

Visibility and Power: Preliminary Analysis of Social Control on a Bandanese Plantation Compound, Eastern Indonesia



DAVID R. CARLSON AND AMY JORDAN

INTRODUCTION

THE EUROPEAN QUEST FOR SPICES and the wealth that came with their acquisition was one of the driving forces pushing early expansion into and colonization of Asia. Among the targets of such exploration, few were so valued or sought as the Banda Islands, the source of almost all of the world's nutmeg. Desire to control this crop drove the colonial efforts of the Dutch, Portuguese, and English in Asia, although it was the Dutch who eventually prevailed. After a brutal campaign of conquest, the Dutch East India Company (Vereenigde Oost-Indische Compagnie, hereafter referred to as VOC) managed to secure control over the Bandas. It then set about establishing a new colonial order whose primary goal was intensive silvaculture: the extraction and shipment of nutmeg from the Bandas to European markets. Whether or not they succeeded in this endeavor is still an open question.

This article presents the results of a GIS-aided visibility pilot study of Groot Walling, a plantation compound in the Banda Islands. We are interested in the role of visibility as a tool of social control, specifically how it affected the design of the plantation. We focus on the extent to which Groot Walling was designed to aid in surveillance as a particular means of using visibility and vision to control behavior. We ask, did visibility matter? That is, was the plantation designed to aid or improve owners' or overseers' abilities to control behavior through manipulating visibility? Drawing on studies of plantation landscapes in the Caribbean and southeastern United States, we test the hypothesis that Groot Walling was designed to produce inequality in the capacity for its inhabitants to surveil each other. We attempt to determine whether or not the compound was designed so that the owners or overseers could keep slaves under surveillance better than the slaves could surveil themselves or the owners in return.

After examining compound architecture by eye and with the aid of GIS visibility analysis, we conclude that our hypothesis is tentatively refuted. The compound does not appear designed to grant greater surveillance capability to one class of inhabitants

David R. Carlson is a graduate student and Amy Jordan is a Ph.D. candidate affiliated with the Department of Anthropology at the University of Washington, Seattle, U.S.A.

Asian Perspectives, Vol. 52, No. 2 © 2014 by the University of Hawai'i Press.

over another. We then draw on additional tools from visibility studies to try to better characterize the visual properties of the compound, suggest some explanations for our results, and describe a series of future research directions that would improve our understanding of the Bandanese plantation landscape and its role in colonial society.

HISTORICAL BACKGROUND

Located in the Maluku region of Eastern Indonesia, the Banda Islands were once the world's primary source of nutmeg (Fig. 1). As a result, they were a desired target of European exploration and colonial efforts. Contact with Europeans first occurred in 1511, when the Portuguese made it to the islands. They were followed by the Dutch in 1599 (Loth 1995b: 16). The Dutch VOC eventually conquered the islands, killed, expelled, or enslaved their inhabitants, and established plantations to extract nutmeg and the related spice mace for sale in Europe. Some historians have noted that VOC actions in the Bandas were unusually violent (Hanna 1978; Loth 1995b). In other parts of Indonesia, the Dutch preferred to work through and subvert local political structures and entities rather than resort to violence (Breman 1989; Leirissa 1978; Villiers 1981). The political and economic reasons why the VOC committed these violent acts help us understand its motivations in the Bandas, as well as the reasons the VOC and the Dutch plantation owners (*perkeniers*) may have had for engaging in tactics of social control such as surveillance.

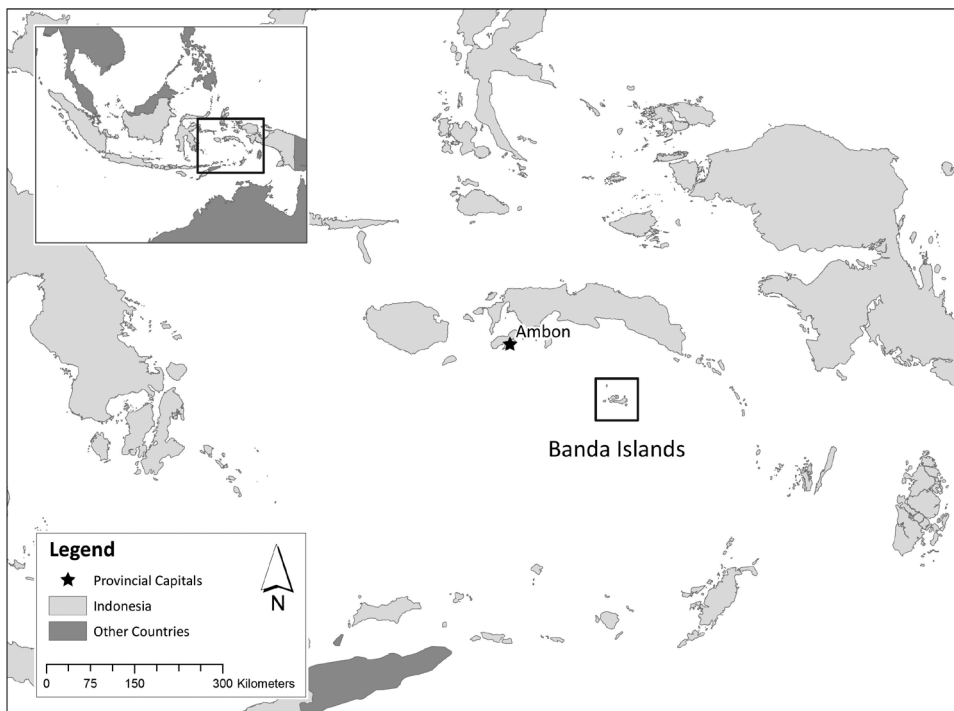


Fig 1. Location of the Banda Islands.

The Banda Islands were occupied by the Dutch for just over 400 years, but we restrict our historical narrative to the period of VOC control over the islands from 1621 to the dissolution of the VOC around 1796. The institution of slavery was present throughout this period. We limit ourselves in this way so as to restrict the scope of this article and its implications.

The Context and Circumstance of Dutch Conquest

When the Dutch finally located the Banda Islands in 1599, they encountered a population already familiar with their European rivals, the Portuguese (Fig. 2). Dutch rivalry with the Portuguese (and the Spanish), including intermittent outbreaks of hostility, had already affected the structure of Dutch control of trade, particularly in areas where they traditionally dominated such as bulk goods trade in the Baltic and between northern Europe and the Mediterranean (Israel 1989). Such was the perceived threat of these two powers that the VOC's charter explicitly stated that it was intended not only to enable Dutch trade overseas, but also to attack the power, prestige, and revenues of both Spain and Portugal (Israel 1989:71). It was to the initial benefit of the Dutch, then, that when they finally landed on the Bandas, the island's inhabitants had grown tired of the Portuguese and their interference in Bandanese trade and religious affairs (Villiers 1990:87–89). The Bandanese initially welcomed the Dutch in the hope that they would help keep the Portuguese away, and even allowed the VOC to build a factory on Banda Naira. Their relationship turned sour when the VOC began fortifying their position (Loth 1995b:16–17).

The goal of the VOC and the States-General in the Indonesian archipelago was to establish a monopoly over the spice trade. High-value rich trade, including spices, was paramount to the development of a merchant elite, capital accumulation, and the development of banking, insurance, and export-oriented businesses (Israel 1989:27). Furthermore, monopolistic control of spice crops would allow the Dutch in theory to centralize distribution of spices in Amsterdam, control spice output to match the ebb and flow of demand, and give them some degree of control over prices (Loth 1995a). The price markup between the Bandas and Amsterdam often ended up in the range of 300 to 400 percent, allowing for considerable profit (Hanna 1978). Such trade would also help expand Dutch political influence, since maintaining trade required a complex network of international relations (Israel 1989:27). Indeed, the rise in the

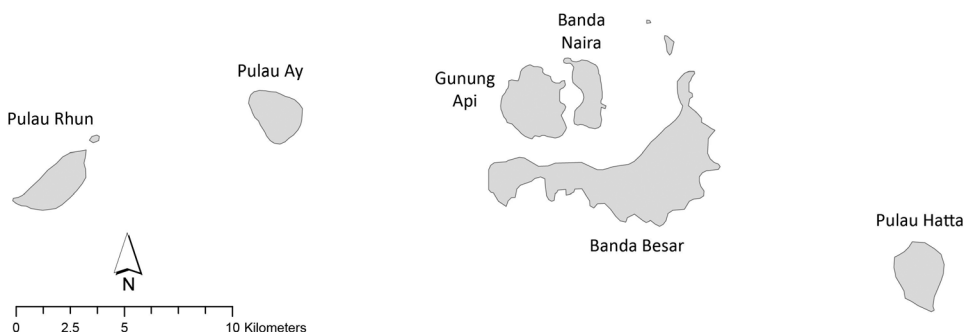


Fig. 2. The Banda Islands, based on Google Earth and Lape (2000).

economic and trade hegemony of the Dutch during the seventeenth and eighteenth centuries was due in part to their control over rich trading (Israel 1989).

With these motivations, one of the first things the VOC did in the Bandas was to sign a monopolistic treaty with the local community heads, the *orang kaya*, in which they agreed to sell nutmeg only to the Dutch. Almost immediately, the Bandanese began ignoring it and continued to deal with their traditional Asian trading partners and other European powers (Loth 1995*b*:16–17). The frustration of the VOC over this was compounded when the English arrived on the scene. By 1609, the English had already penetrated Sumatra, Bantam, and Makassar, as well as the Banda Islands, replacing the Spanish and Portuguese as the major strategic threat to Dutch control of the East Indies (Israel 1989:103–104; Loth 1995*a*). Dutch concern about English interference in what they perceived as their trade was serious enough that the VOC amended their charter to include the English in the list of European powers it was chartered to combat (Steensgaard 1982). The VOC in the Bandas certainly experienced considerable difficulty enforcing their “contracts,” as the English and the Bandanese were perfectly willing to trade with one another. When the Bandanese grew tired of the Dutch on Banda Naira (where the VOC was stationed), they left for Banda Besar or Pulau Ay and the English followed them (Loth 1995*a*:710–712).

Outbreaks of violence were as much the result of policy decisions on the part of the VOC as they were due to local Dutch–English conflicts (Loth 1995*a*:710, 1995*b*:17). The violence was temporarily halted when it threatened to lead to an Anglo–Dutch war, but even a 1619 peace treaty failed to quell tension between the two European powers (Loth 1995*a*:715). Eventually, the VOC decided to weaken any possible future English claim to the Banda Islands by attempting to gain complete control over them. In 1621, the VOC invaded the islands, conquered Banda Besar and Pulau Hatta, and secured control of Pulau Run and Banda Naira. They massacred the inhabitants of Banda Besar; those that did not die or commit suicide were enslaved or driven off (Loth 1995*b*:17–18). By the end of 1621, the Dutch had effective control over the Bandas. This brief history demonstrates that the strategic economic and political contexts of European trade in the East Indies played a part in the VOC’s decision to conquer the Bandas. Constant English interference in what the Dutch perceived as their trade—trade it felt it had won from the Portuguese (Loth 1995*a*)—combined with its perception of the Bandanese as unreliable allies led the VOC to turn to violent conquest to achieve its monopolistic ends.

Having conquered the Bandas, the Dutch tried to reconstitute nutmeg production within a plantation society. The islands were divided into plots called *perken*, which were rented to former VOC merchants and pensioned-off sergeants known as *perkeniers* (Hanna 1978:59; Loth 1995*b*:20, 24). Slaves were brought from areas in Indonesia, coastal China, and India to work in the nutmeg groves. The Dutch enslaved and redistributed the inhabitants of Pulau Hatta across the islands to teach the slaves as well as the plantation owners how to grow nutmeg (Loth 1995*b*:17, 24). The VOC at the time intended for the Bandas to rely on regional trade and VOC shipments for their core necessities; the *perkeniers* were expected to devote their time to growing nutmeg and selling it to the VOC at a fixed price (Hanna 1978; Loth 1995*b*:18–19). The VOC continued to employ military methods to maintain its monopoly postconquest, including attempts to prevent slave escapes and protect against foreign interests and

smuggling. These real and serious threats to its interests led the VOC to invest considerable resources in defensive infrastructure (Loth 1995*b*:24–25).

Incentives for Social Control

While the VOC was motivated to control labor on the Bandas by the desire to maintain a monopoly, the *perkeniers* had somewhat different motivations. We argue that they were more likely motivated by their own engagement in regional trade. As noted above, while some regional trade was expected to be necessary to meet the needs of the islands, the VOC originally intended for the *perkeniers* to work primarily to provide it with nutmeg from the *perken*. The *perkeniers*' actions quickly disabused them of this notion.

The soil and environment of the Banda Islands are ill-suited for growing traditional regional staples such as sago and rice. Prior to Dutch conquest, the inhabitants of the Bandas imported the majority of their foodstuffs by trading nutmeg for necessities (Ellen 2003). Since there was little other than nutmeg that was accepted in trade for goods, the *perkeniers* were forced to disobey VOC regulations and continue extra-company trade if they wanted to survive and prosper.

Perkeniers, particularly the richest ones, participated in regional trade networks that included Makassar, Timor, and the Aru Islands. Such trade was diverse, including rice, textiles, and birds' feathers among many other goods (Hanna 1978:79–80; Heeres 1908:353–354; Wright 1958:18). Trade items were exchanged for nutmeg and mace smuggled out from the planters' own plantations. Through regional trade, the *perkeniers* gained considerable wealth, likely more than they would have gained from selling nutmeg solely to the VOC (Hanna 1978:74, 79–80; Wright 1958:16–17). Most of the *perkeniers* ended up leaving their plantations in the hands of family members or hired administrators while they went to live opulently in Naira Town, where they could entertain guests, network, and ply regional trade. These actions had the effect of increasing tension between the *perkeniers* and the VOC (Bosma and Raben 2008; Hanna 1978:79–80; Wright 1958:17).

This study focuses on the *perken*'s slaves and the extent to which *perkeniers* were motivated to control and direct slave labor as part of their participation both in the VOC's plans for the plantations and in regional trade. They were motivated to control slave labor out of the desire to prevent smuggling, slave escapes, and slave rebellion. Smuggling was consistently a problem in the Banda Islands (Hanna 1978:80–81). Even *perken* slaves may have had the opportunity to participate in smuggling, since as workers responsible for processing nutmeg on the plantations, they would have had access to cured nutmeg. Furthermore, they may have had access to means of smuggling out nutmeg through contact with free Bandanese and freed slaves who interacted with them on the *perken* (Hanna 1978:64). Free individuals, subject to less observation than *perken* slaves, may have provided routes for smuggling out nutmeg. There is certainly evidence that plantation owners were concerned about smuggling in the late colonial, post-VOC, postemancipation period. Oral testimonies recovered by Winn (2007:80) suggest that plantation owners preferred to use foreigners (e.g., Ambonese) over locals as foremen, since they believed foreign workers were less likely to permit smuggling or be open to bribes. Slaves in the Bandas also suffered from their owners' attempts to smuggle nutmeg and other goods. The VOC

tried to crack down on smuggling by issuing stricter regulations concerning the number and frequency of ships that could port at Banda; this limited the opportunities for slaves to escape the plantations (Wright 1958:17).

A stronger argument for the incentive to control labor comes in the form of concerns over slave escapes and rebellion, which were considered a real possibility by both the *perkeniers* and the VOC (Hanna 1978:79, 90; Wright 1958:17). They were certainly a problem during the early years of the plantations. Plantation slaves had many grievances against the *perkeniers*, who had a tendency to substitute company-mandated rice rations for less desirable sago (Wright 1958:17) and substitute mandated sets of clothing for items made of cheaper cloth (Hanna 1978:81). The cloth and rice were likely used as trade goods by the *perkeniers* in the aforementioned regional trading. Meanwhile, VOC ration shipments were often late or nonexistent, so providing a higher quantity of sago may have been the result of efforts to ensure workers had access to some food, if not the preferred food (Hanna 1978). Some of the *perken* slaves were older, or less healthy than they should have been due to the fact that the *perkeniers* had a habit of switching out healthy and able-bodied *perken* slaves, provided by the VOC, for elderly or unhealthy private ones purchased by the *perkeniers* (Heeres 1908:352; Wright 1958:18). Higher quality slaves were moved into the houses of the *perkeniers* as servants. Slaves also appear to have been employed in some less-than-healthy work, such as burning lime (Wright 1958:20).

There is some evidence that slaves were punished harshly for transgressions related to the preservation of the monopoly. Hanna (1978:69) recounts the observations of a German visitor who inhabited the islands from 1633 to 1638. He noted a number of punishments, of which two are important here. First, a female slave who tried to commit suicide (and thus “defraud” her master of his property) was branded and had her cheek cut open from mouth to ear. Second, several attempts at smuggling by local freemen led to their wages being confiscated and the illicit nutmeg and mace burned. In both cases, we can see examples of individuals attempting to deprive the VOC and the *perkeniers* of their perceived property, but in the case of the slave, a far harsher punishment was meted out. Inasmuch as these incidents represent the normal mode of punishment on the islands, they certainly would have provided incentives for slave rebellion and escape, and thus increased the need to control labor on the islands.

The final evidence for tension between *perken* slaves and *perkeniers* is the inability of *perkeniers* to find sufficient workers for the plantations after the slaves were emancipated in the 1860s. Only 73 out of 1122 emancipated slaves are recorded as having continued to work on the plantations (Bosma and Raben 2008:155), though presumably more eventually returned after discovering the lack of other economic opportunities on the islands (Hanna 1978). Additional incentives to control labor, such as the need to force slaves into arduous or dangerous work, are more difficult to argue for at this time. On the one hand, work on the nutmeg plantations has been reported as being relatively easy. Unlike the typical annual cash crop such as sugarcane, tobacco, or cotton, nutmeg is a tree crop. It was unnecessary to replant fields every year, ripened fruit could easily be plucked from trees with a small basket attached to a long pole, and no additional tools were needed to remove the nutmeg from the split-open fruit. On the other hand, reports of slave illness may be evidence for *perkenier*–slave tension. Wright (1958:94) reports that there were 1727 public slaves in 1823, but only 1350 were fit to work. Whether this was due to the aforementioned tendency of planters to shift unhealthy or old slaves to plantation work or represents a form of

resistance to labor by feigning illness, we cannot know at this time. Regardless, the presence of these tensions between the *perkeniers* and their slaves likely increased the worry on the former's part that the latter would rebel or escape.

Both *perkeniers* and the VOC had incentives to control slave labor on the Banda Islands, though for different reasons. The VOC was primarily concerned with the maintenance of their monopoly, of which preventing slave rebellion was but one part. The *perkeniers* more likely needed to control labor for the purpose of maintaining their participation in regional trade, a role that sometimes ran counter to the goals of the VOC. While this article focuses primarily on the *perkeniers'* use of architecture and landscape organization to control their slaves, knowledge about the VOC's motivations is still critical. Although they may have been at odds with one another, shared fears of slave rebellion and violence could have united the *perkeniers* and VOC. Furthermore, given the VOC's role in establishing early fortifications and infrastructure in the Bandas, their intentions may be at least somewhat reflected in the resulting landscape (Loth 1995b).

THEORY AND PRIOR RESEARCH

Since the early 1980s, landscape approaches in archaeology have become increasingly, though not completely, concerned with the role the landscape plays in the production and reproduction of past sociocultural relationships and structure. Concomitant with this, the primary focus in this article is on the use of plantation compound architecture as a means of reinforcing social relationships among plantation owners, overseers, and slaves. Specifically, we look at surveillance as a means of social control. Surveillance here is defined as the focused, occasionally systematic and routine attention paid to personal details for the purpose of influencing, managing, or directing human behavior (Lyon 2007:15–18). We define social control as the body of mechanisms that push people's adherence to norms or rules of appropriate behavior (Waitzkin 1989:225). "Appropriate" is a loaded term, however. We should expect that in any environment—particularly one with structural inequality such as a plantation—there are going to be many sets of "appropriate" behaviors, depending on the situation and social context. In this study, "appropriate" behavior is defined as that which is conducive toward the *perkeniers'* goals of extracting nutmeg from the Banda Islands. Other "appropriate" behaviors of interest may be associated with slave resistance or alternative activities not associated with nutmeg production. These issues cannot be addressed in the span of this article, but are worth future investigation as they would create a more complete narrative of the social dynamics of the Banda Islands, one in which both slave and *perkenier* agency are foregrounded. While this pilot study focuses on the agency of the *perkeniers* alone, we will discuss some ways in which archaeologists have investigated slave agency below.

Having defined our object and purpose of study, how should we go about investigating and evaluating our hypothesis concerning surveillance? What empirical archaeological signatures might we look for? For this article, we turn to Foucault's work on surveillance, discipline, and panopticism for inspiration. Foucault (1977) postulated that a historical phenomenon associated with the emergence of the modern world was the everyday use of forms of discipline and social control that had previously been deployed only by military forces or during extreme situations such as outbreaks of plague. The goal of these forms of discipline was to ensure smooth,

continued functioning of society. Since body and mind were seen as malleable, modern societies gradually adopted a greater variety of means of disciplining them, in order to force the internalization of social norms deemed necessary for society's proper functioning (Wood 2007). One such mechanism was daily, multiscale surveillance whose functioning was aided and improved by the intentional arrangement of architecture and material culture. The most extreme example Foucault provided of this was the panopticon. Designed by Jeremy Bentham in the 1700s, the panopticon was a prison, usually in the shape of a pentagon or octagon, in which the walls consisted of individual cells facing the interior courtyard. Inside the courtyard would be an observation tower. From the tower, an observer could see into any of the cells. However, the observation area of the tower would be masked in some way so that those in the cells could not know when or if they were being observed. They could see the tower, but not who was in it; they could know that surveillance was possible at any time, but not when it was actually happening. Each cell would hold one individual, and no means of communication between the cells was provided.

In theory, the result of this design would be the gradual disciplining of the body and mind of the prisoner such that they eventually internalized the rules of the prison. They would develop an inward gaze and surveil themselves to prevent the possibility of being punished, and thus act as participants in their own subjugation (Foucault 1977:201–203). In practice, this psychological aspect of Foucault's theory seems unlikely to have actually occurred, given the ease with which prison inmates can feign compliance (Simon 2002:6). Feigning compliance likewise makes it possible for slaves to develop their own means of identity building and communication, means that are immune to or at least more difficult to discern through surveillance.

Archaeology can help us better understand such processes through the study of slaves' lives and resistance. For example, drawing on oral historical, textual, and archaeological data, Ruppel and colleagues (2003) identify several instances of enslaved African Americans maintaining their identities and engaging in economic behavior independent of their plantation labor. They draw on Scott's (1990) notion of "hidden transcripts," in which oppressed groups challenge the dominant order by engaging in "coded" practices that dispute or disrupt that order. By coded, we mean to say that these practices are not recognizable as practices of resistance by those in power, as they do not understand or recognize their meaning. In this case study, these practices include utilizing mundane objects to reinforce identity by depositing them in patterns dictated by African spiritual beliefs, selling products from personal gardens (as part of a slave economic network that was tolerated by those in power but resisted their attempts at regulation), and the appropriation of outdoor garden space as a place for manipulation of spiritual power (Ruppel et al. 2003:326–333).

Drawing on ceramic styles and vessel forms, Ferguson (1991) has argued that African-American slaves in South Carolina utilized ethnically distinct eating and decorative practices to unconsciously resist the ideology of their owners. McKee's (1992) work on antebellum slave cabin architecture and material culture suggests that slaves may have deliberately deposited trash all around their cabins as a form of resistance toward their owners' desire to maintain cleanliness and order among their cabins. More recently, Symanski (2012) has shown that slaves in West Brazil repurposed earthenware ceramics originally intended by their owners as markers of inferior status into ethnic symbols, utilizing designs associated with their African heritage.

While practices like these and their material culture by-products are visible, their meanings may not be. Though the authors just cited do not use the term “hidden texts,” their and others’ work on slave life suggests possible archaeological avenues for understanding subversive and resistance practices. In combination with textual sources, where complaints of slave laziness, ignorance, and illness can point to subtle forms of slave resistance (Funari and Orser 2001), archaeological sources provide a window into the ways slaves might feign compliance to plantation owners’ desires while subverting the effects of the panopticon and panoptic surveillance. As already noted, such expressions of slave agency are not dealt with here, but are worth noting if only to recognize that any evidence that slave owners designed plantation architecture for the purpose of surveillance does not necessarily imply slaves acquiesced to said surveillance.

The Panopticon as a Model

While the panopticon was not the only example of panopticism, and panopticism not the only example of modern discipline that concerned Foucault (Wood 2007: 247–248), it provides a valuable starting point for understanding the relationship between surveillance and material culture. First, the panopticon disrupts intervisibility between the observer and the observed. What this means is that those being observed cannot know they are being observed and do not have the same capacity to surveil as their observers. The observer can watch any prisoners or none at all, whereas the prisoners are restricted in their ability to watch one another. In short, there is inequality in the capacity to surveil between the two groups. The second point of interest is the role the panopticon’s architecture plays in this inequality. Specifically, it is the material organization of the panopticon that creates this inequality in the first place. It allows the warden or guards to observe prisoners in a way they are incapable of returning. The panopticon is intentionally designed to create this inequality, though the result is not necessarily understood in such terms. This relationship between the material organization of the panopticon and its intended effect regarding surveillance makes it a useful conceptual model for the research discussed in this article.

Foucault presents an extreme example of this use of material culture as a means of modifying surveillance capacity. As archaeologists, we are unlikely to find anything like the panopticon except in a few specific cases. However, archaeologists have drawn on panopticism as a heuristic, analogy, or historical trend in order to understand how the material organization of a landscape might be used to enable or aid surveillance by granting one group greater capacity to surveil than another. Delle (1998, 1999: 151–153), for example, has argued that the overseer’s house on the Jamaican plantation at Clydesdale afforded the overseer several positions from which he could monitor slave activities. One position, at the entrance to the house, allowed the overseer to observe activities within a nearby slave village and the daily morning procession of slaves to the fields or mill. Another on a balcony allowed surveillance of the coffee works and barbecues (areas of coffee processing). In addition, overseers and slave owners were capable of viewing slave activity from several windows within the main house. Delle argues that these positions were designed to produce a panoptic form of surveillance, in which the ambiguity over whether or not the overseer was focusing his attention on any given slave’s activity would encourage said slave to discipline

him- or herself and internalize norms of behavior that served the economic function of the plantation and the desires of the overseers and owners. He later expands this analysis to include plantations and great houses in the entire Negro Valley, noting that plantation owners not only designed their houses in order to facilitate surveillance of their slaves, but also to be visible to one another as a means of communication (particularly about slave revolts) (Delle 2002).

Along similar lines, Randle (2011) applies Foucault's concept of panopticism as a surveillance model and evaluates its applicability to a series of plantation landscapes in South Carolina, using Wheatley's (1995) cumulative viewshed analysis (CVA) and principles from Higuchi's (1983) work on viewsheds. She examines the extent to which planters designed their houses to improve their ability to surveil their workers and determines that there is some evidence for strategic deployment of overseer and master houses for the purposes of surveillance. Singleton (2001) also examines the strategic construction of architecture and the built environment with a focus on the prison-like quarters given to slaves. She notes that there is some evidence for surveillance of walled slave compounds from slaveholder's roofs, a view not likely afforded to slaves that lived within the compounds.

In these cases, archaeologists have effectively investigated how a landscape's built environment served to create inequality in the capacity to surveil in a manner analogous to how the architectural organization of the panopticon promotes panopticism. More specifically, they have examined the extent to which plantation owners can surveil slaves without their surveillance being known (Delle 1998, 1999), and how plantation owners manipulate the landscape to improve their ability to surveil or gather information on an area or activities and behavior (Randle 2011; Singleton 2001). Our hypotheses concerning the presence of these two forms of inequality in surveillance capacity in Groot Walling and the architectural signatures we investigate to evaluate them are derived from these studies.

While neither Foucault nor the archaeologists mentioned use the concept of *inequality in the capacity to surveil* to describe their work, we feel that it is a useful description, particularly when applying GIS visibility analyses to the problem. One key difference between our investigation and the other case studies summarized above is that ours is limited to a single, small plantation compound. We are not investigating the wider landscape or other compounds, partially because of lack of data (analysis is still preliminary) and partially because of the practice of nutmeg silviculture. Nutmeg silviculture takes place in a forested environment that inherently and drastically reduces the ability of plantation owners to construct a built environment that would enable them to surveil the entire landscape.

METHODOLOGY

Field Methods

Data for this article comes from excavations conducted by the second author on Banda Besar in 2011. Colonial period plantations were established on three islands in the Bandas: Banda Besar, Banda Naira, and Pulau Ay. Only three plantations were established on Naira. Very little remains of them, due to reuse of their construction materials post-World War II. Banda Besar is only a short boat ride from Banda Naira (the main island in the chain), which made it easier to access than the more remote Pulau

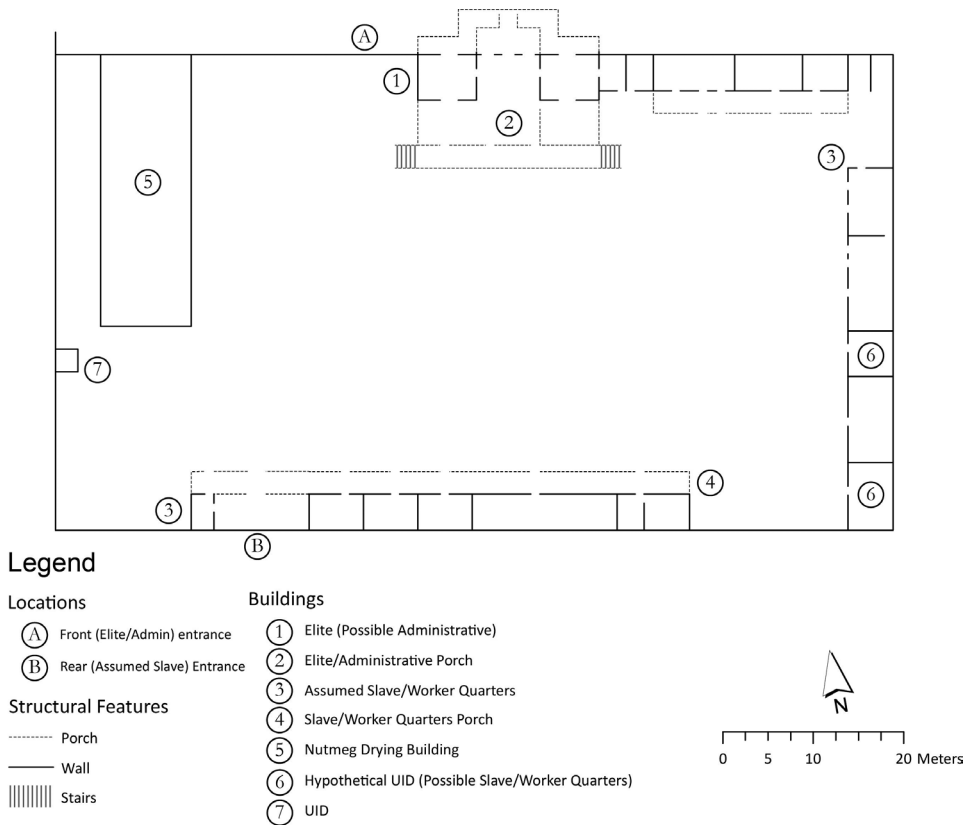


Fig. 3. Plan map of Groot Walling.

Ay. Thirty-four plantations were established on Banda Besar, the greatest number of plantations on any of the Bandas. Local informants showed the second author many of the remaining ruined *perken* during a pilot study in 2010. Three of these *perken* were selected for excavation based on the quality and quantity of remaining architecture. Groot Walling was the best preserved of the *perken* on Banda Besar, as a result of being passed down in a direct line from the original *perkenier*, Pieter van den Broecke, to his modern descendant, Pongky van den Broecke. Consequently, the structures at Groot Walling have been less substantially modified or demolished than others. The original structures are missing roofs and there is some vegetation growing within them, but the walls are primarily intact.

The compound itself is walled, approximately 92.5 m long and 52.5 to 55 m wide (Fig. 3). The interior includes assumed administrative/elite habitation quarters along the north wall, a nutmeg drying building approximately 5 m east of the west wall, what are assumed to be slave quarters along the south wall, and a series of unknown buildings along the east wall. These buildings could have been slave/servant quarters or storage areas. The buildings along the north wall were likely home to relatives or employees of the plantation owners.¹ As noted previously, plantation owners rarely stayed on the plantations themselves, preferring to reside in Naira or Ambon. They

likely sent their relatives or paid overseers and administrators to run the plantation compounds. All buildings have porches associated with them; historic photographs suggest these would originally have been covered porches.

Groot Walling (GW) was mapped with measuring tape and a hand-held Garmin GPS. A rough sketch map was created in the field, with the final GIS map and DEM (digital elevation model) based on GPS coordinates and the sketch map. Auger probes were placed at 5 m intervals inside and outside of the *perke* walls. Four 1 m × 1 m and one 1 m × 50 cm excavation units were placed at GW.

Data analysis is still in the preliminary stage; however, no specific patterns of spatial distribution of artifacts were identified. There were no obvious areas of overseer versus worker activity areas or concentrations of artifacts that could be attributed to a specific class of people. The lack of spatial patterning may be attributed to the adjacency of the ocean and the convenient waste disposal and transport it provides. In the past, there was no need or desire to create trash pits within the compound walls, although modern inhabitants do use trash pits within the walls. While this lack of evidence could prove problematic, there is some historical evidence for slave and laborer occupation of the compounds. Von Geusau (1994:72, pl. 25), a Dutch military official who visited the Bandas in the mid-1800s, observed plantation slaves and workers leaving Spanjibe (a plantation on the north face of Banda Besar) at 6:00 a.m., returning once for lunch, and then returning for good at 6:00 p.m. daily. It is possible that workers may have resided on the plantations during the harvest season, or a small number of workers inhabited the *perken* year-round, which may explain the lack of large identifiable middens or artifact patterning during field work.

While harvest seasons occurred three times per year (Wright 1958), there may have been free time between harvests where workers were not required to live on plantations. Given the aforementioned ambiguities surrounding slave presence, the southern buildings are assumed to be associated with slaves (and plantation laborers in general) for the purposes of this study. Should the hypotheses concerning surveillance be confirmed, then future work would still need to demonstrate the presence of slaves. Should the hypotheses be falsified, then the presence of slaves is largely irrelevant; their being there would not make the plantation any more an aid to surveillance. To best reflect the ambiguity concerning slave presence, we will hereafter refer to the buildings in the south of the compound as “assumed slave quarters” or “assumed laborer quarters.”

GIS Methods

GIS methodology consisted of applying certain tools of visibility analysis to a digitized and rasterized version of the field map created for Groot Walling. Visibility here refers to “*past* cognitive/perceptual acts that served not only to inform, structure and organize the location and form of cultural features, but also to choreograph practice in and around them” (Wheatley and Gillings 1999:3, emphasis in original). By exploring how material culture structures visibility, we can explore how it was used to control and aid past peoples’ ability to influence said perceptual acts, reinforce social relationships, and conduct surveillance. We can explore the relationship between past acts of perception and material culture by exploring the extent to which the landscape and built environment “afford” certain views or perceptions. The concept of “affordances” that originated with Gibson’s (1986) discussions of direct perception was introduced

to anthropology by Ingold (2000), in the context of social learning and reproduction, and Llobera (1996, 2007), in the context of practice and *habitus*. Here, we use “affordance” in a more limited, methodological sense. We wish to know if the compound affords inequality in surveillance capacity, which is to say that it affords overseers and administrators the ability to surveil in some way that is not afforded to slaves. Affordances are evaluated by comparison with different real (historical) and hypothetical configurations. For example, if the plantation compound of Groot Walling affords surveillance, then it was built or configured such that an individual who wished to surveil activities within it from a given vantage point would be more able to do so compared to either other plantations or to past, future, or hypothetical configurations of this plantation.

Affordances are explored by analyzing viewsheds, raster surfaces that identify the cells in an input raster surface (such as a DEM) that can be seen from one or more observation locations. Viewsheds are created by drawing a line of sight from one or more observation points to all other locations on a DEM. Cells whose line of sight to the observation point(s) is unbroken are visible; those whose line of sight is broken are not visible. Here, two types of viewsheds (single and total) are used. Single viewsheds are binary surfaces marking target cells as visible or not visible from a specified viewpoint (Wheatley and Gillings 2002). These were employed to assess what could be seen from the two entrances to the compound (one associated with the master’s quarters and one associated with the slaves’) as well as the extent to which overseers or masters could surveil activity within the compound. Total viewsheds are created by treating every single cell as an observation point; in effect, they calculate viewsheds for all locations on a raster surface (Llobera et al. 2004). Our total viewshed was calculated by algebraically summing the single viewsheds calculated from every single location within our compound. In essence, our total viewshed is a cumulative viewshed involving all possible locations: it measures the number of locations that can see a target cell.

To generate these viewsheds, the field map of Groot Walling created by the second author was digitized and rasterized (Fig. 4). Cell size was set to 0.25 m, so that the width of the walls could be captured by the cells. Floor elevation throughout the compound was effectively flat. Heights of the patio and room floors of the plantation’s administrative section, as well as the short walls around them, have not yet been measured directly, but have been estimated from photography and authors’ prior experience. We should note that the heights of these surfaces are insufficient to dramatically affect the overall distribution of visible space on the plantation. By far the biggest contributors to said distributions are the walls of the rooms and compound, which are high enough that they block all vision, and possibly the visual changes created by different degrees of shade on the covered porches (see below for further discussion).

A few buildings were so ruined that the precise location of doors and windows could not be known. These are noted as Hypothetical UID (Possible Slave/Servant Quarters) in Figure 3. We placed hypothetical doors on those buildings, but no windows. Additionally, there was some question as to whether or not the porch area between the two largest administrative buildings on the north side of the compound was actually a porch. There is no evidence of ruined walls there, but it does seem strange to have an open area running between the buildings. For now, we have left it as is. We wanted to be thorough in rasterizing the ruins, but these small discrepancies should not affect the broader, compound-wide scale at which we are working. They

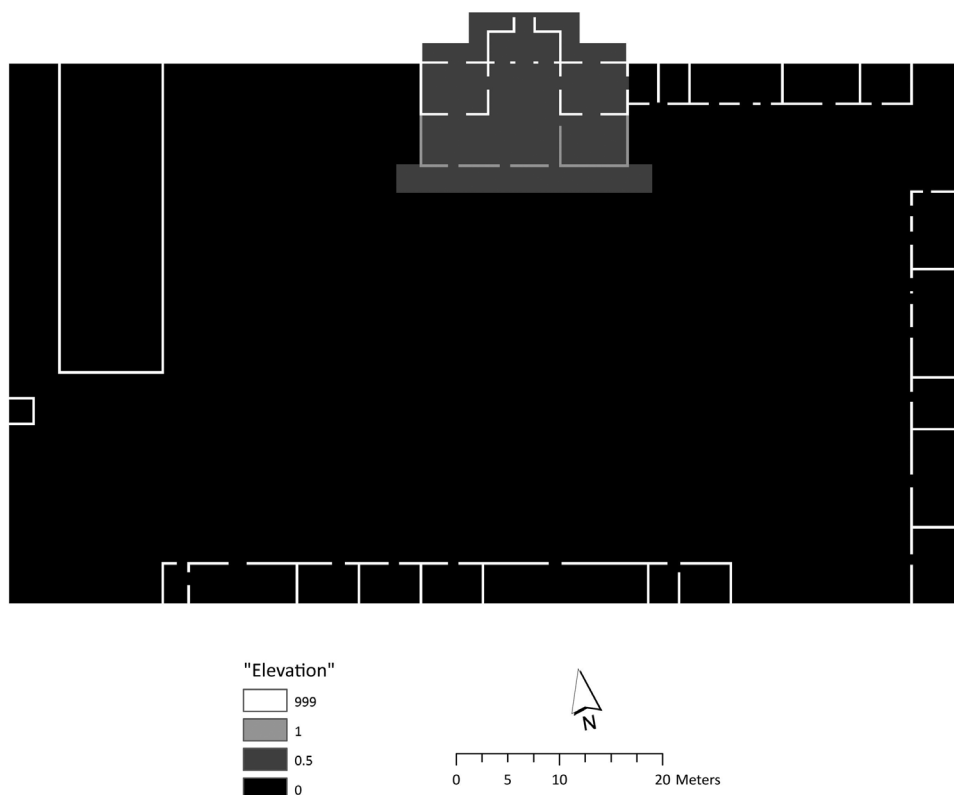


Fig. 4. DEM of Groot Walling.

would become significant were we to attempt a more local analysis, however. For the viewsheds, observer height was set at 1.6 m. We discuss the individual analyses in detail below.

RESULTS

Inspection of the reconstructed architecture plan for Groot Walling reveals that our hypotheses concerning its potential for use in surveillance are generally not supported. Evaluation of these hypotheses proceeded mainly through visual inspection of the compound plan, combined with ground-truthing and GIS-based single viewshed analysis for verification and to aid in visualizing our interpretations.

In addition, a series of hypothetical alternative compounds was created, each with a different arrangement of buildings. These different arrangements were subjected to the same viewshed analyses and their results compared with that of the actual arrangement. Two hypothetical arrangements were used: centralized and dispersed. The centralized arrangement was chosen to represent the opposite of the current, actual organization. Whereas currently the buildings on Groot Walling mostly line the walls, in the hypothetical centralized arrangement they cluster in the center (Fig. 5a). The dispersed arrangement was created to examine the effect of eliminating clustering of buildings either along the walls or in the center (Fig. 5b).

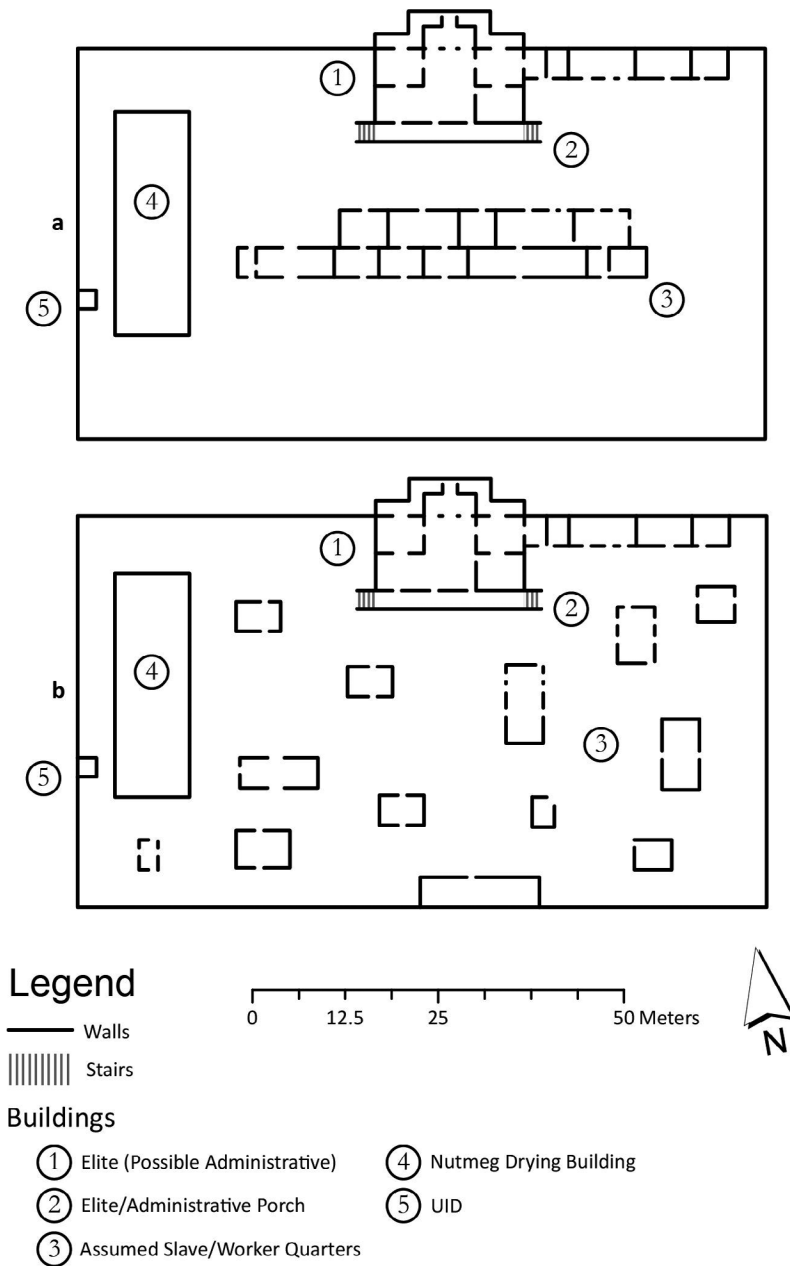


Fig. 5. Alternative arrangements of Groot Walling. a: centralized arrangement; b: dispersed arrangement.

Surveillance

At first analysis, the compound architecture appears to have aided administrators' ability to surveil plantation workers while they were in the compound. An individual standing on the porch in front of the administration area would have had full view of all activities within the center area of the compound, including activities conducted

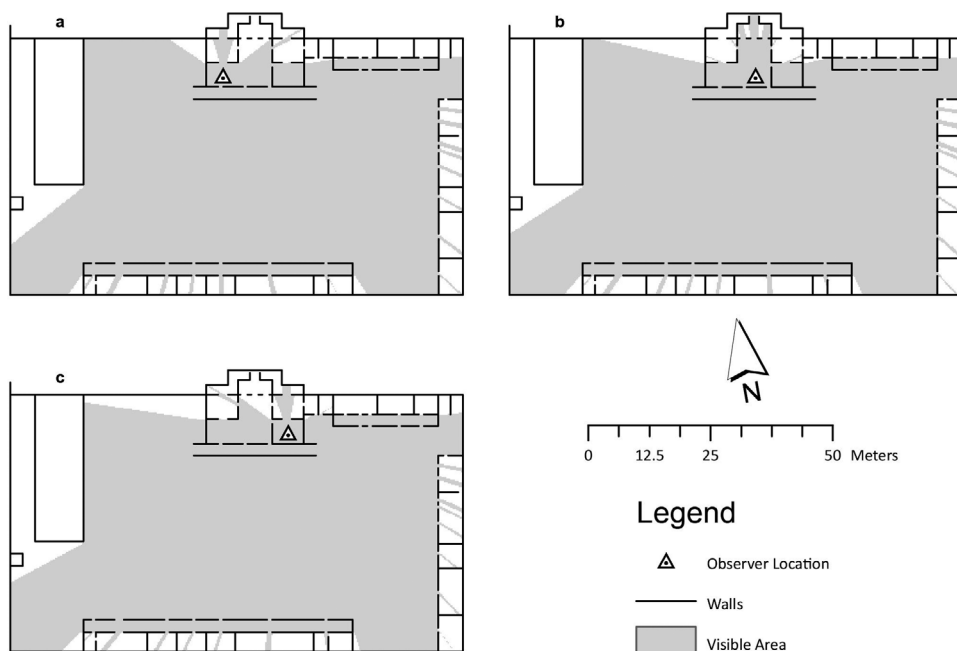


Fig. 6. Series of three viewsheds created from observer points on administrator's porch, normal compound arrangement.

outside the drying shed or on the porches of other buildings. Overseers would have been able to observe the movements of slaves about the plantation compound and when slaves moved to leave the compound to work in the grove. The compound wall would have prevented direct observation of slaves moving toward the grove once they left the compound, however. The visibility of activity within the presumed slave quarters was likely restricted.

Figure 6 displays a series of viewsheds, calculated from observer points on the assumed administrative porch, which help us visualize these observations. As one can see, in each case a considerable portion of the compound falls within the visible area indicated by the viewshed.

To demonstrate the likelihood that this is not a random, unintentional effect, we regenerated the viewsheds using the centralized, dispersed, and offset arrangements. We then calculated the total proportion of space that the viewsheds had from each observer point in each arrangement (including the real one) relative to the total visible space on the compound. "Proportion" here refers to the proportion of cells identified as visible by the viewshed over the total number of visible cells. Figure 7 displays the results of the viewshed calculations. Visible area from the administrator's porch composed 81.46% of the total area in the normal arrangement, 38.99% in the centralized arrangement, and 44.60% in the dispersed arrangement. From these results, we can confirm that changing the arrangement of buildings drastically changes the amount of visible space from these positions, which is consistent with the claim that the plantation compound was designed to aid in surveillance.

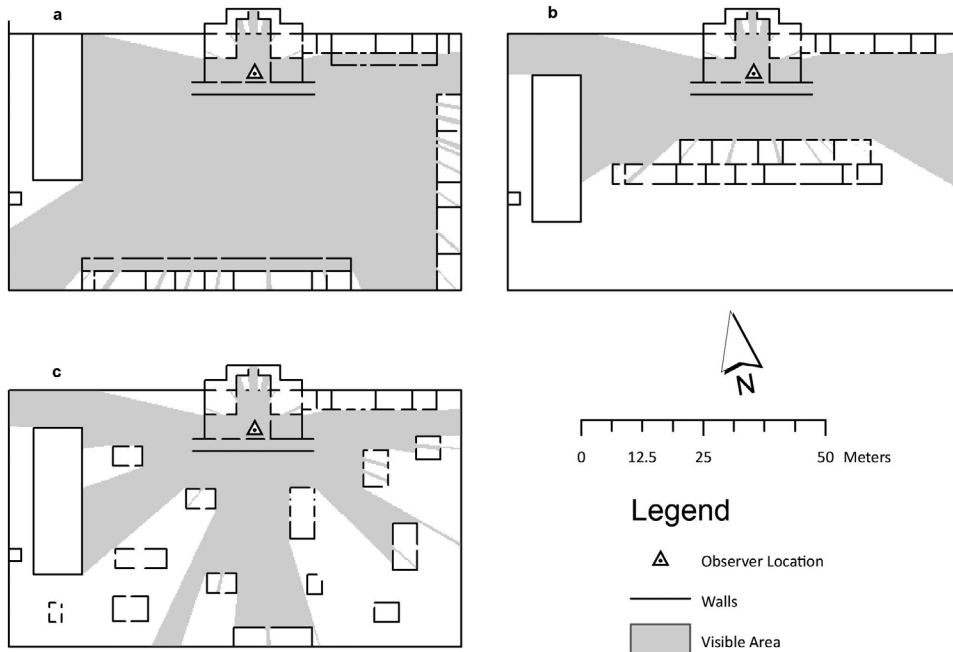


Fig. 7. Series of three views created from one observer point on administrator's porch, alternative arrangements of compounds. a: normal; b: centralized; c: dispersed.

TABLE I. PERCENTAGE OF TOTAL AREA VISIBLE FROM ADMINISTRATOR/ELITE'S PORCH

OBSERVER POINT	NORMAL	CENTERED	DISPERSED
1	81.46	38.99	44.60

However, further scrutiny of Groot Walling calls these initial conclusions into question. As one can see from Figure 8 and Table 2, observers on the porches of the assumed slave/worker cabins can obtain a similar degree of surveillance throughout the compound, up to and including the administration areas. This result is presumably as distinct and unique relative to hypothetical compounds as the views obtained from the administration porch. It appears that workers on porches would be just as capable of surveying the interior courtyard of the plantation compound and the administration area as administrators would be from their observation points. They would thus be capable of both surveying the same amount of area as the plantation owners and potentially knowing when the owners or overseers were surveying them from the opposite porch. Presumably this phenomenon would also occur if we were to calculate views from the courtyard; as a wide open space, enslaved workers there would likely be able to spot plantation owners watching them. The compound itself is not big enough for distance decay effects on vision to occur.

The observations noted above, which appear to point to a deliberate attempt to design Groot Walling so as to aid surveillance, do not seem at this time to produce the

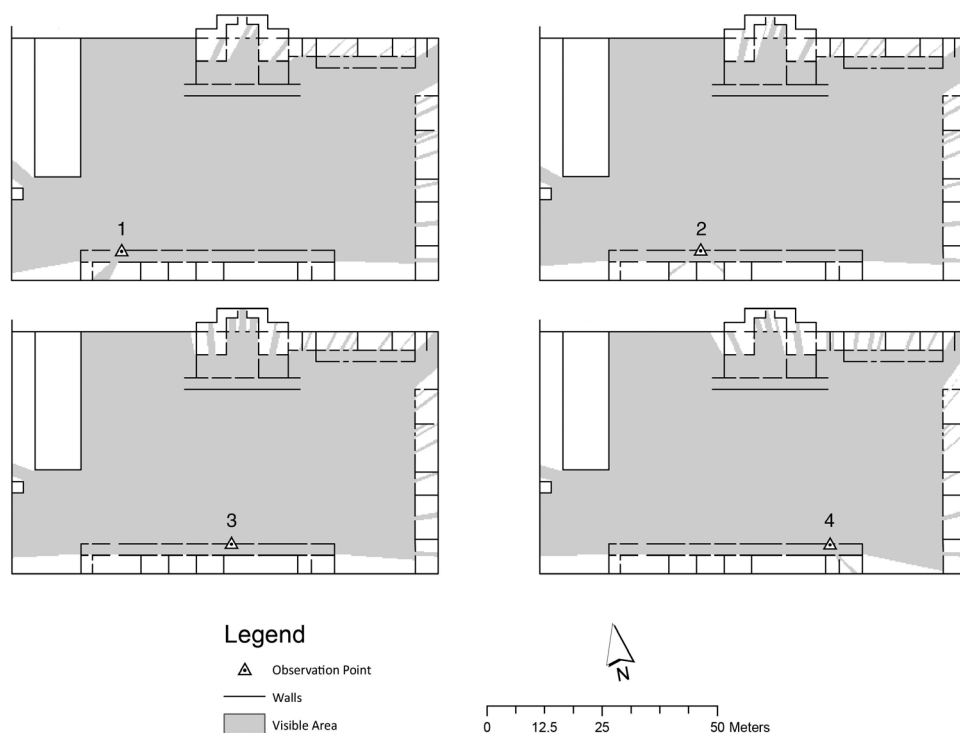


Fig. 8. Series of viewsheds calculated from slave porch, normal compound.

TABLE 2. PERCENTAGE OF TOTAL AREA VISIBLE FROM SLAVES/WORKERS' PORCH

OBSERVER POINT	NORMAL
1	81.94
2	81.93
3	81.79
4	81.92

kind of surveillance that is analogous to the panopticon or to our case studies. Even though plantation administrators on Groot Walling could see a good amount of activity on the plantation, the architecture would not give them any sort of unique view for gathering information, as in the case of Singleton (2001) or Randle (2011). Given this, and the inability to see without being seen, it seems that this plantation compound instead produced a sort of reciprocity of surveillance.

Admittedly, this reciprocal capacity to survey fluctuates when we consider the effects of lighting on visibility. Figure 9 is a photograph of an extant plantation-compound structure. From this photograph, we can see that porches were sometimes covered by roofing, creating a change in lighting during certain times of the day. This shade effect, in combination with intense sunlight, probably made it difficult to observe activity on the porches from within the courtyard. It may have had a similar



Fig. 9. Images of plantation compound Orang Datang, showing shading of porch area during times of high sun. Taken during 2012 pilot study by first author.

effect on the ability of individuals to observe opposite porches. These changes in lighting throughout the day would have created situations where intervisibility between locations in the courtyard and porches was broken. An observer standing on the porches of the southern buildings would potentially be able to see those in the courtyard without being seen in return. The same would hold for plantation administrators on their porch. This could mean that there were times when administrators were capable of observing workers' activities without being seen in return. If one looks closely at the photograph in Figure 9, one can see that some detail can be seen under the porch. It is known that *perkeniers* on Banda Naira often wore white or very light clothing (Bosma and Raben 2008). Assuming that the same can be said of their plantation administrators, they might very well have been visible through the shade. Ultimately, the issue of lighting is one that requires further research into both the specific activities on the plantation and how they might correlate with the times where this would be most a problem.

In the archaeological cases discussed previously, plantation landscapes were organized to aid in and improve plantation owners' ability to surveil activity on their plantations by generating a built environment that afforded them the ability to see without being seen in return, or to see and gather information on a wide range of activities from a small number of vantage points. A plantation's landscape and any modifications to it were identified as having been designed to aid in surveillance if they improved the owners' or overseers' ability to watch slaves.

The Groot Walling compound does not appear to have been designed to generate any such inequality in surveillance capability, however. Both enslaved workers and administrators appear to have had equal capacity to surveil one another and thus equal capacity to gather information on one another, at least in open, public areas. This suggests to us that the reasons for the design of Groot Walling did not include for its use as a “technology” or aid for surveillance. This conclusion is tentative given that we have not yet compared these results with other plantation compounds across space and time. Given our currently incomplete understanding of the chronology of *perk* building, establishing a tight chronology of *perk* architecture and identifying architectural changes through time could be a fruitful endeavor in elucidating any changes in the use of architectural labor control by the *perkeniers*.

Note too that these results do not rule out the use of surveillance as a mechanism of social control on Bandanese plantation landscapes. As noted previously, from the administrator’s porch one can see a great deal of space on the compound. It might be the case that while the plantation compound was not designed to aid in surveillance, plantation administrators found that they still could and did surveil their workers. There may also be other ways in which inequality between administrator and slave capacity for surveillance manifested, ways that were not so dependent upon the qualities of the built environment. It is likely that, on at least some plantations, slaves or contract workers would sit on the porches to process the nutmeg. In such cases, overseers may have utilized surveillance as a means of regulating this behavior by utilizing differences in posture between slaves and administrators. Administrators in a standing position would be better able to see the activity of multiple sitting slaves at a time and quickly deal with slaves who were deviating from acceptable behavior. Slaves who looked up or around, or tried to mimic such surveillance, would have immediately stood out as deviant. Whether or not this way of drying nutmeg occurred on Groot Walling is currently unknown, but the possibility of such activity suggests that we cannot rule out the use of surveillance in some form of small-scale social control.

Nevertheless, our hypotheses are tentatively refuted. Groot Walling’s organization does not appear designed to provide any significant inequality in the capacity of surveillance between administrators and enslaved workers and appears only minimally designed to be used as an aid in surveillance for the purposes of social control and domination. While administrators were still capable of seeing a good portion of the compound and presumably the activities therein, they were not afforded the same capacity to do so as was found on plantations elsewhere, such as in the southeastern United States. Additional research is necessary to fully evaluate this hypothesis, and to determine whether or not surveillance was still used as a means of social control, even if it was not taken into consideration in the design of the compound.

Observability and Total Viewshed Analysis

As we have seen, we are incapable of characterizing the plantation as one that affords surveillance. The reciprocity of the surveillance capability between enslaved workers and administrators suggests that aiding surveillance was not one of the intended goals of this plantation compound’s design. How, then, can we characterize this plantation and the nature of its “visual properties”? One possible answer may be “observability,” here defined as the capacity to be observed or watched. Note that on the plantation compound there is a considerable portion of space where one can be observed from

multiple locations. Each of the viewsheds in Figure 6 and Figure 8 demonstrate a high degree of intervisibility between the courtyard and the porches, so that people on the porches had the ability to see those in the courtyard. During certain nonshady times of the day, this ability could be reciprocated.

A means of visualizing and quantifying this can be found in the total viewshed. As noted previously, total viewsheds measure the visibility from all locations in a study area. The type of total viewshed we use here is based on calculating a viewshed for each cell on the compound and then summing them together. The result is a raster surface where the value at each location corresponds to the number of cells from which it is visible. It is thus a measure of the observability of that location. Since total viewsheds include all possible locations in their calculations, they can be seen as a representation of the visual structure of a study area, that is, a visualization of the trends in the distribution of degrees of some visual property (Llobera 2003). In addition to this, total viewsheds provide quantitative data on such trends, making it easier for us to compare them among different plantation compounds. This would allow us to track changes in observability (along with whatever other data we could gather from such viewsheds) through space and time and provide an empirical ground for interpreting and characterizing Bandanese landscapes.²

Total viewsheds were calculated for all variants of the compound: normal, centralized, and dispersed. In order to make the results more meaningful, the viewsheds were reclassified into four categories: public, public (transitional), private (transitional), and private. Category boundaries were established by examining visually a histogram of the normal compound's total viewshed. Breaks in distribution were identified and used to reclassify all of the viewsheds. This allowed for comparison between viewsheds, as we can compare the relative changes in visual categories. Figure 10 displays the reclassified total viewsheds that resulted from this analysis. Figure 11 displays the base histograms of each distribution, with four shades of gray corresponding to the four classes. This is to give the reader an idea of how the reclassification affected the representation of values on these viewsheds. Figure 12 is a series of pie charts that displays the changes in proportion of these categories between the viewsheds.

The visualization confirms our earlier initial observation that there is a considerable degree of space from which one can be seen from many locations. In fact, as one can see from both the viewshed and its histogram, there is a stark dichotomy between highly observable and highly nonobservable spaces, with the private spaces largely occurring within the very small interiors of buildings and occasionally along the sides of corners. Public space dominates almost all other situations. That this pattern is difficult to achieve with an alternative arrangement, and is thus perhaps nonrandom and intentional, is suggested by a comparison of it with total viewsheds developed for the centralized and dispersed hypothetical compound arrangements. We can see from Figure 12 that moving the presumed slave/servant quarters to the center changes the distribution of visibility categories, privileging public (transitional) spaces over all other categories. The dispersed arrangement's viewshed produces a similar result, though with a bit more private (transitional) space. These results are sensible in light of the visualizations in Figure 10. In Figure 10b, we can see that the centralization of the buildings in the compound serves as a barrier against any attempt to see from one end of the compound to the other. When the buildings are dispersed, as per Figure 10c, they serve to "break up" the highly public areas, creating numerous pockets of mixed degrees of visibility. Altogether, the stark differences between these

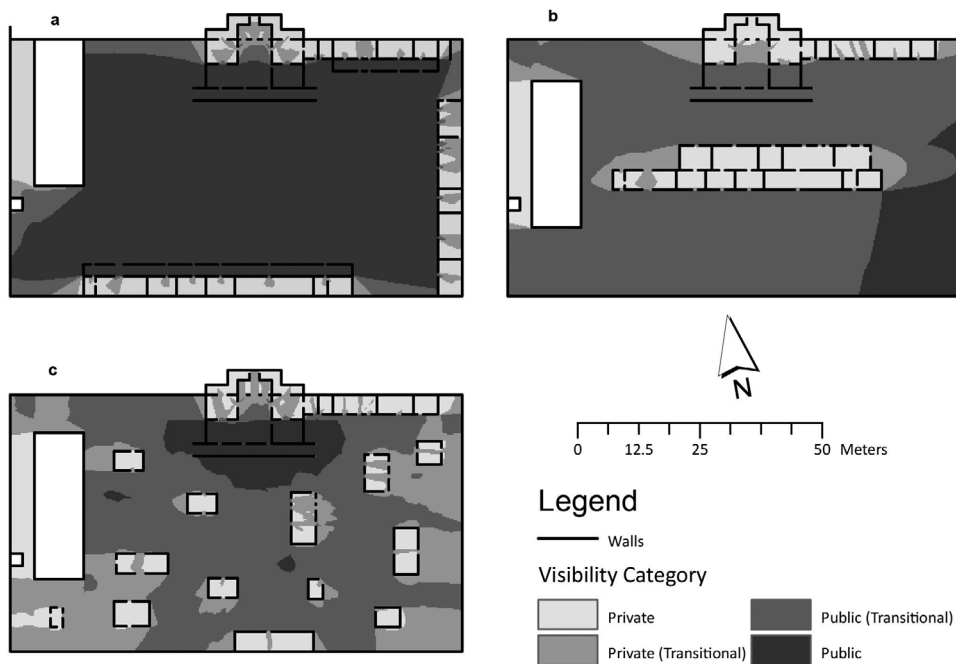


Fig. 10. Total viewsheds of Groot Walling arrangements, reclassified. a: normal; b: centralized; c: dispersed.

different arrangements suggest that the pattern observed in the normal arrangement is fairly robust, and thus more likely to be an intentional result of some plan on the part of the builder.

In summary, the reciprocity of surveillance and high degree of observability on this plantation compound point to something other than surveillance as a guiding principle to the design of or as a means of characterizing the design of Groot Walling. The results of our test for control-of-view are ambiguous, owing to the need for further background and source-side research to establish firmer expectations for what a compound designed for control-of-view should look like. In the following section, we discuss potential explanations for this observability phenomenon and propose future research directions that would help us model the nature of the Bandanese colonial landscape and its role in Bandanese society.

DISCUSSION

The reciprocity of surveillance and high degree of observability noted above are in many ways two sides of the same coin. Reciprocity of surveillance implies that, unlike on other plantations, access to the capacity to surveil was not unequal. This corresponds directly to a high capacity for being observed from multiple locations. More importantly, this property of Groot Walling is something that was likely known by its inhabitants. It is hard to imagine that one could live in this compound without becoming aware of the large degree of public space, although past inhabitants may not have conceived of it literally as “public” space. Given this, we suggest as a possible

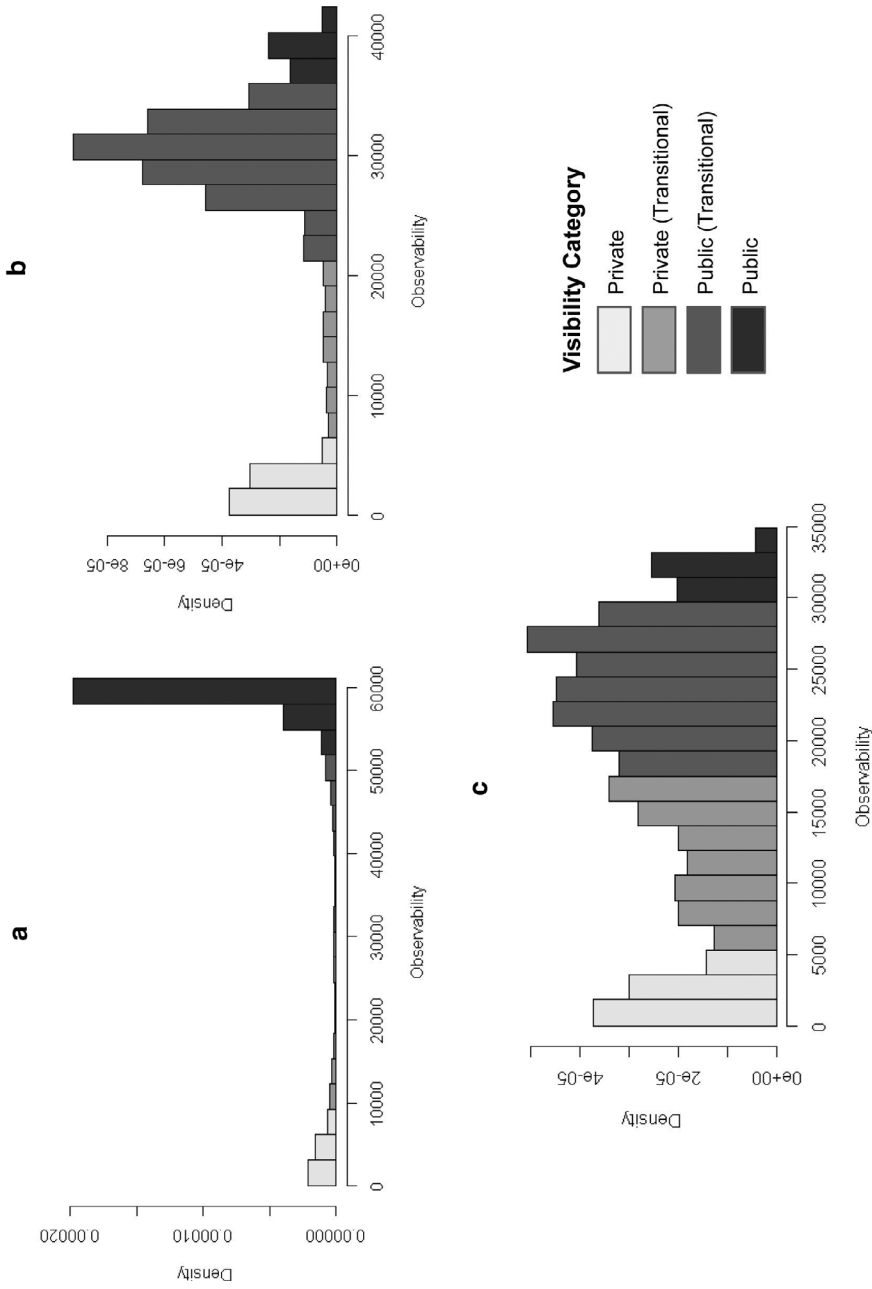


Fig. 11. Histograms of distributions of total viewsheds. a: normal; b: centralized; c: dispersed.

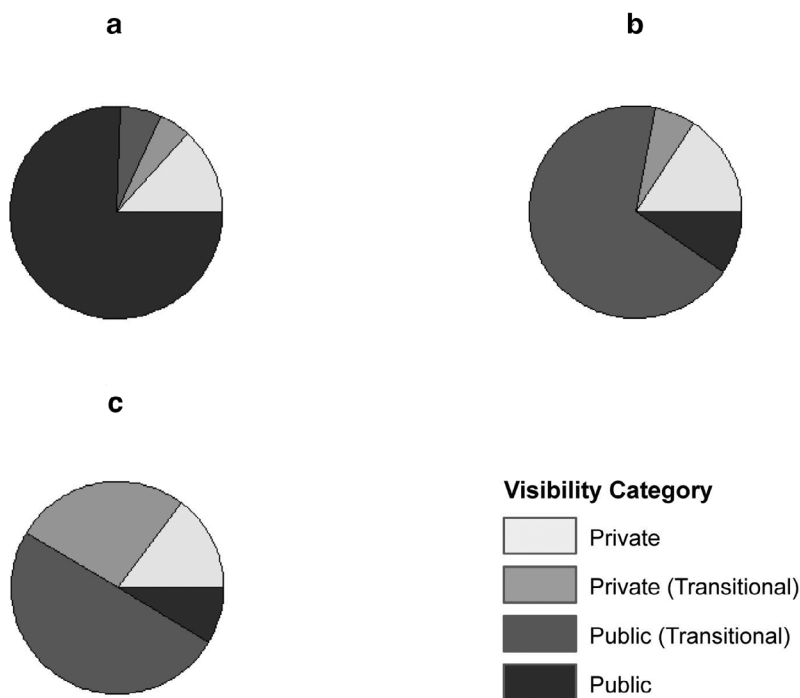


Fig. 12. Pie charts of proportion of type of space. a: normal; b: centralized; c: dispersed.

hypothesis that rather than afford surveillance, Groot Walling's structural design and organization were intended to downplay inequalities within the social system.

In essence, the plantation compound was designed such that no one had the capacity to surveil to a greater degree than anyone else. A potential effect of this may have been an ideological masking or whitewashing of the underlying inequality of the plantation system. By preventing unequal access to surveillance capacity that slaves might have noticed, the compound may have helped hide reminders of the inequality that they faced. This explanation, if accurate, could provide additional support for Winn's (2010) argument concerning the entanglement between enslaved workers and plantation owners. He draws on several lines of evidence, including instances of shifting status and opportunities for manumission among slaves, to suggest that slaves and plantation owners engaged in an entangled process of "culture building" that resulted in the establishment of a common Bandanese identity. Perhaps high observability functioned to encourage slaves/contract workers and administrators to ignore underlying inequality, and thus favored the development of the Bandanese identity. This would suggest that ideological reinforcement was preferred to surveillance as a mechanism of social control.

An alternative explanation would be that the compound was designed with such high observability in order to display slaves and slave activities as markers of wealth and prestige. There is evidence that plantation owners in the Banda Islands and their families displayed domestic (non-*perken*) slaves as a means of signaling wealth and prestige (Heeres 1908:324–325; Winn 2010). This was common to bondage prac-

tices throughout Southeast Asia (Reid 1983). If some of the slaves lived on the compounds, being able to display them might have been the purpose of the high observability of this plantation. Examining the compound, it is reasonable to hypothesize that the plantation owners could easily have entertained guests on their porches. Depending on the time of day and the nature of slave movement on the plantation, such guests could have been treated to displays of the plantation owner's wealth. The number of slaves, the views of slaves working for the plantation owner, and even the mere presence of slaves as a subordinate group to the owner could have served as a display of their material wealth and prestige. It is likely that such displays would have been part of wider tours of the area, since as noted previously it is likely that plantation owners did not actually live on the compounds they owned.

More generally, the apparent lack of the deployment of architecture to aid in surveillance as a management strategy might have its roots in the unique social and political relationships among the various actors on the Banda Islands. For example, as noted earlier, early colonial Bandanese society was designed to be heavily dependent upon the VOC for key goods and services, including military aid in preventing slave violence and rebellions. Depending on the precise nature of the early VOC-*perkenier* relationship, the *perkeniers* may have come to feel that the onus of controlling slaves rested almost entirely on the VOC. They thus neglected to design their plantations so as to aid in their ability to control labor. The intersection of social control and architectural design, instead of being located in the plantation, could have occurred in the placement and design of the military infrastructure on the islands. The VOC maintained multiple forts on the islands: the fort on Banda Naira is in direct view of Groot Walling, and there are two more forts on the island of Banda Besar. These forts were likely built to both defend against foreign and free-Bandanese assault and guard against slave escapes. The *perkeniers* may very well have relied on these forts, rather than their own plantation architecture, as a means of reinforcing control of slaves.

Reasons for this probably originate in the unique social situation created by the demarcation of privately owned versus public slaves. As noted previously, the VOC allotted the *perkeniers* a set of publicly owned slaves to work their plantations and allowed them to purchase private ones for personal use. Whether the public slaves were actually considered owned by the VOC and leased to the *perkeniers* or the *perkeniers* considered themselves the actual owners is unknown. Given that *perkeniers* and VOC officials quarreled over whether or not the former owned or leased their plantations, it is possible that there was disagreement over who owned or had responsibility for the public slaves. Unlike other plantations such as some of those in Jamaica (Delle 1998), slave ownership was split between a state-like entity and the local plantation owners. Combined with the aforementioned promises of the VOC to help protect against slave uprisings, the ambiguity and division created by splitting the slave population into public and private ownership could have led *perkeniers* to take a more cavalier attitude toward policing their slaves, relying more on their own overseers' surveillance in the field and on the VOC to prevent slave escapes and smuggling rather than architecture.

These are not the only possible explanations for this compound's organization or the results of visibility analysis. Given the lack of plantation owner presence, it may be that high observability existed so that if and when owners toured their compounds they would be capable of quickly noting and identifying any problematic or amiss behavior. The lack of surveillance equality would thus be a result of owners' needs to

periodically check up on their plantations. Conversely, the design could be a holdover from Portuguese colonial factory/fort designs. As Boxer (1965) notes, these designs significantly influenced Dutch Southeast Asian colonial architecture (particularly spice factories); they may have had some role in the design of plantation compounds in the Bandas. The layout of the compound could also be the unintended consequence of a series of different intentions or desires. One potential example would be the combination of a desire to defend against slave raids in tandem with economic restrictions on the availability of building materials. Loth (1995*b*) notes that early in the history of the nutmeg plantations there were not only frequent slave escapes, but several of the escapees returned to aid other slaves in escaping or conducted raids on plantations to steal slaves away. Further buildings and fortifications (presumably forts) were then constructed in an attempt to stop this activity. It may be, then, that this in combination with scarcity of resources is the reason for the compound's design and visual properties. The wall around the compound could have been to keep out slave raiders, and the buildings built flush to the wall as a means of saving on construction material. This would have led to the kind of open, high observability courtyard effect that we noted above.

Future Directions

Our pilot research and analysis of a plantation compound on the Banda Islands poses interesting and unique questions about the nature of the Bandanese plantation landscape, the role and function of the compounds within it, and the nature of the use of colonial material culture and surveillance. However, the conclusions that can be drawn are extremely limited by the need for further research. At present, we are unable to adjudicate between the hypotheses originally proposed. One solution to this would be further identification, reconstruction, and dating of other Bandanese plantation-compound designs. There are numerous compounds on the islands, all of them in a considerable degree of ruin and a number simply no longer exist.³ Recovering information on the design and construction date of plantation compounds will likely require a combination of remote sensing, further excavation along ruins and walls, and archival research. Perhaps the biggest limitation to future research will be the ability to reconstruct these plantations, particularly when so many are gone or heavily ruined.

GIS and computing technology in general may be able to assist us to fill in the gaps in data about individual plantations. Where structures or elements are missing, GIS technology and 3D reconstruction could allow us to reassemble those elements in different ways in order to understand how different hypothetical reconstructions would affect our results. It may be that some analyses, such as total viewshed analysis, identify broad enough trends in data that they are fairly robust against variation in plantation design arising from insufficient knowledge of those designs. With a more thorough understanding of the range of variation in compound construction through time, we could begin to evaluate models and hypotheses about compound function similar to those we speculated on in this article. Tracking visual properties such as surveilability and observability through time and space may prove useful in identifying the changing purposes and functions of the plantations and the interests of their builders.

A second, equally necessary, direction of future research is developing a fuller understanding of occupation, movement, and mobility on the Banda Islands. As noted,

we do not yet have a full understanding of the pattern of occupation of these compounds. While it is possible that they were occupied most of the time, archaeological investigations of Groot Walling and two other plantations have not yet turned up any significant midden deposits, and historic data recovered so far has been ambiguous on this matter. It is likely that there were freed slave or other local communities during the preemancipation period, since many of the plantations were located at precolonial village sites (Lape 2000). Winn (2007:82–84) notes the presence of such local communities postemancipation, and if they existed prior to 1863 they likely served as domiciles for plantation slaves and workers. Another concern is the need to better understand the day-to-day movement of slaves and contract workers. What activities did they participate in while in the compound besides drying nutmeg? What were their patterns of movement in the forest? And what patterns of movement were associated with smuggling nutmeg or conducting alternative agricultural practices? As a number of authors have noted (Llobera 2000; Pred 1986:5–31; Wheatley and Gillings 1999), understanding movement is critical to understanding experience, perception, and the means by which the environment structures social relations. Here a combination of archival research and GIS mobility and accessibility analysis could be fruitful. Historical documents can provide firsthand accounts of the activities of past peoples, but there is little information on the non-European-descended population of the colonial Banda Islands, since most historic records focus on the European-descended elites. There are ways of dealing with this problem. One can focus on elite commentary on slave and freed slave activity, identify patterns of slave punishment, or look at local laws, ordinances, and agreements related to slaves and the slave system. A few documents written by outside observers such as Von Geusau or Valentijn describe slave activities and slave–*perkenier* relations in the islands. GIS analysis of mobility and movement, usually via cost-path analysis, could be used to develop models of past movements that would be capable of taking into account a variety of environmental and cultural factors (e.g., Howey 2007; White and Surface-Evans 2012). Between the two approaches, we might be able to reconstruct patterns of day-to-day movement over the landscape.

A third avenue of future research would be to find historical and anthropological case studies that could be used for comparative purposes. There is an unfortunate lack of solid case studies where archaeologists: 1) know that a given landscape or architecture was designed for some purpose of social control, and 2) have developed GIS data from said case study that could be used to compare with this one. Where archaeologists have used GIS to explore social control in historic or colonial contexts, they have more often than not focused more on the use of big houses and owners' houses to survey landscapes dominated by nontree crops, such as sugar, rice, and tobacco (e.g., O'Sullivan 2012; Randle 2011; cf. Delle 2002). Given the stark difference between those landscapes and the one we are examining, they are not appropriate comparative sources. Other possible avenues of inquiry could involve drawing analogies from other colonial compounds (e.g., missionary compounds) or large enclosed spaces like prisons. However, to the best of our knowledge, there is not yet any publicly available GIS data on these that can be used for such analogical reasoning.

Finally, future research will have to attend to issues of scale on this landscape. As we move out from the scale of an individual compound, we may find that different spatial relationships emerge that will help contextualize the roles compounds and the wider built environment might have played. For example, a number of forts were built

in the Bandas, presumably as a means of projecting control over the area, particularly the ocean. Inasmuch as forts were built to afford surveillance (a hypothesis that would require further analysis to test), analyzing them could point to a difference in function, use, or purpose of the built environment between spatial scales.

CONCLUSION

Preliminary analysis of Groot Walling, a nutmeg plantation compound in the Banda Islands, suggests that the plantation compound was not designed for surveillance but was possibly designed to maximize the observability of its inhabitants. These results suggest that a new model or models different from those used in other areas of the world are necessary to understand the various functions Bandanese landscapes served in colonial history. We have proposed several possible explanations for the compound organization at Groot Walling and suggested ways in which future research could contribute to such explanations. As it stands, our preliminary results suggest that the Bandanese plantation landscape is considerably unlike those found elsewhere in the world. It seems likely that we should expect very different or less stringently enforced mechanisms of social control than those found on landscapes in the Caribbean and the southeastern United States. Given this, investigating the nature of the Bandanese colonial landscape and the role it played in colonial society has very real potential to add not only to our understanding of the Southeast Asian colonial period, but to our knowledge of plantation landscapes in general.

ACKNOWLEDGMENTS

We would like to thank everyone who took the time to offer comments and suggestions for this article, particularly Peter Lape, Marcos Llobera, Joss Whittaker, Yi Pan, Jiun-Yu Liu, and Mary Barnes. We would also like to thank our two anonymous reviewers, whose comments dramatically strengthened key sections. We are indebted to the Digital Archaeology Research (DigAR) Lab at the University of Washington for providing access to critical computer equipment and software. Finally, we would like to thank Pongky van den Broecke, who graciously allowed excavation at his home, in addition to Sopyan and Ayup without whose assistance the fieldwork would not have been possible. This research was aided by a Fellowship for East and Southeast Asian Archaeology and Early History from the American Council of Learned Societies, with funding from the Henry Luce Foundation.

NOTES

1. The current inhabitant of the plantation, Pongky van den Broecke, noted that he grew up in these quarters.
2. Llobera (2003: 34–37) provides an example of this.
3. The first author visited over twenty compounds during a summer pilot study to the region.

REFERENCES CITED

- BOSMA, ULBE, AND REMCO RABEN
 2008 *Being "Dutch" in the Indies: A History of Creolization and Empire, 1500–1920*, trans. W. Shaffer. Singapore: RUS Press.
- BOXER, C. R.
 1965 *The Dutch Seaborne Empire: 1600–1800*. London: Penguin Books.

- BREMAN, JAN
1989 *Taming the Coolie Beast: Plantation Society and the Colonial Order in Southeast Asia*. Delhi: Oxford University Press.
- DELLE, JAMES A.
1998 *An Archaeology of Social Space: Analyzing Coffee Plantations in Jamaica's Blue Mountains*. New York: Plenum Press.
1999 The landscapes of class negotiation on coffee plantations in the Blue Mountains of Jamaica: 1790–1850. *Historical Archaeology* 33(1): 136–158.
2002 Power and landscape: Spatial dynamics in early-nineteenth-century Jamaica, in *Dynamics of Power*: 341–361, ed. Maria O'Donovan. Carbondale, IL: Center for Archaeological Investigations.
- ELLEN, ROY
2003 *On the Edge of the Banda Zone: Past and Present in the Social Organization of a Moluccan Trading Network*. Honolulu: University of Hawai'i Press.
- FERGUSON, LELAND
1991 Struggling with pots in colonial South Carolina, in *The Archaeology of Inequality*: 28–39, ed. Randall H. McGuire and Robert Paynter. Oxford: Blackwell.
- FOUCAULT, MICHEL
1977 *Discipline and Punish: The Birth of the Prison*, trans. Alan Sheridan. New York: Vintage Books.
- FUNARI, PEDRO, AND CHARLES ORSER JR.
2001 Archaeology and slave resistance and rebellion. *World Archaeology* 33(1): 61–72.
- GIBSON, JAMES J.
1986 *The Ecological Approach to Visual Perception*. Mahwah, NJ: Lawrence Erlbaum Associates Inc.
- HANNA, WILLARD A.
1978 *Indonesian Banda*. Ann Arbor: University of Michigan Institute for the Study of Human Issues.
- HEERES, J. E.
1908 Eene Engelsche lezing omtrent de verovering van Banda en Ambon in 1976 en omtrent den toestand dier eilandgroepen op het eind der achttiende eeuw, uitgegeven en toegelicht. *Bijdragen tot de Taal-, Land-, en Volkenkunde* 60: 249–368.
- HIGUCHI, TADAHIKO
1983 *The Visual and Spatial Structure of Landscapes*, trans. Charles S. Terry. Cambridge, MA: MIT Press.
- HOWEY, MEGHAN C. L.
2007 Using multi-criteria cost surface analysis to explore past regional landscapes: A case study of ritual activity and social interaction in Michigan, AD 1200–1600. *Journal of Archaeological Science* 34(11): 1830–1846.
- INGOLD, TIM
2000 *The Perception of the Environment: Essays in Livelihood, Dwelling and Skill*. London: Routledge.
- ISRAEL, JONATHAN I.
1989 *Dutch Primacy in World Trade, 1585–1740*. Oxford: Clarendon Press.
- LAPE, PETER
2000 Contact and Conflict in the Banda Islands, Eastern Indonesia, 11th to 17th Centuries. Ph.D. diss. Brown University, Providence, RI.
- LEIRISSA, RICHARD Z.
1978 The Dutch trading monopolies, in *Dynamics of Indonesian History: 189–206*, ed. H. Soebadio and C. du Marchi Sarvaas. Amsterdam: North-Holland Publishing Company.
- LOBERA, MARCOS
1996 Exploring the topography of mind: GIS, social space and archaeology. *Antiquity* 70: 612–622.
2000 Understanding movement: A pilot model towards the sociology of movement, in *Beyond the Map: Archaeology and Spatial Technologies*: 65–84, ed. Gary Lock. Amsterdam: IOS Press.
2003 Extending GIS-based visual analysis: The concept of visualsapes. *International Journal of Geographical Information Science* 17(1): 25–48.
2007 Reconstructing visual landscapes. *World Archaeology* 39(1): 51–69.

- LLOBERA, MARCOS, DAVID WHEATLEY, JAMES STEELE, SIMON COX, AND O. PARCHEMENT
 2004 Calculating the inherent visual structure of a landscape ("total viewshed") using high-throughput computing, in *Beyond the Artifact: Digital Interpretations of the Past. Proceedings of CAA 2004, Prato 13–17 April*: 146–151, ed. F. Nicolucci and S. Herman. Budapest: Archaeolingua.
- LOTH, VINCENT G.
 1995a Armed incidents and unpaid bills: Anglo–Dutch rivalry in the Banda Islands in the 17th century. *Modern Asian Studies* 29(4): 705–740.
 1995b Pioneers and perkeniers: The Banda Islands in the 17th century. *Cakalele* 6: 13–35.
- LYON, DAVID
 2007 *Surveillance Studies: An Overview*. Cambridge: Polity Press.
- McKEE, LAWRENCE
 1992 The ideals and realities behind the design and use of 19th century Virginia slave cabins, in *The Art and Mystery of Historical Archaeology: Essays in Honor of James Deetz*: 195–213, ed. Ann E. Yentsch and Mary C. Beaudry. Boca Raton, FL: CRC Press.
- O'SULLIVAN, REBECCA
 2012 Out of the Land of Forgetfulness: Archaeological Investigations at Bulow Plantation (8FL7), Flagler County, Florida. Master's thesis. University of South Florida, Tampa.
- PRED, ALLAN
 1986 Place as historically contingent process, in *Place, Practice and Structure: Social and Spatial Transformation in Southern Sweden: 1750–1850*: 5–31. Totowa, NJ: Barnes and Noble Books.
- RANDLE, LISA B.
 2011 Applying the Panopticon model to historical plantation landscapes through viewshed analysis. *Historical Geography* 39: 105–127.
- REID, ANTHONY
 1983 Introduction: Slavery and bondage in Southeast Asian history, in *Slavery, Bondage & Dependency in Southeast Asia*: 1–43, ed. Anthony Reid. Brisbane: University of Queensland Press.
- RUPPEL, TIMOTHY, JESSICA NEUWIRTH, MARK P. LEONE, AND GLADYS-MARIE FRY
 2003 Hidden in view: African spiritual spaces in North American landscapes. *Antiquity* 77(296): 321–335.
- SCOTT, JAMES C.
 1990 *Domination and the Arts of Resistance: Hidden Transcripts*. New Haven: Yale University Press.
- SIMON, BART
 2002 The return of panopticism: Supervision, subjection and the new surveillance. *Surveillance & Society* 3(1): 1–20.
- SINGLETON, THERESA
 2001 Slavery and spatial dialectics on Cuban coffee plantations. *World Archaeology* 33(1): 98–114.
- STEENSGAARD, NIELS
 1982 The Dutch East India Company as an institutional innovation, in *Dutch Capitalism and World Capitalism*: 235–258, ed. M. Aymard. Cambridge: Cambridge University Press.
- SYMANSKI, LUÍS CLÁUDIO PEREIRA
 2012 The place of strategy and the spaces of tactics: Structures, artifacts, and power relations on sugar plantations of West Brazil. *Historical Archaeology* 46(3): 124–148.
- VILLIERS, JOHN
 1981 Trade and society in the Banda Islands in the sixteenth century. *Modern Asian Studies* 15(4): 723–750.
 1990 The cash-crop economy and state formation in the Spice Islands in the fifteenth and sixteenth centuries, in *The Southeast Asian Port and Polity: Rise and Demise*: 83–105, ed. J. Kathirithamby-Wells and J. Villiers. Singapore: Singapore University Press.
- VON GEUSAU, WILLEM
 1994 *Views of Indonesia: 1848–1857*, trans. Yu-Chee Chong and Richard Hamblyn. Singapore: Gallery Editions.
- WAITZKIN, H.
 1989 A critical theory of medical discourse: Ideology, social control, and the processing of social context in medical encounters. *Journal of Health and Social Behavior* 30(2): 220–239.

- WHEATLEY, DAVID
1995 Cumulative viewshed analysis: A GIS-based method for investigating intervisibility, and its archaeological application, in *Archaeology and Geographic Information Systems: A European Perspective*: 171–186, ed. G. Lock and Z. Stancic. London: Taylor & Francis.
- WHEATLEY, DAVID, AND MARK GILLINGS
1999 Vision, perception and GIS: Developing enriched approaches to the study of archaeological visibility, in *Beyond the Map: Archaeology and Spatial Technologies*: 1–27, ed. Gary Lock. Amsterdam: IOS Press.
2002 *Spatial Technology and Archaeology: The Archaeological Applications of GIS*. Boca Raton, FL: Taylor & Francis.
- WHITE, DEVIN A., AND SARAH L. SURFACE-EVANS, EDS.
2012 *Least Cost Analysis of Social Landscapes: Archaeological Case Studies*. Salt Lake City: University of Utah Press.
- WINN, PHILLIP
2007 The Southeast Asian exception and “unforeseen results”: Unfree labour in the Banda Islands, in *Legacies of Slavery: Comparative Perspectives*: 76–107, ed. Maria Suzette Fernandes Dias. Newcastle upon Tyne: Cambridge Scholars Publishing.
2010 Slavery and cultural creativity in the Banda Islands. *Journal of Southeast Asian Studies* 41(3): 365–389.
- WOOD, DAVID MURAKAMI
2007 Beyond the panopticon? Foucault and surveillance studies, in *Space, Knowledge and Power: Foucault and Geography*: 245–263, ed. Jeremy W. Crampton and Stuard Elden. Hampshire: Ashgate Publishing Limited.
- WRIGHT, H.R.C.
1958 The Moluccan spice monopoly, 1770–1824. *Journal of the Malayan Branch of the Royal Asiatic Society* 31: 1–127.

ABSTRACT

This article evaluates the extent to which the architectural organization of a Dutch plantation compound was designed to aid in plantation administrators' and owners' ability to engage in acts of social control via surveillance. The particular compound, Groot Walling, is located on Banda Besar, the largest of the Banda Islands, Maluku Province, Indonesia. Our initial hypothesis is that the compound was designed to aid in surveillance activity by administrators against slaves and contract workers. After discussing the history of the islands and prior historical archaeological research into surveillance, we employ GIS-based visibility analysis to evaluate this hypothesis. A series of single viewsheds were calculated within Groot Walling and compared against viewsheds generated from hypothetical organizations of that same compound. The results, while preliminary, are not consistent with our hypothesis, and we tentatively reject it. We follow up these results with some exploratory analyses, utilizing a series of total viewsheds to try to better characterize the visual properties of this compound. We then suggest some alternative hypotheses for our results, and end with a discussion of future research directions. KEYWORDS: plantations, historical archaeology, landscape archaeology, surveillance, Banda Islands, Indonesia, Dutch colonialism.