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– ARTICLE –

Morphological variability and temporal patterning in Rurutuan domestic architecture: Rectangular and oval-ended stone structures of the Austral Islands

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Abstract

This article questions how surface stone architecture and site proxemics can inform on the pre-contact use of house structures on Rurutu Island (Austral archipelago) and their relationship to residential social status and/or occupational specialization. After exploring available linguistic and ethnohistoric accounts to understand emic conceptions of Rurutuan houses, I turn to a survey of the archaeological data, using specific site characteristics, like house form, house size, and architectural elaboration, to understand Rurutuan house types in later prehistory, both at the island-wide scale and with a case study focusing on the Tehaumatea chiefly center in Vitaria. Results demonstrate that Rurutuan house architecture varies substantially, with both house form, size, and architectural elaboration signaling house function and site status. While both residential and specialized house forms have been identified, their specific associations with class types are still murky, as most sites heretofore studied are from elite contexts. In terms of chronological shifts in house form through time, there are hints that Rurutuan houses both get larger and their surface architecture becomes more elaborate. These shifts may be due to social factors, like the accumulation of power by diverse social personae (chiefs, warriors, priests, and perhaps craft specialists) and increased chiefly competition through time, although this proposition must be tested with additional fieldwork.

Keywords: Household Archaeology, Site Proxemics, Specialized-Use Structures, Chiefly Centers, East Polynesia.

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1. Introduction

In her 2009 article on variability in pre-contact Marquesan house sites, Melinda Allen noted that "residential structures are important repositories on domestic activities, social relations, and residential mobility" (Allen 2009: 342). My exploration of Rurutuan house variability follows in Melinda's important footsteps and revolves around exploring variability at the micro-scale of the house in island archipelagoes, like the Austral Islands, and in islands, like Rurutu, where few domestic structures have been excavated.

Multiple lines of data can be used to reconstruct the corpus of Rurutuan house types that were used as domestic dwellings and as specialized structures. First, I explore how the available suite of linguistic and ethnohistoric accounts provide hints at emic conceptions of Rurutuan houses. I then turn to a survey of the archaeological data, following Melinda's lead in using specific site characteristics, like house form, house size, and architectural elaboration, to understand Rurutuan house types in later prehistory. In this article, I primarily explore architectural data along with site proxemics to examine house function, notably whether a structure was used as a residential house or a specialized house. I then turn to a preliminary study of house types' (domestic or specialized) association with social status. Finally, similar to Melinda's analysis of Marquesan domestic architecture, I offer a preliminary chronological analysis of Rurutuan house sites to study whether house form changes through time, and how these shifts may articulate with other natural or social transformations on Rurutu Island and the Austral Island archipelago as a whole.

To conclude, I broaden the discussion to explore how future studies in Rurutu and the Austral archipelago can be conducted to more broadly reconstruct pre-contact social organization in Eastern Polynesia. For example, how does micro-scale diversity inform pre-contact social status and occupational specialization, and their relationship to chiefly ritual power in Austral Island chiefdoms?

2. Literature Review: Theoretical and Methodological Background to Household Archaeology in Polynesia

The application of social models to household-based studies has shifted archaeologists' view of the house from a solely material entity to one influenced by economic, social, and political structures, and imbued with symbolic and ideational meaning. This is reflected in archaeological research globally and within Polynesia, where studies view dwellings and residential clusters as arenas for internal social negotiation structured by social status, gender, class, and wealth (Brumfiel 1992; De Lucia and Overholtzer 2014; Kirch and O'Day 2003; Weisler and Kirch 1985). Such analyses turn our attention to exploring the causes of house site variability, whether they be the size of the residential group, the length of residential occupation, the size of the domestic groups' social networks, wealth inequalities, or the types of activities carried out in and around the house structure, among others (Carpenter and Prentiss 2022; Endicott 2002; Kahn 2007, 2014; Hoffman 1999; Walter 2004).

Like the global setting (Cutting 2006; Thompson 2021; Singer-Avitz 2011; Smith et al. 2001), there is a methodological debate within studies of domestic sites in Polynesia: Should house site variability be explored mainly using architectural data, or using artifactual data and activity areas?

In Eastern Polynesia, domestic architecture has historically figured prominently in debates concerning the development of house-based inequalities, with some studies focusing exclusively on house size or architectural elaboration (Cordy 1981; McCoy 1973; McCoy and Panuska 2024). Yet the fact that in many archipelagoes, structures resembling houses served as everyday sleeping houses in some contexts, but served as specialized-use sites of nondomestic function in other contexts (Dixon et al. 2008; Rolett 2010; Kahn 2022), complicates using surface architectural features in isolation. Polynesian archaeologists presently accept that architectural elaboration alone is not sufficient to identify household rank. As an example, Melinda noted (2009, see below) that raised stone house platforms in the Marquesas may be related to minimizing the risks of flooding, rather than always being an indicator of high status.

Thus, current studies in Polynesia argue that diverse lines of data, both architectural, artifactual, and those from activity areas and sub-surface features, offer the most robust datasets for understanding household variation (Field et al. 2011; Kahn 2016; Quintus and Kahn 2023; Vacca and Kolb 2021). Yet the reality is that many Eastern Polynesian islands and archipelagos still lack robust samples of excavated and dated house sites (see Kahn 2025; Mulrooney et al. 2021). In such places, studies of domestic architecture are often the first launching point for understanding variability at the micro-scale. Given that many Eastern Polynesian pre-contact pole and thatch house sites had stone curbstone outlines and/or were constructed on elevated stone platforms or pavements, the ubiquity of domestic stone architecture across pre-contact Eastern Polynesian cultural landscapes facilitates the use of surface survey architectural data.

One such study was Melinda Allen's 2009 article concerning traditional stone architecture in the Anaho Valley of Nuku Hiva. In this Marquesan analysis, Melinda (2009: 350-351) sought to develop "a more systematic and less ambiguous paradigmatic classification" of the valley's domestic platforms using only the most "general features of house foundations". She examined three main variables: the elevation of the stone platform foundation upon which the house sat, whether the platform was raised on one to four sides vis-à-vis the ground surface or not raised at all, and whether the platform had an internal division (absent, present but not raised, or stepped). Her study found that Marquesan house platforms exhibited a wide range of variability in size, complexity, and topographic setting. Most stone foundation platforms were stepped and they ranged in size from 12.3 to 174 m^2; most fell between 20 and 60 m^2 in size with a mean house platform size of 61 m^2 (Allen 2009: 354). Larger, and presumed to be elite structures, saw the use of exceptionally large façade stones and the use of unique raw materials like cut and faced red volcanic tuff.

In terms of domestic platform chronologies, all of the house platforms dated by Melinda in Anaho valley post-dated AD 1640. In this valley, all platform types (pavements, simple platforms, and stepped structures) of all sizes post-dated AD 1640. Thus, Melinda's study suggested that stone house platforms were rapidly elaborated late in the Marquesan sequence, although she qualified this statement, as some of the dated samples could represent long-lived species with in-built age. Overall, Melinda's study suggested that platform type was not a good chronological marker in Anaho. Yet elsewhere in the archipelago, simpler platforms and pavements were overlain with stepped platforms, suggesting stepped platforms were chronologically later than the simpler forms (Allen 2009: 354; see Bellwood 1972).

While several potential causes for the elaboration of the size, height, and architectural elements of Marquesan house platforms were identified, Melinda suggested that the shift to building more substantial house platforms in this archipelago was first linked to localized climatic variability (Allen 2009: 376). With wetter conditions, households had to grapple with flooding or the onset of large El Ninõ events, leading to decisions to make shifts in domestic architecture. Melinda also stressed that climatic variability likely created new opportunities for displays of wealth, status, and power (Allen 2009: 376), perhaps for social personae outside of the political realm, as with priests and warriors. Thus, diverse natural and social factors were likely associated with transformations in Marquesan domestic architecture.

While my Rurutuan study borrows from Melinda's work, my analysis is also inspired by social theory, which links changes at the micro-scale to changes in social practices. Thus, I draw from other household archaeology studies in Polynesia aiming to track how micro-scale variability might be related to the development of status inequalities, such as differences in elite versus commoner households. Domestic architecture figures prominently in such debates, but other datasets are equally important like integrating house size with topographic placement on the landscape and the structure of settlement space (Kahn and Kirch 2013; Quintus and Kahn 2023; Weisler and Kirch 1985). I also draw from studies tracking the development of diverse social personae, like occupational specialists and craft specialists, whose residences and workspaces might have materially referenced their high rank (Kahn 2021; Rolett 2010). Such studies similarly focus on multi-faceted data sets, like the size and elaboration of the domestic stone foundation or stone-faced terrace; site proxemics, including relative isolation and proximity to sacred trees, specialized-use house structures, and ceremonial structures; and the presence or absence of domestic-related artifacts and sub-surface features (Dixon et al. 2008; Taomia 2002). Ultimately, exploring house size, architectural variability, and function (whether an everyday sleeping house or specialized-use structure) allows us to explore more nuanced socially infused questions, like my main foci here: How was social status and occupation materialized in pre-contact Rurutuan house sites? And how can such data inform on micro-scale social organization in Open chiefdoms of East Polynesia like those found in pre-contact Rurutuan societies?

3. Background to Rurutu

Situated at the southern fringe of Central Eastern Polynesia, the Austral Islands are postulated to have cultural ties to the Society Islands and Southern Cook Islands, given similarities in material culture, language, and oral traditions (Kahn 2025). The Austral archipelago has among the lowest land masses in CEP in terms of elevation, and its semi-tropical climate exhibits greater variability compared to more central CEP archipelagos like the Society Islands. Found at the northwestern end of the Austral archipelago (Figure 1), the island of Rurutu has a small land mass (38.2 km^2) of composite structure. Twenty-eight percent of the island is makatea, predominantly in the Vitaria socio-political district, meaning that Rurutu is not just a small island but one with limited land suited to intensive agriculture (Escue and Kahn 2023).

In terms of pre-contact social organization, the Austral Islands have been described as a series of "Open" chiefdoms with a fluid social structure where occupational and ritual specialists such as warriors and priests could accumulate power through their success in warfare or religious accomplishments (Bollt 2012; Goldman 1970; Kahn 2025; Kirch 2017: 245; Sahlins 1958). Each of

the archipelago's five main islands had its own autonomous political system at European contact in A.D. 1769. At that time, Rurutu had nine socio-political districts ruled by chiefs (ari'i) (Seabrook 1938: 76; see Figure 1). Ethnohistoric sources suggest that priests and warriors also held significant ritual and political power throughout the archipelago (Seabrook 1938: 19, 22, 23, 42, 44, 190; see also Morrison 1935: 71-72).

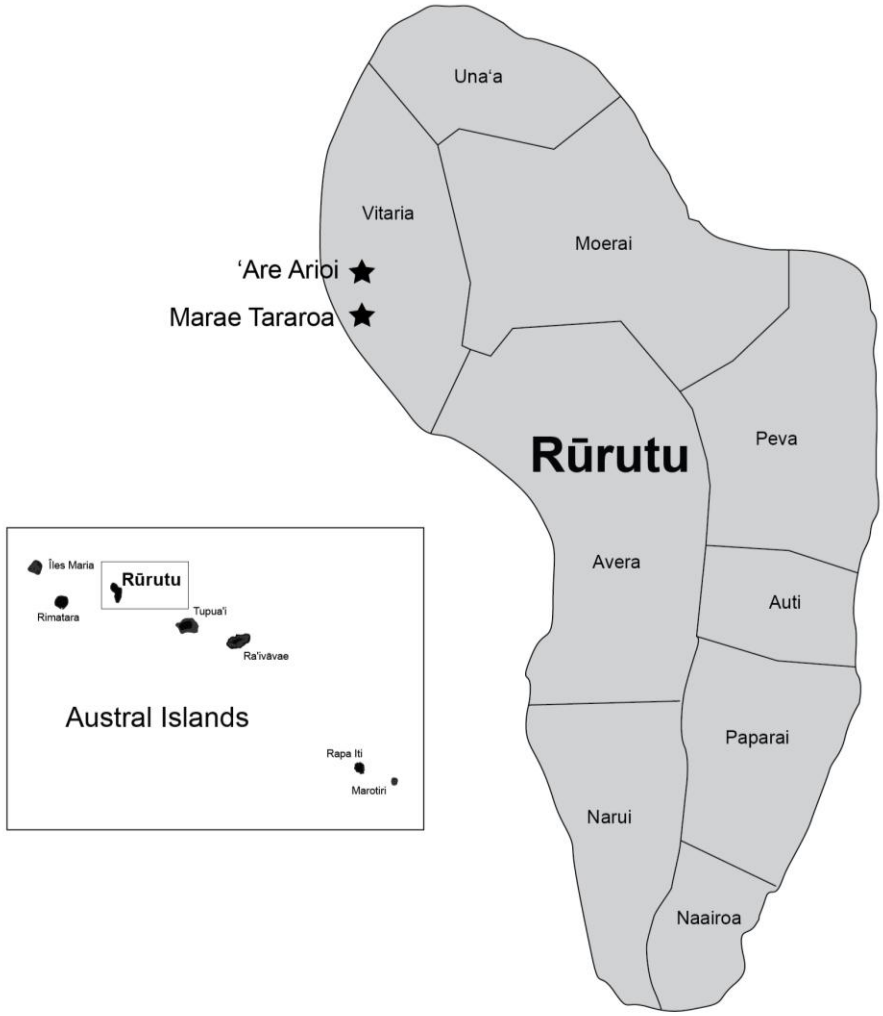

Figure 1: Rurutu Island's socio-political districts, with inset to the Austral Island archipelago. Note the placement of 'Are arioi and Marae Tararoa in the Vitaria socio-political district.

The Austral archipelago remains understudied from an archaeological perspective. Archaeological surveys have documented ceremonial sites (marae) and domestic structures in addition to other site types like rockshelters (Kahn 2025; see Verin 1969). Semi-comprehensive to comprehensive tallies of surface architecture in six of the Rurutu's nine socio-political districts (Chazine and Graffe 1979; CPSH 1979a; Routledge and Routledge 1921; Verin 1964, 1969) have been completed in addition to the collection of surface artifacts (Kellum and Garanger 1964; Verin

1964, 1969). Studies which directly engage with residential architecture include Verin's 1969 monograph, numerous unpublished reports of the archaeology branch of the Centre Polynesien des Sciences Humaines (referred hereafter as CPSH) dating from 1979-1982, and my 2025 article, where I redated archival samples from two previously excavated house structures: a specialized round ended house interpreted as a ʻAre Arioi in Vitaria and a rectangular stone pavement with an interior cist found in Unaʻa (Kahn 2025).

Altogether, only six of the island's house structures have been excavated (either by Verin or CPSH), but much of the data resulting from this work remains understudied, unpublished, or relies on outdated chronological methods (i.e. dating of bulk charcoal samples). Rurutu's corpus of survey data documenting house sites is more robust, as the Verin monograph and DCP reports include qualitative and quantitative data on over 124 domestic sites, data that form the basis of my analysis in the results section.

4. Materials and Methods

4.1. 4.1. Linguistic, Ethnohistoric, and Historic Survey Data for Rurutuan and Austral Island House Sites

4.1.1. Linguistic Data

We can first turn to Rurutuan and Austral Island ethnographies and lexicons to understand emic notions of house structures. As seen in Table 1, ʻare is the generalized gloss for house structure. Other terms gloss house form, whether oval-ended (ʻare potaʻata, ʻare potee), round, rectangular, or U-shaped, or the materials used in house construction, like sweet scented grasses (ʻare noanoa). Glosses for specific types of house structures, like priests' houses, warrior houses, ʻarioi houses, houses of the youth, military storage houses, and schools of learning suggest a functional division between sleeping houses used for everyday domestic activities (presumably for both commoners and elites) and those houses used for specialized activities. Reference to communal or public meeting houses and cook houses also suggests differential functional uses of houses or their auxiliary structures.

Likewise, special reference to chief's houses or royal houses indicates how notions of social class were embedded in Rurutuan and Austral Island ontologies, with the highest-ranking members having sleeping houses which gloss their high status. Yet it is unclear from the linguistic data if all social classes lived in oval-ended houses or not, as only royal/chiefly houses are clearly glossed. Thus, in my treatment below, I have to assume that lesser elites and/or non-elites may have also lived in oval-ended sleeping houses. I will refer to such houses either as non-royal house sites or as lesser elite or as non-elite house sites.

Table 1: Linguistic Glosses, Austral Island House Types

Rurutuan Term	Gloss	Island/Comments	Reference
Are, ʻAre	House	Generalized term, *fare* in Tubuai	Aitken 1930; Seabrook 1938
ʻAre Potaʻata, ʻAre Potee	Oval-ended house, or oval at one end and square at the other	Rurutu, Rimatara, Tubuai	Eddowes 2004; Grimes 1822; Morrison 1935, Seabrook 1938, Stokes n.d.; Verin 1969
---	Rectangular house	Rurutu (Vitaria, Unaa)	Chazine 1979; Verin 1969; Kahn in press
---	U shaped house	Tubuai	Edwards 1993
---	Round house	Rurutu (under Moerai church), Raivavae, Rapa	Anderson et al. 2012; Edwards 2006; Seabrook 1938
ʻAre NoaNoa	Grass house	Sweet scented grass used as construction materials	Stokes n.d.
ʻAre Araʻia	Priest house		Eddowes 2004
ʻAre Arioi	ʻBoy's college', Military college, Warriors' house	Taught military powers, dancing, music, sport	Seabrook 1938; Verin 1969
Fare Taureʻareʻa	House of the youth	Raivavae, for dance and military exercise	Stokes, n.d. (Raivavae ms.)
ʻAre auira	Store house for military gear	Rurutu (Vitaria)	Seabrook 1938
ʻAre Autea Nuʻa	School of learning, led by priests	Rurutu	Seabrook 1938
	Chief's house, Royal house	Rurutu, Tubuai, Raivavae	Edwards 2006; Morrison 1935, Verin 1969; Routledge and Routledge 1921; Seabrook 1938
ʻAre Patiri	Council Meeting house, Public Meeting house	Rapa, Rurutu (place to decide on war and peace)	Aitken 1930, Verin 1969
ʻAre Tumu	Cookhouse	Rapa	Anderson et al. 2012

4.1.1. Ethnohistoric Data and Site Proxemics

Unfortunately, in investigating house variability in the Australs we have few ethnohistoric accounts to draw from. James Cook was the first European to visit the island in 1769 (1955:155), but his ship did not anchor and neither he nor his crew went ashore. Few other ships visited the island during the early post-contact era. James Morrison, a beachcomber, spent time on the neighboring island of Tubuai for three months of 1789 (Morrison 1935). The only other long stay was by the missionary William Ellis (1969), who arrived in the 1820s, already 50 years after first contact. Confounding the lack of robust ethnohistoric sources on Austral Island house structures, European missionaries quickly introduced new forms of house construction (Bambridge 2009: 53). By 1822, Ellis (1969:400-401) remarked that the majority of Rurutuan houses were rectangular and made of coral lime; thus, we have few written discussions of traditional house forms.

House studies throughout the Austral archipelago suggest that the status of the house occupants and possibly house function were reflected in house form, house size, and site proxemics. Some studies suggest that chief houses (or royal houses) were large in size, were constructed from elaborate raw materials, were decorated with elaborate media, and held commanding views of key resources, like watersheds, river mouths, and reef passes (Aitken 1930: 30; Edwards 2005; Hermann et al. 2016; Morrison 1935: 66-67). Royal houses of the chiefs and specialized houses of the priests were often found in association with important ceremonial sites, like marae. An example can be seen in Figure 2, a depiction of Marae Pomoarau from Raivavae, where stone platform C was interpreted by Routledge to be a royal house. This royal house exhibits the use of elaborate raw materials, as worked red tuff blocks were incorporated into its architecture, including the house curbstones (Routledge and Routledge 1921: 451, Figure 11).

5. Results: Rurutu House Data from Archaeological Survey

Data from 124 house structures, including oval-ended and rectangular houses and stone pavements, were recorded on Rurutu during the Verin and CPSH surveys. Here I explore how we can use these archaeological survey data to determine what pre-contact Rurutuan house sites looked like and how they functioned.

Oval-ended houses situated on rectangular upraised stone platforms are the most common house form, comprising 75% of the total population (Table 2). These houses likely looked similar to 1920s Austral Island houses that were still fabricated from traditional materials, like those documented by Stokes in Rimatara (see Figure 3). These data confirm ethnohistoric data suggesting that oval-ended forms were the most common house type on Rurutu at European contact. Yet interestingly, a few rectangular houses have been documented in three of the island's districts through archaeological survey (less than 1% of the total). Pavements potentially related to pre-contact habitations have also been mapped in five of the island's districts (23% of the total); whether these functioned as domestic areas or other sorts of craft areas has yet to be determined.

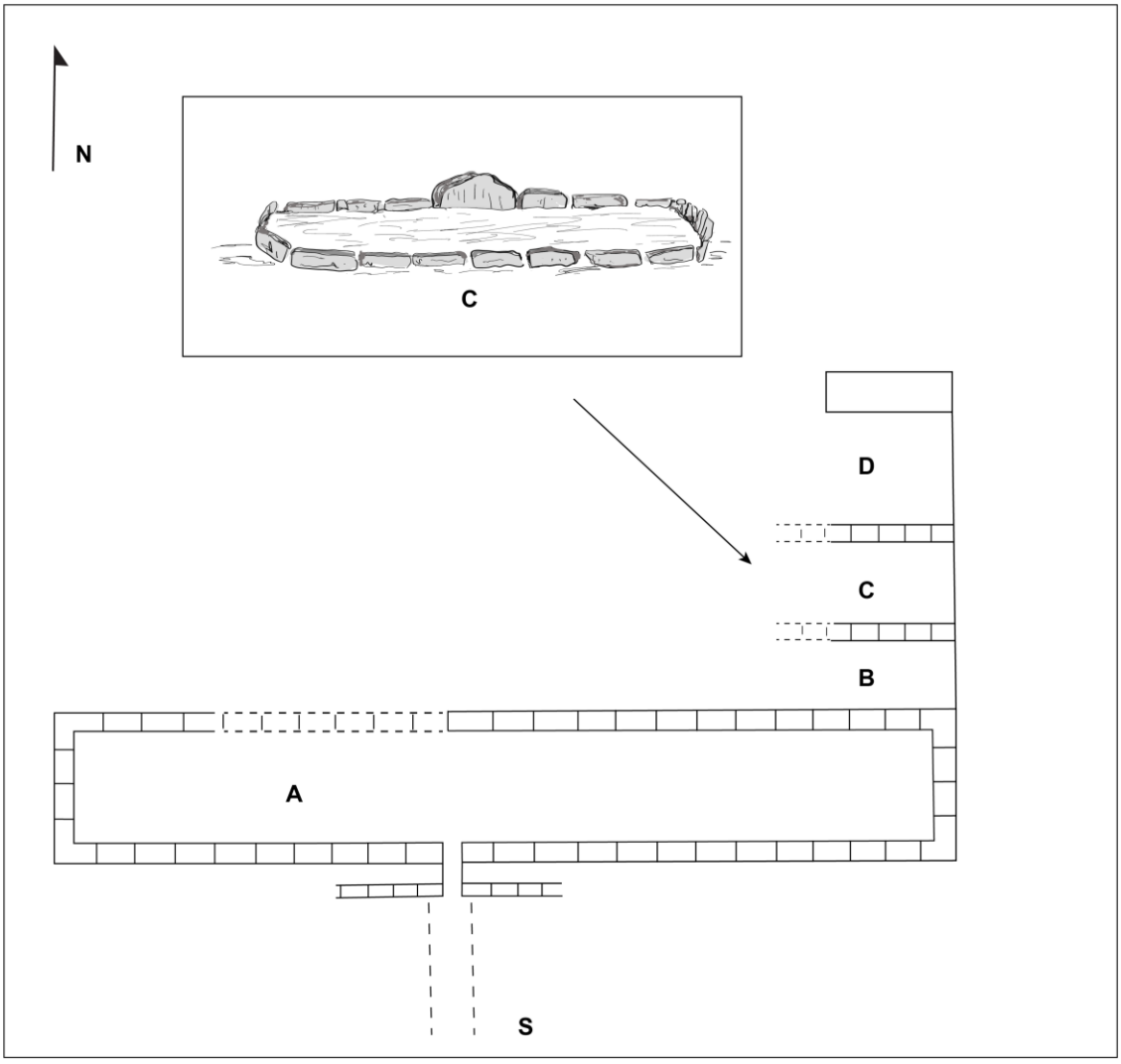

Figure 2: Illustration of Marae Pomoarau, Raivavae Island, as depicted in Routledge and Routledge. The inset shows a closeup of Structure C, interpreted by Routledge as a royal house.

Table 2: Inventory of Surveyed House sites, Rururu Island. After Verin 1969: 35, DCP Unaa report June 14-26 1979, with small additions and changes made by the author.

House Type		**Socio-political District**									**Total**
		Auti	Avera	Moerai	Naairoa	Narui	Paparai	Peva	Una‘a	Vitaria	
Oval-ended	Regular (average size, domestic use)							5	4	72	81
	Royal		1				1				2
	‘Are Arioi			1			1			1	3
	Meeting House, War Council House			1						2	3
Rectangular						1			2	4	7
Pavement			1			2	2		22	1	28
Total			2	2		3	4	5	28	80	124

Figure 3: A traditional oval-ended house from Amaru, Rimatara, Austral Islands photographed in the early 1920s (F. G. Stokes, n.d), courtesy of the Bishop Museum archives.

The survey data are both heavily skewed towards oval-ended house structures and structures situated in the Vitaria district (120 of the total of 124), where Verin focused his survey. Thus, it is impossible to explore district-level variation in house form on Rurutu. Given these issues, my discussion below will concentrate on the Vitaria district oval-ended house site sample, as it is the most representative sample of the overall population. In particular, the southern Vitaria house sample is the most robust data set for analysis because Verin mapped all structures in a .111 km^2 sample of this socio-political district (Figure 4, redrafted from Verin 1969: 58, Figure 13). In Figure 4, southern Vitaria house platforms are depicted in dark grey and oval-ended houses are depicted in white, the only exception is the ʻAre Arioi site, whose house foundation is in speckled black-white. Structures with likely ritual or ceremonial function, notably marae, shrines, and tombs, are colored black. Given its intact settlement pattern, the southern Vitaria subsample is conducive to both quantitative analysis and qualitative analysis (like nearest neighbor analysis). My analysis below predominantly focuses on three key features: the size of the stone paepae upon which the house rests, the size of the house, and the height of the stone platform. Other potential axes of variability, like site proxemics, including spatial proximity to ritual sites (marae, shrines, etc.) and specialized house sites (meeting houses, council houses, ʻAre arioi) will be explored, in addition to raw materials used (particularly coral or red tuff) and the number, placement, and height of stone uprights. In most cases, my datasets include only those oval-ended house structures and stone

foundations that were well preserved and whose complete dimensions could be measured (n=55 of the total of 75 oval-ended houses found in Vitaria [73%].

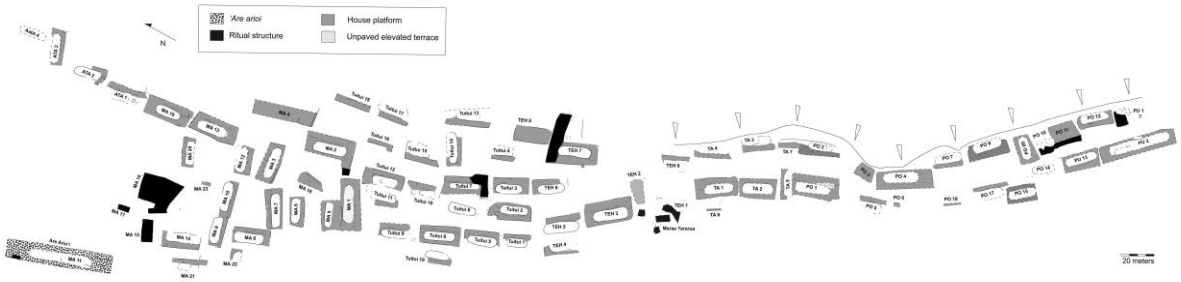

Figure 4: Surface architecture in South Vitaria, modified from Verin 1969: Figure 13.

5.1. House Size and Height Characteristics

On Rurutu, the upraised stone platforms (*paepae*) upon which oval-ended houses are found are commonly faced with cut beachrock slabs placed on end. The latter are locally known as *papa*. House platform size ranges from a low of 82.5 m^2 to a high of 748 m^2, with an average size of 249 m^2 and a high standard deviation (105.6). Figure 5 demonstrates how the highest size house platform frequencies are in the 151-200 m^2 and 201-250 m^2 size ranges. Interestingly, of the houses with the largest foundation platforms, the top ten largest include two '*Are arioi* (one in Vitaria, Ma 11, the other from Paparai, AAP, as identified by Seabrook 1938: 125; Verin 1969:34-35, 248), one council meeting house (Teh 3, Verin 1969: 40, 118), and one likely specialized house (Ma 1) as based on ethnographic, ethnohistoric, and archaeological survey data. Thus, house platform size appears to be an important axis of variability for parsing out structure function and social status.

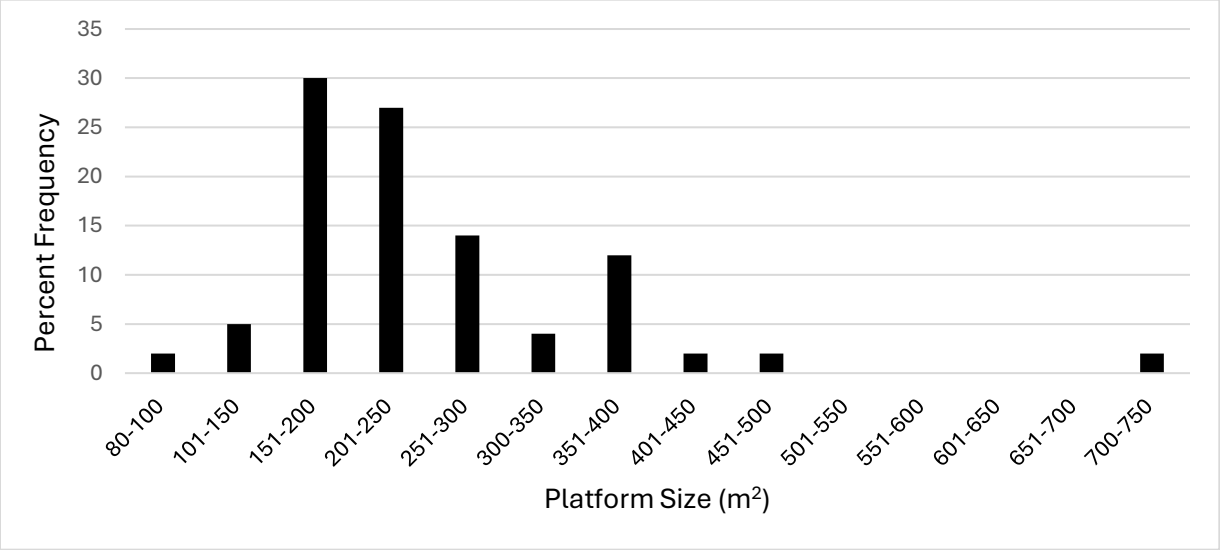

Figure 5: Frequency of house platform size (m^2) by size range

House size can also be measured as houses were demarcated by curbstones placed on end either in the form of a rectangle or an oval. For the oval-ended house sample, house size exhibits much diversity, ranging from a low of 33.25 m^2 to a high of 747.5 m^2 with an average size of 98 m^2, but has a tighter range than house platform sizes and hence a lower standard deviation (30.7). As Figure 6 illustrates, most house outlines are in the 50-100m^2 size range. At 210m^2 Ma 11, the 'Are arioi in Vitaria, is over two times as large as any of the other house structures (see Figure 7); it is the only house in the 201-250 m^2 size range in Figure 6. Interestingly, the top ten largest house sites include two 'Are arioi (Ma 11 the one in Vitaria and the one in Paparai), the council meeting house (Teh 3), and two other house sites interpreted as possibly specialized based on archaeological survey data (Pu 2, Ma 1, see Verin 1969: 56-57), thus almost mirroring the house foundation size dataset. House size then also appears to be an important axis of variability for parsing out structure function and for distinguishing sleeping houses from those with specialized use.

The scatter plot in Figure 7 illustrates the relationship between house platform height and house size. A correlation coefficient of .8 indicates a strong positive relationship between the two variables. The red circle in Figure 7 delineates structures with both the largest house platforms and the largest house area. Of these, 50% have both quite large platform height and house size, indicating that the largest houses tend to be situated on the largest stone platforms. Two of these sites are the only 'Are arioi represented in the dataset (MA 11, AAP), one is a council meeting house (Teh 3), one is a royal house (Teh 7), and the others are likely to be specialized houses or royal houses. Thus, house size and house platform size are important variables for distinguishing sleeping house status from those houses with specialized, and often elite, use.

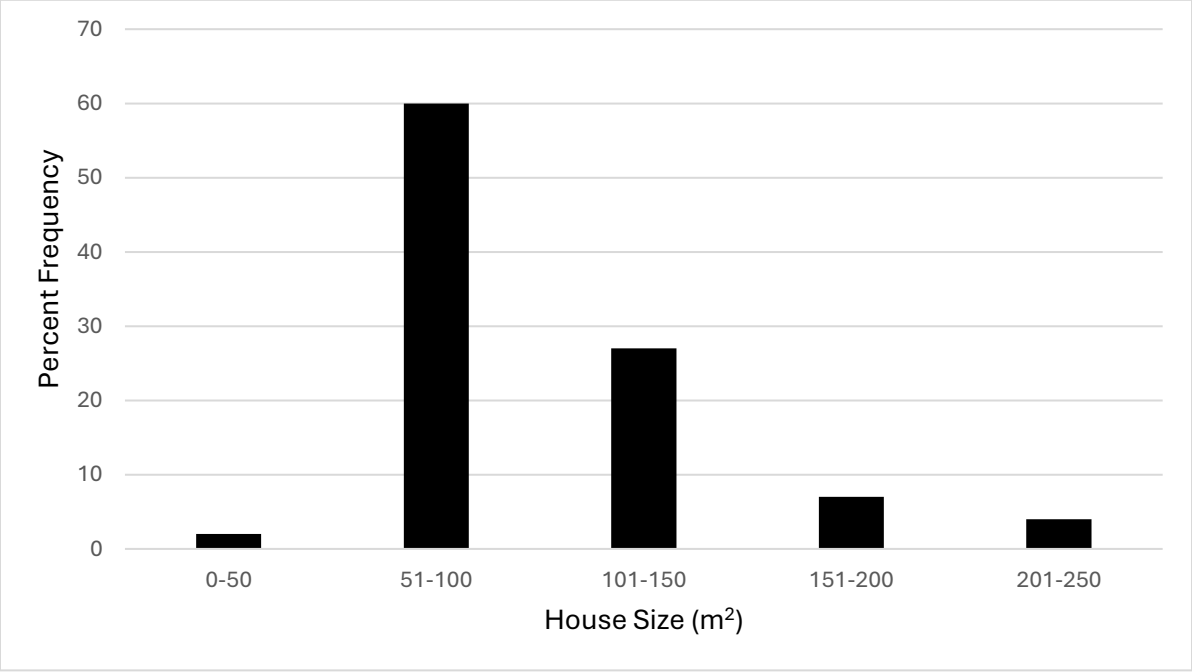

Figure 6: Frequency of house size (m^2) by size range.

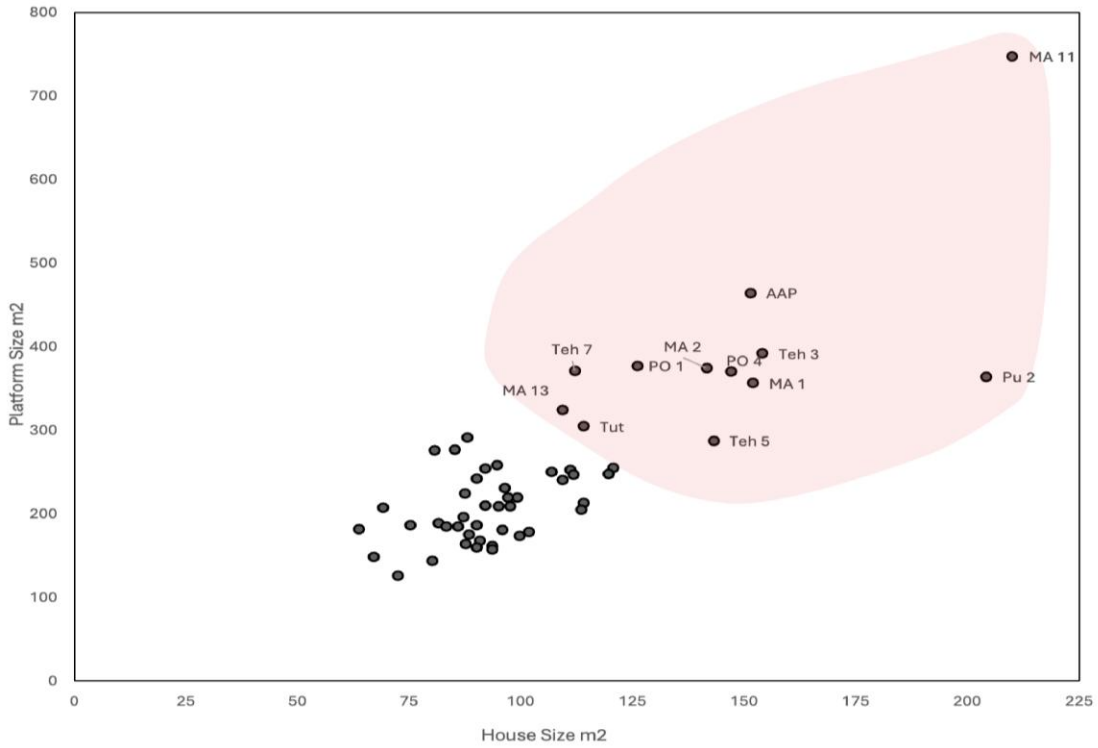

Figure 7: Frequency of house size (m²) by size range

House platform height varies from insignificant at 0.05 m to moderately high at just over 0.5 m (Figure 8). Platforms of modest height, .2 - .3 m, are the most common, forming 54% of the total, while only 16% of platforms are of high height (.3 - .6 m). Four of the ten highest house platforms include sites with large house area and house foundation area (Ma 1, Ma 11, Ma 2, Po 1). Given that some, but not most, house platforms with high height do not exhibit large platform size or house size, this characteristic may play a role in distinguishing houses by function or social status at the local neighborhood scale rather than the sociopolitical district scale.

5.2. Raw Materials Used in House Construction

House construction materials can only be discussed in a qualitative manner, as Verin did not always differentiate between cut and faced coral blocks versus cut and faced beachrock slabs used to face the stone house foundation and/or used as house curbstones. In the overall dataset, houses interpreted as possible specialized houses and royal houses have higher frequencies of cut and faced beachrock and coral blocks used in their platform or house facings, while smaller sleeping houses (perhaps of non-elite or lesser elite rank?) sometimes lack coral or beachrock facings, as unworked basalt slabs were substituted in their place. Specialized houses like Teh 2 also see the use of flat coral slabs in the paved portions of the house platform (Verin 1969), while royal and non-royal sleeping houses have pavings made exclusively from waterworn basalt cobbles.

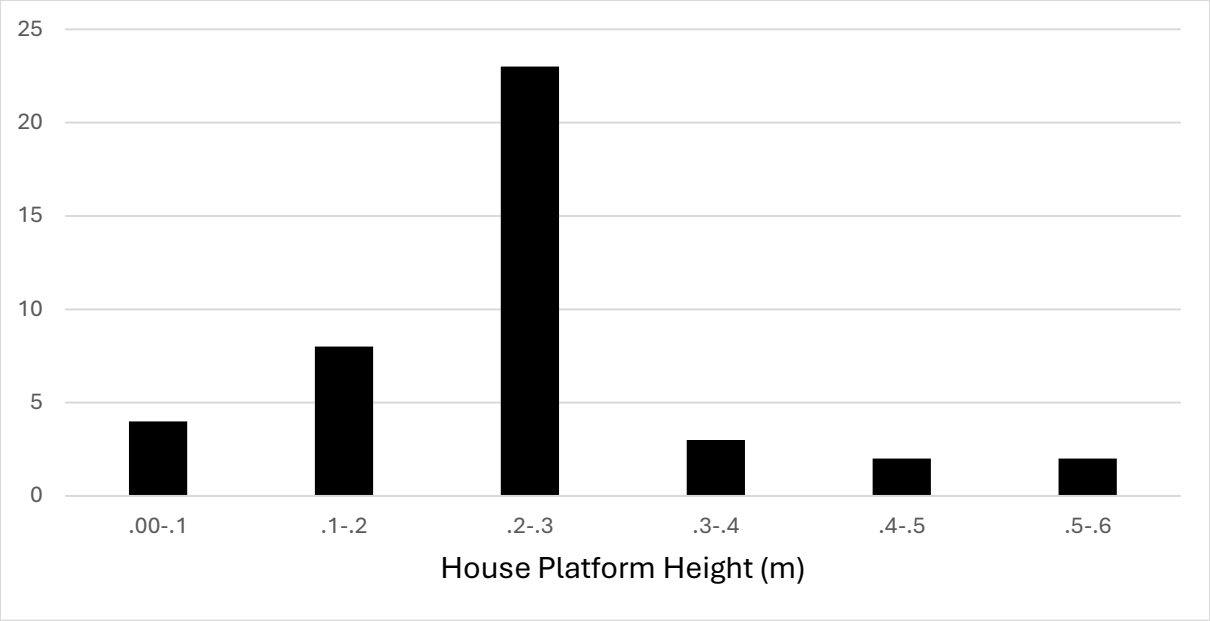

Figure 8: House platform height (m) by count

A few houses see variable use of other types of raw materials. Tui 5, a moderately large oval-ended house on a moderately large platform, has a cut and faced red tuff cornerstone (Verin 1969: 82-83). In Eastern Polynesia, Handy has argued that "red (kura) as a color was very generally associated with the idea of chiefhood and mana" (1927:131), thus signifying that this house may be of elite status. Teh 5, a large house oval-ended house on a large platform, has three coral uprights (Teh 5, see Verin 1969: 78), the only house of its kind to see this unique use of raw material. The color white could have sacred connotations and was used to signal tapu (sacredness or restricted) status (Kahn and Kirch 2014; Molle et al. 2023: 42). Thus, some moderately large to larger houses with unique architectural embellishments may have signaled elite status or specialized use, while in contrast, smaller sleeping houses lacked fancy architectural embellishments and may have been linked to lower social classes, whether lesser elites or commoners.

The number and placement of stone uprights on the upraised stone platform also vary among the house sites. I will return to this more in my Vitaria case study below.

5.3. Site Proxemics

As previously discussed, ethnohistoric sources suggests that chiefly houses (or royal houses) or those of elite occupational specialists, like priests, were sometimes situated near ritual sites, like marae. Utilizing Verin's sample of southern Vitaria district house structures (Figure 4), I examine the nearest neighbors for three subset categories of the Rurutu data: the ten largest house foundations, the ten largest house areas, and the ten houses with highest platform height in Figures 9a-9c. The goal is to see if exceptionally large houses, or those with the largest or most elevated house foundations, were situated near ceremonial sites like marae, shrines, or tombs (depicted as ritual structures in black).

In Figure 9a, the largest southern Vitaria house platforms (those in the top ten largest group of the total house population) are seen in red. Notably, all of these houses are situated nearest to ritual sites or incorporate a ritual component, such as paved shrine-like appendages with rows of stone uprights directly into their own architecture. I must, however, qualify that house Pu 2, which is adjacent to a moderately sized oval-ended house (Pu 13) is also close to Pu 1. I have interpreted Pu 1's function as likely ritual, but Verin failed to offer a detailed description of this site, so its function is a bit ambiguous. However, Verin (1969: 258) noted the presence of a coral cupule with traces of fire-use at Pu 1 and suggested that the site may have had a ceremonial function (Verin 1969: 258), leading me to provisionally type Pu 1 as having a likely ritual function (denoted by the "?" on Figure 9a). If we accept this functional designation, all of the largest Vitaria house platforms are situated near structures with ritual function. In Figure 9b, the largest Vitaria houses (those in the top ten largest group) are seen shaded in yellow. Several (five of the nine) have nearest neighbors that are ritual structures or second nearest neighbors that are ritual sites. The three exceptions include houses whose nearest neighbors are other houses. Site proxemics then highlight that many, but not all, of the largest houses are near ritual sites. Finally, in Figure 9c, the highest house platforms in Vitaria (those in the top ten largest group) are shaded in green. Five of these have nearest neighbors that are ritual sites. While not definitive, site proxemics do appear to play a role in the structure of settlement space, as 56-100% of the time house sites with large area, large stone platforms, or high height are found in close association with ritual structures.

In sum, exploratory data analysis of the total sample of Rurutu houses with size data recorded suggests that several variables, like the size and height of foundation platform, the size of the house, the raw materials used in house construction, and site proxemics are important for differentiating sleeping houses of probable non-elite or lesser elite status from royal sleeping houses and specialized use structures. Below, I turn to house sites and other structures surrounding the Teh 1 marae site in Vitaria to investigate these variables at a finer scale of analysis.

5.4. Vitaria Case Study

Marae Tararoa in the Tehautamatea complex of Vitaria, the island's most nucleated chiefly center, was first mapped and surveyed by Pierre Verin and Marimari Kellum (Verin 1969: 59, fig.13; Wallin 2000). It is found roughly in the middle of the landscape scale settlement pattern map of the southern Vitaria surface architecture (see Figure 4). The CPSH later completed test excavations at the marae (Graffe 1980a), while more recently, Rolett and colleagues (2015) studied an adze quarry found in association with the site. At the request of the site's landowners, I, along with Erika Radewagen, spent three weeks remapping and resurveying the site in late 2024. My description of the chiefly complex follows those found in Verin 1969, Rolett et al. 2015, and my own survey notes.

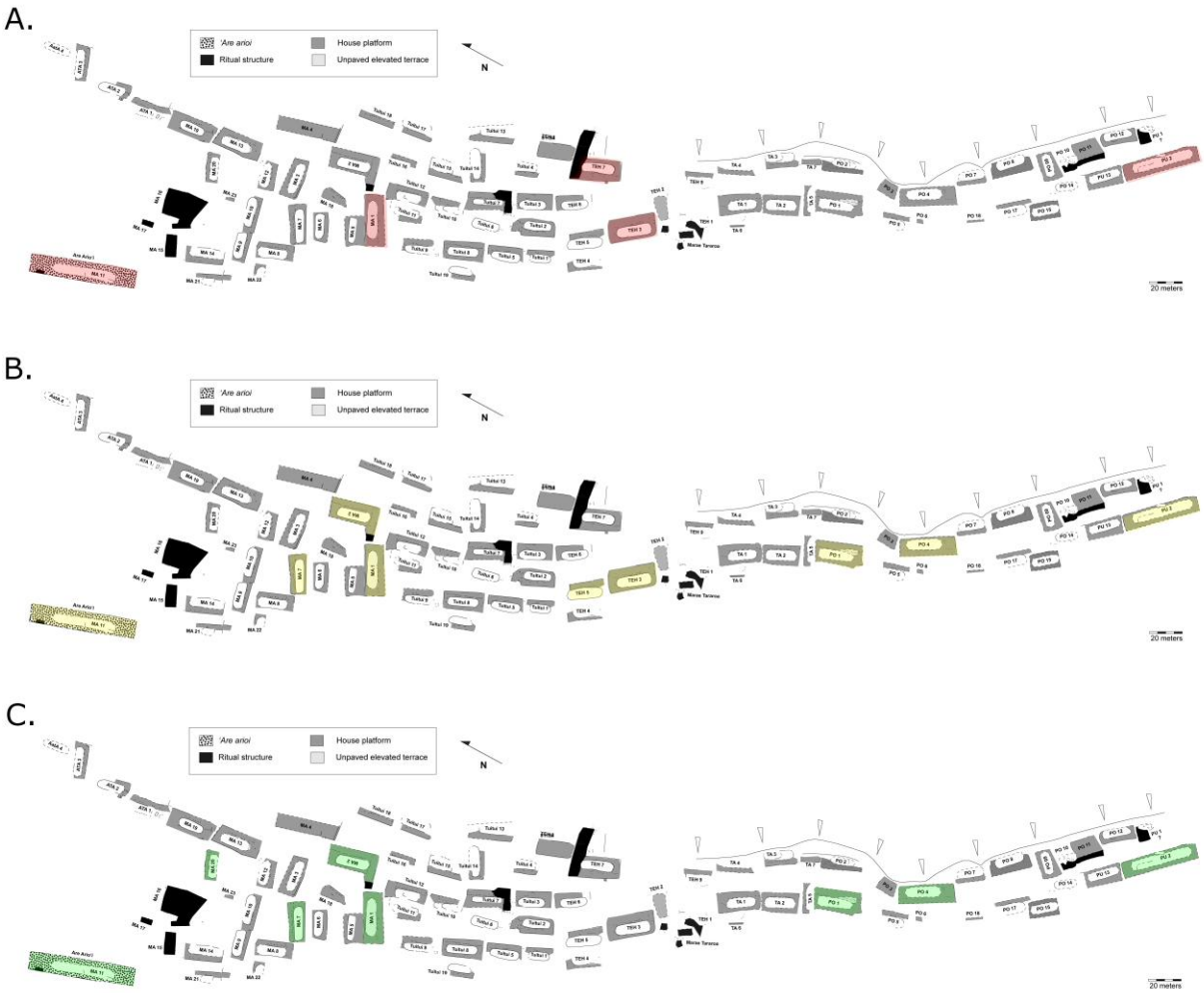

Figure 9: The Vitaria Landscape. A) The southern Vitaria landscape map, with the top ten largest house platforms depicted in red. B) The southern Vitaria house platforms, with the top ten largest houses seen in yellow. C) The southern Vitaria house platforms, with the top ten highest house platforms seen in green.

The Tehautamatea chiefly center is comprised of a series of seven large oval-ended house sites constructed on large, upraised, and internally paved terraces. These houses are found in proximity to a ceremonial meeting ground (Teh 2), and a marae (Tararoa, Teh 1) (Verin 1969: 118-122; Rolett et al. 2015: 460-461) (see Figure 9). Marae Tararoa, seen in yellow in Figure 10, includes a rectangular paved area with two raised platforms and a rectangular a'u. Two stone and beachrock-lined cists are found on the western and eastern edges of the marae. Based on site morphology, oral traditions, and ethnographic interviews, Verin argued that five of the oval-ended houses in the complex were high-status sleeping houses (Teh 4-6, 9), seen in Figure 10 as light orange. Another round-ended house, Teh 7, was interpreted as royal residence/chiefly residence (Teh 7), given oral traditions recorded by Stokes (n.d.a, b). This house has a series of shrines appended to its NE corner, seen in purple in Figure 10. Oval-ended house Teh 3, depicted in green, was described as an 'are patiri, or war council house, while Teh 2, seen in dark blue, was described as a council meeting house. Among the new structures that I mapped but which were lacking from Verin's map, are Teh

12, a large, rectangular flat delineated on two sides by well-constructed stone walls. This structure, which is situated between the royal house Teh 7 and the meeting house Teh 2, and shown in grey in Figure 10, seems to represent a public meeting area of some kind.

5.5. House Size and Height Characteristics

Table 3 provides data on house platform size and height, house size, and raw material components for house site platforms, curbstones, and pavings for structures Teh 2 - 9 at the Tehautamatea complex. Average house platform size at the complex is 235.45 m^2, slightly lower than the average for the larger population (249 m^2). Yet Teh 2, the meeting house, skews this dataset, as it is noticeably smaller than the other house types at only 50 m^2. If the meeting house is removed, the average house platform size rises to 261.49 m^2, which is greater than the overall average for the island-wide sample (249 m^2). The war council house Teh 3 has the largest house platform at 462.6 m^2, followed by the royal house Teh 7 at 381.3 m^2, and then the non-royal sleeping houses. Thus, like the island-wide sample, the Teh house sample suggests that some specialized houses and royal houses are larger than other sleeping houses.

Table 3: Tehautamatea Chiefly Complex, House Size and Architectural Characteristics (after Kahn unpublished field notes, Verin 1969).

Site #	Function	Platform Area (m)	Platform Height (m)	House Area (m)	Platform Facing	Platform Paving	House Facing
Teh 2	Meeting House	50.0	.20	50.0	Cut Beachrock/ Basalt	Waterworn basalt, Coral, Beachrock slabs	Cut Beachrock, Basalt
Teh 3	War Council	462.6	.23	161.3	Cut Beachrock	Waterworn basalt	Cut Beachrock
Teh 7	Royal Sleeping House	381.3	.25	110.0	Cut Beachrock	Waterworn basalt	Cut Beachrock
Teh 4	Sleeping House	195.5	.10	103.1	Cut Beachrock	Waterworn basalt	Cut Beachrock
Teh 5	Sleeping House	287.5	.20	143.0	Cut Beachrock and Basalt	Waterworn basalt	Cut Beachrock
Teh 6	Sleeping House	162.5	.20	93.6	Cut Beachrock	Waterworn basalt	Cut Beachrock
Teh 8	Sleeping House	182.2	.25	63.75	Cut Beachrock	Waterworn basalt, only partially paved	Cut Beachrock, Basalt
Teh 9	Sleeping House	162	.15	93.5	Cut Beachrock	Waterworn basalt	Cut Beachrock, Basalt

Average house area is 102.28 m², but again, this data is being skewed by the small area of meeting house Teh 2 (50 m²). If that house is removed, the average house area for the Teh sample is 109.75 m², which is greater than the average house area for the island-wide sample (98 m²). These data highlight that the Teh houses, excluding Teh 2, trend towards being larger in size. In the Teh house sample, house area also tends to correlate to platform area; namely, the houses with the largest platforms (Teh 3, 7) tend to also have the largest house area.

Figure 10: Landscape scale map of Tehautamatea chiefly complex, black circle represents clustered rituo-political and domestic structures associated with the ruling chiefs.

Similar to the island-wide sample, platform height varies little among the Teh houses (10-.25 m). Of interest is the Teh 4 structure, which has the lowest platform height at .10 m. Based on the surface remains, I believe this is one of the oldest house structures built within this complex. Teh 4 is the southernmost house structure found at Tehautamatea. It is situated in what likely used to be a row of pre-contact house sites running E-W that were situated with closest proximity to the ocean; other sites likely situated in the same row had already been destroyed at the time of Verin's survey to create a coconut plantation (Verin 1969: 76). Whether there was a third E-W row of house sites aligned with Teh 4 could be tested by augering to the northeast of Teh 4 along the coconut plantation flat, while the potential early construction sequence for Teh 4 could be confirmed via excavation and 14C dating.

In sum, at the Tehautamatea chiefly complex, platform size and house size often seem to index house type or function, with larger house platforms and house areas typically conforming to specialized use houses or royal houses. Yet Teh 2, the meeting house, is an exception to this rule. The Tehautamatea house data then suggest that the size of the house and house platform alone are not enough to determine house type or house function. Yet notably, Teh 2 does differ from the other house structures in the complex in its shape, which is more tear-drop shaped than oval, in its lack of a foundation pavement, and in its use of fancy architectural materials, frequent stone uprights, and tall stone uprights as architectural embellishments, which will be described below.

5.6. Raw Materials Used in House Construction

Like the island-wide house sample, raw material treatment varies little across the Teh houses. Yet of interest, the ceremonial meeting ground, Teh 2, while small in size, does see the use of both coral and beachrock slabs in its paving (Table 3). Two of the non-royal sleeping houses (Teh 8, 9) have mixed beachrock and basalt house facings rather than fully beachrock facings, as does Teh 2.

The number of stone uprights, the number of rows they are placed in, and their height varies substantially across the Teh houses (Table 4, Figure 11). The overall number of stone uprights per house ranges from 0-28. Uprights tend to be bimodally distributed, with houses either having none or few (0-2, four houses) or high numbers (16-28, four houses). While small in size and in height, the meeting house, Teh 2, has the highest number of stone uprights (n=28) as well as the tallest uprights (three > 1m). Rather than being situated in rows along a foundation platform, the stone uprights at Teh 2 border the edge of the house curbstones. The tallest upright (1.9 m) is named Teari'i Uira; oral traditions indicated that this was the seat for the chief (Verin 1969: 118). The war council house (Teh 3) and royal house (Teh 7) have four plus rows of uprights, some aligned in rows parallel to the long end of the house, and others parallel to the short ends of the house; these houses also have tall uprights (.7-1.2 m in height). Teh 3 also has one of the most massive uprights in terms of its overall dimensions, (.80 m wide x 1.25 m tall), in addition to another tall upright (.96 m) situated near one of the ends of the round-ended house which may have served as a backrest stone (Verin 1969: 73). In contrast, the other Teh sleeping houses have only one row of uprights parallel to the long end of the house, which commonly, but not exclusively, are of moderate height (.4-.7, with one being .9 m). Given that specialized houses and royal houses have high numbers of uprights, often situated in multiple rows with differing alignments from non-royal houses, and that these uprights are often of high height, data suggest that stone uprights are generally a good indicator of house type or house function.

Table 4: Tehautamatea Chiefly Complex, Spatial Proximity of Houses and Additional Architectural Characteristics

Site #	Function	Nearest Neighbors	# Rows Uprights /Backrests	Location Uprights/ Backrests	# Uprights	Max Height Upright (m)	Coral Uprights	Unique Architectural Features
Teh 2	Meeting House	*Marae* and War Council House	1	Around the edge of the house/platform	28	1.9 (named)	Yes	Interior Cyst/Hearth
Teh 3	War Council	*Marae*, Meeting House, Sleeping House	5	Two long axis of house, one short axis of house, two short axis of platform	19	1.2		Multiple Interior Cysts/Hearths, Square cyst, Special upraised paving on the paving,
Teh 7	Royal Sleeping House	Sleeping Houses, Open Meeting Area near Meeting House and War Council House	4+	Two long axis of house, one short axis of house, one short axis of platform	17	.7		Interior Cysts/Hearth, Kava preparation beachrock slabs
Teh 4	Sleeping House	Sleeping Houses	1	One long axis of house	2	.5	No	Lowest elevation, bisected by Teh 5, potentially older?
Teh 5	Sleeping House	Sleeping Houses	1	One long axis of house	16	.9	Yes	
Teh 6	Sleeping House	Sleeping Houses	1	One long axis of house	2	.7	No	
Teh 8	Sleeping House	Royal House, Sleeping Houses	0	N/A	0	---	---	Poor construction, lacks back terrace wall, built into slope, back of house is back of terrace
Teh 9	Sleeping House	Meeting House, House	1	One long axis of house	1	.42		Poor condition

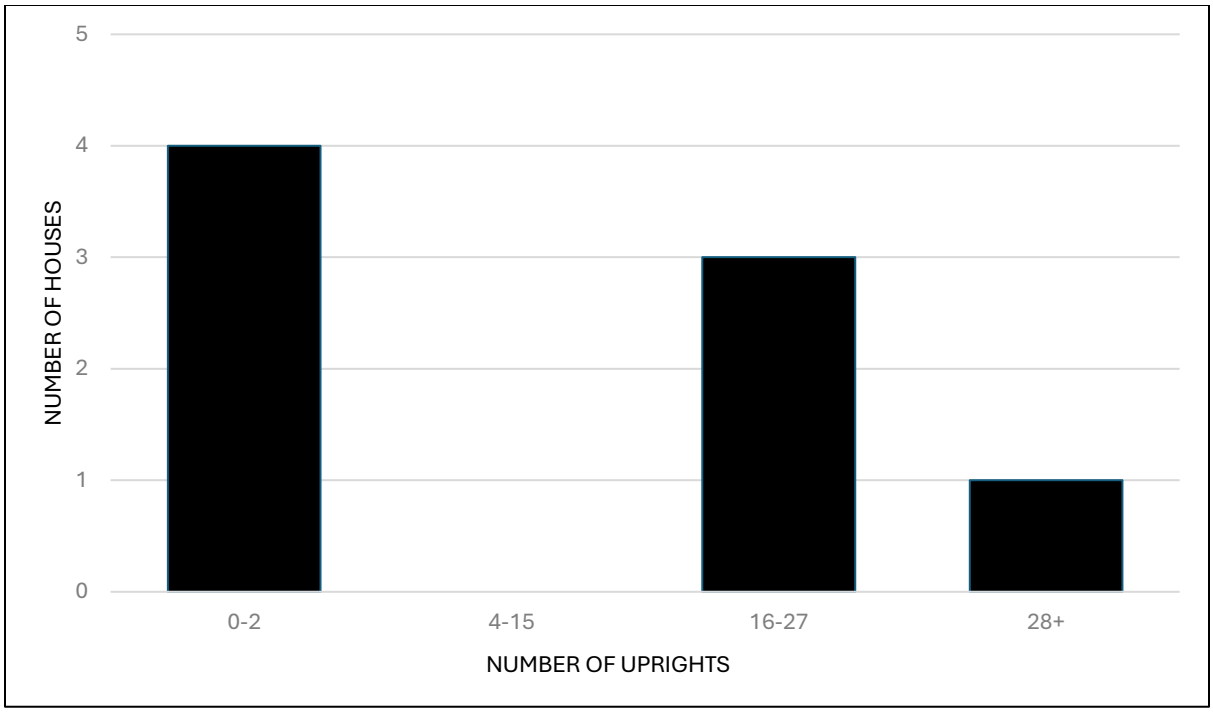

Figure 11: Total upright number by house site, Teh house sub-sample.

5.7. Unique Features

Several of the Teh houses have unique architectural features within or exterior to the house. Teh 7 is a prime example, as it has a series of three rectangular pavements (I-III) with rows of uprights attached to the northern end of the house platform (seen in purple on Figure 10). Verin (1969: 79) and Stokes (n.d.a, b) interpreted these architectural features as components of a marae. However, because these contiguous pavements lack a'u, but do have rows of uprights along all four sides, I have interpreted these features as shrines, similar to those found in the Society Islands (Green 1961: 171). The northernmost shrine III includes a small beachrock-lined cist which likely had a ritual function. To the west of shrine II, another shrine-like feature, comprised of a stone pavement bordered by stone uprights on its north and south faces, is found. While disturbed, this paving was likely faced with beachrock slabs in the past. Verin (1969) argued that this was a burial, but it may have also functioned as a shrine.

Teh 7 also has a unique beachrock slab feature attached to the south wall of its stone foundation. This beachrock slab has two cupules in it. The property owner suggested to Verin that it had been used to prepare ritual beverages in the past, while Verin argued, based on ethnographic analogy with the Cook Islands, that this feature served as a preparation area for kava (1969: 80). Thus, Teh 7, interpreted as a royal house, has attached ritual architecture (shrines) and a feature likely used for the preparation of ritual beverages, belying both the important social status of its residents and their clear role in ritualized activities.

Teh 2 and 3 have small rectangular beachrock-lined cists (found within the house for the former and exterior to the house on the stone platform for the latter) which Verin's interlocutors suggested were used to bury elite children's umbilical cords (1969: 73, 118). These data suggest that small internal beachrock-lined cists are good indicators of house status and specialized house function.

5.8. Site Proxemics

Like unique architectural features, site proxemics exhibit some clear patterning in relation to house status and house function. As seen in Figure 10, spatially, the meeting house (Teh 2) seen in dark blue, and the war council house (Teh 3) seen in green cluster with Marae Tararoa (Teh 1) seen in yellow. The royal house (Teh 7) in red also forms part of this central cluster if we take into account the more open meeting area (Teh 12) shown in Figure 10 in grey found between the royal house and those two structures. All of the non-royal sleeping houses are found along the edges of this core part of the Tehautamatea complex, with the core being comprised of elite domestic and specialized use houses and ritual structures.

5.9. Discussion: Vitaria Case Study

Given that the Tehautamatea complex is Rurutu's only nucleated chiefly center and given that it housed the most powerful chief at the time of European contact, we must assume that all of the structures in this complex are of high status, even if only a few are linked to royal status. In terms of differentiating high status sleeping houses from royal or chiefly sleeping houses from specialized houses, the following characteristics seem to be the most salient when used in conjunction with one another: platform surface area, house surface area, use of special raw materials, the presence of interior cists, the presence of attached shrines, and the presence of unique beachrock slab features with cupules. The number and distribution of uprights or backrest stones are important, including their total number, their placement on the house platform, and their height. Site proxemics are also key, as temples, specialized houses, and royal houses tend to cluster together.

5.10. Developing a Preliminary Chronology

Before closing, we must ask to what extent variation in Rurutuan house morphology perhaps reflects change through time? My recent AMS radiocarbon dating of largely short-lived samples adds to the corpus of dated domestic sites and rockshelter sites on Rurutu (Kahn 2025). Integrating these new dates with Boltt's earlier chronology refined our knowledge of the Archaic (A.D. 1280–1410) and Classic Periods (A.D. 1600-1799–1821), and hinted at the potential to add another middle phase between the two (Kahn 2025: 105). Rurutu's current chronological sequence suggests that initial colonizers of Rurutu lived both in coastal rockshelters (Kahn 2025: 105) and on coastal sand dunes where they built house platforms with coral paving stones (see Boltt 2005: 146; Figure 4.12). Rurutu house sites dating to the Archaic period are of indeterminate shape and size, but those from the neighboring island of Tubuai are at times oval-ended in shape and of moderate size, between 5–7 m long and 2.5–3.0 m wide (Layer V-VI and III houses in Figure 10-11, Hermann et al. 2015: 40-41). At this time, food preparation activities are already being kept separate from the sleeping houses in isolated cook houses.

The 15th-16th centuries saw continued use of rockshelters, like Te Ana Eva, for habitation. Formal rectangular house sites, large specialized 'Are arioi, and other large specialized house sites like war council houses date to the late 17th century in the Classic Period, although sample sizes are limited (Kahn 2025: 107). It is interesting that varied Rurutuan sites with surface architecture, like marae, habitation sites, and specialized houses, largely date to the Classic Period. If larger sample sizes of specialized houses continue to yield late 17th century dates, this will mirror data

from the complex chiefdoms of the Society Islands (Kahn 2021). Such data would be indicative of political centralization, increasing elite power, and greater social exclusivity, whereby Rurutuan chiefs expanded and elaborated their chiefly centers to accommodate large corporate rituals and community-scale economic events.

6. Discussion: Comparative Analysis with Melinda's Marquesan Dataset

If we return to the research questions described at the outset, I can argue that yes, aspects of Rurutuan house form, size, and architectural elaboration can be used to differentiate non-royal residential houses from royal house sites and specialized house sites. A comparison with Melinda's Anaho, Marquesas study suggests inter-archipelago variability vis-à-vis which elements of house architecture were elaborated in Open chiefdoms. Anaho house platforms have noticeably smaller footprints (areas of 20-60 m^2, mean 61 m^2, largest 174 m^2) than Rurutuan house platforms (areas of 82.5 -748 m^2, mean 249 m^2). However, we might be comparing apples to oranges, as it is still unclear if all Rurutuan oval-ended domestic structures housed individuals of high status, whether lesser elites or royal elites, meaning that we might be comparing high-status Rurutuan houses to a mixed low- to high-status Marquesan dataset. Regardless, Marquesan paepae tend to be significantly higher in height than their Rurutuan counterparts, highlighting that certain features of houses are elaborated differently in local contexts. Overall, the comparative paepae height data lends support to Melinda's hypothesis that localized climatic changes, like extreme rainfall and flooding, influence house architecture strongly in the Marquesas, but perhaps to a lesser degree or not at all in the Austral Islands.

7. Conclusions

As discussed above, Rurutuan house architecture varies substantially, with both house form, size, and architectural elaboration signaling house function and site status. While both residential and specialized house forms have been identified largely on surface data alone, their specific associations with class types are still murky, as most sites heretofore studied are from elite contexts, with the Vitaria case study representing an elite royal context. It remains unclear if oval-ended house variability materializes a range in social statuses, from commoner to lesser elite to royal elite. This question can only be answered with expanded datasets from excavated contexts.

In terms of changing house form through time, there are hints that Rurutuan houses both get larger and their surface architecture becomes more elaborate. I believe these shifts may be due to social factors, like the accumulation of power by diverse social personae (chiefs, warriors, priests, and perhaps craft specialists) and increased chiefly competition through time. However, to better understand when the first house sites with surface architecture were constructed and used, and how their change through time might be linked to other macro-scale processes, modern excavations at a broader number of sites are required, as is a larger corpus of radiocarbon dates.

Despite the high utility of relying solely on surface architecture, site size and morphology, and site proxemics, a more holistic study of diverse lines of evidence drawn from the micro-scale would provide a more robust dataset to understand the relationships between domestic site types, social

status, and inequality in the Austral Islands. Additional analysis of material assemblages from already excavated domestic sites, including faunal analysis and lithic analysis, would significantly aid in understanding how social status, whether elite or commoner, chief or ritual or occupational specialist, maps onto domestic sites on Rurutu Island. Likewise, additional work is also needed to understand how house architecture reflects site function and site status in other socio-political districts outside Vitaria. House sites from the Unaʻa sociopolitical district might represent a good comparison. This district is just adjacent to Vitaria, and archaeological survey there suggests the district's marae are small in scale. Furthermore, rectangular house sites appear to outnumber oval-ended house sites in Unaʻa, suggestive of inter-district level variability (CPSH 1979b; Kahn unpublished data, 2025).

Finally, taking a more regional approach to understanding domestic architecture throughout the Austral Islands would provide important data for understanding inter-archipelago interactions. While limited, survey and excavation datasets exist for Tubuai (Hermann et al. 2015), Rimatara (Eddowes 2004), Raʻivavai (Edwards 2005), and Rapa (Anderson et al. 2012; Heyerdahl and Ferdon 1965; Walczak 2003). Key questions remain unanswered at the archipelago level, such as: do all of the Australs share similar forms of domestic architecture and use, or do we find variation within the archipelago? Broadening both the sample of sites studied and incorporating more holistic analysis of diverse data sets will undoubtedly enumerate how changes at the micro-scale give us insight into macro-scale structures in pre-contact Eastern Polynesian chiefdoms.

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Data Availability Statement

Analysis of the data from the Vitaria chiefly center is still in progress. Data availability will depend on the desires of the current landowners.

Partnerships

Partnerships with the Vitaria chiefly center landowners, the mayor of Rurutu, and the island's Council of Elders (Tohitu) were developed starting in 2017. A series of joint meetings between the author and these groups resulted in a list of research questions which have directed the author's research up to the present day. At the start of each field season, the author meets with these key stakeholders to present new data, to discuss potential forms of analyses to be carried out, and to revisit the expectations of the collaborative agreement.

Conflicts of Interest

The author declares no conflicts of interest.

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