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# Agency amongst the entrepôts: Negotiating exchange associations between Motu *hiri* and Mailu seafaring exchange networks at Hood Bay on Papua New Guinea's south coast

Robert Skelly<sup>a</sup> , Chris Urwin<sup>a,b</sup> , Fiona Petchey<sup>c,d</sup> , Matthew Leavesley<sup>d,e</sup> , and Teppy Beni<sup>f</sup> 

<sup>a</sup>Monash Indigenous Studies Centre, Monash University, Clayton, VIC, Australia; <sup>b</sup>ARC Centre of Excellence for Australian Biodiversity and Heritage, Monash University, Clayton, VIC, Australia; <sup>c</sup>Radiocarbon Dating Laboratory, University of Waikato, Hamilton, New Zealand; <sup>d</sup>ARC Centre of Excellence for Australian Biodiversity and Heritage, James Cook University, Cairns, QLD, Australia; <sup>e</sup>Strand of Anthropology, Sociology and Archaeology, School of Humanities and Social Sciences, University of Papua New Guinea, Port Moresby, Papua New Guinea; <sup>f</sup>School of Humanities and Communication, University of Southern Queensland, Toowoomba, QLD, Australia

## ABSTRACT

The exchange of specialized items and the social connections those exchanges engender play a fundamental role in the trajectories of societal relations. Processual archaeologists developed a core-periphery model to understand how these exchange relations work. The model evoked complex societal “cores” and “peripheries” at societal edges where exchanges with other cultures take place. The rigidity of core-periphery modeling led to the emergence of more nuanced network analyses to explain the qualitative as well as quantitative dimensions of cultural exchange. Yet contemporary models still focus on the agency of societal cores as central places. The agency and experiences of communities negotiating connections between exchange networks have gained little attention. In this study, we address this knowledge gap by exploring how the people of Hood Bay on Papua New Guinea's south coast negotiated their position between the famed Motu *hiri* and Mailu seafaring exchange networks. Drawing on archaeological, ethnographic, and historical data, we examine how Hood Bay communities maintained and altered dynamic regional exchange associations through time. By highlighting the agency of communities living between exchange networks, this study contributes to understandings of the complex negotiation and organizing of exchange relations between cultures.

## ARTICLE HISTORY

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**CONTACT** Robert Skelly  [robert.skelly@monash.edu](mailto:robert.skelly@monash.edu)  Monash Indigenous Studies Centre, Monash University, Clayton, VIC, Australia

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## Introduction

Exchange associations and networks play a fundamental role in the trajectories of societal relations. Following Wallerstein's (2011) "world-system theory" first presented in 1974, processual archaeologists adopted a structured approach to exchange (e.g., of objects, language, and culture) that shifted attention from diffusion to interaction (McGuire 1989, 41). Exchange relations were often framed as associations between "cores" and "peripheries" (e.g., Friedman and Rowlands 1977; Rowlands, Larsen, and Kristiansen 1987; for a review see Harding 2013). "Cores" refer to the economically and culturally dominant centers of specialized production and exchange. "Peripheries" are regions at the edges of cultural domains where exchanges take place. The implicit premise of core-periphery frameworks is that culture is created at complex societal cores and taken from there to peripheral places. The implication is that there is a hierarchical relationship between a societal core, and its lesser peripheries (Feuer 2016, 28). The limitations of core-periphery analysis were soon recognized (e.g., Dietler 1989; Stoddart 1989; Szykiewicz 1989) and addressed with network analyses (e.g., Golitko and Feinman 2015, 212–3; Terrell 2010). Network analysis offered a more socially nuanced but still quantitatively structured approach to interpretations of culture-to-culture contact. In a network analysis, the places where cultures meet are "points" which are connected to each other by "lines" of connection. Points with more numerous connections are considered to be more culturally influential (Scott 2012, 1, 13). Golitko and Feinman (2015, 216) propose that the merits of network analysis lie in there being no need for a core-periphery framework when characterizing the "strengths of interconnection" in cross-cultural relations. However, network analysis does not totally avoid the potentially problematic assumptions of world-system theory. The problem is that the nuances of social decision-making at places where "peripheries" meet, "points" connect, or relations are mediated can be subsumed under the "grand narrative" of network analysis (Collar et al. 2015, 13).

World-system and network analyses risk overlooking or minimizing the role of places between peripheries where multilayered and multilateral relations between cultures are mediated. One such place is Hood Bay on the south coast of Papua New Guinea (PNG). In this paper we report the results of archaeological excavations at an ancestral village site in Hood Bay located between two prodigious seafaring cultures. For centuries, Motu *hiri* and Mailu seafarers maintained long-distance trade and exchange relations that connected much of the PNG south coast from the Gulf of Papua in the west to the Massim islands in the east. Motu *hiri* and Mailu seafaring ventures did not directly connect although specialized exchange items moved from one network to the other. The place of articulation and exchange that facilitated the movement of items between ventures is Hood Bay. Hood Bay did not take part directly in Motu *hiri* or Mailu ventures but was implicated in both. Villages in this region were the entrepôts who negotiated the movements of cultural items from one seafaring network to the other. The agency of such communities living between cultures has gained little attention compared to that of prodigious "central places" and their distant "peripheries."

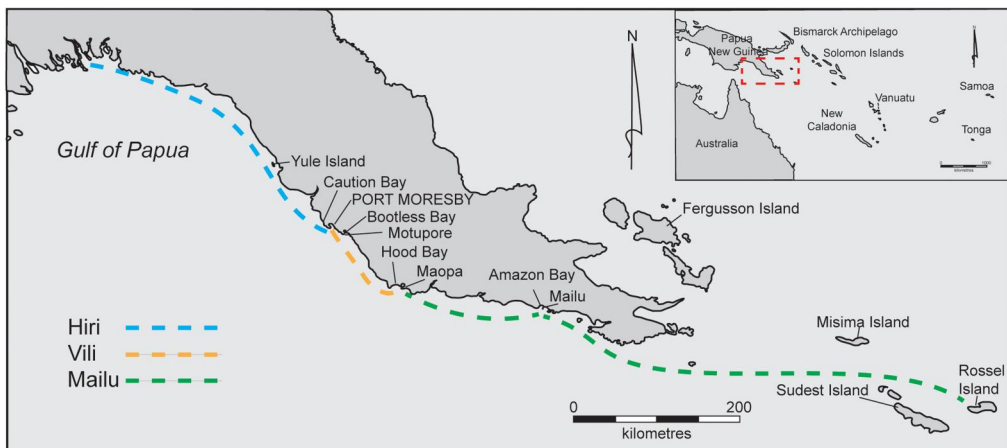
New Guinea's elaborate exchange networks (and the broader geographic region of Melanesia) have played an outsize role in the epistemology of ethnoarchaeology and anthropology. Early twentieth-century ethnographies of the Kula ring informed global

studies of specialized production, debt, and gift exchange (Malinowski 2002; Mauss 1990; Oka and Kusimba 2008, 343). These studies highlighted how exchange associations were structured in ways that transcended the boundaries of individual communities and involved complex systems of reciprocity and obligation. These ethnographies and later archaeological examinations of exchange in New Guinea were mostly written about specific “central places” and over-emphasized the experiences and agency of these people (e.g., see Irwin (1985) for Mailu as a central place; Allen 2017; see Gosden (1989) and Urwin et al. (2023) for critique). There has been comparatively little research that engages with the agency and experiences of communities living between exchange networks. This knowledge gap skews our understanding of how exchange networks functioned and developed over time, at a local and regional scale. It limits our ability to appreciate the complexity of exchange associations and understand their operation. Our study addresses this gap through an archaeological study of exchange activities and associations in Hood Bay. Using archaeological and ethnographic data, we examine how Hood Bay communities maintained and altered exchange relations with the Motu and Mailu trading communities through time.

Here we report the results of archaeological excavations at the ancestral village of Veirarupu in Hood Bay. We ask what role Veirarupu and neighboring villages in Hood Bay played in the development of exchange relations, as their influences expanded, contracted, intensified, and declined through time. We show that the communities living in Hood Bay exercised significant agency in shaping exchange associations and exchange relations.

### ***Specialized production and exchange on Papua New Guinea’s south coast***

In the nineteenth century, cultural exchanges took place on Papua New Guinea’s south coast through seafaring ventures that spanned a 700 km coastal and island seascape from the Gulf of Papua in the west to Rossel Island in the east (Figure 1). The most prominent seafaring ventures were those of the Motu and Mailu. Motu seafarers, who lived in 10 villages near present-day Port Moresby, orchestrated *hiri* voyages. These



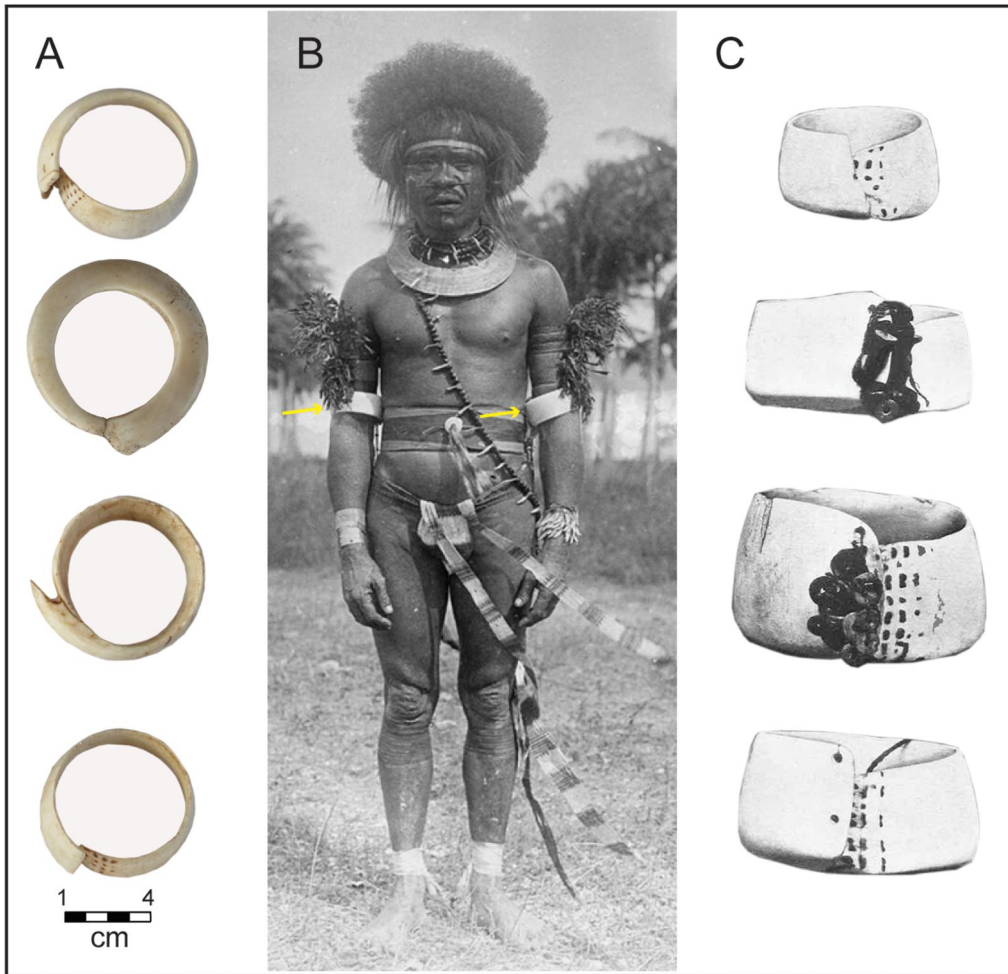
**Figure 1.** Spatial extents of *Hiri*, Motu-Hood Bay–*Vili* and Mailu seafaring.



**Figure 2.** “Trial trip of native trading vessels, Port Moresby,” photograph by J.W. Lindt 1885. Compliments of State Library, Victoria.

voyages involved fleets of *lakatoi* (trading vessels) sailing up to 400 km annually to the northwest (Figure 2). European observers paid considerable attention to these elaborate ventures, and they are detailed in several ethnographies from the turn of the twentieth century (e.g., Barton 1910; Chalmers 1887; Fort 1887). Although *hiri* voyages only sailed to the west, sago obtained during voyages reached the villages of Hula and Keapara in Hood Bay as part of *vili* arrangements which reciprocated the provision of fish to Motu villages when large sections of the male population were away on *hiri* voyages (Chalmers and Gill 1885, 30). *Vili* exchange involved Hood Bay villagers voyaging west to Motu villages and did not involve voyaging further to the east. Seascapes east of Hood Bay were the domain of seafarers from the island of Mailu (Toulon) in Amazon Bay, located 175 km east of Hood Bay. Mailu seafarers engaged in a cycle of annual voyages, sailing ca. 560 km east to Rossel Island and 150 km northwest as far as the village of Maopa, 25 km short of Hood Bay (Saville 1926). There was no direct connection between Motu and Mailu seafaring ventures during the ethnographic period. However, specialized exchange items such as carved shell rings (armshells) and ceremonial blades passed through Hood Bay and were exchanged over the full range of the two networks (Malinowski 2001, 249; Saville 1926) (Figure 3).

The communities inhabiting Papua New Guinea’s south coast were also engaged in specialized local exchange networks. Turner (1878, 489) noted that “among the Motu each village excels in some special industry.” These industries facilitated inter-village communication and the cooperation essential to *hiri* preparations. The specialized exchange associations maintained by Motu and Mailu people transcended generations. In both cases the relations were more important than the items changing hands (Urwin et al. 2023). *Hiri* voyagers maintained *hetura* (friendships) with trading partners in the Gulf of Papua and referred to them as *varavara* (kin-relatives) (Gwilliam 1982, 36; for a Gulf perspective see Kiki 1968). Mailu seafarers referred to their Maopa Village trading partners as *emegi goina* (friends, or relations) (Saville 1926, 162). To this day Mailu people have continued to maintain spiritual and kinship ties with Maopa Village (Pala Rigo and Ravu Valikila, personal communication 2023).



**Figure 3.** Armshells made from conus shells. (A): armshells kept as heirlooms in the Gulf of Papua (end views). (B): Chinnery, Sarah Johnston. 1922, *Decorated Papuan man, Port Moresby, Papua, 1922*, viewed June 22, 2023, <http://nla.gov.au/nla.obj-144347962> (armshells indicated by yellow arrows). (C): “Several varieties, [from the Massim islands] differing in size and finish” (side views) after Malinowski (2002, plate XVI).

Specialized production and exchange played a key role in maintaining local cross-cultural associations. The coastal Motu had fractious associations with Koiari people living in the foothills and were very wary of their potent sorcery (Lawes 1879, 373). The Koiari lacked a specialized exchange commodity that would allow them to maintain contact with Motu villagers. To solve this issue, Koiari villagers traveled to the coast to collect shells, which they burned to produce slaked lime back in their villages. The Motu needed lime as a condiment for chewing betelnut and relied on the Koiari bringing lime back to the coast in exchange for fish. European observers were bemused by the apparent lack of commercial acumen in the Koiari–Motu relationship, as they assumed exchange was motivated by profit and resource scarcity (Turner 1878, 493). Although the Motu could have made lime themselves, breaking with ancestral protocol

would have jeopardized the scheduled contact with the Koiari and would have created a social distance between the two groups potentially destabilizing their relationship. The same situation existed between coastal seafaring villages. Without access to a specialized exchange commodity villages were at risk of social isolation.

Armshells carved from *Conus* shells were a specialized commodity carried by Mailu seafarers to Maopa where they were exchanged for pigs. Armshells were exchanged from Hood Bay to Motu villages where they became an important prestige component of the *hiri* cargoes (Lawes 1879; Saville 1926). Armshells were not merely items of trade, they were given as gifts by *hiri* expedition leaders to village leaders in the Gulf of Papua to reaffirm *hiri* exchange relations (Allen 1977, 405; Oram 1982, 13). Mediating connections between prodigious Motu and Mailu seafaring domains required social dexterity. The oral traditions summarized below show that Veirarupu was an important ancestral village in the social histories of Hood Bay. The archaeological story that follows shows the people of Veirarupu participated in a wider cooperative approach to maintain social order by engaging with the Motu and Mailu seafaring domains simultaneously. These Motu–Hood Bay–Mailu associations are archaeologically apparent in the specialized exchange of pots, and/or ideas about how pots should be formed and decorated.

### **Archaeological research at Hood Bay**

Archaeological research on PNG's south coast has drawn inspiration from the ethnographic descriptions of Motu and Mailu seafaring and their origins (e.g., Allen 1977; Bulmer 1982; Frankel and Rhoads 1994; Irwin 1985, 2010). Specifically, research has concentrated on the “cores” or “central places” (Irwin 1985) on and near Mailu Island and in the Port Moresby region, and on “recipient” villages in the Gulf of Papua (Allen 1977; see discussion in David 2008; Skelly and David 2017, 74–5; Urwin 2022, 26–46). Little is known of how long-distance relations were negotiated at the places in-between, where the exchange networks in some places articulated. As the nexus between Motu and Mailu ventures, Hood Bay briefly caught the attention of archaeologists in the 1960s. Anthropologist Nigel Oram recorded oral traditions and documented ancestral village sites with informants from the local villages of Hula and Makerupu. Archaeologist Ron Lampert (1966) inspected the same sites and excavated several test pits near Hood Point. The Rakaouna site (PNG National Museum and Art Gallery [NMAG] site code: AFT) contained pottery sherds and shell to a depth of 2.25 m, which Lampert believed was due to rapid sediment accumulation rather than lengthy occupation. Lampert (1966) found no “obvious differences” between the pottery assemblages from different sites, and no evidence for chronological change in the 2.25 m deep Rakaouna deposit. Despite the limited scope of his reconnaissance, Lampert (1966, 2) concluded that there was no evidence for a long cultural sequence for Hood Bay, but that a “detailed study of a large sample might prove otherwise.”

In 1971, Gabriel Johnston spent one day in Hood Bay with Nigel Oram and Susan Bulmer inspecting the “old village sites” previously described by Oram. Johnston later returned for a week to inspect those sites further, and record additional sites known to locals. Johnston found most of the sites on Oram's list and registered 19 sites with NMAG. Johnston also excavated test pits at three sites (AFT, AHB, AGA) to determine

whether the archaeological record corresponded with ancestral village sequences recalled in local oral traditions. Her research aimed to provide a cultural sequence for Hood Bay and reconcile any chronological inconsistencies in the oral traditions documented by Oram. Based on collaborative discussions with Jim Allen, Susan Bulmer, and Ron Vanderwal about their research, she placed the ancestral village sites in chronological order. Site ordering was based on comparisons with excavated pottery sherd assemblages from the Port Moresby region sites of Nebira 2, Nebira 4, and the major pottery manufacturing center of Motupore Island, each of which had limited radiocarbon chronologies (Allen 1972, 1977, 2017; Bulmer 1971, 1975, 1978). Johnston found that some of the Hood Bay pottery sherds were comparable to those from Horizon 1 at Nebira 4, dating to AD 820–1300 (Allen 1972), and “Massim” type sherds from Nebira 2 (Bulmer cited in Johnston 1971, 25). On the basis of these similarities, Johnston (1971) proposed a temporal sequence for Hood Bay commencing with “Pre-Hula” occupation (prior to the middle of the nineteenth century), followed by “Post-Hula” occupation in the late nineteenth century and “Post-European” occupation in the early colonial era. Johnston concluded that the Hood Bay ceramic sequence may be a new regional variation or “the amalgamation of several regional variations” as it did not fit neatly with then emerging sequences elsewhere on the PNG south coast (e.g., those later presented by Allen 1972; Bulmer 1971, 1978; Vanderwal 1973).

According to oral traditions related to Johnston (1971, 23) by Pastor Sam Ila Ape of Hula village in 1971, the oldest ancestral villages in Hood Bay are Veirarupu and Seveli. Johnston described Veirarupu as a “vast scatter” of poorly preserved surface material located close to Seveli (NMAG site record card; site code AHA). She considered Seveli to be the older village, based on her comparison of the decorative attributes with those known from the Port Moresby sequences. She also identified some shared decorative attributes at Seveli and Veirarupu, which she took to mean there was an overlap in their occupation. In this paper we present the results of excavations in 2022 at Veirarupu. We resolve the site’s chronology and present a detailed analysis of the pottery sherd assemblage (for vessel form and decoration). The results provide new insights into the cooperative alliances involved in the settlement of Veirarupu and show how the people of Hood Bay managed their relations with Motu and Mailu seafarers.

### ***Veirarupu in Hood Bay oral traditions***

Veirarupu is commemorated in the oral traditions of the present-day villages of Babaka, Kamali, Hula, and Makerupu, but these accounts vary (Oram cited in Johnston 1971). Makerupu villagers describe how their ancestors once lived with Ririga people at Ririga Village near Hood Point. Ririga was abandoned following social disruptions and the two groups went separate ways. The Ririga people then established Veirarupu, while the Makerupu people relocated to a village called Valu. Babaka villagers recall their ancestors arriving from the northeast and founding Ririga with several groups, but not the Makerupu. They later abandoned Ririga and moved further inland to establish Veirarupu. Based on oral traditions from Hula and Kamali and genealogies attributed a 20–30 year generation-spacing, NMAG cultural heritage specialist Guise (1985, 46, 48) provides a different history for settlement at Veirarupu. The sequence commences with



Seveli being established by the Babakarupu and Paugolo clans who came to the coast from east of the Kemp Welch River around AD 1620. They built a large ceremonial house (*koge*) at Seveli called Babakarupu. Around a decade later, the Kwaiporupu people were driven from their settlement near Kerepunu (Keapara) on the eastern edge of Hood Bay. They first moved west to Hood Point and, unable to find a suitable location on the coast, built the inland village of Veirarupu next to Seveli around AD 1610 (Guise 1985, 43, 46).

Oral traditions are in agreement that Veirarupu and Seveli were important villages belonging to the early part of village sequencing in Hood Bay. Guise (1985, personal communication 2022) documented oral traditions about the relationship between the two villages. According to the stories, women from Veirarupu would daily pass by Seveli on their way to collect coastal shellfish. The women wore grass petticoats tied on their right sides that left a gap exposing their thighs as they walked. They would notice Seveli men idling on platforms to the right of the track. When they returned from the beach, they noticed that the men had moved their platforms to the opposite side of the track. After a few days reflecting on the men's behavior, they realized that the men had repositioned their platforms to catch a glimpse of the women's tattooed thighs. Realizing the men's voyeuristic intent, the women were furious, and complained to their husbands at Veirarupu. In response, their husbands then invited Seveli villagers to a feast at Veirarupu. During the feast, when the Seveli villagers were at ease, the Veirarupu men massacred the entire population. They lined the heads of their victims along the path between Seveli and Veirarupu. That night, when all was quiet, the head of the Seveli chief spoke the word "*tope*" and each head repeated the refrain which means that their spirits accepted their fate and departed (Guise, personal communication 2022). Their departure confirmed rights in land at Veirarupu to descendants who today live in Babaka Village.

### ***The Veirarupu excavation***

The land where Veirarupu and Seveli are located is gardened and tended by Babaka villagers. We began the 2022 investigation with introductory meetings with community leaders at Babaka village, almost exactly 50 years after Johnston's surveys. RS and AG met with Ward Councilor Jack Vali and his brother, senior community representative Ia Numu. Expressing our interest in investigating ancestral villages in Hood Bay, we discussed local oral traditions and present-day archaeological methods. We then left to allow time for community leaders to discuss the merits of the project. We returned three days later and were informed that the community were interested in participating in the research. Jack, Ia, and landowner Eric Iruna then guided us to Seveli (Teveli, in modern orthography). Teveli was extensively disturbed by a road constructed through the site before Johnston's (1971) surveys. The road has since been graded many times, and today forms a 1 m-deep cutting through the site. Although no subsurface cultural materials were apparent in the cutting profile, horticultural gardens either side of the road contain scatters of pottery sherds and marine shell across a wide area. Teveli is located on fertile horticultural land and the entire area has been mechanically plowed to ca. 70 cm depth. Citing their appreciation of the taphonomic problems presented by this extensive disturbance at Teveli, Ia,



**Figure 4.** Veirarupu 2022, Ia Numu (of Babaka Village) reading the NMAG site record card for Veirarupu completed by Gabrielle Johnston on November 14, 1971, Eugene Piti (of Babaka Village) left, and R Skelly right (Monash University).

Jack, and Eric guided us instead to Veirarupu, which is located some 70 m east of the road through Teveli and has not been mechanically plowed. We accessed the site *via* a track which ascended into thick vegetation and continued 60 m past the boundary of the site, to a location within Veirarupu which Ia identified as the ideal place for the excavation. Thus, the site that we excavated, and the location of the excavation, was decided by senior Babaka community representatives (Figure 4).

Veirarupu is on a northeast–southwest oriented eolian dune formed on beach plains at the western margin of Hood Bay (Figures 5 and 6). The geomorphology of dune formation has not been investigated in detail, but it is apparent that the sediment load carried to the coast by the Kemp Welch River has been transported west by ocean currents to form the beach plains delimiting the western margin of the bay (Löffler 1977, 116). Dune formation has been hastened by the strong easterly trade winds that have also shaped the eolian dunes located inland. The beach plains and dunes support open grasslands, horticultural gardens, and occasional clusters of coconut palms. The 2 m high dune where Veirarupu is located is flanked by thickly vegetated ferny slopes. Swales between the dune sequence are poorly drained and support mixed herbaceous vegetation, mid-height coastal forest, and isolated stands of sago palm (*Metroxylon sagu*). The track following the dune where excavations were located provides village access to gardens and wetland resources, including sago palms 20 m down-slope northeast from the site. The Veirarupu archaeological site is a low-density surface scatter of pottery sherds and pieces of marine shell on the 12 m wide domed dune (Grid Reference: 0580529/8889008 [AGD66]).

### **Stratigraphy**

A 1 × 1 m excavation (Square A) was positioned on top of the dune next to a well-worn garden track (Figure 7). The excavation proceeded in arbitrary excavation units (XUs)

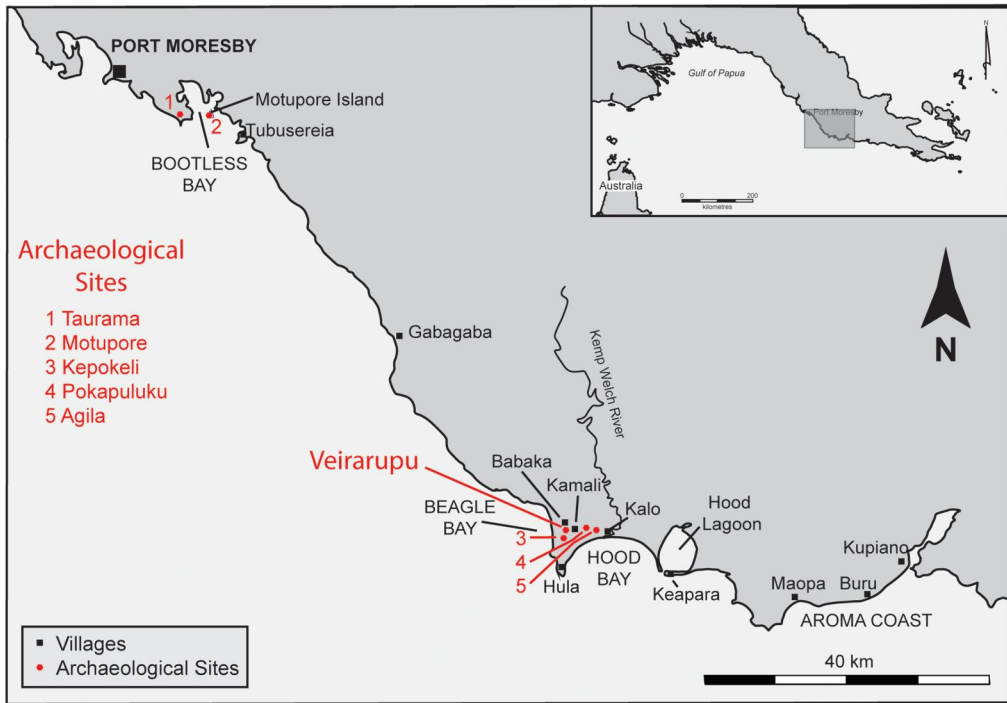


Figure 5. Veirarupu, showing locations of Bootless Bay, Hood Bay and the Aroma Coast.

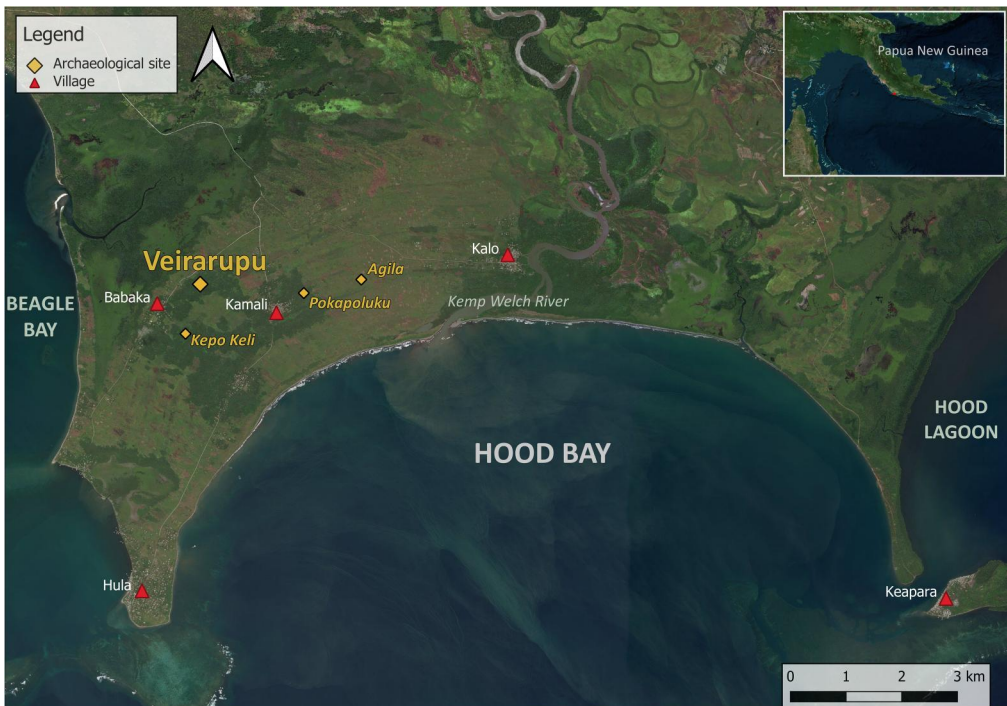


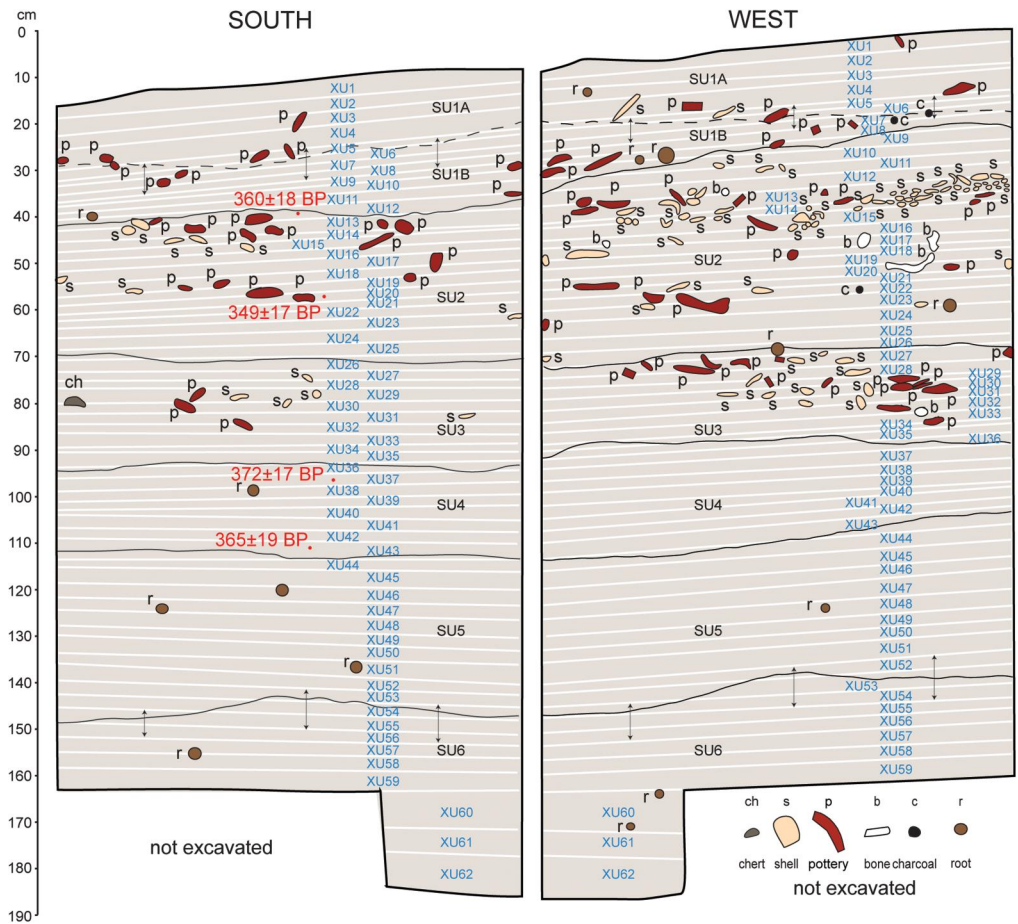
Figure 6. Hood Bay showing the location of Veirarupu in relation to other archaeological sites excavated in 2022. Map created using Open Source QGIS, <http://qgis.osgeo.org> (drafted by Georgina Skelly).



**Figure 7.** Veirarupu during excavation. (A) Kylie Sesuki (UPNG) left, Jemina Haro (NMAG) right. (B) Domed dune crest and excavation square. (C) Sieving materials on site, left to right, Alu Guise (of Kamali Village), Willie and Eric Iruna (of Babaka Village), Teppsy Beni (UPNG), Jemina Haro right (NMAG). (D) View northeast along the dune to the Veirarupu excavation.

following stratigraphic changes. Six stratigraphic units (SUs) were differentiated based on sediment color (dry Munsell), grain-size, consolidation, compaction, and cultural material contents. The six SUs comprising the stratigraphic sequence were excavated in 62 XUs with a mean 2.9 cm thickness. Excavations concluded in culturally sterile sand at 181 cm depth.

SU1A contains poorly consolidated very dark brown (Munsell: 10YR 2/2) humic fine-grained sandy silt matted together in clumps by fine rootlets. Cultural materials from SU1A include highly fragmented pieces of shell and pottery sherds impacted by pedestrian traffic. Commencing at 12 cm depth, SU1B contains fine-grained brown (Munsell: 7.5YR 5/3) sandy silt with less humic staining and less pottery sherds and pieces of shell than SU1A above. Consolidation increases in XU9 (20 cm depth) signaling the transition to fine-grained brown (Munsell: 7.5YR 5/6) sandy silt in SU2. Cultural deposits peak in the upper levels of SU2 and decline approaching the SU base. SU3 contains brown (Munsell: 7.5YR 5/4) silty sand, coarser in texture than sediments in SU2 above. Sediments in SU3 are increasingly compacted with increasing depth. The stratigraphic change to brown (Munsell: 7.5YR 4/6) very fine well-consolidated sand in SU4 commenced in XU34 (75–77 cm depth). Pottery sherds by number and weight reach a minor peak in the upper part of SU4 (77–82 cm depth) and decline abruptly near the



**Figure 8.** Veirarupu Square A, south and west sections with XUs superimposed. Radiocarbon determinations on samples collected *in situ* are shown as spot locations.

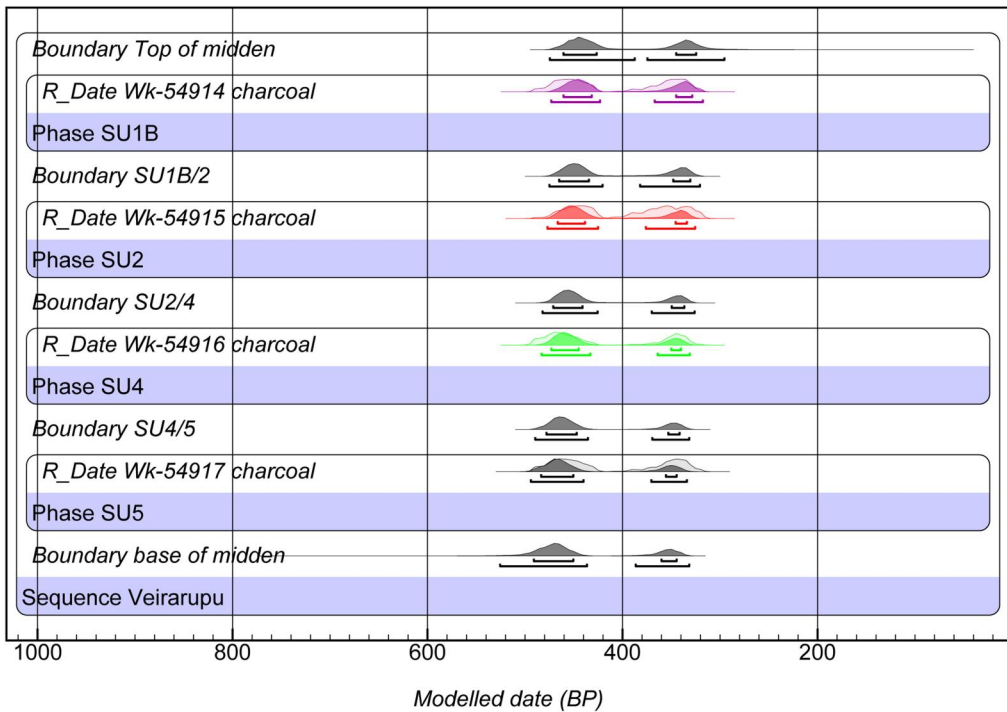


**Figure 9.** Veirarupu Square A, south and west sections, excavation complete.

**Table 1.** Radiocarbon determinations for Veirarupu.

XU	SU	Wk-laboratory code	% Modern (F14C %)	$\delta^{13}\text{C}$ ‰ (IRMS)	$^{14}\text{C}$ Age BP	Calibrated age BP (68.3% probability)	Calibrated age BP (95.4% probability)	Median calibrated age BP
12	1B/2	54914	95.6 ± 0.2	-22.3 ± 0.7	360 ± 18	480 – 430 (0.381) 360 – 330 (0.301)	500 – 420 (0.497) 400 – 310 (0.457)	427
20	2	54915	95.7 ± 0.2	-27.0 ± 0.7	349 ± 17	460 – 420 (0.288) 380 – 320 (0.395)	480 – 420 (0.397) 400 – 310 (0.558)	381
37	4	54916	95.5 ± 0.2	-24.1 ± 0.7	372 ± 17	490 – 440 (0.457) 360 – 330 (0.226)	500 – 420 (0.617) 380 – 320 (0.338)	450
43	4/5	54917	95.6 ± 0.2	-25.6 ± 0.7	365 ± 19	480 – 430 (0.405) 360 – 330 (0.278)	500 – 420 (0.542) 380 – 310 (0.413)	436

All radiocarbon determinations are AMS on wood-charcoal collected *in situ*. Calibrations undertaken using OxCal v4.4.4 Bronk Ramey (2021); r:5 Atmospheric data from Reimer et al. (2020).



**Figure 10.** The Bayesian age model for radiocarbon dates from Veirarupu, Square A. The outline distributions are the unmodeled calibrated dates. Solid distributions represent the results after Bayesian modeling.

SU4–SU5 interface (93–99 cm depth). Reddish-brown (Munsell: 5YR 6/4) consolidated sand in SU5 contained small quantities of highly fragmented pottery sherds (mean sherd weight = 0.92 g), and shell in upper levels. Lower levels of SU5, the SU5–SU6 interface, and SU6 are culturally sterile. SU6 contains light gray (Munsell: 2.5Y 7/2)

**Table 2.** Results of the Bayesian sequence model.

Name	Unmodeled (BP)				Modeled (BP)			
	68.2%		95.4%		68.2%		95.4%	
Boundary Top of midden					470	320	480	290
R_Date Wk-54914 charcoal	480	330	500	310	470	320	480	310
Phase SU1B								
Boundary SU1B/2					470	330	480	320
R_Date Wk-54915 charcoal	460	320	480	310	470	330	480	320
Phase SU2								
Boundary SU2/4					480	330	490	320
R_Date Wk-54916 charcoal	490	330	500	320	480	340	490	330
Phase SU4								
Boundary SU4/5					480	340	490	330
R_Date Wk-54917 charcoal	480	330	500	310	490	340	500	330
Phase SU5								
Boundary base of midden					500	340	530	330

**Table 3.** Pottery sherd weights (g) per liter of sediment for cultural SUs.

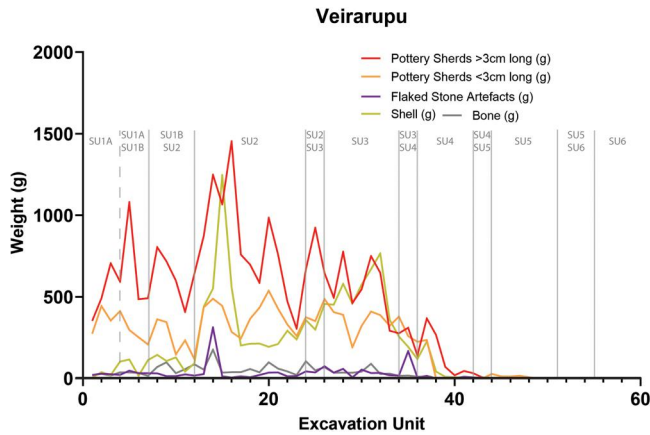
SU	Pottery sherds (g)	Sediment volume (l)	Pottery sherds (g) per liter of sediment
1A	3630	127.5	28.5
1A/1B interface	2816	88	32.0
1B/2 interface	4382	114	38.4
2	14,517	305	47.6
3	7062	181	39.0
4	1044	166	6.3
5	102	206.5	0.5

fine-grained sand with gray olive-tinged clay lenses and patches of mottled orange clay. Excavations concluded in SU6 at 181 cm maximum depth (Figures 8 and 9).

### Radiocarbon dates

Four charcoal samples from Veirarupu were radiocarbon (AMS) dated at the Radiocarbon Dating Laboratory, University of Waikato. Age distributions for these samples have been calibrated using the Intcal20 (Reimer et al. 2020) dataset in OxCal v4.4 (Table 1). We undertook Bayesian sequence analysis to estimate when occupation of the site started and ended, and the duration of deposition for each SU (see Bronk Ramsey 2009, 2023 for detailed methods). Our Bayesian model (Figure 10) consists of four contiguous phases, comprising the SU1B–SU2 interface (Wk-54914), SU2 (Wk-54915), SU4 (Wk-54916), and the SU4–SU5 interface (Wk-54917) with each phase separated by a single boundary command because there was no evidence for a hiatus between the phases (Table 2). No dates were acquired for the near-surface SU1A which is poorly consolidated compared to SU1B–SU6, and has been subject to bioturbation and pedestrian traffic.

Rates of pottery sherd deposition vary slightly, with a peak in deposition in SU2, yet there is no pause in accumulation other than a drop-off toward the base of SU4 (Table 3). In addition, no changes were identified in pottery decoration or form with depth that would suggest the assemblage belongs to anything other than a single manufacturing tradition (see below). The following discussion of calibrated ages is based on



**Figure 11.** Veirarupu Square A, vertical distribution of cultural materials by weight, by XU.

the 95.4% probability distributions, with ages rounded to the closest 10 years and modeled ages shown in italics following Hamilton and Krus (2018).

Our model estimates that the site was used from 530 to 330 *cal BP* until 480–290 *cal BP*. As there is no stratigraphic or radiocarbon evidence for a hiatus, the model indicates a period of uninterrupted site use sometime within the period 530–290 *cal BP* (Table 1). A limitation of our model is the sample size: each stratigraphic phase was constructed using only a single radiocarbon date. Yet given the site's tightly constrained chronology and the similarity of each modeled probability distribution, it is unlikely that further dating would improve the precision of our chronology.

### **Cultural materials**

The volume of cultural materials varies through the sequence with a major peak in SU2, and smaller peaks in the SU1A–SU1B interface above, and in SU3 below. Cultural materials by weight decline in the SU3–SU4 interface and increase again in upper levels of SU4 before declining rapidly approaching the base of SU4 (Figure 11). Small quantities of highly fragmented pottery sherds, shell, charcoal, and flaked chert pieces in the upper levels of SU5 appear likely to be downward displacements of highly fragmented materials from *in situ* cultural deposits in SU4 above. The lowermost cultural materials are from XU50 (depth = 114–118 cm) where four tiny pieces of pottery (mean weight = 0.25 g), shell fragments, and two pieces of flaked chert were found. Lower levels of SU5 and all SU6 are culturally sterile (depth = 118–181 cm). Excavations continued 62 cm into culturally sterile deposits until the base of the eolian dune formation was reached.

### **Ceramic assemblage**

The ceramic assemblage comprises 28,501 pottery sherds >2 mm long (being the mesh size of the sieve), 2240 of these are  $\geq 3$  cm long. There are 218 rim sherds (of any size)



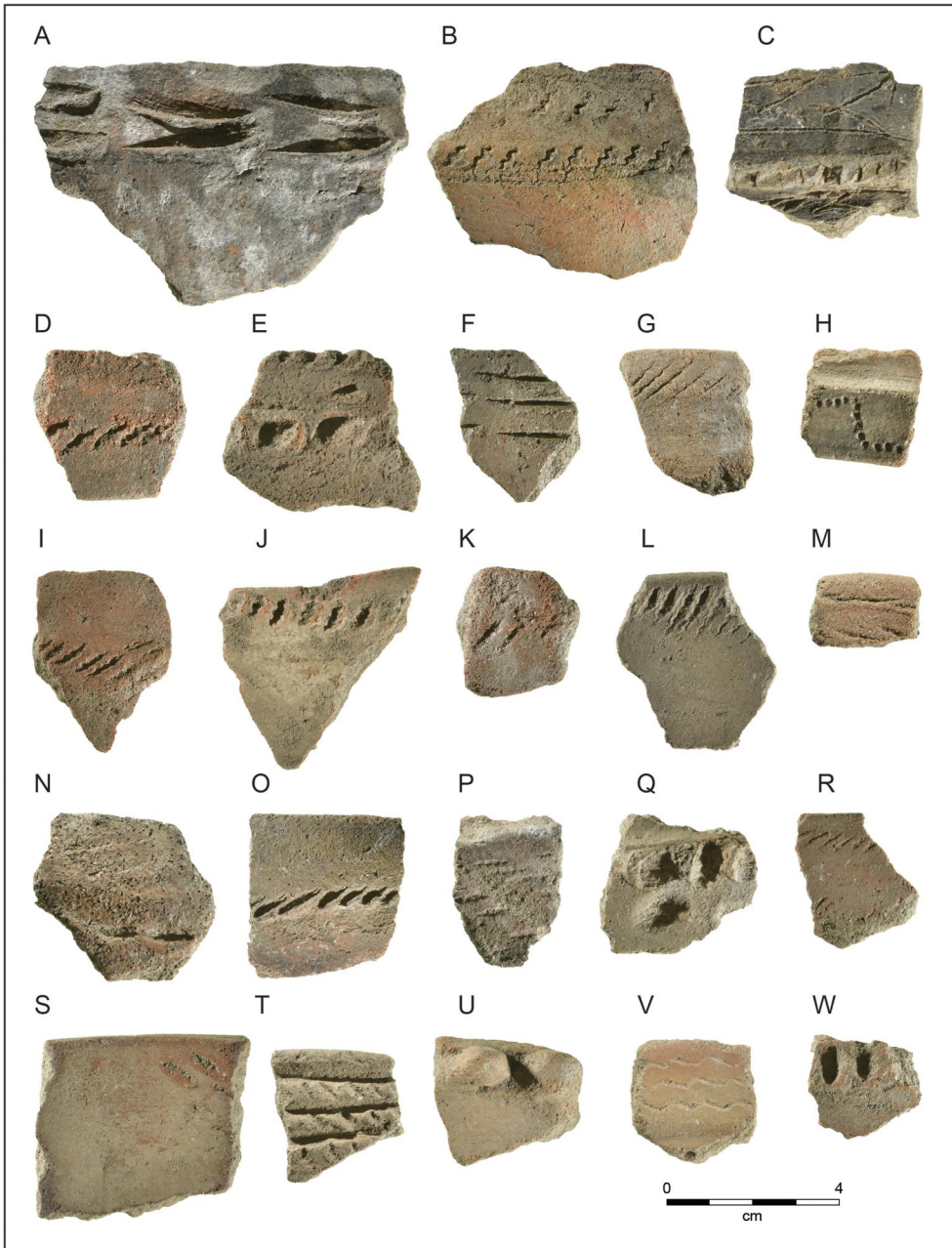
which are defined as rim sherds when part of the vessel lip remains. Pottery sherds were counted and bulk weighed for each XU. The assemblage of individually analyzed sherds comprises the 218 rim sherds and 10 body sherds with incised and/or impressed decoration. Of these 228 sherds, 178 are  $\geq 3$  cm long and 50 are  $< 3$  cm long. Impressed and/or incised body decoration is present on 39 sherds (29 are rim sherds) and 37 rim sherds have decorated lips.

Pottery sherds were excavated from each of XU1–XU50 (depth = 0–119 cm). There are peaks in sherds by weight in upper levels of the site (SU1A/B, SU1B/2). Sherd deposition reaches maximum density in SU2 and SU3 before declining rapidly in SU4 and SU5 (Table 3). No sherds of any size are from lower levels of SU5 or culturally sterile SU6.

### ***Incised, impressed, and appliqué body decoration***

Thirty-two sherds have impressed body decoration, six are incised, and one has appliqué decoration. Of the 32 sherds with impressed decoration, 30 are shell-impressed. Seventeen of these have bands of rippled lines rendered with the margin of a bivalve shell (e.g., Figure 12B, D, G, I–L, N, R). The impressions are applied in diagonal ( $n = 10$ ), vertical ( $n = 4$ ), or horizontal ( $n = 3$ ) bands below the vessel lip. Nine sherds have gouged shell impressions that vary in depth and alignment (e.g., Figures 12A and 15E). Two have gouged impressions made with an indeterminate tool (Figure 12E, W). Six sherds were incised using a single-pointed tool, five of these have discrete and/or converging lines (e.g., Figure 12C, F, T). One has a set of three wave-like lines on the rim interior (Figure 12V). One sherd has a punctated rectilinear motif on the rim interior (Figure 12H). Decorations are on vessel exteriors, above changes in wall angles (80%), on changes in wall angle (13%), and on rim interiors (7%). Five sherds have impressed/incised markings on rim interiors that appear to be non-decorative (Figures 12M, P, S, and 13I, O). The markings may represent a maker's mark or "trademark" as described on rim interiors from the Motu ancestral site of Motupore (Allen 2017, 302–3). More recently Motu women from the village of Manumanu placed their own individual marks on the rims of pots made for trade. When Murray Groves observed pottery makers at work, they marked their pots with initials which had, by the 1950s, replaced the "simple geometric figures" used earlier (Groves 1960, 11, 13).

Motupore is an archaeological site on Motupore Island, located 650 m offshore in Bootless Bay and 80 km northwest of Hood Bay. The ceramic assemblage from the influential pottery manufacturing site—the ancestral western Motu village of Motu Hanua on Motupore Island—provides a comparative assemblage for the period when Veirarupu was occupied (see Allen 2017). In our comparative analysis we focus on Motupore because it is the most extensively published and best dated site in Bootless Bay (Allen 2017). There are, however, other mainland coastal sites in Bootless Bay including Taurama which was excavated in the 1970s (Bulmer 1978) and many other sites yet to be investigated. These include five sites registered with NMAG (site codes: ACC, AQO, AQP, ADQ, AQM) and Gwamo (not registered) on the eastern edge of Bootless Bay which is well-preserved, and has high archaeological potential (Alu Guise, personal communication 2020). Though the Motupore radiocarbon chronology is



**Figure 12.** Veirarupu, representative sherds with impressed and/or incised body decoration.

imprecise, it overlaps with the Veirarupu sequence. Drawing on “equivocal” dates from recent levels and other dating evidence, Allen (2017, 128) places the abandonment of Motupore close to AD 1700 (250 BP). There is, however, doubt as to the timing for the abandonment of Motupore with dates from recent levels producing median ages of 382 cal BP (ANU-1218) and 407 cal BP (ANU-217) at 95.4% probability (Urwin 2022, table 3.3). Based on all reliable dates from Motupore we infer that Allen’s Pottery

Analytic Units (PAUs) date to ca. 750–600 cal BP (PAU 6), ca. 600–450 cal BP (PAU 5), and ca. 450–300 cal BP (PAU 4–1). In summary, occupation at Motupore is suggested to date to the period 750–300 cal BP (Urwin 2022, 180). Occupation at Veirarupu dates to a period within 530–290 cal BP.

Painted and shell-impressed decorations are most frequent in the early part of the Motupore sequence. The early part of the sequence as defined by Pottery PAUs 5 and 6 dates to 750–450 cal BP based on (Allen 2017, 151, 620). Other less commonly used decorations in this early part of the Motupore sequence include punctated, combed, appliqué, and incised decoration. Incision is most prominent in more recent deposits (450–300 cal BP) in which overall fewer decorated sherds are found (Allen 2017, 231). Body decorations at Veirarupu show several parallels with the Motupore sherds in terms of decorative method and motif types. None of the Veirarupu sherd surfaces (most of which are well-preserved) show any evidence of painted decoration. The most striking parallel with the Motupore sequence is the presence of gouged impressions (Figures 12A and 15C, E). These are visually indistinguishable from the “slashing” motifs from PAU5 (c. 600–450 cal BP) described by Allen (2017, 86, 151, 293, Figures 8.18b, c). The Motupore-style “early shell impressed sloping band motif” also from PAU5 (c. 600–450 cal BP) appears on one sherd from Veirarupu (Figure 12G; Allen 2017, 285, Figure 8.12c). There is also an example of the “Finger arcade motif” from PAU3 (c. 450–300 cal. BP) in the Veirarupu assemblage (Figure 12E; Allen 2017, Figure 8.10e).

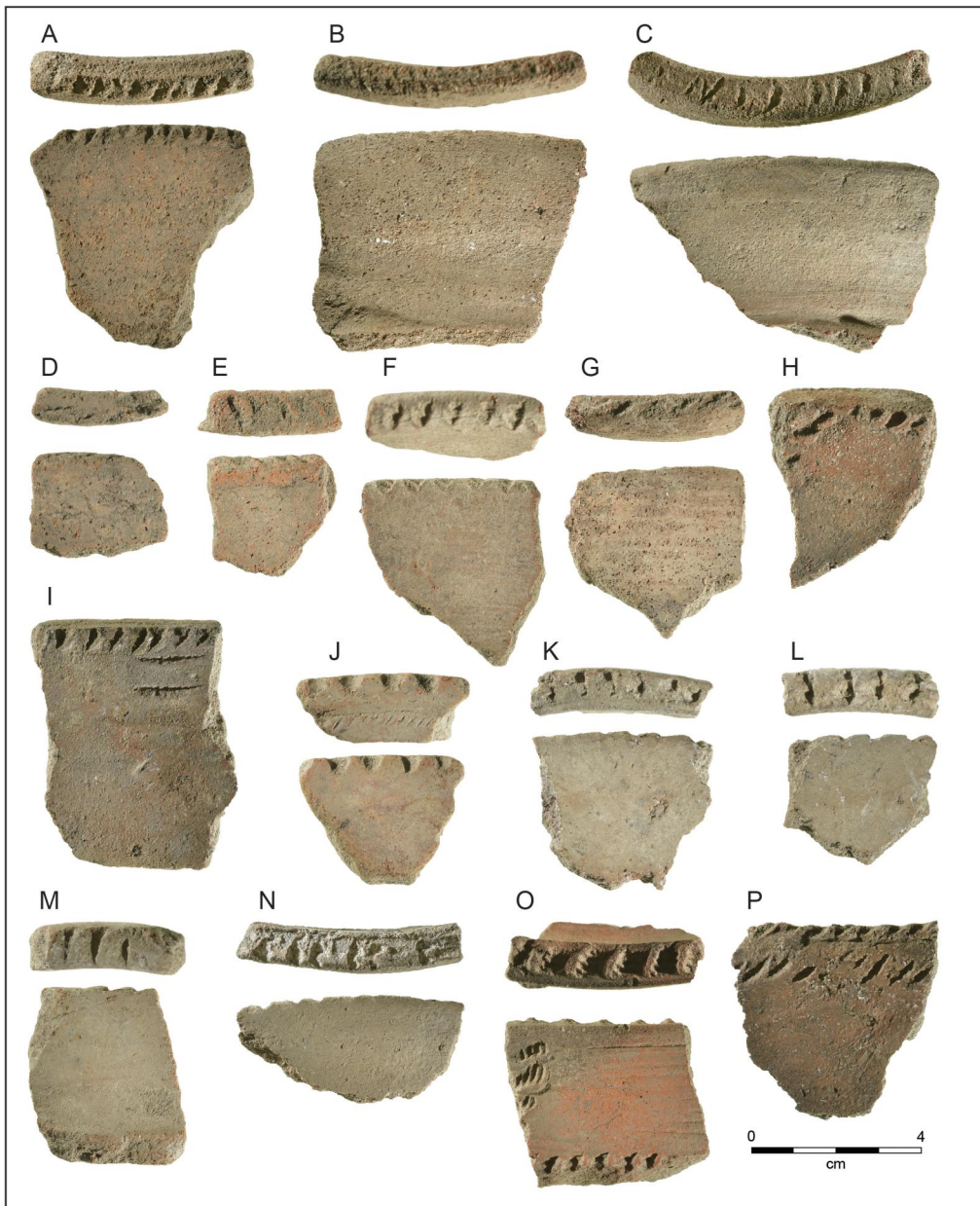
### **Lip decoration**

Thirty-seven rims have lip decoration, 25 of these are shell-impressed (e.g., Figure 13C, F, L), and 12 have been notched using a single-pointed or edged tool (e.g., Figure 13H, J, P). Decorations mostly involve short shell impressions limited in length by the morphology of decorative fields on vessel lips. One poorly preserved rim has rippled linear bivalve margin lines on top of a flat lip top (Figure 13D). Decorations are rendered inside lips (38%) (e.g., Figure 13B, F, H), on top of lips (36%) (Figure 13C–E, G, K–O), and outside lips (26%) (e.g., Figure 13A, P). Shell-impressed decoration predominates (68%) amongst lip decoration as it does among body decorated sherds (85%) (see above).

### **Vessel form**

Terms used to describe vessel forms are dish, bowl, and pot (following David et al. 2009, 13). We use dish to describe a vessel with an orifice diameter greater than the vessel depth; bowl for a vessel with an orifice diameter approximately equal to the vessel depth; and pot for a vessel with an orifice diameter smaller than the vessel depth. A vessel rim is considered everted when the orientation angle of the rim is 0–90° and inverted when the rim orientation is 270–360°.

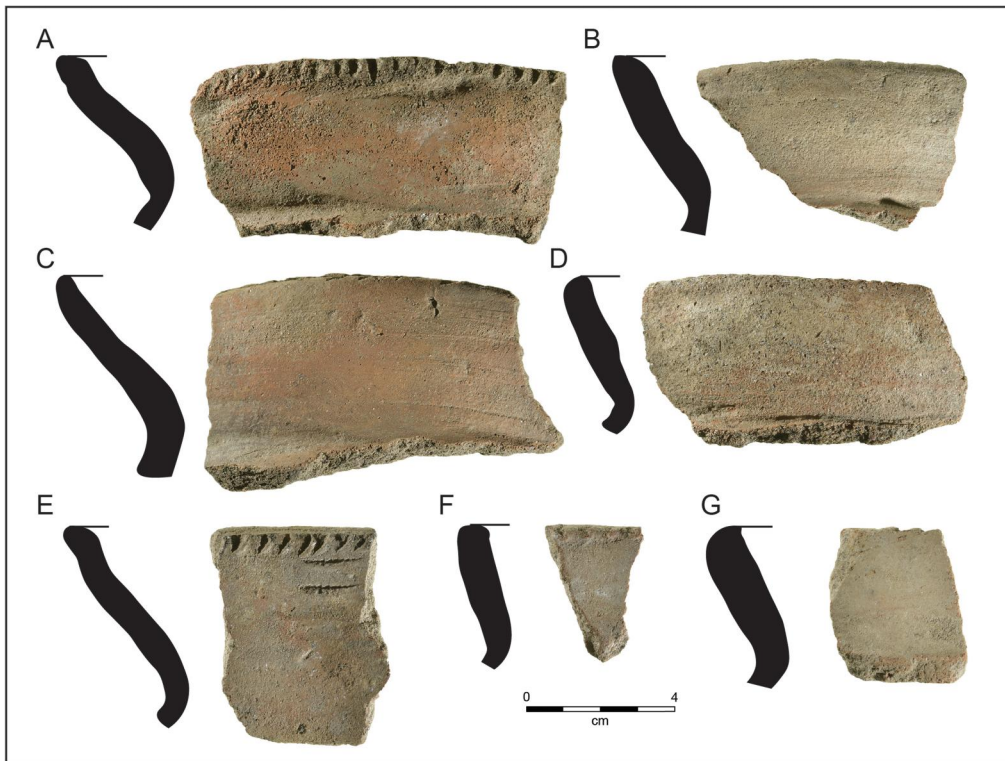
Fifty rim sherds were analyzed to vessel form: 38 from everted pots with restricted necks (indirect), seven from inverted straight sided (direct) bowls, four from inverted carinated bowls (those with a change in wall angle creating a shoulder), and one from an everted bowl. Given that surface decorations share traits with those known from



**Figure 13.** Veirarupu lip decoration.

Motupore, we applied the typological criteria Allen (2017) used for Motupore vessel forms to the Veirarupu assemblage to determine whether diagnostic parallels extend to vessel form. Allen (2017) subdivided Motupore pots into three types:

1. **Type 1a:** small pots with orifice diameters <20 cm and rim lengths <3 cm;
2. **Type 1b:** small pots with orifice diameters <20 cm and rim lengths >3 cm;
3. **Type 2:** large pots with orifice diameters >20 cm and rim lengths >3 cm.

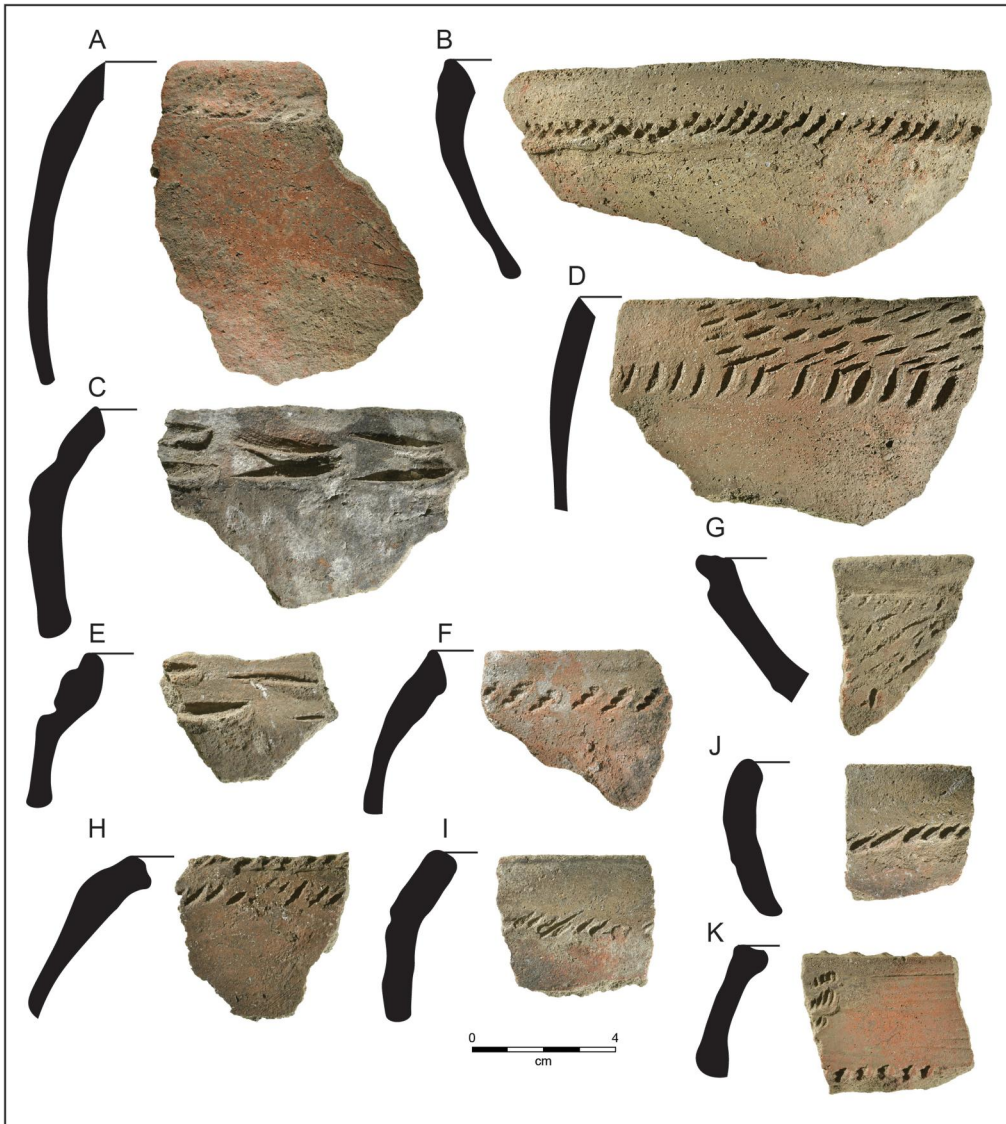


**Figure 14.** Representative everted indirect rims with incised and/or impressed decoration.

Allen (2017, 222) found that the proportion of pot Types 1a and 1b remained constant through the Motupore sequence, while the proportion of Type 2 pots increased through time. Applying Allen’s criteria at Veirarupu, the smaller (Type 1a/b) and larger (Type 2) vessel forms are present in equal proportions, with four rim sherds conforming to Type 1a, nine to Type 1b and 13 to Type 2. Orifice diameters were calculated for 26 rims from everted indirect pots. Thirteen are from pots with orifice diameters <20 cm and 13 are from pots with orifice diameters >20 cm. All rims on large pots at Veirarupu are >3 cm long. The Veirarupu assemblage is too small to draw conclusive inferences about cross-site similarities and potential changes in vessel form through time. However, the 50/50 divide between large and small pots is like Allen’s findings at Motupore (2017, Figure 7.15).

Nine of the 38 rim sherds from everted indirect pots have shell-impressed lip decoration (e.g., Figures 13H, I, M and 14A, E, F). None of the 38 rims have evidence of red slip or paint although four rims have a reddish coloring which may be a vegetable dye (see Groves 1960, 17–8). None of the everted pot rims have body decoration, though one has a pair of bivalve margin impressions on the rim interior appearing more like a “trademark” than a form of decoration (Figure 14E). Large sherds from XU33 have dimple marks on interior surfaces suggesting paddle and anvil construction.

Six inverted bowls (Figure 15A, B, D, F, H, J), four inverted carinated bowls (Figure 15C, E, I, K), and one everted bowl (Figure 15G) are represented in the assemblage. Of the bowl rim sherds large enough for orifice diameters to be calculated, inverted bowl



**Figure 15.** Bowl rims with incised and/or impressed decoration.

sherds are from vessels with orifice diameters of 25, 32, and 42 cm, and sherds from carinated bowls are from vessels with orifice diameters of 17, 25, and 41 cm. The single everted bowl sherd is from a vessel with an orifice diameter of 24 cm.

Despite the small sample size, the Veirarupu bowl assemblage is morphologically consistent with the vessels found at Motupore (Allen 2017, 259–60). The inverted and everted bowls from Veirarupu conform with Motupore “Type 1/Variety 2” bowls, which are not carinated and have shell-impressed decoration on the upper body and lips. These are most numerous in PAU3–4 at Motupore (ca. 450–300 cal BP) but were found in all levels (Allen 2017, 265). The four inverted carinated bowl sherds are akin to Motupore Type 3 bowls which are carinated and usually have shell-impressed decoration. Type 3 bowl sherds are prevalent in PAU5–6 (ca. 750–450 cal BP) at Motupore

but also occur in all levels (Allen 2017, 265). As described above, shell decoration on Veirarupu bowl sherds is strikingly comparable to decoration found at Motupore (Allen 2017, 286, Figure 8.13, 293, Figures 8.18b, c, d).

## Discussion

The radiocarbon and material cultural evidence indicates that Veirarupu was occupied continuously for a period after 530 *cal BP* and before 290 *cal BP*. At the time Veirarupu was established, a specialist pottery-producing settlement had been operating on Motupore Island for at least two centuries (Allen 1977, 412; 2017, 620). Pottery with decorations akin to those found at Motupore has also been found at Urourina on Yule Island (first occupied 904–526 *cal BP*, based on a single radiocarbon date), site OFA near Kerema (undated), Keveoki and Lui Ova east of the Vailala River (first occupied after 665 *cal BP*), and Popo in Orokolobay (first occupied ca. 650 *cal BP*) (David et al. 2009; Frankel and Rhoads 1994; Rhoads 1994; Skelly and David 2017; Urwin 2022; Vanderwal 1973). Pottery with Motupore-style decoration has also been found to the east of Bootless Bay and now also at Veirarupu in Hood Bay (Johnston 1971, 27; Skelly et al. 2018). The appearance of pottery with these similar designs across a vast coastline implies that Motupore and potentially allied villages such as Taurama were implicated in long-distance seafaring following the “Ceramic Hiccup,” a period between ca. 1200 and 700 *cal BP* when inter-regional seafaring and exchange retracted significantly (Allen 2017, 604–5; Irwin 1991, 507).

The ancestral village of Agila, 2.2 km east of Veirarupu, was established at 770–550 *cal BP* and may have coincided closely with the first settlement of Motupore Island (Skelly et al. 2023). Pottery sherds from Agila have decorations including the distinctive “herringbone” motifs seen on sherds from lower levels at Motupore which date to ca. 750–450 *cal BP* (dates from Allen 2017, 151, 620; see discussion in Urwin 2022, 180). Having maintained contact with ancestral Motu pottery makers for potentially 200 or more years, pottery at Agila dating to 490–300 *cal BP* no longer resembled sherds found at Motupore. Pottery from the more recent era had greater affinity to that made on Mailu Island to the east (see discussion in Skelly et al. 2018). It is far from certain that these pots came from Mailu, as they could have come from other pottery centers such as Maopa on the Aroma coast or been made locally. What the pottery does tell us is that social attention pivoted from the west to the east. Skelly et al. (2018, 13) suggested that pottery was no longer sourced from the ancestral Motu villages due to social dislocations among the Motu (regional warfare), and so Hood Bay communities turned their “attention eastward, maintaining closer connections with the Aroma coast and/or Amazon Bay-Mailu instead.” Veirarupu was established during the time maritime exchange associations at Agila were oriented to the east. The Veirarupu sequence confirms that associations between Hood Bay and ancestral Motu villages continued when social engagement at nearby Agila was focused to the east. Thus, Hood Bay villages simultaneously mediated social engagement to the east and west thus forming a point of articulation between emerging Motu and Mailu long-distance seafaring ventures. Managing multi-directional relations would have involved negotiating social sensitivities. We suggest that the motivation for engaging in the social complexities stemmed from

the need for Hood Bay villages to maintain coastal communication with all comers otherwise risking isolation that could in turn lead to instability and lack of security.

The inhabitants of Veirarupu and Agila would have been in contact with one another. The two villages were within easy walking distance across open beach plains and were both occupied after 530 cal BP. Yet Veirarupu maintained associations with pottery-producing ancestral Motu villages to the west, while Agila maintained relations with seafarers from the east. We suggest that these different but contemporaneous patterns reflect village-specific trading partnerships, and possibly a coordinated approach to managing long-distance exchange associations. Cross-generational exchange between Agila or intermediaries and ancestral Motu villages ceased at 490–300 cal BP yet these associations were established or continued unabated ca. 2.2 km to the east at Veirarupu. As such, Hood Bay communities did not unilaterally abandon ties with ancestral Motu communities but used their strategic location at a nexus between Motu and Mailu seafaring to maintain relations to the west and east from after ca. 490 cal BP.

The closest coastal access for Veirarupu is Beagle Bay, 2.2 km to the west (Figure 6). For Agila, the coast is 1.25 km to the southeast at Hood Bay. Assuming these villages accessed the coast at these locations, Agila was better situated to engage with eastern seafarers and Veirarupu with western seafarers. Agila villagers ceased their exchange relations with ancestral Motu communities after ca. 490 cal BP. Veirarupu was occupied within the period 530–290 cal BP although the comparative ceramic analysis above suggests that establishment was close to the earlier date of 530 cal BP. Thus, changing attitudes and exchange relations at Agila potentially align chronologically with the establishment of Veirarupu–Motu relations shortly after ca. 530 cal BP. Considering that Agila and Veirarupu continued to coexist for at least several decades, we suggest that Veirarupu and Agila belonged to a confederation of Hood Bay communities that coordinated and negotiated involvement in ancestral Motu and Mailu exchange networks to maintain the benefits of both. They were the entrepôts maintaining their own cultural autonomy negotiating multilateral relations at the edges of prodigious cultural domains.

In terms of patterns and pulses of regional exchange, it is intriguing that Veirarupu was abandoned before 290 cal BP, Agila likely before 190 cal BP (Skelly et al. 2023) or possibly more recently, and Motupore ca. 300 cal BP (Allen 2017, 118). According to Western Motu genealogies and oral traditions, the ancestral village of Motu Hanua on Motupore Island was abandoned around AD 1725 (225 BP) (Golson 1968, 406; Oram 1968, 429). This would pre-date colonial incursions on the PNG south coast by ca. 150 years (Moresby 1874). Coincidences in timing for site abandonment remain equivocal. However, the potential alignment of the abandonment of Veirarupu and Agila supports our suggestion that these villages were closely socially connected and that the circumstances which led people to leave Veirarupu also had implications for people living at Agila. Western Motu oral traditions suggest that this was a time of increased conflict between the Eastern and Western Motu (Oram 1968, 1981). Such conflict would have destabilized coastal exchange relations and in turn jeopardized security, leading Hood Bay communities to abandon exposed coastal locations.

### ***The places in-between: Managing, maintaining, and manipulating exchange***

Excavations at Veirarupu show that a coordinated approach to specialized exchange played a role in maintaining cultural autonomy and social order at the edges of the



Mailu and Motu seafaring domains. This strategy can be traced to the reanimation of seafaring after 770 cal BP following “The Ceramic Hiccup” (Irwin 1991, 507–8; Skelly et al. 2023). The climax to those negotiated social relations was witnessed during the colonial era when exchange items accrued value as they entered Motu and Mailu seafaring domains *via* the hands of the *entrepôts* of Hood Bay. The articulating roles of Motu–Hood Bay–Mailu multilateral interactions were implicated in the redistribution of items along a 700 km coastal and island seascape. In addition to domestic items (e.g., fish and sago as in *vili* exchanges), highly valued armshells, shell ornaments, and decorated pots changed hands. The distances that items moved likely enhanced their value. *Kula* shell valuables exchanged in the Massim attained their renown through repeated exchange. Exchange items passing through Hood Bay added value through exchange and exotic provenance. It follows that Motu–Hood Bay–Mailu exchange relations also achieved value over time.

The spatial extent of Motu and Mailu seafaring or the “peripheries” of their cultural domains, ended at Hood Bay. Hood Bay itself conforms to a conventional definition of a cultural “core” rather than a place where peripheries meet. “Peripheries” are more likely places of instability due to competition and ensuing conflict (Feuer 2016, 57). People in Hood Bay maintained autonomy and social stability with villages such as Veirarupu occupied continuously for long periods of time. The “core” of Hood Bay culture remained permeable and allowed the movement of items from the edge or “periphery” of one culture to that of another. We make the distinction that Hood Bay was not “middle ground” between cultures as the space was not negotiated by protagonists but rather curated by *entrepôts* (see White 1991, x). Such multilateral social negotiation is not easily amenable to being framed in terms of “points” and “lines of connection” in a systems analysis. The ceramics found at Veirarupu as proxies for the social relations show strategic agency. The complexities of negotiating social connections between the “peripheries” exceeds the agency of those neighboring cultures who in a core–periphery or systems analysis are attributed undue prominence. Thus, the dexterous agency of the *entrepôt* is too complex to be fully understood through quantitative modeling. The *entrepôts* of Hood Bay highlight the vibrant agency of those living between cultures. The agency of such people needs greater recognition when characterizing exchanges between cultures.

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The authors report there are no competing interests to declare.

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## ORCID

Robert Skelly  <http://orcid.org/0000-0002-3578-0604>

Chris Urwin  <http://orcid.org/0000-0002-3868-9574>

Fiona Petchey  <http://orcid.org/0000-0002-3308-9983>

Matthew Leavesley  <http://orcid.org/0000-0002-4612-8304>

Teppsy Beni  <http://orcid.org/0009-0009-6705-3338>

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