Mapping Water in Dominica

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Mapping the Sugar Revolution

I was at Sugar Estate and saw the Negro Hospital & them [the slaves] lying on tables like a Butchers stall. I saw the sugar & rum making. Cane is cut in bundles and introduced between 3 cylinders covered with tin, each touching one another. These are turned around by wheels driven by a water Mill. The sugar juice is expressed and runs through a canal into Boilers 4, 5, 6 of them together. Fist full of lime introduced to coagulate and clarify the sugar. The better it is [the quality of juice], so much the less lime is requisite. Then it [the resulting slurry] is cooled to put into hogsheads with holes in them to let off the Molasses. From it, [the molasses], the Rum is distilled & made.

—Journal of Jonathan Troup, May 15, 1789

Jonathan Troup described this sugar estate a few days after arriving in Dominica. Filled with aspirations for making a fortune in the new colony, he set up a small practice among sixteen “Mullato, French and English” physicians in the town. Shortly after arriving off the coast of Roseau, Troup witnessed the operations of a sugar estate during harvest. Dominica was still a relatively new colony undergoing some growing pains. Accounts such as his are useful for archaeologists, as they animate many of the standing ruins we document when we walk the landscape. For example, it is possible that Troup is describing Sugarloaf Estate, though he could be referring to any of a number of sugar-producing estates along the leeward side of the island. The physical description by Troup matches well the physical layout of Sugarloaf Estate. This “canal” was a narrow-gauged wooden gutter lined with lead. The boiling house had six cauldrons—unusual for sugar plantations in Dominica, but not for the largest ones.

Such documents also attune our eye to those things that might be less visible. By the time Troup was visiting Dominica, plantation managers and owners had
begun to commission infirmaries, sick houses, or “negro hospitals” close to the villages, but far enough away to avoid spreading disease. Enslaved workers often avoided going to these infirmaries when they were sick, preferring their own homes and caretakers. The site of the hospital and his analogy to a butcher stall foreshadowed Troup’s experience. Troup spent just under a year in Dominica, becoming increasingly despondent and critical of Dominica’s plantocracy. As a physician, he saw the cost of slavery as the Nature Island’s promise was met with the slow violence that accompanied everyday life.

Dominica’s sugar revolution signaled the predicaments that emerge when you replace one crop with another. These predicaments reach back in time to the seventeenth century, outward to colonial policies and distant markets, and inward to the very immediate and concrete: which crops grew where, the patterns of rainfall, and the implications for enslaved Africans and the people who claimed ownership over them. Slavery did not begin in Dominica with the introduction of sugar, but the sugar revolution did entangle unwilling actors at a rate that had yet to be seen. Assemblages of land, buildings, and artifacts scattered in the hilly uplands of Soufriere and the flat lowlands of Portsmouth index profound changes in political authority and how social relations were mediated through the environment. They also signal the predicaments of enslaved laborers faced with such transformations. Water insecurity was created by colonizing narratives that stressed a latent abundance of Dominica’s nature and encouraged English-speaking elites to improve their situation by rendering the island productive and governable.

The Sugar Revolution

Water insecurity materialized through competing agendas of production and reproduction that emerged after Dominica’s sugar revolution. Between the seventeenth and twentieth centuries, crop booms of tobacco plants, cotton bushes, sugar cane, coffee, cocoa, and lime trees marked Caribbean economic history. Taking advantage of various social factors, landowners consolidated land and invested in infrastructure. This prioritization of cash-crop farming decreased land availability for growing foodstuffs and other crops. There is a large body of research attempting to determine the impacts, if any, of increasingly intensified cultivation and processing of cash crops in colonial contexts, including the Caribbean. Sugar cane has been an especially favorite target of investigation. An export-oriented crop introduced under old colonial regimes to the Americas, and one increasingly promoted for its ability to generate wealth, this species of grass
has high nutrient demands. Many have linked capitalism and its predicaments with sugar’s cultivation, including widespread deforestation, hydrologic manipulation, and manuring. Sugar draws attention, since the flow of export value is merely a disguised form of topsoil, nutrients, and water, spirited away from local fields, leaving Caribbean soils and farmers vulnerable to climate variation—even as merchants and investors in distant capitals turn significant profits.

As a concept, resource security is controversial, as it can have the unintended consequence of weaponizing resources. Yet water security and insecurity are issues that people have to contend with in everyday life, and the scholarship recognizes it as such. The context of eighteenth-century Caribbean security is an appropriate framework, as it evokes the social reality of violence that accompanied slave society in both its spectacular and everyday forms. Security also maps well onto the idea of slow violence, a concept forwarded by Rob Nixon. Nixon defines slow violence as a “violence that occurs gradually and out of sight; a delayed destruction often dispersed across time and space.” He attends to the “long dyings” resulting from environmental crises, rather than the spectacular and sensational accounts of crisis that drive media outlets. Nixon says the political impact of those who examine slow violence is often limited by the scope and frame within which their work is read—as historically situated critiques bound through national frames. The violence, therefore, is twofold. First are the ecological and human casualties that occur in seemingly unconnected ways but are symptomatic effects of priorities forged at the centers of empire and endorsed by colonizing narratives and market imperatives. Second is the relative blindness to the ways such globally connected predicaments are linked. Importantly, while the violence is slow, it is not invisible for those most directly affected by it. Water insecurity as slow violence did not result from the insufficiency of the land or inadequacy of the people forced to work it. It was a consequence of colonizing narratives that attempted to take advantage of the Nature Island’s latent abundance through slavery and markets.

Clearing the Land

English-speaking elites in the late eighteenth century loved plans. From the 1720s onward, elite writers, mostly men with aspirations of title and land, commissioned and consumed a plethora of printed treatises aimed at giving advice to the empire, mapping lands and properties in distant territories, or producing paintings of the people who lived in those territories. These plans schematized the management of colonies, the roles of property owners and their inferiors, and techniques of husbandry and debt. These plans created predicaments for colonial
administrators who designed legal, economic, and land systems to realize these ambitions, and for ordinary people, many of whom were enslaved, who labored to materialize those designs in everyday life. One such plan was widely discussed for the ceded islands, including Dominica, after their annexation to the British Empire in 1763. English-speaking elites wanted to take these islands with mountainous and densely forested interiors and create plantation colonies—that is, colonies that could provide lucrative commodities for the European market, and act as markets themselves for metropolitan manufacturers. Although Dominica became an official colony in 1763, its colonization extends back in time in ways that are difficult to track through the documentary record. Seventeenth-century accounts describe the island’s latent abundance. The colonizers were rarely able to take advantage of the possibilities for agricultural and economic expansion before its colonization between 1729 and 1763. To realize the potential abundance, colonizers had to prepare the land. Preparing the land meant removing the Kalinago in a physical and discursive manner.

Throughout the seventeenth century, the number of indigenous settlements decreased, and those settlements were located on fewer and fewer islands. Beginning in the sixteenth century and continuing well into the eighteenth century, European slave raids targeted Indigenous peoples in the Eastern Caribbean (both autochthonous and refugee). European settlers also displaced Indigenous peoples as they moved into new islands, often through violent means. Importantly, the Kalinago were often caught in the middle of geopolitical struggles extending beyond the Caribbean theater. On islands in which Europeans had established territorial claims, Indigenous peoples were often expelled in response to political action or due to the potential of political instability they signified. Only a few contested islands (Dominica, St. Vincent, and Grenada) remained Kalinago strongholds. Their status was conferred to maintain an uneasy peace in the Caribbean between European powers and made secure by the reputation of fierceness that the Kalinago developed. Shifting alliances with France and Britain throughout the seventeenth and eighteenth centuries were used as justifications for punitive raids and military outposts on islands such as Dominica.

Europeans labeled all Indigenous occupants of the Eastern Caribbean “Carib,” which erased the multicultural and politically diverse Indigenous landscape. Breton, for example, documented that residents of the island called themselves Kalinago, “of the islands,” to distinguish themselves from those from the South American mainland.10 Eighteenth-century refractions of that diversity into racialized taxonomies by European military and civilian administrators “fractured” ethnicity into “new identities that might be dubbed ‘Black
Carib’ . . . ‘White Carib’ . . . and ‘Red Carib.’ ”

Late-eighteenth-century administrators began to rely on distinctions between “true Caribs” and escaped slaves who were “pretending,” the latter providing justifications for expulsion or administrative oversight. By the time Thomas Atwood claimed, “there are not more than twenty or thirty families, who have their dwellings on the east part of the island, at a great distance from Roseau, where they are seldom seen,” in his *History of Dominica* (1791), administrators were using the claim of “pretending” to expel Indigenous peoples. This was certainly the case of the Garifuna, who were expelled from St. Vincent.

While Indigenous populations were subjected to violence in land grabs, markets also played an important role in remaking the landscapes of the Caribbean. Between the 1700s and 1740s, various European farmers, would-be planters, lumbermen, and fishermen settled smaller Caribbean islands to gain standing in a region where land suitable for export crops was increasingly scarce. Would-be smallholders immigrated to Dominica from Martinique and Guadeloupe during the early part of the eighteenth century for a number of reasons. A head-tax was imposed on free people of color, effectively pushing a class of individuals to seek their economic fortunes elsewhere. An earthquake devastated the economic fortunes of cacao planters, creating a class of small landholders willing to sell land for hard currency. Coffee was also introduced, offering new possibilities for accumulation but also making land scarce, especially in northern Martinique. It is no surprise, then, that the earliest agricultural enterprises on Dominica required less capital to establish and relied on existing agricultural expertise of the enslaved who labored for them, and could find a ready market in the region. These enterprises cultivated cotton, coffee, cacao, and provisions, including root crops and plantains, that were grown for rations.

Many, such as “Lewis” de la Ferriere Constance, a “Creole” of Martinique and owner of Bois Cotlette, continued to live in Dominica after 1761, when Britain solidified its position in the region and sent its navy and army to wrest control of the island from the French. For those who complied with the conditions instituted after the Treaty of Paris in 1763—like the owner of Morne Rouge, Joseph Bellot—the new colonial order took advantage of their possession of the land and claims to ownership over people. Transactions made in subsequent years provide some clue about crops grown under nominal French rule. For example, when Constance gifted one third of his estate as a wedding gift to his niece and nephew, Adrien and Therese Constance, the will catalogues thirty thousand coffee, twenty thousand cacao, and four thousand plantain trees, as well as ten acres of cassava, and six and a half acres of sweet potatoes. For coffee and cacao trees
to have reached maturity to bear fruit, they needed to be planted in the 1740s.\textsuperscript{19} Because Dominica lacked legal access to European mercantilist networks, these yields were ferried to northern Martinique.\textsuperscript{20} Dominican coffee and cacao were folded into Martinican yields, allowing the commodities to be exported as the product of the French colony.

Despite the proximity of the French and their territorial claim over the island, there are very few archival records from the period of French occupation in the first half of the eighteenth century. Until 1729, the nearest French official to Soufrière was in the northern communes of Martinique. The same could be said of Portsmouth and the southern islands of Guadeloupe. That year, the French asserted nominal rule over the island when the governor of Martinique appointed commandant LeGrand to administer island affairs. Installed by military appointment, the commandant oversaw the island’s defenses. LeGrand and his successors in turn appointed “capitaines de quartier.”\textsuperscript{21} These men were nominated among the planters and acted on behalf of the commandant to captain the militia. The French relied on these captains to indirectly monitor the island. In 1730, 1731, 1743, 1745, and 1753, the commandant tabulated the population, crops, domesticated animals, and weapons in each quarter (see table 3.1).\textsuperscript{22}

Nicholas Croquet de Belligny was one such planter. As a wealthy proprietor of coffee estates in Le Prêcheur, northern Martinique, Belligny and his wife established an agricultural concern in Dominica sometime between 1723 and 1745.\textsuperscript{23} While land and capital were available to planters such as Belligny, they resisted growing sugar. As Dominica was a colonial dependency of Martinique, sugar cultivation was kept to a minimum. The illegality of settlements led to an ever-present fear of evacuation that prevented investment. Martinique’s plantocracy did not want competition and lobbied to restrict sugar cultivation in Dominica. There are no documents specifically detailing what these estates grew. We can infer from the recensement described above that it was most likely coffee, cocoa, foodstuffs, or some combination of the three. A 1770 testament in which Belligny designated his heirs lists a “Farina House” at Morne Patate, suggesting that slaves on the property cultivated and processed cassava into flour.\textsuperscript{24} Food grown here could have been for his properties in Martinique or sold to planters who failed to cultivate sufficient rations for enslaved workers.\textsuperscript{25}

While both smallholders and plantation owners had their own reasons for establishing plantations in Dominica in the first half of the eighteenth century, they also shared priorities. Dominica was an island with unrealized latent potential to grow coffee and cocoa for the international market and food to meet the needs of the growing urban and enslaved populations in neighboring
Martinique. Land made available through exclusionary forces, such as expelling the Kalinago, allowed them to accumulate wealth by meeting demands in both local and global markets.

**Improving the Land**

In 1761, Dominica was captured by Lord Admiral Rollo during a campaign in the Seven Years’ War. At the conclusion of the war, the British formally annexed the island, thus ending nearly one hundred years of official “neutrality.” In 1763, British colonial planners and agents set rules that established who got what land and how that land could be used in their newly acquired “ceded islands,” Dominica included. It is convenient, then, that Diderot’s encyclopedia published the entry on sugar plantations in his 1751 release of *Encyclopédie ou Dictionnaire raisonné des sciences, des arts et des métiers*.26 As in other land grabs, treatises on husbandry, like this dictionary, and advocates of slavery “created principled arguments about the ways in which land may, may not, and must be governed.”27 These regulations and principled arguments revolved around “improvement.”

The “philosophy of improvement” gained currency in mid-eighteenth-century Britain because it married both “profit and moral benefit” through Enlightenment ideals of utility, personhood, reason, and religion.28 According to this philosophy, individuals had a moral duty to take advantage of latency in land and better themselves through its improvement, thus entangling the land with technological, economic, and social agendas. Improvement was also a part of state-making: “forcing Scottish peasants into modern agriculture was thus bringing them into the present and, as reformers saw it, into civilization.”29 In a newly formed United Kingdom that included Scotland, highlanders were dissonant subjects.30 They transgressed social norms of unionist sentiments that stressed Britishness, including being primary belligerents in the Jacobite rebellion in 1745. Eighteenth-century accounts stressed the poor management of land by Scottish highlanders. Accounts described unemployment, overpopulation, crop failures, and famine.31 They argued that “rational” land stewardship, including proper field drainage and novel fertilization techniques, increased productivity and relieved predicaments. By “improving” the land, such policies sought to secure dissonant subjects whose allegiance was tenuous.

Such ideas can be extended to endeavors to create a British Empire, in which French settlers, Scots, and Irish were potential dissonant subjects of colonial territories. It is useful to question, as Sherwin Bryant does in eighteenth-century Quito, slavery’s uses in governing colonial subjects.32 In addition to feeding a political economy, slavery also improvised racialized modes of marking a
difference between Europeans and non-Europeans, which allowed for governing a potentially dissonant set of subjects.\textsuperscript{33} Specifically, slave relations entangled people categorized as \textit{Indios} and \textit{Negros} in predicaments that were central in governing a colonial state.\textsuperscript{34} In Dominica, slavery had an enormous imprint on the regulation, norms, and practices of the land and its resources. At the close of the eighteenth century, even as the instability of colonies dominated by enslaved labor became increasingly expressed in the form of revolts and rebellions, and the productivity of and returns from sugar waned, the total number of slaves living on sugar estates continued to increase. Slave relations also entangled people into governing colonial states through policies that described who could get land and how it could be used.

Principled arguments surrounding the colonization of the ceded islands extended these policies into the new territories. Slavery and markets associated with commercially oriented agriculture of sugar and coffee created the conditions necessary for “improvement.” Properly activated, this latent abundance also “improved” the situation for enslaved Africans and the people who claimed ownership over them. For example, a pamphlet authored by Sir William Young (\textit{1725–1788}) explicitly discusses the improvement of newly acquired territories and links it with the improvement of people, dissonant subjects included. Prime Minister George Grenville nominated this Antiguan-born Scot to oversee the Commission for the sale of lands in the ceded islands of Dominica, St. Vincent, Grenada, and Tobago.\textsuperscript{35} The treasury, the board of trade, and Young spent the next year negotiating the regulations and policies that shaped the sale of land. Young’s pamphlet, \textit{Considerations Which May Tend to Promote the Settlement of Our New West India Colonies by Encouraging Individuals to Embark in the Undertaking}, was part of this endeavor.\textsuperscript{36} This document, which summarized the year of work and negotiations between stakeholders, prescribed a series of actions that, among other things, ensured that goods began to flow immediately, and that there was a laboring population to help transform the land.

Young confronted two issues with the settlement of Dominica: first, securing the political and economic integrity of the island through building fortifications to monitor enemy (in this case, French) navies and contraband trade; second, generating wealth for the metropole through immediate sugar production. He also had to integrate French settlers, who occupied the land, grew coffee, and purportedly had continued economic and social ties through trade with Martinique and Guadeloupe. A two-part effort ensued to convert much of the land for sugar production and to retain the coffee estates owned by French settlers.\textsuperscript{37} Finally, there was the instability of a society where enslavement was foundational,
with the added risk in Dominica that some also had pre-existing social and economic relationships with neighboring islands.

Smallholders, state actors, corporations, and would-be planters tried to take or keep control over land and its resources during land grabs. The actors involved in Dominica’s sugar revolution were equally diverse. Governors appointed by the crown were frequently at odds with a local plantocracy—made up of absentee and resident British proprietors, some of whom operated through agents—that composed colonial assemblies. There was also an in situ class of smallholders who had been cultivating food crops and selling them to neighboring islands for nearly fifty years. These smallholders were generally creoles who spoke French, and at least some of them were of African descent. As such, they were excluded from the political franchise in the island assembly, but controlled some of the infrastructures that made the colony work. French subjects—such as Belligny, Bellot, and Constance—were encouraged to remain on the island to continue cultivating coffee. They took advantage of the change in sovereignty to transform farms on which slaves grew food, cacao, and coffee to also cultivate sugar cane. It was unthinkable in the colonial context to allow Kalinago or runaway slaves to purchase or lease land. Rather, local militias and state actors used violence and its threat to gain access to and exercise control over land and its resources. Despite these efforts, large portions of the island were left, and a small enclave was designated for “Caribs.”

Young promoted the development of sugar on this vast new frontier through absentee proprietorship. It was believed there was always a market for sugar that the land could produce. There was also a market for land. English, Irish, and Scottish merchants accumulated wealth through their ties to the West Indian trade or through interest on debts encumbered by the crown in its prosecution of the War of the Austrian Succession (1740–1748) and the Seven Years’ War (1756–1763). Between 1755 and 1763, Britain’s debt had grown nearly sevenfold, and to service that debt required an expenditure of nearly 63 percent of Britain’s annual budget. These merchants were largely excluded from the profit accumulated by owning a sugar estate. By the time they had amassed the capital to start such a venture, land was unavailable—Jamaica was the last major island annexed by England in 1655. Britain attempted to take advantage of new territories to reduce debt acquired through the wars of the previous fifty years. The sale of land in Dominica, along with increased revenues from sugar production, offset the state’s debt to the same merchants they hoped to sell the land to. At least, that was the plan.

The lands to be settled and the settlers to be improved were diverse. For Young, the right people were to make use of the right land for the right crops.
Young appointed John Byres to survey properties purchased and leased in the years after British annexation. Byres mapped the apportionment and sale of 94,345 acres (figure 3.1, maps 3.1 and 3.2). Byres linked this map to an index of ownership that detailed who the freeholders of the land were and who the leaseholders of the land were. To encourage proprietorship and reduce the vagaries brought on by speculation, Young suggested that no one should be able to purchase land “more than 300 acres.” The remaining French subjects were required to lease the land they previously considered property from the British crown until they were able to demonstrate their loyalty. Young proposed “that the French inhabitants of Dominica, are permitted to enjoy their possessions, by leases unto the Crown . . . that is to say the lessee is to take the oaths of allegiance and subscribe the declaration of abjuration against the pretender. He is to hold, by his lease, only such lands as he was, at the surrender of those islands.” Poor settlers were given access to plots of land of ten to thirty acres. In exchange, they were to make a small annual payment (quit rent) of six shillings and clear the land in seven years. Failure to clear the land or pay penalties resulted in severe penalties. By implicating French subjects in the improvement of the island, Young secured the political and economic integrity of the island.

Byres’s map was also a mechanism to attract prospective owners. Byres underemphasized the topographic difficulty of the island, creating vast plains where none existed in reality. This made Dominican land more attractive to prospective buyers. In reality, the physical geography of Dominica is very steep. Less than 8 percent of Dominica’s land mass has less than a five-degree slope. In the Byres map, just over 50 percent of the land was displayed as a flat plain. This was no mere cartographic hyperbole. So keen were the British to attract settlers to the island that they glossed over the actual nature of the landscape. For example, in describing the island, authors of a Gazetteer published in 1776 say: “Its appearance is rugged and mountainous . . . but assent is easy . . . some have reported it to be the best of the Caribbees for its fruitful valleys, large plains, and fine rivulets.” This was despite the steep terrain that made roads expensive and difficult to build. It also left little room to pasture cattle responsible for dragging ox carts and manuring fields—a vital step in refreshing the soil. The map had a short-lived success. Within the first years of public auction, some buyers were reimbursed after detailed surveys revealed inaccuracies in the initial sale. By improving the island through absentee ownership, Young’s design also implicated Scots, Irish, and English into a project of Britishness and empire overseas and abroad.

Young’s pamphlet not only made clear the regulations under which land could be purchased or leased, it also spoke to the principled arguments that
Figure 3.1. “Plan of the Island of Dominica Laid Down by Actual Survey,” by John Byres, 1776. (See Edelson, New Map of Empire, for a thorough discussion of this project.) Courtesy of the Library of Congress.
MAP 3.1. Apportionment of land in the Portsmouth Enclave as depicted on Byres’s “Plan of the Island of Dominica.” Numbers are indexed to specific proprietors or leaseholders in Byres’s References to the Plan of the Island of Dominica. Freeholds are displayed as plain numbers, and leaseholders as numbers with an asterisk. Sugarloaf, a freehold, would include land demarcated as 44, 43a, 50, 50a, and 47a. Illustration by author.

MAP 3.2. Apportionment of land in the Soufriere Enclave as Depicted on Byres’s “Plan of the Island of Dominica.” Numbers are indexed to specific proprietors or leaseholders in Byres’s References to the Plan of the Island of Dominica. Freeholds are displayed as plain numbers, and leaseholders as numbers with an asterisk. Bois Cotlette included 2*; Morne Patate 7, 8, and 9; Morne Rouge 11; and Crabier 12. Illustration by author.
legitimized the land grab. “Natural” resources permitted colonists to avoid some of the mistakes made in the first wave of sugar revolutions. The potential for wealth, Young argued, is tied to the potential of the land: “Old islands, being less mountainous, and almost entirely cleared of wood, [have] become extremely dry and unseasonable; at the same time the lands in them, by long and constant planting, have . . . lost their spring and spirit of vegetation, as to stand in need of more rains than they had before.”50 The soil, according to Young, is new and “will be rich, yield large and regular crops, ratoon longer, require less planting and be cultivated with moderate expense and fewer negroes.”51 His assessment was not based on mere speculation. Grenada, which had been more intensively settled by the French, had more than three dozen sugar estates by the 1760s.52

The ceded islands had other advantages over older British West Indian colonies. The limited size of Barbados, Antigua, and St. Kitts meant that wealthy merchants and poor settlers could not take advantage of different types of land to grow different crops. Young argued, “Our new islands [including Dominica] are something larger in extent than any of our older ones, excepting Jamaica.”53 The number of potential acres put to cash crops in Dominica exceeded those of the “older ones.” As such, wealthy investors might buy fertile valleys to grow sugar, while poor settlers could take advantage of hilly uplands to grow coffee. At the same time, the island was not too large. Unlike Jamaica, where roads were necessary for developing the interior, on the ceded islands, canoes and sloops could ferry much of the traffic between estates and transshipment ports (“long land carriage of burdensome commodities is destructive to cattle, and renders the interior part of the country of little or no value”).54 Quick access to the coastline meant that plantations were easily connected to significant ports employing small boat traffic—cabotage.

Young’s pamphlet also enthusiastically described the potential of planting in the “fertile” ceded islands for those for whom “there has been no such opportunity of improving private fortunes.”55 Here Young is targeting poor whites excluded from purchasing land on other islands, and tradespeople, like Troup. Linking the improvement of the land with the improvement of personal fortune was a way to enlist Scots, Irish, and French, poor or wealthy, in the project of building an empire on the margins. For leaseholders and poor whites, this meant investing in a “few negroes” and “erecting temporary huts and buildings, of little cost.”56 From there he argues that the best return for such a modest investment was “the culture of indigo, cotton, coffee, or cocoa.” For those who own larger tracts of land, Young argues, “it is evident that by these and similar means, beginning with provisions, cocoa, coffee, cotton and indigo,” estates can be grown
at an “easy rate.” Upon reaching a level of financial security, he argues that the land can then be converted into “sugar plantations, or if the proprietors be so disposed might probably be sold for four-or five-hundred percent advantage.”

Young does not mention enslaved laborers often in his pamphlet. He uses the words “slave” seven and “negroe” eight times. In most cases, he refers to them in terms of the value they add to estates. For example, to improve the land, woodland had to be cleared. He estimates “Twenty or thirty will, perhaps, at first be sufficient for the largest possession . . . [for] clearing . . .” That said, he does link the improvement of the land with the improvement of their person. He describes how “moist and good grounds . . . greatly lessen the cost of feeding and supporting the slaves.” But, as described above, improvement in the eighteenth century also carried with it moral connotations: “Their pride should be cultivated. . . . It would be wished moreover, that some sentiments of religion could be instilled into the minds of our negroes.”

Mentioned only in passing, the enslaved were an important but unstated part of the plans of English-speaking elites to improve the land. Woodlands became an important category when the plans of English-speaking elites were materialized in the colony. To further encourage white settlement and land cultivation, West Indian assemblies in the British Windward Islands passed what have been referred to as the Diminishment Acts. In other colonial contexts, distinctions such as forests, savannas, and farmland are part of the discourse of state-making. In Dominica, the act defined each owner six shillings per acre of land that was still a woodland. These acts were not so much to rid private landowners of woodland, but to promote white settlement. The act paid out of the public treasury twenty pounds per annum for every white person on each estate over the age of fourteen. As with any law, we should always be suspicious about the degree to which it was enforced. We could, however, read acts such as the woodland tax act as promoting deforestation. Governors considered these acts necessary because, at the time, absenteeism was high in Dominica and such an act encouraged owners to populate their estates with white families.

By linking the personal fortunes of in situ and would-be smallholders and plantocrats with “improvement,” the regulations and legitimizing arguments, an exclusionary force in and of themselves, implicated diverse peoples. There is some evidence that the commission’s efforts began to bear fruit by the time of the American Revolution. According to an enumeration taken by the French in 1785, there were 216 coffee and “other” estates and 65 sugar estates on the island; among the sugar estates, there were 54 water mills, 18 cattle mills, and 6 windmills. Between 1753 and 1801, enslaved residents grew from approximately 4,690 to nearly 23,000.
Insecure Assemblages

Most historians who discuss agricultural transitions in Dominica stress the failure of sugar and the dominance of coffee as an export-oriented cash crop with good reason. The amount of land devoted to sugar retreated slowly through the nineteenth century. In 1825, estates in the Portsmouth enclave were producing fewer than five hundred hogsheads of sugar per year, and estates in Soufriere were producing just over one hundred. One estate, Bois Cotlette, produced only two hogsheads in that year. Difficulties in maintaining a steady and skilled labor force, coupled with a perceived lack of quality control on the part of the sugar board, led to a “partial or entire abandonment of many sugar estates” by 1884. In 1896, there were only two estates exclusively cultivating sugar on the island, neither of which was in Portsmouth or Soufriere. The total acreage of these two estates, along with other parcels on estates growing a variety of crops, composed only 975 acres of cultivation.

The number of factories detailed in the French enumeration suggests that Dominica did experience a crop boom. Anthropologist Derek Hall defines a crop boom “as a rapid increase in a given area in the amount of land devoted to a given crop as a monocrop or near-monocrop, and when that crop involves investment decisions that span multiple growing seasons.” Importantly, crop booms are not events with discrete beginnings or ends. Rather, they are processes through which social, political, and economic arrangements change. The sugar revolution is not so much a historical moment or a realized ambition. To approach it as such is to mistake a sugar revolution as an ideology with a sugar revolution as a lived reality. As Higman notes, it is important that we not conflate technological shifts with specific crops, nor frame such transformations as totalizing.

Crops were not the only things that proliferated during crop booms. Buildings began to dot the landscape (figure 3.2). Some of the buildings were constructed to process sugar, coffee, or some other botanical into commodities. Other buildings housed people. Like all assemblages, some of these buildings were more visible than others. Archaeological analyses of plantations have typically mapped the relationship between estate houses, factories, and dense artifact scatters indicating villages. This project of mapping has benefited from a discussion of variation from the norms described above, particularly how built landscapes vary from idealized notions. Estate houses, industrial works, dependencies, and laborer villages were constructed in a particular physical and cultural geography, and created tensions in past landscapes. Estates were also
organized to enact certain power relations where lines of sight and spaces of partial visibility all interacted to create a spatial dialectic.\textsuperscript{72}

Plantations were assemblages of the insecure. Certainly, the polite architecture of estate houses signals that its commissioner often had something to prove.\textsuperscript{73} Additionally, plantations were not just about the buildings but also the

\textbf{FIGURE 3.2.} Buildings of the “Sugar Revolution.” These buildings were documented during the course of archaeological survey. All of them, excluding the coffee “boucan” and the farina house, seem to have been built during the flurry of activity subsequent to 1763. Illustration by author.
Mapping the Sugar Revolution

landscapes they inhabited. The location, orientation, and size of plantation buildings describe spatial practices of power and the clever concealment of labor upon which that power was based. Living spaces were purposefully obscured in everyday life, save for surveillance devices such as a bell tower to which only the planters had access. Landowners also placed buildings and manipulated landscapes to be in sight of each other, allowing visual or aural communication. In contexts where an enslaved labor force outnumbered those who claimed ownership over them ten-to-one, such communication allowed planters to exert control and aid each other during rebellions. Plantations were also assemblages of the insecure because of what the crop boom entailed for those who labored in them.

Securing the Plantation

Moments of agricultural intensification, like the sugar revolution, are subjects on which archaeologists have focused considerable energies. Archaeologists define agricultural intensification as “attempts to increase concentration of production” through the manipulation of space, labor, and technology. For some, land as a container of resources, including soils, vegetation, animals, minerals, and water, has value in and of itself, but can only be fully realized through its management and modification. This approach maps well onto plantation studies where proxies, including architecture and landscape features for which we have a general sense of labor requirements and productivity, can suggest intensification. Economic and social historians have carefully mapped out the labor requirements for different cash crops. It is taken for granted that the number of workers, the degree of specialization, and the organization of that labor required for cultivating and processing cotton were far less than the requirements for processing coffee or sugar. Detailed analyses of maps and documents have been particularly helpful in describing the material indices of such estates. From these we can infer whether a plantation grew coffee, sugar, cotton, indigo, or tobacco, based on the kind of outbuildings devoted to transforming crops into exportable commodities, and the rough number of laborers employed to cultivate and process those crops. Mapping both the standing and ruined buildings provides different information about the tempo and extent of Dominica’s sugar revolution (maps 3.3 and 3.4).

The diversity of structures built in Portsmouth and Soufriere in the years subsequent to 1763 is remarkable (table 3.1). Perhaps the most spectacular ruins are remains of factories. Factories had different building configurations depending on the cash crop being processed. Cotton factories, for example, contained a magazine to remove seeds, and indigo facilities contained vats to soak vegetable
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<th>Type of Location</th>
<th>Artifact Scatter Density</th>
<th>Approximate Date Range</th>
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TABLE 3.1. Archaeological evidence of agricultural buildings, landscape features, and village settlements in the Soufrière and Portsmouth enclaves.
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**Note:** Loci correspond to identification numbers of archaeological examples in Maps 3.3 and 3.4: Boucan and Glacee (BG), Boiling House (BH), Wind Mill (MV), Water Mill (WM), Cattle Mill (CM), Estate House or Manager’s House (EH), Dew Pond (DP), Aqueduct (AQ), Well (WL), Cistern (CI), and House Platform (HP). The date range is approximated based on associated artifacts and documented events. “*” indicates the presence of pre-Columbian material. “?” refers to an archaeological feature reported by a community member but not confirmed by a member of the archaeological team. Artifact scatter is designated as greater or less than ten per one square meter.
matter. Coffee factories included a structure that contained trays for drying coffee beans (boucan), adjacent to a paved open area (glacee) where those beans were dried during sunny days, and a mill (moulin) in which water was filled to remove the fleshy pulp from the seed. Sugar factories also had mills to express juice from the cane, and a platform (batterie) with kettles in which cane juice was slowly boiled into a cane slurry of molasses and sugar (map 3.3). All of the sugar factories in these two enclaves were built in the years immediately following annexation and used different methods to crush the cane. Four in the low-lying plains of Portsmouth (3) and Soufriere (1) were quite large and employed a water wheel to power the rollers. Four more, located in the uplands of Soufriere, employed cattle mills to crush the sugar cane. Only one sugar estate, also located in the Soufriere uplands, employed a windmill, and it is unclear the degree to which it ever operated.

Factories drink and feed off the land, often creating the conditions for soil displacement. Soil erosion can undermine and bury foundations on the upslope and downslope sides of buildings. As part of standard practice in survey archaeology, insights gained from geophysical testing and subsequent analysis of soil profiles show how, in the case of one of the low-lying estates, erosion, brought about by precipitation, damaged the complex of structures associated with the sugar mill. One of the walls of the wheelhouse at Sugarloaf’s water mill in Portsmouth had subsided and required repair by 1820. In the uplands of Soufriere, it appears that adjustments were made at about the same time. There was clear evidence, in the form of larger and partially buried masonry structure at one of the upland sugar factories, that the first boiling house, associated with a windmill, was also abandoned in 1810. Productivity might be measured by the size of the factory and the number of “coppers,” or cauldrons, used to reduce cane juice into a slurry of sugar and molasses. Mapping these buildings in a matrix of time and space allows us to detail when general labor requirements increased for workers.

Two expansive aqueduct systems characterize some of the hydrosocial manipulations. In each enclave, they began upstream in the drainage system, relying on a weir to divert water into a surface-level channel. For the most part, these systems remained parallel to the river system and along a slight downward gradient. The channels followed the contours of the terrain and relied on bridgework when the terrain met a steep slope or attempted to bridge other features, including ox-cart roads. Because of the steep gradient, the distances traversed by these aqueducts were not far, but the amount of construction and landscape manipulation was still extensive. Before the waterwheel, large tanks allowed sediment to settle and mill operators to control the flow of the water.
Map 3.3. Landscape and waterway features in Portsmouth located during the course of archaeological survey. See table 3.1 for identification of features related to each location. Not shown on the map are loci 40, 42, 43, 44, and 45. Illustration by author.

Map 3.4. Landscape and waterway features in Soufriere located during the course of archaeological survey. See table 3.1 for identification of features related to each location. Illustration by author.
Numerous patches of sunken path, cobbled road, and railroad dotted the landscape. These interconnected concourses took advantage of surface contours to find a way from one point to another, while simultaneously shaping those contours over the course of use. Atwood lamented the dangerous roads, characterized as being “in general very steep ascent; narrow, and subject to breaking in.” At the time, two major roads connected Roseau with the windward side of the island, and one connected to Portsmouth. Other roads described by Atwood were never engineered or designed. They were built over many years by water erosion, foot traffic, and foraging animals, especially the medium-sized goats and pigs that Europeans brought with them to the island. Foot traffic compacts the soil underneath it, making it difficult for plants to grow and leaving the soil unanchored to the substratum. Water erosion speeds up this process and makes some stretches little more than barren wastelands.

Atwood was also alluding to the predicament of building roads on the island. This was not a neutral act. Roads were part of colonizing narratives from the beginning. Early maps of the island depict three roads during the French occupation of the island before 1763. Joseph Byres drew “Three Chain lands” running in a sixty-six-foot band parallel to the seashore surrounding Dominica. They were designed to enable the Crown to establish fortifications and build roads. Using and reusing paths animals and humans had taken for centuries is one thing; shaping the terrain to build new roads on dynamic and unstable earth is another. Leveling stretches of land to make passage easy creates conditions that facilitate landslides during heavy rains. In this way, roads behave very much like hollow-ways, or sunken paths that take on a life of their own “within the dynamic processes of landscape change.”

A change in buildings, or indeed in the position of those buildings, could represent a massive disruption in the political as well as the material landscape, to the benefit of some and the detriment of others. The flurry of construction between 1763 and 1780 was truly a crop boom, where the built landscape was fashioned to grow, process, and move sugar cane. Evidence for the age of these roads, aqueducts, and factories comes from literary and archaeological sources. Estate owners financed factories, aqueducts, and roads. As such, they are often described in instructions to estate managers, as in the case of Richard Neave’s property, Sugarloaf. They are also “improvements” that add value to the land. At Sugarloaf, Bois Cotlette, and Morne Patate, “plantation” roads were listed in probates and inventories during land transfers and marriages. Because many of these roads were “engineered,” material culture recovered underneath them during excavation reveals the approximate date at which they were laid down.
Stretches of cobble road mapped at Sugarloaf, Bois Cotlette, Morne Patate, and Morne Rouge were part of the archaeological horizon associated with the sugar revolution. The material structures and associated soils all provide evidence for the dynamic and changing relationships between people and the land after their construction.

**Securing the Land**

Discarded artifacts associated with household practices speak to an intensification of settlement in the last quarter of the eighteenth century. During our survey, we found material culture on the surface of recently turned-over soil, in burrow holes made by rodents and crabs, or next to the roots of trees, suggesting the presence of past settlements, both colonial and pre-colonial. Durable objects, including pottery and glass, are relatively easy to see in turned-over soil. These objects were likely discarded, left behind, or forgotten as some past person was walking the land, tending fields, or traveling from one location to another. We delineated any area with more than ten artifacts per square meter as suggestive of a potential settlement, one of several criteria we used for identifying sites. Areas with fewer than ten were equally important, for reasons other than habitation. These could be places where laborers sought temporary shade and relaxation in the cane fields or coffee grounds during their midday meal. They could also be refuge sites, away from and out of sight of places where estate owners and managers lived. All of these features intensified during the sugar revolution.

Landscape features included house platforms, agricultural terraces, springs, rivers, channels, and ponds. Some of these features were relatively easy to identify: loose stones were arranged to create terraces or charcoal pits, slopes carved to create house platforms and road, lines of fast-growing trees planted as wind-breaks to protect fields, and channels dug into the ground to circulate water away from agricultural fields saturated by November rains. Other features are less easy to identify. The hills within Portsmouth and Soufriere contain a variety of landscape features, common to many Eastern Caribbean islands, that were significant to past inhabitants. Particular trees were planted in fields to provide shade under the noonday sun. Loose stones could be arranged to retain soil recently turned over to plant root crops on slopes. In order to make way for agricultural fields, tree stumps could be burned in shallow hollows, and the charcoal could be used to feed cooking fires. People who built dew ponds, for example, took advantage of low-lying flat areas (*fondes*) surrounded by hills. They excavated or widened these shallow depressions and lined them so they retained water. In areas where soil does not drain well, gullies created by heavy rains could...
be channeled to create drainage systems that moved standing water away from houses or out of fields.

The patches of land considered arable in the Eastern Caribbean are diverse, dynamic, and adaptable to a wide variety of purposes. Nowhere does this seem more the case than in Dominica, where the confluence of heavy precipitation and an active geological context produce fluid and seemingly unstable soils. The instability of these soils and their ability to yield cannot be entirely divorced from human activity, however. Expansive forests with gum trees, mangroves, and tropical hardwoods covered the diverse topography of the Nature Island, and large-scale manipulation of the land, performed mostly by enslaved Africans, was required before planting could begin. Consequently, the sugar revolution was in some ways a “multicultural dialogue” on land cultivation, relying on African and Kalinago agricultural strategies in order to restructure the landscape. As I mentioned in the previous chapter, both the Kalinago and the enslaved Africans working on the island had their own ways of categorizing soils, principles of planting, and best practices for managing the land. Such insights bend our gaze toward a plantation not as a single entity or site, but as an “assemblage of things.” The construction of villages, terraces, factories, large plots of pavement, aqueducts, cisterns, and roads was fused with changes in soil dynamics.

A productive definition of land is “a physical composite of microbes, soils, flora, terraces, and canals, which can act in particular ways and affect politics because of how they are entrained in an ecological and social context.” Understanding soil as a cultural, political, and natural product is as important as considering it primordial matter from which culture is born. For example, the proxies of intensification do not necessarily need to be as visible. Concentrations of lead increased in soils surrounding factories where sugar was distilled. Used in flanges and pipes containing the precious sugar syrup as it traveled and transformed into a commodifiable product, lead was a crucial building material. It also had the unknown consequence of contaminating water supplies and liquor that enslaved laborers might drink.

According to colonizing narratives, the settlement pattern and organization of plantations differed depending on the enclave, the background of its inhabitants, and its potential for growing crops. French planters had cultivated coffee since the 1740s, but it was not until the sugar revolution that coffee was officially endorsed as an agricultural product. For Young, existing French planters and less wealthy British subjects benefited most from the different regimes of labor, soil conditions, and water needs of coffee. Dominica’s hilly uplands aligned with contemporary ideas about ideal conditions for the cultivation of coffee. John
Ellis, a contemporary and author of *An Historical Account of Coffee* recommends that “light soil, dry and elevated slopes” produce superior coffee beans in greater quantities and “low, fertile and moist” soil is “bad,” producing an “insipid berry” in lesser quantities. In a “dry, gravelly or mixed soil,” much like Soufrière’s, the plant remains short (under five feet) and its berries are smaller, with less pulp and greater aroma. These characteristics were advantageous, as the berries were easier to harvest and process into coffee beans. As an island with lands deemed suitable for both coffee and sugar, Dominican lands were purchased on the markets with the hope they would realize profits for their owners. Because these early French settlers were so successful, Young felt that coffee was a way for would-be smallholders to improve themselves and the land.

Young also argued that absentee British planters and newly arrived British planters could take advantage of “valleys, luxuriant in their soil, and well-watered with fine rivers” for sugar plantations. Additionally, cutting down trees on these low-lying and well-drained soils to make way for fields provided timber, “useful in erecting and repairing houses, mills, and sugar works.” These assertions were in keeping with treatises on planting at the time. J. B. Moreton, in his 1793 manual *West India Customs and Manners*, describes “brick mould soil” as “good,” needing no manure, which would require “there must be cattle pens contiguous to every piece intended for holing, and a number of cattle negroes, cattle, and wanes, employed for several weeks, carrying canetops, grass and vines to them.” These iron and aluminum-rich soils are common in the low-lying valleys in Dominica. According to Moreton, each acre in such geography could contain up to 3,555 holes. While possible, he argued that plantations on mountainous land were less productive. “Mountainous plantations require more cultivation, manure, and labour than others.”

Beyond the physical infrastructure of factories, roads, and aqueducts, the cost of establishing a sugar plantation was in the preparation of the soil, to take advantage of its latency. Improving the land involved cutting down trees, digging cane holes, and fertilizing the fields. Fertilizing the soil was the only way for new owners to take advantage of the land and its untapped resources. To enrich depleted soil, planters and slaves relied on a variety of strategies. Manure was a principal method of recharging the soil. Bryan Edwards describes five sources of manure: “vegetable ashes drawn from the boiling house,” “Feculencies discharged from the still house, mixed with rubbish of buildings,” “the decayed leaves and stems of cane,” “dung obtained from horse and mule stables, and from moveable pens,” and “good mould (soil) collected in gullies and thrown into cattle pens.” It took six laborers the better part of a day to accomplish this. It
took an additional ten laborers to manure that acre and four more to cover the acre with field trash to protect the soil.\textsuperscript{94} Agricultural soils are, after all, created by people, but they also influence the people who use them.\textsuperscript{95} Soil is alive and unconsolidated matter. Composed of water, air, inorganic and organic elements, it forms at the earth’s surface through atmospheric, biological, chemical, geological, and hydrological processes. Because of this, the material is continuously and simultaneously added, removed, and transformed in place. The soil is alive in the sense that it is filled with millions of microorganisms living out their lives—lives that include forming and altering their soil world.\textsuperscript{96} Soil is often distinguished from sediment, or displaced soil. Still a collection of organic and inorganic geological material, sediment is characterized by the fact that it has been moved and deposited by wind, water, geological, or human upheaval.\textsuperscript{97} Although accumulated over thousands of years and still in the process of formation today, Dominica’s deepest deposits appear to be ones containing materials dating to the late eighteenth and early nineteenth centuries. This deep sediment signals the increased rates at which land was modified either by direct human action, as in the building of terraces, or by landslides created through destabilized soils. As such, soil can constitute an ecological and geological force in its own right.

Improving the land involved clearing the forests. Atwood insisted that “to render Dominica a good sugar country . . . extensive forests had to be cleared.”\textsuperscript{98} Atwood, who admired the “uncommon” size of the trees of Dominica, argued the forests they composed were responsible for excessive fog and rainfall on the island, which rotted canes and created pools of standing water on the “stiff clay” which in turn “chill[ed] the soil.” Mangroves, a predominant tree taxon in the Portsmouth enclave, were seen as detrimental to sugar colonies. Thomas Jefferys’s \textit{The Natural and Civil History of the French Dominions} (1761) provides some insight about how land might be improved. In this account, Jefferys describes Guadeloupe, which “abounds in great quantities of mangroves and palmettoes, by which the free course of the air being interrupted . . . generates tedious and often fatal disorders.” He argues that if the mangroves and palmettoes were cut, “the air would be much more wholesome, and the inconveniences arising to the people from the number of trees would be removed by a constant supply of fresh air.”\textsuperscript{99}

At the same time, Jefferys recognized drawbacks to deforestation. Later in the treatise, he describes the commune Vieux-Habitants, which at the time of his visit was characterized by sandy soil. This parish that once “appeared as beautiful as any other part of Basse-Terre,” was subject to frequent floods and landslides
precipitated by “cutting trees that consolidated banks” of the rivière du Plessis.\textsuperscript{101} Soil that was “taxed” or “worn out” could also be employed to grow cotton, manioc, maize, and potatoes [most likely yams].\textsuperscript{102} Added to that, many observers, Young included, began to draw connections between deforestation and water availability. They speculated that two severe droughts earlier in the eighteenth century were made especially harsh by the lack of foliage on Antigua and Barbados. So, while clearing the land was important, it had to be done with great care.

The work was hard and those who were tasked with clearing the forests were familiar with neither the terrain nor the labor required of them. Atwood noted, “Many of them [English] brought negros who had only been in the capacities of domestics; some of those banished from other islands for their crimes; and others purchased negros just brought from Africa for the purpose of settling new estates.”\textsuperscript{103} In addition, those who labored in this capacity “were not used to the climate, which, from the abundance of woods, was so unsettled, that it rained the greatest part of the year; whilst they only had temporary huts covered with branches and leaves of trees to shelter them.”\textsuperscript{104} The difficult labor combined with the system of subsistence that emerged in situ meant that the environment quickly became enmeshed in the predicament of slavery. In clearing the land, water insecurity was materialized for those relying on land and its resources to make a living. By 1787, residents Alex Stewart and Thomas Beech complained about, “the heavy expences and labor attendant on clearing and settling,” and how the “infertility of the soil” led to an impoverished populace.\textsuperscript{105}

The loose soils of Soufriere and the sticky clays of Portsmouth are not preternaturally infertile, as suggested by Beech and Stewart. Rather, there was a consequence to planting sugar in them. At Morne Patate, clearing trees planted or curated as wind breaks, increased soil loss on the surface, resulting in a denuded landscape. What was also lost in clearing the trees were the roots that anchored the topsoil to the ashy subsoil. This is an effect we can document in the archaeological record. As is standard practice in archaeological survey, test excavations are conducted at regular intervals. These indicate what is underneath the surface, including sediment depth. One of the surprising findings of testing in the uplands of Soufriere was the depth of intact deposits dating to the late eighteenth century. In the case of Morne Patate, many of the houses were built one on top of the other in layers between 40 centimeters and 150 centimeters. Under these strata of soil, the layer of pyroclastic flow that dates to the fifteenth century (see chapter 2) was only ten centimeters below that.\textsuperscript{106} Along the same lines, but manifested differently, were the depth of soils at Sugarloaf estate. In the slave village, sediment depth was zero to fifteen centimeters deep.
Together, the observations above indicate highly unstable soils that began to erode in the years just after the 1760s. As noted elsewhere, productivity did not always follow from intensification of labor. In one case, this meant the loss of soil, and in the other, the burying of soils. This distinction is crucial because workers still needed to be fed despite poor returns on a plantation owner’s investment. The soil horizons also speak to changes in the way people used the land. When land was organized through the small-scale French plantations, mixed agriculture, including root crops and cereals, was organized in fields near the houses where workers and plantation owners lived. After the plans of English-speaking elites materialized in the landscape, much of the land on which food for everyday life was grown moved some distance away, in woodlands on the margins of the estate.

Artifact Scatters

Most of the material structures associated with the sugar revolution can be understood only in relation to who used them. At some locations, there are multiple lines of evidence about daily life that provide important points of analysis and comparison. On most British West Indian islands, planters provided building materials and a location for enslaved workers to build a village. The workers were left to decide how to organize it. Towns, or settlements with parish churches, anchorages, and some commercial structures, were the sites of greatest intensity of archaeological materials (though also the most disturbed from centuries of occupation). Villages, or areas where regimented housing of enslaved workers was once located, were the sites with the greatest density of artifacts, outside of towns in Portsmouth and Soufriere (more than ten artifacts per meter squared). Because of the steep slopes, the shape and organization of these villages can be inferred. Provision grounds—areas where those who lived in the regimented villages set up temporary shacks while they grew food in their “free time”—were sites of less dense scatters (fewer than ten artifacts per meter squared). Many of these artifacts are broken up into pieces rarely larger than a thumbnail, but still retain characteristics that reveal their origin and time of use. Importantly, these artifact scatters contain high quantities of goods associated with the sugar revolution.

Chronologically sensitive materials deposited at the time of building construction provide a mechanism to study the tempo and accretion of buildings and identify rapid phases of construction. Ceramics made in Europe are perhaps the most useful in this regard. Recovered tableware was made, with few exceptions, in England or France. The sugar revolution in Dominica loosely coincided
with dramatic changes in the manufacture and style of the tableware available in these places. Cream-colored earthenware made in Staffordshire became a ubiquitous form of material culture found throughout the Atlantic world.\textsuperscript{110} Ceramics from the second and third quarter of the eighteenth century in the French Atlantic came in many varieties, including some that had a lead glaze on one side and a tin enamel on the other.\textsuperscript{111} The popularity of these wares and the speed at which they entered household assemblages in the eighteenth century meant that deposits could be dated with a degree of accuracy by establishing the average age of recovered ceramics.\textsuperscript{112} Variation in such approximations between contemporary sites, according to some, would reflect consumer access based on cost.\textsuperscript{113} While this may be the case in some contexts, it does not account for all the manners by which ceramics come to furnish households, or the choices that people make when they purchase goods.\textsuperscript{114}

To accommodate the terrain, workers carved terraces into the hillside. In some cases, where stone platforms were used to elevate houses, the relationship between different parts of the yard could be ascertained from the surface. In other cases, detailed excavation to reveal postholes or other evidence of architecture was required to suggest such maps. Not all platforms contained evidence of architecture. Some were most likely gardens attached to a house on a neighboring platform. In all cases, there was evidence that past residents had to adjust over time. House were rotated, moved, and sometimes abandoned outright. Some conditions that made such adjustments necessary were environmental. Heavy winds and rainfall could bring down trees and instigate landslides. They could also be political. Upon emancipation, many people left their sites of bondage by seeking employment elsewhere and moving to the “Three Chains” set aside for roadways and forts.\textsuperscript{115}

Of the landscape features we documented, the one that figures prominently, according to both historical scholarship and the stories that people tell today, is provision grounds and gardens.\textsuperscript{116} Gardens were attached to the small houses in which the enslaved lived. Grounds were more difficult to locate. Many of the provision grounds where enslaved laborers made a living were situated in heavily wooded areas of the Soufriere and Portsmouth uplands. Efforts to make soil productive are telltale signs of provision grounds. The soil in Soufriere is shallow. Add to that it is loose, gravelly, and filled with large rocks. Topsoil in the hills above Portsmouth can be equally shallow, with a clayey subsoil. In both cases, the enslaved took steps to stabilize and retain the soil. Depending on the crop, there were many ways to improve the land so the soil would yield. In some areas, slaves prepared the soil and removed large rocks with digging sticks. Trees were
burned, and the charcoal mixed into the soil. To retain soil for growing small plots of land, people piled stones in loosely organized terraces. To enrich the soil, people fertilized the field with animal dung, rotting trash, and mould (soil). In fertilizing, household rubbish, including broken artifacts, might be introduced into garden and provision ground soil. In all cases, slaves took advantage of geographic features such as rock outcrops, slopes, and large trees to make gardens. Late-eighteenth-century gardens are often characterized by loosely prepared soil with relatively fewer rocks, some remains of charcoal, and fewer diagnostic pieces of pottery. Slaves, in improving the land on which they grew provisions, transformed that land intentionally to ease cultivation, which rendered it more visible to the archaeologist.

Provision grounds were one location where slaves attempted to resolve predicaments of security. Workers had to address issues of increasingly insecure soils, eroded by deforestation, to provide food for an increasingly dense population. Their resolutions included cutting woodlands to make way for new crops and growing trees as windbreaks so that new divisions of land could be implemented. Enslaved laborers didn’t just chop down trees and begin to grow food. They did so with a design that often secured loose and destabilized soils. That design included decisions about what crops to grow where and the landscape modifications that might best produce a yield. Decisions about land modification and plant arrangement also created a secure space, where the planter’s gaze was obscured. Consequently, these sites were places of refuge, where enslaved laborers from different estates could meet, re-create elements of everyday life, and pursue them outside the planter’s scrutiny.

Enslaved laborers were forced to solve problems of soil erosion, soil exhaustion, and water insecurity created by intense agricultural production—not only to facilitate the cultivation of cash crops, but also to feed themselves through part-time food cultivation. Because the sugar revolution had implications for land and its resources, it is important to understand how water was made available for the sugar revolution and the changing requirements for water that this transformation entailed. Water was one of many substances fundamental to sugar production, and water was also central to reproduction. It is an “uncooperative commodity” in its potential as a medium for health risks, and in that its materiality inhibits direct competition and facilitates political resistance. In the last quarter of the eighteenth century, an expanding agro-industrial economy and a growing, mostly enslaved population created pressure on the amount of fresh water available for residents of Dominica. In what follows, I show how enslaved laborers resolved this predicament.
The Hydrosocial Plantation

There is general consensus that Caribbean planters located laborer villages, industrial works, and estate houses to take advantage of topography, prevailing winds, and proximity to fresh water. They depended on rivers, wells, canals, or ponds to supply water for people, animals, and factories built to crush, boil, and refine sugar. This is certainly true in Dominica. In Portsmouth, the sugar estates took advantage of the river systems to power water mills, fill reservoirs, and feed livestock. Workers relied on rivers for drinking, cooking, bathing, and washing. In Soufrière, where there was only one river, fed by a sulfur spring, estate houses were located close to, but upslope from, low lying areas. Three of the estates had freshwater springs within their property boundaries, but in difficult-to-reach places. In this enclave, cisterns of varying ages dotted the landscape.

In general, the switch to sugar cane taxed existing water management infrastructure, including capture, irrigation, and storage. Sugar cane requires more water to grow than coffee, cocoa, and root crops, which formed the agricultural base of colonial settlements before 1763. The World Wildlife Fund identified sugar cane, along with cotton, rice, and wheat, as among the world’s thirstiest monocultures. Signaling the switch to a thirstier crop, archaeological materials document a change in land use in upland and lowland areas accompanying the shift to sugar production.

Sugar cane needed more water to process the grass into syrup, molasses, sugar, and rum. The amount depended on the method of juice extraction, crystallization, and distillation employed. For example, in just the boiling process, approximately 180 liters of water were required daily to clean and season the boiling cauldron used to concentrate cane juice. Distillation of molasses into rum required an additional volume of water to cool the evaporate into rum. Sugar cane production also entailed more nonhuman labor. According to an inventory taken in 1769, Bois Cotlette had thirteen cattle, two horses, and ten sheep. Horses and oxen alone required 913 liters of water per day. Sugar production also involved more human labor. Sugarcane demanded more time and energy to cultivate than coffee, cocoa, or cotton. Consequently, by 1810 the slave population in Dominica had risen from 3,500 to 19,000. In Soufrière, sugar-producing estates were home to 737 of 1,010 slaves. Rising numbers of enslaved peoples also meant increasing need for water in Dominica. The water needs of the enslaved were in direct competition with the water needs of sugar, and this created scarcity for those deemed most expendable by planters.
This last point requires further elaboration. There is no consensus on minimum water needs for an individual or household. Most calculations underestimate total body water and free water and do not account for daily intake from respiration and food. Additionally, eighteenth-century water requirements varied greatly depending on conceptions of cleanliness and hygiene. Conservatively, if we take two liters per day per person, we can estimate that the island’s new laboring population needed 29,000 liters per day. While patterns of rainfall meant this was not a problem for most of the island, on the dry southwest coast (where Soufriere is located), water was scarce. While some of this water was obtained from imported and domestic liquors like gin and rum, and beverages made from available resources including coconuts, fruit, and bark, many relied on sourcing water from rivers, springs, or ponds.

Access to surface water and groundwater—and seasonal precipitation cycles necessary to provide drinking water and sustain export agriculture and part-time food production—varied considerably within and between eighteenth-century Caribbean colonies. Many islands (e.g., Antigua, St. John, Saba) had limited reliable freshwater sources to begin with. People living on them relied on seasonal watercourses, human-made water holes, and cisterns. Slaves were more susceptible to major shifts in seasonal or long-term rainfall patterns, as their sanitation, food, and drink relied on annual precipitation cycles. On other islands (e.g., Jamaica, Hispaniola, Dominica) relative scarcity and availability of fresh water varied depending on where people lived. Despite being a “wet island” (some parts receive 9,000 mm of rain per year), parts of Dominica contain little surface water and receive little rain (1,800 mm per year). The dry season (ca. January/February to May/June) creates a “green desert” where temperatures rise. Yet slaves still needed water for drinking, washing, and food preparation, to make daub or mortar for houses, and for other domestic activities. This put increased pressure on precious drinking water.

Seasonal cycles of rainfall and agricultural activity were critical factors shaping the amount of available groundwater in the aquifer. Attached to factories and estate houses were architectural features devoted to water retrieval, channeling, or containment. Cisterns appeared as isolated structures near factories or houses. The rain that fell onto the roofs of factories and houses was diverted to the cisterns through a complex system of gutters. Cisterns came in three varieties. On most estates (Picard, Sugarloaf, Point Round, Chance, Morne Patate, Morne Rouge, Bois Cotlette, Soufriere, Petit Coulibri), masons appear to have built cisterns above ground as rectangular structures. Factories devoted to processing sugar (Sugarloaf, Chance, Petit Coulibri, Bois Cotlette, Soufriere)
had cisterns attached to the boiling house. These are “snake” cisterns, through which evaporated alcohol was cooled down to create a distilled liquor. In the Portsmouth enclave, the water tables near slave villages were relatively shallow. Here, we saw cisterns only associated with sugar processing and consumption by residents of the estate house. Indeed, water insecurity engendered creative ways to gather and store water, but access to this water was affected by race, class, and gender in a system that prioritized the needs of capital and planters.

Soufriere contains shallow perched water tables and a much deeper aquifer. It appears that early French settlers in Soufriere took advantage of these perched water tables in response to limited access to potable surface water. The surface survey revealed evidence of wells at Bois Cotlette, Morne Patate, Morne Rouge, and Crabier. In some cases, wells were filled in, as in the case of Petite Coulibri and Bois Cotlette. At Crabier and Morne Patate, these wells were lined with plaster and turned into cisterns. The relationship between sugar cane, precipitation, and water tables is useful in understanding why these wells might have been sealed. Noël Deerr estimated that for every acre of land, approximately eleven million liters of water were required to ensure a successful crop. Portsmouth and Soufriere received almost ten times that amount. For example, in 1894, estates in Soufriere received 2,000 mm of rain, while estates in Portsmouth’s enclave received 2,200 mm of rain. The rainy season accounted for almost 80 percent of 1894’s rainfall. This precipitation was significant for recharging the water table. Soils of Portsmouth drained poorly. In the rocky protosols of Soufriere, water drained quickly. This, in addition to the requirements of sugar production, meant that the perched water tables failed to get recharged.

Sugarcane cultivation was profoundly structured by water and climate. The beginning of the rainy season marked the onset of intensive agricultural activities. This included digging up cane stumps, digging cane holes, weeding cane holes, planting cane, manuring, and covering the cane fields. For instance, Colthurst says one person could dig 160 cane holes in light hillside land and 85 holes in flat-bottom land of stiff clay daily. Some of these efforts were taxing and made more dangerous by the rain. On the slopes of Soufriere, rainfall meant that landslides were always a possibility. Stone terraces prevented soil loss and captured water for the plants. In Portsmouth, rain could fill the cane holes with stagnant water, rotting the young sugar canes. In Portsmouth, technicians designed and enslaved laborers built a complicated system of canals, dikes, and trenches to control water levels on Sugarloaf Estate. Enslaved laborers had to maintain canals and regulate ditches and dikes to allow for irrigation in the dry season and drainage in the wet season. The rainy season also signaled the start of hurricane season,
in which the slaves’ crops were vulnerable. High winds would blow over trees, including plantains and breadfruit. If slaves were unable to reach the grounds in time, root crops such as tania and dasheen would rot. In times like these, the needs of the estate were prioritized, intensifying the insecurity of the enslaved.

The onset of the dry season also affected water availability. Activities commenced in the dry season—including the harvesting of cane, the crushing of the stalks, and the rendering of the cane juice into export products—required considerable water for humans, animals, and machinery. According to Colthurst, it took a team of twenty-four people to cut and load two acres of cane in one day, “where it [cane] is rank and green. It would take a further four to bring the canes, ‘not more than a half mile’ to the mill. One person was required to bring fuel for the boiling house. A further 33 people worked in the factory on jobs that included boilers, stokers, and boatswains.”

While the amount of precipitation in the dry season varied from year to year, enclaves such as Soufrière could receive as little as two millimeters of rain between January and June. Planters concerned about the lack of groundwater commissioned above-and below-ground cisterns. Cisterns were constructed adjacent to the estate house and industrial buildings and collected the rain through gutters and channels. Not everyone had access to this water. For instance, in nearby Barbados, water collected in cisterns was intended for a plantation’s white population, reinforcing distinctions between enslaved and free people. Planters also used enslaved labor to manipulate landscape features to capture and store rainfall. These included dry stone terraces to retain soil and trap water for sugar cane and ponds that were either excavated or enlarged.

Some of these ponds were also lined with clay and during the dry season provided at least some, if not most, water for enslaved people, cattle, and machinery. As such, storage and transport of the pond water became essential to ensure social reproduction of enslaved peoples.

While many objects were part of peoples’ waterways, hoops from barrels, ceramic vessels, and glass bottles are the only items that leave residues easily recovered in the archaeological record. Of these, bottle glass is the most ubiquitous. Bottle glass is statistically the most consistently discarded material culture item in contexts associated with enslaved life. Villagers used glass bottles for many reasons, including holding liquor and infusing the liquid with local herbs for medicinal purposes. They also curated readily available and fragile wine and case bottles to store water. Gabriel Debien noted that the enslaved, who could not afford water jars in Saint-Domingue, used glass bottles to store and serve water.

In Dominica, the archaeological record of laborer villages occupied between 1763 and 1830 allows us to look at the collection, distribution, and use of water in
Soufriere and Portsmouth. By the last quarter of the eighteenth century, estates in both enclaves were producing molasses, sugar, and rum for export. There were critical differences in access to groundwater and surface water, and the need to manage rainfall, for Bois Cotlette in Soufriere and Sugarloaf in Portsmouth. Bois Cotlette’s village was located between one and a half and two and a half kilometers from the freshwater springs. Paths taken required a vertical ascent or descent of three hundred to five hundred meters. Anywhere between 25 and 96 enslaved laborers lived in the estate in the years after the sugar revolution. Sugarloaf’s village was close to many freshwater sources—between twenty and two hundred meters. The village was home to between 137 and 262 enslaved laborers. At both estates, slaves were acutely aware of their need for water and the effects of its insecurity (figures 3.3 and 3.4).

Excavations of similar villages produce a suite of materials in common, including imported tableware from Europe, a mixture of iron and clay cooking pots, tools such as cutlasses and hoes, storage jars for dry goods and liquids, and bottle glass. In short, they partially reflect the many elements of everyday life in the Atlantic world, including peoples’ waterways. Because estates in Portsmouth and Soufriere employed the same sampling strategy and methods to archaeologically test the laborer villages, there are comparable sets of evidence to analyze how slaves responded to increased insecurity of water. Given bottle glass’s ubiquity and the much denser population at Sugarloaf Estate, it was reasonable to assume we would find nearly twice the amount of bottle glass. Materials recovered from both villages suggest something different, however. At Bois Cotlette, subsurface testing produced over twice the weight of bottle glass. Bottles reflect slave strategies to adapt to Soufriere’s dry environment and the distance from the villages to fresh water. At Sugarloaf, the enslaved did not face the same levels of scarcity. While not a complete picture, bottle glass shows how slaves accommodated for vagaries in rainfall and limitations in surface water and groundwater.

Vital to agricultural production, water was also essential for washing, cooking, and drinking. Durable glass bottles were associated with water storage, among other uses, and can help us map the predicaments faced by the enslaved who needed to collect, transport, and store water to live. As a durable form of material culture, bottle glass density can be used to scrutinize differences in water security. In Bois Cotlette, which had more bottle glass than Sugarloaf, people did not have reliable access to fresh water, an insecurity that might have built on and exacerbated existing hierarchies. While the documentary record provides some of this story, material remains enable us to understand some of the complexities on the ground. Assemblages of objects allow us to understand
**Figure 3.3.** This histogram tabulates the number of estates labeled on the 1978 Ordinance Survey Map based on their distance to year-round rivers.

**Figure 3.4.** This line graph illustrates the rise and distance residents had to walk at two estates—Bois Cotlette and Sugarloaf—to reach the closest fresh water source (spring or river). Illustration by author.
social relations on plantations, the need to develop innovative strategies to obtain water, the socializing of needs through objects, and the influence of those objects on daily life.

Conclusion

The landscape created through the plans of English-speaking elites was truly insecure. By linking proprietorship to crops (sugarcane with the British and coffee with the French), linking those crops to soils (sugar cane with lowland soils and coffee with upland soils), and linking the improvement of those soils with enslaved labor, William Young was designing political landscapes. In addition to complaints quoted above, Stewart and Beech describe other predicaments in Dominica, including a slave rebellion, an occupation by France, a fire that destroyed Roseau in 1781, and devastation following two hurricanes. That hurricanes are mentioned in the same breath as arson, rebellion, and war highlights that there is little distinction between natural and political when lives and livelihoods are made insecure.

Because water inscribes itself in the archaeological record in economic, metabolic, and symbolic ways, waterways allow an examination of slavery’s predicaments and the assemblages of politics, economy, body, and culture they generated. In Dominica, the effects of changes to the land, including deforestation, soil erosion, and the amount and quality of surface water and groundwater, unfolded slowly and without spectacle. They may have been glossed as a consequence of intense wet seasons, harsh dry seasons, and unpredictable weather events such as hurricanes. Similarly, the population explosion, while sudden, was difficult to see in its entirety from the perspective of any one place. Ultimately, few people on the island lived long enough to see the unfolding of the sugar revolution and feel its effects. Instead, the slow violence was embodied in the changing quality of water, and the greater distances people had to travel to get it. These changes affected those who were bound to the land through enslavement more severely than those they labored for.