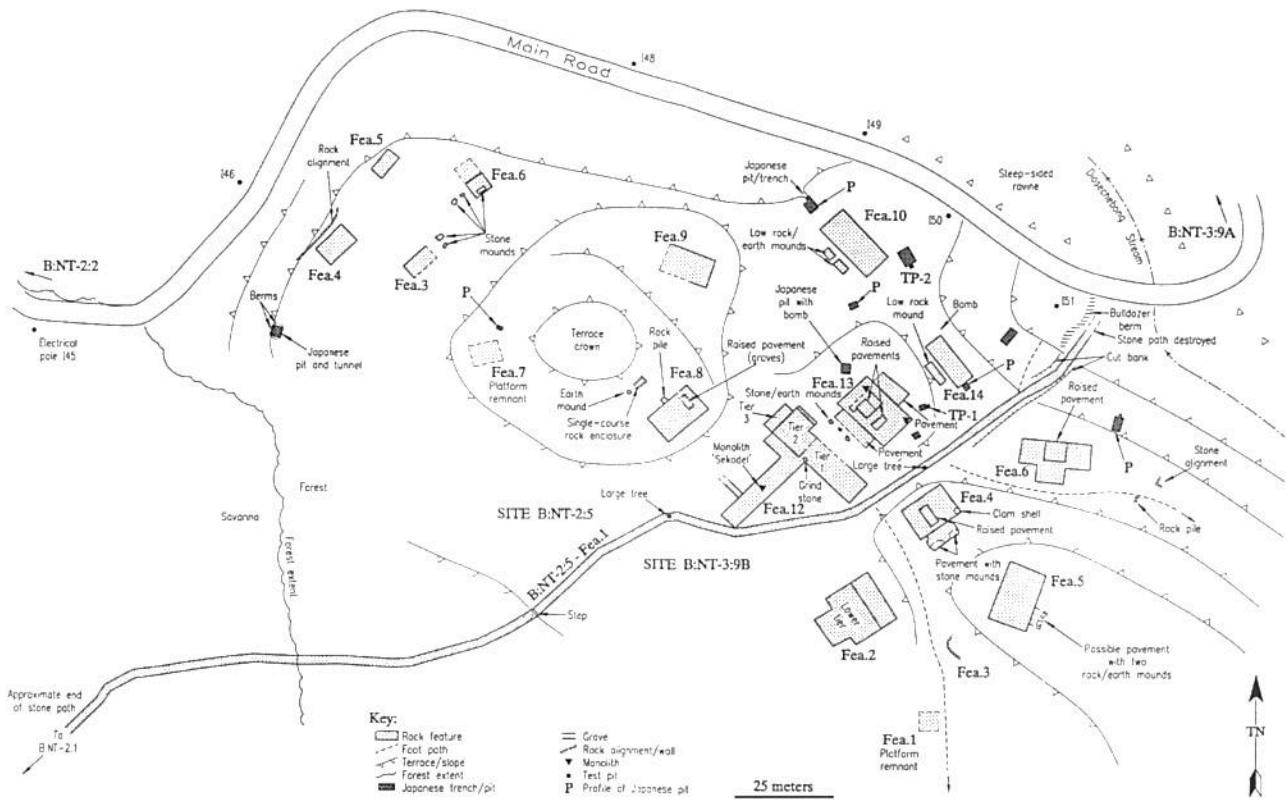


Fig. 11. The traditional village of Ngerumlol (Site B:NT-2:5) and southern portion of Ngerdubech village (Site B:NT-3:9B).

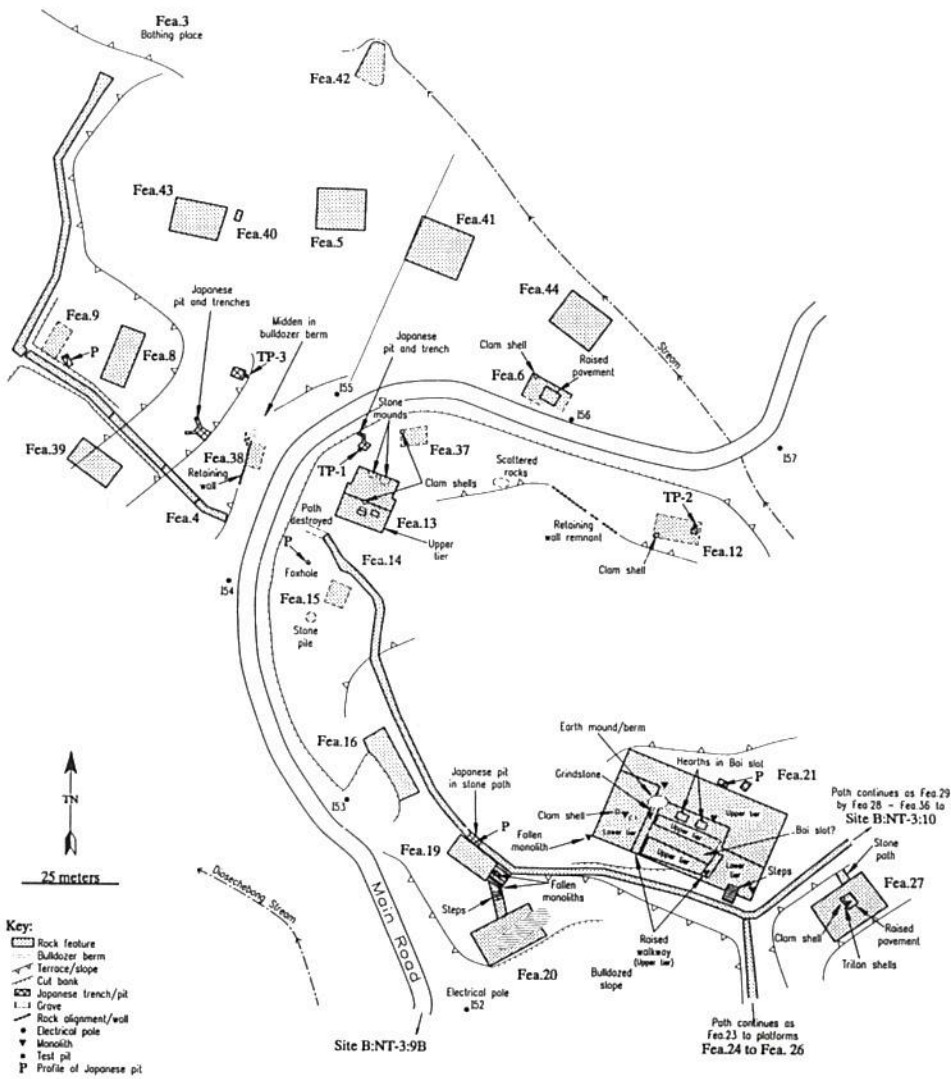


Fig. 12. The traditional village of Ngerdubech (Site B:NT-3:9A).



Fig. 13. Men's club bai platform (Feat.2) viewed from the stone path at the traditional village of Ngimís.

characterizes the village council, residential platforms of the first and third ranked chiefs are located in one half of the village, and the second and fourth ranked chiefs in the other half in close proximity to the chief's meeting house.

Testing the Traditional Model: the Ngatpang Village Complex

Olsudong (1995) tested her theoretical model of traditional village organization against archaeological data from a set of six abandoned traditional village sites in Ngatpang State. The archaeological evidence consisted of site maps from each of the villages with structural remains mapped by Olsudong and personnel from the Division of Cultural Affairs. The reliability and comparability of these site maps varied considerably due to factors such as site disturbance and the degree of accuracy and detail in the recording of features. Interviews with knowledgeable local informants were carried out in conjunction with the archaeological survey in order to collect oral traditions concerning the socio-political organization of the villages and the clan names and function of individual features, particularly stone platforms. Based on the results of her study, Olsudong concluded that the spatial distribution of archaeological features only partially supports the idealized model of traditional village organization.

Archaeological investigations for the Compact Road project included intensive survey and test excavations at three of the village sites in Olsudong's study. These village sites are components of a tightly clustered complex which also includes four terraced earthwork sites and extends for a distance of 2 km along the eastern shore of Ngermeduu Bay on the west coast of Babeldaob (Fig. 9). The villages, which include Ngimís (Site B:NT-2:1), Ngerumlol (Site B:NT-2:5), and Ngerdubech (Site B:NT-3:9A and B), were traditionally part of a confederation led by Ngerdubech (see fig. 3 for site locations). The Compact Road investigations were able to provide a more detailed and accurate record of archaeological features at the three village sites than that presented by Olsudong through precise mapping and descriptions of individual features and associated subfeatures. Test excavations within and in close proximity to structural features also enabled an assessment of feature function and chronology.

The physical characteristics and spatial arrangement of stone structural features at the three traditional village sites

provided only limited support for the idealized village model (see village site maps, figs. 10 - 12). Aspects of the model supported by the archaeological investigations include the central location of the chief's meeting house bai and some symmetry in the placement of other structures, primarily stone platforms from the residences of the highest ranked chiefs.

As predicted by the model, bai platforms are the largest structures at each of the three village sites ranging from 1,112 m² at Ngerdubech to 659 m² at Ngimís and 223 m² at Ngerumlol (Fig. 13). The relative rank of the three villages based on bai platform size also agrees with traditional sources that identify Ngerdubech as the para-mountain village in Ngatpang, followed by Ngimís.

The much smaller platform at Ngerumlol is consistent with its position as a hamlet of Ngerdubech. This reconstruction assumes that the platforms are contemporaneous, which has yet to be demonstrated. Differences in the construction of bai platforms which appear to be chronologically significant were noted between the sites and only Ngerdubech has a chief's bai platform with features typical of those in use during the historic period. Attributes of bai platforms and associated features such as shrines may be linked to their relative age with the chief's bai platform at Ngimís (Fea. 1) exhibiting traits which appear to be transitional between a possible early bai type at Ngerumlol (Fea. 13) and the typical historic period bai platform recorded at Ngerdubech (Fea. 21).

Palauan residential structures were traditionally built on piles adjacent to, and usually behind, stone platforms or pavements, rather than on the platforms themselves. Platforms are the property of individual clans and the family of the clan head resided at the clan platform. Platforms also served as clan cemeteries with graves marked by stone slabs or raised pavements. Residential platforms in the three village sites were separated into two categories on the basis of size and associated features. Chief's platforms tend to be large and are commonly associated with features such as multiple tiers, raised pavements, graves, monoliths, and contiguous earth platforms or stone pavement aprons. Platforms belonging to lower status clans are smaller and lack subfeatures. These findings substantiate the identification of high and low status platforms by local informants based on traditional knowledge. Although the size distribution of residential platforms at the investigated sites follows a smooth upward curve lacking multiple modes, there is some degree of separation between small and large platforms at ca. 100 m² and internal clustering within each group (Fig. 14, page 21). General aspects of residential platform construction such as presence or absence of an earth core and the amount of effort invested in stone facings may also reflect temporal intra- and inter-site differences between structures.

In a traditional model of Palauan village organization, residential platforms serve as centers of domestic production in contrast to bai platforms which are the focus of community-wide activities (Gumerman et al. 1981; Snyder et al. 1983). Investigations of residential platforms at the three village sites revealed four types of features associated with food preparation and related domestic activities: low stone faced earthen platforms, small stone

Feature No.	Feature Type	Area (m ²)
NGIMIS (NT-2:1)		
4	1st chief's platform	294.0
10	10th chief's platform	175.5
22	stone platform	155.0
13	4th chief's platform	153.9
8	stone platform	149.5
5	3rd chief's platform	125.7
12	7th chief's platform	104.0
21	stone platform	93.6
6	2nd chief's platform	93.0
7	6th chief's platform	80.9
14	stone platform	14.0
NGERUMLOL (NT-2:5)		
10	3rd chief's platform	105.0
8	1st chief's platform	104.0
9	2nd chief's platform remnant	82.6
14	4th chief's platform	76.3
6	stone platform/ pavement	46.6
4	stone platform	42.1
3	stone platform remnant	30.0
5	stone platform	23.5
NGERDUBECH (NT-3:9B)		
2 (38)	stone platform	188.5
5 (41)	stone platform	160.4
4 (40)	stone platform	155.2
6 (42)	stone platform	140.0
NGERDUBECH (NT-3:9A)		
28	1st chief's platform	214.7
24	stone platform	194.4
31	2nd chief's platform	189.7
13	stone platform	170.4
20	4th chief's platform remnant	170.0
11	stone platform	166.3
5	stone platform	160.8
31	stone platform (<i>ongur</i>)	135.5
17	stone platform	100.8
12	stone platform/ pavement remnant	96.0
8	stone platform	95.0
33	stone platform	92.0
34	stone platform	90.7
35/36	stone platform	86.3
6	stone platform	74.8
18	3rd chief's platform	72.0
30	stone platform	61.2
2	stone platform	37.4
9	stone platform/ pavement remnant	32.0
25	stone platform	25.2

Fig. 14. Residential platforms from traditional village sites sorted by total area (sq.m.).

pavement aprons, extensions giving platforms a notched appearance, and probable hearths or cooking mounds. Inter-site variability in the distribution of these features may be chronological as well as functional. Excavations within and near bai and residential platforms revealed cultural deposits with shell and bone midden suggesting that food preparation and consumption took place at both types of platforms.

A Chronology of Village Settlement

Investigations of traditional village organization and settlement have commonly assumed that villages were

occupied over a relatively brief period of time during the late prehistoric to historic period and that oral traditions can be a reliable source of information on these sites. One consequence of this model has been a tendency to discount the potential for long term occupation and multiple building phases in traditional villages. The assumption that the occupation of traditional villages was relatively brief and structures are roughly contemporaneous simplifies the task of explanation, but the validity of this assumption must be critically evaluated. Radiocarbon dating results from the three Ngatpang village sites demonstrate that occupation extended over a longer period of time and began significantly earlier than previously thought. The collective results document up to three periods of village settlement on the basis of stratigraphic evidence and radiocarbon dates. The most recent period of occupation covers a period of roughly 300 years beginning at around AD 1650. A majority of the existing structural remains and the oral traditions referring to them undoubtedly date to this period. Multiple cultural layers suggesting two earlier temporally distinct periods of occupation were recorded in excavations at the village sites. The nature of site use during the earliest period (AD 1250-1450) remains uncertain and may reflect horticultural activity or temporary habitation of the terraces on which the existing villages are built prior to any kind of village settlement. A series of radiocarbon dates provide firm evidence for nucleated village settlement by the first half of the 15th century and signal the beginning of the second period of site use (AD 1450-1650). Subsurface features such as postholes and refuse pits as well as dense midden concentrations demonstrate the presence of structures and more intensive habitation than during the previous period. It is also possible that some of the stone structures visible on the surface today were initially constructed before the end of this period.

Archaeology and Oral Traditions: A Dynamic Perspective on the Past

The collective results of archaeological investigations at the Ngatpang village sites illustrate the need for considerable caution in the interpretation of traditional village settlement in Palau based on traditional sources alone. In addition to the oft cited caveats concerning the questionable utility of traditional sources in societies where Western impacts have radically altered indigenous perceptions of the past, oral traditions must also be viewed critically as the reflection of attitudes held by certain segments of society, particularly in highly ranked societies such as Palau.

Although oral traditions have definite limitations as a tool for interpreting the past, they are an invaluable source of thought provoking models providing a starting point for archaeological inquiry. This is especially true in Palau where we are fortunate to have a wealth of detailed knowledge concerning the socio-political role of archaeological remains in villages as concrete expressions and powerful symbols of collective identity and social order. The importance of platforms and other village structures as a means by which individuals legitimized their membership in groups defined by kinship, sex, age and status has played an important role in preserving traditional

knowledge despite two centuries of foreign impacts on Palauan society.

Only through the active integration of oral traditions in archaeological research, not merely as an afterthought or supplement to archaeological evidence, will it be possible to provide a holistic perspective on village development and the history of Palauan settlement in general making use of the full range of resources at our disposal.

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Language and Communication in Tokelau

Ingjerd Hoëm¹

In my work I am concerned with making explicit the conceptions that underlie and inform patterns of communicative practice (W. F. Hanks 1996). In the following I shall present some examples from my material, to illustrate some of the most salient characteristics of communicative practice in Tokelau.

Tokelau is a tiny atoll society which currently comprises three atolls (the fourth being counted as US territory) with approximately 1500 inhabitants. There is also a migrant population, located mainly in New Zealand, but also in Australia, Hawaii and the mainland USA, which amount to approximately 5000 people. The atolls are situated in the South Pacific, north of Western Samoa and close to the equator, and are called Atafu, Nukunonu and Fakaofu (Fig. 1 and 2).



Fig. 1. Atafu, a tiny atoll in the Tokelau islands (Photo by Even Hovdhaugen).



Fig. 2. Village at Fakaofu Island (Photo by Ingjerd Hoëm).

Tokelauans frequently describe themselves as being shy. I have even seen them characterised as “the shyest people in the Pacific” (R. Simona in A. Thomas, 1986). Although I would not vouch for this statement in a comparative perspective, it certainly points to a clearly observable way of acting. The native term that is used to characterise this state (when Tokelauans use English, “shy” is the word they would use) is *ma*. In the anthropological literature, and in

the Tokelau Dictionary, this word is translated as “shame” or “embarrassment”.

When characterising themselves this way, Tokelauans point to a whole cultural complex of emotional states and attitudes towards the relationship between self and other. In particular this complex is expressed as a prevalent ambivalence towards authority (a pattern also observed and described in great detail by Niko Besnier from Tuvalu) and a concomitant concern with the public presentation of self, or face (*mata*) (as both the classical behavioural sociologist Erving Goffman and Tokelauans call it).

This concern with one’s public presentation results in a relative low-key demeanour, or “shyness”, a behavioural pattern which is recognisable in one form or another in many parts of the Pacific region. Thus Henry Adams described Polynesians generally as “culturally thin” (cf. Markus and Fisher 1986). When this term “thinness” is used in the literature, it is both in reference to a relative absence of elaborate rituals, and to the somewhat inconspicuous behaviour that dominate everyday life. Moreover, in works grounded in theories of modernisation coming to the fore in the seventies, this “thinness” is frequently interpreted as a sign of acculturation caused by an increased integration into the global economy.

Robert Levy however, on the basis of his extensive work from Tahiti, makes the important observation that behind this apparent “thinness”, there lies what he calls: “a substantive division between casual, low-key public culture and a private culture consisting of feelings about the body and the emotions” (1973:361). I should mention that I find the analytical distinction between a private and a public realm awkward to use in a society such as Tokelau. However, and more importantly for our present purposes, it seems reasonable, on the basis of his observations, to interpret this “thinness” as an expression of a behavioural pattern which is of a much greater historical depth than what the modernisation theories would seem to imply.

Levy describes Tahitian aesthetic codes, especially as they are expressed in public performances, as characterised by what he calls “fragrantly presented surfaces”. These “surfaces” are created, among other things through the lavish sprinkling of perfume and powder on dancers, by adorning people with flower garlands, and by the use of coconut oil to make bodies shiny. And, perhaps most importantly, through adopting a smiling, outgoing attitude (Fig. 3, page 25). These codes are easily recognisable as elements of what also goes into the making of a Tokelau “face”.

Such a code of a-aesthetics bears in other words a close resemblance to practices found cross-culturally; in Samoa, Tonga, Ki-ribati, Tuvalu and Pukapuka just to mention some.

In Tokelau, the demeanour associated with such a code of aesthetics applies first and foremost to activities that are said to take place “in front of” (*ki mua*) the village people or certain segments thereof. Examples of such activities would be feasts, political or family meetings or *fono* (either in the public meeting house located at the centre of the village and close to the *malae*, or in the house of the extended family (*kaiga*), or when walking along the path within the confines of the village. These activities are associated with formality, with lightness, polished surfaces

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Fig. 3. Smiling dancers «front» context (Photo by A.M. Vonen).

and the “dayside” of things (*ao*). In contrast to this, activities which take place on the outskirts of the village, in the back (*ki muli*) or in the bush (*ki uta*) are not subject to the same behavioural restrictions (Fig. 4). These areas are associated with darkness or the “nightside” (*PO*), with dirtiness and heavy work, with spirits and with danger.



Fig. 4. «Dirty» work «back» context (Photo by A.M. Vonen).

In these “back” areas, and particularly in all-male or all-female company, in cook-houses and in the outhouses built over the lagoon, people joke and gossip, and not infrequently engage in behaviour which would be totally unacceptable if it was carried out “in the front”, or if rumors of it were to spill over into the more formal contexts. Such

breeches of etiquette is a matter of great shame or embarrassment — *ma*.

In short, a significant amount of time in the atolls is spent on the topic of “shame” in one way or another, either through discussing and evaluating other peoples behaviour, through making jokes about it, through gossip and through bringing up cases deemed to be serious breeches of etiquette for the Women’s Committee or for the Council of Elders.

As Bradd Shore observes for Samoa, it is also the case in Tokelau that the distinction between “front” and “back” (in their terms), or as he describes it, between formal and intimate situations, is reflected in kinetics (Shore 1982). To illustrate: To look at, or as it is called to “face” a person directly, carries the potential of implying a relationship of equality. In most cases, it is the prerogative of the highest-ranking person to direct his or her gaze at the other, whereas this other person would keep his or her gaze averted. In most contexts it is considered improper for a girl or woman to “face” a man directly. This would imply sexual intentions, and therefore, the gaze is averted, sideways and downwards. This is clearest exemplified in the relationship between brothers and sisters or cousins who are as brothers and sisters to each other by rule of extension. Their relationship is characterised as a *va*, lit. “space between”. People bound by such a relationship observe strict avoidance vis-à-vis each other. Earlier, that is for the older generation of today, brothers and sisters did not communicate directly at all. If they had to, the message would be conveyed through a third party. It is still the case that for example if a brother eats in the house where his sister is, he would seat himself on the threshold of the house, facing outwards, away from her.

A similar pattern is found between people of different age: the younger show the older respect by stepping aside, again averting the gaze. Generally, a person signals lower status and thus respect by placing him or herself physically lower than the other person, e.g. by bowing down (and saying *tulou*) when forced to pass in front of such a person. These patterns of avoidance is in great contrast to the behaviour presented in such situations as I mentioned earlier, for example in public dancing, where the dancers shift from slow movements and downcast eyes at the beginning of each dance, to rapid movements towards the end of the dance with the gaze, smile, energy and attention directed straight at the members of the other dancing team situated at the opposite side of the meeting house.

So, in sum: easy going, joking relationships exist between same sex siblings (and by extension, cousins, up to third and fourth), and also between grandparents and grandchildren. Such interaction dominate in “back” situations, and in the “non serious” parts of “front situations” such as clowning at a feast etc. Most interaction though, take place in contexts which involve both men and women, and where by implication there are people present who are related to each other as brothers and sisters. In such contexts, behaviour is dominated by the observance of the *va*, the avoidance and respect pattern. Furthermore, I mentioned that a respect relationship also dominates interaction across agegroups. This institution is expressed

in a communicative pattern where the older person commands (i.e. directs the form and content of the interaction and tells the younger what to do) and the younger carries the responsibility of interpreting the order and carrying it out. (Fig. 5 and 6).

In conclusion I would like to point to the significance of the spatial dimension, which we in the above have seen may be employed both to create and interpret relationships of hierarchy and equality.

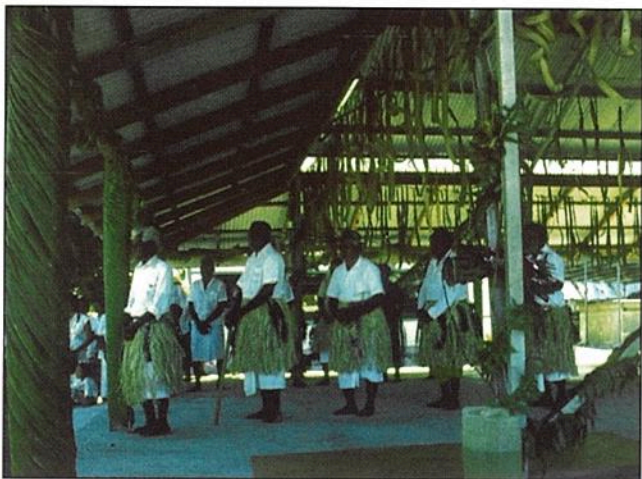


Fig. 5. «Restricted» elders on Nukunonu island «front» context (Photo by Ingjerd Hoëm).



Fig. 6. «Loose» boys on Fakaofu island «back» context (Photo by A.M. Vonen).

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Note

A fuller version of this paper was presented at the seminar «The Verb in Cognitive Grammar» held at Gran, June 1998, and is to be published in a volume resulting from that conference (hosted by the Cognitive Linguistics Group at the Department of Linguistics, University of Oslo).

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The recipient of the **No Barriers** grant is also invited to Oslo (all expenses covered) to receive the grant at the Kon-Tiki Museum on April 28th the anniversary day of the Kon-Tiki Expedition's departure from Callao in Peru. Application for the **No Barriers** grant (on a special form), accompanied by a description of the research project, an economic plan and a CV (all in duplicate), must be submitted to the Kon-Tiki Museum before January 31st at the address below:

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The recipient of the **No Barriers** grant will be notified no later than February 15th, so that necessary travel arrangements can be made. For further information on the **No Barriers** grant, please contact one of the members of the review committee:

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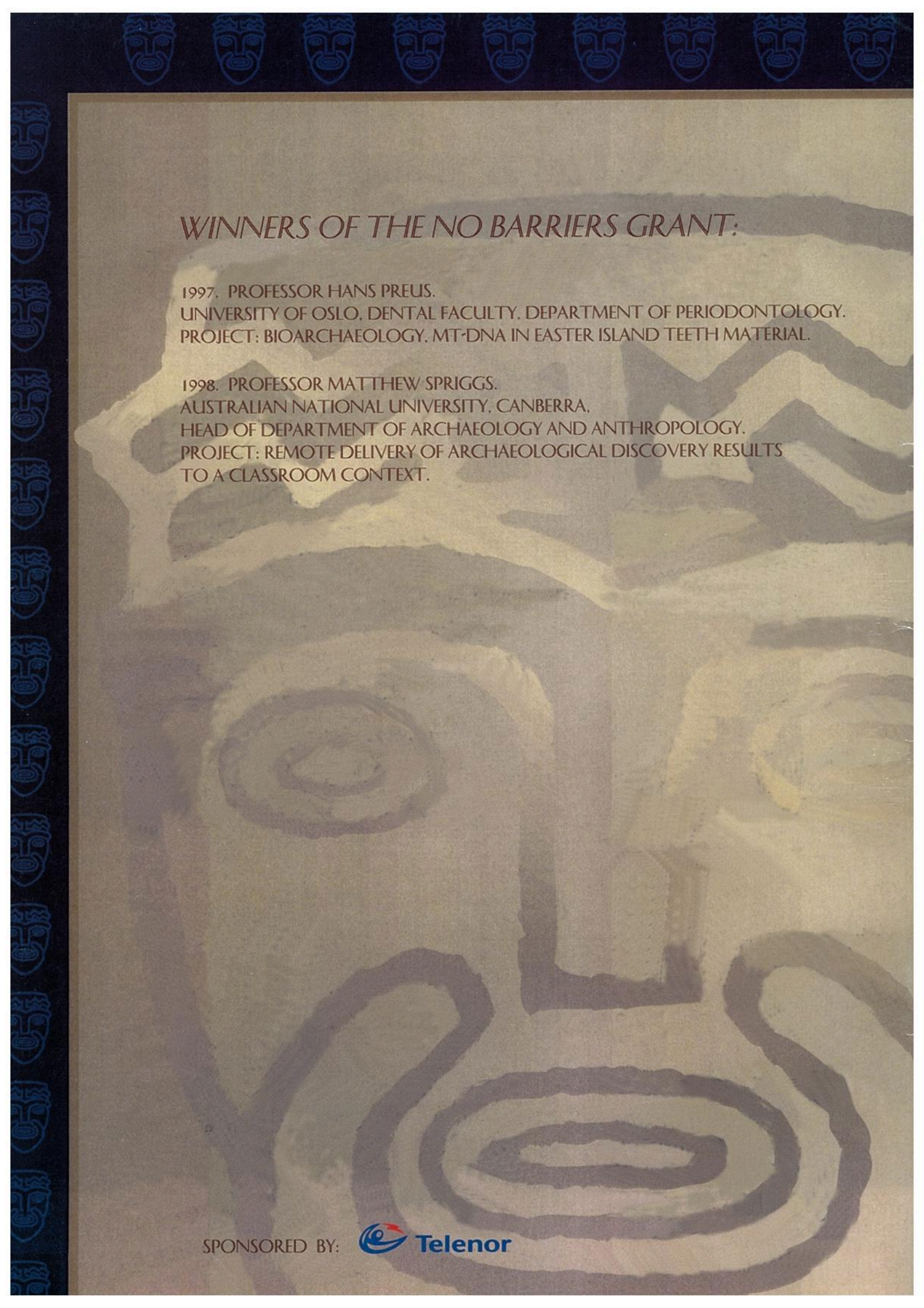
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No Barriers expresses the ability to break down communication barriers, the willingness to work in partnership and co-operation and a will to succeed.

More information about Telenor International and the **No Barriers** idea can be found at the Telenor International web site: <http://www.internat.telenor.no>



WINNERS OF THE NO BARRIERS GRANT:

1997. PROFESSOR HANS PREUS.
UNIVERSITY OF OSLO, DENTAL FACULTY, DEPARTMENT OF PERIODONTOLOGY.
PROJECT: BIOARCHAEOLOGY, MT-DNA IN EASTER ISLAND TEETH MATERIAL.

1998. PROFESSOR MATTHEW SPRIGGS.
AUSTRALIAN NATIONAL UNIVERSITY, CANBERRA,
HEAD OF DEPARTMENT OF ARCHAEOLOGY AND ANTHROPOLOGY.
PROJECT: REMOTE DELIVERY OF ARCHAEOLOGICAL DISCOVERY RESULTS
TO A CLASSROOM CONTEXT.

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