

**ARCHAEOLOGICAL AND ETHNOBOTANICAL  
FIELDWORK IN  
WEST NEW BRITAIN PROVINCE, PNG**

**JUNE-JULY 1995**

**Reported by**

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This project is affiliated with the PNG National Museum and Art Gallery.

NOTE: This report summarizes PRELIMINARY results compiled immediately following fieldwork. For confirmed and accurate data, please consult publications.

## SUMMARY

The aims of our ongoing archaeological research in West New Britain are to obtain detailed information about how obsidian was used and traded in the past and to examine the effects of ancient volcanic eruptions on human subsistence and settlement. The project is directed by Dr. Robin Torrence from the Australian Museum in Sydney, assisted by a team of specialists and university students from Australia, the USA, and Papua New Guinea. This year separate teams were based on Garua Island and in Garu Village. On Garua Island we concentrated on (1) collecting samples needed to reconstruct the geological history of Garua Island; (2) enlarging the sample of the earliest obsidian tools; and (3) making maps and conducting surveys aimed at selecting areas for future investigations. We also visited archaeological sites at Bitakara Mission and Bamba village. The Garu village team made an extensive reference collection of plants to assist the identification of plant fossils preserved in archaeological sites. Bakovi names and uses for 226 different plants were recorded. Additional samples were obtained from the Lae Herbarium at the Forestry Research Institute.

## **PARTICIPANTS**

John Namuno and Clement Mare, WNB Provincial Cultural Centre, assisted both projects.

### **Archaeology: Garua Island**

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### **Ethnobotany: Garu Village**

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## ITINERARY

- June 21** Lentfer, Kealhofer, Therin travel to Lae; consult with scientists at the Forestry Research Institute; begin sampling at the Herbarium.
- June 22** Torrence and White travel to Port Moresby and assist with setting up exhibition written and designed by Torrence with assistance from Colley and Davies at the University of Sydney: "How Archaeologists Learn About the Past: Archaeology in West New Britain."
- June 23** Torrence, White, Araho meet with staff and students at the University of PNG; meet Michael Laki at the Cultural Studies Division, National Research Institute; attend opening of exhibition on West New Britain archaeology at the National Museum.
- June 25** Teams assemble at Walindi Plantation, Kimbe.
- June 26** Organize equipment; meet with John Namuno, Clement Mare, John Normu.
- June 27** Preliminary visit Garua Island.
- June 28** All visit Garu village; Lentfer, Kealhofer, Therin begin study of local plant uses.
- June 29** Torrence, White, Jackson, Araho, Muke, Piening travel to Garua Island and begin fieldwork.
- July 8** Day trip to Talasea area, Bitokara Mission, Bamba village.
- July 9** Dr. Muke departs Garua Island.
- July 10** Both teams return to Walindi Plantation.
- July 11-12** Torrence, White, Therin pack equipment and have meetings with members of WNB Provincial government and staff at Kimbe International School; Araho, Piening, Jackson, Kealhofer depart. Lentfer travels to Lae to collect additional samples at the Herbarium until August 1.
- July 13** Torrence and White return to Sydney; Therin travels to Port Moresby to assist Dr. Muke (UPNG) for two weeks and then join Summerhayes' project in New Ireland.

## FIELDWORK IN 1995

Although only two weeks were spent in West New Britain, our field trip achieved two major objectives: (1) to collect botanical, geological, and archaeological information required for analyses of material recovered in 1992 and 1993 and (2) to conduct on-the-ground surveys in preparation for further work on Garua Island. The 1995 fieldwork made a significant contribution to improving our knowledge about the environments people occupied during the past 6,000 years, the types of plants they used, and the nature of the volcanic hazards that they experienced. The collection of botanical reference material was carried out with the assistance of John Normu and his family at Garu village. Geological and archaeological data collected on Garua Island were supplemented by a visit to the Talasea area and to a geological outcrop in Kimbe town.

The results of our work can be conveniently summarized in terms of the following categories:

- (1) Ethnobotany;
- (2) Geological research;
- (3) Field survey and mapping;
- (4) Excavations;
- (5) Analysis of stemmed tools.

### Ethnobotany

Preliminary analyses of soils collected from archaeological sites on Garua Island in 1993 have revealed the presence of two types of microscopic plant fossil, called phytoliths and starch grains. Identification of the species represented by the fossils is essential for finding out what kinds of plants people ate or used to make baskets, tools, etc and to help reconstruct what the environment was like when the sites were occupied. These plant fossils can be identified by matching their shapes with phytoliths and starch grains extracted from modern plants. Since this type of study has not been carried out before in Papua New Guinea, we needed to make a reference collection of modern plants.

Two approaches were used to obtain modern plant material. Firstly, the Herbarium at the Forestry Research Institute in Lae gave permission to sample their extensive collection. Three weeks were spent photographing and obtaining over a thousand samples. Secondly, Lentfer, Kealhofer, and Therin collected over 200 plants from the area around Garu village. Emphasis was placed on obtaining leaf, stem, wood, and fruit samples from plants likely to have been used in the past or from weedy species which are good indicators of gardening or other forms of human forest management. Extraction and study of the phytoliths and starch grains will take place over the next year at Southern Cross University and the Australian Museum. As the only

one of its kind for Papua New Guinea, this reference collection of phytoliths and starch grains will form an invaluable resource for both future archaeological and botanical research. The type collection will be published as a monograph.

In addition to making the reference collection, the team collaborated with John Normu and his family in recording local names and uses of as many plants as possible. A day was also spent with Koi Malala of Kilu village collecting plants in forest which has not been logged. In obtaining the ethnobotanical data, emphasis was placed on food, building and craft materials, and ornamental or ceremonial plants, although attempts were also made to collect medicinal examples where possible. The plants were identified by scientific name, photographed, and voucher specimens collected. This information will be extremely important for archaeological interpretations of plant fossils recovered from ancient sites. In the shorter term, the team aims to prepare a booklet describing Bakovi uses for plants. It will be distributed within West New Britain in cooperation with the Provincial Cultural Centre in order to encourage local people to participate in the recording of their local knowledge.

### **Geological Research**

One of the aims of our research on Garua Island is to understand how people have adapted their lifestyles in response to environmental changes caused by their activities as well as external forces. To achieve this goal, we need the collaboration and assistance of scientists such as geologists, sedimentologists and geomorphologists, whose speciality is in finding out how the island was formed through volcanic activity as well as alterations due to changes in sea level and erosion. Previous work on Garua Island by Machida and Webb yielded a basic sequence of recent volcanic events, but subsequent archaeological fieldwork has revealed additional volcanic deposits whose source is unknown. Using the chemical composition of glass fragments in the volcanic ashes, Dr. Peter Jackson (La Trobe University) has been successful at matching many, but not all, of the recently discovered ashes with dated eruptions from the Witori and Dakataua volcanoes. To solve the outstanding problems, Jackson carried out additional fieldwork on Garua Island aimed at clarifying the stratigraphic position of the unknown tephras. He also collected additional samples for geochemical analysis from a section in Kimbe town where Machida had previously identified a series of tephras. Since the Kimbe section has become so important to the geochemical work, voucher samples were collected for the National Museum. Jackson will continue his analyses in Melbourne using the micro-probe on a scanning electron microscope, but will also explore the use of x-ray spectroscopy for differentiating tephras.

Jackson also made a preliminary study of geological exposures on Garua in order to understand the geological history of modern landforms on the island. As shown in Figure 1, the tentative reconstruction involves the following three volcanic centres.

1. Remnants of flows derived from a volcano located somewhere in what is now Garua Harbour form two ridges and crosscut current landforms (G). The "Baki" obsidian source outcrops within the northernmost of the two ridges.
2. Hamilton volcano (H) consists of a dome which rose up within an older caldera (HC) from which a number of flows originated.
3. Baki volcano (B) is another dome associated with a series of flows.

Further fieldwork would be needed to clarify the chronological relationships between the history of the Hamilton and Baki volcanoes and to link the various blocks of raised coral exposed in Malaiol stream with a specific volcanic dome. Geochemical analysis of samples collected by Jackson may further illuminate these issues. Although still a very preliminary and sketchy history of the island, the basic patterns recognised by Jackson are invaluable as a guide to different types of landscape and as predictors of variations in soil type. As discussed below, the scheme is very useful in targeting specific areas for archaeological excavation.

Finally, Jackson has concluded on the basis of his field observations that current exposures of the Baki obsidian source on Garua are likely to be the result of recent erosion. His view lends support to the hypothesis that after the Witori eruption of c. 5600 years ago, the Baki source may have been completely covered up for some time and therefore was not easy to exploit. The inaccessibility of the source may help explain why Baki obsidian was not widely used in the past.

### **Field survey and mapping**

Detailed topographic maps are essential for comparison and interpretation of the sequence of layers found in the widely-spaced test pits excavated in 1992 and 1993. During the 1995 fieldwork, White assisted by Muke, Pienning and Araho extended and completed the contour maps of excavated sites FSZ, FAO and FAQ. The survey team also undertook additional mapping in the local region of these sites to assist ongoing geomorphological analyses of the erosional history of Garua Island. Using the sophisticated EDM surveying equipment and walkie-talkies, they tied distant locations into a unified map of the island.

Previous archaeological research on Garua Island has been focussed on specific locations, called "sites", where concentrations of ancient stone tools and pottery had been observed during survey of the beaches and roads. These locations may not be an unbiased or fair representation of the types of places used by people in the past, because all the sites were discovered either as a result of recent erosion and redeposition or bulldozing for scoria or new roads. We suspect that a great deal of the archaeology of Garua Island still lies buried under recent volcanic tephtras. To obtain a more realistic picture of where people lived and gardened at different periods in the past, we need to explore new areas by digging small test pits to see what has been preserved by previous volcanic eruptions.

One of the aims of the 1995 visit to Garua Island was to explore the use of more rigorous methods for choosing how and where to explore for buried sites. Using air photographs and contour maps, we have divided the island into 5 segments on the basis of catchment zones, which roughly correspond to the main drainages, and basic topography (Figure 2). Zones A, B, C have been selected for further research since they each contain a major excavated site and also represent a good sample of the different geological formations (and by implication soil types) as shown in Jackson's preliminary map (Figure 1).

A ground survey was still necessary to obtain enough familiarity with the local topographic variation to be able to select the exact location of the 90 test pits (an estimate of what is possible in 2 field seasons). Following a more general reconnaissance of all the zones and using Jackson's field observations, Torrence selected 7 specific areas in Zones A and B for the proposed 1996 fieldwork. The locations were noted by painting numbers on co-conut trees. Choice of areas was made on the basis of topographic variation, distance from the coast, safety (absence of coconut trees where possible), and good preservation of deposits (i.e. relatively level land). Subsequently, the numbered trees were plotted by the mapping team who made contour maps in the surrounding region. Roughly 160 hectares were mapping using a 5 metre contour interval.

The ground survey was found to be an extremely useful way to test out the theoretical rationale of the sampling strategy and to familiarise ourselves with areas which had not been previously surveyed. We are now in an excellent position both theoretically and logistically to begin the shovel pit survey in 1996.

### Excavations

Small test excavations were made at sites FAQ and FAO. The test at FAQ (labelled Test pit 1, 1995) was carried out because radiocarbon dating obtained from a square excavated in 1993 was much younger than had been expected. Since it seemed likely that the previous excavation had been terminated prematurely, it was important to relocate the square and remove additional layers. A one meter square test pit was placed partially overlapping the previous square and excavated to a depth of 1.5 meters into an orange layer which Jackson has suggested is soil formed from the underlying bedrock. The excavation confirmed the previous stratigraphy and the absence of the W-K2 tephra at this locality.

A second small test pit (c. 0.5 m<sup>2</sup>), labelled Test Pit D, was excavated at the base of the slope leading up to the previous excavations on FAO. The object of the work was to obtain soil samples from an 'off-site' context, i.e. away from the major concentration of artifacts. We were not successful since all the soil horizons contained reasonably abundant obsidian artifacts, although pottery was absent. The presence of artifacts outside the limits of known archaeological sites emphasises the need to expand future excavations into different areas representing a wide range of landscape types.

### **Analysis of stemmed tools**

Nick Araho (staff member at the National Museum of PNG) is currently making a study of stemmed tools from the Talasea region for a Master's thesis to be submitted to the University of Sydney. He is concentrating on the description of two forms of retouched tools which have been found in archaeological deposits dating between about 6000 to 3500 years ago. The tools which he has studied were collected previously by various scholars from Malaial Stream on Garua Island, Bitokara Mission and the beach below the modern Bamba village. Our trip provided a useful opportunity for Araho to revisit the sites and gain essential first hand knowledge of the context of deposition and surrounding area.

On Garua Island Araho made supplementary collections of obsidian artifacts from Malaial Stream in order to expand his statistical study of tools and to gain a better understanding of how the tools were made. He also worked with Jackson to verify the stratigraphic position of stemmed tools on Garua Island. His fieldwork has confirmed the abundance of nearly completed bladed tools, the surprising absence of blade cores and other diagnostic manufacturing debris, and the rarity of other stemmed tool forms on Garua.

The team also visited sites at Bitokara Mission and near Bamba village where substantial collections of stemmed tools have been made previously. In 1988 Specht's team was unable to relocate the FCH site, but this time we found numerous obsidian artifacts on the beach as described previously by Kamminga. At both locations Araho was able to examine the stratigraphic setting of the tools and to make additional collections for analysis, particularly of examples showing the various stages of manufacture of the tools.

### **FUTURE PLANS**

One of the most important out-comes of the 1995 trip was the enormous interest and support that we received from West New Britain Provincial Government, the Garua Island Plantation, and local residents. With such encouragement and the excellent facilities available on the Plantation, continuation of our research on Garua Island is both feasible and very attractive. We are also very excited that funding has been obtained for a new Research Centre to be based at Walindi Plantation. The possibility of using the Centre as a base on the mainland and the potential for further collaboration with other scientists working in the region further enhances the excellent working conditions in WNB.

From an archaeological point of view, the excellent preservation of archaeological material between layers of dated volcanic ash allows us to undertake very sophisticated studies of prehistoric living conditions before and after the catastrophic volcanic eruptions of the past

6,000 years. Research on Garua Island, therefore, has excellent potential for answering questions about human adaptation and the role of trade in the past, issues which have significance beyond the local area and are relevant to the discipline of archaeology as a whole.

Torrence has made an application to the Australian Research Council for funds to undertake further environmental and archaeological fieldwork on Garua Island in 1995-6. She will also be seeking additional sources of funding during the next few months. It is hoped that finances will allow us to increase the involvement of local school children in future fieldwork.

## **COMMUNICATION OF RESULTS**

The field trip was scheduled so that Torrence could offer advice during the setting up of an exhibition about our research on Garua Island at the National Museum and Art Gallery in Port Moresby. The exhibition entitled "How Archaeologists Learn About the Past: Archaeology in West New Britain" was originally designed by Torrence with assistance from Dr. Sarah Colley and Susan Davies at the University of Sydney where it was first shown at the Macleay Museum. In Port Moresby the exhibition was curated by Pamela Swadling with considerable assistance from Anton Gideon and other members of the museum staff. Torrence and White attended the opening of the exhibition by the Minister for Education, Joseph Ongoglu, on June 22, 1995. Later White and Torrence wrote a description of the exhibition to assist school teachers visiting the museum and prepared a worksheet for students. Torrence and White also made a brief visit to the University to consult with Dr. Muke and were able to meet with students at the opening of the exhibition.

In West New Britain Torrence reported to the Administrative Secretary's Office and Torrence and White met with Joshua Kaguhouama, Assistant Secretary for Commerce. Although our trip coincided with school holidays, we discussed our work with staff at the Kimbe International Primary School. In Lae Lentfer, Kealhofer, and Therin consulted with staff at the Herbarium of the Forestry Research Institute.

After the fieldwork team members Torrence, White, Araho, Therin, Kealhofer, and Jackson reported their findings to the staff of the Prehistory section at the National Museum and Art Gallery. During two weeks spent in Port Moresby, Therin assisted Dr. Muke at the University of Papua New Guinea with undergraduate teaching and presented the findings of our work to senior students.

## **ACKNOWLEDGMENTS**

The project is sponsored by The Australian Museum and is largely funded by grants to Torrence from the Australian Research Council and the Papua New Guinea Biological Foundation. Additional funds were obtained from the Carlyle Greenwell Bequest (Araho), The Australian Museum (Kealhofer and Lentfer), and the University of Sydney (White).

As in previous years, we have benefited in numerous ways from our affiliation with the National Museum and Art Gallery. We are extremely grateful to Pamela Swadling and to the staff who assisted her in mounting the exhibition "How Archaeologists Learn about the Past." Herman Mandui of the National Museum also arranged transport and other assistance for team members. We thank Pamela Swadling and the Vagi family for accommodation. We also acknowledge the Cultural Studies Division of the National Research Institute and especially the Research Officer, Michael Laki, for his prompt handling of our research permit request and for assistance with obtaining visas.

In Lae we would like to thank Max Kuduk and the staff of the Forestry Research Institute for their general encouragement and hospitality and well as permission to sample the collections and assistance with identification of specimens.

The success of our project depends to a very large extent on the enormous moral support and assistance which we have received over the years from the Provincial government and local people in West New Britain. Once again we received transport, storage facilities, and invaluable advice from John Namuno and Clement Mare at the Provincial Cultural Centre in Kimbe.

In Garu village the team was hosted by John Normu and his family who provided excellent housing and domestic duties and cheerfully answered innumerable questions about Bakovi daily life. John, his wife Emma, daughter Stephanie, and Gabriel Loga were our major informants and guides. The high quality of the ethnobotanical data obtained during our short visit is due to their enthusiasm for and enormous knowledge of traditional plant uses. We are privileged that they have shared so much with us.

We thank Ivan O'Hanlon of the Kimbe Bay Shipping Agency for permission to work on Garua Island and for the excellent accommodation. Nick Lyons and the employees of the Garua Island Plantation provided transport by road and sea as well as much useful advice and assistance. We are especially grateful to Nick and his family for their gracious hospitality and their interest in and support of our work. Vincent and Gabrielle Taka were helpful guides in the Talasea area and in Bamba village. As always we owe much thanks to Max and Cecilie Benjamin and the staff of Walindi Plantation and Resort for providing a friendly and comfortable base and their substantial help with accommodation, radio contact, transport, and local contacts.