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## Introduction

The earth oven has been described as “the quintessentially Melanesian form of cooking” (Spriggs 1997:60). Known as the *mumu* in Papua New Guinea (PNG), *umu* in Samoa and Tonga, *motu* in the Solomon Islands and *hangi* in New Zealand, the cooking of food using heated rocks in an enclosed earth oven has been documented ethnographically throughout the island Pacific. Archaeological examples of fire-cracked stones attributed to this form of food preparation have been found in contexts dating back to the Pleistocene (Torrence et al. 1999).



Figure 1. Preparation of a *mumu* using banana leaves, PNG.



Figure 2. A selection of the archaeological (above) and ethnographic (below) stones analysed.

## The Project

Archaeological identification of cooking stones has traditionally been based on stone raw material and/or evidence of heating. The aim of this study was to augment current techniques by developing relevant microscopic residue analysis criteria, both to confirm the use of possible cooking stones and to identify the food cooked in archaeological *mumus*. Stones from a *mumu* made by students from the University of Papua New Guinea (Figure 1) were collected for analysis, along with a sample of possible cooking stones discovered during archaeological fieldwork in West New Britain, PNG.

## Residue Criteria

Criteria were based on ethnographic accounts of *mumu* construction and use in PNG (e.g. Sillitoe 1997, Sopade 1997). The form and content of *mumus* varies slightly geographically within PNG, and the table (right) summarises the residues expected for each regional type. A schematic of the Rabaul *mumu* type is shown below (after Sopade 1997). In all cases charred banana leaves, used to wrap food parcels and cover the *mumu*, are expected to be the dominant residue, along with oils and fats released from plants and animals during cooking. Diagnostic food tissue residues are expected to be rare due to a lack of direct contact with the stones. The position of a stone within the *mumu* will also affect the amounts and types of residues present.

<i>Mumu</i> type	Banana leaf residues	Plant/animal oils and fats	Completely gelatinised starch	Coconut residue	Meat/vegetal tissues	Large wood charcoal fragments
Rabaul (Tolai)	✓	✓	✓	✓	-	-
Daru	✓	✓	✓	✓	-	-
Madang	✓	✓	✓	✓	-	-
Milne Bay (Alotau)	✓	✓	✓	-	-	✓
Goroka	✓	✓	-	✓	-	-
Mt Hagen	✓ / X	✓	✓	-	✓	-

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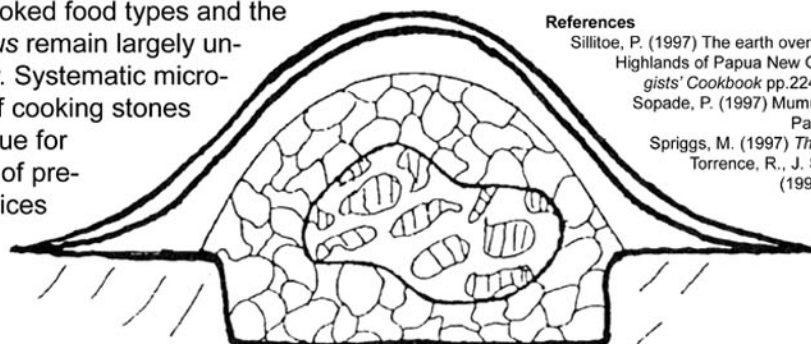
Figure 3. Replication (left), ethnographic (centre) and archaeological (right) cooking stone residues.

## Analysis

Microscopic analysis of ethnographic and control (unused) cooking stones agreed with the established criteria. Charred banana leaf and cooked starch were the most abundant residues, with solidified caramelised residues also present. No diagnostic food tissues were observed. The control stones (sourced from the same river as the ethnographic stones) did not possess any cooking residues. Preliminary analysis of the archaeological stones has revealed undiagnostic charred plant tissue on several, and further replication experiments are being undertaken in an attempt to identify other observed residues.

## Conclusion

Questions of antiquity, cooked food types and the subsistence role of *mumus* remain largely unexplored archaeologically. Systematic microscopic residue analysis of cooking stones therefore offers one avenue for addressing the character of pre-historic subsistence practices in the island Pacific.



## References

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