RAPA NUI'S POLITICAL ECONOMY AND THE VISIBILITY OF ITS MONUMENTAL ARCHITECTURE

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INTRODUCTION

Rapa Nui has a rich tradition of cultural evolution, adaptation, and monumental labor. While famous for its monolithic moai, a most intriguing development was the construction, rebuilding, and eventual destruction of the island’s approximately 300-ahu. As fixed and sacred secular features in the landscape, ahu acted as cultural stages in which the ancient Rapa Nui drama unfolded, for the platforms provided spatial centers for the social, political, economic, and religious activities of the island’s inhabitants. They also housed ancestral statues (Heyerdahl and Ferdon 1961), human remains (Mulloy 1997), and denoted territoriality (Stevenson 1986, 2002). Drawing on the benefits of using Rapa Nui’s monumental architecture for archaeological analysis and interpretation (Beadles 1990: 1-2), this investigation focuses upon how the island’s chiefs and elites in overseeing ancient political economies is well documented in Polynesia, with examples from Hawai‘i (Kolb 1994; Earle 1997), French Polynesia (Emory 1943), Tikopia (Firth 1967), and Tonga (Kirch 1990b). These studies underline how elite classes “managed and oversaw various aspects of the society, including food production, specialized craft production and prestige goods exchange, and the performance of ritual behavior” (Graves & Sweeny 1993:113).

The large number of monumental works on Hawai‘i, Tonga, and Rapa Nui has been inferred to reflect the complex level of chiefly management, the size of labor force directed by corporate strategies, and intense control over staple resources by elite groups (Kolb 1994; Earle 1997; Stevenson 1997). Also, monumental architecture bolstered chiefly landscapes was demarked by “visualscapes” (Llobera 2003) provided by ahu. These visualsapes supported a panopticon model of surveillance (Foucault 1980; Yekutieli 2006) that enabled chiefly and elite managers to oversee dispersed land-use, populations, and resources. Archaeological analysis focuses on two questions: was the spatial arrangement of resource sectors based on field-of-view intervisibility between and amongst district ahu? And, did this in turn help to denote chiefly control, assisting elites to monitor production and allocation of staple resources? The GIS (Geographic Information Systems) application of viewshed analysis is used to identify commanding visualscapes created by the island’s ahu, leading to a larger issue: how did Rapanui chiefs and elites maintain control over the island’s political economy and influence its socio-political trajectory during the chiefdom integration period? On Rapa Nui, this research seeks to understand how chiefs and elites were able to fund, construct, and maintain the prolific archaeological features found throughout the island.

RAPANUI ELITE

At the peak of chiefdom integration (1400-1600 CE), the Rapanui socio-political system was highly stratified (Métroix 1940) and dominated by a chiefly/elite-monitored political economy (Stevenson & Haas 1998). The importance of chiefs and elites in overseeing ancient political economies is well documented in Polynesia, with examples from Hawai‘i (Kolb 1994; Earle 1997), French Polynesia (Emory 1943), Tikopia (Firth 1967), and Tonga (Kirch 1990b). These studies underline how elite classes “managed and oversaw various aspects of the society, including food production, specialized craft production and prestige goods exchange, and the performance of ritual behavior” (Graves & Sweeny 1993:113).

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found at Maunga Tari (Stevenson 1997), La Pérouse (Stevenson & Haoa 1998), and Vaitie (Stevenson et al. 2005). In these areas, elite retainers oversaw agricultural fields and maintained coastal estates, controlling waterlogged soils, vegetation surfaces, stacked boulder concentrations, pu (steep sided rock depressions), manavai, and planting circles (Stevenson & Haoa 1998; Wozniak 2001). Thus, a chiefly and elite class has been found in both island and coastal regions.

Over time and through the carving of megalithic features, crafts guilds including noai carvers and ahu architects increased their mana and subsequently their political power, and may have become an achieved elite class (Van Tilburg 1988a). Together they either competed and/or collaborated with local chiefs (and perhaps the Miru) for prestige and resource control.

In summary, four groups represented the island’s ancient elite: members of the Miru (henua and pahu), honai, priests (kia atua), and feed mgas. They represented the main catalysts and organizers for the propulsion of Rapa Nui’s ancient political economy.

RESOURCES CONTROL IN THE ORAL TRADITION, ETHNOHISTORIC, AND ETHNOGRAPHIC RECORDS

[After leaving ‘Anakena, Hotu Matu’a led a solitary life and devoted himself to agricultural pursuits. As he was an ariki honua and a sacred person, he should have delegated such work to subordinates and offered only the stimulation of this good advice. He was apparently obsessed with the desire to provide a secure economy for his people. (Englert 1970:84, emphasis added)]

The above highlights two interesting observations. First, that from colonization to the integration of the Rapa Nui chieftain, chiefs and associated elite had managerial authority over a “subordinate” food production and collection. Often, the basis for this managerial authority and chiefly power came from ascribed genealogical positioning. Starting from some mythical and/or human ancestor, high rank was traced through patrilineal descent and continued through the male primogeniture of each generation (Sahlins 1958; Ayres 1973). This ascribed positioning and associated mana were legitimized by mana that “manifested the power of the gods in the human world” (Shore 1989:164).

Firth (1967) pointed out that the central role occupied by chiefs in Tokipia during its annual first fruits cycle sanctioned and regulated (1968, cited in Al-regulation 2008:4) “chiefly” behavior and beliefs, “was intimately tied to ritual sanction and control” and “it is precisely at the level of ritually controlled production that the political economy held sway over the domestic mode of production and provided for chiefdom.” Plus, as ahu were the “sites of two broad classes of ritual: rites of passage and first fruits ceremonies” (Van Tilburg 1988a). To the kings alone was the role of ahu assigned. This rank was traced through patrilineal descent and continued through the male primogeniture of each generation (Sahlins 1958; Ayres 1973). This ascribed positioning and associated power came from ascribed genealogical positioning. Starting from some mythical and/or human ancestor, high rank was traced through patrilineal descent and continued through the male primogeniture of each generation (Sahlins 1958; Ayres 1973). This ascribed positioning and associated mana were legitimized by mana that “manifested the power of the gods in the human world” (Shore 1989:164). Enforced by tupu, chiefs maintained their sanction, authority and control over the distribution of monument resources, which provided appropriate, channeled, transformed, and bound (ibid:143). In other words, “chieftaincy is an absolute aspect of Polynesian social transformation.”

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power european and/or subsequent the plantations” (La Pérouse 1797:12, emphasis added). Perhaps referring to honai, La Pérouse highlights a similar situation to the prehistoric political economy of Ka’au’s 1. There, Earlé (1997) explains that with the assistance of lesser chiefs (konokoki), Hawaiian ali’i had control over commoners, corporate work strategies, and surplus taro resources from wet farming plots. However, control over such resources was needed to feed mgas, but instead was used by ancient Hawaiian chiefs to finance warfare, to acquire luxury goods like feathered cloaks and hats, and to help in the construction of monumental architecture and “landesque capital intensifications” (Kirch 1994).

Roussel made observations about the daily life of the islanders and the nature of their customs, including chiefly resource control:

[There had been an uninterrupted succession of great chiefs or kings. These kings, who were regarded as gods, exercised absolute power over the island and used their authority to retain the prestige associated with the gift of apparently superhuman powers, as well as certain personal privileges. To the kings alone belonged the first fruits of the land. These offerings were brought to them with great ceremony. (Roussel 1868, as cited in Altman 2004:40, emphasis added)]

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similar point that “tapu associated with Polynesian aviri was not merely a passive indicator of rank, it was actively used as an economic tool” which allowed Polynesian chiefs to take control of economic forces in the interest of the community — as well as for the chief.

Routledge (1919) and Métraux (1957) provide examples of how chiefly mana and tapu helped to facilitate mandatory inspection and participation of chiefs at key stages of the productive economy and legitimized this control through ideology, architecture, and ceremony (Kirch 1984). In addition, control was maintained through the ownership of land and by access restriction to key resources within its boundaries. The results of these management efforts were directed towards generating surplus agricultural production that could be funneled into the construction of monumental architecture.

This, in itself, further substantiated claims to land and resources and legitimized the position of the elite. (Stevenson 1997:3)

Archaeological evidence for this system was found in the inland regions of Rapa Nui, at Maunga Tari (Stevenson 1997), La Pérana (Stevenson & Haoa 1998, 2008; Stevenson et al. 1998, 2005; Howard 2007). Within these regions, archaeological features such as small abu, hare paenga, rectangular homes, and petroglyphs have been interpreted as structures and ideological markers of an elite-built environment constructed to monitor agricultural production and allocation. Considering that “generating a surplus production may not have come completely voluntarily and/or the ‘subsistence economy’ (Johnson & Earle 2000:135), and that these inland areas were some distance from coastal ceremonial complexes, elites retained use familiar architectural features and symbols from chiefly mana and tapu. This included inspecting boats, tattoos, and kohau rongo rongo tablets, blessing homes, and “making tours of the island to inspect the schools for priests and listen to recitations of the sacred chants associated with various economic and social activities” (ibid.:91-3).

These activities show that, by keeping a chiefly eye over economic activities, rituals and craft production, aviri played a significant role in the island’s socio-political organization and political economy.

RESOURCE CONTROL IN ANTHROPOLOGICAL AND ARCHAEOLOGICAL INTERPRETATIONS

Anthropological and archaeological investigations support the idea that chiefly and elite resource control was, “intimately and strongly linked to the typical Polynesian system of chiefly land use rights” (Van Tilburg 1994:94). This scheme was directed by the principles of mana and tapu, with control given to those with the most senior and ranking genealogical position.

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Examples throughout Polynesia highlight how corporate strategies funded and created monumental architecture and influenced the long-term evolutionary trajectories of chiefly organized societies (Kirch 1990a, 1990b; Kolb 1991; Graves and Sweany 1993; Earle 1997). While previous works highlight the ancient political economy of Rapa Nui and lay a framework to better investigate how Rapanui chiefs and elite retainers oversaw resource sector production, there are two problems. While it seems reasonable that the association of chiefly symbols and features with agricultural fields implies elite overseeing and monitoring, unless this can be archaeologically quantified using some form of spatial and statistical analysis, it is no more than an assumption. And, although the inland area provided a great deal of the resources needed to finance the activities of the chiefly and elite class, there were areas closer to coastal district ahu that were also producing staple resources. But, no prior investigation has focused on how elite monitoring was accomplished here or how larger monumental works were used to oversee production and distribution. In an attempt to add to prior studies, this investigation archaeologically quantifies how the elite monitored and oversaw resource sectors close to coastal regions using the visualscapes provided by district ahu.

Study Area – Northwest Coast (Figure 1)

The northwest coast (NWC) study area is within the archaeological quadrangles 26 (Matiake te Moa) and 32 (Omohe) and is composed of ~2 km of coastal land (north to south) from Ahu O Hurari to Ahu Vai Mata. According to Routledge (1919), this was Muri land, while Hotots et al. (1988) divided the area between the Hamea and Kao and Rau Uru mata. Using district mapping by Poukura and Akahanga, and semipyramidal Ahu Taka Para Puna) and 129 resource sectors used in analysis. Spatial data for ahu was geo-referenced from Martinsson-Wallin (1994) and Shepardson (2005), while permission was given by Terry Hunt, Alex Morrison, Francisco Torres, and colleagues to use the spatial data of resource sectors from the Pacific Prehistory Project. Spatial data for ahu was georeferenced from McCoy (1976), Cristino et al. (1981), Martinsson-Wallin (1994), and Shepardson (2005), while permission was given by Claudio priests, managers and commoners working on political projects. (Earle 2002:23)

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Study Area – Southern Coast (Figure 2)

The southern coast (SC) study area is within the archaeological quadrangles 5 (Hangi Poukura), 6 (Vaihu) and 7 (Akahanga) and is composed of ~7.5 km of coastal land (east to west) from Ahu Poukura to Ahu Akahanga. According to Routledge (1919), this area was divided between Ngatimo, Marama, and Ngaure clans, while Hotots et al. (1988) divided the area between the Ngatimo, Marama Tupa, Ngaure, and Nakau O Ure Ghein many using ahu distribution. Stevenson (2002) considers this district area Vai Mata. Besides general surveys and excavations (Thomson 1891; Cristino et al. 1985; Vargas et al. 2006), archaeological work interested in moai and ahu (Martinsson-Wallin 1994; Shepardson 2005) and the extensive fieldwork carried out by the Pacific Prehistory Project and the CONADI (National Corporation for Indigenous Development) archaeological project, little has been published about this area of the NWC.1 This may be due to the fact that no roads reach this area and/or that there exist fewer megalithic remains than are found on the southern coast. In total, there are five ahu (image Ahu O Hurari, Matiake te Moa, Motu Teweke, Vai Mata, and semipyramidal Ahu Taka Para Puna) and 129 resource sectors used in analysis. Spatial data for ahu was georeferenced from Martinsson-Wallin (1994) and Shepardson (2005), while permission was given by Terry Hunt, Alex Morrison, Francisco Torres, and colleagues to use the spatial data of resource sectors from the Pacific Prehistory Project.

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[Image 324x397 to 571x716]

Figure 1. Single Viewshed from Vai Mata.

Study Area – Northwest Coast (Figure 1)

The northwest coast (NWC) study area is within the archaeological quadrangles 26 (Matiake te Moa) and 32 (Omohe) and is composed of ~2 km of coastal land (east to west) from Ahu Poukura to Ahu Akahanga. According to Routledge (1919), this was Muri land, while Hotots et al. (1988) divided the area between the Hamea and Kao and Rau Uru mata. Using district mapping by Poukura and Akahanga, and semipyramidal Ahu Taka Para Puna) and 129 resource sectors used in analysis. Spatial data for ahu was geo-referenced from Martinsson-Wallin (1994) and Shepardson (2005) while permission was given by Terry Hunt, Alex Morrison, Francisco Torres, and colleagues to use the spatial data of resource sectors from the Pacific Prehistory Project.
The Norwegian Archaeological Expedition brought the first use of radiometric (14C) dating for the island and its monuments complete with maori and pukao (Stevenson 1986). This latter period coincides with the island’s chiefdom integration where chiefs and elites had control over the island’s monumental architecture and ancient political economy (Stevenson 1997). More recent examination of Rapa Nui’s ahu has focused on stylistic and spatial analysis. Working on the south coast, Stevenson used ethnographic data from an African case study to define Rapa Nui’s moai as corporate groups who “share a set of common concerns and procedures, an organization for the conduct of affairs, and an autonomy of action” (Stevenson 1986:70). To understand how Rapanui corporate groups related to monumental architecture, Stevenson created an architectural feature typology of ahu based on cluster analysis. He identified five architectural types that were hypothesized to be coincident with social groups of the district (Stevenson 1986). Obsidian hydration dates were then used to propose 12 temporal phases of the southern coastal settlement pattern. Also interested in identifying “discrete social territories” (maita), Beardsley (1990) used spatial provenance and stylistic attributes from southern and western coast ahu to reconstruct Rapa Nui’s “prehistoric social landscape”. To analyze the spatial provenance of ahu, Beardsley used nearest-neighbor analysis to group ahu into clusters and identify gaps between quantitatively defined spatial clusters of ahu. The gaps were considered to be potential boundary areas and were compared with the ethnographic record to determine that, of the four territories that existed within the study areas, two boundary locations corresponded to areas without ahu. To analyze the stylistic attributes of ahu, Beardsley used similar metric and non-metric traits as Stevenson’s (1986) investigation to perform cluster analysis. Her hierarchical agglomerative method produced a dendrogram of eight clusters or style groups. These groups were then put on a map, showing that their positions were “generally coincident with the historically described distribution” (Beardsley 1990:256).

In the most extensive investigation of Rapa Nui’s ahu, Martinsson-Wallin (1994) used 164 image ahu from her database of 313 to perform construction, correspondence, tempo, and spatial analysis. Her first construction of correspondence analyses indicated that ahu platforms were highly standardized with respect to their architectural elements. This pattern led Martinsson-Wallin (1994:137) to suggest that:

"...The original or typical ahu can be seen as a structure with well-dressed high rear walls as well as having a well-dressed front wall with a red lintel. The platforms project towards the sea and a ramp or a level pavement is situated in front of the platform. The structure is large and has two wings, crematorium, and several statues. Ahu which radically diverge ... may have differed in function".

This statement describes the physical construction of “original or typical” image ahu and argues for the similar functions of these platforms. Subsequently, this investigation adapts Stevenson-Wallin’s physical definition of image ahu and relies on the fact that these platforms had similar functions. This is important, because not only were the functions of image ahu entirely different when compared to semipiramidal...
au, but also the temporality and the physical appearance of these latter platform differed. For example, image auhu showed the strong social, ceremonial, economic, and political ties of the moai to the status of human beings, and how they were interconnected. In turn, this spatial situation formed a materialized place to link gods, ancestors, both the living and the dead. These platforms advertised tribal strength and unity to other clans, while enforcing polity divisions within each ma'uta. Finally, image auhu denoted and claimed primary resources such as water and lithics, staple resource sectors, and access points to the ocean (Routledge 1919; McCoy 1976; Love 1993; Martinsson-Wallin & Wallin 2000).

Semipyramidal auhu appeared later in the pre/proto- historic period and were often much smaller structures incapable of supporting moai. Also, they were often marked with unworked stones where the highest point of the structure was the juxtaposition of the lateral wings. Semipyramidal auhu were located by a circular or oval wall, relatively thick, and made from locally gathered stones. On average, these structures are 1-1.5m of height and 3-10m of diameter (Vargas et al. 2006), but in some cases, as at Ana Te Pahu, exceed 5 m. Below ground manuavai are subterranean gardens created by building up rock walls inside natural or human made depressions. These structures average 1-3 m in depth (Vargas et al. 2006). In general, manuavai are found in singular constructions, but there are areas on the island with multi-gardens, some with up to 40 manuavai (Vargas et al. 2006). The ethnohistoric record speaks of paper mulberry (Broussonetia papyfera-mahauto) being found inside manuavai (La Pérouse 1797; Heyerdahl 1961:57) along with other species such as banana trees (Musa sp.-maika), sugar cane (Saccharum officinarum tua), ti (Cordyline sp.) and propagation plants (Vargas 1998; Stevenson 2002). On the beneficial auhu that include protection against the wind, sun, and sea spray. Also, water, leaves, and other biomass that accumulate in manuavai could have created wet and rich organic mulch. In turn, these agricultural features likely provided a substantial amount of staple resources.

First fruits ceremonies would have been the best crops of manuavai that were harvested and given to elite retainers (Vargas et al. 2006). In an attempt to incorporate previous archaeological work concerning auhu, and in response to Stevenson’s (2002:226) call to use his territorial model to investigate the political organization of the Rapanui chieftain, I appropriate analytical and interpretive frameworks from past research. First, although up to seven types of auhu have been identified, I focus on the visibility of the beneficial auhu, which included protection against the wind, sun, and sea spray. Also, water, leaves, and other biomass that accumulate in manuavai could have created wet and rich organic mulch. In turn, these agricultural features likely provided a substantial amount of staple resources.
The pan-Polynesian uhu or earth oven is found throughout Remote Oceania. On Rapa Nui, uhu is also called uhu keri oka oka and uhu avu with the latter used for feasts for many people (McCoy 1976). These are made from large basalt stones which sometimes include recycled hare paenga (comb-stones). Makahare (flat lava fields) or earth oven is found throughout Remote Oceania. On Rapa Nui, uhu is also called uhu keri oka oka and uhu avu with the latter used for feasts for many people (McCoy 1976). These are made from large basaltic or scoria stone (i.e., Tahai). Those carved in uhu are often associated with petroglyphs (Lee 1992). A few cases show that these structures located next to elite houses were carved with taheta (i.e., Akahanga).

Although taheta fill up naturally with rainfall, water could have been transported from wells or rano (fresh water lakes) in gourds or other vessels and put into taheta. In turn, these features formed a type of “water trough” where water could be drawn, used, or distributed to the multiple households or the multiple people inside the household. However, little information exists about taheta in ethnographic records and, as few options exist to reconstruct the temporality of taheta, it is a resource sector that needs more quantitative and qualitative analysis. However, if the taheta’s ultimate purpose was to collect and distribute water, it would be considered a crucial resource sector and also would be under the constant monitoring of chiefly and elite retainers, especially when the drought-prone island was without rain for some time (Hunt & Lipo 2001; Ladehoff et al. 2005).

Agricultural Terraces

Terraces were made for both habitation structures and agriculture. For this investigation, only terraces covered with agricultural fields are considered as a staple resource sector. It could be argued that there are limited terraces on Rapa Nui because naturally-forming or human made depressions were usually topped-up to form walls and manuverai. However, as terraces produced staple resources, these features also were under direct management of the elite and should have similar distributional patterns as other monitored resource sectors.

Analytical Units

Two analytical units are used in this analysis: 500 m and 1,000 m spatial buffers that are centered upon the ahu in this investigation. The main purpose of buffers is to help reduce “background noise” or in this particular case “background vegetation” that has nothing to do with the study areas (i.e., high elevation portions of Poike and Rano Kau). The addition of these visible areas into spatial and statistical analysis would certainly influence results.

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Although positioning of some ahu may reflect an interest of the elite to control and oversee valuable coastline, maritime resources, and seascapes (Martinson-Wallin 1994), buffers used in this analysis only focus upon terrestrial areas of the landward side of the platforms. Future work may use visibility analysis to reconstruct patterns of coastal and maritime resource control, where presumably hure paonga along with ahu played a roll in demarcating and monitoring these areas.

It is important that the NWC study area only uses a 500 m buffer due to survey limits of the Pacific Prehistory Project and the fact that there is less inhabitable land from the coast to the inland region. Conversely, the flat, but rising southern coastal plain allows for a great deal of inland habitation. This elongated settlement pattern and the placement of staple resource sectors throughout this pattern prescribe both 500 m and 1,000 m buffers.

Another analytical difference between the northwest and southeast coastal plain can be the number of ahu that are represented. On the northwest coast, all five ahu were under the jurisdiction of Vai Mata. Thus, for this investigation, all ahu of that area are considered to represent just one ahu. On the south coast, each of the three image ahu represents a different district. Thus, for this investigation, each platform (Hanga Poukura or multiple platform clusters [Vaihu and Akahanga]) are considered as different social units, representing their own territorial district.

In summary, this study focuses on 11 ahu (7 image and 4 semipyramidal) and 549 resource sectors found in 4 mata districts.

Spatial Analysis – Viewshed Analysis

With the efficiency of GIS applications, computational programs like ESRI’s ArcGIS 9.x provide unique spatial tools for researchers. Archaeologists have used one particular GIS method, viewshed analysis, to examine a whole range of issues dealing with ancient patterns of visibility. The calculation of a viewshed from a single location is a relatively easy raster-based computing problem available in the spatial analyst portion of ArcGIS 9.x. The actual calculation requires that, for each cell in the raster, a straight line be interpolated between the source point (i.e., ahu location) and every other cell within a DEM (Digital Elevation Model). The heights of all the cells that occur in the straight line between the source and target cells can then be obtained in order to ascertain whether or not the cell exceeds the height of the DEM at that point. When performed for the entire raster, the result is a binary image with those areas of the landscape that have a direct line of sight from the target cell coded as a 1 and those with no line of sight coded as a 0. ArcMap then displays the spatial information onscreen showing which portions of the landscape are seen and unseen from a source point. This makes it easy to count and calculate the number of resource sectors in both visible and non-visible areas; which sectors are seen the most; and if ahu have repeated patterns of overlapping resource sectors.

Pattingen in viewshed data becomes more apparent when the results of multiple viewsheds are explored together. Multiple viewshed analysis compares the output from many viewsheds resulting in a single raster representing the visibility from a number of observer points in an area (Wheater 2004). This method can count, for example, the number of total visible resources per mata territory.

Statistical Analysis – Chi-Square (x²)

In order to evaluate the occurrence of the resource sectors within and outside visible and non-visible areas of ahu and to see if their distribution is statistically significant, chi-square is used. For this investigation, the level of significance was set at 0.05, the generally used limit value (Edlon 1985:66) created by the formula:

$$x^2 = \sum \frac{d^2}{e}$$

where x² is the symbol of chi-square, d is the difference between the observed and the expected frequency for each category, and e is the expected frequency for each category. For more efficient and valid results, the statistical program SPSS was used to calculate x². For this investigation, the level of significance was set at 0.05, the generally used limit value (Edlon 1985; Drennan 1996). A large chi-square (<0.05) suggests that there is a large amount of difference between the observed and expected frequencies and would allow a hypothesis to be rejected. On the other hand, a low chi-square (>0.05) suggests that there is a small amount of difference between the observed and expected frequencies and would allow a hypothesis to be accepted and/or considered statistically significant.

Hypotheses

Two hypotheses are put forward to test the frequency of resource sectors found within the area visible and multiple ahu viewsheds.

Hypothesis 1 (H¹): There should be more visible resource sectors within the viewshed area of image ahu.

Hypothesis 2 (H²): There should be less visible resource sectors within the viewshed area of semipyramidal ahu.

Although positioning of some ahu may reflect an interest of the elite to control and oversee valuable coastline, maritime resources, and seascapes (Martinson-Wallin 1994), buffers used in this analysis only focus upon terrestrial areas of the landward side of the platforms. Future work may use visibility analysis to reconstruct patterns of coastal and maritime resource control, where presumably hure paonga along with ahu played a roll in demarcating and monitoring these areas.

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Below are the results of the spatial and statistical analysis:

(1) Two tables listing NWC and SC ahu number of visible and non-visible resource sectors, percentage of visible resource sectors, a chi-square tabulation, and a test result. (2) A review of the results from both study areas. (3) Selected graphs illustrating the type of resource and the number of times it is found in a visible or non-visible area.

### Results

#### Northwest Coast

Of the six spatial and statistical analyses that were calculated on the NWC ahu, two tests supported $H^1$ while one test supported $H^2$. As the district center and one of the largest platforms on the far northwest coast, it seems logical to posit that Ahu Vai Mata, with its considerable elite presence ($x^2=0.022$), but likely reflects a pattern where two tests supported $H^1$ while one test supported $H^2$. Stevenson (2002), should illustrate the best evidence for resource sector overseeing. And, 82% of all sectors within the 500 m buffer were under the visibility of Ahu Vai Mata (Figure 1). This included 22 uma pae / hare uma and 10 manavai (Table 3). This suggests that the placement of resource sectors in the landscape around Ahu Vai Mata was not random ($x^2=0.002$), but likely reflects a pattern where sectors were positioned and installed to be intervisible.

#### Southern Coast

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### Table 1. Test Results from the Northwest Coast

<table>
<thead>
<tr>
<th>Ahu</th>
<th>Visible Resource Sectors</th>
<th>Non-Visible Resource Sectors</th>
<th>% of Visible Resource Sectors</th>
<th>$x^2$</th>
<th>Test Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vai Mata</td>
<td>37</td>
<td>8</td>
<td>82%</td>
<td>0.022</td>
<td>Supports $H^1$</td>
</tr>
<tr>
<td>Motu Tevaka</td>
<td>25</td>
<td>41</td>
<td>39%</td>
<td>0.007</td>
<td>–</td>
</tr>
<tr>
<td>Maitake te Moa</td>
<td>25</td>
<td>37</td>
<td>40%</td>
<td>0.16</td>
<td>–</td>
</tr>
<tr>
<td>O’Hurari</td>
<td>5</td>
<td>15</td>
<td>25%</td>
<td>0.002</td>
<td>–</td>
</tr>
<tr>
<td>Ahu Vai Mata</td>
<td>97</td>
<td>32</td>
<td>75%</td>
<td>0</td>
<td>Supports $H^1$</td>
</tr>
<tr>
<td>Taka Para Puna</td>
<td>17</td>
<td>38</td>
<td>30%</td>
<td>0.005</td>
<td>Supports $H^1$</td>
</tr>
</tbody>
</table>

### Table 2. Test Results from the Southern Coast

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<tr>
<td>Poukura 500m</td>
<td>11</td>
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<td>0.233</td>
<td>–</td>
</tr>
<tr>
<td>Poukura 1000m</td>
<td>82</td>
<td>58</td>
<td>59%</td>
<td>0</td>
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<tr>
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<tr>
<td>Hanga Te’e 1000m</td>
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<td>65</td>
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</tr>
<tr>
<td>Akahanga 500m</td>
<td>32</td>
<td>13</td>
<td>71%</td>
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<tr>
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<td>46</td>
<td>64%</td>
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</tr>
<tr>
<td>Semi pyramidal 5-153</td>
<td>20</td>
<td>103</td>
<td>16%</td>
<td>0</td>
<td>Supports $H^1$</td>
</tr>
<tr>
<td>Semi pyramidal 6-141</td>
<td>60</td>
<td>98</td>
<td>38%</td>
<td>0</td>
<td>Supports $H^1$</td>
</tr>
<tr>
<td>Semi pyramidal 6-256</td>
<td>40</td>
<td>186</td>
<td>17%</td>
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Table 3. Visible and Non-Visible Resource Sectors from Ahu Vai Mata.

Table 4. Visible and Non-Visible Resource Sectors from the Vai Mata District.

Results from the other image *ahu* in the Vai Mata district did not present evidence for the overseeing of resource sectors. This suggests that there may be a larger pattern on the NWC where multiple *ahu* were being used in an accumulated attempt to overlook larger areas of the Vai Mata district. And, when a multiple viewshed was calculated from all image *ahu* in the district, 75% of all resource sectors within the study area were under the visibility of at least one image *ahu*. Also, results from semipyramidal *ahu* Taka Para Puna supported H². Only 30% of the resource sectors within the 500m buffer were found intervisible with this *ahu*. Therefore, the placement of resource sectors around semipyramidal *ahu* Taka Para Puna was not a random process ($x^2 = .005$), but reflects a pattern where sectors found around this *ahu* were not positioned to be intervisible.

As hypothesized, *umu pae* / hare *umu* were most visible ($n=46$) within the NWC study area (Table 4). Statistically, 74% percent of all *umu pae* / hare *umu* were under the visibility of at least one image *ahu*. Also, results from semipyramidal *ahu* Taka Para Puna supported H². Only 30% of the resource sectors within the 500m buffer were found intervisible with this *ahu*. Therefore, the placement of resource sectors around semipyramidal *ahu* Taka Para Puna was not a random process ($x^2 = .005$), but reflects a pattern where sectors found around this *ahu* were not positioned to be intervisible.

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Of the 9 spatial and statistical analyses that were calculated about SC ahu, 5 tests supported H1, while 3 supported H2. As southern coast district centers, it seems logical to imagine that Ahu Hanga Poukura, the Vaihu complex, and the Akahanga complex, with their considerable elite presence (Stevenson 1986, 2002), should illustrate the best evidence for resource sector overseeing. As such, 48% of all resource sectors within the 500 m buffer were under the visibility of Hanga Poukura, while 59% were visible within the 1000 m buffer (Figure 3). This evidence suggests that the placement of resource sectors in the landscape around Hanga Poukura was not a random process ($x^2=0.000$ at 1000 m), but possibly reflects a pattern where sectors were positioned and installed to be intervisible with this ahu. At the Vaihu complex, a more convincing 79% of all resource sectors were within the visibility of Ahu Hanga Poukura (Figure 4). This suggests that the placement of resource sectors in the landscape around the Vaihu complex was not random ($x^2=0.035$ at 1000 m), but possibly reflects a pattern where sectors were positioned and installed to be intervisible with this ahu. At the Vaihu complex, while 64% were visible within the 1000 m buffer, only 48% were visible within the 500 m buffer (Figure 4). This suggests that the placement of resource sectors in the landscape around the Vaihu complex was not random ($x^2=0.000$ at 1000 m), but reflects a pattern where sectors were positioned and installed to be intervisible.

**Figure 3.** Single Viewshed from Hanga Poukura (500-1000 m).

**Figure 4.** Multiple Viewshed from Vaihu (500-1,000 m).

**Figure 5.** Multiple Viewshed from Hanga Poukura (500-1,000 m).

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Akahanga

Figure 5. Multiple Viewshed from Akahanga (500-1,000 m).

Akahanga

Figure 5. Multiple Viewshed from Akahanga (500-1,000 m).

DISCUSSION

There is no need for arms, physical violence, material constraints. Just a gaze. An inspecting gaze, a gaze in which each individual under its weight will end by interiorizing to the point that he is his [sic] own overseer, each individual thus exercising this surveillance over, and against himself [sic]. A superb formula: power exercised continuously and for what turns out to be a minimal cost. (Foucault 1980:155).

While criticism has been put forward by Cosgrove (1984) and Thomas (1993) that interpretations made by landscape archaeologists "seem to be seeking to undermine the past" (Fleming 2006), my results emphasize Foucauldian ideas of surveillance and enforce the notion of elite monitoring over Rapa Nui’s ancient political economy. While Foucault’s work (1977, 1980) focused on the contemporary penal system and how the panopticon captured best the principles and techniques of control in the modern disciplinary society, other authors have noted that such surveillance was used as a mechanism for power in the past. For example, Yekutieli (2006) uses a landscape approach to present two case studies from the southern Judean Desert (Israel). Here, the close relationship between panoplistic arrangements and power in a quarry allowed elite Romans to manipulate the political landscape in order to oversee non-elite Jews and make them work the quarry. From an ostensible lookout crevice, a supervisor could boost his domination over a group of workers by keeping a constant gaze over them. In his second case, Yekutieli illustrates that at a crucial juxtaposition for transport between a high ridge ascent and the Nahal Hemar drainage basin, the unequal visibility created by the ascent allowed a small group of guards to monitor large numbers of road users. In turn, this vista had an effect on those road users under the gaze.

The notion of being observed by someone in power has its effect... Even if there is only one overseer or none at all, the observed behavior is altered: depending on who they are, they might be either anxious or reassured by the possibility that a powerful eye watches [them]. (Yekutieli 2006:83)

To better understand elite-controlled landscapes, Yekutieli stresses the need for an archaeological approach that does not limit attention to the mere description and dating of sites. He argues that a landscape perspective can best assess the economic, social, political, and religious activities that created the archaeological record, especially patterns that can be identified through the analysis of the viewed or line of sight. Yekutieli states that it is best to shed the archaeological practice of only looking at sites from the outside in, and reverse the prospect to consider what might have been in view from the inside out. Thus, instead of looking inwards toward Polynesian monumental architecture to identify temporal diagnostic attributes or stylistic differences between social districts, it may be worthwhile to look outwards from marae or ahu to assess how the visualscape of these monuments influenced the spatial positioning of economic, political, social, and religious activities in the wider landscape. Work by Emory (1942:66-68) on marae from the Tuamotus highlights the social reality of this inside-out orientation.

A tribe held an island or a certain portion of an island in common but in the title of its chief, who could say, I turn my back in one direction [looking towards the marae], I turn my back in the opposite direction, all that I see belongs to me. The archaeological task then becomes how to spatially and statistically quantify what chiefs and elite members saw when they looked away from monumental features. This includes how Rapa Nui’s district ahu were used as panoptic points to allow a small number of ariki and honou to oversee mata, resource sectors, and corporate members.

While criticism has been put forward by Cosgrove (1984) and Thomas (1993) that interpretations made by landscape archaeologists “seem to be seeking to undermine the past” (Fleming 2006), my results emphasize Foucauldian ideas of surveillance and enforce the notion of elite monitoring over Rapa Nui’s ancient political economy. While Foucault’s work (1977, 1980) focused on the contemporary penal system and how the panopticon captured best the principles and techniques of control in the modern disciplinary society, other authors have noted that such surveillance was used as a mechanism for power in the past. For example, Yekutieli (2006) uses a landscape approach to present two case studies from the southern Judean Desert (Israel). Here, the close relationship between panoplistic arrangements and power in a quarry allowed elite Romans to manipulate the political landscape in order to oversee non-elite Jews and make them work the quarry. From an ostensible lookout crevice, a supervisor could boost his domination over a group of workers by keeping a constant gaze over them. In his second case, Yekutieli illustrates that at a crucial juxtaposition for transport between a high ridge ascent and the Nahal Hemar drainage basin, the unequal visibility created by the ascent allowed a small group of guards to monitor large numbers of road users. In turn, this vista had an effect on those road users under the gaze.

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built landscape that used small ahu, hare paenga, and rectangular houses as lookouts. In addition, other visible archaeological features such as pipi horeko (stone cairns [Vargas et al. 2006]), petroglyph complexes (Lee 1992), and natural features such as karava (overhangs), puka (outcrops) and caves (ana, ana kionga) may also have been used to demarcate an elite-built landscape and to denote valuable agricultural planting strategies.

The spatial and statistical analyses of this research quantifiably illustrate that there exists a perceptible pattern with regard to the placement of staple resource sectors within areas visible by district ahu. I suggest that this pattern reflects a conscious attempt by Rapanui elite to install resource sectors within the visualscape of image ahu. On one hand, this inter-visibility effectively helped the elite to monitor manavai, umu pae / hare umu, hare moa, taheta and agricultural terraces while, at the same time, effectively reminded matai inhabitants of corporate work responsibilities. In turn, resources produced in monitored sectors were protected by chiefly tapu and appropriated by elites through mechanisms such as first-fruit ceremonies. With control over the staple resource economy, chiefs then had a surplus to fund the construction and maintenance of the monumental works for which Rapa Nui is so famous.
Table 7. Visible and Non-Visible Resource Sectors from Akahanga (1,000 m).

<table>
<thead>
<tr>
<th>RS</th>
<th>Terraces</th>
<th>Basalt Quarry</th>
<th>Hare Moa</th>
<th>Taheta</th>
<th>Umu Pae</th>
<th>Mananai</th>
</tr>
</thead>
<tbody>
<tr>
<td>RS</td>
<td>60</td>
<td>50</td>
<td>40</td>
<td>30</td>
<td>20</td>
<td>10</td>
</tr>
</tbody>
</table>

The construction of pukao-topped moai further helped the elite to retain control over the political economy and mata territory by demarcating land, denoting resource sectors, and reminding district inhabitants of elite hegemony. This is important because, unlike other Polynesian islands such as the Marquesas and Society Islands that have natural borders formed by the physical landscape (valleys, gullies, etc.), Rapa Nui’s slow rising coastal plains prescribed a system where ariki and honui needed monumental elaboration to overtly denote corporate land, inhabitants, and interests. And, in the view of Kirch (1990b:206), as monumental architecture of the island’s staple economy. In fact, Rapa Nui’s present chiefly rule over territory, and elite control over the island’s staple economy. In fact, Rapa Nui (1994) questioned why this connection of mata for eye and clan exists. It may be related to how the mata of the moai was monitoring the mata of the district. Could it be that the all-seeing mata of the ancestors, within in the aringa nui (living face) of the moai, was effectively overseeing, controlling and maintaining the fertility of mata resource sectors; similar to the job of living ariki and honui? Could it be that on Rapa Nui, we have an ancient Orwellian case of big moai is Watching you? I imagine that everyday a corporate member tended a manauna, retrieved chickens from a hare moa, and or ate from an umu pae, they would have been reminded of their subordinate role by the elite-built political landscape. The constant gaze from the ancestors past and hegemonic present, created a “superb formula, power exercised continuously and for what turn[ed] out to be a minimal cost” (Foucault 1980: 155).

**Ontological Considerations**

There are several methodological and ontological particulars that should be considered to improve the epistemological validity of this investigation:

1. Little temporal consideration has been made with regard to the analysis of ahu and resource sectors. In reality, this is the case, as some features were undoubtedly from much later periods. Future work should incorporate dates from, for example, umu pae / hare umu to see when earth ovens began to be installed outside the visibility of ahu, for this may not only represent a change in control over resource sectors, but also in Rapanui’s ancient socio-political system.

2. Although a good percentage of resource sectors were still visible, there were no non-visible resource sectors contemporaneous for the purpose of analysis. In reality, this is the case, as some features were undoubtedly from much later periods. Future work should incorporate dates from, for example, umu pae / hare umu to see when earth ovens began to be installed outside the visibility of ahu, for this may not only represent a change in control over resource sectors, but also in Rapanui’s ancient socio-political system.

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found within the range of visibility of district ahu, what did districts outside the visibility of ahu represent? What did patterns of non-visibility mean for Rapa Nui’s ancient political economy? Did the non-visible resources around ahu represent later occupational contexts when the ahu were allegedly not used as ceremonial structures after a “desanctification” of coastal areas around the 1600’s (Stevenson 1984, 1997; Vargas 1998)? Or, did non-visible resources represent features that were not under the surveillance of district ahu? Could it be that the resources were under the surveillance of other features in the landscape? By using elements such as chiefly manu and tapu, first fruits ceremonies, and corporate strategies, Rapanui chiefs and elites maintained significant control over the island’s staple resource economy. (a) What happened during the (pre)historic timeline. Logically then, questions arise such as: (a) What happened during the intermediate period of Rapa Nui’s prehistoric timeline, an epoch which saw a level of massive monumental construction not previously seen in the Pacific? (b) How were the noteworthy isolated island inhabitants and celebrated stone carvers organized socio-politically to be able to construct the more than 20,000 features that are found throughout the island? (c) How did chiefly and elite retainers manipulate the political economy to fund and construct the monumental architecture for which the island is so famous? (d) What happened during the intermediate period of Rapa Nui’s prehistoric timeline, an epoch which saw a level of monumental construction not previously seen in the Pacific? (e) How were the noteworthy island inhabitants and celebrated stone carvers organized socio-politically to be able to construct the more than 20,000 features that are found throughout the island? (f) How did chiefly and elite retainers manipulate the political economy to fund and construct the monumental architecture for which the island is so famous? (g) What happened during the intermediate period of Rapa Nui’s prehistoric timeline, an epoch which saw a level of monumental construction not previously seen in the Pacific? (h) How were the noteworthy island inhabitants and celebrated stone carvers organized socio-politically to be able to construct the more than 20,000 features that are found throughout the island? (i) How did chiefly and elite retainers manipulate the political economy to fund and construct the monumental architecture for which the island is so famous? (j) What happened during the intermediate period of Rapa Nui’s prehistoric timeline, an epoch which saw a level of monumental construction not previously seen in the Pacific? (k) How were the noteworthy island inhabitants and celebrated stone carvers organized socio-politically to be able to construct the more than 20,000 features that are found throughout the island?


We human beings “are born as islands”. Before birth we float happily in the amniotic fluid, in the ocean of the maternal womb.

— James Hamilton