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Settlement Patterning on the British Caribbean Island of Tobago

ABSTRACT

Sugar planters on Tobago faced a variety of challenges. Foremost among these were creating and maintaining the economic viability of their estates while subjugating a vastly larger enslaved population. As a minority cultural group, however, planters were also faced with the task of reaffirming their own identities as British subjects. These goals were met by constructing a landscape that offered communications, familiarity, and symbolic power. Sugar estate layouts can be interpreted functionally by focusing on the issues of sugar production and control of an enslaved labor force. This paper adds a third dimension by examining the production of sugar and the control of labor from the perspective of the estate house and its relationship to the larger landscape. Additional hypotheses that could account for settlement choices are presented where production and control are insufficient explanation for patterned arrangements.

Introduction

On many Caribbean islands, the manufacture of sugar was the economic goal of the European inhabitants. The settlement patterning that accompanies this endeavor is well documented (e.g., Higman 1988; Armstrong 1990). Sugar factories are located central to cane fields, estate villages are located in positions accessible to both field and factory, and estate houses are built on nearby hilltops. This settlement patterning can be explained with reference to the functional aspects of production. Because the quality and quantity of juice in the cane rapidly decrease after cutting, a location that afforded the shortest travel between field and factory and thus limited the time between cutting and crushing was the most desirable choice for factory siting. To increase worker output, estate villages housing the labor force were located close to both

fields and factory, allowing laborers easy access to their assigned tasks in either locale. Finally, estate houses were sited to take advantage of the healthful benefits of a steady breeze in an environment supporting a host of potentially deadly insect-borne diseases. Added benefits of such a location were managerial: planters obtained an unobstructed view of both ongoing operations at the sugar factory and activities in the estate village.

This paper examines the causality assigned in the above model using documentary and archaeological survey data gathered on the Caribbean island of Tobago. After presenting a discussion of the methods used to locate and identify sites and a description of the patterning revealed by archaeological survey, alternative explanations for the observed patterning are discussed. These explanations are suggested by a broader focus than is the norm in Caribbean plantation archaeology. The data and conclusions presented herein are based on examination of several adjacent estates rather than through focus on an individual plantation. This approach is advocated because it illuminates intersite relationships as well as intrasite relationships. It results in potentially conflicting data that could not otherwise be recognized while supplying the data by which that conflict can be resolved.

The analysis herein indicates that on Tobago the choice of sugar factory location was dependent on water availability for rum production and on factors relating to the transport of sugar, molasses, and rum from plantation to shipping point and that these were the initial concerns of planters when choosing a location for their plantation. The most suitable location for the estate house and estate village were selected after property was acquired and the sugar factory sited. Estate house site selection was based on a variety of implicit and explicit considerations including health, economic and social advantage, and protection from both internal and external threats. On Tobago plantations that enjoyed a higher than normal economic and social status, the es-

tate village was sited and constructed to support that status as well as to provide housing for the plantation labor force.

Archaeological Survey

Tobago is a small island, covering an area of approximately 116 mi., situated at latitude 11°15' N and longitude 60°40' W, the extreme southeastern end of the Lesser Antilles (Figure 1). The island is approximately 26 mi. long and 8 mi. wide at its widest point, and trends from northeast to southwest (Figure 2). It was permanently settled by the British in 1763 after centuries during which various European powers unsuccessfully vied for ownership. Within less than 40 years of settlement Tobago reached the high point of its sugar production, exporting 7,939 U.S. tons in 1799 (Deerr 1949:202). In 1811 the island supported 89 sugar plantations (Young 1812a). Twenty-two were located in St. David's Parish, which was extensively surveyed in 1992 and 1993 for architectural and archaeological remains associated with the sugar industry (Clement 1995). St. David's Parish covers an area of approximately 35 km² and spans the three principle physiographic provinces of the island. These include a mountainous interior, a transitional hills province, and lowlands.

The central geological core of the island rises to elevations of greater than 500 mmsl and is characterized by plunging watercourses, deep, moist valleys, and jagged, abruptly rising hills and ridges. The hills province contains abundant streams of varying sizes and steep, eroded hills grading into gently rolling topography nearer the coast. The lowlands are characterized by flat, arid, savanna-like conditions. St. David's Parish thus contains areas of high relief and areas of little or no relief. It was selected for study because these attributes impose the greatest variety of topographic constraints to structure location, ranging from few in the lowlands to many in the rugged interior. It was therefore expected that St. David's Parish sugar estates would evince the greatest variety in layout. Methodologically, this was an important consideration. From the outset an assumption of the project

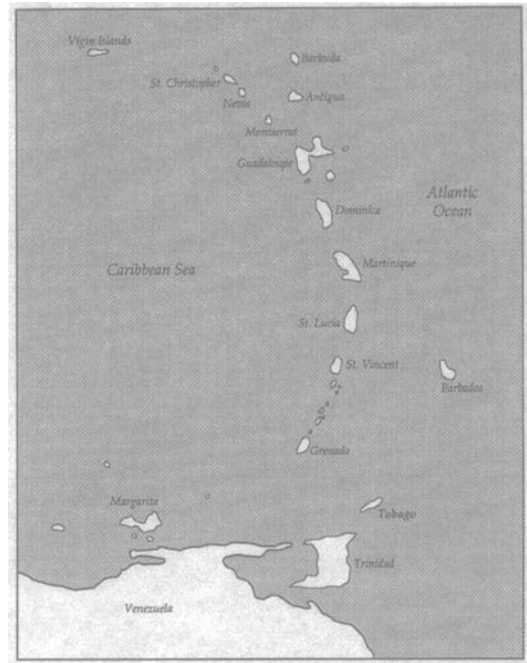


FIGURE 1. Tobago and the Lesser Antilles.

was that sugar estate design and layout would be patterned and that patterning would reflect both idealized notions of the way an estate ought to look and constraints imposed on that ideal by the natural environment. Comparing and contrasting a number of estates in a variety of settings would clarify the relationship between the ideal layout and the environment on individual estates. In addition, the broad approach implemented through examination of a study population composed of all estates in an entire parish allowed examination of the relationship between estates as well as within estates.

Survey focused on locating remains associated with sugar estates. The primary mechanical means of locating sites was through pedestrian survey. Few sites would have been located had this method alone been relied on, however, due to the large study area, topographic variation, and dense vegetation. A concerted effort to identify possible sites was undertaken before fieldwork began through the examination of a number of written sources including historic maps, manuscripts and documents, and modern maps and published works. As much of the historic road system on Tobago is still in use

today, the modern maps served as a baseline by which descriptions in the literature and graphic representations of past land use were evaluated. Many local informants were also consulted, and several sites were approximately located with their aid.

Survey Results

Remains associated with 20 sugar estates were located during the course of pedestrian survey in St. David's Parish (Figure 3). These include 22 sugar factory complexes utilizing a variety of power sources. Ten windmill towers, 8 water wheels or wheel pits, 5 steam engines, and 1 cattle mill were identified. Domestic components identified were 16 estate houses and four estate villages—a fifth was identified later. In several cases, only a tentative identification of the sugar estate components was made. These components include one probable steam engine, two probable estate houses, and six probable estate villages. Finally, a variety of additional structures were identified, including two coastal warehouses that served as shipping points for

sugar, rum, and molasses from the interior estates, two lime kilns, a residential structure associated with the kilns, and a semaphore station. No remains were found on Dunvegan or Mt. Dillon estates.

Analysis of the located sites occurred at both the intersite and intrasite level. Where possible, sketch maps of all factories and estate houses were drawn in the field, with particular focus on layout and aspect in relation to other estate buildings and location. All sites were plotted on modern topographic maps to which superimposed approximate 19th-century estate boundaries derived from available contemporary maps (e.g., Jefferys 1969[1765], 1778, 1794; Byres 1776, 1832) had been transferred.

Of the 22 sugar factories encountered during the survey, 19 are located adjacent to a water source sufficient to provide water for rum production. Significantly, of the three that are not, two were later replaced by new factories located adjacent to streams or canals. The third has a small wind tower that was used to pump water from a nearby river to the factory. This reliance on water for rum-making resulted in the confine-

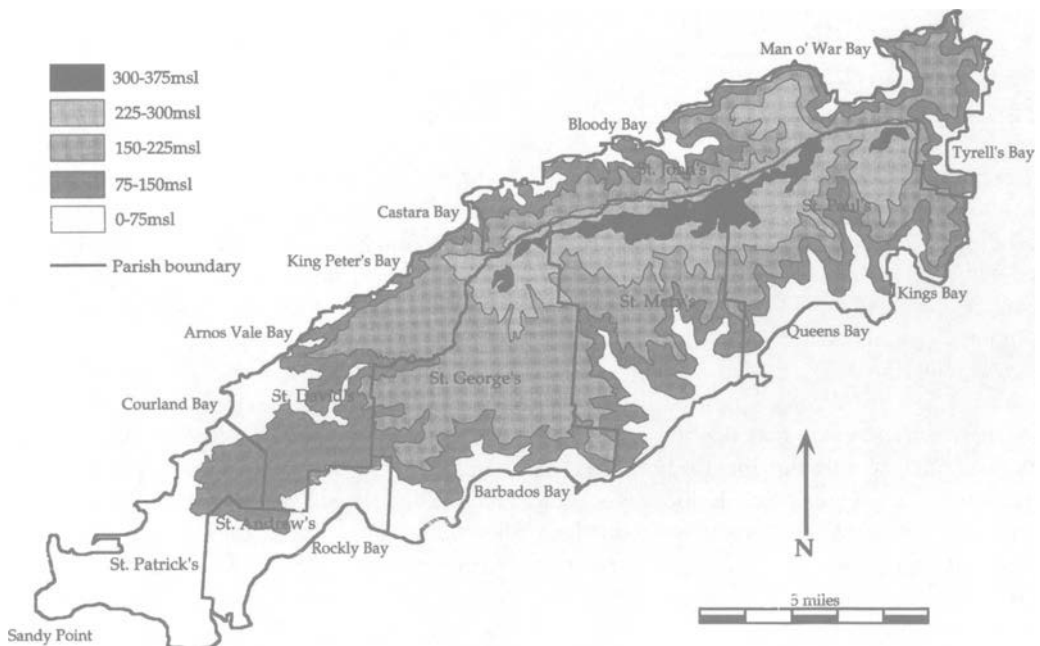


FIGURE 2. Physical features and parishes of Tobago.

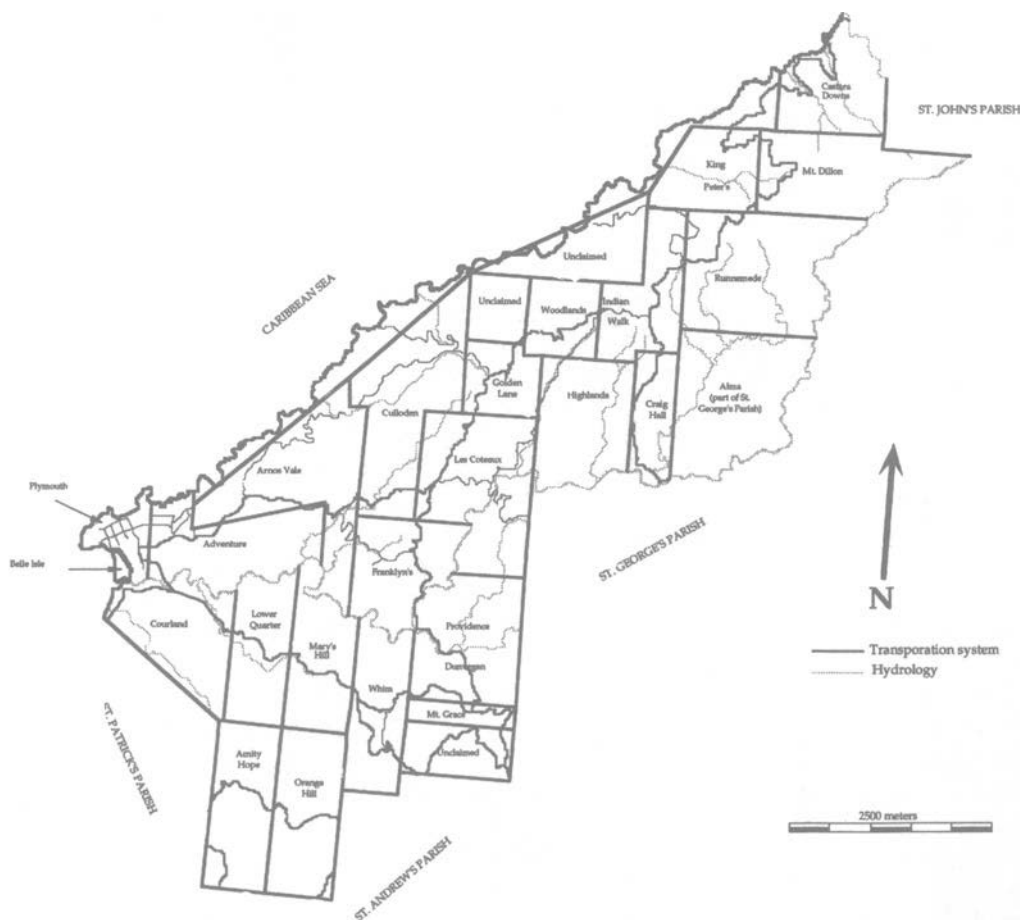


FIGURE 3. St. David's parish estates.

ment of factories to valley bottoms, broad vales, or locations that could be reached by canal in areas of high topographic relief. In addition, all of the sugar factories are located close to a protected bay or near a road with access to shipping points. In the latter case, because sugar, molasses, and rum were hauled in large, heavy quantities, roads were routed so as to minimize climbs between factories and the sea. Whether roads were constructed prior to factories or whether factories were sited in locations with access to suitable routes and the roads built later is unknown, but it seems reasonable to suggest that road-building and factory-siting took place more or less simultaneously.

Layout of the factories varied. Two were constructed in an L form and four in T forms,

while three had a linear layout and one was constructed in the shape of a square. The form of the remaining factories could not be determined due to disturbance.

Estate house location is very similar throughout the survey area. All but one are located on elevated landforms, while the exception is low on a hillside overlooking a factory. Elevated locations provided a good view of the sugar estate including the factory, and probably the estate village as well, although too few of the latter were definitively located by the survey to firmly establish this fact. In addition, six estate houses were constructed on elevated piers. Two were not and the remainder could not be determined. Where these piers are extant, they are made from a combination of stone or coral ma-

sonry and brick. The brick also served an ornamental purpose in that it was inlaid to create design patterns. These same six estate houses are also identifiable by the presence of arched stairways at the front entrance, and sometimes at the back or side. Brickwork was used in all but one case to highlight these arches. The exception is a house that was built on concrete piers in the post-emancipation period. At all four estate houses where layout could be determined, a T shape was adopted, though one is slightly asymmetrical when viewed in plan.

Four slave villages were identified in the survey area during fieldwork and a fifth was identified during a subsequent visit to the island. These are in a variety of locations. Three are adjacent to factories, one is adjacent to an estate house, and one is roughly midway between the factory and the house.

Elements of Factory Location

When British planters first arrived on Tobago they encountered a rugged wilderness; what they saw, however, was a rich and fertile land ripe for colonization. The land was not perfect, however. Steep slopes, dense forestation, shipping access, health concerns, and water availability were factors that added to, or detracted from, the perceived desirability of individual plots of land. Tobago planters selected and bought their chosen lots based on their perceptions of the positive and negative factors affecting their choice.

Land Sales

In all, seven land sales were held on the island between 1765 and 1771 (Archibald 1987:107–123). The rapidity of the land sales reflects the overall attitude among the settlers that sugar could be enormously profitable and that Tobago was well suited for cane cultivation. The distribution of lots sold reflects rapidly changing ideas about where the lands most suitable for cane cultivation and sugar production were located. In the earliest years of settlement these ideas were based on information supplied by word of mouth. Personal observation became

important only during the later period of initial settlement.

Land sales on Tobago occurred initially in the area immediately surrounding the site of the proposed capital town at Barbados Bay (Figure 2), chosen by the government by virtue of its geographic centrality (Young in Archibald 1987:117). The area of Barbados Bay was soon abandoned as a seat of government in favor of a more westerly location, however. The new site, Scarborough on Rockly Bay, was also centrally located, though with reference to population rather than geography. The westward population shift occurred as planters became increasingly familiar with the island. It was initiated by James Simpson, chief surveyor of Tobago and the European most cognizant of the potential of individual land lots.

Simpson bought Lot 1 of St. David's Parish (Courland Estate, Figure 3) prior to the second land sale. Other buyers quickly followed suit, and St. David's Parish lands were the most popular during the 1766 land sales. Sales were confined primarily to the southern and western portions of the parish, however, and included all or part of what would become Amity Hope, Orange Hill, Lower Quarter, Mary's Hill, Whim, Providence, Dunvegan, Les Coteaux, and Franklyn's (Nardin 1969:Plate 4). These are principally the southwesternmost lots in the parish (Figure 3) and are closest to Barbados Bay. Most of them also border the Courland River, which has sufficient flow volume to support water-powered crushing mills.

Attention had shifted away from St. David's Parish by the 1767 land sales. Instead, sales concentrated in St. Patrick's and St. Andrew's parishes to the south. Courland Estate and St. Patrick's and St. Andrew's parishes share two commonalities. Most importantly, they have sufficient surface water to support the rum-making process. Where Courland Estate abuts the Courland River and contains two perennial streams within its boundaries, St. Patrick's and St. Andrew's parishes have many small but reliable springs. Second, Courland Estate shares with St. Patrick's and St. Andrew's parishes a relatively flat topography (Figure 2), the former

as a result of Courland River deposition and the latter as a result of emergent coralline formations (Niddrie 1961). Thus, land sales in 1767 focused on areas of low relief that facilitated road construction and maintenance, simplifying problems of transport between field, factory, and shipping point that affect the more rugged portions of the island. Courland Estate and virtually all of the estates of St. Patrick's and St. Andrew's utilized windmills to power their crushing mills (Eubanks 1992). Post-1767 land sales focused on land with access to sheltered bays despite its distance from population centers, indicating that ease of transport outweighed the recognized advantages of access to water power to drive crushing mills (Young 1812a:78).

Power Systems

Possible explanations for the apparent inconsistency between land sales data and the advantages of water power over wind power lie in the relative design complexity of the two power systems, in the materials used in their construction, and in the maintenance required for their upkeep. Water power was acknowledged as the better system:

On the computation of our most intelligent planters, a "water mill" adds to the value of the plantation one fifth, and one fifth more income from the proceeds of the crop, never being at a stand, or even retarded; from the Negroes never being employed in cutting canes which eventually there may be no wind to grind, and the labours be lost as well as canes; from canes being taken off in their prime, and at the most seasonable and convenient moment, with a certainty of immediate manufacture, and generally from a saving of produce, time, and labour (Young 1812b:78).

While windmill construction was complex, it pales in comparison to the design and engineering skills required for the construction of a water-powered system. Windmills are fairly uniform throughout the island, though some temporal variation in their form is present. The constancy and accessibility of the trade winds meant that the construction of windmills was an uncomplicated operation requiring significantly less labor. While siting to access both wind for power and factory for processing was a critical

consideration, it was a fairly simple task in the relatively flat lands where wind-powered sites are predominant.

In contrast, each water-powered site is unique: variation occurs according to the nature of the water course tapped, the underlying geological formation, and the surrounding topography. In conjunction, these factors effected dam location, canal length, overland entrance and egress, and factory siting. Where high-volume streams required a dam principally designed for diversion, smaller water courses required both diversion and impoundment structures. These were sometimes constructed as a single dam but often also occurred as separate structures. For stability, dams were constructed on bedrock outcrops that constricted the watercourse valley and thus limited the land available for factory siting and constrained road construction. Finally, canals had to be long enough to access factories, usually requiring that they cross smaller drainages, a task accomplished by the construction of small aqueducts. Slope, and thus flow, had to be tightly controlled: too steep, and a canal was subject to damage by erosion; too shallow, and insufficient force was maintained to drive the wheel.

Materials used for windmill construction were also more accessible and easier to work with, given the range of skills available on Tobago. In contrast to water-powered systems where the dam, canal, and wheel pit required stone or brick construction and necessitated skilled masons, windmills were made primarily of wood during the first 50 years of settlement. Though post-1860 windmill towers were tall, circular structures constructed of stone and brick (Anonymous [1870]), as late as 1808 they were primarily wooden structures atop low hexagonal stone and brick bases (Colonial Records Office [CO] 1808; Young 1812a:103).

Both wind- and water-powered systems, of course, were subject to general wear and tear brought about by nearly continuous use during the harvest season. Repair was no doubt a nearly constant task. However, where severe damage to windmills would occur only during tropical storms and rare hurricanes, seasonal rainfall created freshets in Tobago rivers and streams

that had the potential significantly to damage water control and delivery systems on an annual basis. Dams, canal inlets, and aqueducts would have been particularly affected, while in severe cases the potential for damage to the water wheel itself was present.

Developing an Estate

The planters who initiated agricultural production on Tobago in the mid-18th century faced not only environmental constraints, but constraints imposed by the government as well. Foremost among these was limited acreage. By the second decade of the 19th century, while not all estates contained the 500 acres or less mandated by parliament (Nardin 1969:296), most did (Young 1812a). The size of Tobago sugar estates averaged slightly more than 400 acres (Young 1812a). They occupied significantly less land than did sugar estates of Jamaica, where the average estate covered just over 1,000 acres (Higman 1988:81). As a result, the layout of Tobago estates was in some ways compacted. For example, where Higman (1988) cites an average area of seven acres for a sugar factory complex on Jamaica, the St. David's Parish sample averaged one to two acres. Whether the distance between the various elements of an estate varies from Higman's model is not known. On Tobago the average distance between the estate house and the sugar factory is 345 m and agrees well with Higman's (1988:81) figure of 357 m for Jamaica. However, three of the five Tobago estate villages were found within 100 m of the sugar factory complex. Though this is in contrast to Higman's figure of 351 m, the majority of activity in the present survey took place within the immediate vicinity of identified sites. As most of those sites were sugar factories, it is readily apparent that sampling bias can account for the apparent differences between the data from Tobago and Jamaica.

The Sugar Factory

Access to water and ease of transport were the principal factors effecting sugar factory location

on Tobago; a factory site was chosen only after these requirements were met. In the absence of such a location suitable for water power, windmills, cattle mills, or steam engines were used. In only one instance was a cattle mill used in St. David's Parish. At this site, Golden Lane, hills to the northeast and southwest block prevailing winds, while insufficient water is available in the adjacent stream to support a water-powered mill. There is sufficient water to support rum manufacture, however, and the terrain allowed construction of a road sloping generally downward to a shipping point at Arnos Vale Bay.

The layout of the factory complex itself was determined only after selection of a site. There is a slight preference for a T form on Tobago, and this is probably the most efficient from a production standpoint (Beckford 1790:28). The form is more compact on the landscape and requires less travel time between various areas, reducing transport and enhancing supervision. These should be important concerns in an industry stressing production with forced labor (Wray 1848:285). Had the engineers who designed the factories had such ideas foremost in their minds, all factories would have been constructed with a T-shaped floor plan. Instead, factories were built within the limitations imposed by local topography resulting in the variety of forms encountered by the survey.

The Estate House

By building estate houses on hilltops and on elevated piers, both the view and the breeze were enhanced. Other concerns may have been equally important, however, in both the siting and construction of estate houses. In conceptualizing these concerns, a useful construct is that of internal and external function. This construct was initially formulated by Orser (1988), who used it to differentiate between slaves-as-labor and slaves-as-property: internally, slaves provided labor; externally, they demonstrated the purchasing power of the owner (Padgug 1976:17-18). In more general terms, internal functions contribute to an estate's profit while

external functions enhance the status of the planter in the eyes of his peers. These distinctions can also be applied to estate house location.

From an internal perspective, hilltop locations provided enhanced communication, valuable both for security and for economic reasons. In all but one case, the estate houses of St. David's Parish were within view of the established towns of Plymouth and Scarborough or of other estate houses, allowing line-of-sight communication between locations that were distant from one another by road. Also visible from each estate house was at least one semaphore station, maintained by the military for communication between towns and between the two forts and 15 batteries guarding the coast (Young 1809:155). In an extreme case, the station on top of the 244-m-high French Fort hill was visible from the location of an estate house located some eight km distant. The sole exception occurs at Mary's Hill estate, where the planter's residence is located 200 m below the crest of the hill. This hill, however, was occupied by a military semaphore station, and it is likely that the personnel responsible for its operation were housed by the estate.

From the perspective of external function, not only were estate houses visible to one another and to population centers, they also tended to be oriented in those directions. This sometimes compromised the planter's view of the factory. For example, the orientation of the Arnos Vale estate house was to the southwest, affording a panoramic view towards the town of Plymouth and facing estate houses on both Adventure and Courland estates. The village and the factory, however, were to the southeast and would only have been visible from windows in the southeastern facade of the house. At Les Coteaux, while the front of the estate house faces west towards the town of Plymouth, the factory complex is almost due east. A sense of community was thus fostered by the view of a neighboring house in the isolated environment of a Tobago estate. If, in the view of slaves, estate houses garnered an aura of power as the center of estate authority (Armstrong 1990), their siting also engendered a feeling of solidarity on the part of

planters (Pulsipher 1992).

Regularity of design was apparent at the estate houses where form could be determined. All but one were symmetrical, and decorative elements such as arched stairways and designs in supporting piers were always present. Symmetry and regularity were attainable aesthetic attributes in estate house design because houses were less bound than factory buildings by functional considerations and topographic variation. In the one case of an asymmetrical layout documented by the survey, the main steps of an estate house were constructed off center to present the appearance of symmetry as the house was approached up the main drive, which was divergent from the main axis of the house. Estate house symmetry operated on an external level. It reflected the Georgian worldview of the planters, who thereby reified their ties with the home country. The grandeur of the estate houses, expressed in their elevated design, gracefully arched main stairways and decorative brickwork on exposed supporting piers, on the other hand, reflects their external function as status symbols, signaling the worth of the owner and his or her association with the aristocracy. That these signals were most apparent from the main approach to the houses indicates that they were directed towards other Europeans rather than towards the slave population, who could be expected to approach the houses, on those rare occasions when they did, by a more direct route between estate house and village.

Otto (1984:127) defines a "showplace plantation" as an estate "where elite travelers could be assured of a hospitable welcome." One estate in St. David's Parish, Courland, fits this description. Its proximity to Plymouth made it accessible while the position and political power of its original owner, James Simpson, made him a well-known figure both on and off the island. At Courland, however, the external "showplace" function may have been complimented by an internal function as a "premier" estate, manufacturing a variety of supplemental products used in sugar production but not readily available otherwise. The craftworkers—wheelwrights, carpenters, blacksmiths, barrel-makers, etc.—responsible for manufacturing these supplemental products

were highly skilled and would have been expensive to buy or train. Because not all estates could afford such an investment, however, only a few supported such supplemental manufacture, making their products available to other estates for a fee. Courland estate house is the only such structure in St. David's Parish that contained a broad variety of ancillary structures in association. Supplemental manufacturing at Courland is a likely explanation for the presence of these structures.

No documentary records exist on Tobago to directly confirm this hypothesis, though support is provided by the fact that only Betsey's Hope estate produced more sugar and rum in 1811 than Courland. Betsey's Hope, in St. Paul's Parish, was owned by Sir William Young, then governor of Tobago and member of a prominent Caribbean family with interests on other islands (Young 1812a). Prominent individuals are here considered more likely to own or build "premier estates." Ancillary structures at the Orange Hill estate house may also have been the sites of supplemental manufacture, though this was not confirmed in the field and they are described as "offices" in the contemporary literature (Anonymous [1870]). The owner of Orange Hill Estate in the late 18th century was William Lindsay, who was appointed Governor of Tobago in 1794. Thus, he conforms to the expected station of a premier estate owner.

Premier estates also existed on Antigua. Betty's Hope was established in ca. 1655 and by 1668 had come into the hands of the Codrington family, eventually becoming their "flagship estate" (Goodwin 1994:100; Pulsipher and Goodwin 1988:1). The Codringtons were on a social par with Sir William Young of Tobago: Young served as the governor of Tobago and the Codrington family of Betty's Hope supplied two governor-generals of the British Leeward Islands in the late 17th and early 18th centuries. The prestige attached to Betty's Hope Estate lasted throughout the 18th century. Its preeminent position in 1897 and the function of a premier estate were described by an Antiguan laborer many years later:

Betty was the largest estate on the island and it would have a good amount of work while the others would have very little—particularly in the dull season—for Betty was responsible to carry out the repairs on the mills and other equipment for some of the other estates. . . . The workshop at Betty was second to none on the island and the best tradesmen of all kinds was there. Blacksmith service was one of the most important things back then and no place could touch Betty's Hope. Coopering and tanning was also important back then and old Betty was very capable in them things too (Smith and Smith 1986:87–88).

The Estate Village

The generally accepted location of the estate village was "in a peripheral but proxemic position to the main complex" (Lange and Handler 1985:18). At Courland, however, the village is adjacent to the estate house, reaffirming Courland's status as both a showplace and a premier estate. In this view, it is significant that one firmly identified domestic structure and one possible domestic structure excavated within the Courland estate village were aligned on nearly the same axis as the majority of the structures in the estate house complex, reinforcing the overall symmetry of the whole.

Orderliness was also an apparent goal of Tobago planters in the construction of estate villages: "The negroes inhabit three streets, near the plantation to which they are attached: their huts are built of stone, and covered with slates" (Lavaysse 1969[1820]:350). The accuracy of this description is borne out by limited surface survey of Golden Grove Estate in St. Patrick's Parish, one of the estates referred to in the above quote. These data indicate that some planters considered orderliness within the estate village to be important. Orderliness can also be viewed from the perspective of internal and external function. Internally, it reinforced the regimented sugar production system and the power of the planter (e.g., Goodwin 1987; Higman 1988; Armstrong 1990; McKee 1992). Externally, it enhanced the overall pattern of estate regularity (e.g., Pulsipher 1992).

A Dynamic Perspective

The model presented above is static. In reality, sugar estates throughout the Caribbean were modified frequently and regularly, with modifications ranging from equipment upgrades (Eubanks 1992) to the relocation of entire estate complexes (Pulsipher and Goodwin 1982). The estates of St. David's Parish provide several examples.

The earliest archaeologically recognizable modification occurred at Adventure Estate when a new sugar factory was built between 1784 and 1807. The old factory is located on a hilltop in the western portion of the estate (Anonymous 1784) where cane was processed with a wind-powered crushing mill. By 1807, however, Young (1809) notes that the mill was water powered. The water wheel he refers to was located at the site of the new sugar factory adjacent to the Courland River. The late 18th century was a boom time on Tobago. As sugar profits steadily rose, more capital became available to Tobago planters. The owner of Adventure responded to increased capital availability and the prospect of greater profits by building a new, more efficient water-powered mill. This necessitated the relocation of the entire factory complex to its new location on the Courland River.

A similar economic argument can be used to explain steam engines at Franklyn's and King Peter's Estates by 1807 (Young 1809) and the fact that 13 estates were put into sugar production after 1786 (Young 1812b). Planters with insufficient capital to immediately initiate sugar production, or with estates located on land that was marginal for sugar production, could fall back on a variety of crops. Land use figures for Tobago indicate that during the period of initial settlement by the British, planters often relied on cash crops other than sugar (Young 1812b:92). Foremost among these was cotton: in 1774, 96,500 lbs were produced on the island (Young 1812b:83). One of the major advantages of cotton is that it does not require extensive capital outlay for processing facilities. Rather, although it is labor intensive, when labor is available cotton is inexpensive to produce. Capital from

cotton production, or indigo, coffee, or cocoa, could then be reinvested in sugar processing equipment. Franklyn's and King Peter's estates are poorly suited for wind- or water-powered mills. Steam, though experimental at the time, was seen as a viable means of sugar production in the absence of alternative power sources. The steam engines at Franklyn's and King Peter's estates may have been bought by the owners as funds became available through the production of other crops, and this same mechanism can account for the addition of 13 estates to the ranks of the sugar producers after 1786 (Young 1812b).

From 1807 onwards, the antislavery lobby made sugar production ever more difficult. Despite growing economic and political pressure on the planters, some continued to reinvest capital in sugar production equipment. Eubanks (1992:199-200) argues that reinvestment was a response to declining labor in the period following emancipation. Briefly, machinery upgrades were primarily directed towards increasing juice-yield per cane. Production levels were thus maintained despite the decreasing availability of labor to work the cane fields. At Arnos Vale, a steam engine was installed adjacent to the crushing mill to supplement the power derived from the water wheel, increasing juice-yield per cane from an estimated 61 percent when crushed with a water-powered mill to as much as 81 percent when crushed with a steam-powered mill (Benjamin 1880:839). At Courland Estate, the owner went beyond upgrading equipment. The Courland old estate house was occupied as late as 1837, when Eliza MacDougal was laid to rest in a tomb adjacent to the house. Later in the nineteenth century, however, a new estate house was built adjacent to the sugar factory. By placing his house near the manufacturing process, the planter was able to oversee production more closely, eliminating inefficiency resulting from a poorly supervised work force. Although the date of this move is uncertain, it most likely followed the hurricane of 1847, which destroyed 30 estate houses on the island (Woodcock 1866:107). The Courland old estate house was subsequently replaced by a new structure at the new location.

A factor that Eubanks does not discuss, but which may have contributed to the tendency to reinvest in sugar production despite its decline, was an influx of immigrants, and presumably capital, in the period following emancipation. Between 1832 and 1866, every estate in St. David's Parish changed hands (Woodcock 1866:Appendix 7, Appendix 10). Based on the surnames of the owners, this represents the abandonment of sugar production by the old, established families of Tobago. The enthusiasm of the newcomers is reflected in the remains of sugar estates. All the dated milling equipment encountered during the survey and by an island-wide survey in 1989 (Eubanks 1992) was acquired in the mid-19th century. In addition, six of the 10 identified windmills in St David's Parish utilized post-1808 design plans.

Conclusion

This study has attempted to elucidate the functional aspects of settlement patterning on Tobagonian sugar estates. Since the appearance of Gordon R. Willey's (1953) pioneering "Pre-historic Settlement Patterns of the Virú Valley," settlement pattern studies have been a useful tool in the prehistoric archaeological kit. Historical archaeologists have also used settlement patterns to their advantage (e.g., Paynter 1982; Lewis 1984; Warren and O'Brien 1984; Adams 1990). Despite the utility of settlement pattern studies, however, plantation archaeologists have concentrated on individual sites rather than broader areas (cf. Delle 1994). Only during the analysis stage has comparative data been utilized.

Plantation archaeologists in the southeastern United States have focused primarily on questions of plantation social structure (e.g., Otto 1975, 1977, 1980; Lewis 1985; Orser 1988) and slave lifeways (e.g., Wheaton and Garrow 1985; Brown and Cooper 1990; Jamieson 1995; Wilkie 1995). This focus reflects the statement that historical archaeology can make the greatest contributions through studies of "issues for which there is simply inadequate documentation" (Deagan 1988:9). Thus, slaves and their place in the plantation power structure constitute im-

portant subjects because they are rarely discussed in the historical documents.

Research questions of plantation archaeologists in the Caribbean have primarily focused on issues relating to slaves. The most successful efforts have been those that illuminate African retentions and cultural change in the slave population. For example, Handler and Lange (1978) have closely examined these issues with regard to mortuary patterns on Barbados, while Armstrong (1990) has studied the changes in slave domestic life that occurred with emancipation on Jamaica.

In addition to its obvious utility for the study of disenfranchised peoples, however, historical archaeology can contribute to our understanding of well-documented groups in ways that history can not. This paper has focused primarily on estate owners. It has demonstrated that estate layout reflects as much their unstated goals, goals that related to their social standing in the community and to their economic well-being, as it does the goals they made explicit in their writings. Beyond issues of which groups constitute an important focus of study for historical archaeologists is the issue of what questions to ask. If studies of "the complex relationships which bond cultural institutions" are also valid research issues for historical archaeologists (Cleland 1988:14), then the focus on individual plantations that has characterized plantation archaeology should be extended to incorporate groups of plantations. This paper has begun to define the relationship between neighboring estates by focusing on intersite settlement patterns rather than individual sites. This approach suggests that a hierarchy of estates existed on Tobago that can be defined through archaeological techniques in the absence of historic documentation. Though all estate owners participated in an often lucrative economic enterprise by producing sugar, molasses, and rum for export, only a few invested in the infrastructure necessary to produce manufactured goods for local consumption. Estates producing these goods, referred to herein as premier estates, were owned by prominent families or individuals whose enhanced economic status is reflected in the layout of the estate.

Ancillary structures where supplemental manufacture occurred are associated with planter residences on premier estates, while estate villages are laid out in patterned arrangements, reinforcing planter control of the labor force (Armstrong 1990) and reifying the status of the estate owner through patterned regularity.

This paper has also examined factors relating to the location of sugar factories. Locational choices were based on a variety of considerations. Though sugar production was a primary goal of planters on Tobago, in the absence of transportation routes this production would have been pointless. Sugar factories were sited with access to routes that made the transportation of the finished product to the market easier. In addition, though rum production was intimately tied to sugar manufacture from a technological perspective, the data presented here also indicate close ties from an economic perspective. Sugar factories that were poorly sited for rum production, defined by the absence of a suitable water source, were abandoned in favor of more advantageous locations, suggesting that the economic viability of an estate rested as much on the production of rum as on sugar.

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