

## Human cultural diversity in prehistoric Fiji

### Ethan E. Cochrane

*Remote islands and their human, animal and plant populations have long fascinated archaeologists, biologists and geographers. In this article, the chronology, diversity and interactions of human cultures in some small islands of the Fiji archipelago are explored, particularly through the application of sophisticated chemical analyses of the composition of prehistoric pottery.*

The Fiji Islands (Fig. 1) were first inhabited in approximately 900 by colonists sailing eastwards from island Melanesia.<sup>1</sup> Like all the founding populations of western Remote Oceania – from Vanuatu and New Caledonia, to Fiji, Tonga and Samoa – the first Fijians were part of a related group of colonizing peoples sharing aspects of language, biology and also material culture, including the well known Lapita pottery. Many archaeologists, anthropologists and other scholars suggest that, over the past three millennia, these once-similar populations diverged from their common origins.<sup>2</sup> Our current research in Fiji investigates the generation of cultural difference over 3000 years of human occupation. Specifically, how do we explain present-day cultural diversity across Fiji and Remote Oceania? Is cultural divergence the most appropriate model?<sup>3</sup>

#### Culture history of Fiji

To measure changes in human cultural diversity we must first generate a representative and precise description of the archaeological record in a region. This has been a primary goal of our research in the western islands of the Fiji archipelago over the past few years. In the Yasawa Islands, the focus of our current research (Fig. 2), chronological variation in the material-culture record shares broad similarities with the rest of Fiji.

The Yasawa Islands were first inhabited

in approximately 700 and have been home to human populations since then to the present. The initial colonization and sustained occupation of the Yasawas probably occurred several hundred years after the initial habitation of sites in other parts of Fiji, particularly in the east of the archipelago. The earliest identified occupations of the Yasawa Islands, at sites such as Olo (Fig. 3) and Qaranicagi, is indicated by pottery with vessel forms and decorative attributes similar to the so-called “terminal Lapita”<sup>4</sup> pottery found at other sites in Fiji and Remote Oceania. The earliest inhabitants of the Yasawas lived in small communities on the coasts, but probably also spent time in the uplands, where occupation sites have been found in caves and on ridges. Unfortunately, the limited research on early settlement patterns and mobility means that we can only speculate about this aspect of life in the islands.

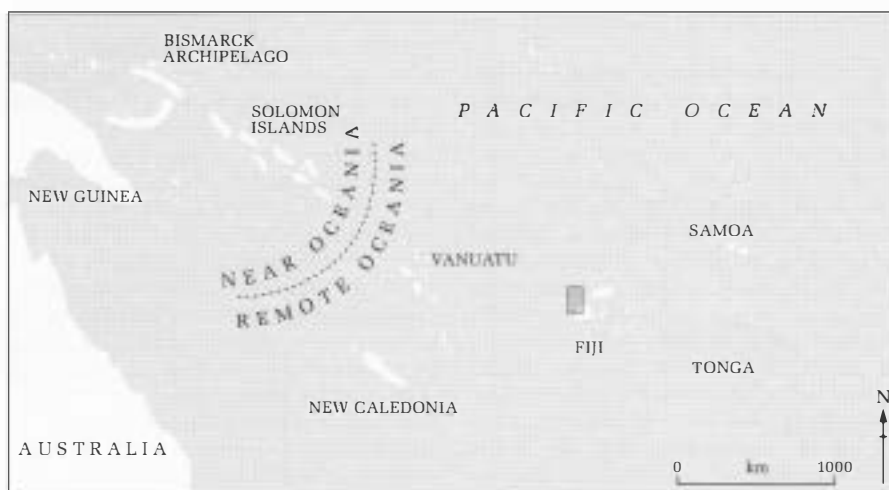
The earliest inhabitants also left a record of both artefacts and food remains, indicating a heavy reliance on marine resources, but the earliest inhabitants of the Yasawas consumed chickens in addition to plant resources that were probably grown in gardens. Modified shells found at Olo may have been used as root peelers, and hammer stones may have been used to extract the kernels from nuts. Evidence of a reliance on marine resources occurs throughout the Yasawa Islands sequence, with fishbone and marine shell occurring in deposits of all ages. Other animal resources

appear at different times during the cultural sequence, for example, pig, turtle, fruit bat and a variety of lizards are present in the Olo and Qaranicagi deposits.

Over time, subsistence and settlement systems in the Yasawa Islands changed, although perhaps not as greatly as on the larger islands of Fiji.<sup>5</sup> Although agriculture was certainly practised in the Yasawas, there is little direct archaeological evidence of this, unlike other areas of Fiji<sup>6</sup> and Remote Oceania. By AD 500, increasing numbers of inland (possibly defensive) settlements occur on the larger Fijian islands. This settlement change appears to occur later in the Yasawa Islands, with mountain-top settlements protected by annular ditch and bank defences (Figs 4, 5) appearing from about AD 1400.

Pottery is the most abundant category of artefact recovered in the Yasawa Islands and it displays a range of decorative and formal variation that is used to divide Fiji-an prehistory into phases or periods of relative cultural homogeneity. Like all archaeological phases, those used in Fiji chop a record of continuous temporal and spatial variation into convenient packages.<sup>7</sup> Yasawa Islands pottery, as with pottery throughout Fiji, is classified into the following phases:

- Sigatoka phase (900–500) pottery assemblages comprise sherds that are often intricately decorated and known by the archaeological term Lapita.
- These assemblages contain a diverse array of vessel shapes, including carinated bowls, pot stands, water jugs, and various types of cooking pots.



**Figure 1** The southwest Pacific, showing major island groups and the boundary between Near and Remote Oceania. The box on Fiji shows the area covered by Figure 2.



**Figure 2** Western Fiji, showing the Yasawa and Mamanuca Island groups, and some principal archaeological sites in the Yasawa Islands.



**Figure 3** Southern Waya island. The Qaranicagi site is beneath the cliffs at right. View to southwest.



**Figure 4** Plan of the hillfort settlement of Druidrui on Nacula Island.

- Navatu phase (500 to AD 1000) pottery assemblages begin with the loss of Lapita pottery and contain Polynesian Plainware that initially has very little decoration. Later Navatu assemblages contain increasing numbers of pots decorated by grooves and ridges impressed into the vessel surface. These are formed by beating the wet clay vessel with a carved wooden paddle prior to final firing. In general, Navatu phase deposits contain fewer vessel shapes than earlier assemblages do, although at least one new cooking-vessel type emerged during this phase. Interestingly, several archaeologists<sup>8,9</sup> argue that, during the Navatu phase, some novel pottery variants are an indication of new populations arriving in Fiji from the west.
- Vuda phase (AD 1000–1800) assemblages contain fewer carved-paddle impressed pot-sherds than Navatu phase assemblages and are characterized by sherds with incised, punctate and appliqué decorations.
- Râ phase (AD 1800–1900) pottery assemblages are characterized by increasingly complex incised and appliqué patterns. There is little evidence for large-scale craft specialization associated with pottery manufacture in Fiji. Most pottery appears to have been made by households that were not integrated into larger specialized production systems, but no systematic research has investigated the possibility of specialized ceramic production.

Archaeologists have long argued that similarities in pottery decoration and vessel shape across a region may reflect interaction between producers of the pottery.<sup>10</sup> Assemblages of pottery to be found in the Yasawa Islands are similar to those found throughout Fiji, as described by the phases above, and it therefore appears that people in the Yasawas were interacting with populations throughout Fiji, sharing information about pottery at similar intensities throughout prehistory. However, the similarities in decorative features and vessel shape between pottery in the Yasawas and the rest of Fiji may not precisely measure interaction between different groups. Other potential measures of interaction, such as language,<sup>11,12</sup> show great differences across the archipelago and suggest that Fijian populations may have interacted less frequently than implied by these pottery data. The resolution of these apparent contradictions is one of the principal objectives of my research in the Fijian islands.

**Fijian cultural diversity: new questions and methods**

Our current research in Fiji is based on a framework of evolutionary and ecological theory, within which human diversity is explained as the result of a variety of



**Figure 5** A view of central Nacula island, looking northeast. The site of Druidrui is located on top of the rocky hilltop in the middle ground.

processes, including the interaction and transmission of ideas between individuals, variation and change in environmental and ecological factors, adaptation, and convergence.<sup>13</sup> If contemporary cultural diversity in Fiji is at least partly a product of variation in the spatial scale and frequency of human interaction in prehistory, what aspects of pottery variation might help us track any such changes in interaction? Provenance analyses of artefacts are one method for tracking interaction in prehistoric populations. Artefact provenance typically refers to the geographical location where an artefact was made. By comparing artefact provenance with the location of the artefact's final deposition in the archaeological record, we can estimate the geographical range of populations over time may indicate changes in the spatial extent of interaction. Cochrane & Neff<sup>14</sup> recently conducted geochemical provenance analyses of archaeological pottery from sites in the Yasawa Islands to compare the likely location of pottery manufacture with the location of its ultimate deposition.

We generated geochemical provenance data for 260 sherds from sites throughout the Yasawa Islands using an analytical technique known, rather dauntingly, as laser-ablation inductively coupled plasma mass-spectrometry (LA-ICP-MS, for short).<sup>15</sup> The chemical data were subsequently analyzed using multivariate statistical techniques to define groups of pot-sherds with similar compositions and thus probably

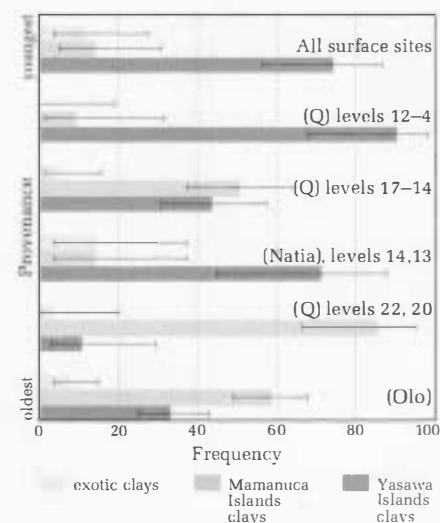
from pots made from the same, or similar, clay sources. By studying the geology of the Yasawa Islands, we were able to link sherd compositional groups to general geographical areas having particular types of clay resources. Finally, after examining the varying proportions of sherd compositional groups present in Yasawa Islands assemblages over time, we were able to track the changing geographical scale of geological clay resources used by the island inhabitants.

The results of the LA-ICP-MS analyses indicate the shifts in clay resources used by Yasawa Islands populations and, therefore, the likely changes in the interaction between different groups (with interaction measured by the use of clay resources from different localities). For the first several hundred years of occupation in the Yasawas, people used vessels manufactured from clay deposits distributed throughout the Yasawa Islands and probably also the Mamanuca Islands to the south. This suggests that the earliest groups in the Yasawa Islands interacted within a broader inclusive population framework that was spread across the Yasawa and Mamanuca Islands, although the proportions of different clay types in these early pottery assemblages indicate that people usually used vessels manufactured from clay sources nearest them (Fig. 6). For the earliest populations, the frequency of interaction across space appears to decrease with increasing distance.

Some 1000 years later, at about AD 500, the pottery assemblage in levels 17–14 of the southern Yasawas site of Qaranicagi, on Waya Island, contains approximately

equal proportions of sherds made from clays derived from the two principal geological sources (Fig. 6). This suggests that, by AD 500, the inhabitants of Waya Island made equal use of pottery produced from clay deposits across the Yasawa Islands and Mamanuca Islands and were, therefore, part of an interaction system that stretched across the Yasawa–Mamanuca island arc.

This widespread interaction ends at about AD 1000, as indicated by pottery



**Figure 6** Grouped bar chart showing proportions (with 95% confidence intervals) of sherd compositional groups in Yasawa Islands pottery assemblages. Assemblages are shown in chronological order, with the oldest at the foot and the youngest at the top of the chart. Q = Qaranicagi site.

assemblages in levels 12–4 of the Qaranicagi site (Fig. 6). For the remainder of the prehistoric sequence, clays from Yasawa Islands sources account for approximately 80 per cent or more of all the ceramic assemblages. Thus, for the past 1000 years, the interaction system of the Yasawa–Mamanuca Islands has not existed to anything like the same degree as before.

Our provenance analyses paint a fairly complicated picture of prehistoric interaction in the islands of western Fiji. The data document a previously unrecognized expansion and subsequent contraction in the spatial extent of interaction within the Yasawa and Mamanuca Islands, as indicated by clay raw-material use. Explanations for these changes are as yet uncertain. Possibly the contraction in the spatial scale of interaction after approximately AD 1000 may be related to environmental changes around this time that might have affected the resource base of the islands.<sup>16</sup> Hunt's analysis of linguistic data for the Yasawa Islands also suggests deepening community isolation, with an increase in linguistic diversity at some point in the prehistoric sequence that may be related to the changes in interaction presented here.<sup>12</sup> Research during the summer of 2006, which involved students from the Institute of Archaeology, concentrated on the identification and excavation of sites in the previously unexplored Mamanuca Islands. Pottery assemblages from these sites will be incorporated into the continuing provenance analyses, the results from which should help to refine our initial conclusions. Our fieldwork in the Mamanucas will generate data on palaeoenvironmental and natural-resource change, as well as possible correlated shifts in human subsistence practices and intergroup competition, as evidenced by the chronology of defensive settlements. Through this work we hope to clarify the processes generating human cultural diversity in the region.

Notes

1. Island Melanesia encompasses the islands west of Fiji (i.e. New Caledonia, Vanuatu, the Solomons, the Bismarcks and the Admiralties), excluding New Guinea.
2. *Hawaiki, ancestral Polynesia: an essay in historical anthropology*, P. V. Kirch & R. C. Green (Cambridge: Cambridge University Press, 2001).
3. A model of cultural divergence, or a phylogenetic model, assumes that human cultural diversity arises through a process of "cultural branching". Cultural daughter-populations branch off from ancestral populations in much the same way that biological evolution of species is thought to occur. Cultural daughter-populations retain some of the similarities of their ancestral "parents", but also acquire new traits through innovation, by inhabiting new environments, and also by chance (or random change).
4. Lapita pottery marks the first human presence in Remote Oceania and is found in

Vanuatu c. 1100, New Caledonia c. 1000, and Fiji, Tonga and Samoa, c. 900. The earliest Lapita pottery in these islands is decorated with intricate stamped patterns and comprised complexly shaped vessels. However, after a few hundred years Lapita decoration and vessel shapes become simpler and are known by the term "terminal Lapita".

5. Current isotopic research by Cochrane and his colleagues on the diet of prehistoric Fijians indicates that, although Yasawa Islands populations relied on marine resources throughout prehistory, populations on the main island of Viti Levu incorporated, over time, increasingly more agricultural items into their diet.
6. J. Field, "Environmental and climatic considerations: a hypothesis for conflict and the emergence of social complexity in Fijian prehistory", *Journal of Anthropological Archaeology* **23**, 79–99, 2004.
7. T. L. Hunt, "Conceptual and substantive issues in Fijian prehistory", in *Island societies: archaeological approaches to evolution and transformation*, P. V. Kirch (ed.), 20–32 (Cambridge: Cambridge University Press, 1986).
8. *Lapita: a view from the east*, S. Best (Auckland: New Zealand Archaeological Association, 2002).
9. D. V. Burley, "Mid-sequence archaeology at the Sigatoka sand dunes with interpretive implications for Fijian and oceanic culture history", *Asian Perspectives* **44**, 320–48, 2005.
10. F. Plog, "Measurement of prehistoric interaction between communities", in *The Mesoamerican village*, K. V. Flannery (ed.), 255–72 (New York: Academic Press, 1976).
11. *The history of the Fijian languages*, P. A. Geraghty (Honolulu: University of Hawaii Press, 1983).
12. T. L. Hunt, "Patterns of human interaction and evolutionary divergence in the Fiji Islands", *Journal of the Polynesian Society* **96**, 299–334, 1987.
13. E. E. Cochrane, "Explaining the prehistory of ceramic technology on Waya Island, Fiji", *Archaeology in Oceania* **37**, 37–50, 2002.
14. E. E. Cochrane & H. Neff, "Investigating compositional diversity among Fijian ceramics with laser-ablation inductively coupled plasma mass spectrometry (LA-ICP-MS): implications for interaction studies on geologically similar islands", *Journal of Archaeological Science* **33**, 378–90, 2006.
15. LA-ICP-MS instruments are capable of making very precise measurements (in the parts per billion range) of elemental proportions in a sample, which could be anything from sea water to tooth enamel to archaeological ceramics. A laser system is used to vaporize spot samples of archaeological pot-sherds to introduce the clay portion into the ICP-MS. The ICP-MS atomizes the introduced sample with a plasma torch. Individual atoms are separated by mass or charge and sent to the detector (the mass spectrometer) so that relative abundances of each element in the sample are measured. See, R. J. Speakman & H. Neff, "The application of laser ablation ICP-MS to the study of archaeological materials – an introduction", in *Laser ablation*

*ICP-MS in archaeological research*, R. J. Speakman & H. Neff (eds), 1–14 (Albuquerque: University of New Mexico Press, 2005).

16. P. D. Nunn, "Illuminating sea-level fall around AD 1220–1510 (730–440 cal yr BP) in the Pacific Islands: implications for environmental change and cultural transformation", *New Zealand Geographer* **56**, 46–54, 2000.